REPORT

DURHAM YORK ENERGY CENTRE

COURTICE, ONTARIO

2018 Q4 AMBIENT AIR QUALITY MONITORING REPORT

RWDI # 1803743

February 13, 2019

SUBMITTED TO:

The Director, Legislative Services-Regional Clerk or Designate,

The Regional Municipality of Durham
605 Rossland Road East, 1st Floor
Corporate Services-Legislative Services Division
Whitby, ON L1N 6A3

CC:
Lyndsay Waller
lyndsay.waller@durham.ca

SUBMITTED BY:

Matthew Lantz, B.Sc., C.Tech., QSTI
Project Manager/Senior Specialist
Matt.Lantz@rwdi.com

RWDI
Consulting Engineers & Scientists
600 Southgate Drive
Guelph, ON N1G 4P6
T: 519.823.1311
F: 519.823.1316

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1 INTRODUCTION

RWDI AIR Inc. (RWDI) was retained by The Regional Municipality of Durham (Region of Durham) to conduct discrete and continuous air quality ambient monitoring at the Durham York Energy Centre (DYEC) monitoring stations. The facility address is 1835 Energy Drive, Clarington, Ontario. The DYEC is a facility that manages diverted municipal solid waste from the Regions of Durham and York to create energy from waste combustion. Commercial operation of the DYEC commenced on February 1, 2016. The site location is shown below in **Figure 1**.

Condition 11 of the Environmental Assessment Notice of Approval and Condition 7(4) of the Environmental Compliance Approval (ECA) requires ambient air monitoring to be undertaken by the DYEC. An Ambient Air Monitoring and Reporting Plan was prepared and approved by the Ministry of Environment, Conservation and Parks (MECP) to satisfy these conditions. Three (3) monitoring stations were established to monitor ambient air quality around the DYEC, and quantify the background ambient air quality levels and DYEC contributed emissions to ambient air quality levels.

This monitoring plan was developed based on the Regional Council mandate to provide ambient monitoring in the area of the DYEC. The purposes of the ambient monitoring program are to:

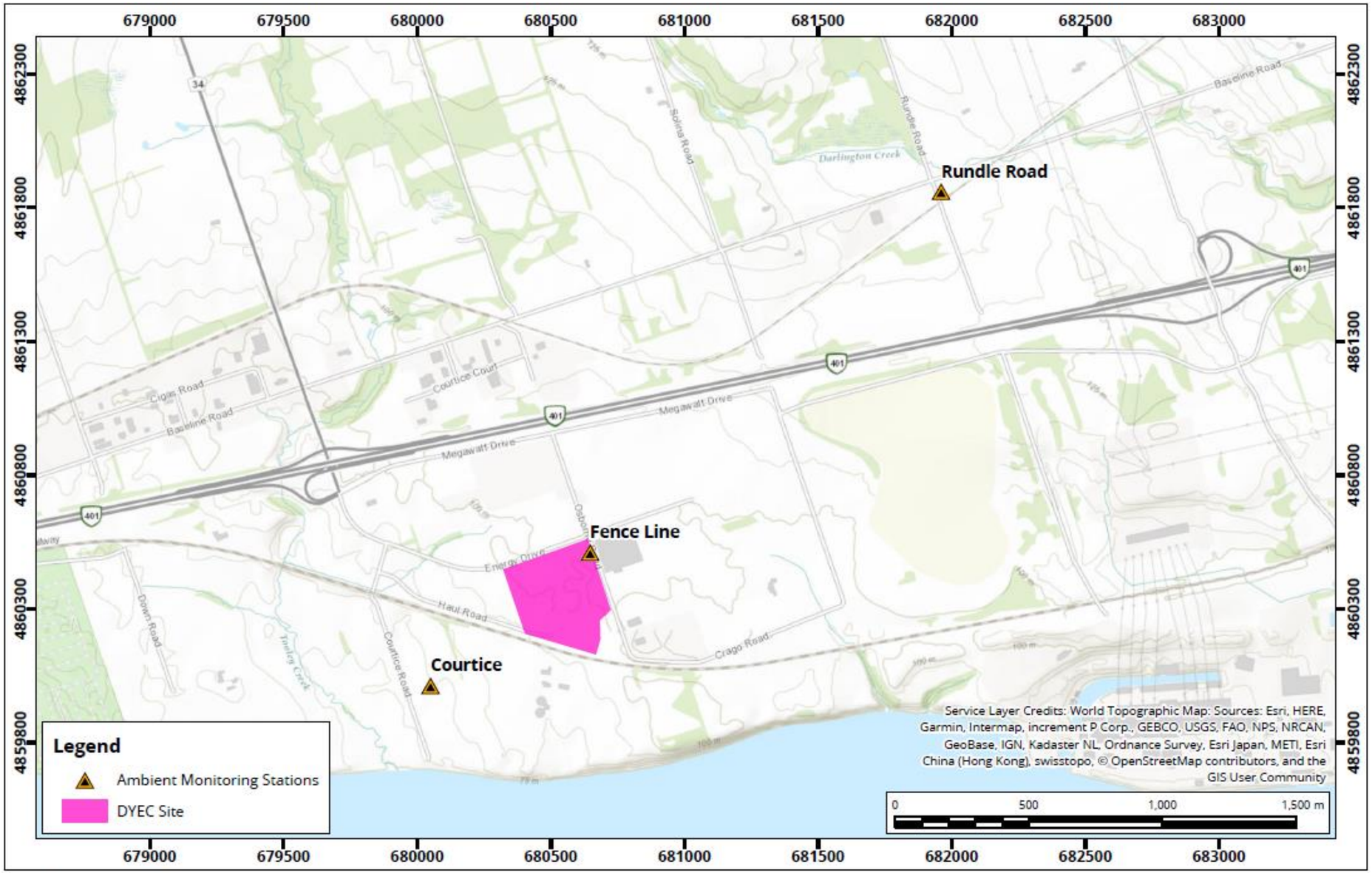
1. Quantify any measurable ground level concentrations resulting from emissions from the DYEC cumulative to local air quality, including validating the predicted concentrations from the dispersion modelling conducted in the Environmental Assessment (2009a);
2. Monitor concentration levels of EFW-related air contaminants in nearby residential areas; and,
3. Quantify background ambient levels of air contaminants in the area.

The facility has two (2) monitoring stations which collect continuous and discrete ambient measurements, known as the Courtice Station and Rundle Road Station, and one (1) ambient monitoring station which collects discrete measurements only, known as the Fence Line Station. The station locations are shown in **Figure 1**. The Courtice and Rundle Road Stations were operational in May of 2013 and have been operated on behalf of the Region of Durham by Stantec Consulting Ltd. since that time up until July 31, 2018. The Fence Line Station has been in operation since the commencement of commercial operations on February 1, 2016 and has been operated on behalf of the Region of Durham by Stantec Consulting Ltd. since that time up until July 31, 2018. RWDI has overseen the operation of the stations on behalf of the Region of Durham since August 1, 2018. The Fence Line Station was decommissioned in December 2018 and the last sample was collected on December 4, 2018.

The Courtice and Rundle Road Stations continuously monitor the following air quality parameters: Particulate Matter less than 2.5 microns ($PM_{2.5}$), Nitrogen Oxides (NO_x) and Sulfur Dioxide (SO_2). In addition, both discretely monitor the following air quality parameters: Total Suspended Particulate (TSP), Metals, Dioxins and Furans (D&F) and Polycyclic Aromatic Hydrocarbons (PAHs). The Fence Line Station discretely monitors Total Suspended Particulate (TSP) and metals.

Continuous meteorological data is collected at the Courtice and Rundle Road Stations. The Rundle Road Station collects the following meteorological parameters: wind speed, wind direction, ambient temperature, precipitation and relative humidity. The meteorological tower there, is approximately 10 meters tall. The Courtice Station collects the following meteorological parameters: ambient temperature, ambient pressure, precipitation and relative humidity. For purposes of this report, wind speed and wind direction data for the Courtice Station have been obtained from the adjacent Courtice Water Pollution Control Plant (WPCP) meteorological tower, which is approximately 20 meters tall.

With the exception of wind direction and wind speed at the Rundle Station, data recovery for all parameters measured was greater than 75% during the fourth quarter. This meets the quarterly validity criteria. Due to a malfunctioning wind head at the Rundle Station, data recovery for these parameters was less than 75% during the fourth quarter. Benzo(a)pyrene was found in excess of the Ambient Air Quality Criteria on December 4, 2018 at both the Courtice and Rundle station and on December 16, 2018 at Rundle station. No other measurement for any parameter was in excess of the Ambient Air Quality Criteria during the fourth quarter. Based on wind direction on December 4th and 16th 2018, the Benzo(a)pyrene exceedance was not caused by the DYEC.



DYEC Site and Ambient Monitoring Station Locations

True North

Map Projection: NAD 1983 UTM Zone 17N
DYEC - Region of Durham, Ontario

Project #: 1803743

Drawn by: DJH	Figure: 1
Approx. Scale:	1:20,000
Date Revised:	Oct 25, 2018

1.1 Sampling Locations

The Station sites were selected in consultation with MECP and Region of Durham representatives at the onset of the program and were chosen based on considerations of nearby receptors and agreeability with MECP siting criteria. The Courtice Station is predominantly upwind of the DYEC and is located on the Courtice WPCP property just southwest of the DYEC. The Rundle Road Station is predominantly downwind of the DYEC and is located just southeast of the intersection of Baseline Road and Rundle Road just northeast of the DYEC. The Fence Line Station is located on the northeast corner of the DYEC property and measures fugitive TSP and metals emissions from the facility. Pictures of all three (3) Stations are presented as **Figure 2, 3** and **4**.

Figure 2. Rundle Road Station

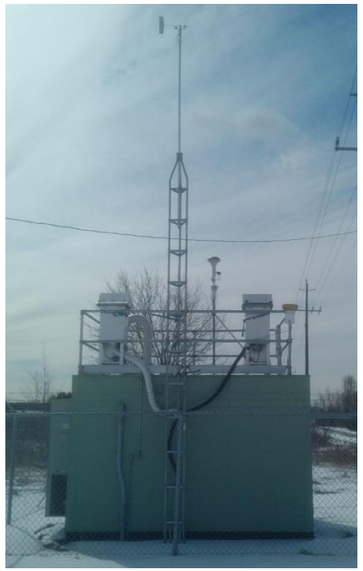


Figure 3. Courtice Station

Figure 4. Fence Line Station

2 SAMPLING METHODOLOGY

The Rundle Road and Courtice Stations are both equipped with the following continuous monitors: Thermo Scientific Model 5030 SHARP (Synchronized Hybrid Ambient Real-time Particulate) monitor ($PM_{2.5}$ analyzer), Teledyne Nitrogen Oxides Analyzer Model T200 (NO_x analyzer), and a Teledyne Sulfur Dioxide Analyzer Model T100 (SO_2 analyzer). Both Stations also have the following periodic monitors: High Volume (Hi-Vol) Air Sampler outfitted with a TSP inlet head as approved by the United States Environmental Protection Agency (U.S. EPA), and a Hi-Vol Air Sampler outfitted with a polyurethane foam plug and circular quartz filter for measuring PAH's and D&F's as approved by U.S. EPA. The Fence Line Station has a High Volume (Hi-Vol) Air Sampler outfitted with a TSP inlet head as approved by the U.S. EPA.

2.1 Nitrogen Oxide Analyzers

The Teledyne T200 Nitrogen Oxide (NO_X) analyzers use chemiluminescence detection, coupled with microprocessor technology to provide sensitivity and stability for ambient air quality applications. The instrument determines real-time concentration of nitric oxide (NO), total nitrogen oxides (NO_X) (the sum of NO and NO_2), and nitrogen dioxide (NO_2). The amount of NO is measured by detecting the chemiluminescence reaction that occurs in the reaction cell when NO molecules are exposed to ozone (O_3). The NO and O_3 molecules collide in the reaction cell and enter a higher energy state. When these excited molecules return to a stable energy state, they emit a photon of light which is proportional to the amount of NO in the sample stream of gas entering the analyzer. To determine the total NO_x ($NO+NO_2$) measurement, sample gas is periodically bypassed through a heated molybdenum converter cartridge that converts any NO_2 molecules in the sample stream into NO (any existing NO molecules in the stream remain as is). The instrument will switch the sample stream through the converter periodically and then through the reaction cell where the same chemiluminescence reaction occurs with ozone. The resultant response produced is now the sum of NO and converted NO_2 producing a NO_x measurement. The resultant NO_2 determination is the NO_x measurement subtracted from the NO measurement.

The NO_X analyzers were zero and span checked daily using the internal zero and span (IZS) system and calibrated once a month using either EPA protocol span gases and a dilution system or an ESA permeation tube calibrator. Automatic IZS checks were performed on a daily basis commencing at approximately 23:45 on one day and ending at 00:10 the next day. On November 5, 2018 the IZS checks were changed and programmed to occur at 1:45 to 02:10 on the same day. The checks consisted of a 10-minute zero check, a 10-minute span check and a 5-minute purge. These checks provide a way to monitor daily performance of the analyzer using an external charcoal and purafil zeroing cartridge for the zero, and an internal permeation oven with a permeation tube for the span. These IZS checks are not for calibration purposes but are merely a diagnostic tool to identify instrument drift. Data was collected at 1-minute intervals by an external datalogger using analog output connections, and was averaged using Envista processing software over a 1-hour and 24-hour period to compare to the applicable ambient air quality criteria. The instrument also collects data using its own data acquisition system (DAS) on a 5-minute resolution.

2.2 Sulphur Dioxide Analyzers

The Teledyne T100 Sulphur Dioxide (SO_2) Analyzer is a microprocessor controlled analyzer that determines the concentration of SO_2 in a sample gas drawn through the instrument. In the sample chamber, sample gas is excited by ultraviolet light causing the SO_2 to absorb energy from the light and move to an active state (SO_2*). These active SO_2* molecules must decay into a stable state back to SO_2, and when this happens a photon of light is released which is recognized by the instrument as fluorescence. The instrument measures the amount of florescence to determine the amount of SO_2 present in the sample gas.

The SO_2 analyzers were zero and span checked daily using the IZS system and calibrated once a month using either EPA protocol span gases and a dilution system or an ESA permeation tube calibrator. Automatic IZS checks were performed on a daily basis commencing at approximately 23:45 on one day and ending at 00:10 the next day. On November 15, 2018 the IZS checks were changed and programmed to occur at 01:45 to 02:10 on the same day. The checks consisted of a 10-minute zero check, a 10-minute span check and a 5-minute purge. These checks provide a way to monitor daily performance of the analyzer using an external charcoal and purafil zeroing cartridge for the zero, and an internal permeation oven with a permeation tube for the span. These IZS checks are not for calibration purposes but are merely a diagnostic tool to identify instrument drift. Data was collected at 1-minute intervals by an external datalogger using analog output connections, and was averaged using Envista processing software over a 1-hour and 24-hour period to compare to the applicable ambient air quality criteria. The instrument also collects data using its own data acquisition system (DAS) on a 1-hour resolution.

2.3 SHARP 5030 $PM_{2.5}$ Analyzers

The SHARP 5030 is a hybrid nephelometric/radiometric particulate mass monitor capable of providing precise, real-time measurements with a superior detection limit. The SHARP incorporates a high sensitivity light scattering photometer whose output signal is continuously referenced to the time-averaged measurement of an integral beta attenuating mass sensor. The SHARP also incorporates a dynamic inlet heating system designed to maintain the relative humidity of the air passing through the filter tape constant.

The SHARP is calibrated once a month to ensure accuracy and validity of its data. The $PM_{2.5}$ inlet head and sharp cut cyclone is cleaned monthly as well to ensure proper performance. The monthly calibration process consists of the following: zeroing the nephelometer if necessary, calibration of ambient temperature, calibration of barometric pressure, and calibration of the flow.

2.4 TSP High Volume Air Samplers

The Tisch TE-5170 TSP (Total Suspended Particulate) high volumetric air samplers (Hi-Vols) were outfitted with a TSP inlet capable of collecting particulate of all aerodynamic diameters. Each Hi-Vol is equipped with a mass flow controller, which ensures a flow rate of 40 cubic feet per minute (CFM), a chart recorder for measuring cfm flow throughout the run time, an elapsed timer and a wheel timer for starting and stopping each sample. The Hi-Vols have Teflon coated glass fibre filters that are outfitted at the top of the sampler, and air is drawn through the filter, thereby collecting all TSP. All of the TSP Hi-Vols operate on a six-day cycle, each consisting of 24-hour (midnight to midnight) samples, concurrent with the National Air Pollution Surveillance (NAPS) schedule. Each Hi-Vol is calibrated monthly to ensure accuracy and validity of the volume of air drawn through the filter.

The Teflon coated glass fibre filter media was pre and post weighed by ALS Laboratories in Burlington, Ontario in 2018 and 2019. The filters are then analyzed for total particulate weight, metals analysis and mercury.

2.5 Polyurethane Foam Samplers

The Dioxins, Furans, and PAH samples were collected using Tisch TE-1000 samplers which are listed as reference devices for U.S. EPA Methods TO-9 and TO-13. The samplers use a collection filter that is 'backed-up' by a polyurethane foam (PUF) plug. The airborne compounds present in the particulate phase are collected on the Teflon coated glass fibre filter and any compounds present in the vapour phase are absorbed in the PUF plug. At the start of August, the PUF media was changed to include two PUF plugs enclosing XAD material. This was a recommendation from ALS Laboratories to achieve lower detection limits due to the stability of the compounds being absorbed into the XAD material. Each PUF sampler is equipped with a mass flow controller, which can sustain 8 cubic feet per minute (CFM) of flow over the sampling period, an elapsed timer and a wheel timer for starting and stopping each sample. All PUF samplers operate on a twelve-day cycle, each consisting of 24-hour (midnight to midnight) samples, concurrent with the NAPS schedule. Every twelve days, the PUF plugs and filters are analyzed for PAH's, and every twenty-four days they are analyzed for both PAH's and D&F's. Each PUF sampler is calibrated monthly to ensure accuracy and validity of the volume of air drawn through the filters.

The filter and PUF media/glassware is proofed and analyzed by ALS Laboratories in Burlington, Ontario in 2018 and 2019. The filters and PUF/XAD plugs are then analyzed for PAH's and D&F's.

2.6 Meteorological Towers

Meteorological data was collected from the Rundle and Courtice Stations. The MET One Instruments Model 034B wind head at the Rundle station was replaced with a RM Young wind head on December 20, 2018. The replacement was made as the existing wind head was malfunctioning. This was done so that a vector could be associated with the applicable contaminant concentrations. The Rundle and Courtice Stations are outfitted with a Campbell Scientific HMP60 Temperature/Relative Humidity probe, and a Texas Instruments TE525M rain gauge. Meteorological data was collected at 1-minute intervals and was averaged using Envista processing software over a 1-hour period.

3 AIR QUALITY CRITERIA AND STANDARDS

The monitored contaminant concentrations were compared to air quality criteria and standards set by the MECP and by Environment Canada. The MECP developed Ambient Air Quality Criteria (AAQCs) which are the maximum desirable concentrations in the outdoor air, based on effects to the environment and health (MECP, 2012). Not all contaminants have an applicable regulatory limit; therefore, other criteria were used for comparison. These included human health risk assessment (HHRA) criteria. For $PM_{2.5}$, Environment Canada has established a Canadian Ambient Air Quality Standard (CAAQS) (Environment Canada, 2013). CAAQS are health-based air quality objectives for the outdoor air. The current CAAQS' for $PM_{2.5}$ are 28 $\mu g/m^3$ for the 3-year average of annual 98th percentile 24-hour concentration, and 10 $\mu g/m^3$ for the 3-year average of annual average concentrations (in effect as of 2015). Since the 24-hour and annual CAAQS are based on the average of three calendar years of data, it should be noted that these standards do not apply to the quarterly data presented in this report.

All applicable criteria and standards are shown in the 'Summary of Ambient Measurements' section of this report.

4 SUMMARY OF AMBIENT MEASUREMENTS

Ambient air quality monitoring results for all contaminants sampled at the Courtice, Rundle Road and Fence Line Stations are discussed herein. Summary statistics from October 1, 2018 to December 31, 2018 are presented in a summary format below and in a more detailed matrix format in **Appendix A** for continuous measurements and **Appendix B** for discrete measurements.

4.1 Meteorological Station Results

4.1.1 Courtice Station Results

The Courtice Station collected the following meteorological parameters: relative humidity, ambient temperature, ambient pressure and precipitation. For purposes of this report, wind speed and wind direction data for the Courtice Station have been obtained from the adjacent Courtice Water Pollution Control Plant (WPCP) meteorological tower, which is approximately 20 meters tall. The WPCP wind head maintained 99.9% data collection for windspeed and wind direction for Q4. The Courtice station maintained a minimum 99.3% of data collection for all of the parameters measured during Q4 and experienced some data loss discussed in the Data Requests section of this report. Hourly statistics from the meteorological station are presented in Table 1. A wind rose showing trends in wind speed and wind direction during Q4 is provided in **Figure 5**.

Table 1: Hourly Statistics from the Courtice WPCP Meteorological Station

Courtice Station MET Statistics	Maximum 1 hr Mean					Minimum 1 hr Mean					Monthly Mean					Total	% Valid Hours					
Parameter	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain	Rain	WS	WD	Temp	RH	Pres	Rain
Units	(km/hr)	(°C)	(%)	"Hg	mm	(km/hr)	(°C)	(%)	"Hg	mm	(km/hr)	(°C)	(%)	"Hg	mm	mm	(%)					
October	34	23	94	30.2	5.7	0	-1	36	29.3	0.0	11	9	73	29.7	0.1	63.1	100.0	100.0	100.0	100.0	100.0	100.0
November	44	13	94	30.3	4.0	1	-13	39	29.1	0.0	14	2	72	29.7	0.1	78.4	100.0	100.0	99.0	94.6	99.0	99.0
December	38	8	95	30.3	5.4	0	-10	42	28.9	0.0	12	0	75	29.8	0.1	49.1	99.7	99.7	100.0	100.0	100.0	100.0
Q4 Arithmetic Mean											13	3	73	29.7	0.1	190.6	99.9	99.9	99.7	99.3	99.7	99.7

4.1.2 Rundle Road Station Results

The Rundle Road Station collected the following meteorological parameters: wind speed, wind direction, relative humidity, ambient temperature and precipitation. The meteorological tower at the station is at a height of approximately 10 meters tall. The Rundle Road station maintained 97.0% of data collection for relative humidity and ambient temperature measured during Q4. The Rundle Road station maintained 91.8% of data collection for rain measured during Q4. The wind speed maintained 83.9%, and wind direction maintained 58.4% data collection due to a malfunctioning wind head in addition to some missing data discussed in the Data Requests section of this report. Hourly statistics from the meteorological station is presented in Table 2. A wind rose showing trends in wind speed and wind direction during Q4 is provided in **Figure 5**.

Table 2: Hourly Statistics from the Rundle Road Meteorological Station

Rundle Station MET Statistics	Maximum 1 hr Mean				Minimum 1 hr Mean				Monthly Mean				Total	% Valid Hours				
Parameter	WS	Temp	RH	Rain	WS	Temp	RH	Rain	WS	Temp	RH	Rain	Rain	WS	WD	Temp	RH	Rain
Units	(km/hr)	(°C)	(%)	mm	(km/hr)	(°C)	(%)	mm	(km/hr)	(°C)	(%)	mm	mm	(%)				
October	29	24	99	6.5	0	-3	38	0.0	11	8	77	0.1	65.4	100.0	100.0	100.0	100.0	100.0
November	41	13	100	4.7	0	-14	43	0.0	-	1	79	0.1	81.9	45.0	43.5	97.9	97.9	81.9
December	26	9	100	2.6	0	-11	46	0.0	-	-1	80	0.0	14.7	29.7	30.7	93.0	93.0	93.0
Q4 Arithmetic Mean									11	3	79	0.1	162.0	58.4	58.4	97.0	97.0	91.8

"- The monthly mean is not presented as the % valid hours were not met

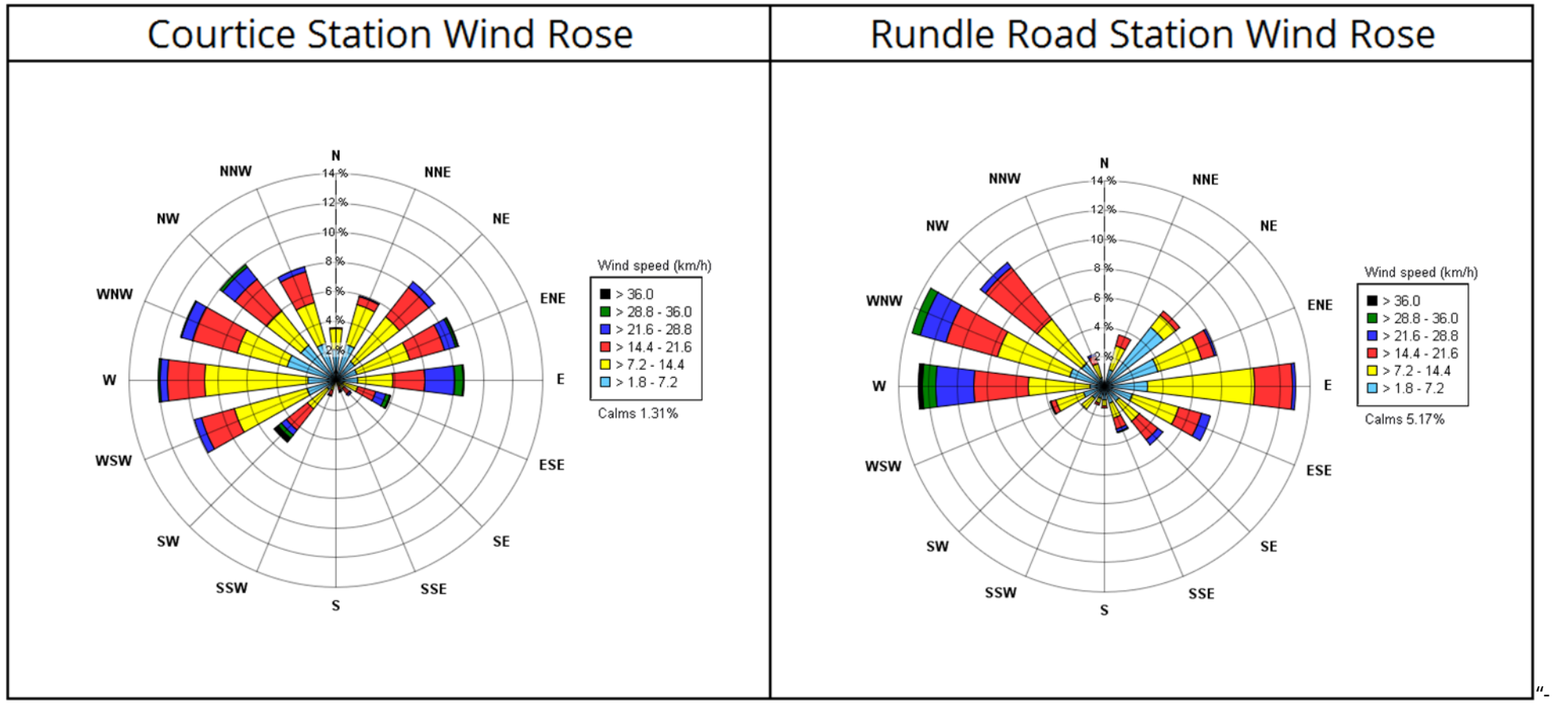


Figure 5. Wind Roses of Hourly Wind Speed and Wind Direction – October to December 2018

4.2 NO_x, SO2 and $PM_{2.5}$ Summary Table Results

Table 3 provides a summary of Maximum 1-hour Means, Maximum 24-hour Means, Monthly Means, Quarterly Means and Percent valid data for Courtice station. Table 4 provides a summary of Maximum 1-hour Means, Maximum 24-hour Means, Monthly Means, Quarterly Means and Percent valid data for Rundle station. Table 5 provides a summary of Exceedance Statistics for both Courtice and Rundle stations. There were no exceedances for any parameters at either station during this quarter.

