REPORT

DURHAM YORK ENERGY CENTRE

DURHAM, ONTARIO

Q3 AMBIENT AIR QUALITY MONITORING REPORT

RWDI # 1803743

November 14, 2018

SUBMITTED TO

The Director, Legislative Services-
Regional Clerk or Designate,
The Regional Municipality of Durham

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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 ambient air quality 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 is to:

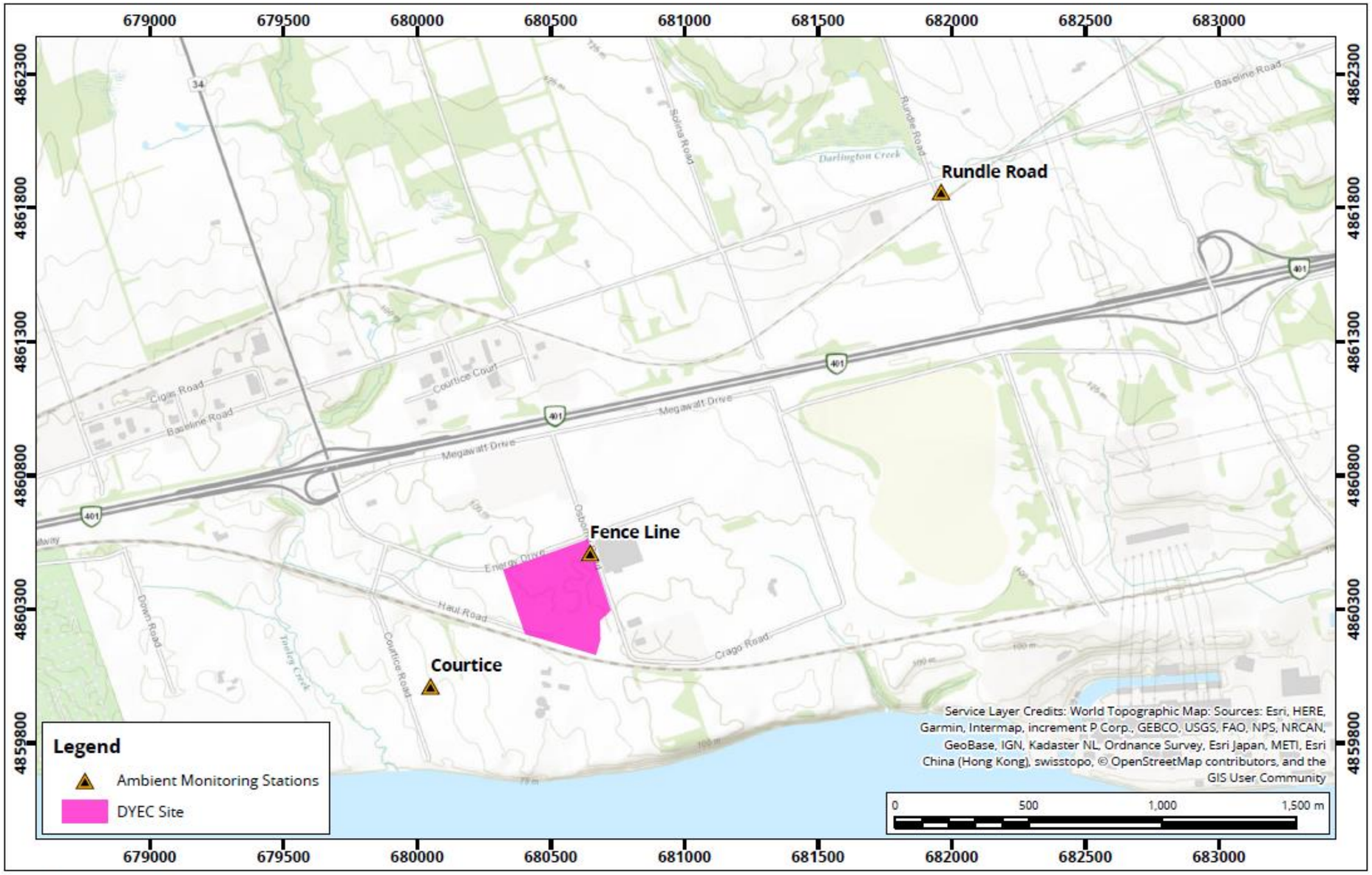
1. Quantify any measurable ground level concentrations resulting from emissions from the DYEC cumulative to local air quality, including validating the predicted concentrations from the dispersion modelling conducted in the Environmental Assessment (2009a);
2. Monitor concentration levels of EFW-related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

Data recovery for all parameters measured was greater than 75% during the third quarter, this meets the quartely validity criteria. None of the measurements for any parameter were in excess of the Ambient Air Quality Criteria during the third quarter.



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 September 18, 2018 the IZS checks were changed and programmed to occur at 00:45 to 01:10 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 September 18, 2018 the IZS checks were changed and programmed to occur at 00:45 to 01:10 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 Maxxam Analytics in Mississauga, Ontario (July 2018) and ALS Laboratories in Burlington, Ontario (August and September 2018). 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 Maxxam Analytics in Mississauga, Ontario (July) and ALS Laboratories in Burlington, Ontario (August and September). 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 meteorological tower at the Rundle Station was outfitted with a MET One Instruments Model 034B wind head that recorded wind direction and wind speed. 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 µg/m^3 for the 3-year average of annual 98th percentile 24-hour concentration, and 10 µg/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 MECP AUDITS

An MECP audit was completed on all continuous analyzers on September 26, 2018. Results from the audit indicated that all of the equipment was working within MECP requirements.

5 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 July 1, 2018 to September 30, 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.

5.1 Meteorological Station Results

5.1.1 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 98.7% data collection for windspeed and wind direction for Q3. The Courtice station maintained 86.6% of data collection for all of the parameters measured during Q3 and experienced some data loss discussed in the Data Requests section of this report. Hourly statistics from the meteorological station is presented in Table 1. A wind rose showing trends in wind speed and wind direction during Q3 is provided in **Figure 5**.

Table 1: Hourly Statistics from the Courtice Station and 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	(%)					
July	31	30	93	30.1	19.1	0	14	33	29.4	0.0	10	22	70	30	0.1	103.3	99.7	99.7	100.0	100.0	99.6	100.0
August	31	27	93	29.9	7.8	0	14	41	29.3	0.0	9	-	-	-	-	37.1	99.9	99.9	60.5	60.5	59.4	60.5
September	39	28	94	30.1	3.9	0	8	39	29.3	0.0	12	18	74	30	0.1	54.7	96.4	96.4	99.9	99.9	99.9	99.9
Q3 Arithmetic Mean											10	21	73	30	0.1	195.1	98.7	98.7	86.6	86.6	86.1	86.6

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

5.1.2 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 84.1% of data collection for relative humidity, ambient temperature and precipitation measured during Q3. The wind speed maintained 83.9%, and wind direction 83.4% data collection due to some maintenance that was performed in July 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 Q3 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	(%)				
July	24	31	98	20.4	0	12	35	0.0	9	22	72	0.1	105.6	99.5	97.8	100.0	100.0	100.0
August	25	29	98	4.3	0	12	44	0.0	-	-	-	-	16.6	53.0	53.0	53.0	53.0	53.0
September	33	30	98	5.4	0	6	40	0.0	9	18	79	0.1	78.0	99.9	99.9	99.9	99.9	99.9
Q3 Arithmetic Mean									9	20	77	0.1	200.2	83.9	83.4	84.1	84.1	84.1

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

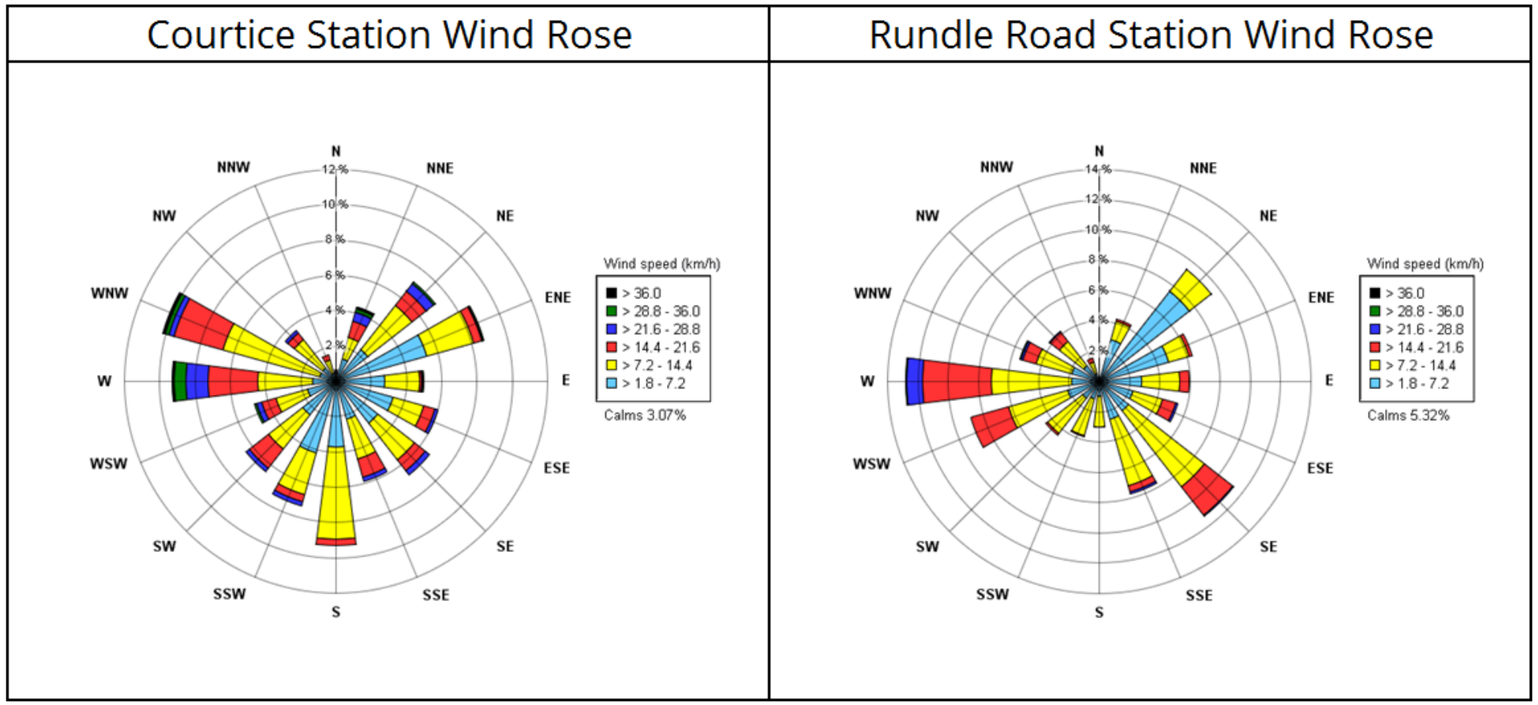


Figure 5. Wind Roses of Hourly Wind Speed and Wind Direction – July to September 2018

5.2 NO_x, SO_2 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. The Rundle Road Station SO_2 analyzer did not meet the validity requirements for % valid hours in August, therefore its monthly mean is not presented.

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	($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				(%)				
AAQC				200	250	28[A]			100	100										
July	65	63	38	37	96	25	16	6	11	10	8	7	2	5	4	99.7	95.4	95.4	95.4	95.3
August	22	75	57	32	61	17	17	9	11	8	8	6	2	5	2	99.7	97.4	97.4	97.4	97.4
September	14	69	51	22	78	8	15	7	8	13	4	6	2	4	4	99.4	97.4	97.4	97.4	97.2
Q3 Arithmetic Mean											7	6	2	5	3	99.6	96.7	96.7	96.7	96.7

[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	($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				(%)				
AAQC				200	250	28[A]			100	100										
July	24	74	36	38	23	17	14	6	8	2	6	6	2	4	1	99.7	99.7	99.7	99.7	98.9
August	23	26	13	16	24	18	9	4	6	3	8	5	3	3	-	99.7	99.7	99.7	99.7	74.6
September	36	34	19	15	6	11	9	4	6	1	4	4	2	3	1	99.4	99.4	99.4	99.4	96.8
Q3 Arithmetic Mean											6	5	2	3	1	99.6	99.6	99.6	99.6	90.0

[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.		
July		0	0		0	0	N/A	0	0	N/A	0	0
August		0	0		0	0	N/A	0	0	N/A	0	0
September		0	0		0	0	N/A	0	0	N/A	0	0
Q3 Total		0	0		0	0	N/A	0	0	N/A	0	0

5.3 Oxides of Nitrogen Results

5.3.1 Courtice Station Results

Data recovery levels were high for oxides of nitrogen (96.7% valid data for Q3). 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 37 ppb, which is 18.5% of the AAQC. The highest NO_2 value seen among the rolling 24-hour averages was 11 ppb, which is 11% of the AAQC. The measurements are summarized in Table 3 above. A pollution rose is presented in **Figure 6** for the Courtice Station during Q3 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 southerly directions. The pollution wind rose indicates that the DYEC was not a major contributor to NO_2 levels at the station.