Table 3: Summary of Percent Valid Data for Courtice Station

Courtice Monitoring Station Data Statistics	Maximum 1 hr Mean					Maximum 24 hr Mean					Monthly Mean					% Valid Hours				
Compound	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2
Units	(µg/m³)	ppb				(µg/m³)	ppb				(µg/m³)	ppb				(%)				
AAQC				200	250	28[A]			100	100										
October	18	87	69	35	25	11	32	15	16	6	4	8	2	5	2	99.9	98.0	98.0	98.0	97.8
November	29	72	36	71	72	18	30	11	19	12	5	9	2	7	4	98.9	96.4	96.4	96.4	96.4
December	40	76	56	33	42	35	35	17	17	9	9	12	3	9	2	92.9	99.2	99.2	99.2	99.3
Q4 Arithmetic Mean											6	10	3	7	3	97.2	97.9	97.9	97.9	97.9

[A] The 24-hour $PM_{2.5}$ criterion applies to the 98th percentile over 3 consecutive years.

Table 4: Summary of Percent Valid Data for Rundle Road Station

Rundle Monitoring Station Data Statistics	Maximum 1 hr Mean					Maximum 24 hr Mean					Monthly Mean					% Valid Hours				
Compound	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2
Units	(µg/m³)	ppb				(µg/m³)	ppb				(µg/m³)	ppb				(%)				
AAQC				200	250	28[A]			100	100										
October	27	31	18	23	3	16	14	4	10	1	4	6	2	4	0	99.7	97.0	97.0	97.2	97.0
November	29	39	26	25	10	16	18	5	13	2	5	7	2	5	1	97.5	95.1	92.1	95.1	95.8
December	68	49	30	29	2	34	20	7	16	1	9	7	1	5	0	99.3	99.2	99.5	99.2	99.6
Q4 Arithmetic Mean											6	7	2	5	0	98.9	97.1	97.2	97.2	97.5

[A] The 24-hour $PM_{2.5}$ criterion applies to the 98th percentile over 3 consecutive years

Table 5: Summary of Exceedance Statistics

Event Statistics	Mean > 1 hr AAQC for Courtice Monitoring Station			Mean > 1 hr AAQC for Rundle Monitoring Station			Rolling Mean > 24 hr AAQC for Courtice Monitoring Station			Rolling Mean > 24 hr AAQC for Rundle Monitoring Station		
Compound	$PM_{2.5}$	NO_2	SO_2	$PM_{2.5}$	NO_2	SO_2	$PM_{2.5}$	NO_2	SO_2	$PM_{2.5}$	NO_2	SO_2
Units	No.			No.			No.			No.		
October		0	0		0	0	N/A	0	0	N/A	0	0
November		0	0		0	0	N/A	0	0	N/A	0	0
December		0	0		0	0	N/A	0	0	N/A	0	0
Q4 Total		0	0		0	0	N/A	0	0	N/A	0	0

4.3 Oxides of Nitrogen Results

4.3.1 Courtice Station Results

Data recovery levels were high for oxides of nitrogen (97.9% valid data for Q4). Monitoring results were compared to the AAQC for NO_2 only, as it is the only parameter that has AAQC values for 1-hour and 24-hour averaging periods (there are no AAQC's for NO or NO_x). There were no exceedances above the AAQC values for the entirety of the sampling period for 1-hour and 24-hour averaged data. The highest NO_2 value seen among the 1-hour averages was 71 ppb, which is 35.5% of the AAQC. The highest NO_2 value seen among the rolling 24-hour averages was 19 ppb, which is 19% of the AAQC. The measurements are summarized in Table 3 above. A pollution rose is presented in **Figure 6** for the Courtice Station during Q4 composed of hourly average NO_2 concentrations. A pollution rose indicates the percentage of time that the wind originates from a given direction coupled with the pollutant measurement for that time in either ppb or micrograms per meter cubed. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation.

The pollution wind rose below shows that the majority of elevated NO_2 events at Courtice occurred when the winds were from east, east southeasterly and west southwesterly directions. The pollution wind rose indicates that the DYEC was not a major contributor to NO_2 levels at the station.

4.3.2 Rundle Road Station Results

Data recovery levels were high for oxides of nitrogen (97.1% valid data for Q4). There were no exceedances above the AAQC values for the entirety of the sampling period for 1-hour and 24-hour averaged data. The highest NO_2 value seen among the 1-hour averages was 29 ppb, which is 14.5 % of the AAQC. The highest NO_2 value seen among the rolling 24-hour averages was 16 ppb, which is 16% of the AAQC. The measurements are summarized in Table 4 above. A pollution rose is presented in **Figure 6** for the Rundle Road Station during Q4 composed of hourly average NO_2 concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation.

The pollution wind rose below shows that the majority of elevated NO_2 events at the Rundle station occurred when winds were from the west and west northwest. The pollution wind rose indicates that the DYEC was not a major contributor to NO_2 levels at the station.

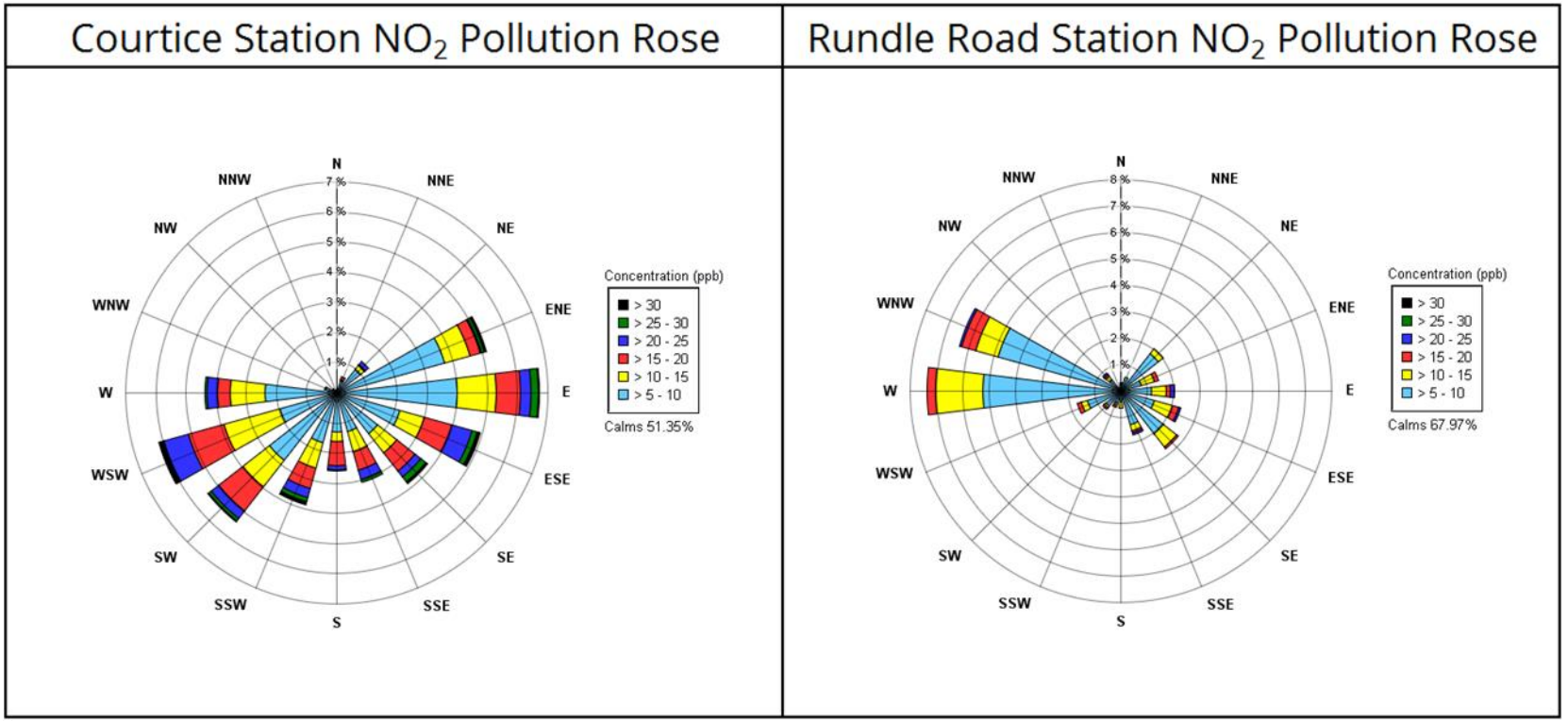


Figure 6. Pollution Roses of Hourly Average NO_2 Concentrations – October to December 2018

4.4 Sulphur Dioxide Results

4.4.1 Courtice Station Results

Data recovery levels were high for sulphur dioxide (97.9% valid data). Monitoring results were compared to the AAQC for 1-hour and 24-hour averaging periods. There were no exceedances above these AAQC values for the entirety of the sampling period for 1-hour and 24-hour averaged data. The highest SO_2 value seen among the 1-hour averages was 72 ppb, which is 28.8% of the AAQC. The highest SO_2 value seen among the 24-hour averages was 12 ppb, which is 12% of the AAQC. The results are summarized in Table 3 above. A pollution rose is presented in **Figure 7** for the Courtice Station during Q4 composed of hourly average SO_2 concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation.

The pollution wind rose below shows that the majority of elevated SO_2 events at Courtice occurred when the winds were from west southwest and south-southwest directions. The pollution wind rose indicates that the DYEC was not a major contributor to SO_2 levels at the station.

4.4.2 Rundle Road Station Results

Data recovery levels were high for sulphur dioxide (97.5% valid data). Monitoring results were compared to the AAQC for 1-hour and 24-hour averaging periods. There were no exceedances above these AAQC values for the entirety of the sampling period for 1-hour and 24-hour averaged data. The highest SO_2 value seen among the 1-hour averages was 10 ppb, which is 4.0% of the AAQC. The highest SO_2 value seen among the 24-hour averages was 2 ppb, which is 2% of the AAQC. The results are summarized in Table 4 above. A pollution rose is presented in **Figure 7** for the Rundle Road Station during Q4 composed of hourly average SO_2 concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation.

The pollution wind rose below shows that the majority of elevated SO_2 events at the Rundle station occurred when winds were from the southeast. The pollution wind rose indicates that the DYEC was a not major contributor to SO_2 levels at the stations.

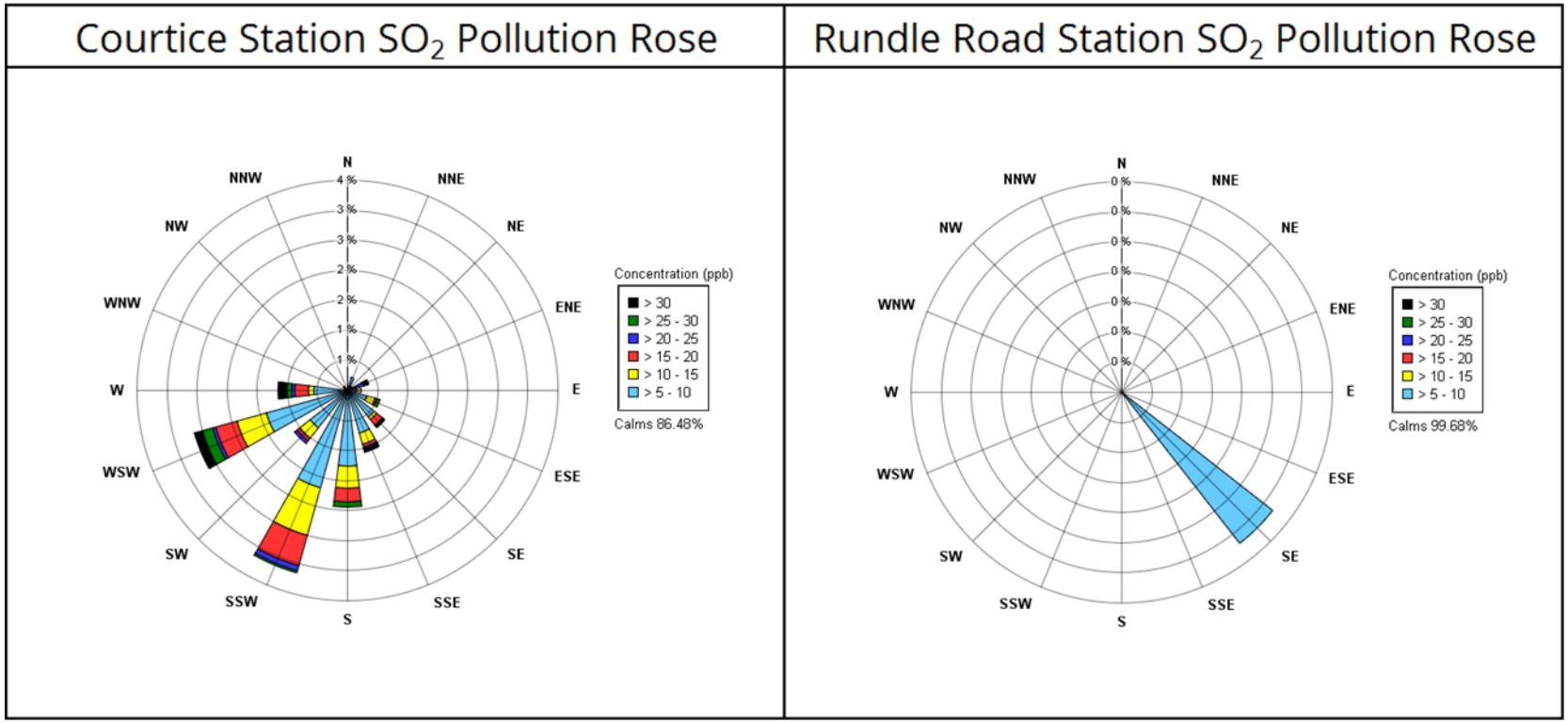


Figure 7. Pollution Roses of Hourly Average SO_2 Concentrations October to December 2018

4.5 Fine Particulate Matter ($PM_{2.5}$) Results

4.5.1 Courtice Station Results

Data recovery levels were high for particulate matter less than 2.5 microns (97.3% valid data). There is no 1-hour AAQC or standard for $PM_{2.5}$, but there is a 24-hour CAAQS standard of 28 µg/m^3 for the 3-year average of annual 98th percentile 24-hour concentrations, and 10 µg/m^3 for the 3-year average of annual average concentrations (in effect as of 2015). Note that since the reported data has not surpassed the 3-year average, the CAAQS' for $PM_{2.5}$ was not applicable to the data. The highest $PM_{2.5}$ value seen among the 1-hour averages was 40 µg/m^3 and the highest value seen among the rolling 24-hour averages was 35 µg/m^3. The results are summarized in Table 3 above. A pollution rose is presented in **Figure 8** for the Courtice Station during Q4 composed of hourly average $PM_{2.5}$ concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 µg/m^3 were omitted from the graphic wind rose representation.

The pollution rose below shows that the majority of elevated $PM_{2.5}$ events at Courtice occurred when the winds were westerly, west southwesterly, easterly and east north-easterly directions. It is unlikely elevated $PM_{2.5}$ measurements were related to emissions from the DYEC and were more likely related to nearby roadway construction or other sources.

4.5.2 Rundle Road Station Results

Data recovery levels were high for particulate matter less than 2.5 microns (98.9% valid data). The highest $PM_{2.5}$ value seen among the 1-hour averages was 68 µg/m^3 and the highest value seen among the rolling 24-hour averages was 34 µg/m^3. The results are summarized in Table 4 above. A pollution rose is presented in **Figure 8** for the Rundle Road Station during Q4 composed of hourly average $PM_{2.5}$ concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 µg/m^3 were omitted from the graphic wind rose representation.

The pollution wind rose below shows that the majority of elevated $PM_{2.5}$ events at the Rundle station occurred when winds were from the west northwesterly, westerly and northeast direction. The pollution rose indicates that elevated $PM_{2.5}$ measurements were not caused by the DYEC.

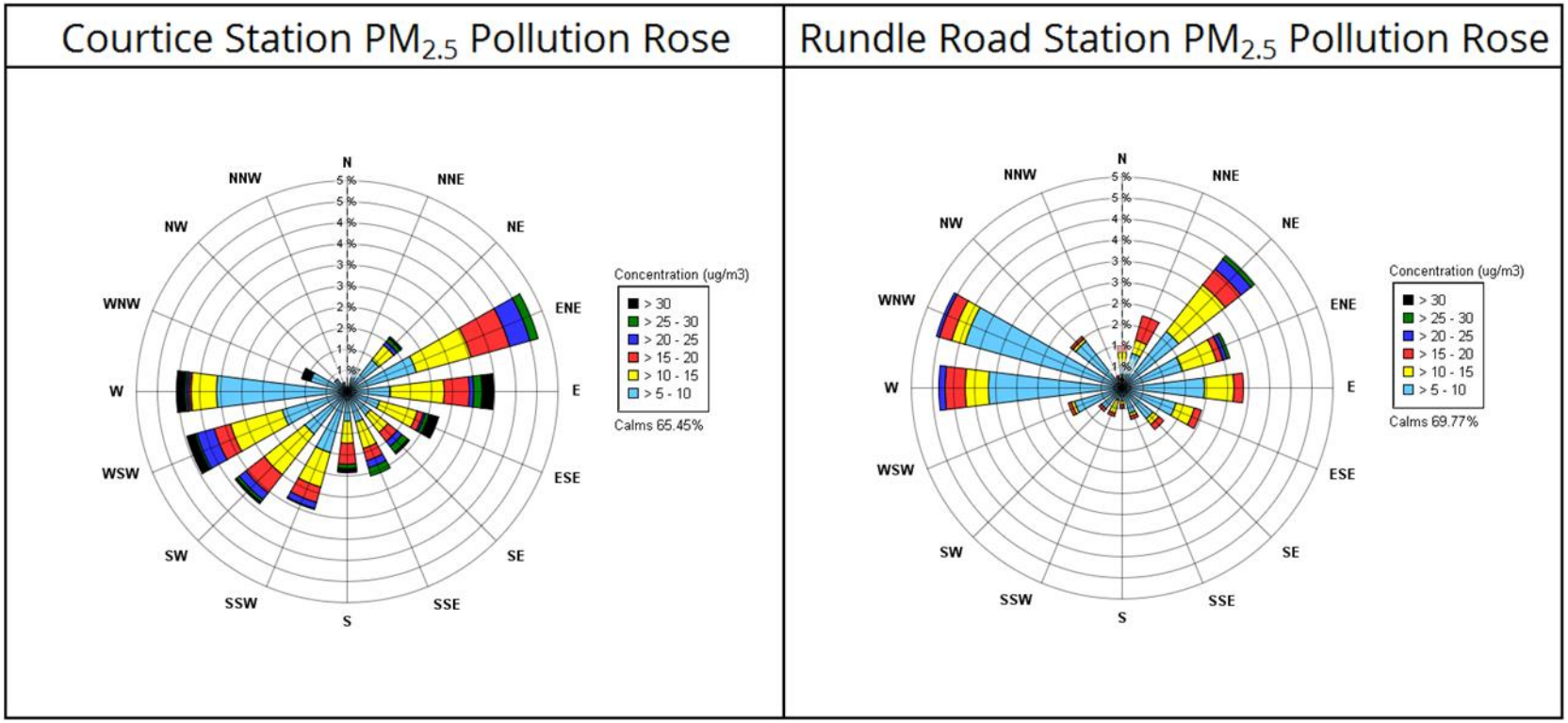


Figure 8. Pollution Roses of Hourly Average $PM_{2.5}$ Concentrations – October to December 2018

4.6 TSP and Metals Hi-Vol Results

All of the TSP Hi-Vols operated on a discrete schedule every 6 days according to the NAPS schedule during Q4 with the sample days being: October 5, 11, 17, 23, 29, November 4, 10, 16, 22, 28, and December 4, 10, 16, 22, 28, 2018.

4.6.1 Courtice Station Results

Data recovery levels were high for the TSP sampler at the Courtice Station (100% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for TSP, mercury or metals during Q4. Table 6 is a summary of the statistics for this station.

Table 6: Summary of TSP Sampler Courtice Station

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
Particulate (TSP)	µg/m³	*120*	*120*	0	11.5	12.7	4.6	20.8	19.3	18.0	20.8	15	100
Total Mercury (Hg)	µg/m³	*2*	*2*	0	5.75E-06	8.90E-06	1.49E-06	3.43E-05	1.32E-05	3.43E-05	1.39E-05	15	100
Aluminum (Al)	µg/m³	*4.8*	-	0	7.70E-02	9.10E-02	2.49E-02	1.77E-01	1.48E-01	1.17E-01	1.77E-01	15	100
Antimony (Sb)	µg/m³	*25*	*25*	0	5.52E-04	6.02E-04	2.45E-04	1.12E-03	8.60E-04	1.10E-03	1.12E-03	15	100
Arsenic (As)	µg/m³	*0.3*	*0.3*	0	9.66E-04	1.03E-03	7.72E-04	2.30E-03	9.20E-04	9.80E-04	2.30E-03	15	100
Barium (Ba)	µg/m³	*10*	*10*	0	4.67E-03	5.24E-03	2.20E-03	1.46E-02	7.80E-03	6.57E-03	1.46E-02	15	100
Beryllium (Be)	µg/m³	*0.01*	*0.01*	0	4.82E-05	2.27E-04	2.57E-05	1.56E-03	1.56E-03	3.27E-05	3.04E-05	15	100
Bismuth (Bi)	µg/m³	-	-	-	5.16E-04	5.18E-04	4.63E-04	5.88E-04	5.52E-04	5.88E-04	5.46E-04	15	100
Boron (B)	µg/m³	*120*	-	0	1.15E-02	1.15E-02	1.03E-02	1.31E-02	1.23E-02	1.31E-02	1.21E-02	15	100
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	0	5.74E-04	5.75E-04	5.15E-04	6.54E-04	6.13E-04	6.54E-04	6.07E-04	15	100
Chromium (Cr)	µg/m³	*0.5*	-	0	2.14E-03	2.48E-03	1.30E-03	5.40E-03	5.40E-03	1.63E-03	3.35E-03	15	100
Cobalt (Co)	µg/m³	*0.1*	*0.1*	0	5.74E-04	5.75E-04	5.15E-04	6.54E-04	6.13E-04	6.54E-04	6.07E-04	15	100
Copper (Cu)	µg/m³	*50*	-	0	1.79E-02	1.96E-02	9.00E-03	4.22E-02	2.87E-02	1.89E-02	4.22E-02	15	100
Iron (Fe)	µg/m³	*4*	-	0	2.10E-01	2.28E-01	8.41E-02	4.80E-01	2.75E-01	2.89E-01	4.80E-01	15	100
Lead (Pb)	µg/m³	*0.5*	*0.5*	0	1.30E-03	1.45E-03	7.72E-04	2.60E-03	2.60E-03	2.14E-03	1.86E-03	15	100
Magnesium (Mg)	µg/m³	-	-	-	1.12E-01	1.36E-01	2.60E-02	2.72E-01	2.72E-01	1.62E-01	1.91E-01	15	100
Manganese (Mn)	µg/m³	*0.4*	-	0	4.54E-03	5.86E-03	6.28E-04	1.09E-02	1.02E-02	7.36E-03	1.09E-02	15	100
Molybdenum (Mo)	µg/m³	*120*	-	0	7.09E-04	1.41E-03	2.60E-04	7.69E-03	1.41E-03	7.69E-03	9.27E-04	15	100
Nickel (Ni)	µg/m³	*0.2*	-	0	8.60E-04	8.63E-04	7.72E-04	9.80E-04	9.20E-04	9.80E-04	9.11E-04	15	100
Phosphorus (P)	µg/m³	-	-	-	3.16E-01	4.18E-01	1.93E-01	1.08E+00	1.08E+00	2.45E-01	2.28E-01	15	100
Selenium (Se)	µg/m³	*10*	*10*	0	2.87E-03	2.88E-03	2.57E-03	3.27E-03	3.07E-03	3.27E-03	3.04E-03	15	100
Silver (Ag)	µg/m³	*1*	*1*	0	2.87E-04	2.88E-04	2.57E-04	3.27E-04	3.07E-04	3.27E-04	3.04E-04	15	100
Strontium (Sr)	µg/m³	*120*	-	0	2.22E-03	2.71E-03	7.80E-04	5.60E-03	5.60E-03	4.85E-03	5.36E-03	15	100
Thallium (Tl)	µg/m³	-	-	-	2.58E-05	2.59E-05	2.32E-05	2.94E-05	2.76E-05	2.94E-05	2.73E-05	15	100
Tin (Sn)	µg/m³	*10*	*10*	0	6.41E-04	7.31E-04	2.60E-04	1.33E-03	1.12E-03	1.33E-03	9.78E-04	15	100
Titanium (Ti)	µg/m³	*120*	-	0	3.63E-03	3.96E-03	2.86E-03	1.08E-02	7.40E-03	3.59E-03	1.08E-02	15	100

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
Uranium (Ur)	µg/m³	*1.5*	-	0	2.87E-05	2.88E-05	2.57E-05	3.27E-05	3.07E-05	3.27E-05	3.04E-05	15	100
Vanadium (V)	µg/m³	*2*	*1*	0	1.43E-03	1.44E-03	1.29E-03	1.63E-03	1.53E-03	1.63E-03	1.52E-03	15	100
Zinc (Zn)	µg/m³	*120*	-	0	2.41E-02	2.58E-02	1.06E-02	5.35E-02	3.06E-02	5.35E-02	2.64E-02	15	100
Zirconium (Zr)	µg/m³	*20*	-	0	6.04E-04	6.16E-04	5.20E-04	1.13E-03	6.13E-04	6.54E-04	1.13E-03	15	100

Note: All non-detectable results were reported as 1/2 of the detection limit

4.6.2 Rundle Road Station Results

Data recovery levels were high for the TSP sampler at the Rundle Road Station (87% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for TSP, mercury or metals during Q4. Table 7 is a summary of the statistics for this station.

Table 7: Summary of TSP Sampler Rundle Road Station

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
Particulate (TSP)	µg/m³	*120*	*120*	0	17.5	22.9	5.3	59.7	59.7	57.6	24.7	13	87
Total Mercury (Hg)	µg/m³	*2*	*2*	0	4.60E-06	7.65E-06	1.53E-06	2.51E-05	1.38E-05	2.51E-05	1.59E-05	13	87
Aluminum (Al)	µg/m³	*4.8*	-	0	1.30E-01	1.95E-01	1.21E-02	6.18E-01	6.18E-01	4.29E-01	2.83E-01	13	87
Antimony (Sb)	µg/m³	*25*	*25*	0	3.80E-04	4.58E-04	7.68E-05	8.70E-04	6.90E-04	8.70E-04	5.10E-04	13	87
Arsenic (As)	µg/m³	*0.3*	*0.3*	0	9.89E-04	1.02E-03	8.91E-04	2.10E-03	9.20E-04	9.80E-04	2.10E-03	13	87
Barium (Ba)	µg/m³	*10*	*10*	0	4.98E-03	5.51E-03	2.00E-03	9.30E-03	9.30E-03	6.70E-03	8.90E-03	13	87
Beryllium (Be)	µg/m³	*0.01*	*0.01*	0	5.71E-05	2.79E-04	2.97E-05	1.81E-03	1.81E-03	3.27E-05	3.33E-05	13	87
Bismuth (Bi)	µg/m³	-	-	-	5.58E-04	5.58E-04	5.35E-04	5.99E-04	5.52E-04	5.88E-04	5.99E-04	13	87
Boron (B)	µg/m³	*120*	-	0	1.24E-02	1.24E-02	1.19E-02	1.33E-02	1.23E-02	1.31E-02	1.33E-02	13	87
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	0	6.20E-04	6.20E-04	5.94E-04	6.66E-04	6.13E-04	6.54E-04	6.66E-04	13	87
Chromium (Cr)	µg/m³	*0.5*	-	0	2.86E-03	3.23E-03	1.51E-03	6.80E-03	6.80E-03	3.50E-03	3.70E-03	13	87
Cobalt (Co)	µg/m³	*0.1*	*0.1*	0	6.20E-04	6.20E-04	5.94E-04	6.66E-04	6.13E-04	6.54E-04	6.66E-04	13	87
Copper (Cu)	µg/m³	*50*	-	0	1.47E-02	1.68E-02	6.10E-03	4.15E-02	2.59E-02	1.67E-02	4.15E-02	13	87
Iron (Fe)	µg/m³	*4*	-	0	2.71E-01	3.20E-01	1.23E-01	8.91E-01	8.91E-01	5.95E-01	4.01E-01	13	87
Lead (Pb)	µg/m³	*0.5*	*0.5*	0	1.26E-03	1.40E-03	9.16E-04	2.70E-03	2.50E-03	2.70E-03	2.10E-03	13	87
Magnesium (Mg)	µg/m³	-	-	-	1.70E-01	2.44E-01	3.02E-02	8.47E-01	8.47E-01	5.02E-01	2.52E-01	13	87
Manganese (Mn)	µg/m³	*0.4*	-	0	6.16E-03	9.31E-03	3.27E-04	2.79E-02	2.79E-02	1.84E-02	1.38E-02	13	87
Molybdenum (Mo)	µg/m³	*120*	-	0	6.58E-04	1.09E-03	3.02E-04	6.26E-03	1.09E-03	6.26E-03	1.68E-03	13	87

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
Nickel (Ni)	µg/m³	*0.2*	-	0	9.29E-04	9.30E-04	8.91E-04	9.99E-04	9.20E-04	9.80E-04	9.99E-04	13	87
Phosphorus (P)	µg/m³	-	-	-	3.77E-01	5.19E-01	2.23E-01	1.75E+00	1.75E+00	2.45E-01	2.50E-01	13	87
Selenium (Se)	µg/m³	*10*	*10*	0	3.10E-03	3.10E-03	2.97E-03	3.33E-03	3.07E-03	3.27E-03	3.33E-03	13	87
Silver (Ag)	µg/m³	*1*	*1*	0	3.10E-04	3.10E-04	2.97E-04	3.33E-04	3.07E-04	3.27E-04	3.33E-04	13	87
Strontium (Sr)	µg/m³	*120*	-	0	4.76E-03	7.20E-03	9.06E-04	2.70E-02	2.70E-02	1.84E-02	8.40E-03	13	87
Thallium (Tl)	µg/m³	-	-	-	2.79E-05	2.79E-05	2.67E-05	3.00E-05	2.76E-05	2.94E-05	3.00E-05	13	87
Tin (Sn)	µg/m³	*10*	*10*	0	6.00E-04	6.54E-04	3.07E-04	1.06E-03	1.06E-03	9.40E-04	7.90E-04	13	87
Titanium (Ti)	µg/m³	*120*	-	0	5.25E-03	6.96E-03	3.27E-03	2.47E-02	2.47E-02	1.51E-02	1.15E-02	13	87
Uranium (Ur)	µg/m³	*1.5*	-	0	3.83E-05	4.20E-05	2.97E-05	9.80E-05	9.80E-05	3.27E-05	3.33E-05	13	87
Vanadium (V)	µg/m³	*2*	*1*	0	1.88E-03	2.88E-03	1.49E-03	1.88E-02	1.88E-02	1.63E-03	1.66E-03	13	87
Zinc (Zn)	µg/m³	*120*	-	0	1.97E-02	2.31E-02	1.05E-02	7.14E-02	3.48E-02	7.14E-02	1.55E-02	13	87
Zirconium (Zr)	µg/m³	*20*	-	0	6.20E-04	6.20E-04	5.94E-04	6.66E-04	6.13E-04	6.54E-04	6.66E-04	13	87

Note: All non-detectable results were reported as 1/2 of the detection limit

4.6.3 Fence Line Station Results

Data recovery levels were high for the TSP sampler at the Fence Line Station (100 % valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for TSP, mercury or metals during Q4. Table 8 is a summary of the statistics for this station. Sampling at the Fence Line Station stopped on December 4, 2018.

Table 8: Summary of TSP Sampler Fence Line Station

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	MECP Criteria (µg/m³)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
Particulate (TSP)	µg/m³	*120*	*120*	*120*	0	18.9	21.5	8.2	46.9	28.4	46.9	31.3	11	100
Total Mercury (Hg)	µg/m³	*2*	*2*	*2*	0	6.34E-06	9.08E-06	1.42E-06	1.81E-05	1.60E-05	1.69E-05	1.81E-05	11	100
Aluminum (Al)	µg/m³	*4.8*	-	*4.8*	0	1.43E-01	1.65E-01	5.10E-02	3.06E-01	3.06E-01	2.11E-01	2.64E-01	11	100
Antimony (Sb)	µg/m³	*25*	*25*	*25*	0	7.13E-04	7.77E-04	2.70E-04	1.38E-03	1.11E-03	9.70E-04	1.38E-03	11	100
Arsenic (As)	µg/m³	*0.3*	*0.3*	*0.3*	0	9.01E-04	9.01E-04	8.52E-04	9.24E-04	9.20E-04	9.24E-04	8.86E-04	11	100
Barium (Ba)	µg/m³	*10*	*10*	*10*	0	6.89E-03	7.64E-03	3.40E-03	1.64E-02	9.50E-03	9.70E-03	1.64E-02	11	100
Beryllium (Be)	µg/m³	*0.01*	*0.01*	*0.01*	0	6.23E-05	3.33E-04	2.84E-05	1.73E-03	1.73E-03	3.08E-05	2.95E-05	11	100
Bismuth (Bi)	µg/m³	-	-	-	-	5.41E-04	5.41E-04	5.11E-04	5.55E-04	5.52E-04	5.55E-04	5.31E-04	11	100
Boron (B)	µg/m³	*120*	-	*120*	0	1.20E-02	1.20E-02	1.14E-02	1.23E-02	1.23E-02	1.23E-02	1.18E-02	11	100
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	*0.025*	0	6.01E-04	6.01E-04	5.68E-04	6.16E-04	6.13E-04	6.16E-04	5.90E-04	11	100

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	MECP Criteria (µg/m³)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
Chromium (Cr)	µg/m³	*0.5*	-	*0.5*	0	3.43E-03	3.97E-03	1.42E-03	6.90E-03	6.90E-03	3.20E-03	5.80E-03	11	100
Cobalt (Co)	µg/m³	*0.1*	*0.1*	*0.1*	0	6.01E-04	6.01E-04	5.68E-04	6.16E-04	6.13E-04	6.16E-04	5.90E-04	11	100
Copper (Cu)	µg/m³	*50*	-	*50*	0	2.48E-02	2.73E-02	1.18E-02	4.08E-02	4.08E-02	3.47E-02	3.72E-02	11	100
Iron (Fe)	µg/m³	*4*	-	*4*	0	3.11E-01	3.39E-01	1.41E-01	5.84E-01	5.05E-01	4.49E-01	5.84E-01	11	100
Lead (Pb)	µg/m³	*0.5*	*0.5*	*2*	0	1.77E-03	2.05E-03	8.52E-04	4.30E-03	4.30E-03	2.40E-03	2.50E-03	11	100
Magnesium (Mg)	µg/m³	-	-	-	-	2.12E-01	2.43E-01	6.60E-02	4.77E-01	4.77E-01	3.22E-01	3.53E-01	11	100
Manganese (Mn)	µg/m³	*0.4*	-	*0.4*	0	7.63E-03	1.08E-02	7.40E-04	2.62E-02	1.80E-02	1.47E-02	2.62E-02	11	100
Molybdenum (Mo)	µg/m³	*120*	-	*120*	0	1.69E-03	2.75E-03	2.88E-04	1.07E-02	2.12E-03	1.07E-02	2.43E-03	11	100
Nickel (Ni)	µg/m³	*0.2*	-	*0.2*	0	9.71E-04	1.01E-03	8.52E-04	2.10E-03	2.10E-03	9.24E-04	8.86E-04	11	100
Phosphorus (P)	µg/m³	-	-	-	-	4.07E-01	5.74E-01	2.13E-01	1.57E+00	1.57E+00	2.31E-01	2.21E-01	11	100
Selenium (Se)	µg/m³	*10*	*10*	*10*	0	3.00E-03	3.00E-03	2.84E-03	3.08E-03	3.07E-03	3.08E-03	2.95E-03	11	100
Silver (Ag)	µg/m³	*1*	*1*	*1*	0	3.00E-04	3.00E-04	2.84E-04	3.08E-04	3.07E-04	3.08E-04	2.95E-04	11	100
Strontium (Sr)	µg/m³	*120*	-	*120*	0	4.43E-03	5.12E-03	1.80E-03	1.01E-02	6.90E-03	1.01E-02	9.90E-03	11	100
Thallium (Tl)	µg/m³	-	-	-	-	2.70E-05	2.70E-05	2.56E-05	2.77E-05	2.76E-05	2.77E-05	2.66E-05	11	100
Tin (Sn)	µg/m³	*10*	*10*	*10*	0	8.35E-04	9.14E-04	2.88E-04	1.75E-03	1.23E-03	1.75E-03	1.16E-03	11	100
Titanium (Ti)	µg/m³	*120*	-	*120*	0	5.80E-03	6.76E-03	3.12E-03	1.50E-02	9.50E-03	1.00E-02	1.50E-02	11	100
Uranium (Ur)	µg/m³	*1.5*	-	*1.5*	0	3.72E-05	4.00E-05	2.84E-05	7.50E-05	7.50E-05	3.08E-05	2.95E-05	11	100
Vanadium (V)	µg/m³	*2*	*1*	*2*	0	1.89E-03	3.09E-03	1.42E-03	1.90E-02	1.90E-02	1.54E-03	1.48E-03	11	100
Zinc (Zn)	µg/m³	*120*	-	*120*	0	2.45E-02	2.55E-02	1.53E-02	4.14E-02	4.14E-02	3.33E-02	3.11E-02	11	100
Zirconium (Zr)	µg/m³	*20*	-	*20*	0	6.54E-04	6.84E-04	5.68E-04	1.50E-03	6.13E-04	6.16E-04	1.50E-03	11	100

Note: All non-detectable results were reported as 1/2 of the detection limit

4.7 PAH Results

All of the PUF Hi-Vols operated on a discrete schedule every 12 days for PAH's according to the NAPS schedule during Q4 with the sample days being: October 5, 17, 29, November 10, 22 December 4, 16, 28, 2018.

4.7.1 Courtice Station Results

Data recovery levels were high for the PAH results at the Courtice Station (88% valid data). There was one exceedance of Benzo(a)Pyrene on December 4, 2018. The exceedance occurred at both Courtice and Rundle Stations with predominant winds coming from the northwest and north northwesterly direction. The exceedance was 0.0000672 µg/m³ (134% of the limit). Based on the predominant wind direction and the occurrence at both stations it is unlikely that DYEC was the contributor of Benzo(a)Pyrene measured at the Rundle station There were no other exceedances of any of the AAQC's or HHRA Criteria for any of the PAH's during Q4. Table 9 is a summary of the statistics for this station.

Table 9: Statistics Summary of PAH Results for Courtice Station

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
1-Methylnaphthalene	ng/m³	*12000*	-	0	2.50E+00	1.23E+00	3.78E+00	2.70E+00	1.23E+00	3.78E+00	7	88
2-Methylnaphthalene	ng/m³	*10000*	-	0	4.05E+00	2.21E+00	6.25E+00	4.27E+00	2.21E+00	6.25E+00	7	88
Acenaphthene	ng/m³	-	-	-	5.80E-01	2.28E-01	1.04E+00	1.04E+00	2.28E-01	7.08E-01	7	88
Acenaphthylene	ng/m³	*3500*	-	0	1.89E-01	4.86E-02	4.29E-01	2.08E-01	6.89E-02	4.29E-01	7	88
Anthracene	ng/m³	*200*	-	0	5.17E-02	2.15E-02	8.38E-02	8.38E-02	2.15E-02	6.24E-02	7	88
Benzo(a)Anthracene	ng/m³	-	-	-	1.59E-02	5.76E-03	3.02E-02	2.69E-02	6.21E-03	3.02E-02	7	88
Benzo(a)fluorene	ng/m³	-	-	-	2.30E-02	1.66E-03	6.35E-02	6.35E-02	2.37E-02	3.20E-02	7	88
Benzo(a)Pyrene	ng/m³	*0.05*[1] *5*[2] *1.1*[3]	*1*	1	2.30E-02	2.77E-03	6.72E-02	3.01E-02	1.07E-02	6.72E-02	7	88
Benzo(b)Fluoranthene	ng/m³	-	-	-	2.75E-02	2.95E-04	6.58E-02	6.58E-02	2.36E-02	4.97E-02	7	88
Benzo(b)fluorene	ng/m³	-	-	-	2.19E-02	3.31E-03	5.38E-02	5.38E-02	2.05E-02	2.95E-02	7	88
Benzo(e)Pyrene	ng/m³	-	-	-	4.21E-02	1.55E-02	7.54E-02	5.00E-02	7.54E-02	6.87E-02	7	88
Benzo(g,h,i)Perylene	ng/m³	-	-	-	3.64E-02	1.76E-02	7.29E-02	5.03E-02	2.00E-02	7.29E-02	7	88
Benzo(k)Fluoranthene	ng/m³	-	-	-	2.72E-02	2.95E-04	6.89E-02	5.53E-02	1.91E-02	6.89E-02	7	88
Biphenyl	ng/m³	-	-	-	1.19E+00	4.14E-01	1.64E+00	1.62E+00	1.18E+00	1.64E+00	7	88
Chrysene	ng/m³	-	-	-	5.33E-02	2.74E-02	8.79E-02	7.84E-02	2.99E-02	8.79E-02	7	88
Dibenzo(a,h)Anthracene	ng/m³	-	-	-	5.15E-03	7.40E-04	1.83E-02	6.35E-03	7.40E-04	1.83E-02	7	88
Fluoranthene	ng/m³	-	-	-	2.89E-01	1.49E-01	4.23E-01	3.98E-01	1.49E-01	4.23E-01	7	88
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	-	3.33E-02	1.44E-02	8.54E-01	4.68E-02	1.66E-02	7.14E-02	7	88
Naphthalene	ng/m³	*22500*	*22500*	0	1.27E+01	7.84E+00	1.73E+01	1.71E+01	7.84E+00	1.73E+01	7	88
o-Terphenyl	ng/m³	-	-	-	1.88E-02	4.41E-03	1.06E+01	6.81E-03	4.41E-03	9.14E-02	7	88
Perylene	ng/m³	-	-	-	1.37E-03	2.95E-04	1.05E-02	4.56E-03	7.40E-04	8.16E-04	7	88
Phenanthrene	ng/m³	-	-	-	1.18E+00	6.12E-01	1.60E+00	1.60E+00	6.12E-01	1.45E+00	7	88
Pyrene	ng/m³	-	-	-	1.75E-01	8.99E-02	1.41E+00	2.51E-01	8.99E-02	2.10E-01	7	88
Tetralin	ng/m³	-	-	-	1.59E+00	1.28E-01	2.64E+00	2.64E+00	1.14E+00	2.19E+00	7	88
Total PAH[4]	ng/m³	-	-	-	2.48E+01	1.50E+01	3.27E+01	3.17E+01	1.50E+01	3.27E+01	7	88

Note: All non-detectable results were reported as 1/2 of the detection limit

[1] AAQC

[2] O. Reg. 419/05 Schedule 6 Upper Risk Thresholds

[3] O. Reg. 419/05 24 Hour Guideline

[4] Total PAH sums all PAH contaminants

4.7.2 Rundle Road Station Results

Data recovery levels were high for the PAH results at the Rundle Road Station (100% valid data). There were two exceedances of Benzo(a)Pyrene on December 4, 2018 and December 16, 2018. The exceedance on December 4, 2018 occurred at both Courtice and Rundle Stations with predominant winds coming from the northwest and north northwesterly direction. The exceedance was 0.0000764 µg/m^3 (153% of the limit). Based on the predominant wind direction and the occurrence at both stations it is unlikely that DYEC was the contributor of Benzo(a)Pyrene measured at the Rundle station. The exceedance on December 16, 2018 occurred only at Rundle Station with predominant winds coming from the north north-easterly to easterly direction. The exceedance was 0.0000606 µg/m^3 (121% of the limit). Based on the wind direction it is unlikely that DYEC was the contributor of Benzo(a)Pyrene measured at the Rundle station. There were no other exceedances of any of the AAQC's or HHRA Criteria for any of the PAH's during Q4. Table 10 is a summary of the statistics for this station.

Table 10: Statistics Summary of PAH Results for Rundle Road Station

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
1-Methylnaphthalene	ng/m^3	*12000*	-	0	2.32E+00	1.46E+00	2.87E+00	2.87E+00	2.86E+00	2.43E+00	8	100
2-Methylnaphthalene	ng/m^3	*10000*	-	0	3.79E+00	2.36E+00	5.20E+00	5.20E+00	4.99E+00	4.32E+00	8	100
Acenaphthene	ng/m^3	-	-	-	6.34E-01	2.33E-01	2.33E+00	2.33E+00	2.91E-01	7.17E-01	8	100
Acenaphthylene	ng/m^3	*3500*	-	0	2.64E-01	7.83E-02	6.27E-01	1.28E-01	6.27E-01	4.94E-01	8	100
Anthracene	ng/m^3	*200*	-	0	7.34E-02	3.64E-02	1.21E-01	1.21E-01	6.71E-02	1.06E-01	8	100
Benzo(a)Anthracene	ng/m^3	-	-	-	2.19E-02	6.41E-03	3.44E-02	3.25E-02	2.96E-02	3.44E-02	8	100
Benzo(a)fluorene	ng/m^3	-	-	-	4.09E-02	1.63E-03	8.97E-02	8.97E-02	6.48E-02	4.15E-02	8	100
Benzo(a)Pyrene	ng/m^3	*0.05*[1] *5*[2] *1.1*[3]	*1*	0	2.93E-02	5.13E-03	7.62E-02	2.68E-02	2.04E-02	7.62E-02	8	100
Benzo(b)Fluoranthene	ng/m^3	-	-	-	4.95E-02	3.11E-04	1.30E-01	8.17E-02	1.30E-01	6.41E-02	8	100
Benzo(b)fluorene	ng/m^3	-	-	-	3.02E-02	1.63E-03	7.59E-02	7.59E-02	4.42E-02	2.78E-02	8	100
Benzo(e)Pyrene	ng/m^3	-	-	-	4.33E-02	7.42E-04	8.39E-02	6.59E-02	8.39E-02	6.06E-02	8	100
Benzo(g,h,i)Perylene	ng/m^3	-	-	-	4.70E-02	2.07E-02	9.60E-02	5.59E-02	7.16E-02	9.60E-02	8	100
Benzo(k)Fluoranthene	ng/m^3	-	-	-	4.72E-02	3.11E-04	1.23E-01	5.95E-02	1.23E-01	8.45E-02	8	100
Biphenyl	ng/m^3	-	-	-	1.24E+00	5.05E-01	2.03E+00	1.68E+00	2.03E+00	9.19E-01	8	100
Chrysene	ng/m^3	-	-	-	9.36E-02	3.82E-02	2.37E-01	9.94E-02	2.37E-01	1.17E-01	8	100
Dibenzo(a,h)Anthracene	ng/m^3	-	-	-	6.37E-03	7.42E-04	1.59E-02	6.57E-03	1.24E-02	1.59E-02	8	100
Fluoranthene	ng/m^3	-	-	-	3.43E-01	2.34E-01	4.87E-01	4.87E-01	3.55E-01	4.38E-01	8	100
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	-	4.86E-02	1.85E-02	1.02E-01	5.66E-02	8.15E-02	1.02E-01	8	100

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
Naphthalene	ng/m^3	*22500*	*22500*	0	1.47E+01	9.41E+00	2.50E+01	1.89E+01	2.50E+01	1.76E+01	8	100
o-Terphenyl	ng/m^3	-	-	-	1.66E-02	4.51E-03	8.82E-02	8.52E-03	8.78E-03	8.82E-02	8	100
Perylene	ng/m^3	-	-	-	1.62E-03	3.11E-04	4.42E-03	4.41E-03	7.46E-04	4.42E-03	8	100
Phenanthrene	ng/m^3	-	-	-	1.38E+00	7.40E-01	2.39E+00	2.39E+00	1.46E+00	1.83E+00	8	100
Pyrene	ng/m^3	-	-	-	2.23E-01	1.50E-01	3.25E-01	3.25E-01	2.39E-01	2.59E-01	8	100
Tetralin	ng/m^3	-	-	-	2.38E+00	6.57E-01	7.67E+00	2.57E+00	1.79E+00	7.67E+00	8	100
Total PAH[4]	ng/m^3	-	-	-	2.78E+01	1.77E+01	4.05E+01	3.45E+01	4.05E+01	3.73E+01	8	100

Note: All non-detectable results were reported as 1/2 of the detection limit

[1] AAQC

[2] O. Reg. 419/05 Schedule 6 Upper Risk Thresholds

[3] O. Reg. 419/05 24 Hour Guideline

[4] Total PAH sums all PAH contaminants

4.8 Dioxin and Furan Results

All of the PUF Hi-Vols operated on a discrete schedule every 24 days for D&F's according to the NAPS schedule during Q4 with the sample days being: October 17, November 10, and December 4, 28, 2018.

4.8.1 Courtice Station Results

Data recovery levels were acceptable for the D&F results at the Courtice Station (100% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for any of the D&F's during Q4. Table 10 is a summary of the statistics for this station.

Table 11: Courtice Station Q4 Monitoring Results for Dioxins and Furans

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
2,3,7,8-TCDD	pg/m^3	-	-	-	-	7.46E-04	3.21E-04	1.88E-03	1.88E-03	3.55E-04	4.29E-04	4	100
1,2,3,7,8-PeCDD	pg/m^3	-	-	-	-	3.98E-04	2.07E-04	7.99E-04	7.99E-04	2.07E-04	3.79E-04	4	100
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	-	-	9.75E-04	6.27E-04	1.88E-03	1.88E-03	6.95E-04	6.95E-04	4	100
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	-	-	9.21E-04	6.21E-04	1.57E-03	1.57E-03	6.21E-04	8.75E-04	4	100
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	-	-	9.24E-04	5.92E-04	1.72E-03	1.72E-03	5.92E-04	7.14E-04	4	100
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	-	-	2.86E-02	1.22E-02	4.64E-02	4.64E-02	2.78E-02	2.78E-02	4	100
OCDD	pg/m^3	-	-	-	-	6.39E-02	4.37E-02	7.15E-02	7.15E-02	7.01E-02	7.01E-02	4	100
2,3,7,8-TCDF	pg/m^3	-	-	-	-	2.85E-04	5.77E-05	7.05E-04	7.05E-04	5.77E-05	3.21E-04	4	100

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	MECP Criteria (µg/m³)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
1,2,3,7,8-PeCDF	pg/m³	-	-	-	-	3.28E-04	7.40E-05	5.96E-04	5.96E-04	7.40E-05	5.69E-04	4	100
2,3,4,7,8-PeCDF	pg/m³	-	-	-	-	7.05E-04	5.10E-04	8.73E-04	5.64E-04	8.73E-04	8.73E-04	4	100
1,2,3,4,7,8-HxCDF	pg/m³	-	-	-	-	7.29E-04	5.33E-04	1.24E-03	1.24E-03	5.33E-04	6.12E-04	4	100
1,2,3,6,7,8-HxCDF	pg/m³	-	-	-	-	6.27E-04	4.52E-04	1.08E-03	1.08E-03	4.88E-04	4.88E-04	4	100
2,3,4,6,7,8-HxCDF	pg/m³	-	-	-	-	9.10E-04	6.27E-04	1.24E-03	1.24E-03	8.88E-04	8.88E-04	4	100
1,2,3,7,8,9-HxCDF	pg/m³	-	-	-	-	8.01E-04	5.54E-04	1.35E-03	1.35E-03	6.51E-04	6.51E-04	4	100
1,2,3,4,6,7,8-HpCDF	pg/m³	-	-	-	-	2.05E-03	1.11E-03	2.51E-03	1.11E-03	2.51E-03	2.51E-03	4	100
1,2,3,4,7,8,9-HpCDF	pg/m³	-	-	-	-	6.28E-04	3.64E-04	1.11E-03	1.11E-03	5.18E-04	5.18E-04	4	100
OCDF	pg/m³	-	-	-	-	2.91E-03	1.49E-03	4.11E-03	1.49E-03	4.11E-03	4.11E-03	4	100
Total Toxic Equivalency	pg TEQ/m³	*0.1 1*[1]	-	0.1	0	2.32E-03	1.51E-03	4.45E-03	4.45E-03	1.61E-03	1.69E-03	4	100

Note: All non-detectable results were reported as 1/2 of the detection limit

[1] O. Reg. 419/05 Schedule Upper Risk Thresholds

4.8.2 **Rundle Road Station Results**

Data recovery levels were acceptable for the D&F results at the Courtice Station (100% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for any of the D&F's during Q4. Table 11 is a summary of the statistics for this station.