5.3.2 Rundle Road Station Results

Data recovery levels were high for oxides of nitrogen (99.6% valid data for Q3). 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 38 ppb, which is 19% of the AAQC. The highest NO_2 value seen among the rolling 24-hour averages was 8 ppb, which is 8% 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 Q3 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 southeast and the west. The pollution wind rose indicates that the DYEC was not a major contributor to NO_2 levels at the station.

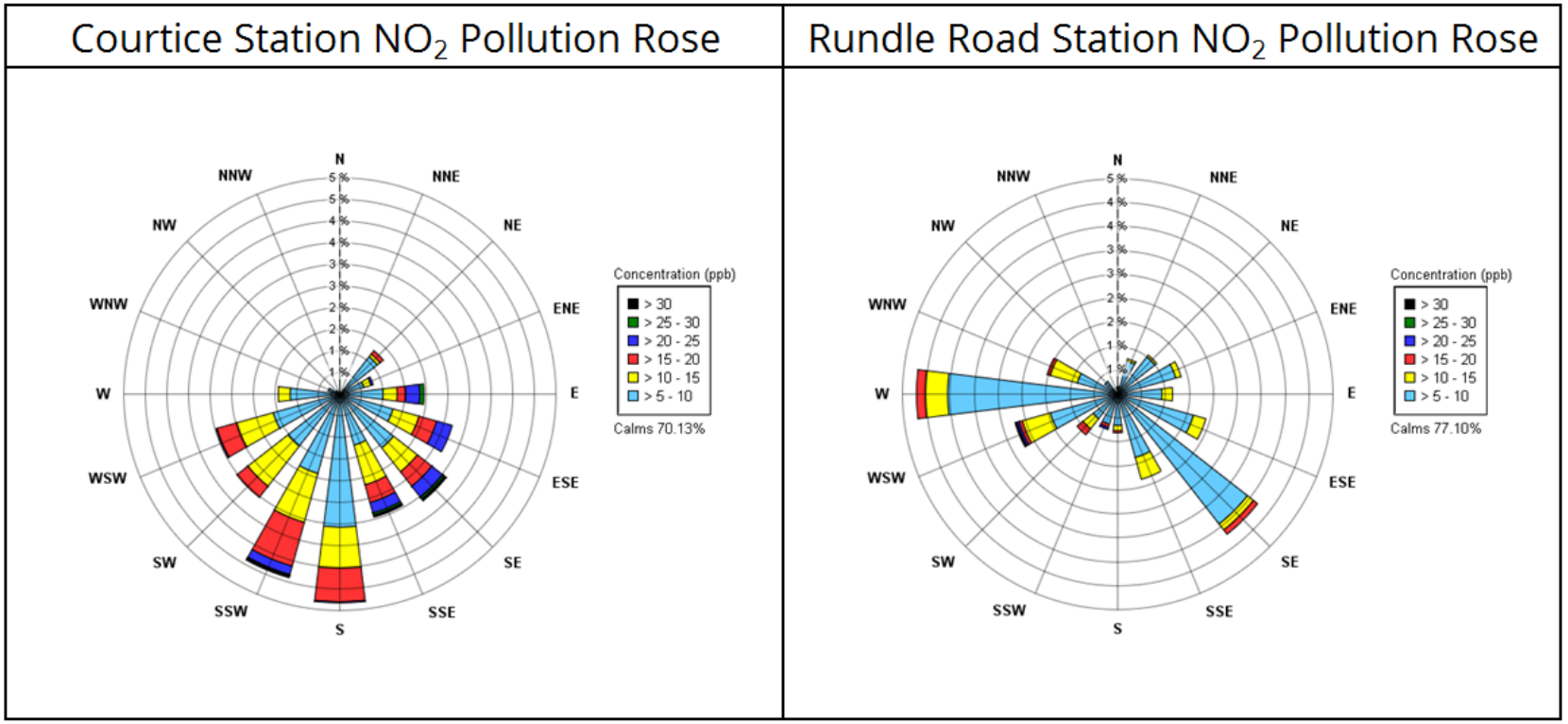


Figure 6. Pollution Roses of Hourly Average NO_2 Concentrations – July to September 2018

5.4 Sulphur Dioxide Results

5.4.1 Courtice Station Results

Data recovery levels were high for sulphur dioxide (96.7% 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 96 ppb, which is 38.4% of the AAQC. The highest SO_2 value seen among the 24-hour averages was 13 ppb, which is 13% of the AAQC. The results are summarized in Table 3 above. A pollution rose is presented in **Figure 7** for the Courtice Station during Q3 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 south and south southwest directions. The pollution wind rose indicates that the DYEC was not a major contributor to SO_2 levels at the station.

5.4.2 Rundle Road Station Results

Data recovery levels were high for sulphur dioxide (90.0% 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 24 ppb, which is 9.6% of the AAQC. The highest SO_2 value seen among the 24-hour averages was 3 ppb, which is 3% 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 Q3 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 and the south southeast. The pollution wind rose indicates that the DYEC was a not major contributor to SO_2 levels at the stations.

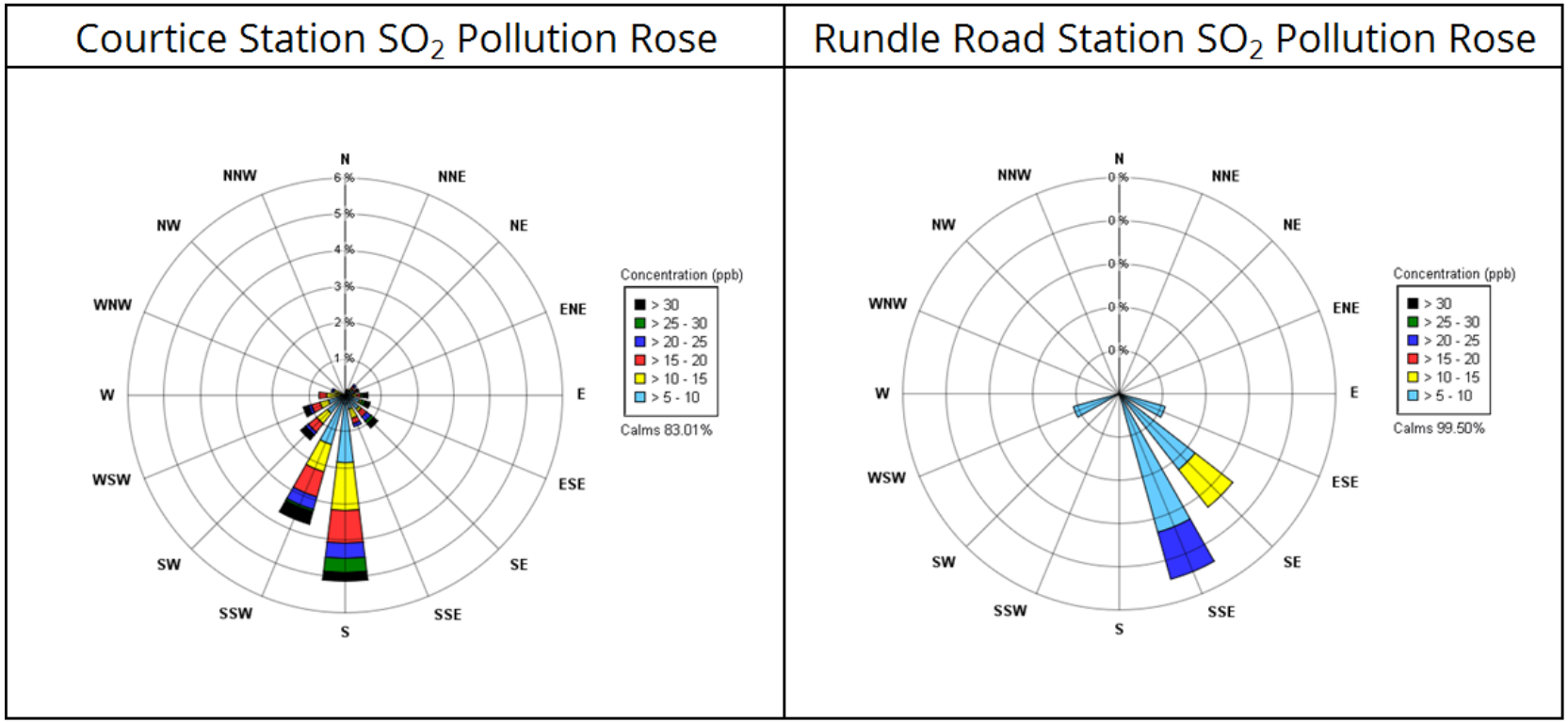


Figure 7. Pollution Roses of Hourly Average SO_2 Concentrations – July to September 2018

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

5.5.1 Courtice Station Results

Data recovery levels were high for particulate matter less than 2.5 microns (99.6% 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). 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. 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 65 µg/m^3 and the highest value seen among the rolling 24-hour averages was 25 µg/m^3. The results are summarized in Table 3 above. A pollution rose is presented in **Figure 8** for the Courtice Station during Q3 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 Courtice occurred when the winds were southerly and east-northeast directions. Some of the elevated $PM_{2.5}$ measurements may have been related to emissions from the DYEC but were more likely related to nearby roadway construction.

5.5.2 Rundle Road Station Results

Data recovery levels were high for particulate matter less than 2.5 microns (99.6% valid data). The highest $PM_{2.5}$ value seen among the 1-hour averages was 36 µg/m^3 and the highest value seen among the rolling 24-hour averages was 18 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 Q3 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 and the northeast. Some of the elevated $PM_{2.5}$ measurements may have been related to emissions from the DYEC but were more likely related to nearby roadway construction.

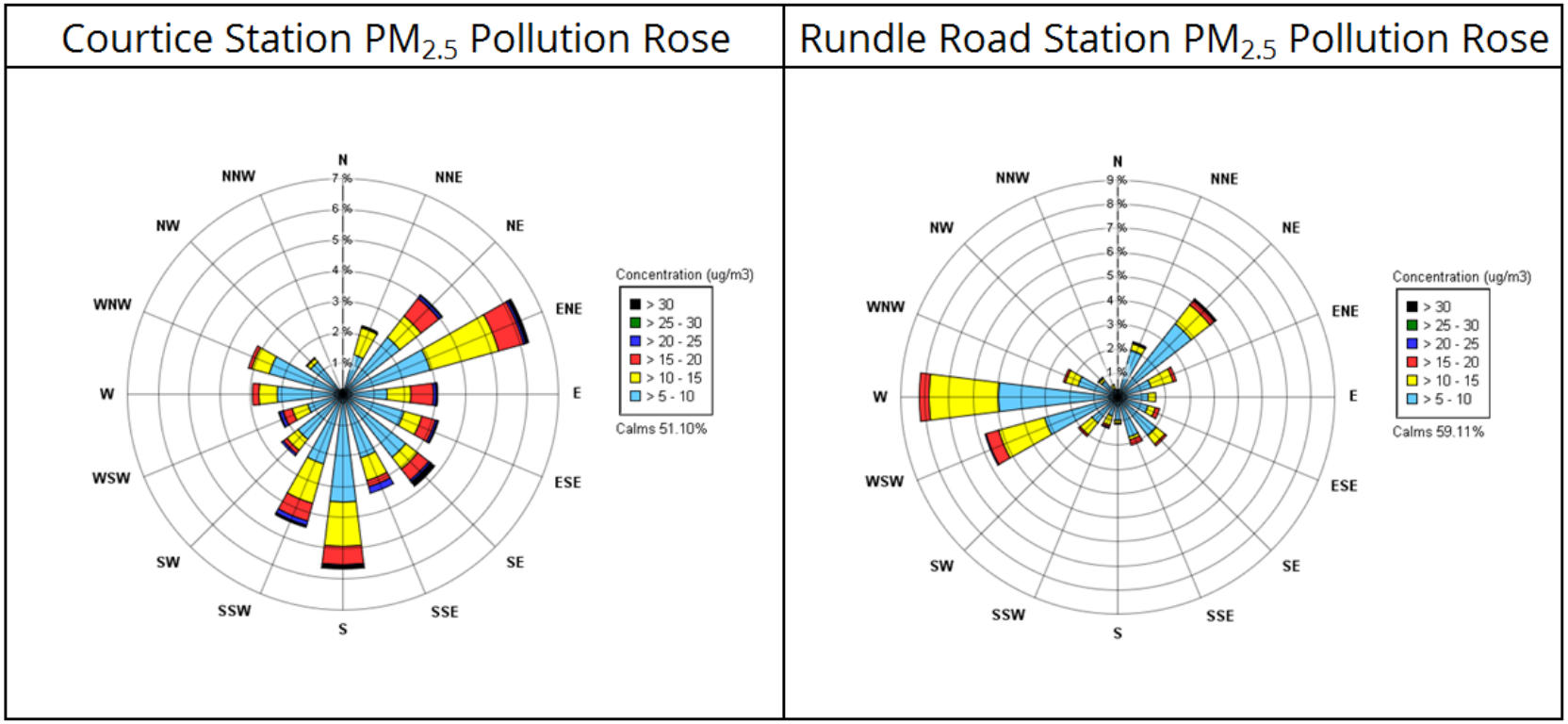


Figure 8. Pollution Roses of Hourly Average $PM_{2.5}$ Concentrations – July to September 2018

5.6 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 Q3 with the sample days being: July 1, 7, 13, 19, 25, 31, August 6, 12, 18, 24, 30, September 5, 11, 17, 23, and 29, 2018.

5.6.1 Courtice Station Results

Data recovery levels were high for the TSP sampler at the Courtice Station (94% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for TSP, mercury or metals during Q3. 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	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	µg/m³	*120*	*120*	0	27.1	29.8	10.2	54.4	54.4	39.4	52.0	15	94
Total Mercury (Hg)	µg/m³	*2*	*2*	0	6.94E-06	9.35E-06	7.36E-07	2.48E-05	6.32E-06	2.04E-05	2.48E-05	15	94
Aluminum (Al)	µg/m³	*4.8*	-	0	1.44E-01	1.69E-01	6.10E-02	4.12E-01	4.12E-01	1.98E-01	3.78E-01	15	94
Antimony (Sb)	µg/m³	*25*	*25*	0	1.33E-03	1.67E-03	4.50E-04	3.16E-03	3.16E-03	1.55E-03	1.44E-03	15	94
Arsenic (As)	µg/m³	*0.3*	*0.3*	0	1.17E-03	1.24E-03	9.20E-04	1.90E-03	1.90E-03	9.20E-04	9.20E-04	15	94
Barium (Ba)	µg/m³	*10*	*10*	0	8.36E-03	9.25E-03	3.30E-03	1.79E-02	1.54E-02	1.79E-02	1.54E-02	15	94
Beryllium (Be)	µg/m³	*0.01*	*0.01*	0	6.66E-05	1.25E-04	3.07E-05	3.16E-04	3.16E-04	3.07E-05	3.07E-05	15	94
Bismuth (Bi)	µg/m³	-	-	-	8.31E-04	9.96E-04	5.52E-04	1.90E-03	1.90E-03	5.52E-04	5.52E-04	15	94
Boron (B)	µg/m³	*120*	-	0	6.57E-03	8.81E-03	1.84E-03	1.23E-02	1.90E-03	1.23E-02	1.23E-02	15	94
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	0	6.18E-04	6.18E-04	6.13E-04	6.32E-04	6.32E-04	6.13E-04	6.13E-04	15	94
Chromium (Cr)	µg/m³	*0.5*	-	0	4.95E-03	5.58E-03	1.53E-03	9.50E-03	4.41E-03	9.50E-03	8.30E-03	15	94
Cobalt (Co)	µg/m³	*0.1*	*0.1*	0	6.18E-04	6.18E-04	6.13E-04	6.32E-04	6.32E-04	6.13E-04	6.13E-04	15	94
Copper (Cu)	µg/m³	*50*	-	0	2.82E-02	2.97E-02	1.43E-02	4.55E-02	3.65E-02	3.56E-02	4.55E-02	15	94
Iron (Fe)	µg/m³	*4*	-	0	4.55E-01	6.00E-01	1.79E-01	2.53E+00	1.03E+00	6.76E-01	2.53E+00	15	94
Lead (Pb)	µg/m³	*0.5*	*0.5*	0	2.32E-03	2.63E-03	9.20E-04	5.40E-03	3.10E-03	5.40E-03	3.70E-03	15	94
Magnesium (Mg)	µg/m³	-	-	-	2.09E-01	2.35E-01	8.20E-02	4.36E-01	4.36E-01	4.25E-01	4.00E-01	15	94
Manganese (Mn)	µg/m³	*0.4*	-	0	1.20E-02	1.39E-02	4.66E-03	3.03E-02	2.54E-02	2.27E-02	3.03E-02	15	94
Molybdenum (Mo)	µg/m³	*120*	-	0	1.28E-03	1.36E-03	7.80E-04	2.29E-03	9.48E-04	2.12E-03	2.29E-03	15	94
Nickel (Ni)	µg/m³	*0.2*	-	0	1.03E-03	1.08E-03	9.20E-04	2.20E-03	9.48E-04	9.20E-04	2.20E-03	15	94
Phosphorus (P)	µg/m³	-	-	-	1.69E-01	2.79E-01	2.97E-02	6.30E-01	3.91E-02	5.40E-01	6.30E-01	15	94
Selenium (Se)	µg/m³	*10*	*10*	0	3.09E-03	3.09E-03	3.07E-03	3.16E-03	3.16E-03	3.07E-03	3.07E-03	15	94
Silver (Ag)	µg/m³	*1*	*1*	0	5.28E-04	7.27E-04	3.07E-04	1.58E-03	1.58E-03	3.07E-04	3.07E-04	15	94
Strontium (Sr)	µg/m³	*120*	-	0	5.88E-03	6.80E-03	2.10E-03	1.73E-02	1.10E-02	9.10E-03	1.73E-02	15	94
Thallium (Tl)	µg/m³	-	-	-	1.34E-04	1.06E-03	2.76E-05	3.16E-03	3.16E-03	2.96E-05	2.76E-05	15	94
Tin (Sn)	µg/m³	*10*	*10*	0	1.33E-03	1.68E-03	3.07E-04	3.16E-03	3.16E-03	1.77E-03	1.48E-03	15	94
Titanium (Ti)	µg/m³	*120*	-	0	5.37E-03	7.61E-03	3.15E-03	2.65E-02	2.46E-02	3.37E-03	2.65E-02	15	94
Uranium (Ur)	µg/m³	*1.5*	-	0	5.10E-05	6.75E-05	3.07E-05	1.42E-04	1.42E-04	3.07E-05	3.07E-05	15	94

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Vanadium (V)	µg/m³	*2*	*1*	0	1.55E-03	1.55E-03	1.53E-03	1.58E-03	1.58E-03	1.53E-03	1.53E-03	15	94
Zinc (Zn)	µg/m³	*120*	-	0	3.21E-02	3.79E-02	1.63E-02	1.16E-01	1.16E-01	7.92E-02	5.27E-02	15	94
Zirconium (Zr)	µg/m³	*20*	-	0	8.77E-04	9.71E-04	6.13E-04	1.58E-03	1.58E-03	6.13E-04	1.20E-03	15	94

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

5.6.2 Rundle Road Station Results

Data recovery levels were high for the TSP sampler at the Rundle Road Station (100% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for TSP, mercury or metals during Q3. 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	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	µg/m³	*120*	*120*	0	48.3	53.6	24.0	109.0	67.4	109.0	93.0	16	100
Total Mercury (Hg)	µg/m³	*2*	*2*	0	8.76E-06	1.46E-05	2.76E-06	9.83E-05	9.83E-05	1.33E-05	2.76E-05	16	100
Aluminum (Al)	µg/m³	*4.8*	-	0	2.49E-01	2.92E-01	5.40E-02	5.99E-01	4.25E-01	3.12E-01	5.99E-01	16	100
Antimony (Sb)	µg/m³	*25*	*25*	0	1.36E-03	3.13E-03	2.50E-04	2.64E-02	2.64E-02	1.99E-03	1.42E-03	16	100
Arsenic (As)	µg/m³	*0.3*	*0.3*	0	1.39E-03	2.44E-03	9.20E-04	2.06E-02	2.06E-02	9.20E-04	9.20E-04	16	100
Barium (Ba)	µg/m³	*10*	*10*	0	9.20E-03	1.02E-02	4.70E-03	1.84E-02	1.84E-02	1.43E-02	1.72E-02	16	100
Beryllium (Be)	µg/m³	*0.01*	*0.01*	0	7.63E-05	1.36E-04	3.07E-05	3.08E-04	3.08E-04	6.60E-05	3.07E-05	16	100
Bismuth (Bi)	µg/m³	-	-	-	8.67E-04	1.04E-03	5.52E-04	1.85E-03	1.85E-03	5.52E-04	5.52E-04	16	100
Boron (B)	µg/m³	*120*	-	0	6.03E-03	8.36E-03	1.84E-03	1.23E-02	1.85E-03	1.23E-02	1.23E-02	16	100
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	0	6.97E-04	8.71E-04	6.13E-04	4.73E-03	4.73E-03	6.13E-04	6.13E-04	16	100
Chromium (Cr)	µg/m³	*0.5*	-	0	4.33E-03	5.06E-03	1.53E-03	8.20E-03	5.21E-03	6.80E-03	8.20E-03	16	100
Cobalt (Co)	µg/m³	*0.1*	*0.1*	0	6.14E-04	6.14E-04	6.13E-04	6.15E-04	6.15E-04	6.13E-04	6.13E-04	16	100
Copper (Cu)	µg/m³	*50*	-	0	1.72E-02	1.89E-02	7.73E-03	3.81E-02	3.78E-02	1.60E-02	3.81E-02	16	100
Iron (Fe)	µg/m³	*4*	-	0	5.14E-01	5.97E-01	1.46E-01	1.39E+00	1.39E+00	6.68E-01	9.71E-01	16	100
Lead (Pb)	µg/m³	*0.5*	*0.5*	0	2.76E-03	2.69E-02	9.20E-04	3.96E-01	3.96E-01	3.80E-03	3.40E-03	16	100
Magnesium (Mg)	µg/m³	-	-	-	3.49E-01	3.89E-01	1.19E-01	7.67E-01	5.22E-01	6.37E-01	7.67E-01	16	100
Manganese (Mn)	µg/m³	*0.4*	-	0	1.59E-02	1.80E-02	4.99E-03	2.92E-02	2.79E-02	2.79E-02	2.92E-02	16	100
Molybdenum (Mo)	µg/m³	*120*	-	0	8.25E-04	8.60E-04	3.07E-04	1.37E-03	9.23E-04	8.40E-04	1.37E-03	16	100
Nickel (Ni)	µg/m³	*0.2*	-	0	1.10E-03	1.18E-03	9.20E-04	2.46E-03	2.46E-03	9.20E-04	2.20E-03	16	100
Phosphorus (P)	µg/m³	-	-	-	1.63E-01	2.81E-01	3.07E-02	1.07E+00	5.53E-02	5.70E-01	1.07E+00	16	100

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Selenium (Se)	µg/m³	*10*	*10*	0	3.07E-03	3.07E-03	3.07E-03	3.08E-03	3.08E-03	3.07E-03	3.07E-03	16	100
Silver (Ag)	µg/m³	*1*	*1*	0	6.33E-04	1.33E-03	3.07E-04	1.06E-02	1.06E-02	3.07E-04	3.07E-04	16	100
Strontium (Sr)	µg/m³	*120*	-	0	1.38E-02	1.59E-02	4.90E-03	4.00E-02	1.77E-02	2.84E-02	4.00E-02	16	100
Thallium (Tl)	µg/m³	-	-	-	1.62E-04	1.17E-03	2.76E-05	3.08E-03	3.08E-03	2.76E-05	2.76E-05	16	100
Tin (Sn)	µg/m³	*10*	*10*	0	1.41E-03	3.49E-03	3.07E-04	3.09E-02	3.08E-03	3.09E-02	1.63E-03	16	100
Titanium (Ti)	µg/m³	*120*	-	0	8.87E-03	1.14E-02	3.37E-03	2.52E-02	2.09E-02	8.50E-03	2.52E-02	16	100
Uranium (Ur)	µg/m³	*1.5*	-	0	5.39E-05	7.10E-05	3.07E-05	1.38E-04	1.38E-04	3.07E-05	3.07E-05	16	100
Vanadium (V)	µg/m³	*2*	*1*	0	1.53E-03	1.53E-03	1.53E-03	1.54E-03	1.54E-03	1.53E-03	1.53E-03	16	100
Zinc (Zn)	µg/m³	*120*	-	0	2.49E-02	2.99E-02	9.80E-03	1.12E-01	1.12E-01	4.14E-02	3.95E-02	16	100
Zirconium (Zr)	µg/m³	*20*	-	0	8.65E-04	9.59E-04	6.13E-04	1.54E-03	1.54E-03	6.13E-04	6.13E-04	16	100

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

5.6.3 Fence Line Station Results

Data recovery levels were high for the TSP sampler at the Fence Line Station (94% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for TSP, mercury or metals during Q3. Table 8 is a summary of the statistics for this station.