Table 12: Rundle Road Station Q4 Monitoring Results for Dioxins and Furans

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	MECP Criteria (µg/m³)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
2,3,7,8-TCDD	pg/m³	-	-	-	-	5.29E-04	2.52E-04	9.47E-04	9.47E-04	2.52E-04	4.66E-04	4	100
1,2,3,7,8-PeCDD	pg/m³	-	-	-	-	8.53E-04	2.52E-04	2.09E-03	8.07E-04	2.52E-04	2.09E-03	4	100
1,2,3,4,7,8-HxCDD	pg/m³	-	-	-	-	1.82E-03	9.63E-04	2.80E-03	9.63E-04	1.72E-03	2.80E-03	4	100
1,2,3,6,7,8-HxCDD	pg/m³	-	-	-	-	1.77E-03	7.42E-04	4.70E-03	8.54E-04	7.42E-04	4.70E-03	4	100
1,2,3,7,8,9-HxCDD	pg/m³	-	-	-	-	1.82E-03	7.42E-04	4.81E-03	9.47E-04	7.42E-04	4.81E-03	4	100
1,2,3,4,6,7,8-HpCDD	pg/m³	-	-	-	-	3.66E-02	1.32E-02	7.98E-02	1.32E-02	2.61E-02	7.98E-02	4	100
OCDD	pg/m³	-	-	-	-	1.03E-01	2.95E-02	2.23E-01	2.95E-02	7.89E-02	2.23E-01	4	100
2,3,7,8-TCDF	pg/m³	-	-	-	-	1.15E-03	2.96E-04	1.55E-03	1.26E-03	1.48E-03	1.55E-03	4	100
1,2,3,7,8-PeCDF	pg/m³	-	-	-	-	1.28E-03	6.21E-04	1.80E-03	6.21E-04	1.72E-03	1.80E-03	4	100
2,3,4,7,8-PeCDF	pg/m³	-	-	-	-	8.28E-04	5.75E-04	1.40E-03	5.75E-04	6.53E-04	1.40E-03	4	100
1,2,3,4,7,8-HxCDF	pg/m³	-	-	-	-	8.66E-04	4.30E-04	1.37E-03	1.21E-03	4.30E-04	1.37E-03	4	100
1,2,3,6,7,8-HxCDF	pg/m³	-	-	-	-	1.06E-03	8.90E-04	1.37E-03	1.04E-03	8.90E-04	1.37E-03	4	100
2,3,4,6,7,8-HxCDF	pg/m³	-	-	-	-	1.01E-03	3.86E-04	2.02E-03	1.21E-03	3.86E-04	2.02E-03	4	100
1,2,3,7,8,9-HxCDF	pg/m³	-	-	-	-	9.72E-04	7.63E-04	1.30E-03	1.30E-03	8.90E-04	9.32E-04	4	100
1,2,3,4,6,7,8-HpCDF	pg/m³	-	-	-	-	3.42E-03	6.68E-04	5.53E-03	6.68E-04	3.65E-03	5.53E-03	4	100

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	MECP Criteria (µg/m³)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid Data
1,2,3,4,7,8,9-HpCDF	pg/m³	-	-	-	-	6.74E-04	5.19E-04	8.70E-04	8.70E-04	5.19E-04	7.63E-04	4	100
OCDF	pg/m³	-	-	-	-	2.67E-03	2.17E-03	3.96E-03	2.17E-03	2.23E-03	3.96E-03	4	100
Total Toxic Equivalency	pg TEQ/m³	*0.1* *1*[1]	-	0.1	0	3.15E-03	1.81E-03	5.73E-03	2.98E-03	1.81E-03	5.73E-03	4	100

Note: All non-detectable results were reported as 1/2 of the detection limit

[1] O. Reg. 419/05 Schedule Upper Risk Thresholds

5 DATA REQUESTS

The following sections outline any instrumentation issues encountered that have caused data loss at any of the monitors at each of the stations.

Appendix C contains monthly IZS zero trends for the NO_x and SO_2 analyzers at the Courtice and Rundle Road Stations.

Edit logs identifying missing data, maintenance times, calibrations and any other missing data have been included in **Appendix D**.

5.1 Courtice Road Station

Due to time based drift between the NO_x and SO_2 unit time prompting overnight IZS response and the datalogger time recording the response, the overnight IZS response periodically spanned over 15 min of the 00:00-01:00 or 01:00-02:00 hour. Since 75% valid data was not captured, there was not enough sample size required for the hour to be valid. This occurred periodically throughout Q4 until both times were synced up together. This issue was corrected by November 21, 2018.

On November 13 the TSP, NOx and SO_2 units were set up on a remote DAS. The SO_2 analyzer was changed out and replaced from the decommissioned Crago Station. The station did not record data from 09:00 to 15:00.

On December 30 the TSP unit had a tape break occur. The tape was replaced in January 2019.

The PAH sample on November 22, 2018 was invalid due to a large sample volume collected.

5.2 Rundle Road Station

Due to time based drift between the SO_2 unit time prompting overnight IZS response and the datalogger time recording the response, the overnight IZS response periodically spanned over 15 min of the 00:00-01:00 or 01:00-02:00 hour. Since 75% valid data was not captured, there was not enough sample size required for the hour to be valid. This occurred periodically throughout Q4 until both times were synced up together. This issue was corrected by November 21, 2018.

The TSP sample on November 10, 2018 was invalid due to a pump failure.

On November 13, 2018 the NOx and SO_2 units were set up on a remote DAS. The station did not record data from 09:00 to 20:00.

From November 15, 2018 to December 12, 2018 the anemometer malfunctioned therefore the wind direction and speed for this time period was invalidated.

On November 21, 2018 there was a suspected power loss from 16:00 to 19:00.

On November 30, 2018 there was a suspected power loss from 15:00 to 16:00.

The TSP sample on December 10, 2018 was invalid due to an insufficient sample volume collected.

5.3 Fence Line Station

The TSP sampling ceased on December 4, 2018 at the Fence Line station therefore no samples were collected between December 4th and the end of Q4.

6 CONCLUSIONS

This Q4 report provides a summary of the ambient air quality data collected at the Courtice, Rundle Road and Fence Line Stations. Throughout this monitoring period, there were three exceedances of Benzo(a)pyrene. On December 4th Benzo(a)pyrene exceeded at both Courtice and Rundle stations. On December 16th Benzo(a)pyrene only exceeded only at the Rundle station. Based on available wind rose data RWDI believes that DYEC was not a major contributor of Benzo(a)pyrene measured at these stations on those dates. Other than the three Benzo(a)pyrene exceedances there were no other exceedances of any AAQC or HHRA Health Based Criteria. Data recovery rates were acceptable and valid for all measured Q4 parameters; however, there were a few monthly averages that were invalid due to obtaining less than 75% data; namely Rundle November and December wind speed and direction meteorological parameters.

7 REFERENCES

1. Canadian Council of Ministers of the Environment, 2012. Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone. PN 1483 978-1-896997-91-9 PDF
2. Environment Canada, 2013. Canadian Ambient Air Quality Standards. [Online]
3. Ontario Ministry of the Environment and Climate Change, 2012. [Standards Development Branch] Ontario's Ambient Air Quality Criteria (Sorted by Contaminant Name). PIBS #6570e01

APPENDIX A

Table A1: 2018 Summary Statistics for Q4

Courtice Monitoring Station Data Statistics	Maximum 1 hr Mean					Maximum 24 hr Mean					Monthly Mean					% valid hours				
Compound	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2
Units	($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				(%)				
AAQC				200	250	28[A]			100	100										
October	18	87	69	35	25	11	32	15	16	6	4	8	2	5	2	99.9	98.0	98.0	98.0	97.8
November	29	72	36	71	72	18	30	11	19	12	5	9	2	7	4	98.9	96.4	96.4	96.4	96.4
December	40	76	56	33	42	35	35	17	17	9	9	12	3	9	2	92.9	99.2	99.2	99.2	99.3
Q4 Arithmetic Mean											6	10	3	7	3	97.2	97.9	97.9	97.9	97.9

Rundle Monitoring Station Data Statistics	Maximum 1 hr Mean					Maximum 24 hr Mean					Monthly Mean					% valid hours				
Compound	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2	$PM_{2.5}$	NO_x	NO	NO_2	SO_2
Units	($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				(%)				
AAQC				200	250	28[A]			100	100										
October	27	31	18	23	3	16	14	4	10	1	4	6	2	4	0	99.7	97.0	97.0	97.2	97.0
November	29	39	26	25	10	16	18	5	13	2	5	7	2	5	1	97.5	95.1	95.1	95.1	95.8
December	68	49	30	29	2	34	20	7	16	1	9	7	1	5	0	99.3	99.2	99.5	99.2	99.6
Q4 Arithmetic Mean											6	7	2	5	0	98.9	97.1	97.2	97.2	97.5

Event Statistics	Mean > 1 hr AAQC for			Mean > 1 hr AAQC for			Rolling Mean > 24 hr			Rolling Mean > 24 hr		
Compound	$PM_{2.5}$	NO_2	SO_2	$PM_{2.5}$	NO_2	SO_2	$PM_{2.5}$	NO_2	SO_2	$PM_{2.5}$	NO_2	SO_2
Units	No.			No.			No.			No.		
October		0	0		0	0	N/A	0	0	N/A	0	0
November		0	0		0	0	N/A	0	0	N/A	0	0
December		0	0		0	0	N/A	0	0	N/A	0	0
Q4 Total		0	0		0	0	N/A	0	0	N/A	0	0

Courtice Station MET Statistics	Maximum 1 hr Mean					Minimum 1 hr Mean					Monthly Mean					Total	% valid hours					
Parameter	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain	Rain	WS	WD	Temp	RH	Pres	Rain
Units	(km/hr)	(°C)	(%)	"Hg	mm	(km/hr)	(°C)	(%)	"Hg	mm	(km/hr)	(°C)	(%)	"Hg	mm	mm	(%)					
October	34	23	94	30.2	5.7	0	-1	36	29.3	0.0	11	9	73	29.7	0.1	63.1	100.0	100.0	100.0	100.0	100.0	100.0
November	44	13	94	30.3	4.0	1	-13	39	29.1	0.0	14	2	72	29.7	0.1	78.4	100.0	100.0	99.0	94.6	99.0	99.0
December	38	8	95	30.3	5.4	0	-10	42	28.9	0.0	12	0	75	29.8	0.1	49.1	99.7	99.7	100.0	100.0	100.0	100.0
Q4 Arithmetic Mean											13	3	73	29.7	0.1	190.6	99.9	99.9	99.7	99.3	99.7	99.7

Rundle Station MET Statistics	Maximum 1 hr Mean				Minimum 1 hr Mean				Monthly Mean				Total	% valid hours				
Parameter	WS	Temp	RH	Rain	WS	Temp	RH	Rain	WS	Temp	RH	Rain	Rain	WS	WD	Temp	RH	Rain
Units	(km/hr)	(°C)	(%)	mm	(km/hr)	(°C)	(%)	mm	(km/hr)	(°C)	(%)	mm	mm	(%)				
October	29	24	99	6.5	0	-3	38	0.0	11	8	77	0.1	65.4	100.0	100.0	100.0	100.0	100.0
November	41	13	100	4.7	0	-14	43	0.0	-	1	79	0.1	81.9	45.0	43.5	97.9	97.9	81.9
December	26	9	100	2.6	0	-11	46	0.0	-	-1	80	0.0	14.7	29.7	30.7	93.0	93.0	93.0
Q4 Arithmetic Mean									11	3	79	0.1	162.0	58.4	58.4	97.0	97.0	91.8

Table A2: 2018 Q4 Station Courtice Monitoring Results for $PM_{2.5}$

Data Statistics	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$
	No.	(ug/m^3)	(ug/m^3)	(ug/m^3)	No.	%
October	N/A	4	18	11	743	99.9
November	N/A	5	29	18	712	98.9
December	N/A	9	40	35	691	92.9

Table A3: 2018 Q4 Station Rundle Monitoring Results for $PM_{2.5}$

Data Statistics	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$
	No.	(ug/m^3)	(ug/m^3)	(ug/m^3)	No.	%
October	N/A	4	27	16	742	99.7
November	N/A	5	29	16	702	97.5
December	N/A	9	68	34	739	99.3

Table A4: 2018 Q4 Station Courtice Monitoring Results for NOx

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO_x	NO_x	NO_x	NO_x	NO_x	NO_x	NO_x
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	8	87	32	729	98.0
November	N/A	N/A	9	72	30	694	96.4
December	N/A	N/A	12	76	35	738	99.2

Table A5: 2018 Q4 Station Rundle Monitoring Results for NOx

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO_x	NO_x	NO_x	NO_x	NO_x	NO_x	NO_x
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	6	31	14	722	97.0
November	N/A	N/A	7	39	18	685	95.1
December	N/A	N/A	7	49	20	738	99.2

Table A6: 2018 Q4 Station Courtice Monitoring Results for NO

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO	NO	NO	NO	NO	NO	NO
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	2	69	15	729	98.0
November	N/A	N/A	2	36	11	694	96.4
December	N/A	N/A	3	56	17	738	99.2

Table A7: 2018 Q4 Station Rundle Monitoring Results for NO

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO	NO	NO	NO	NO	NO	NO
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	2	18	4	722	97.0
November	N/A	N/A	2	26	5	685	95.1
December	N/A	N/A	1	30	7	740	99.5

Table A8: 2018 Q4 Station Courtice Monitoring Results for NO_2

Data Statistics	Events > 1 hr AAQC	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	5	35	16	729	98.0
November	0	0	7	71	19	694	96.4
December	0	0	9	33	17	738	99.2

Table A9: 2018 Q4 Station Rundle Monitoring Results for NO_2

Data Statistics	Events > 1 hr AAQC	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	4	23	10	723	97.2
November	0	0	5	25	13	685	95.1
December	0	0	5	29	16	738	99.2

Table A10: 2018 Q4 Station Courtice Monitoring Results for SO_2

Data Statistics	Events > 1 hr AAQC	Rollling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	SO_2	SO_2	SO_2	SO_2	SO_2	SO_2	SO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	1.7	25	6	728	97.8
November	0	0	4.0	72	12	694	96.4
December	0	0	2.3	42	9	739	99.3

Table A11: 2018 Q4 Station Rundle Monitoring Results for SO_2

Data Statistics	Events > 1 hr AAQC	Rollling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	SO_2	SO_2	SO_2	SO_2	SO_2	SO_2	SO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	0.5	3	1	722	97.0
November	0	0	0.7	10	2	690	95.8
December	0	0	0.3	2	1	741	99.6

Table A12: 2018 Q4 Courtice Meterological Station Windspeed Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Wind Speed	Wind Speed	Wind Speed	Wind Speed
	(km/hr)	(km/hr)	(km/hr)	(%)
October	34	0	11	100.0
November	44	1	14	100.0
December	38	0	12	99.7

Table A13: 2018 Q4 Rundle Meterological Station Windspeed Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Wind Speed	Wind Speed	Wind Speed	Wind Speed
	(km/hr)	(km/hr)	(km/hr)	(%)
October	29	0	11	100.0
November	41	0	13	45.0
December	26	0	9	29.7

Table A14: 2018 Q4 Courtice Meterological Station Wind Direction Data Summary

MET Statistics	% valid hours
Month	Wind Direction
	(%)
October	100.0
November	100.0
December	99.7

Table A15: 2018 Q4 Rundle Meterological Station Wind Direction Data Summary

MET Statistics	% valid hours
Month	Wind Direction
	(%)
October	100.0
November	43.5
December	30.7

Table A16: 2018 Q4 Courtice Meterological Station Temperature Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Temperature	Temperature	Temperature	Temperature
	(°C)	(°C)	(°C)	(%)
October	23	-1	9	100.0
November	13	-13	2	99.0
December	8	-10	0	100.0

Table A17: 2018 Q4 Rundle Meterological Station Temperature Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Temperature	Temperature	Temperature	Temperature
	(°C)	(°C)	(°C)	(%)
October	24	-3	8	100.0
November	13	-14	1	97.9
December	9	-11	-1	93.0

Table A18: 2018 Q4 Courtice Meterological Station Relative Humidity Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	% valid hours
Month	Relative Humidity	Relative Humidity	Relative Humidity	Relative Humidity
	(%)	(%)	(%)	(%)
October	94	36	73	100.0
November	94	39	72	94.6
December	95	42	75	100.0

Table A19: 2018 Q4 Rundle Meterological Station Relative Humidity Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	% valid hours
Month	Relative Humidity	Relative Humidity	Relative Humidity	Relative Humidity
	(%)	(%)	(%)	(%)
October	99	38	77	100.0
November	100	43	79	97.9
December	100	46	80	93.0

Table A20: 2018 Q4 Courtice Meterological Station Precipitation Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Total	% valid hours
Month	Precipitation	Precipitation	Precipitation	Precipitation	Precipitation
	(mm)	(mm)	(mm)	(mm)	(mm)
October	5.7	0.0	0.1	63.1	100.0
November	4.0	0.0	0.1	78.4	99.0
December	5.4	0.0	0.1	49.1	100.0

Table A21: 2018 Q4 Rundle Meterological Station Precipitation Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Total	% valid hours
Month	Precipitation	Precipitation	Precipitation	Precipitation	Precipitation
	(mm)	(mm)	(mm)	(mm)	(mm)
October	6.5	0.0	0.1	65.4	100.0
November	4.7	0.0	0.1	81.9	81.9
December	2.6	0.0	0.0	14.7	93.0

Table A22: 2018 Q4 Courtice Meterological Station Pressure Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Pressure	Pressure	Pressure	Pressure
	(mmHg)	(mmHg)	(mmHg)	(%)
October	30.2	29.3	29.7	100.0
November	30.3	29.1	29.7	99.0
December	30.3	28.9	29.8	100.0

APPENDIX B

Table B1: Summary of Sample Flow Rate and Sample Duration for Dioxins & Furans

Sample Date	Courtice			Rundle		
	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume
	No.	(min)	(m^3)	No.	(min)	(m^3)
October 17, 2018	COURTICE-DX/PAH-OCT17	1436	319	RUNDLE-DX/PAH-OCT17	1437	322
November 10, 2018	COURTICE-DX/PAH-NOV10	1431	338	RUNDLE-DX/PAH-NOV10	1432	337
December 4, 2018	COURTICE-DX/PAH-DEC4	1442	338	RUNDLE-DX/PAH-DEC4	1433	323
December 28, 2018	COURTICE-DX/PAH-DEC28	1429	343	RUNDLE-DX/PAH-DEC28	1430	321

Table B2: 2018 Courtice Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	17 Oct-18	10 Nov-18	4-Dec 18	28 Dec 18
2,3,7,8-TCDD	pg/m^3	-	-	1.88E-03	3.55E-04	4.29E-04	3.21E-04
1,2,3,7,8-PeCDD	pg/m^3	-	-	7.99E-04	2.07E-04	2.07E-04	3.79E-04
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	1.88E-03	6.95E-04	6.95E-04	6.27E-04
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	1.57E-03	6.21E-04	6.21E-04	8.75E-04
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	1.72E-03	5.92E-04	6.66E-04	7.14E-04
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	4.64E-02	2.78E-02	2.78E-02	1.22E-02
OCDD	pg/m^3	-	-	7.15E-02	7.01E-02	7.01E-02	4.37E-02
2,3,7,8-TCDF	pg/m^3	-	-	7.05E-04	5.77E-05	5.77E-05	3.21E-04
1,2,3,7,8-PeCDF	pg/m^3	-	-	5.96E-04	7.40E-05	7.40E-05	5.69E-04
2,3,4,7,8-PeCDF	pg/m^3	-	-	5.64E-04	8.73E-04	8.73E-04	5.10E-04
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	1.24E-03	5.33E-04	5.33E-04	6.12E-04
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	1.08E-03	4.88E-04	4.88E-04	4.52E-04
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	1.24E-03	8.88E-04	8.88E-04	6.27E-04
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	1.35E-03	6.51E-04	6.51E-04	5.54E-04
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	1.11E-03	2.51E-03	2.51E-03	2.06E-03
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	1.11E-03	5.18E-04	5.18E-04	3.64E-04
OCDF	pg/m^3	-	-	1.49E-03	4.11E-03	4.11E-03	1.91E-03
Total Toxic Equivalency	pg TEQ/m^3	*0.1* *1* [1]	-	4.45E-03	1.61E-03	1.69E-03	1.51E-03

NOTE: All non-detectable results were reported as 1/2 of the detection limit

[1] O. Reg. 419/05 Schedule Upper Risk Thresholds

Table B2: 2018 Courtice Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	-	-	7.46E-04	3.21E-04	1.88E-03	1.88E-03	3.55E-04	4.29E-04	4	100
1,2,3,7,8-PeCDD	-	-	3.98E-04	2.07E-04	7.99E-04	7.99E-04	2.07E-04	3.79E-04	4	100
1,2,3,4,7,8-HxCDD	-	-	9.75E-04	6.27E-04	1.88E-03	1.88E-03	6.95E-04	6.95E-04	4	100
1,2,3,6,7,8-HxCDD	-	-	9.21E-04	6.21E-04	1.57E-03	1.57E-03	6.21E-04	8.75E-04	4	100
1,2,3,7,8,9-HxCDD	-	-	9.24E-04	5.92E-04	1.72E-03	1.72E-03	5.92E-04	7.14E-04	4	100
1,2,3,4,6,7,8-HpCDD	-	-	2.86E-02	1.22E-02	4.64E-02	4.64E-02	2.78E-02	2.78E-02	4	100
OCDD	-	-	6.39E-02	4.37E-02	7.15E-02	7.15E-02	7.01E-02	7.01E-02	4	100
2,3,7,8-TCDF	-	-	2.85E-04	5.77E-05	7.05E-04	7.05E-04	5.77E-05	3.21E-04	4	100
1,2,3,7,8-PeCDF	-	-	3.28E-04	7.40E-05	5.96E-04	5.96E-04	7.40E-05	5.69E-04	4	100
2,3,4,7,8-PeCDF	-	-	7.05E-04	5.10E-04	8.73E-04	5.64E-04	8.73E-04	8.73E-04	4	100
1,2,3,4,7,8-HxCDF	-	-	7.29E-04	5.33E-04	1.24E-03	1.24E-03	5.33E-04	6.12E-04	4	100
1,2,3,6,7,8-HxCDF	-	-	6.27E-04	4.52E-04	1.08E-03	1.08E-03	4.88E-04	4.88E-04	4	100
2,3,4,6,7,8-HxCDF	-	-	9.10E-04	6.27E-04	1.24E-03	1.24E-03	8.88E-04	8.88E-04	4	100
1,2,3,7,8,9-HxCDF	-	-	8.01E-04	5.54E-04	1.35E-03	1.35E-03	6.51E-04	6.51E-04	4	100
1,2,3,4,6,7,8-HpCDF	-	-	2.05E-03	1.11E-03	2.51E-03	1.11E-03	2.51E-03	2.51E-03	4	100
1,2,3,4,7,8,9-HpCDF	-	-	6.28E-04	3.64E-04	1.11E-03	1.11E-03	5.18E-04	5.18E-04	4	100
OCDF	-	-	2.91E-03	1.49E-03	4.11E-03	1.49E-03	4.11E-03	4.11E-03	4	100
Total Toxic Equivalency	0.1	0	2.32E-03	1.51E-03	4.45E-03	4.45E-03	1.61E-03	1.69E-03	4	100

Table B3: 2018 Rundle Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	17 Oct-18	10 Nov-18	4-Dec 18	28 Dec 18
2,3,7,8-TCDD	pg/m^3	-	-	9.47E-04	2.52E-04	4.66E-04	4.52E-04
1,2,3,7,8-PeCDD	pg/m^3	-	-	8.07E-04	2.52E-04	2.64E-04	2.09E-03
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	9.63E-04	1.72E-03	1.80E-03	2.80E-03
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	8.54E-04	7.42E-04	7.76E-04	4.70E-03
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	9.47E-04	7.42E-04	7.76E-04	4.81E-03
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	1.32E-02	2.61E-02	2.73E-02	7.98E-02
OCDD	pg/m^3	-	-	2.95E-02	7.89E-02	8.26E-02	2.23E-01
2,3,7,8-TCDF	pg/m^3	-	-	1.26E-03	1.48E-03	1.55E-03	2.96E-04
1,2,3,7,8-PeCDF	pg/m^3	-	-	6.21E-04	1.72E-03	1.80E-03	9.81E-04
2,3,4,7,8-PeCDF	pg/m^3	-	-	5.75E-04	6.53E-04	6.83E-04	1.40E-03
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	1.21E-03	4.30E-04	4.50E-04	1.37E-03
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	1.04E-03	8.90E-04	9.32E-04	1.37E-03
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	1.21E-03	3.86E-04	4.04E-04	2.02E-03
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	1.30E-03	8.90E-04	9.32E-04	7.63E-04
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	6.68E-04	3.65E-03	3.82E-03	5.53E-03
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	8.70E-04	5.19E-04	5.43E-04	7.63E-04
OCDF	pg/m^3	-	-	2.17E-03	2.23E-03	2.33E-03	3.96E-03
Total Toxic Equivalency	pg TEQ/m^3	*0.1* *1* [1]	-	2.98E-03	1.81E-03	2.09E-03	5.73E-03

NOTE: All non-detectable results were reported as 1/2 of the detection limit

[1] O. Reg. 419/05 Schedule Upper Risk Thresholds

Table B3: 2018 Rundle Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	-	-	5.29E-04	2.52E-04	9.47E-04	9.47E-04	2.52E-04	4.66E-04	4	100
1,2,3,7,8-PeCDD	-	-	8.53E-04	2.52E-04	2.09E-03	8.07E-04	2.52E-04	2.09E-03	4	100
1,2,3,4,7,8-HxCDD	-	-	1.82E-03	9.63E-04	2.80E-03	9.63E-04	1.72E-03	2.80E-03	4	100
1,2,3,6,7,8-HxCDD	-	-	1.77E-03	7.42E-04	4.70E-03	8.54E-04	7.42E-04	4.70E-03	4	100
1,2,3,7,8,9-HxCDD	-	-	1.82E-03	7.42E-04	4.81E-03	9.47E-04	7.42E-04	4.81E-03	4	100
1,2,3,4,6,7,8-HpCDD	-	-	3.66E-02	1.32E-02	7.98E-02	1.32E-02	2.61E-02	7.98E-02	4	100
OCDD	-	-	1.03E-01	2.95E-02	2.23E-01	2.95E-02	7.89E-02	2.23E-01	4	100
2,3,7,8-TCDF	-	-	1.15E-03	2.96E-04	1.55E-03	1.26E-03	1.48E-03	1.55E-03	4	100
1,2,3,7,8-PeCDF	-	-	1.28E-03	6.21E-04	1.80E-03	6.21E-04	1.72E-03	1.80E-03	4	100
2,3,4,7,8-PeCDF	-	-	8.28E-04	5.75E-04	1.40E-03	5.75E-04	6.53E-04	1.40E-03	4	100
1,2,3,4,7,8-HxCDF	-	-	8.66E-04	4.30E-04	1.37E-03	1.21E-03	4.30E-04	1.37E-03	4	100
1,2,3,6,7,8-HxCDF	-	-	1.06E-03	8.90E-04	1.37E-03	1.04E-03	8.90E-04	1.37E-03	4	100
2,3,4,6,7,8-HxCDF	-	-	1.01E-03	3.86E-04	2.02E-03	1.21E-03	3.86E-04	2.02E-03	4	100
1,2,3,7,8,9-HxCDF	-	-	9.72E-04	7.63E-04	1.30E-03	1.30E-03	8.90E-04	9.32E-04	4	100
1,2,3,4,6,7,8-HpCDF	-	-	3.42E-03	6.68E-04	5.53E-03	6.68E-04	3.65E-03	5.53E-03	4	100
1,2,3,4,7,8,9-HpCDF	-	-	6.74E-04	5.19E-04	8.70E-04	8.70E-04	5.19E-04	7.63E-04	4	100
OCDF	-	-	2.67E-03	2.17E-03	3.96E-03	2.17E-03	2.23E-03	3.96E-03	4	100
Total Toxic Equivalency	0.1	0	3.15E-03	1.81E-03	5.73E-03	2.98E-03	1.81E-03	5.73E-03	4	100

Table B4: Summary of Sample Flow Rate and Sample Duration for Polycyclic Aromatic Hydrocarbons

Sample Date	Courtice			Rundle		
	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume
	No.	(min)	(m^3)	No.	(min)	(m^3)
October 5, 2018	COURTICE-PAH-OCT5	1397	302	RUNDLE-PAH-OCT5	1402	306
October 17, 2018	COURTICE-DX/PAH-OCT17	1436	319	RUNDLE-DX/PAH-OCT17	1437	322
October 29, 2018	COURTICE-PAH-OCT29	1427	342	RUNDLE-PAH-OCT29	1438	311
November 10, 2018	COURTICE-DX/PAH-NOV10	1431	338	RUNDLE-DX/PAH-NOV.10	1432	337
November 22, 2018	Invalid Sample	Invalid Sample	Invalid Sample	RUNDLE-DX/PAH-NOV22	1432	335
December 4, 2018	COURTICE-DX/PAH-DEC4	1442	338	RUNDLE-DX/PAH-DEC4	1433	323
December 16, 2018	COURTICE-DX/PAH-DEC16	1427	339	RUNDLE-DX/PAH-DEC16	1435	322
December 28, 2018	COURTICE-DX/PAH-DEC28	1429	343	RUNDLE-DX/PAH-DEC28	1430	321