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	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	µg/m³	*120*	*120*	*120*	0	35.7	42.3	13.5	93.6	93.6	43.8	47.9	15	94
Total Mercury (Hg)	µg/m³	*2*	*2*	*2*	0	1.66E-05	4.94E-04	7.36E-07	7.20E-03	2.48E-05	7.20E-03	3.03E-05	15	94
Aluminum (Al)	µg/m³	*4.8*	-	*4.8*	0	1.84E-01	2.54E-01	4.20E-02	6.57E-01	6.57E-01	2.38E-01	3.34E-01	15	94
Antimony (Sb)	µg/m³	*25*	*25*	*25*	0	1.51E-03	1.83E-03	4.40E-04	3.12E-03	3.12E-03	2.07E-03	2.03E-03	15	94
Arsenic (As)	µg/m³	*0.3*	*0.3*	*0.3*	0	1.16E-03	1.23E-03	9.20E-04	1.87E-03	1.87E-03	9.20E-04	9.20E-04	15	94
Barium (Ba)	µg/m³	*10*	*10*	*10*	0	1.08E-02	1.20E-02	4.40E-03	2.31E-02	1.73E-02	2.31E-02	2.11E-02	15	94
Beryllium (Be)	µg/m³	*0.01*	*0.01*	*0.01*	0	6.63E-05	1.24E-04	3.07E-05	3.12E-04	3.12E-04	3.07E-05	3.07E-05	15	94
Bismuth (Bi)	µg/m³	-	-	-	-	8.27E-04	9.87E-04	5.52E-04	1.87E-03	1.87E-03	5.52E-04	5.52E-04	15	94
Boron (B)	µg/m³	*120*	-	*120*	0	7.25E-03	9.87E-03	1.84E-03	2.60E-02	4.18E-03	1.23E-02	2.60E-02	15	94
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	*0.025*	0	6.15E-04	6.15E-04	6.13E-04	6.23E-04	6.23E-04	6.13E-04	6.13E-04	15	94
Chromium (Cr)	µg/m³	*0.5*	-	*0.5*	0	5.99E-03	6.93E-03	1.53E-03	1.16E-02	1.05E-02	1.02E-02	1.16E-02	15	94
Cobalt (Co)	µg/m³	*0.1*	*0.1*	*0.1*	0	6.15E-04	6.15E-04	6.13E-04	6.23E-04	6.23E-04	6.13E-04	6.13E-04	15	94
Copper (Cu)	µg/m³	*50*	-	*50*	0	2.04E-02	2.37E-02	9.10E-03	7.23E-02	2.37E-02	2.22E-02	7.23E-02	15	94

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	MECP Criteria (µg/m³)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Iron (Fe)	µg/m³	*4*	-	*4*	0	4.82E-01	6.19E-01	1.34E-01	1.74E+00	1.74E+00	7.73E-01	8.72E-01	15	94
Lead (Pb)	µg/m³	*0.5*	*0.5*	*2*	0	2.99E-03	3.53E-03	9.20E-04	7.00E-03	6.54E-03	4.70E-03	7.00E-03	15	94
Magnesium (Mg)	µg/m³	-	-	-	-	2.87E-01	3.44E-01	9.40E-02	7.99E-01	7.99E-01	4.17E-01	5.35E-01	15	94
Manganese (Mn)	µg/m³	*0.4*	-	*0.4*	0	1.73E-02	2.27E-02	4.86E-03	6.63E-02	6.63E-02	2.71E-02	3.56E-02	15	94
Molybdenum (Mo)	µg/m³	*120*	-	*120*	0	1.02E-03	1.21E-03	3.07E-04	3.89E-03	9.35E-04	1.33E-03	3.89E-03	15	94
Nickel (Ni)	µg/m³	*0.2*	-	*0.2*	0	1.15E-03	1.24E-03	9.20E-04	2.35E-03	2.35E-03	9.20E-04	2.10E-03	15	94
Phosphorus (P)	µg/m³	-	-	-	-	1.88E-01	3.00E-01	3.55E-02	1.12E+00	7.21E-02	5.80E-01	1.12E+00	15	94
Selenium (Se)	µg/m³	*10*	*10*	*10*	0	3.08E-03	3.08E-03	3.07E-03	3.12E-03	3.12E-03	3.07E-03	3.07E-03	15	94
Silver (Ag)	µg/m³	*1*	*1*	*1*	0	5.26E-04	7.21E-04	3.07E-04	1.56E-03	1.56E-03	3.07E-04	3.07E-04	15	94
Strontium (Sr)	µg/m³	*120*	-	*120*	0	8.59E-03	1.03E-02	3.10E-03	2.45E-02	2.45E-02	1.00E-02	1.65E-02	15	94
Thallium (Tl)	µg/m³	-	-	-	-	1.33E-04	1.05E-03	2.76E-05	3.12E-03	3.12E-03	2.76E-05	2.76E-05	15	94
Tin (Sn)	µg/m³	*10*	*10*	*10*	0	1.32E-03	1.72E-03	3.07E-04	3.12E-03	3.12E-03	2.20E-03	2.03E-03	15	94
Titanium (Ti)	µg/m³	*120*	-	*120*	0	7.52E-03	1.24E-02	3.37E-03	4.29E-02	4.29E-02	3.37E-03	1.60E-02	15	94
Uranium (Ur)	µg/m³	*1.5*	-	*1.5*	0	5.08E-05	6.69E-05	3.07E-05	1.40E-04	1.40E-04	3.07E-05	3.07E-05	15	94
Vanadium (V)	µg/m³	*2*	*1*	*2*	0	1.54E-03	1.54E-03	1.53E-03	1.56E-03	1.56E-03	1.53E-03	1.53E-03	15	94
Zinc (Zn)	µg/m³	*120*	-	*120*	0	2.81E-02	3.21E-02	9.90E-03	8.36E-02	5.22E-02	8.36E-02	4.52E-02	15	94
Zirconium (Zr)	µg/m³	*20*	-	*20*	0	8.78E-04	9.71E-04	6.13E-04	1.56E-03	1.56E-03	6.13E-04	1.30E-03	15	94

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

5.7 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 Q3 with the sample days being: July 1, 13, 25, August 6, 18, 30, September 11 and 23, 2018.

5.7.1 Courtice Station Results

Data recovery levels were high for the PAH results at the Courtice Station (88% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for any of the PAH's during Q3. 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 Q3 Concentration	Maximum Q3 Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	ng/m³	*12000*	-	0	6.45E+00	2.72E+00	2.18E+01	2.18E+01	3.28E+00	4.46E+00	7	88
2-Methylnaphthalene	ng/m³	*10000*	-	0	1.17E+01	5.18E+00	3.99E+01	3.99E+01	6.49E+00	7.55E+00	7	88

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Arithmetic Mean	Minimum Q3 Concentration	Maximum Q3 Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Acenaphthene	ng/m³	-	-	-	5.72E+00	1.63E+00	2.02E+01	2.02E+01	3.67E+00	4.11E+00	7	88
Acenaphthylene	ng/m³	*3500*	-	0	2.38E-01	4.06E-02	5.62E-01	4.82E-01	5.62E-01	2.96E-01	7	88
Anthracene	ng/m³	*200*	-	0	3.72E-01	1.76E-01	7.72E-01	7.72E-01	4.35E-01	3.28E-01	7	88
Benzo(a)Anthracene	ng/m³	-	-	-	5.27E-02	1.15E-02	1.21E-01	1.21E-01	3.14E-02	1.33E-02	7	88
Benzo(a)fluorene	ng/m³	-	-	-	1.11E-01	1.62E-03	2.41E-01	2.41E-01	8.64E-02	3.44E-02	7	88
Benzo(a)Pyrene	ng/m³	*0.05*[1] *5*[2] *1.1*[3]	*1*	0	1.77E-02	9.49E-03	3.76E-02	2.37E-02	3.76E-02	1.01E-02	7	88
Benzo(b)Fluoranthene	ng/m³	-	-	-	6.51E-02	1.84E-02	1.21E-01	1.21E-01	7.25E-02	2.92E-02	7	88
Benzo(b)fluorene	ng/m³	-	-	-	9.87E-02	1.62E-03	2.41E-01	2.41E-01	4.38E-02	2.04E-02	7	88
Benzo(e)Pyrene	ng/m³	-	-	-	1.00E-01	1.30E-02	2.41E-01	2.41E-01	3.82E-02	3.13E-02	7	88
Benzo(g,h,i)Perylene	ng/m³	-	-	-	5.56E-02	1.89E-02	1.21E-01	1.21E-01	3.34E-02	2.42E-02	7	88
Benzo(k)Fluoranthene	ng/m³	-	-	-	5.12E-02	2.96E-03	1.21E-01	1.21E-01	3.51E-02	1.73E-02	7	88
Biphenyl	ng/m³	-	-	-	3.43E+00	1.65E+00	1.01E+01	1.01E+01	1.91E+00	2.82E+00	7	88
Chrysene	ng/m³	-	-	-	7.35E-02	4.39E-02	1.21E-01	1.21E-01	7.11E-02	4.55E-02	7	88
Dibenzo(a,h)Anthracene	ng/m³	-	-	-	4.74E-02	2.96E-03	1.21E-01	1.21E-01	1.83E-02	1.32E-02	7	88
Fluoranthene	ng/m³	-	-	-	1.54E+00	5.88E-01	3.28E+00	3.28E+00	1.26E+00	8.95E-01	7	88
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	-	5.10E-02	2.96E-03	1.21E-01	1.21E-01	3.67E-02	1.62E-02	7	88
Naphthalene	ng/m³	*22500*	*22500*	0	2.67E+01	1.42E+01	7.78E+01	7.78E+01	1.63E+01	1.71E+01	7	88
o-Terphenyl	ng/m³	-	-	-	8.97E-02	6.66E-03	2.41E-01	2.41E-01	1.94E-02	9.97E-03	7	88
Perylene	ng/m³	-	-	-	8.42E-02	8.12E-04	2.41E-01	2.41E-01	2.96E-03	1.59E-03	7	88
Phenanthrene	ng/m³	-	-	-	7.66E+00	3.31E+00	2.16E+01	2.16E+01	5.32E+00	4.27E+00	7	88
Pyrene	ng/m³	-	-	-	6.79E-01	3.18E-01	1.35E+00	1.35E+00	6.79E-01	4.87E-01	7	88
Tetralin	ng/m³	-	-	-	2.63E+00	1.19E+00	4.64E+00	4.24E+00	2.01E+00	4.64E+00	7	88
Total PAH[4]	ng/m³	-	-	-	6.80E+01	3.52E+01	2.04E+02	2.04E+02	3.98E+01	4.47E+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

5.7.2 Rundle Road Station Results

Data recovery levels were high for the PAH results at the Rundle Road Station (100% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for any of the PAH's during Q3. 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 Q3 Concentration	Maximum Q3 Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	ng/m³	*12000*	-	0	1.13E+01	2.57E+00	2.66E+01	2.66E+01	1.29E+01	6.43E+00	8	100
2-Methylnaphthalene	ng/m³	*10000*	-	0	2.31E+01	4.18E+00	5.41E+01	5.41E+01	2.91E+01	1.26E+01	8	100
Acenaphthene	ng/m³	-	-	-	1.47E+01	1.26E+00	4.04E+01	4.04E+01	1.62E+01	1.14E+01	8	100
Acenaphthylene	ng/m³	*3500*	-	0	2.06E-01	7.95E-02	4.02E-01	3.85E-01	4.02E-01	1.26E-01	8	100
Anthracene	ng/m³	*200*	-	0	1.04E+00	7.64E-02	2.62E+00	2.62E+00	1.25E+00	5.54E-01	8	100
Benzo(a)Anthracene	ng/m³	-	-	-	5.35E-02	8.76E-03	1.40E-01	1.40E-01	3.99E-02	1.22E-02	8	100
Benzo(a)fluorene	ng/m³	-	-	-	1.33E-01	1.64E-03	2.80E-01	2.80E-01	2.30E-01	2.91E-02	8	100
Benzo(a)Pyrene	ng/m³	*0.05*[1] *5*[2] *1.1*[3]	*1*	0	1.68E-02	2.49E-03	3.57E-02	1.59E-02	3.20E-02	3.57E-02	8	100
Benzo(b)Fluoranthene	ng/m³	-	-	-	6.04E-02	1.42E-02	1.40E-01	1.40E-01	4.98E-02	2.94E-02	8	100
Benzo(b)fluorene	ng/m³	-	-	-	1.02E-01	1.64E-03	2.80E-01	2.80E-01	8.04E-02	1.48E-02	8	100
Benzo(e)Pyrene	ng/m³	-	-	-	1.02E-01	7.33E-03	2.80E-01	2.80E-01	5.05E-02	2.84E-02	8	100
Benzo(g,h,i)Perylene	ng/m³	-	-	-	5.64E-02	1.31E-02	1.40E-01	1.40E-01	3.32E-02	3.57E-02	8	100
Benzo(k)Fluoranthene	ng/m³	-	-	-	5.44E-02	8.61E-03	1.40E-01	1.40E-01	2.78E-02	3.80E-02	8	100
Biphenyl	ng/m³	-	-	-	5.33E+00	1.01E+00	1.32E+01	1.32E+01	6.72E+00	2.63E+00	8	100
Chrysene	ng/m³	-	-	-	8.18E-02	2.93E-02	1.40E-01	1.40E-01	1.32E-01	5.08E-02	8	100
Dibenzo(a,h)Anthracene	ng/m³	-	-	-	4.60E-02	1.78E-03	1.40E-01	1.40E-01	1.93E-02	1.08E-02	8	100
Fluoranthene	ng/m³	-	-	-	4.95E+00	5.82E-01	1.35E+01	1.35E+01	6.08E+00	1.71E+00	8	100
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	-	5.80E-02	7.39E-03	1.40E-01	1.40E-01	5.95E-02	2.08E-02	8	100
Naphthalene	ng/m³	*22500*	*22500*	0	3.15E+01	1.08E+01	7.42E+01	7.42E+01	4.01E+01	2.05E+01	8	100
o-Terphenyl	ng/m³	-	-	-	9.02E-02	7.70E-03	2.80E-01	2.80E-01	1.82E-02	1.22E-02	8	100
Perylene	ng/m³	-	-	-	8.33E-02	8.20E-04	2.80E-01	2.80E-01	5.52E-03	1.52E-03	8	100

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Arithmetic Mean	Minimum Q3 Concentration	Maximum Q3 Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Phenanthrene	ng/m^3	-	-	-	2.17E+01	2.32E+00	5.81E+01	5.81E+01	2.96E+01	8.56E+00	8	100
Pyrene	ng/m^3	-	-	-	2.02E+00	3.00E-01	5.38E+00	5.38E+00	2.61E+00	9.18E-01	8	100
Tetralin	ng/m^3	-	-	-	1.98E+00	1.12E+00	3.36E+00	3.36E+00	2.36E+00	1.95E+00	8	100
Total PAH[4]	ng/m^3	-	-	-	1.19E+02	2.52E+01	2.92E+02	2.92E+02	1.48E+02	6.76E+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

5.8 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 Q3 with the sample days being: July 13, August 6, 30, and September 23, 2018.

5.8.1 Courtice Station Results

Data recovery levels were acceptable for the D&F results at the Courtice Station (75% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for any of the D&F's during Q3. Table 11 is a summary of the statistics for this station.

Table 11: Courtice Station Q3 Monitoring Results for Dioxin and Furan Results

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	pg/m^3	-	-	-	-	2.87E-03	1.19E-03	5.47E-03	5.47E-03	1.97E-03	1.19E-03	3	75
1,2,3,7,8-PeCDD	pg/m^3	-	-	-	-	5.52E-03	9.74E-04	9.14E-03	6.43E-03	9.14E-03	9.74E-04	3	75
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	-	-	5.34E-03	8.60E-04	8.23E-03	6.91E-03	8.23E-03	8.60E-04	3	75
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	-	-	6.98E-03	4.71E-03	1.06E-02	5.63E-03	1.06E-02	4.71E-03	3	75
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	-	-	5.76E-03	2.11E-03	9.22E-03	5.95E-03	9.22E-03	2.11E-03	3	75
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	-	-	4.92E-02	9.65E-03	1.07E-01	9.65E-03	3.08E-02	1.07E-01	3	75
OCDD	pg/m^3	-	-	-	-	1.74E-01	1.06E-01	3.10E-01	1.07E-01	1.06E-01	3.10E-01	3	75
2,3,7,8-TCDF	pg/m^3	-	-	-	-	3.83E-03	8.28E-04	6.91E-03	6.91E-03	3.74E-03	8.28E-04	3	75
1,2,3,7,8-PeCDF	pg/m^3	-	-	-	-	6.74E-03	9.09E-04	1.16E-02	7.72E-03	1.16E-02	9.09E-04	3	75
2,3,4,7,8-PeCDF	pg/m^3	-	-	-	-	7.09E-03	3.08E-03	1.05E-02	7.72E-03	1.05E-02	3.08E-03	3	75
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	-	-	4.23E-03	1.28E-03	7.07E-03	7.07E-03	4.33E-03	1.28E-03	3	75
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	-	-	3.74E-03	9.74E-04	6.11E-03	6.11E-03	4.14E-03	9.74E-04	3	75
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	-	-	6.98E-03	4.09E-03	9.30E-03	7.56E-03	9.30E-03	4.09E-03	3	75
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	-	-	7.42E-03	2.14E-03	1.11E-02	9.00E-03	1.11E-02	2.14E-03	3	75

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	MECP Criteria (µg/m³)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
1,2,3,4,6,7,8-HpCDF	pg/m³	-	-	-	-	1.37E-02	5.47E-03	1.94E-02	5.47E-03	1.63E-02	1.94E-02	3	75
1,2,3,4,7,8,9-HpCDF	pg/m³	-	-	-	-	6.73E-03	1.27E-03	1.01E-02	8.84E-03	1.01E-02	1.27E-03	3	75
OCDF	pg/m³	-	-	-	-	9.21E-03	6.11E-03	1.29E-02	6.11E-03	8.67E-03	1.29E-02	3	75
Total Toxic Equivalency	pg TEQ/m³	*0.1* *1*[1]	-	0.1	0	1.59E-02	6.19E-03	2.13E-02	2.02E-02	2.13E-02	6.19E-03	3	75

NOTE: All non-detectable results were reported as 1/2 of the detection limit
[1] O. Reg. 419/05 Schedule Upper Risk Thresholds

5.8.2 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 Q3. Table 12 is a summary of the statistics for this station.

Table 12: Rundle Road Station Q3 Monitoring Results for Dioxin and Furan Results

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	MECP Criteria (µg/m³)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	pg/m³	-	-	-	-	2.38E-03	3.28E-04	6.90E-03	6.90E-03	1.79E-03	3.28E-04	4	100
1,2,3,7,8-PeCDD	pg/m³	-	-	-	-	2.50E-03	3.38E-04	7.65E-03	7.65E-03	9.57E-04	1.05E-03	4	100
1,2,3,4,7,8-HxCDD	pg/m³	-	-	-	-	3.43E-03	3.02E-04	8.96E-03	8.96E-03	6.81E-04	3.77E-03	4	100
1,2,3,6,7,8-HxCDD	pg/m³	-	-	-	-	4.02E-03	2.85E-04	7.46E-03	7.46E-03	9.36E-04	7.38E-03	4	100
1,2,3,7,8,9-HxCDD	pg/m³	-	-	-	-	4.16E-03	3.02E-04	7.84E-03	7.84E-03	1.40E-03	7.08E-03	4	100
1,2,3,4,6,7,8-HpCDD	pg/m³	-	-	-	-	4.65E-02	5.55E-03	1.42E-01	8.40E-03	2.96E-02	1.42E-01	4	100
OCDD	pg/m³	-	-	-	-	1.50E-01	1.59E-02	3.93E-01	8.40E-02	1.05E-01	3.93E-01	4	100
2,3,7,8-TCDF	pg/m³	-	-	-	-	2.62E-03	3.91E-04	7.28E-03	7.28E-03	2.13E-03	6.89E-04	4	100
1,2,3,7,8-PeCDF	pg/m³	-	-	-	-	3.79E-03	2.85E-04	7.84E-03	7.84E-03	3.70E-03	3.34E-03	4	100
2,3,4,7,8-PeCDF	pg/m³	-	-	-	-	4.66E-03	4.09E-04	8.02E-03	8.02E-03	3.02E-03	7.18E-03	4	100
1,2,3,4,7,8-HxCDF	pg/m³	-	-	-	-	3.72E-03	7.12E-04	7.65E-03	7.65E-03	2.76E-03	3.77E-03	4	100
1,2,3,6,7,8-HxCDF	pg/m³	-	-	-	-	4.19E-03	4.45E-04	8.92E-03	6.53E-03	8.51E-04	8.92E-03	4	100
2,3,4,6,7,8-HxCDF	pg/m³	-	-	-	-	4.26E-03	3.38E-04	8.21E-03	8.21E-03	2.93E-03	5.57E-03	4	100
1,2,3,7,8,9-HxCDF	pg/m³	-	-	-	-	5.46E-03	2.14E-03	9.70E-03	9.70E-03	4.64E-03	5.38E-03	4	100
1,2,3,4,6,7,8-HpCDF	pg/m³	-	-	-	-	1.86E-02	2.67E-03	6.10E-02	6.53E-03	4.25E-03	6.10E-02	4	100
1,2,3,4,7,8,9-HpCDF	pg/m³	-	-	-	-	4.79E-03	1.96E-04	1.06E-02	1.06E-02	5.74E-04	7.74E-03	4	100
OCDF	pg/m³	-	-	-	-	9.35E-03	7.83E-04	2.62E-02	7.84E-03	2.55E-03	2.62E-02	4	100
Total Toxic Equivalency	pg TEQ/m³	*0.1* *1*[1]	-	0.1	0	1.03E-02	1.55E-03	2.38E-02	2.38E-02	5.77E-03	1.01E-02	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

6 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**.

6.1 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 23:00-00:00 or 00:00-01:00 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 Q3 until both times were synced up together. This issue will be corrected into Q4.

On July 19, 2018 a takeout calibration was performed on the temporary NO_x analyzer at the station and was removed. The original NO_x analyzer was reinstalled and calibrated after service and maintenance was performed. A takeout calibration was performed on the original SO_2 analyzer and was removed for service and maintenance. A temporary analyzer was installed and calibrated in its place.

The TSP sample on July 19, 2018 was invalid due to what is believed to be poor filter condition issues noting water spots and 2 large tears around 2 edges by Stantec field staff.

On July 26, 2018 it was noted that there was a plant wide power shut down at the Courtice Wastewater Treatment Plant that resulted in one hour of station data loss from 09:00-10:00. On this day the temporary SO_2 analyzer was removed and the original analyzer was reinstalled after service and maintenance was performed.