Table B5: 2018 Courtice Station Q4 Monitoring Results for Polycyclic Aromatic Hydrocarbons

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	5-Oct-18	17 Oct-18	29 Oct-18	10 Nov-18	22 Nov-18	4-Dec 18	16 Dec 18	28 Dec 18
1-Methylnaphthalene	ng/m^3	*12000*	-	2.70E+00	2.44E+00	2.55E+00	1.23E+00		2.42E+00	3.78E+00	2.39E+00
2-Methylnaphthalene	ng/m^3	*10000*	-	4.27E+00	3.89E+00	4.09E+00	2.21E+00		3.91E+00	6.25E+00	3.70E+00
Acenaphthene	ng/m^3	-	-	1.04E+00	4.33E-01	6.58E-01	2.28E-01		3.22E-01	6.67E-01	7.08E-01
Acenaphthylene	ng/m^3	*3500*	-	2.08E-01	4.86E-02	1.62E-01	6.89E-02		4.29E-01	3.42E-01	6.41E-02
Anthracene	ng/m^3	*200*	-	8.38E-02	4.11E-02	7.16E-02	2.15E-02		3.05E-02	5.07E-02	6.24E-02
Benzo(a)Anthracene	ng/m^3	-	-	5.76E-03	1.24E-02	2.69E-02	6.21E-03		3.02E-02	2.14E-02	8.66E-03
Benzo(a)fluorene	ng/m^3	-	-	1.66E-03	2.35E-02	6.35E-02	2.37E-02		3.20E-02	7.85E-03	9.18E-03
Benzo(a)Pyrene	ng/m^3	*0.05* [1] *5* [2]	*1*	4.21E-03	1.45E-02	3.01E-02	1.07E-02		6.72E-02	3.19E-02	2.77E-03
Benzo(b)Fluoranthene	ng/m^3	-	-	1.86E-02	1.16E-02	6.58E-02	2.36E-02		4.97E-02	2.95E-04	2.27E-02
Benzo(b)fluorene	ng/m^3	-	-	3.31E-03	1.60E-02	5.38E-02	2.05E-02		2.95E-02	1.65E-02	1.34E-02
Benzo(e)Pyrene	ng/m^3	-	-	2.87E-02	1.55E-02	5.00E-02	7.54E-02		3.64E-02	6.87E-02	2.02E-02
Benzo(g,h,i)Perylene	ng/m^3	-	-	2.39E-02	2.44E-02	5.03E-02	2.00E-02	Invalid Sample	4.56E-02	7.29E-02	1.76E-02
Benzo(k)Fluoranthene	ng/m^3	-	-	1.49E-02	1.16E-02	5.53E-02	1.91E-02		6.89E-02	2.95E-04	2.06E-02
Biphenyl	ng/m^3	-	-	1.43E+00	9.31E-01	1.62E+00	1.18E+00		4.14E-01	1.64E+00	1.08E+00
Chrysene	ng/m^3	-	-	2.74E-02	3.20E-02	7.84E-02	2.99E-02		7.49E-02	8.79E-02	4.26E-02
Dibenzo(a,h)Anthracene	ng/m^3	-	-	4.87E-03	3.48E-03	6.35E-03	7.40E-04		7.40E-04	1.83E-02	1.57E-03
Fluoranthene	ng/m^3	-	-	2.88E-01	2.26E-01	3.98E-01	1.49E-01		2.01E-01	3.39E-01	4.23E-01
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	1.68E-02	1.44E-02	4.68E-02	1.66E-02		4.82E-02	7.14E-02	1.87E-02
Naphthalene	ng/m^3	*22500*	*22500*	1.00E+01	1.06E+01	1.71E+01	7.84E+00		1.56E+01	1.73E+01	1.06E+01
o-Terphenyl	ng/m^3	-	-	6.29E-03	5.14E-03	6.81E-03	4.41E-03		6.83E-03	9.14E-02	1.05E-02
Perylene	ng/m^3	-	-	1.66E-03	7.84E-04	4.56E-03	7.40E-04		7.40E-04	2.95E-04	8.16E-04
Phenanthrene	ng/m^3	-	-	1.51E+00	9.25E-01	1.60E+00	6.12E-01		7.37E-01	1.45E+00	1.41E+00
Pyrene	ng/m^3	-	-	1.95E-01	1.29E-01	2.51E-01	8.99E-02		1.50E-01	2.10E-01	2.00E-01
Tetralin	ng/m^3	-	-	1.75E+00	2.12E+00	2.64E+00	1.14E+00		2.19E+00	1.28E-01	1.15E+00
Total PAH[4]	ng/m^3	-	-	2.37E+01	2.20E+01	3.17E+01	1.50E+01		2.69E+01	3.27E+01	2.20E+01

NOTE: All non-detectable results were reported as 1/2 of the detection limit

[1] AAQC

[2] O. Reg. 419/05 Schedule Upper Risk Thresholds

[3] O. Reg. 419/05 24 Hour Guideline

[4] Total PAH sums all PAH contaminants

Table B5: 2018 Courtice Station Q4 Monitoring Results for Polycyclic Aromatic Hydrocarbons

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	12000	0	2.50E+00	1.23E+00	3.78E+00	2.70E+00	1.23E+00	3.78E+00	7	88
2-Methylnaphthalene	10000	0	4.05E+00	2.21E+00	6.25E+00	4.27E+00	2.21E+00	6.25E+00	7	88
Acenaphthene	-	-	5.80E-01	2.28E-01	1.04E+00	1.04E+00	2.28E-01	7.08E-01	7	88
Acenaphthylene	3500	0	1.89E-01	4.86E-02	4.29E-01	2.08E-01	6.89E-02	4.29E-01	7	88
Anthracene	200	0	5.17E-02	2.15E-02	8.38E-02	8.38E-02	2.15E-02	6.24E-02	7	88
Benzo(a)Anthracene	-	-	1.59E-02	5.76E-03	3.02E-02	2.69E-02	6.21E-03	3.02E-02	7	88
Benzo(a)fluorene	-	-	2.30E-02	1.66E-03	6.35E-02	6.35E-02	2.37E-02	3.20E-02	7	88
Benzo(a)Pyrene	0.05	1	2.30E-02	2.77E-03	6.72E-02	3.01E-02	1.07E-02	6.72E-02	7	88
Benzo(b)Fluoranthene	-	-	2.75E-02	2.95E-04	6.58E-02	6.58E-02	2.36E-02	4.97E-02	7	88
Benzo(b)fluorene	-	-	2.19E-02	3.31E-03	5.38E-02	5.38E-02	2.05E-02	2.95E-02	7	88
Benzo(e)Pyrene	-	-	4.21E-02	1.55E-02	7.54E-02	5.00E-02	7.54E-02	6.87E-02	7	88
Benzo(g,h,i)Perylene	-	-	3.64E-02	1.76E-02	7.29E-02	5.03E-02	2.00E-02	7.29E-02	7	88
Benzo(k)Fluoranthene	-	-	2.72E-02	2.95E-04	6.89E-02	5.53E-02	1.91E-02	6.89E-02	7	88
Biphenyl	-	-	1.19E+00	4.14E-01	1.64E+00	1.62E+00	1.18E+00	1.64E+00	7	88
Chrysene	-	-	5.33E-02	2.74E-02	8.79E-02	7.84E-02	2.99E-02	8.79E-02	7	88
Dibenzo(a,h)Anthracene	-	-	5.15E-03	7.40E-04	1.83E-02	6.35E-03	7.40E-04	1.83E-02	7	88
Fluoranthene	-	-	2.89E-01	1.49E-01	4.23E-01	3.98E-01	1.49E-01	4.23E-01	7	88
Indeno(1,2,3-cd)Pyrene	-	-	3.33E-02	1.44E-02	7.14E-02	4.68E-02	1.66E-02	7.14E-02	7	88
Naphthalene	22500	0	1.27E+01	7.84E+00	1.73E+01	1.71E+01	7.84E+00	1.73E+01	7	88
o-Terphenyl	-	-	1.88E-02	4.41E-03	9.14E-02	6.81E-03	4.41E-03	9.14E-02	7	88
Perylene	-	-	1.37E-03	2.95E-04	4.56E-03	4.56E-03	7.40E-04	8.16E-04	7	88
Phenanthrene	-	-	1.18E+00	6.12E-01	1.60E+00	1.60E+00	6.12E-01	1.45E+00	7	88
Pyrene	-	-	1.75E-01	8.99E-02	2.51E-01	2.51E-01	8.99E-02	2.10E-01	7	88
Tetralin	-	-	1.59E+00	1.28E-01	2.64E+00	2.64E+00	1.14E+00	2.19E+00	7	88
Total PAH[4]	-	-	2.48E+01	1.50E+01	3.27E+01	3.17E+01	1.50E+01	3.27E+01	7	88

Table B6: 2018 Rundle Station Q4 Monitoring Results for Polycyclic Aromatic Hydrocarbons

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	5-Oct-18	17 Oct-18	29 Oct-18	10 Nov-18	22 Nov-18	4-Dec 18	16 Dec 18	28 Dec 18
1-Methylnaphthalene	ng/m^3	*12000*	-	2.87E+00	2.25E+00	2.84E+00	1.46E+00	2.86E+00	2.35E+00	2.43E+00	1.52E+00
2-Methylnaphthalene	ng/m^3	*10000*	-	5.20E+00	3.39E+00	4.34E+00	2.52E+00	4.99E+00	3.22E+00	4.32E+00	2.36E+00
Acenaphthene	ng/m^3	-	-	2.33E+00	3.14E-01	6.62E-01	2.91E-01	2.33E-01	2.41E-01	7.17E-01	2.87E-01
Acenaphthylene	ng/m^3	*3500*	-	9.84E-02	7.83E-02	1.28E-01	1.60E-01	6.27E-01	3.22E-01	4.94E-01	2.06E-01
Anthracene	ng/m^3	*200*	-	1.21E-01	5.50E-02	1.05E-01	6.71E-02	5.43E-02	4.33E-02	1.06E-01	3.64E-02
Benzo(a)Anthracene	ng/m^3	-	-	6.41E-03	1.28E-02	3.25E-02	8.13E-03	2.96E-02	3.44E-02	3.39E-02	1.77E-02
Benzo(a)fluorene	ng/m^3	-	-	1.63E-03	3.66E-02	8.97E-02	4.51E-02	6.48E-02	4.15E-02	2.00E-02	2.80E-02
Benzo(a)Pyrene	ng/m^3	*0.05* [1] *5* [2]	*1*	5.13E-03	1.64E-02	2.68E-02	1.15E-02	2.04E-02	7.62E-02	6.06E-02	1.73E-02
Benzo(b)Fluoranthene	ng/m^3	-	-	2.53E-02	1.75E-02	8.17E-02	3.56E-02	1.30E-01	6.41E-02	3.11E-04	4.14E-02
Benzo(b)fluorene	ng/m^3	-	-	1.63E-03	2.31E-02	7.59E-02	4.09E-02	4.42E-02	2.78E-02	1.53E-02	1.27E-02
Benzo(e)Pyrene	ng/m^3	-	-	2.48E-02	1.83E-02	6.59E-02	7.42E-04	8.39E-02	5.11E-02	6.06E-02	4.11E-02
Benzo(g,h,i)Perylene	ng/m^3	-	-	2.07E-02	2.35E-02	5.59E-02	2.56E-02	7.16E-02	5.26E-02	9.60E-02	3.01E-02
Benzo(k)Fluoranthene	ng/m^3	-	-	1.99E-02	1.72E-02	5.95E-02	2.68E-02	1.23E-01	8.45E-02	3.11E-04	4.67E-02
Biphenyl	ng/m^3	-	-	1.65E+00	8.91E-01	1.68E+00	1.39E+00	2.03E+00	5.05E-01	8.51E-01	9.19E-01
Chrysene	ng/m^3	-	-	4.44E-02	3.82E-02	9.94E-02	5.16E-02	2.37E-01	9.26E-02	1.17E-01	6.88E-02
Dibenzo(a,h)Anthracene	ng/m^3	-	-	6.57E-03	3.26E-03	6.30E-03	7.42E-04	1.24E-02	7.74E-04	1.59E-02	5.02E-03
Fluoranthene	ng/m^3	-	-	4.87E-01	2.43E-01	4.79E-01	2.61E-01	3.55E-01	2.34E-01	4.38E-01	2.49E-01
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	2.09E-02	1.85E-02	5.66E-02	2.35E-02	8.15E-02	5.60E-02	1.02E-01	3.06E-02
Naphthalene	ng/m^3	*22500*	*22500*	1.06E+01	1.03E+01	1.89E+01	9.41E+00	2.50E+01	1.60E+01	1.76E+01	1.00E+01
o-Terphenyl	ng/m^3	-	-	4.51E-03	5.19E-03	8.52E-03	5.52E-03	8.78E-03	6.93E-03	8.82E-02	4.77E-03
Perylene	ng/m^3	-	-	8.17E-04	7.76E-04	4.41E-03	7.42E-04	7.46E-04	7.74E-04	3.11E-04	4.42E-03
Phenanthrene	ng/m^3	-	-	2.39E+00	9.13E-01	1.81E+00	1.00E+00	1.46E+00	7.40E-01	1.83E+00	9.13E-01
Pyrene	ng/m^3	-	-	2.79E-01	1.50E-01	3.25E-01	1.91E-01	2.39E-01	1.54E-01	2.59E-01	1.87E-01
Tetralin	ng/m^3	-	-	1.55E+00	1.83E+00	2.57E+00	1.53E+00	1.79E+00	1.42E+00	7.67E+00	6.57E-01
Total PAH[4]	ng/m^3	-	-	2.77E+01	2.06E+01	3.45E+01	1.85E+01	4.05E+01	2.58E+01	3.73E+01	1.77E+01

NOTE: All non-detectable results were reported as 1/2 of the detection limit

[1] AAQC

[2] O. Reg. 419/05 Schedule Upper Risk Thresholds

[3] O. Reg. 419/05 24 Hour Guideline

[4] Total PAH sums all PAH contaminants

Table B6: 2018 Rundle Station Q4 Monitoring Results for Polycyclic Aromatic Hydrocarbons

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	Decemberr Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	*12000*	0	2.32E+00	1.46E+00	2.87E+00	2.87E+00	2.86E+00	2.43E+00	8	100
2-Methylnaphthalene	*10000*	0	3.79E+00	2.36E+00	5.20E+00	5.20E+00	4.99E+00	4.32E+00	8	100
Acenaphthene	-	-	6.34E-01	2.33E-01	2.33E+00	2.33E+00	2.91E-01	7.17E-01	8	100
Acenaphthylene	*3500*	0	2.64E-01	7.83E-02	6.27E-01	1.28E-01	6.27E-01	4.94E-01	8	100
Anthracene	*200*	0	7.34E-02	3.64E-02	1.21E-01	1.21E-01	6.71E-02	1.06E-01	8	100
Benzo(a)Anthracene	-	-	2.19E-02	6.41E-03	3.44E-02	3.25E-02	2.96E-02	3.44E-02	8	100
Benzo(a)fluorene	-	-	4.09E-02	1.63E-03	8.97E-02	8.97E-02	6.48E-02	4.15E-02	8	100
Benzo(a)Pyrene	*0.05*	2	2.93E-02	5.13E-03	7.62E-02	2.68E-02	2.04E-02	7.62E-02	8	100
Benzo(b)Fluoranthene	-	-	4.95E-02	3.11E-04	1.30E-01	8.17E-02	1.30E-01	6.41E-02	8	100
Benzo(b)fluorene	-	-	3.02E-02	1.63E-03	7.59E-02	7.59E-02	4.42E-02	2.78E-02	8	100
Benzo(e)Pyrene	-	-	4.33E-02	7.42E-04	8.39E-02	6.59E-02	8.39E-02	6.06E-02	8	100
Benzo(g,h,i)Perylene	-	-	4.70E-02	2.07E-02	9.60E-02	5.59E-02	7.16E-02	9.60E-02	8	100
Benzo(k)Fluoranthene	-	-	4.72E-02	3.11E-04	1.23E-01	5.95E-02	1.23E-01	8.45E-02	8	100
Biphenyl	-	-	1.24E+00	5.05E-01	2.03E+00	1.68E+00	2.03E+00	9.19E-01	8	100
Chrysene	-	-	9.36E-02	3.82E-02	2.37E-01	9.94E-02	2.37E-01	1.17E-01	8	100
Dibenzo(a,h)Anthracene	-	-	6.37E-03	7.42E-04	1.59E-02	6.57E-03	1.24E-02	1.59E-02	8	100
Fluoranthene	-	-	3.43E-01	2.34E-01	4.87E-01	4.87E-01	3.55E-01	4.38E-01	8	100
Indeno(1,2,3-cd)Pyrene	-	-	4.86E-02	1.85E-02	1.02E-01	5.66E-02	8.15E-02	1.02E-01	8	100
Naphthalene	*22500*	0	1.47E+01	9.41E+00	2.50E+01	1.89E+01	2.50E+01	1.76E+01	8	100
o-Terphenyl	-	-	1.66E-02	4.51E-03	8.82E-02	8.52E-03	8.78E-03	8.82E-02	8	100
Perylene	-	-	1.62E-03	3.11E-04	4.42E-03	4.41E-03	7.46E-04	4.42E-03	8	100
Phenanthrene	-	-	1.38E+00	7.40E-01	2.39E+00	2.39E+00	1.46E+00	1.83E+00	8	100
Pyrene	-	-	2.23E-01	1.50E-01	3.25E-01	3.25E-01	2.39E-01	2.59E-01	8	100
Tetralin	-	-	2.38E+00	6.57E-01	7.67E+00	2.57E+00	1.79E+00	7.67E+00	8	100
Total PAH[4]	-	-	2.78E+01	1.77E+01	4.05E+01	3.45E+01	4.05E+01	3.73E+01	8	100

Table B7: Summary of Sample Flow Rate and Sample Duration for Total Suspended Particulate

Sample Date	Courtice			Rundle			Fenceline		
	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume
	No.	(min)	(m^3)	No.	(min)	(m^3)	No.	(min)	(m^3)
October 5, 2018	738324	1396	1630	738326	1441	1630	738325	1442	1630
October 11, 2018	738328	1405	1630	738330	1435	1630	738329	1448	1630
October 17, 2018	738332	1400	1630	738458	1433	1630	738457	1450	1630
October 23, 2018	738460	1402	1630	738462	1429	1630	738461	1441	1630
October 29, 2018	738464	1405	1630	738466	1436	1630	738465	1445	1630
November 4, 2018	L2195875-2	1403	1530	738470	1436	1530	738469	1461	1761
November 10, 2018	738665	1408	1912	Invalid Sample	Invalid Sample	Invalid Sample	738666	1453	1654
November 16, 2018	738668	1341	1808	738669	1409	1683	738677	1446	1706
November 22, 2018	738671	1400	1917	738670	1409	1595	738676	1443	1623
November 28, 2018	738675	1402	1922	738673	1409	1627	738674	1448	1735
December 4, 2018	738480	1410	1942	738481	1411	1637	738479	1447	1694
December 10, 2018	738472	1408	1896	Invalid Sample	Invalid Sample	Invalid Sample	No Longer Sampling	No Longer Sampling	No Longer Sampling
December 16, 2018	738657	1403	1829	738633	1412	1655	No Longer Sampling	No Longer Sampling	No Longer Sampling
December 22, 2018	738653	1406	1683	738656	1384	1502	No Longer Sampling	No Longer Sampling	No Longer Sampling
December 28, 2018	738655	1403	1647	738654	1411	1612	No Longer Sampling	No Longer Sampling	No Longer Sampling

Table B8: 2018 Courtice Station Q4 Monitoring Results for Total Suspended Particulate and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	5-Oct-18	11 Oct-18	17 Oct-18	23 Oct-18	29 Oct-18	4-Nov-18	10 Nov-18	16 Nov-18	22 Nov-18
Particulate (TSP)	µg/m^3	*120*	*120*	16.9	19.3	14.2	17.1	8.7	7.8	13.7	9.8	18.0
Total Mercury (Hg)	µg/m^3	*2*	*2*	1.32E-05	1.53E-06	1.53E-06	7.17E-06	8.28E-06	1.63E-06	8.94E-06	5.97E-06	3.43E-05
Aluminum (Al)	µg/m^3	*4.8*	-	1.48E-01	1.19E-01	1.11E-01	1.46E-01	7.40E-02	1.16E-01	1.17E-01	2.49E-02	9.91E-02
Antimony (Sb)	µg/m^3	*25*	*25*	6.00E-04	4.80E-04	5.60E-04	8.60E-04	6.50E-04	6.20E-04	4.45E-04	1.10E-03	6.31E-04
Arsenic (As)	µg/m^3	*0.3*	*0.3*	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.80E-04	7.85E-04	8.30E-04	7.82E-04
Barium (Ba)	µg/m^3	*10*	*10*	5.10E-03	4.10E-03	5.00E-03	7.80E-03	4.60E-03	5.40E-03	5.33E-03	2.27E-03	6.57E-03
Beryllium (Be)	µg/m^3	*0.01*	*0.01*	3.07E-05	3.07E-05	3.07E-05	1.56E-03	1.47E-03	3.27E-05	2.62E-05	2.77E-05	2.61E-05
Bismuth (Bi)	µg/m^3	-	-	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.88E-04	4.71E-04	4.98E-04	4.69E-04
Boron (B)	µg/m^3	*120*	-	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.31E-02	1.05E-02	1.11E-02	1.04E-02
Cadmium (Cd)	µg/m^3	*0.025*	*0.025*	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.54E-04	5.23E-04	5.53E-04	5.22E-04
Chromium (Cr)	µg/m^3	*0.5*	-	5.40E-03	3.90E-03	4.00E-03	3.90E-03	4.10E-03	1.63E-03	1.31E-03	1.38E-03	1.30E-03
Cobalt (Co)	µg/m^3	*0.1*	*0.1*	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.54E-04	5.23E-04	5.53E-04	5.22E-04
Copper (Cu)	µg/m^3	*50*	-	2.87E-02	1.15E-02	2.27E-02	2.81E-02	2.11E-02	1.89E-02	1.89E-02	1.29E-02	1.73E-02
Iron (Fe)	µg/m^3	*4*	-	2.75E-01	2.58E-01	2.62E-01	2.71E-01	2.46E-01	2.43E-01	2.14E-01	8.41E-02	2.89E-01
Lead (Pb)	µg/m^3	*0.5*	*0.5*	2.30E-03	1.90E-03	9.20E-04	2.60E-03	2.20E-03	9.80E-04	1.88E-03	8.30E-04	2.14E-03
Magnesium (Mg)	µg/m^3	-	-	1.82E-01	2.72E-01	2.43E-01	2.31E-01	1.04E-01	1.21E-01	1.62E-01	6.08E-02	1.46E-01
Manganese (Mn)	µg/m^3	*0.4*	-	1.02E-02	9.02E-03	7.53E-03	8.47E-03	8.55E-03	9.30E-04	6.28E-04	2.82E-03	7.36E-03
Molybdenum (Mo)	µg/m^3	*120*	-	3.07E-04	6.60E-04	8.50E-04	1.41E-03	8.40E-04	5.80E-03	7.69E-03	5.53E-04	7.30E-04
Nickel (Ni)	µg/m^3	*0.2*	-	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.80E-04	7.85E-04	8.30E-04	7.82E-04
Phosphorus (P)	µg/m^3	-	-	1.08E+00	7.60E-01	1.06E+00	1.05E+00	2.30E-01	2.45E-01	1.96E-01	2.07E-01	1.96E-01
Selenium (Se)	µg/m^3	*10*	*10*	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.27E-03	2.62E-03	2.77E-03	2.61E-03
Silver (Ag)	µg/m^3	*1*	*1*	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.27E-04	2.62E-04	2.77E-04	2.61E-04
Strontium (Sr)	µg/m^3	*120*	-	5.60E-03	3.40E-03	2.80E-03	3.50E-03	9.20E-04	3.10E-03	2.56E-03	8.30E-04	4.85E-03
Thallium (Tl)	µg/m^3	-	-	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.94E-05	2.35E-05	2.49E-05	2.35E-05
Tin (Sn)	µg/m^3	*10*	*10*	6.80E-04	7.20E-04	8.40E-04	1.12E-03	8.60E-04	1.33E-03	1.26E-03	7.19E-04	2.61E-04
Titanium (Ti)	µg/m^3	*120*	-	7.40E-03	3.37E-03	3.37E-03	3.37E-03	3.37E-03	3.59E-03	2.88E-03	3.04E-03	2.87E-03
Uranium (Ur)	µg/m^3	*1.5*	-	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.27E-05	2.62E-05	2.77E-05	2.61E-05
Vanadium (V)	µg/m^3	*2*	*1*	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.63E-03	1.31E-03	1.38E-03	1.30E-03
Zinc (Zn)	µg/m^3	*120*	-	2.31E-02	2.76E-02	2.31E-02	2.64E-02	3.06E-02	5.35E-02	3.17E-02	3.66E-02	2.18E-02
Zirconium (Zr)	µg/m^3	*20*	-	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.54E-04	5.23E-04	5.53E-04	5.22E-04

NOTE: All non-detectable results were reported as 1/2 of the detection limit

Table B8: 2018 Courtice Station Q4 Monitoring Results for Total Suspended Particulate and Metals

Contaminant	28 Nov-18	4-Dec 18	10 Dec 18	16 Dec 18	22 Dec 18	28 Dec 18
Particulate (TSP)	4.6	17.2	20.8	10.9	5.7	6.0
Total Mercury (Hg)	1.03E-05	1.39E-05	1.23E-05	1.13E-05	1.49E-06	1.52E-06
Aluminum (Al)	3.33E-02	1.77E-01	3.22E-02	3.34E-02	5.80E-02	7.60E-02
Antimony (Sb)	2.45E-04	1.12E-03	4.22E-04	6.18E-04	2.60E-04	4.20E-04
Arsenic (As)	7.80E-04	7.72E-04	7.91E-04	8.20E-04	2.00E-03	2.30E-03
Barium (Ba)	2.60E-03	1.46E-02	4.22E-03	4.32E-03	4.50E-03	2.20E-03
Beryllium (Be)	2.60E-05	2.57E-05	2.64E-05	2.73E-05	2.97E-05	3.04E-05
Bismuth (Bi)	4.68E-04	4.63E-04	4.75E-04	4.92E-04	5.35E-04	5.46E-04
Boron (B)	1.04E-02	1.03E-02	1.05E-02	1.09E-02	1.19E-02	1.21E-02
Cadmium (Cd)	5.20E-04	5.15E-04	5.27E-04	5.47E-04	5.94E-04	6.07E-04
Chromium (Cr)	1.30E-03	3.35E-03	1.32E-03	1.37E-03	1.49E-03	1.52E-03
Cobalt (Co)	5.20E-04	5.15E-04	5.27E-04	5.47E-04	5.94E-04	6.07E-04
Copper (Cu)	1.26E-02	4.22E-02	1.18E-02	2.83E-02	9.00E-03	1.06E-02
Iron (Fe)	1.18E-01	4.80E-01	1.25E-01	1.82E-01	1.76E-01	1.97E-01
Lead (Pb)	7.80E-04	7.72E-04	7.91E-04	1.86E-03	8.91E-04	9.11E-04
Magnesium (Mg)	2.60E-02	1.91E-01	7.91E-02	2.73E-02	1.04E-01	9.80E-02
Manganese (Mn)	2.63E-03	1.09E-02	3.85E-03	3.23E-03	4.76E-03	7.02E-03
Molybdenum (Mo)	2.60E-04	9.27E-04	2.64E-04	2.73E-04	2.97E-04	3.04E-04
Nickel (Ni)	7.80E-04	7.72E-04	7.91E-04	8.20E-04	8.91E-04	9.11E-04
Phosphorus (P)	1.95E-01	1.93E-01	1.98E-01	2.05E-01	2.23E-01	2.28E-01
Selenium (Se)	2.60E-03	2.57E-03	2.64E-03	2.73E-03	2.97E-03	3.04E-03
Silver (Ag)	2.60E-04	2.57E-04	2.64E-04	2.73E-04	2.97E-04	3.04E-04
Strontium (Sr)	7.80E-04	5.36E-03	2.27E-03	1.64E-03	8.91E-04	2.10E-03
Thallium (Tl)	2.34E-05	2.32E-05	2.37E-05	2.46E-05	2.67E-05	2.73E-05
Tin (Sn)	2.60E-04	9.78E-04	5.80E-04	7.65E-04	2.97E-04	3.04E-04
Titanium (Ti)	2.86E-03	1.08E-02	2.90E-03	3.01E-03	3.27E-03	3.34E-03
Uranium (Ur)	2.60E-05	2.57E-05	2.64E-05	2.73E-05	2.97E-05	3.04E-05
Vanadium (V)	1.30E-03	1.29E-03	1.32E-03	1.37E-03	1.49E-03	1.52E-03
Zinc (Zn)	1.90E-02	2.10E-02	1.90E-02	1.06E-02	2.64E-02	1.58E-02
Zirconium (Zr)	5.20E-04	1.13E-03	5.27E-04	5.47E-04	5.94E-04	6.07E-04

Table B8: 2018 Courtice Station Q4 Monitoring Results for Total Suspended Particulate and Metals

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples
Particulate (TSP)	*120*	0	11.5	12.7	4.6	20.8	19.3	18.0	20.8	15
Total Mercury (Hg)	*2*	0	5.75E-06	8.90E-06	1.49E-06	3.43E-05	1.32E-05	3.43E-05	1.39E-05	15
Aluminum (Al)	*4.8*	0	7.70E-02	9.10E-02	2.49E-02	1.77E-01	1.48E-01	1.17E-01	1.77E-01	15
Antimony (Sb)	*25*	0	5.52E-04	6.02E-04	2.45E-04	1.12E-03	8.60E-04	1.10E-03	1.12E-03	15
Arsenic (As)	*0.3*	0	9.66E-04	1.03E-03	7.72E-04	2.30E-03	9.20E-04	9.80E-04	2.30E-03	15
Barium (Ba)	*10*	0	4.67E-03	5.24E-03	2.20E-03	1.46E-02	7.80E-03	6.57E-03	1.46E-02	15
Beryllium (Be)	*0.01*	0	4.82E-05	2.27E-04	2.57E-05	1.56E-03	1.56E-03	3.27E-05	3.04E-05	15
Bismuth (Bi)	-	-	5.16E-04	5.18E-04	4.63E-04	5.88E-04	5.52E-04	5.88E-04	5.46E-04	15
Boron (B)	*120*	0	1.15E-02	1.15E-02	1.03E-02	1.31E-02	1.23E-02	1.31E-02	1.21E-02	15
Cadmium (Cd)	*0.025*	0	5.74E-04	5.75E-04	5.15E-04	6.54E-04	6.13E-04	6.54E-04	6.07E-04	15
Chromium (Cr)	*0.5*	0	2.14E-03	2.48E-03	1.30E-03	5.40E-03	5.40E-03	1.63E-03	3.35E-03	15
Cobalt (Co)	*0.1*	0	5.74E-04	5.75E-04	5.15E-04	6.54E-04	6.13E-04	6.54E-04	6.07E-04	15
Copper (Cu)	*50*	0	1.79E-02	1.96E-02	9.00E-03	4.22E-02	2.87E-02	1.89E-02	4.22E-02	15
Iron (Fe)	*4*	0	2.10E-01	2.28E-01	8.41E-02	4.80E-01	2.75E-01	2.89E-01	4.80E-01	15
Lead (Pb)	*2*	0	1.30E-03	1.45E-03	7.72E-04	2.60E-03	2.60E-03	2.14E-03	1.86E-03	15
Magnesium (Mg)	-	-	1.12E-01	1.36E-01	2.60E-02	2.72E-01	2.72E-01	1.62E-01	1.91E-01	15
Manganese (Mn)	*0.4*	0	4.54E-03	5.86E-03	6.28E-04	1.09E-02	1.02E-02	7.36E-03	1.09E-02	15
Molybdenum (Mo)	*120*	0	7.09E-04	1.41E-03	2.60E-04	7.69E-03	1.41E-03	7.69E-03	9.27E-04	15
Nickel (Ni)	*0.2*	0	8.60E-04	8.63E-04	7.72E-04	9.80E-04	9.20E-04	9.80E-04	9.11E-04	15
Phosphorus (P)	-	-	3.16E-01	4.18E-01	1.93E-01	1.08E+00	1.08E+00	2.45E-01	2.28E-01	15
Selenium (Se)	*10*	0	2.87E-03	2.88E-03	2.57E-03	3.27E-03	3.07E-03	3.27E-03	3.04E-03	15
Silver (Ag)	*1*	0	2.87E-04	2.88E-04	2.57E-04	3.27E-04	3.07E-04	3.27E-04	3.04E-04	15
Strontium (Sr)	*120*	0	2.22E-03	2.71E-03	7.80E-04	5.60E-03	5.60E-03	4.85E-03	5.36E-03	15
Thallium (Tl)	-	-	2.58E-05	2.59E-05	2.32E-05	2.94E-05	2.76E-05	2.94E-05	2.73E-05	15
Tin (Sn)	*10*	0	6.41E-04	7.31E-04	2.60E-04	1.33E-03	1.12E-03	1.33E-03	9.78E-04	15
Titanium (Ti)	*120*	0	3.63E-03	3.96E-03	2.86E-03	1.08E-02	7.40E-03	3.59E-03	1.08E-02	15
Uranium (Ur)	*1.5*	0	2.87E-05	2.88E-05	2.57E-05	3.27E-05	3.07E-05	3.27E-05	3.04E-05	15
Vanadium (V)	*2*	0	1.43E-03	1.44E-03	1.29E-03	1.63E-03	1.53E-03	1.63E-03	1.52E-03	15
Zinc (Zn)	*120*	0	2.41E-02	2.58E-02	1.06E-02	5.35E-02	3.06E-02	5.35E-02	2.64E-02	15
Zirconium (Zr)	*20*	0	6.04E-04	6.16E-04	5.20E-04	1.13E-03	6.13E-04	6.54E-04	1.13E-03	15

Table B8: 2018 Courtice Station Q4 Monitoring Results for Total Suspended Particulate and Metals

Contaminant	% Valid data
Particulate (TSP)	100
Total Mercury (Hg)	100
Aluminum (Al)	100
Antimony (Sb)	100
Arsenic (As)	100
Barium (Ba)	100
Beryllium (Be)	100
Bismuth (Bi)	100
Boron (B)	100
Cadmium (Cd)	100
Chromium (Cr)	100
Cobalt (Co)	100
Copper (Cu)	100
Iron (Fe)	100
Lead (Pb)	100
Magnesium (Mg)	100
Manganese (Mn)	100
Molybdenum (Mo)	100
Nickel (Ni)	100
Phosphorus (P)	100
Selenium (Se)	100
Silver (Ag)	100
Strontium (Sr)	100
Thallium (Tl)	100
Tin (Sn)	100
Titanium (Ti)	100
Uranium (Ur)	100
Vanadium (V)	100
Zinc (Zn)	100
Zirconium (Zr)	100

Table B9: 2018 Rundle Station Q4 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	5-Oct-18	11-Oct-18	17-Oct-18	23-Oct-18	29-Oct-18	4-Nov-18	10-Nov-18	16-Nov-18	22-Nov-18
Particulate (TSP)	µg/m^3	*120*	*120*	16.7	59.7	32.7	31.1	14.2	12.7	Invalid Sample	16.8	57.6
Total Mercury (Hg)	µg/m^3	*2*	*2*	9.38E-06	1.38E-05	5.52E-06	7.17E-06	1.53E-06	1.63E-06		2.51E-05	1.57E-06
Aluminum (Al)	µg/m^3	*4.8*	-	1.52E-01	6.18E-01	2.52E-01	2.66E-01	1.28E-01	1.06E-01		7.50E-02	4.29E-01
Antimony (Sb)	µg/m^3	*25*	*25*	3.20E-04	6.90E-04	3.80E-04	6.70E-04	4.40E-04	8.70E-04		5.90E-04	3.30E-04
Arsenic (As)	µg/m^3	*0.3*	*0.3*	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.80E-04		8.91E-04	9.40E-04
Barium (Ba)	µg/m^3	*10*	*10*	3.90E-03	9.30E-03	7.90E-03	7.70E-03	3.40E-03	3.90E-03		5.20E-03	6.70E-03
Beryllium (Be)	µg/m^3	*0.01*	*0.01*	3.07E-05	3.07E-05	3.07E-05	1.81E-03	1.47E-03	3.27E-05		2.97E-05	3.13E-05
Bismuth (Bi)	µg/m^3	-	-	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.88E-04		5.35E-04	5.64E-04
Boron (B)	µg/m^3	*120*	-	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.31E-02		1.19E-02	1.25E-02
Cadmium (Cd)	µg/m^3	*0.025*	*0.025*	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.54E-04		5.94E-04	6.27E-04
Chromium (Cr)	µg/m^3	*0.5*	-	4.70E-03	6.80E-03	4.20E-03	4.30E-03	3.40E-03	1.63E-03		3.40E-03	1.57E-03
Cobalt (Co)	µg/m^3	*0.1*	*0.1*	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.54E-04		5.94E-04	6.27E-04
Copper (Cu)	µg/m^3	*50*	-	6.10E-03	1.35E-02	2.59E-02	2.37E-02	1.96E-02	1.67E-02		1.22E-02	1.15E-02
Iron (Fe)	µg/m^3	*4*	-	2.47E-01	8.91E-01	3.53E-01	3.84E-01	2.17E-01	2.25E-01		2.43E-01	5.95E-01
Lead (Pb)	µg/m^3	*0.5*	*0.5*	9.20E-04	2.40E-03	9.20E-04	2.50E-03	9.20E-04	9.80E-04		2.70E-03	9.40E-04
Magnesium (Mg)	µg/m^3	-	-	1.59E-01	8.47E-01	3.64E-01	3.61E-01	1.13E-01	1.23E-01		1.29E-01	5.02E-01
Manganese (Mn)	µg/m^3	*0.4*	-	5.71E-03	2.79E-02	1.22E-02	1.30E-02	6.01E-03	3.27E-04		9.12E-03	1.84E-02
Molybdenum (Mo)	µg/m^3	*120*	-	3.07E-04	7.50E-04	1.02E-03	1.09E-03	8.70E-04	6.26E-03		6.10E-04	3.13E-04
Nickel (Ni)	µg/m^3	*0.2*	-	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.80E-04		8.91E-04	9.40E-04
Phosphorus (P)	µg/m^3	-	-	8.80E-01	1.75E+00	8.70E-01	1.14E+00	2.30E-01	2.45E-01		2.23E-01	2.35E-01
Selenium (Se)	µg/m^3	*10*	*10*	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.27E-03		2.97E-03	3.13E-03
Silver (Ag)	µg/m^3	*1*	*1*	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.27E-04		2.97E-04	3.13E-04
Strontium (Sr)	µg/m^3	*120*	-	5.50E-03	2.70E-02	8.20E-03	7.90E-03	2.90E-03	4.10E-03		3.60E-03	1.84E-02
Thallium (Tl)	µg/m^3	-	-	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.94E-05		2.67E-05	2.82E-05
Tin (Sn)	µg/m^3	*10*	*10*	3.07E-04	8.40E-04	6.80E-04	1.06E-03	7.80E-04	3.27E-04		9.40E-04	6.70E-04
Titanium (Ti)	µg/m^3	*120*	-	3.37E-03	2.47E-02	3.37E-03	8.40E-03	3.37E-03	3.59E-03		3.27E-03	1.51E-02
Uranium (Ur)	µg/m^3	*1.5*	-	3.07E-05	9.80E-05	6.90E-05	6.80E-05	3.07E-05	3.27E-05		2.97E-05	3.13E-05
Vanadium (V)	µg/m^3	*2*	*1*	1.53E-03	1.88E-02	1.53E-03	1.53E-03	1.53E-03	1.63E-03		1.49E-03	1.57E-03
Zinc (Zn)	µg/m^3	*120*	-	1.17E-02	3.48E-02	2.69E-02	2.44E-02	1.45E-02	2.65E-02		7.14E-02	1.58E-02
Zirconium (Zr)	µg/m^3	*20*	-	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.54E-04		5.94E-04	6.27E-04

NOTE: All non-detectable results were reported as 1/2 of the detection limit

Table B9: 2018 Rundle Station Q4 Monitoring Results for TSP and Metals

Contaminant	28-Nov-18	4-Dec-18	10-Dec-18	16-Dec-18	22-Dec-18	28-Dec-18
Particulate (TSP)	8.7	24.7	Invalid Sample	8.5	5.3	8.6
Total Mercury (Hg)	1.54E-06	1.59E-05		1.31E-05	1.66E-06	1.55E-06
Aluminum (Al)	6.10E-02	2.83E-01		1.21E-02	7.20E-02	7.70E-02
Antimony (Sb)	7.68E-05	5.10E-04		5.10E-04	8.32E-05	4.90E-04
Arsenic (As)	9.22E-04	9.16E-04		9.06E-04	9.99E-04	2.10E-03
Barium (Ba)	2.00E-03	8.90E-03		4.30E-03	2.50E-03	5.90E-03
Beryllium (Be)	3.07E-05	3.05E-05		3.02E-05	3.33E-05	3.10E-05
Bismuth (Bi)	5.53E-04	5.50E-04		5.44E-04	5.99E-04	5.58E-04
Boron (B)	1.23E-02	1.22E-02		1.21E-02	1.33E-02	1.24E-02
Cadmium (Cd)	6.15E-04	6.11E-04		6.04E-04	6.66E-04	6.21E-04
Chromium (Cr)	3.50E-03	3.70E-03		1.51E-03	1.66E-03	1.55E-03
Cobalt (Co)	6.15E-04	6.11E-04		6.04E-04	6.66E-04	6.21E-04
Copper (Cu)	7.90E-03	4.15E-02		1.93E-02	7.50E-03	1.33E-02
Iron (Fe)	1.37E-01	4.01E-01		1.23E-01	1.48E-01	1.99E-01
Lead (Pb)	9.22E-04	9.16E-04		2.10E-03	9.99E-04	9.31E-04
Magnesium (Mg)	7.40E-02	2.52E-01		3.02E-02	1.22E-01	9.00E-02
Manganese (Mn)	3.15E-03	1.38E-02		2.66E-03	4.40E-03	4.35E-03
Molybdenum (Mo)	3.07E-04	1.68E-03		3.02E-04	3.33E-04	3.10E-04
Nickel (Ni)	9.22E-04	9.16E-04		9.06E-04	9.99E-04	9.31E-04
Phosphorus (P)	2.31E-01	2.29E-01		2.27E-01	2.50E-01	2.33E-01
Selenium (Se)	3.07E-03	3.05E-03		3.02E-03	3.33E-03	3.10E-03
Silver (Ag)	3.07E-04	3.05E-04		3.02E-04	3.33E-04	3.10E-04
Strontium (Sr)	2.30E-03	8.40E-03		9.06E-04	2.10E-03	2.30E-03
Thallium (Tl)	2.77E-05	2.75E-05		2.72E-05	3.00E-05	2.79E-05
Tin (Sn)	3.07E-04	7.40E-04		7.90E-04	3.33E-04	7.30E-04
Titanium (Ti)	3.38E-03	1.15E-02		3.32E-03	3.66E-03	3.41E-03
Uranium (Ur)	3.07E-05	3.05E-05		3.02E-05	3.33E-05	3.10E-05
Vanadium (V)	1.54E-03	1.53E-03		1.51E-03	1.66E-03	1.55E-03
Zinc (Zn)	2.28E-02	1.55E-02		1.05E-02	1.44E-02	1.11E-02
Zirconium (Zr)	6.15E-04	6.11E-04		6.04E-04	6.66E-04	6.21E-04

Table B9: 2018 Rundle Station Q4 Monitoring Results for TSP and Metals

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	DecemberMaximum Concentration	Number of Valid Samples
Particulate (TSP)	*120*	0	17.5	22.9	5.3	59.7	59.7	57.6	24.7	13
Total Mercury (Hg)	*2*	0	4.60E-06	7.65E-06	1.53E-06	2.51E-05	1.38E-05	2.51E-05	1.59E-05	13
Aluminum (Al)	*4.8*	0	1.30E-01	1.95E-01	1.21E-02	6.18E-01	6.18E-01	4.29E-01	2.83E-01	13
Antimony (Sb)	*25*	0	3.80E-04	4.58E-04	7.68E-05	8.70E-04	6.90E-04	8.70E-04	5.10E-04	13
Arsenic (As)	*0.3*	0	9.89E-04	1.02E-03	8.91E-04	2.10E-03	9.20E-04	9.80E-04	2.10E-03	13
Barium (Ba)	*10*	0	4.98E-03	5.51E-03	2.00E-03	9.30E-03	9.30E-03	6.70E-03	8.90E-03	13
Beryllium (Be)	*0.01*	0	5.71E-05	2.79E-04	2.97E-05	1.81E-03	1.81E-03	3.27E-05	3.33E-05	13
Bismuth (Bi)	-	-	5.58E-04	5.58E-04	5.35E-04	5.99E-04	5.52E-04	5.88E-04	5.99E-04	13
Boron (B)	*120*	0	1.24E-02	1.24E-02	1.19E-02	1.33E-02	1.23E-02	1.31E-02	1.33E-02	13
Cadmium (Cd)	*0.025*	0	6.20E-04	6.20E-04	5.94E-04	6.66E-04	6.13E-04	6.54E-04	6.66E-04	13
Chromium (Cr)	*0.5*	0	2.86E-03	3.23E-03	1.51E-03	6.80E-03	6.80E-03	3.50E-03	3.70E-03	13
Cobalt (Co)	*0.1*	0	6.20E-04	6.20E-04	5.94E-04	6.66E-04	6.13E-04	6.54E-04	6.66E-04	13
Copper (Cu)	*50*	0	1.47E-02	1.68E-02	6.10E-03	4.15E-02	2.59E-02	1.67E-02	4.15E-02	13
Iron (Fe)	*4*	0	2.71E-01	3.20E-01	1.23E-01	8.91E-01	8.91E-01	5.95E-01	4.01E-01	13
Lead (Pb)	*2*	0	1.26E-03	1.40E-03	9.16E-04	2.70E-03	2.50E-03	2.70E-03	2.10E-03	13
Magnesium (Mg)	-	-	1.70E-01	2.44E-01	3.02E-02	8.47E-01	8.47E-01	5.02E-01	2.52E-01	13
Manganese (Mn)	*0.4*	0	6.16E-03	9.31E-03	3.27E-04	2.79E-02	2.79E-02	1.84E-02	1.38E-02	13
Molybdenum (Mo)	*120*	0	6.58E-04	1.09E-03	3.02E-04	6.26E-03	1.09E-03	6.26E-03	1.68E-03	13
Nickel (Ni)	*0.2*	0	9.29E-04	9.30E-04	8.91E-04	9.99E-04	9.20E-04	9.80E-04	9.99E-04	13
Phosphorus (P)	-	-	3.77E-01	5.19E-01	2.23E-01	1.75E+00	1.75E+00	2.45E-01	2.50E-01	13
Selenium (Se)	*10*	0	3.10E-03	3.10E-03	2.97E-03	3.33E-03	3.07E-03	3.27E-03	3.33E-03	13
Silver (Ag)	*1*	0	3.10E-04	3.10E-04	2.97E-04	3.33E-04	3.07E-04	3.27E-04	3.33E-04	13
Strontium (Sr)	*120*	0	4.76E-03	7.20E-03	9.06E-04	2.70E-02	2.70E-02	1.84E-02	8.40E-03	13
Thallium (Tl)	-	-	2.79E-05	2.79E-05	2.67E-05	3.00E-05	2.76E-05	2.94E-05	3.00E-05	13
Tin (Sn)	*10*	0	6.00E-04	6.54E-04	3.07E-04	1.06E-03	1.06E-03	9.40E-04	7.90E-04	13
Titanium (Ti)	*120*	0	5.25E-03	6.96E-03	3.27E-03	2.47E-02	2.47E-02	1.51E-02	1.15E-02	13
Uranium (Ur)	*1.5*	0	3.83E-05	4.20E-05	2.97E-05	9.80E-05	9.80E-05	3.27E-05	3.33E-05	13
Vanadium (V)	*2*	0	1.88E-03	2.88E-03	1.49E-03	1.88E-02	1.88E-02	1.63E-03	1.66E-03	13
Zinc (Zn)	*120*	0	1.97E-02	2.31E-02	1.05E-02	7.14E-02	3.48E-02	7.14E-02	1.55E-02	13
Zirconium (Zr)	*20*	0	6.20E-04	6.20E-04	5.94E-04	6.66E-04	6.13E-04	6.54E-04	6.66E-04	13

Table B9: 2018 Rundle Station Q4 Monitoring Results for TSP and Metals

Contaminant	% Valid data
Particulate (TSP)	87
Total Mercury (Hg)	87
Aluminum (Al)	87
Antimony (Sb)	87
Arsenic (As)	87
Barium (Ba)	87
Beryllium (Be)	87
Bismuth (Bi)	87
Boron (B)	87
Cadmium (Cd)	87
Chromium (Cr)	87
Cobalt (Co)	87
Copper (Cu)	87
Iron (Fe)	87
Lead (Pb)	87
Magnesium (Mg)	87
Manganese (Mn)	87
Molybdenum (Mo)	87
Nickel (Ni)	87
Phosphorus (P)	87
Selenium (Se)	87
Silver (Ag)	87
Strontium (Sr)	87
Thallium (Tl)	87
Tin (Sn)	87
Titanium (Ti)	87
Uranium (Ur)	87
Vanadium (V)	87
Zinc (Zn)	87
Zirconium (Zr)	87

Table B10: 2018 Fenceline Station Q4 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	5-Oct-18	11-Oct-18	17-Oct-18	23-Oct-18	29-Oct-18	4-Nov-18	10-Nov-18	16-Nov-18	22-Nov-18
Particulate (TSP)	µg/m^3	*120*	*120*	20.8	28.4	27.3	21.3	13.1	8.2	15.1	13.7	46.9
Total Mercury (Hg)	µg/m^3	*2*	*2*	1.16E-05	6.62E-06	5.52E-06	7.17E-06	1.60E-05	1.42E-06	1.51E-06	1.69E-05	1.54E-06
Aluminum (Al)	µg/m^3	*4.8*	-	2.08E-01	3.06E-01	2.31E-01	1.53E-01	1.04E-01	9.50E-02	1.31E-01	5.10E-02	2.11E-01
Antimony (Sb)	µg/m^3	*25*	*25*	6.60E-04	1.11E-03	6.20E-04	1.03E-03	7.00E-04	6.50E-04	9.70E-04	4.40E-04	7.20E-04
Arsenic (As)	µg/m^3	*0.3*	*0.3*	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	8.52E-04	9.07E-04	8.79E-04	9.24E-04
Barium (Ba)	µg/m^3	*10*	*10*	8.80E-03	7.60E-03	9.50E-03	9.40E-03	5.50E-03	4.10E-03	5.40E-03	4.20E-03	9.70E-03
Beryllium (Be)	µg/m^3	*0.01*	*0.01*	3.07E-05	3.07E-05	3.07E-05	1.73E-03	1.66E-03	2.84E-05	3.02E-05	2.93E-05	3.08E-05
Bismuth (Bi)	µg/m^3	-	-	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.11E-04	5.44E-04	5.28E-04	5.55E-04
Boron (B)	µg/m^3	*120*	-	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.14E-02	1.21E-02	1.17E-02	1.23E-02
Cadmium (Cd)	µg/m^3	*0.025*	*0.025*	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	5.68E-04	6.05E-04	5.86E-04	6.16E-04
Chromium (Cr)	µg/m^3	*0.5*	-	6.70E-03	6.90E-03	4.60E-03	4.50E-03	4.50E-03	1.42E-03	1.51E-03	1.47E-03	3.20E-03
Cobalt (Co)	µg/m^3	*0.1*	*0.1*	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	5.68E-04	6.05E-04	5.86E-04	6.16E-04
Copper (Cu)	µg/m^3	*50*	-	3.89E-02	2.67E-02	2.87E-02	4.08E-02	3.64E-02	3.47E-02	1.18E-02	1.24E-02	1.92E-02
Iron (Fe)	µg/m^3	*4*	-	3.53E-01	5.05E-01	4.06E-01	3.12E-01	2.95E-01	2.14E-01	2.98E-01	1.69E-01	4.49E-01
Lead (Pb)	µg/m^3	*0.5*	*0.5*	2.10E-03	4.30E-03	9.20E-04	3.00E-03	2.60E-03	8.52E-04	2.10E-03	8.79E-04	2.40E-03
Magnesium (Mg)	µg/m^3	-	-	2.11E-01	4.77E-01	3.53E-01	2.75E-01	1.33E-01	1.38E-01	2.19E-01	1.30E-01	3.22E-01
Manganese (Mn)	µg/m^3	*0.4*	-	1.30E-02	1.80E-02	1.33E-02	1.09E-02	9.55E-03	2.06E-03	7.40E-04	7.02E-03	1.47E-02
Molybdenum (Mo)	µg/m^3	*120*	-	2.12E-03	1.55E-03	1.47E-03	1.93E-03	1.82E-03	6.37E-03	1.07E-02	2.93E-04	1.31E-03
Nickel (Ni)	µg/m^3	*0.2*	-	9.20E-04	2.10E-03	9.20E-04	9.20E-04	9.20E-04	8.52E-04	9.07E-04	8.79E-04	9.24E-04
Phosphorus (P)	µg/m^3	-	-	1.08E+00	1.57E+00	1.04E+00	1.07E+00	2.30E-01	2.13E-01	2.27E-01	2.20E-01	2.31E-01
Selenium (Se)	µg/m^3	*10*	*10*	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	2.84E-03	3.02E-03	2.93E-03	3.08E-03
Silver (Ag)	µg/m^3	*1*	*1*	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	2.84E-04	3.02E-04	2.93E-04	3.08E-04
Strontium (Sr)	µg/m^3	*120*	-	6.90E-03	6.10E-03	5.30E-03	4.40E-03	2.50E-03	3.30E-03	3.50E-03	2.50E-03	1.01E-02
Thallium (Tl)	µg/m^3	-	-	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.56E-05	2.72E-05	2.64E-05	2.77E-05
Tin (Sn)	µg/m^3	*10*	*10*	6.90E-04	1.08E-03	7.40E-04	1.23E-03	1.05E-03	7.00E-04	1.75E-03	6.60E-04	7.10E-04
Titanium (Ti)	µg/m^3	*120*	-	9.50E-03	7.70E-03	8.30E-03	3.37E-03	3.37E-03	3.12E-03	7.60E-03	3.22E-03	1.00E-02
Uranium (Ur)	µg/m^3	*1.5*	-	3.07E-05	7.50E-05	6.20E-05	6.50E-05	3.07E-05	2.84E-05	3.02E-05	2.93E-05	3.08E-05
Vanadium (V)	µg/m^3	*2*	*1*	1.53E-03	1.90E-02	1.53E-03	1.53E-03	1.53E-03	1.42E-03	1.51E-03	1.47E-03	1.54E-03
Zinc (Zn)	µg/m^3	*120*	-	1.99E-02	4.14E-02	2.38E-02	2.75E-02	2.53E-02	1.90E-02	3.33E-02	1.69E-02	2.75E-02
Zirconium (Zr)	µg/m^3	*20*	-	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	5.68E-04	6.05E-04	5.86E-04	6.16E-04