Shortly after RWDI began operating the Region of Durham stations, the data plans associated with the modems installed at the Stations were discontinued and new modems and SIM cards were to be installed. On August 20, 2018 new modems were being installed at the Courtice and Rundle stations and there were short term power losses to the loggers associated with the installation, which subsequently corrupted the non-volatile memory of the CR1000 loggers. This should not have occurred with a logger with non-volatile memory, and after troubleshooting with Campbell Scientific to recover the data, all attempts at recovery were unsuccessful. After a thorough investigation, it is thought that the initial programs that were installed in the dataloggers at the Courtice and Rundle Stations were not programmed to recover after power loss; and this, in addition to running a very outdated operating system version is thought to have contributed to the non-volatile memory loss. Data was recovered from

the unit DAS systems from the SHARP and Teledyne units which was successful, however it produced data at either 5 minute or 1 hour intervals, and did not show any of the IZS data; this is why there are missing records in the timelines of zero trends in **Appendix C**. $PM_{2.5}$, NO_x and SO_2 data were inserted from the unit DAS between August 8, 2018 at 07:00 and August 20, 2018 at 12:00.

The PAH/D&F sample on August 30, 2018 was invalid as the GFI had tripped resulting in the PUF unit not running on that sample day.

On September 3, 2018, it was noted that the permeation device in the SO_2 unit at the station was depleting and was subsequently replaced on September 18, 2018.

On September 18, 2018 the overnight IZS sequence was changed from spanning from 23:45 (on one day) to 00:10 (on the following day), to 00:45 to 01:10 on the same day.

On September 20, 2018, there was a suspected loss of power to the entire station for one hour from 09:00-10:00.

6.2 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 23:00-00:00 or 00:00-01:00 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 Q3 until both times were synced up together. This issue will be corrected into Q4.

On July 19, 2018 a takeout calibration was performed on the original NO_x analyzer at the station and was removed for service and maintenance. A temporary NO_x analyzer was installed and calibrated. A takeout calibration was performed on the temporary SO_2 analyzer and it was removed. The original analyzer was reinstalled after service and maintenance and was calibrated. During this day, the Meteorological tower onsite was lowered and the anemometer and wind vane was serviced by Stantec. The tower length was also increased to 10 meters. The wind vane required repair which was performed the morning of July 20, 2018 and was put online later that morning.

Shortly after RWDI began operating the Region of Durham stations, the data plans associated with the modems installed at the Stations were discontinued and new modems and SIM cards were to be installed. On August 20, 2018 new modems were being installed at the Courtice and Rundle stations and there were short term power losses to the loggers associated with the installation, which subsequently corrupted the non-volatile memory of the CR1000 loggers. This should not have occurred with a logger with non-volatile memory, and after troubleshooting with Campbell Scientific to recover the data, all attempts at recovery were unsuccessful. After a thorough investigation, it is thought that the initial programs that were installed in the dataloggers at the Courtice and Rundle Stations were not programmed to recover after power loss; and this, in addition to running a very outdated operating system version is thought to have contributed to the non-volatile memory loss. Data was recovered from the unit DAS systems from the SHARP and Teledyne units which was successful, however it produced data at either

5 minute or 1 hour intervals, and did not show any of the IZS data; this is why there are missing records in the timelines of zero trends in **Appendix C**. $PM_{2.5}$, NO_x and SO_2 data were inserted from the unit DAS between August 8, 2018 at 07:00 and August 22, 2018 at 20:00. Some SO_2 data was not recoverable from the unit DAS system and is missing from August 8, 2018 at 07:00 to August 15, 2018 at 16:00.

On August 30-31, 2018 and September 11-13, 2018, the IZS sequence for the NOx and SO2 analyzers were disabled due to unknown causes which is why there are missing records in the timelines of zero trends in **Appendix C**.

On September 18, 2018 the overnight IZS sequence was changed from spanning from 23:45 (on one day) to 00:10 (on the following day), to 00:45 to 01:10 on the same day.

On September 20, 2018, there was a suspected loss of power to the entire station for one hour from 09:00-10:00.

6.3 Fence Line Station

The TSP sample on July 25, 2018 was invalid as per Stantec field staff's notes due to a tripped GFI, resulting in the Hi-Vol unit not running on that sample day.

7 CONCLUSIONS

This Q3 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 no exceedances of any AAQC or HHRA Health Based Criteria. Data recovery rates were acceptable and valid for all measured Q3 parameters; however, there were a few monthly averages that were invalid due to obtaining less than 75% data; namely Rundle Road August monthly mean for SO_2 and station collected meteorological parameters.

8 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 Q3

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										
July	65	63	38	37	96	25	16	6	11	10	8	7	2	5	4	99.7	95.4	95.4	95.4	95.3
August	22	75	57	32	61	17	17	9	11	8	8	6	2	5	2	99.7	97.4	97.4	97.4	97.4
September	14	69	51	22	78	8	15	7	8	13	4	6	2	4	4	99.4	97.4	97.4	97.4	97.2
Q3 Arithmetic Mean											7	6	2	5	3	99.6	96.7	96.7	96.7	96.7

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										
July	24	74	36	38	23	17	14	6	8	2	6	6	2	4	1	99.7	99.7	99.7	99.7	98.9
August	23	26	13	16	24	18	9	4	6	3	8	5	3	3	-	99.7	99.7	99.7	99.7	74.6
September	36	34	19	15	6	11	9	4	6	1	4	4	2	3	1	99.4	99.4	99.4	99.4	96.8
Q3 Arithmetic Mean											6	5	2	3	1	99.6	99.6	99.6	99.6	90.0

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.		
July		0	0		0	0	N/A	0	0	N/A	0	0
August		0	0		0	0	N/A	0	0	N/A	0	0
September		0	0		0	0	N/A	0	0	N/A	0	0
Q3 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	WD	Temp	RH	Pres	Rain	WS	WD	Temp	RH	Pres	Rain	WS	WD	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	(%)					
July	31		30	93	30.1	19.1	0		14	33	29.4	0.0	10		22	70	30	0.1	103.3	99.7	99.7	100.0	100.0	100.0	100.0
August	31		27	93	29.9	7.8	0		14	41	29.3	0.0	9		-	-	-	-	37.1	99.9	99.9	60.5	60.5	60.5	60.5
September	39		28	94	30.1	3.9	0		8	39	29.3	0.0	12		18	74	30	0.1	54.7	96.4	96.4	99.9	99.9	99.9	99.9
Q3 Arithmetic Mean													10		21	73	30	0.1	195.1	98.7	98.7	86.6	86.6	86.6	86.6

Rundle Station MET Statistics	Maximum 1 hr Mean					Minimum 1 hr Mean					Monthly Mean					Total	% valid hours				
Parameter	WS	WD	Temp	RH	Rain	WS	WD	Temp	RH	Rain	WS	WD	Temp	RH	Rain	Rain	WS	WD	Temp	RH	Rain
Units	(km/hr)	(°)	(°C)	(%)	mm	(km/hr)	(°)	(°C)	(%)	mm	(km/hr)	(°)	(°C)	(%)	mm	mm	(%)				
July	24		31	98	20.4	0		12	35	0.0	9		22	72	0.1	105.6	99.5	97.8	100.0	100.0	100.0
August	25		29	98	4.3	0		12	44	0.0	-		-	-	-	16.6	53.0	53.0	53.0	53.0	53.0
September	33		30	98	5.4	0		6	40	0.0	9		18	79	0.1	78.0	99.9	99.9	99.9	99.9	99.9
Q3 Arithmetic Mean											9		20	77	0.1	200.2	83.9	83.4	84.1	84.1	84.1

Table A2: 2018 Q3 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.	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	No.	%
July	N/A	8	65	25	742	99.7
August	N/A	8	22	17	742	99.7
September	N/A	4	14	8	716	99.4

Table A3: 2018 Q3 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.	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	No.	%
July	N/A	6	24	17	742	99.7
August	N/A	8	23	18	742	99.7
September	N/A	4	36	11	716	99.4

Table A4: 2018 Q3 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	NOx	NOx	NOx	NOx	NOx	NOx	NOx
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
July	N/A	N/A	7	63	16	710	95.4
August	N/A	N/A	6	75	17	725	97.4
September	N/A	N/A	6	69	15	701	97.4

Table A5: 2018 Q3 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	NOx	NOx	NOx	NOx	NOx	NOx	NOx
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
July	N/A	N/A	6	74	14	742	99.7
August	N/A	N/A	5	26	9	742	99.7
September	N/A	N/A	4	34	9	716	99.4

Table A6: 2018 Q3 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.	%
July	N/A	N/A	2	38	6	710	95.4
August	N/A	N/A	2	57	9	725	97.4
September	N/A	N/A	2	51	7	701	97.4

Table A7: 2018 Q3 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.	%
July	N/A	N/A	2	36	6	742	99.7
August	N/A	N/A	3	13	4	742	99.7
September	N/A	N/A	2	19	4	716	99.4

Table A8: 2018 Q3 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.	%
July	0	0	5	37	11	710	95.4
August	0	0	5	32	11	725	97.4
September	0	0	4	22	8	701	97.4

Table A9: 2018 Q3 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.	%
July	0	0	4	38	8	742	99.7
August	0	0	3	16	6	742	99.7
September	0	0	3	15	6	716	99.4

Table A10: 2018 Q3 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.	%
July	0	0	3.8	96	10	709	95.3
August	0	0	2.1	61	8	725	97.4
September	0	0	4.0	78	13	700	97.2

Table A11: 2018 Q3 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	SO2	SO_2	SO_2	SO_2	SO_2	SO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
July	0	0	0.9	23	2	736	98.9
August	0	0	-	24	3	555	74.6
September	0	0	0.6	6	1	697	96.8

Table A12: 2018 Q3 Courtice Meteorological 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)	(%)
July	31	0	10	99.7
August	31	0	9	99.9
September	39	0	12	96.4

Table A13: 2018 Q3 Rundle Meteorological 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)	(%)
July	24	0	9	99.5
August	25	0	-	53.0
September	33	0	9	99.9

Table A14: 2018 Q3 Courtice Meteorological Station Wind Direction Data Summary

MET Statistics	% valid hours
Month	Wind Direction
	(%)
July	99.7
August	99.9
September	96.4

Table A15: 2018 Q3 Rundle Meteorological Station Wind Direction Data Summary

MET Statistics	% valid hours
Month	Wind Direction
	(%)
July	97.8
August	53.0
September	99.9

Table A16: 2018 Q3 Courtice Meteorological 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)	(%)
July	30	14	22	100.0
August	27	14	-	60.5
September	28	8	18	99.9

Table A17: 2018 Q3 Rundle Meteorological 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)	(%)
July	31	12	22	100.0
August	29	12	-	53.0
September	30	6	18	99.9

Table A18: 2018 Q3 Courtice Meteorological 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
	(%)	(%)	(%)	(%)
July	93	33	70	100.0
August	93	41	-	60.5
September	94	39	74	99.9

Table A19: 2018 Q3 Rundle Meteorological 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
	(%)	(%)	(%)	(%)
July	98	35	72	100.0
August	98	44	-	53.0
September	98	40	79	99.9

Table A20: 2018 Q3 Courtice Meteorological 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)
July	19.1	0.0	0.1	103.3	100.0
August	7.8	0.0	-	37.1	60.5
September	3.9	0.0	0.1	54.7	99.9

Table A21: 2018 Q3 Rundle Meteorological 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)
July	20.4	0.0	0.1	105.6	100.0
August	4.3	0.0	-	16.6	53.0
September	5.4	0.0	0.1	78.0	99.9

Table A22: 2018 Q3 Courtice Meteorological 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)	(%)
July	30.1	29.4	29.7	100.0
August	29.9	29.3	-	60.5
September	30.1	29.3	29.8	99.9

APPENDIX B

Table B1: Summary of Sample Flow Rate and Sample Duration for D&Fs

Sample Date	Courtice			Rundle		
	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume
	No.	(min)	(m^3)	No.	(min)	(m^3)
July 13, 2018	102GFF-COURTICE-20180713 & GYU311-01	1424	311	102GFF-RUNDLE-20180713 & GYU313-01	1396	268
August 6, 2018	COURTICE DF/PAH 08/06	1435	254	RUNDLE DF/PAH 08/06	1401	235
August 30, 2018	Invalid Sample			RUNDLE-DIOXIN/PAH-AUG30	1398	281
September 23, 2018	COURTICE-PAH/DX-SEP23	1401	308	RUNDLE-PAH/DX-SEP23	1397	305