NOTE: All non-detectable results were reported as 1/2 of the detection limit

Table B10: 2018 Fence Line Station Q4 Monitoring Results for TSP and Metals

Contaminant	28-Nov-18	4-Dec-18
Particulate (TSP)	9.9	31.3
Total Mercury (Hg)	1.35E-05	1.81E-05
Aluminum (Al)	6.10E-02	2.64E-01
Antimony (Sb)	2.70E-04	1.38E-03
Arsenic (As)	8.65E-04	8.86E-04
Barium (Ba)	3.40E-03	1.64E-02
Beryllium (Be)	2.88E-05	2.95E-05
Bismuth (Bi)	5.19E-04	5.31E-04
Boron (B)	1.15E-02	1.18E-02
Cadmium (Cd)	5.76E-04	5.90E-04
Chromium (Cr)	3.10E-03	5.80E-03
Cobalt (Co)	5.76E-04	5.90E-04
Copper (Cu)	1.33E-02	3.72E-02
Iron (Fe)	1.41E-01	5.84E-01
Lead (Pb)	8.65E-04	2.50E-03
Magnesium (Mg)	6.60E-02	3.53E-01
Manganese (Mn)	3.81E-03	2.62E-02
Molybdenum (Mo)	2.88E-04	2.43E-03
Nickel (Ni)	8.65E-04	8.86E-04
Phosphorus (P)	2.16E-01	2.21E-01
Selenium (Se)	2.88E-03	2.95E-03
Silver (Ag)	2.88E-04	2.95E-04
Strontium (Sr)	1.80E-03	9.90E-03
Thallium (Tl)	2.59E-05	2.66E-05
Tin (Sn)	2.88E-04	1.16E-03
Titanium (Ti)	3.17E-03	1.50E-02
Uranium (Ur)	2.88E-05	2.95E-05
Vanadium (V)	1.44E-03	1.48E-03
Zinc (Zn)	1.53E-02	3.11E-02
Zirconium (Zr)	5.76E-04	1.50E-03

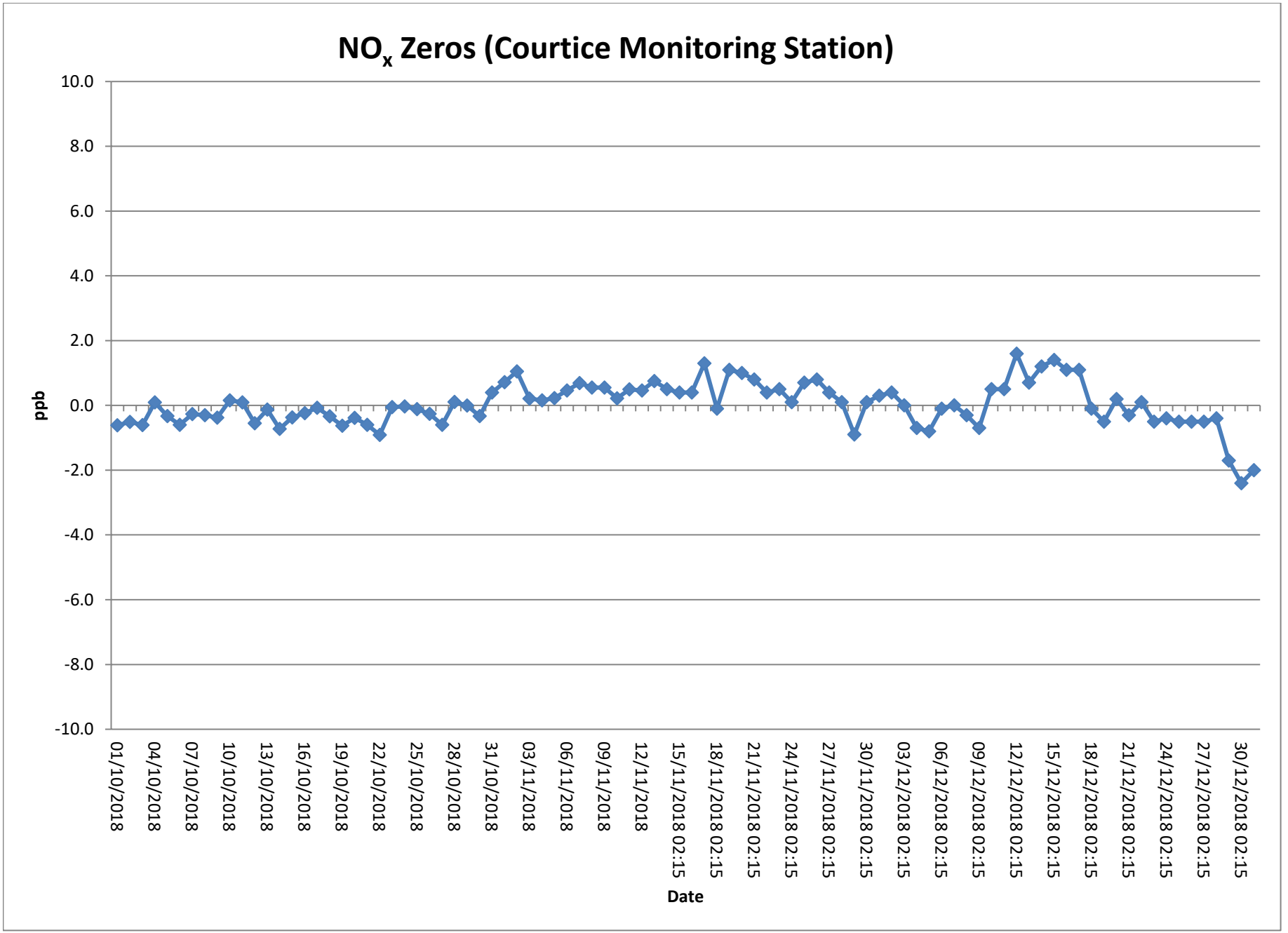
Table B10: 2018 Fence Line Station Q4 Monitoring Results for TSP and Metals

Contaminant	MECP Criteria ($\mu g/m^3$)	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration
Particulate (TSP)	*120*	0	18.9	21.5	8.2	46.9	28.4	46.9	31.3
Total Mercury (Hg)	*2*	0	6.34E-06	9.08E-06	1.42E-06	1.81E-05	1.60E-05	1.69E-05	1.81E-05
Aluminum (Al)	*4.8*	0	1.43E-01	1.65E-01	5.10E-02	3.06E-01	3.06E-01	2.11E-01	2.64E-01
Antimony (Sb)	*25*	0	7.13E-04	7.77E-04	2.70E-04	1.38E-03	1.11E-03	9.70E-04	1.38E-03
Arsenic (As)	*0.3*	0	9.01E-04	9.01E-04	8.52E-04	9.24E-04	9.20E-04	9.24E-04	8.86E-04
Barium (Ba)	*10*	0	6.89E-03	7.64E-03	3.40E-03	1.64E-02	9.50E-03	9.70E-03	1.64E-02
Beryllium (Be)	*0.01*	0	6.23E-05	3.33E-04	2.84E-05	1.73E-03	1.73E-03	3.08E-05	2.95E-05
Bismuth (Bi)	-	-	5.41E-04	5.41E-04	5.11E-04	5.55E-04	5.52E-04	5.55E-04	5.31E-04
Boron (B)	*120*	0	1.20E-02	1.20E-02	1.14E-02	1.23E-02	1.23E-02	1.23E-02	1.18E-02
Cadmium (Cd)	*0.025*	0	6.01E-04	6.01E-04	5.68E-04	6.16E-04	6.13E-04	6.16E-04	5.90E-04
Chromium (Cr)	*0.5*	0	3.43E-03	3.97E-03	1.42E-03	6.90E-03	6.90E-03	3.20E-03	5.80E-03
Cobalt (Co)	*0.1*	0	6.01E-04	6.01E-04	5.68E-04	6.16E-04	6.13E-04	6.16E-04	5.90E-04
Copper (Cu)	*50*	0	2.48E-02	2.73E-02	1.18E-02	4.08E-02	4.08E-02	3.47E-02	3.72E-02
Iron (Fe)	*4*	0	3.11E-01	3.39E-01	1.41E-01	5.84E-01	5.05E-01	4.49E-01	5.84E-01
Lead (Pb)	*2*	0	1.77E-03	2.05E-03	8.52E-04	4.30E-03	4.30E-03	2.40E-03	2.50E-03
Magnesium (Mg)	-	-	2.12E-01	2.43E-01	6.60E-02	4.77E-01	4.77E-01	3.22E-01	3.53E-01
Manganese (Mn)	*0.4*	0	7.63E-03	1.08E-02	7.40E-04	2.62E-02	1.80E-02	1.47E-02	2.62E-02
Molybdenum (Mo)	*120*	0	1.69E-03	2.75E-03	2.88E-04	1.07E-02	2.12E-03	1.07E-02	2.43E-03
Nickel (Ni)	*0.2*	0	9.71E-04	1.01E-03	8.52E-04	2.10E-03	2.10E-03	9.24E-04	8.86E-04
Phosphorus (P)	-	-	4.07E-01	5.74E-01	2.13E-01	1.57E+00	1.57E+00	2.31E-01	2.21E-01
Selenium (Se)	*10*	0	3.00E-03	3.00E-03	2.84E-03	3.08E-03	3.07E-03	3.08E-03	2.95E-03
Silver (Ag)	*1*	0	3.00E-04	3.00E-04	2.84E-04	3.08E-04	3.07E-04	3.08E-04	2.95E-04
Strontium (Sr)	*120*	0	4.43E-03	5.12E-03	1.80E-03	1.01E-02	6.90E-03	1.01E-02	9.90E-03
Thallium (Tl)	-	-	2.70E-05	2.70E-05	2.56E-05	2.77E-05	2.76E-05	2.77E-05	2.66E-05
Tin (Sn)	*10*	0	8.35E-04	9.14E-04	2.88E-04	1.75E-03	1.23E-03	1.75E-03	1.16E-03
Titanium (Ti)	*120*	0	5.80E-03	6.76E-03	3.12E-03	1.50E-02	9.50E-03	1.00E-02	1.50E-02
Uranium (Ur)	*1.5*	0	3.72E-05	4.00E-05	2.84E-05	7.50E-05	7.50E-05	3.08E-05	2.95E-05
Vanadium (V)	*2*	0	1.89E-03	3.09E-03	1.42E-03	1.90E-02	1.90E-02	1.54E-03	1.48E-03
Zinc (Zn)	*120*	0	2.45E-02	2.55E-02	1.53E-02	4.14E-02	4.14E-02	3.33E-02	3.11E-02
Zirconium (Zr)	*20*	0	6.54E-04	6.84E-04	5.68E-04	1.50E-03	6.13E-04	6.16E-04	1.50E-03

Table B10: 2018 Fence Line Station Q4 Monitoring Results for TSP and Metals

Contaminant	Number of Valid Samples	% Valid data
Particulate (TSP)	11	100
Total Mercury (Hg)	11	100
Aluminum (Al)	11	100
Antimony (Sb)	11	100
Arsenic (As)	11	100
Barium (Ba)	11	100
Beryllium (Be)	11	100
Bismuth (Bi)	11	100
Boron (B)	11	100
Cadmium (Cd)	11	100
Chromium (Cr)	11	100
Cobalt (Co)	11	100
Copper (Cu)	11	100
Iron (Fe)	11	100
Lead (Pb)	11	100
Magnesium (Mg)	11	100
Manganese (Mn)	11	100
Molybdenum (Mo)	11	100
Nickel (Ni)	11	100
Phosphorus (P)	11	100
Selenium (Se)	11	100
Silver (Ag)	11	100
Strontium (Sr)	11	100
Thallium (Tl)	11	100
Tin (Sn)	11	100
Titanium (Ti)	11	100
Uranium (Ur)	11	100
Vanadium (V)	11	100
Zinc (Zn)	11	100
Zirconium (Zr)	11	100

APPENDIX C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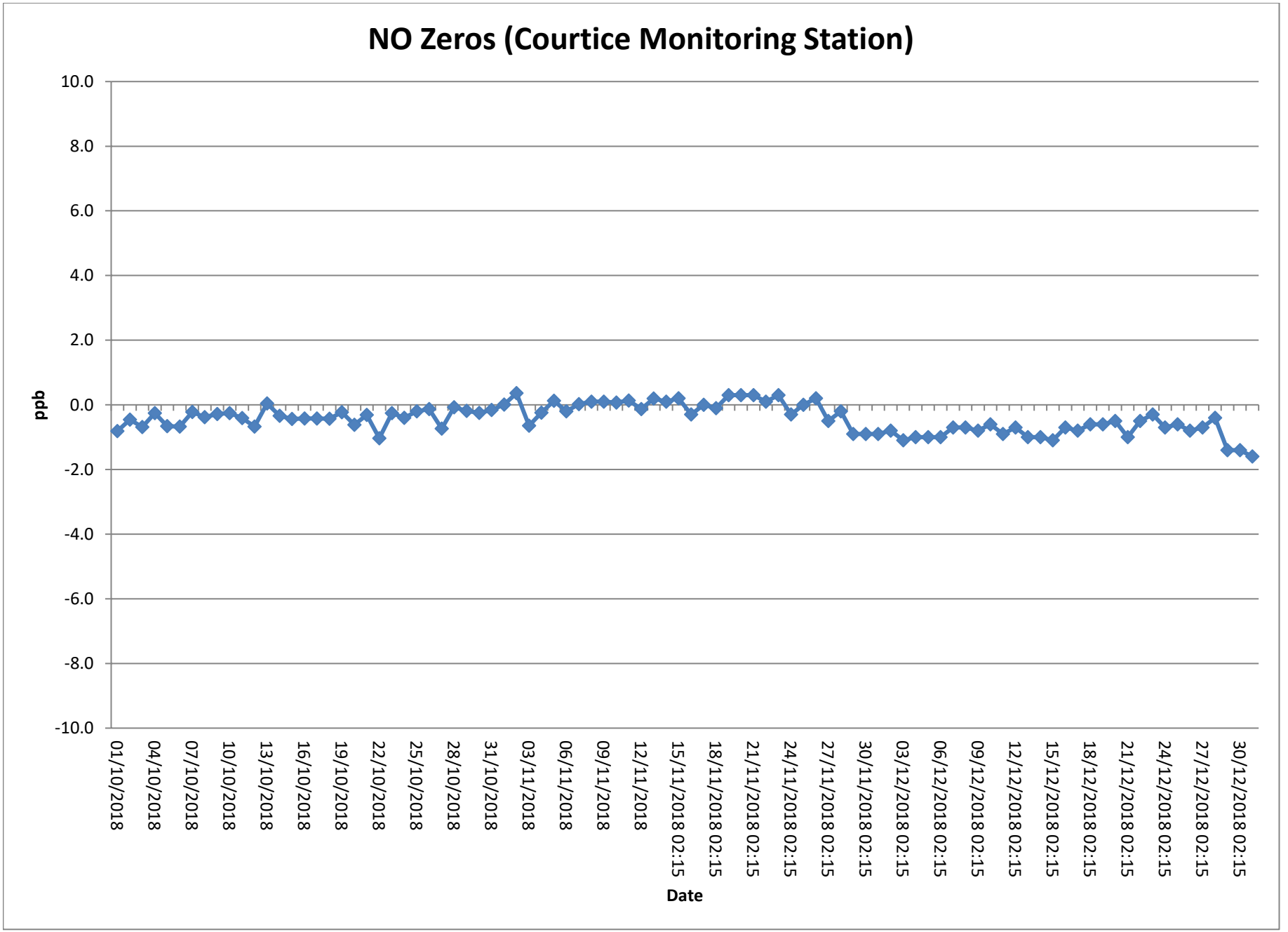
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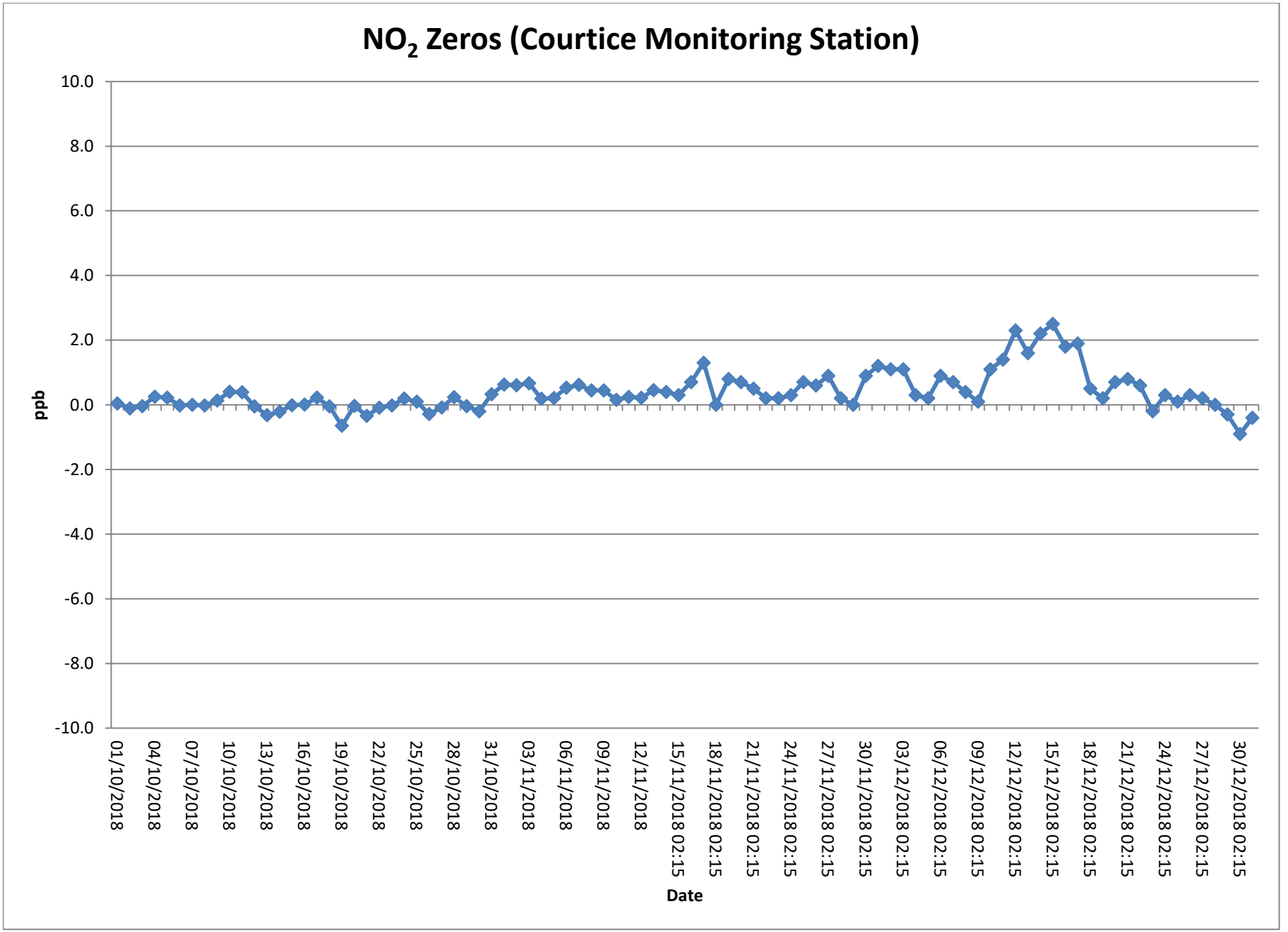
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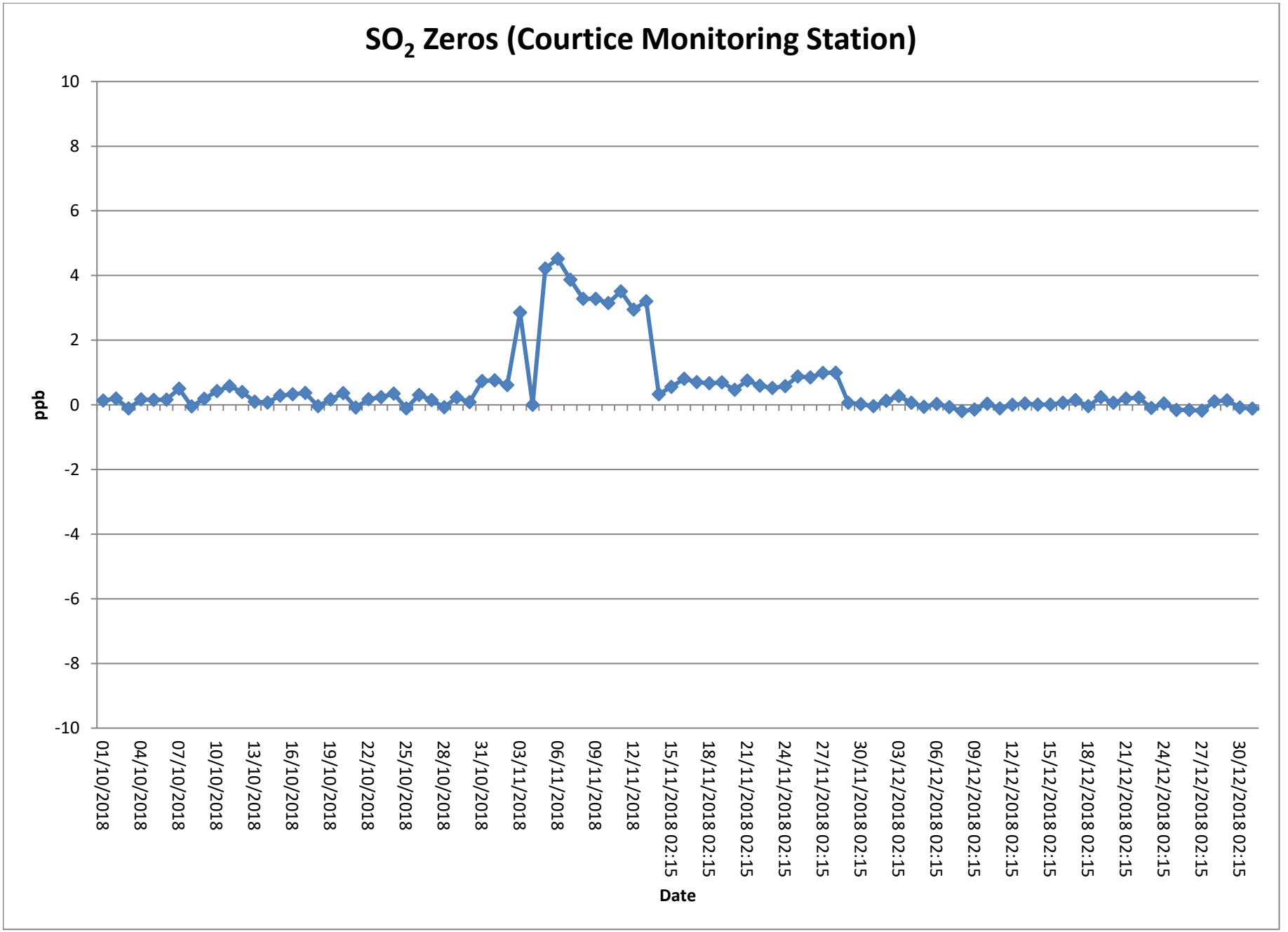
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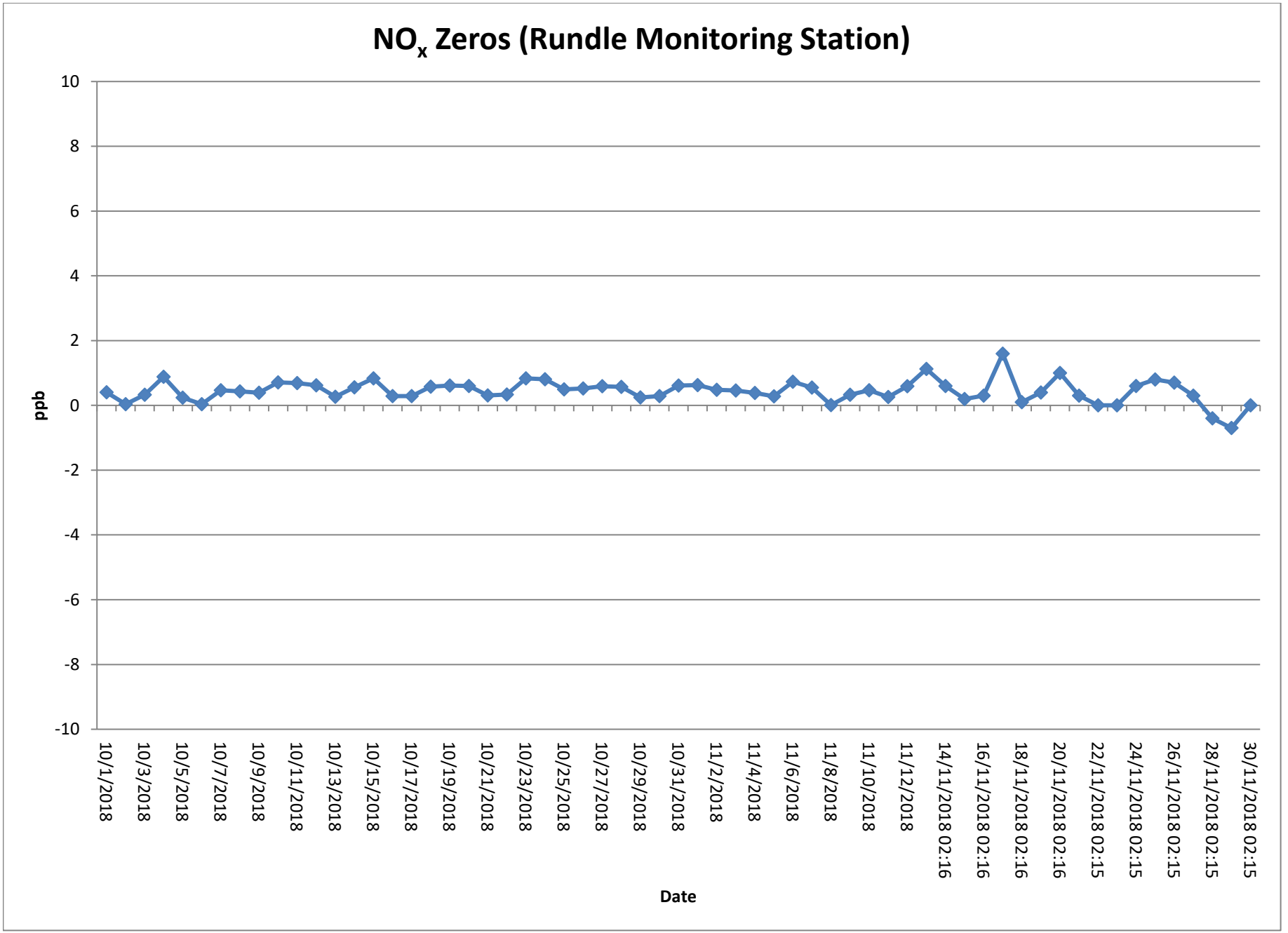
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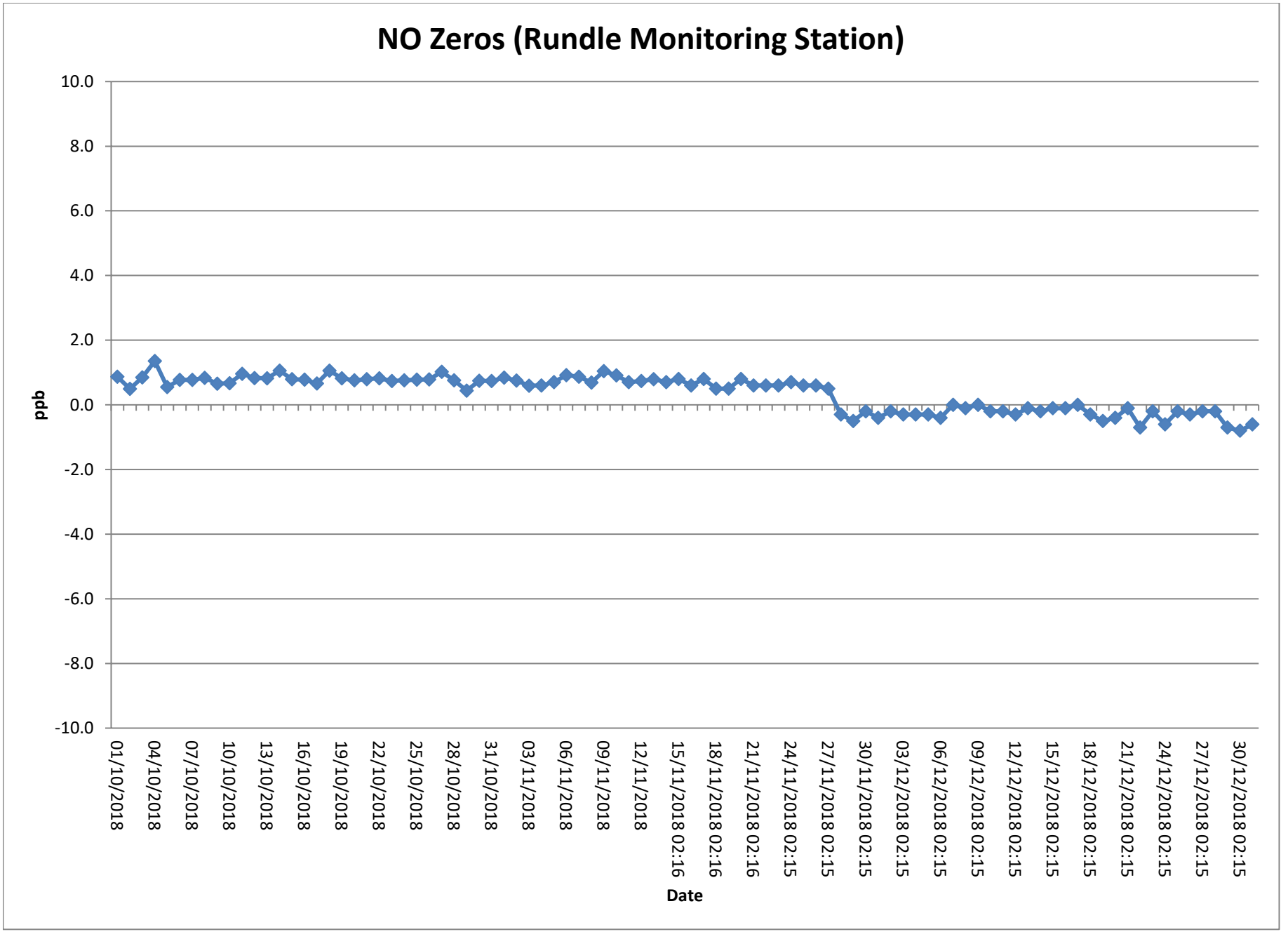
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ppb
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04/10/2018
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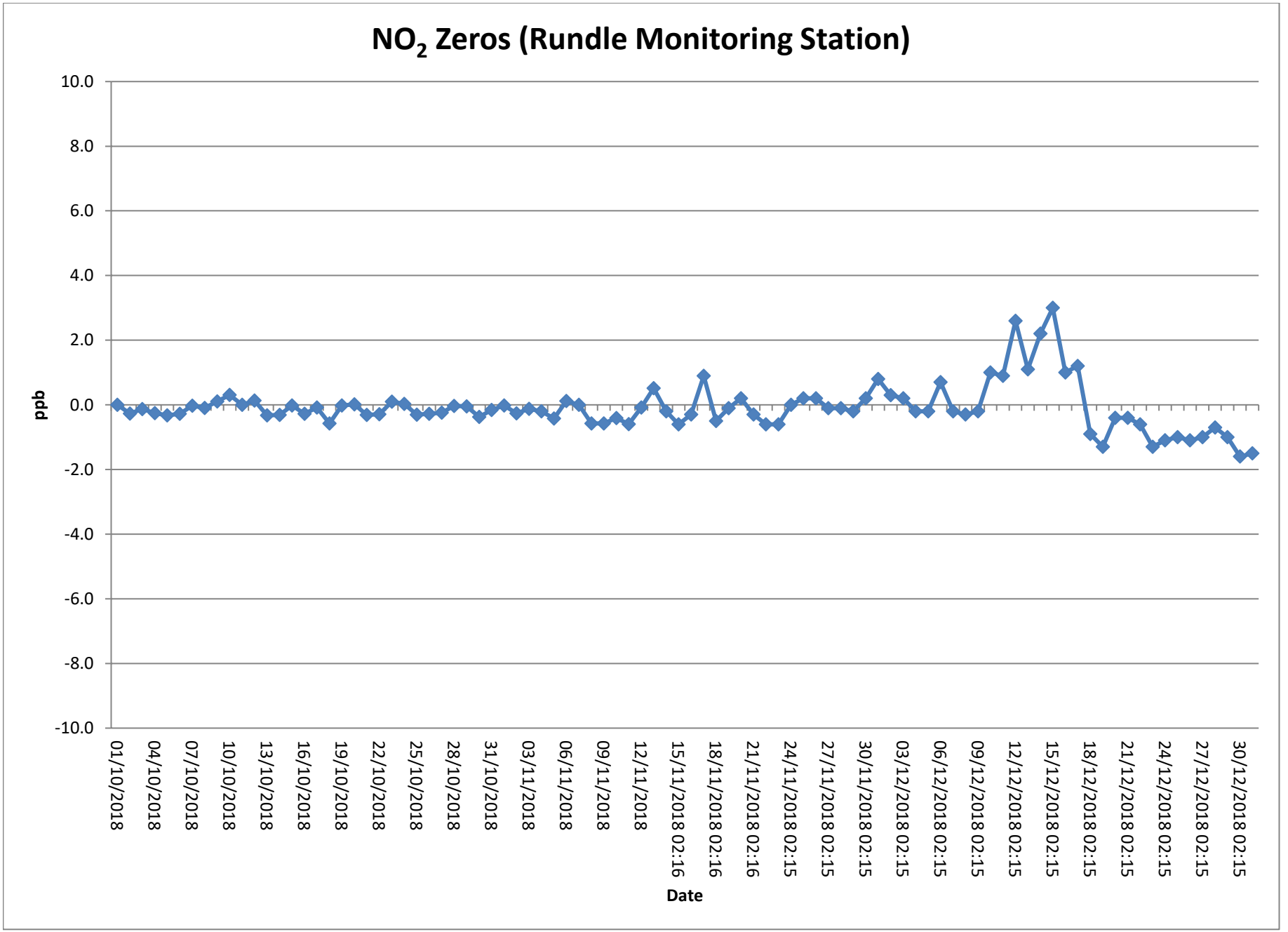
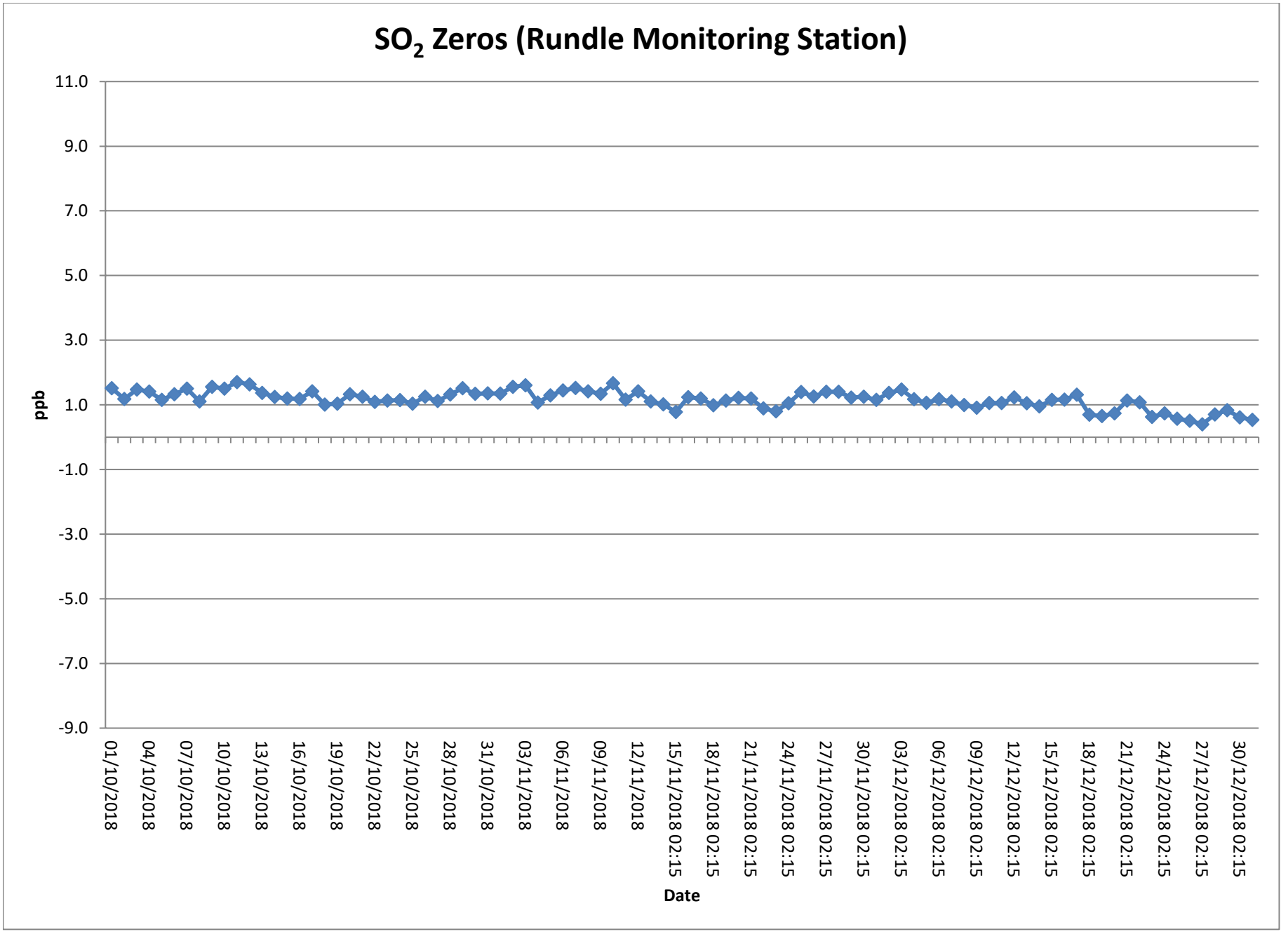
18/11/2018 02:16
21/11/2018 02:16
24/11/2018 02:15
27/11/2018 02:15
30/11/2018 02:15
03/12/2018 02:15
06/12/2018 02:15
09/12/2018 02:15
12/12/2018 02:15
15/12/2018 02:15
18/12/2018 02:15
21/12/2018 02:15
24/12/2018 02:15
27/12/2018 02:15
30/12/2018 02:15
Date


NO2 Zeros (Rundle Monitoring Station)
10.0
8.0
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
-8.0
-10.0
ppb
01/10/2018
04/10/2018
07/10/2018
10/10/2018
13/10/2018
16/10/2018
19/10/2018
22/10/2018
25/10/2018
28/10/2018
31/10/2018
03/11/2018
06/11/2018
09/11/2018
12/11/2018
15/11/2018 02:16
18/11/2018 02:16
21/11/2018 02:16
24/11/2018 02:15
27/11/2018 02:15
30/11/2018 02:15
03/12/2018 02:15
06/12/2018 02:15
09/12/2018 02:15
12/12/2018 02:15
15/12/2018 02:15
18/12/2018 02:15
21/12/2018 02:15
24/12/2018 02:15
27/12/2018 02:15
30/12/2018 02:15
Date


SO2 Zeros (Rundle Monitoring Station)
11.0
9.0
7.0
5.0
3.0
1.0
-1.0
-3.0
-5.0
-7.0
-9.0
ppb
01/10/2018
04/10/2018
07/10/2018
10/10/2018
13/10/2018
16/10/2018
19/10/2018
22/10/2018
25/10/2018
28/10/2018
31/10/2018
03/11/2018
06/11/2018
09/11/2018
12/11/2018
15/11/2018 02:15
18/11/2018 02:15
21/11/2018 02:15
24/11/2018 02:15
27/11/2018 02:15
30/11/2018 02:15
03/12/2018 02:15
06/12/2018 02:15
09/12/2018 02:15
12/12/2018 02:15
15/12/2018 02:15
18/12/2018 02:15
21/12/2018 02:15
24/12/2018 02:15
27/12/2018 02:15
30/12/2018 02:15
Date

APPENDIX D

Table D1: 4th Quarter Edit Log for $PM_{2.5}$ at Courtice Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller		**Phone:** (905) 404 0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca			
Station Number: 45201				**Station Name:** Courtice Station				
Station Address: 100 Osbourne Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: $PM_{2.5}$			**Instrument Make & Model:** Thermo Scientific Model 5030 SHARP Monitor				**s/n:** E 1563	
Data Edit Period		**Start Date:** October 1, 2018		**End Date:** December 31, 2018			All testing done in EST	
Edit #	**Edit date (dd/mm/yyyy)**	**Editor's Name**	**Edit Action**	**Starting**		**Ending**		**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	
1	02/01/18	NJM	Deleted Hours	30/10/2018	14:00	30/10/2018	15:00	Monthly Calibration
2	04/01/18	NJM	Deleted Hours	13/11/2018	09:00	13/11/2018	15:00	Datalogger reprogrammed to automatically log to Envista. During this time the logger was not recording values.
3	02/01/18	NJM	Deleted Hours	28/11/2018	14:00	28/11/2018	14:00	Monthly Calibration
4	08/01/18	NJM	Deleted Hours	18/12/2018	11:47	18/12/2018	13:22	Monthly Calibration
5	08/01/18	NJM	Deleted Hours	20/12/2018	10:00	20/12/2018	12:00	MECP Audit
6	09/01/18	NJM	Deleted Hours	30/12/2018	01:20	31/12/2018	23:59	Tape Break

Table D2: 4th Quarter Edit Log for $PM_{2.5}$ at Rundle Road Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller	**Phone:** (905) 404 0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca				
Station Number: 45200				**Station Name:** Rundle Road Station				
Station Address: Rundle Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: $PM_{2.5}$		**Instrument Make & Model:** Thermo Scientific Model 5030 SHARP Monitor				**s/n:** E 1569		
Data Edit Period	**Start Date:** October 1, 2018			**End Date:** December 31, 2018		All testing done in EST		
Edit #	**Edit date (dd/mm/yyyy)**	**Editor's Name**	**Edit Action**	**Starting**		**Ending**		**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	
1	04/01/18	NJM	Deleted Hours	29/10/2018	12:00	29/10/2018	14:00	Monthly Calibration
2	04/01/18	NJM	Deleted Hours	13/11/2018	09:00	13/11/2018	20:00	Datalogger reprogrammed to automatically log to Envista. During this time the logger was not recording values.
3	04/01/18	NJM	Deleted Hours	21/11/2018	16:00	21/11/2018	19:00	Data loss unable to collect enough data to validate hour. Presumed power outage.
4	04/01/18	NJM	Deleted Hours	27/11/2018	15:00	27/11/2018	17:00	Monthly Calibration and Cleaning the Inlet Head
5	04/01/18	NJM	Deleted Hours	30/11/2018	15:00	30/11/2018	16:00	Data loss unable to collect enough data to validate hour. Presumed power outage.
6	08/01/18	NJM	Deleted Hours	17/12/18	16:20	17/12/18	18:20	Monthly Calibration
7	08/01/18	NJM	Deleted Hours	20/12/2018	12:00	20/12/2018	14:00	MECP Audit

Table D3: 4th Quarter Edit Log for NO_x at Courtice Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller	**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca				
Station Number: 45201			**Station Name:** Courtice Station					
Station Address: 100 Osbourne Road			**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON					
Pollutants or Parameter: NOx		**Instrument Make & Model:** Teledyne Nitrogen Oxide Analyzer Model T200					**s/n:** 675	
Data Edit Period	**Start Date:** October 1, 2018		**End Date:** December 31, 2018			All testing done in EST		
Edit #	**Edit date (dd/mm/yyyy)**	**Editor's Name**	**Edit Action**	**Starting**		**Ending**		**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	
1	04/01/19	NJM	Zero Correction	1/10/2018	00:00	31/12/2018	23:00	Correcting values <0 to 0
2	03/01/19	NJM	Deleted Hours	15/10/2018	00:00	1/30/2018	01:00	Due to time based drift between the NOx unit time prompting overnight z/s response and the datalogger time recording the response, the z/s response spanned over 15 min of the 00:00-01:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
3	04/01/19	NJM	Calibration	30/10/2018	11:00	30/10/2018	12:00	Monthly Calibration
4	03/01/19	NJM	Deleted Hours	6/11/2018	01:00	21/11/2018	02:00	Due to time based drift between the NOx unit time prompting overnight z/s response and the datalogger time recording the response, the z/s response spanned over 15 min of the 01:00-02:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
5	04/01/19	NJM	Deleted Hours	13/11/2018	09:00	13/11/2018	15:00	Datalogger reprogrammed to automatically log to Envista. During this time the logger was not recording values.
6	04/01/19	NJM	Calibration	28/11/2018	12:00	28/11/2018	14:00	Monthly Calibration
7	11/01/19	NJM	Deleted Hours	18/12/2018	11:00	18/12/2018	13:00	Monthly Calibration
9	09/01/19	SRS	Corrected Data	18/12/2018	12:00	28/12/2018	16:00	Suspected contaminated calibration gas cylinder used during calibration on December 18, 2018 which was discovered during the MECP Audit.
8	11/01/19	NJM	Deleted Hours	20/12/2018	10:00	20/12/2018	12:00	MECP Audit
10	11/01/19	NJM	Deleted Hours	28/12/2018	16:00	28/12/2018	18:00	Calibration to correct NOx analyzer

Table D4: 4th Quarter Edit Log for NO_x at Rundle Road Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller		**Phone:** (905) 404 0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca			
Station Number: 45200				**Station Name:** Rundle Road Station				
Station Address: Rundle Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: NOx			**Instrument Make & Model:** Teledyne Nitrogen Oxide Analyzer Model T200				**s/n:** 676	
Data Edit Period		**Start Date:** October 1, 2018		**End Date:** December 31, 2018			All testing done in EST	
Edit #	**Edit date (dd/mm/yyyy)**	**Editor's Name**	**Edit Action**	**Starting**		**Ending**		**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	
1	04/01/18	NJM	Zero Correction	1/10/2018	00:00	31/12/2018	23:00	Correcting values <0 to 0
2	03/01/18	NJM	Deleted Hours	9/10/2018	00:00	2/11/2018	01:00	Due to time based drift between the NOx unit time prompting overnight z/s response and the datalogger time recording the response, the z/s response spanned over 15 min of the 00:00-01:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
3	04/01/18	NJM	Calibration	29/10/2018	13:00	29/10/2018	15:00	Monthly Calibration
4	03/01/18	NJM	Deleted Hours	6/11/2018	01:00	21/11/2018	02:00	Due to time based drift between the NOx unit time prompting overnight z/s response and the datalogger time recording the response, the z/s response spanned over 15 min of the 01:00-02:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
5	04/01/18	NJM	Deleted Hours	13/11/2018	09:00	13/11/2018	20:00	Datalogger reprogrammed to automatically log to Envista. During this time the logger was not recording values.
6	04/01/18	NJM	Deleted Hours	21/11/2018	16:00	21/11/2018	19:00	Data loss unable to collect enough data to validate hour. Presumed power outage.
7	04/01/18	NJM	Calibration	27/11/2018	13:00	27/11/2018	16:00	Monthly Calibration
8	04/01/18	NJM	Deleted Hours	30/11/2018	15:00	30/11/2018	16:00	Data loss unable to collect enough data to validate hour. Presumed power outage.
9	11/01/18	NJM	Deleted Hours	12/18/2018	16:00	12/18/2018	18:00	Monthly Calibration
10	09/01/19	SRS	Corrected Data	17/12/2018	18:00	28/12/2018	19:00	Suspected contaminated calibration gas cylinder used during calibration on December 18, 2018 which was discovered during the MECP Audit.
11	11/01/18	NJM	Deleted Hours	12/20/2018	12:00	12/20/2018	14:00	MECP Audit
12	11/01/18	NJM	Deleted Hours	12/28/2018	18:00	12/28/2018	20:00	Calibration to correct NOx analyzer

Table D5: 4th Quarter Edit Log for SO_2 at Courtice Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller		**Phone:** (905) 404 0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca			
Station Number: 45201				**Station Name:** Courtice Station				
Station Address: 100 Osbourne Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: SO_2			**Instrument Make & Model:** Teledyne Sulfur Dioxide Analyzer Model T100				**s/n:** 565	
Data Edit Period		**Start Date:** October 1, 2018		**End Date:** December 31, 2018			All testing done in EST	
Edit #	**Edit Date (dd/mm/yyyy)**	**Editor's Name**	**Edit Action**	**Starting**		**Ending**		**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	
1	04/01/18	NJM	Zero Correction	1/10/2018	00:00	31/12/2018	23:00	Correcting values <0 to 0
2	04/01/18	NJM	Deleted Hours	15/10/2018	00:00	30/10/2018	01:00	Due to time based drift between the SO_2 unit time prompting overnight z/s response and the datalogger time recording the response, the z/s response spanned over 15 min of the 00:00-01:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
3	04/01/18	NJM	Calibration	30/10/2018	11:00	30/10/2018	13:00	Monthly Calibration
4	04/01/18	NJM	Deleted Hours	6/11/2018	00:00	21/11/2018	01:00	Due to time based drift between the SO_2 unit time prompting overnight z/s response and the datalogger time recording the response, the z/s response spanned over 15 min of the 01:00-02:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
5	04/01/18	NJM	Deleted Hours	13/11/2018	09:00	13/11/2018	15:00	Datalogger reprogrammed to automatically log to Envista. During this time the logger was not recording values.
6	04/01/18	NJM	Calibration	28/11/2018	13:00	28/11/2018	15:00	Monthly Calibration
7	09/01/18	NJM	Calibration	18/12/2018	12:57	18/12/2018	16:01	Monthly Calibration
8	09/01/18	NJM	Deleted Hours	20/12/2018	10:00	20/12/2018	12:00	MECP Audit

Table D6: 4th Quarter Edit Log for SO_2 at Rundle Road Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller		**Phone:** (905) 404 0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca			
Station Number: 45200				**Station Name:** Rundle Road Station				
Station Address: Rundle Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: SO_2			**Instrument Make & Model:** Teledyne Sulfur Dioxide Analyzer Model T100				**s/n:** 566	
Data Edit Period		**Start Date:** October 1, 2018		**End Date:** December 31, 2018		All testing done in EST		
Edit #	**Edit date (dd/mm/yyyy)**	**Editor's Name**	**Edit Action**	**Starting**		**Ending**		**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	
1	04/01/18	NJM	Zero Correction	1/10/2018	00:00	31/12/2018	23:00	Correcting values <0 to 0
2	04/01/18	NJM	Deleted Hours	9/10/2018	00:00	2/11/2018	01:00	Due to time based drift between the SO_2 unit time prompting overnight z/s response and the datalogger time recording the response, the z/s response spanned over 15 min of the 00:00-01:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
3	04/01/18	NJM	Calibration	29/10/2018	13:00	29/10/2018	15:00	Monthly Calibration
4	04/01/18	NJM	Deleted Hours	5/10/2018	00:00	14/11/2018	01:00	Due to time based drift between the SO_2 unit time prompting overnight z/s response and the datalogger time recording the response, the z/s response spanned over 15 min of the 01:00-02:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
5	04/01/18	NJM	Deleted Hours	13/11/2018	09:00	13/11/2018	21:00	Datalogger reprogrammed to automatically log to Envista. During this time the logger was not recording values.
6	04/01/18	NJM	Deleted Hours	21/11/2018	16:00	21/11/2018	19:00	Data loss unable to collect enough data to validate hour. Presumed power outage.
7	04/01/18	NJM	Calibration	27/11/2018	16:00	27/11/2018	18:00	Monthly Calibration
8	04/01/18	NJM	Deleted Hours	30/11/2018	15:00	30/11/2018	16:00	Data loss unable to collect enough data to validate hour. Presumed power outage.
9	09/01/18	NJM	Deleted Hours	17/12/2018	17:47	17/12/2018	18:59	Monthly Calibration
10	09/01/18	NJM	Deleted Hours	20/12/2018	12:00	20/12/2018	14:00	MECP Audit

Table D7: 4th Quarter Edit Log for Meteorological Parameters at Courtice Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller		**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca			
Station Number: 45201				**Station Name:** Courtice Station				
Station Address: 100 Osbourne Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: Ambient T, P, RH and Rain			**Instrument Make & Model:** Miscellaneous Meterological Instrumentation				**s/n:** N/A	
Data Edit Period		**Start Date:** October 1, 2018		**End Date:** December 31, 2018			All testing done in EST	
Edit #	**Edit date (dd/mm/yyyy)**	**Editor's Name**	**Edit Action**	**Starting**		**Ending**		**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	
1	09/01/18	NJM	Deleted Hours	13/11/2018	09:00	13/11/2018	15:00	Datalogger reprogrammed to automatically log to Envista. During this time the logger was not recording values.

Table D8: 4th Quarter Edit Log for Meteorological Parameters at Rundle Road Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller		**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca			
Station Number: 45201				**Station Name:** Courtice Station				
Station Address: 100 Osbourne Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: WS, WD, Ambient T, P, RH and Rain			**Instrument Make & Model:** Miscellaneous Meterological Instrumentation			**s/n:** N/A		
Data Edit Period		**Start Date:** October 1, 2018		**End Date:** December 31, 2018		All testing done in EST		
Edit #	**Edit date (dd/mm/yyyy)**	**Editor's Name**	**Edit Action**	**Starting**		**Ending**		**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	
1	09/01/18	NJM	Deleted Hours	13/11/2018	09:00	13/11/2018	20:00	Datalogger reprogrammed to automatically log to Envista. During this time the logger was not recording values.
2	09/01/18	NJM	Deleted Hours	15/11/2018	0:00	20/12/2018	17:00	Anemometer malfunctioning during this time therefore the wind direction and speed were invalidated.