Table B2: 2018 Courtice Station Q3 Monitoring Results for D&F

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	13-Jul-18	6-Aug-18	30-Aug-18	23-Sep-18
2,3,7,8-TCDD	pg/m^3	-	-	5.47E-03	1.97E-03	Invalid Sample	1.19E-03
1,2,3,7,8-PeCDD	pg/m^3	-	-	6.43E-03	9.14E-03		9.74E-04
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	6.91E-03	8.23E-03		8.60E-04
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	5.63E-03	1.06E-02		4.71E-03
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	5.95E-03	9.22E-03		2.11E-03
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	9.65E-03	3.08E-02		1.07E-01
OCDD	pg/m^3	-	-	1.07E-01	1.06E-01		3.10E-01
2,3,7,8-TCDF	pg/m^3	-	-	6.91E-03	3.74E-03		8.28E-04
1,2,3,7,8-PeCDF	pg/m^3	-	-	7.72E-03	1.16E-02		9.09E-04
2,3,4,7,8-PeCDF	pg/m^3	-	-	7.72E-03	1.05E-02		3.08E-03
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	7.07E-03	4.33E-03		1.28E-03
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	6.11E-03	4.14E-03		9.74E-04
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	7.56E-03	9.30E-03		4.09E-03
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	9.00E-03	1.11E-02		2.14E-03
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	5.47E-03	1.63E-02		1.94E-02
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	8.84E-03	1.01E-02		1.27E-03
OCDF	pg/m^3	-	-	6.11E-03	8.67E-03		1.29E-02
Total Toxic Equivalency	pg TEQ/m^3	*0.1* *1* [1]	-	2.02E-02	2.13E-02		6.19E-03

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

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

Table B2: 2018 Courtice Con't

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	-	-	2.87E-03	1.19E-03	5.47E-03	5.47E-03	1.97E-03	1.19E-03	3	75
1,2,3,7,8-PeCDD	-	-	5.52E-03	9.74E-04	9.14E-03	6.43E-03	9.14E-03	9.74E-04	3	75
1,2,3,4,7,8-HxCDD	-	-	5.34E-03	8.60E-04	8.23E-03	6.91E-03	8.23E-03	8.60E-04	3	75
1,2,3,6,7,8-HxCDD	-	-	6.98E-03	4.71E-03	1.06E-02	5.63E-03	1.06E-02	4.71E-03	3	75
1,2,3,7,8,9-HxCDD	-	-	5.76E-03	2.11E-03	9.22E-03	5.95E-03	9.22E-03	2.11E-03	3	75
1,2,3,4,6,7,8-HpCDD	-	-	4.92E-02	9.65E-03	1.07E-01	9.65E-03	3.08E-02	1.07E-01	3	75
OCDD	-	-	1.74E-01	1.06E-01	3.10E-01	1.07E-01	1.06E-01	3.10E-01	3	75
2,3,7,8-TCDF	-	-	3.83E-03	8.28E-04	6.91E-03	6.91E-03	3.74E-03	8.28E-04	3	75
1,2,3,7,8-PeCDF	-	-	6.74E-03	9.09E-04	1.16E-02	7.72E-03	1.16E-02	9.09E-04	3	75
2,3,4,7,8-PeCDF	-	-	7.09E-03	3.08E-03	1.05E-02	7.72E-03	1.05E-02	3.08E-03	3	75
1,2,3,4,7,8-HxCDF	-	-	4.23E-03	1.28E-03	7.07E-03	7.07E-03	4.33E-03	1.28E-03	3	75
1,2,3,6,7,8-HxCDF	-	-	3.74E-03	9.74E-04	6.11E-03	6.11E-03	4.14E-03	9.74E-04	3	75
2,3,4,6,7,8-HxCDF	-	-	6.98E-03	4.09E-03	9.30E-03	7.56E-03	9.30E-03	4.09E-03	3	75
1,2,3,7,8,9-HxCDF	-	-	7.42E-03	2.14E-03	1.11E-02	9.00E-03	1.11E-02	2.14E-03	3	75
1,2,3,4,6,7,8-HpCDF	-	-	1.37E-02	5.47E-03	1.94E-02	5.47E-03	1.63E-02	1.94E-02	3	75
1,2,3,4,7,8,9-HpCDF	-	-	6.73E-03	1.27E-03	1.01E-02	8.84E-03	1.01E-02	1.27E-03	3	75
OCDF	-	-	9.21E-03	6.11E-03	1.29E-02	6.11E-03	8.67E-03	1.29E-02	3	75
Total Toxic Equivalency	0.1	0	1.59E-02	6.19E-03	2.13E-02	2.02E-02	2.13E-02	6.19E-03	3	75

Table B3: 2018 Rundle Station Q3 Monitoring Results for D&F

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	13-Jul-18	6-Aug-18	30-Aug-18	23-Sep-18
2,3,7,8-TCDD	pg/m^3	-	-	6.90E-03	1.79E-03	4.98E-04	3.28E-04
1,2,3,7,8-PeCDD	pg/m^3	-	-	7.65E-03	9.57E-04	3.38E-04	1.05E-03
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	8.96E-03	6.81E-04	3.02E-04	3.77E-03
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	7.46E-03	9.36E-04	2.85E-04	7.38E-03
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	7.84E-03	1.40E-03	3.02E-04	7.08E-03
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	8.40E-03	2.96E-02	5.55E-03	1.42E-01
OCDD	pg/m^3	-	-	8.40E-02	1.05E-01	1.59E-02	3.93E-01
2,3,7,8-TCDF	pg/m^3	-	-	7.28E-03	2.13E-03	3.91E-04	6.89E-04
1,2,3,7,8-PeCDF	pg/m^3	-	-	7.84E-03	3.70E-03	2.85E-04	3.34E-03
2,3,4,7,8-PeCDF	pg/m^3	-	-	8.02E-03	3.02E-03	4.09E-04	7.18E-03
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	7.65E-03	2.76E-03	7.12E-04	3.77E-03
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	6.53E-03	8.51E-04	4.45E-04	8.92E-03
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	8.21E-03	2.93E-03	3.38E-04	5.57E-03
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	9.70E-03	4.64E-03	2.14E-03	5.38E-03
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	6.53E-03	4.25E-03	2.67E-03	6.10E-02
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	1.06E-02	5.74E-04	1.96E-04	7.74E-03
OCDF	pg/m^3	-	-	7.84E-03	2.55E-03	7.83E-04	2.62E-02
Total Toxic Equivalency	$pg\ TEQ/m^3$	*0.1* *1* [1]	-	2.38E-02	5.77E-03	1.55E-03	1.01E-02

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

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

Table B3: 2018 Rundle Con't

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	-	-	2.38E-03	3.28E-04	6.90E-03	6.90E-03	1.79E-03	3.28E-04	4	100
1,2,3,7,8-PeCDD	-	-	2.50E-03	3.38E-04	7.65E-03	7.65E-03	9.57E-04	1.05E-03	4	100
1,2,3,4,7,8-HxCDD	-	-	3.43E-03	3.02E-04	8.96E-03	8.96E-03	6.81E-04	3.77E-03	4	100
1,2,3,6,7,8-HxCDD	-	-	4.02E-03	2.85E-04	7.46E-03	7.46E-03	9.36E-04	7.38E-03	4	100
1,2,3,7,8,9-HxCDD	-	-	4.16E-03	3.02E-04	7.84E-03	7.84E-03	1.40E-03	7.08E-03	4	100
1,2,3,4,6,7,8-HpCDD	-	-	4.65E-02	5.55E-03	1.42E-01	8.40E-03	2.96E-02	1.42E-01	4	100
OCDD	-	-	1.50E-01	1.59E-02	3.93E-01	8.40E-02	1.05E-01	3.93E-01	4	100
2,3,7,8-TCDF	-	-	2.62E-03	3.91E-04	7.28E-03	7.28E-03	2.13E-03	6.89E-04	4	100
1,2,3,7,8-PeCDF	-	-	3.79E-03	2.85E-04	7.84E-03	7.84E-03	3.70E-03	3.34E-03	4	100
2,3,4,7,8-PeCDF	-	-	4.66E-03	4.09E-04	8.02E-03	8.02E-03	3.02E-03	7.18E-03	4	100
1,2,3,4,7,8-HxCDF	-	-	3.72E-03	7.12E-04	7.65E-03	7.65E-03	2.76E-03	3.77E-03	4	100
1,2,3,6,7,8-HxCDF	-	-	4.19E-03	4.45E-04	8.92E-03	6.53E-03	8.51E-04	8.92E-03	4	100
2,3,4,6,7,8-HxCDF	-	-	4.26E-03	3.38E-04	8.21E-03	8.21E-03	2.93E-03	5.57E-03	4	100
1,2,3,7,8,9-HxCDF	-	-	5.46E-03	2.14E-03	9.70E-03	9.70E-03	4.64E-03	5.38E-03	4	100
1,2,3,4,6,7,8-HpCDF	-	-	1.86E-02	2.67E-03	6.10E-02	6.53E-03	4.25E-03	6.10E-02	4	100
1,2,3,4,7,8,9-HpCDF	-	-	4.79E-03	1.96E-04	1.06E-02	1.06E-02	5.74E-04	7.74E-03	4	100
OCDF	-	-	9.35E-03	7.83E-04	2.62E-02	7.84E-03	2.55E-03	2.62E-02	4	100
Total Toxic Equivalency	0.1	0	1.03E-02	1.55E-03	2.38E-02	2.38E-02	5.77E-03	1.01E-02	4	100

Table B4: Summary of Sample Flow Rate and Sample Duration for PAHs

Sample Date	Courtice			Rundle		
	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume
	No.	(min)	(m^3)	No.	(min)	(m^3)
July 1, 2018	102GFF-COURTICE-20180701 GSI487-01	1419	310	102GFF-RUNDLE-20180701 GSI488-01	1394	260
July 13, 2018	102GFF-COURTICE-20180713 & GYU311-01	1424	311	102GFF-RUNDLE-20180713 & GYU313-01	1396	268
July 25, 2018	102GFF-COURTICE-20180725 GYU404-01	1422	278	102GFF-RUNDLE-20180725 GYU403-01	1393	276
August 6, 2018	COURTICE DF/PAH 08/06	1435	254	RUNDLE DF/PAH 08/06	1401	235
August 18, 2018	COURTICE-PAH-AUG18	1424	308	RUNDLE-PAH-AUG18	1392	281
August 30, 2018	Invalid Sample			RUNDLE-DIOXIN/PAH-AUG30	1398	281
September 11, 2018	COURTICE-PAH-SEP11	1388	314	RUNDLE-PAH-SEP11	1403	283
September 23, 2018	COURTICE-PAH/DX-SEP23	1401	308	RUNDLE-PAH/DX-SEP23	1397	305

Table B5: 2018 Courtice Station Q3 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1 Jul 18	13 Jul 18	25 Jul 18	6 Aug-18	18 Aug-18	30 Aug-18	11 Sep 18	23 Sep 18
1-Methylnaphthalene	ng/m^3	*12000*	-	6.06E+00	2.18E+01	3.02E+00	2.72E+00	3.28E+00	Invalid Sample	4.46E+00	3.83E+00
2-Methylnaphthalene	ng/m^3	*10000*	-	1.06E+01	3.99E+01	5.18E+00	5.36E+00	6.49E+00		7.55E+00	6.72E+00
Acenaphthene	ng/m^3	-	-	5.42E+00	2.02E+01	3.38E+00	1.63E+00	3.67E+00		4.11E+00	1.65E+00
Acenaphthylene	ng/m^3	*3500*	-	8.06E-02	4.82E-01	8.99E-02	4.06E-02	5.62E-01		2.96E-01	1.18E-01
Anthracene	ng/m^3	*200*	-	3.23E-01	7.72E-01	3.60E-01	1.76E-01	4.35E-01		3.28E-01	2.08E-01
Benzo(a)Anthracene	ng/m^3	-	-	8.06E-02	1.21E-01	8.99E-02	2.17E-02	3.14E-02		1.33E-02	1.15E-02
Benzo(a)fluorene	ng/m^3	-	-	1.61E-01	2.41E-01	1.80E-01	7.49E-02	8.64E-02		3.44E-02	1.62E-03
Benzo(a)Pyrene	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	*1*	2.37E-02	1.40E-02	1.51E-02	3.76E-02	1.40E-02		9.49E-03	1.01E-02
Benzo(b)Fluoranthene	ng/m^3	-	-	8.06E-02	1.21E-01	8.99E-02	7.25E-02	4.42E-02		1.84E-02	2.92E-02
Benzo(b)fluorene	ng/m^3	-	-	1.61E-01	2.41E-01	1.80E-01	4.29E-02	4.38E-02		2.04E-02	1.62E-03
Benzo(e)Pyrene	ng/m^3	-	-	1.61E-01	2.41E-01	1.80E-01	3.82E-02	3.73E-02		1.30E-02	3.13E-02
Benzo(g,h,i)Perylene	ng/m^3	-	-	8.06E-02	1.21E-01	8.99E-02	2.16E-02	3.34E-02		1.89E-02	2.42E-02
Benzo(k)Fluoranthene	ng/m^3	-	-	8.06E-02	1.21E-01	8.99E-02	2.96E-03	3.51E-02		1.19E-02	1.73E-02
Biphenyl	ng/m^3	-	-	3.87E+00	1.01E+01	1.65E+00	1.73E+00	1.91E+00		1.91E+00	2.82E+00
Chrysene	ng/m^3	-	-	8.06E-02	1.21E-01	8.99E-02	6.30E-02	7.11E-02		4.39E-02	4.55E-02
Dibenzo(a,h)Anthracene	ng/m^3	-	-	8.06E-02	1.21E-01	8.99E-02	2.96E-03	1.83E-02		1.32E-02	5.94E-03
Fluoranthene	ng/m^3	-	-	1.81E+00	3.28E+00	2.01E+00	9.14E-01	1.26E+00		8.95E-01	5.88E-01
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	8.06E-02	1.21E-01	8.99E-02	2.96E-03	3.67E-02		9.81E-03	1.62E-02
Naphthalene	ng/m^3	*22500*	*22500*	3.03E+01	7.78E+01	1.42E+01	1.63E+01	1.46E+01		1.70E+01	1.71E+01
o-Terphenyl	ng/m^3	-	-	1.61E-01	2.41E-01	1.80E-01	1.94E-02	9.48E-03		9.97E-03	6.66E-03
Perylene	ng/m^3	-	-	1.61E-01	2.41E-01	1.80E-01	2.96E-03	1.62E-03		1.59E-03	8.12E-04
Phenanthrene	ng/m^3	-	-	8.52E+00	2.16E+01	7.05E+00	3.52E+00	5.32E+00		4.27E+00	3.31E+00
Pyrene	ng/m^3	-	-	7.74E-01	1.35E+00	7.19E-01	4.26E-01	6.79E-01		4.87E-01	3.18E-01
Tetralin	ng/m^3	-	-	1.23E+00	4.24E+00	1.94E+00	2.01E+00	1.19E+00		3.14E+00	4.64E+00
Total PAH[4]	ng/m^3	-	-	7.03E+01	2.04E+02	4.11E+01	3.52E+01	3.98E+01		4.47E+01	4.16E+01

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

Table B5: 2018 Courtice Con't

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Q3 Concentration	Maximum Q3 Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	12000	0	6.45E+00	2.72E+00	2.18E+01	2.18E+01	3.28E+00	4.46E+00	7	88
2-Methylnaphthalene	10000	0	1.17E+01	5.18E+00	3.99E+01	3.99E+01	6.49E+00	7.55E+00	7	88
Acenaphthene	-	-	5.72E+00	1.63E+00	2.02E+01	2.02E+01	3.67E+00	4.11E+00	7	88
Acenaphthylene	3500	0	2.38E-01	4.06E-02	5.62E-01	4.82E-01	5.62E-01	2.96E-01	7	88
Anthracene	200	0	3.72E-01	1.76E-01	7.72E-01	7.72E-01	4.35E-01	3.28E-01	7	88
Benzo(a)Anthracene	-	-	5.27E-02	1.15E-02	1.21E-01	1.21E-01	3.14E-02	1.33E-02	7	88
Benzo(a)fluorene	-	-	1.11E-01	1.62E-03	2.41E-01	2.41E-01	8.64E-02	3.44E-02	7	88
Benzo(a)Pyrene	0.05	0	1.77E-02	9.49E-03	3.76E-02	2.37E-02	3.76E-02	1.01E-02	7	88
Benzo(b)Fluoranthene	-	-	6.51E-02	1.84E-02	1.21E-01	1.21E-01	7.25E-02	2.92E-02	7	88
Benzo(b)fluorene	-	-	9.87E-02	1.62E-03	2.41E-01	2.41E-01	4.38E-02	2.04E-02	7	88
Benzo(e)Pyrene	-	-	1.00E-01	1.30E-02	2.41E-01	2.41E-01	3.82E-02	3.13E-02	7	88
Benzo(g,h,i)Perylene	-	-	5.56E-02	1.89E-02	1.21E-01	1.21E-01	3.34E-02	2.42E-02	7	88
Benzo(k)Fluoranthene	-	-	5.12E-02	2.96E-03	1.21E-01	1.21E-01	3.51E-02	1.73E-02	7	88
Biphenyl	-	-	3.43E+00	1.65E+00	1.01E+01	1.01E+01	1.91E+00	2.82E+00	7	88
Chrysene	-	-	7.35E-02	4.39E-02	1.21E-01	1.21E-01	7.11E-02	4.55E-02	7	88
Dibenzo(a,h)Anthracene	-	-	4.74E-02	2.96E-03	1.21E-01	1.21E-01	1.83E-02	1.32E-02	7	88
Fluoranthene	-	-	1.54E+00	5.88E-01	3.28E+00	3.28E+00	1.26E+00	8.95E-01	7	88
Indeno(1,2,3-cd)Pyrene	-	-	5.10E-02	2.96E-03	1.21E-01	1.21E-01	3.67E-02	1.62E-02	7	88
Naphthalene	22500	0	2.67E+01	1.42E+01	7.78E+01	7.78E+01	1.63E+01	1.71E+01	7	88
o-Terphenyl	-	-	8.97E-02	6.66E-03	2.41E-01	2.41E-01	1.94E-02	9.97E-03	7	88
Perylene	-	-	8.42E-02	8.12E-04	2.41E-01	2.41E-01	2.96E-03	1.59E-03	7	88
Phenanthrene	-	-	7.66E+00	3.31E+00	2.16E+01	2.16E+01	5.32E+00	4.27E+00	7	88
Pyrene	-	-	6.79E-01	3.18E-01	1.35E+00	1.35E+00	6.79E-01	4.87E-01	7	88
Tetralin	-	-	2.63E+00	1.19E+00	4.64E+00	4.24E+00	2.01E+00	4.64E+00	7	88
Total PAH[4]	-	-	6.80E+01	3.52E+01	2.04E+02	2.04E+02	3.98E+01	4.47E+01	7	88

Table B6: 2018 Rundle Station Q3 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1 Jul 18	13 Jul 18	25 Jul 18	6 Aug-18	18 Aug-18	30 Aug-18	11 Sep-18	23 Sep-18
1-Methylnaphthalene	ng/m^3	*12000*	-	2.66E+01	2.66E+01	5.14E+00	1.29E+01	5.55E+00	4.34E+00	2.57E+00	6.43E+00
2-Methylnaphthalene	ng/m^3	*10000*	-	5.38E+01	5.41E+01	9.35E+00	2.91E+01	1.25E+01	9.00E+00	4.18E+00	1.26E+01
Acenaphthene	ng/m^3	-	-	4.04E+01	3.31E+01	5.72E+00	1.62E+01	6.23E+00	3.49E+00	1.26E+00	1.14E+01
Acenaphthylene	ng/m^3	*3500*	-	3.85E-01	1.40E-01	9.06E-02	7.95E-02	4.02E-01	3.05E-01	1.21E-01	1.26E-01
Anthracene	ng/m^3	*200*	-	2.62E+00	2.35E+00	6.52E-01	1.25E+00	5.48E-01	2.92E-01	7.64E-02	5.54E-01
Benzo(a)Anthracene	ng/m^3	-	-	9.62E-02	1.40E-01	9.06E-02	3.99E-02	2.24E-02	1.78E-02	8.76E-03	1.22E-02
Benzo(a)fluorene	ng/m^3	-	-	1.92E-01	2.80E-01	1.81E-01	2.30E-01	9.15E-02	6.26E-02	2.91E-02	1.64E-03
Benzo(a)Pyrene	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	*1*	1.53E-02	1.42E-02	1.59E-02	3.20E-02	1.24E-02	2.49E-03	6.12E-03	3.57E-02
Benzo(b)Fluoranthene	ng/m^3	-	-	9.62E-02	1.40E-01	9.06E-02	4.98E-02	3.88E-02	2.42E-02	1.42E-02	2.94E-02
Benzo(b)fluorene	ng/m^3	-	-	1.92E-01	2.80E-01	1.81E-01	8.04E-02	4.02E-02	2.80E-02	1.48E-02	1.64E-03
Benzo(e)Pyrene	ng/m^3	-	-	1.92E-01	2.80E-01	1.81E-01	3.75E-02	4.09E-02	5.05E-02	7.33E-03	2.84E-02
Benzo(g,h,i)Perylene	ng/m^3	-	-	9.62E-02	1.40E-01	9.06E-02	2.21E-02	3.32E-02	2.04E-02	1.31E-02	3.57E-02
Benzo(k)Fluoranthene	ng/m^3	-	-	9.62E-02	1.40E-01	9.06E-02	2.78E-02	1.72E-02	1.67E-02	8.61E-03	3.80E-02
Biphenyl	ng/m^3	-	-	1.32E+01	1.24E+01	2.32E+00	6.72E+00	2.51E+00	1.90E+00	1.01E+00	2.63E+00
Chrysene	ng/m^3	-	-	9.62E-02	1.40E-01	9.06E-02	1.32E-01	6.16E-02	5.37E-02	2.93E-02	5.08E-02
Dibenzo(a,h)Anthracene	ng/m^3	-	-	9.62E-02	1.40E-01	9.06E-02	1.93E-02	1.78E-03	2.67E-03	1.08E-02	7.08E-03
Fluoranthene	ng/m^3	-	-	1.35E+01	1.07E+01	4.57E+00	6.08E+00	1.62E+00	7.62E-01	5.82E-01	1.71E+00
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	9.62E-02	1.40E-01	9.06E-02	5.95E-02	3.74E-02	1.23E-02	7.39E-03	2.08E-02
Naphthalene	ng/m^3	*22500*	*22500*	7.42E+01	6.23E+01	1.59E+01	4.01E+01	1.61E+01	1.20E+01	1.08E+01	2.05E+01
o-Terphenyl	ng/m^3	-	-	1.92E-01	2.80E-01	1.81E-01	1.82E-02	1.52E-02	1.47E-02	1.22E-02	7.70E-03
Perylene	ng/m^3	-	-	1.92E-01	2.80E-01	1.81E-01	3.19E-03	1.78E-03	5.52E-03	1.52E-03	8.20E-04
Phenanthrene	ng/m^3	-	-	5.81E+01	4.93E+01	1.42E+01	2.96E+01	7.69E+00	4.06E+00	2.32E+00	8.56E+00
Pyrene	ng/m^3	-	-	5.38E+00	3.92E+00	1.81E+00	2.61E+00	8.15E-01	3.91E-01	3.00E-01	9.18E-01
Tetralin	ng/m^3	-	-	2.23E+00	3.36E+00	1.59E+00	2.36E+00	1.40E+00	1.12E+00	1.85E+00	1.95E+00
Total PAH[4]	ng/m^3	-	-	2.92E+02	2.61E+02	6.30E+01	1.48E+02	5.58E+01	3.80E+01	2.52E+01	6.76E+01

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

Table B6: 2018 Rundle Con't

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Q3 Concentration	Maximum Q3 Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	*12000*	0	1.13E+01	2.57E+00	2.66E+01	2.66E+01	1.29E+01	6.43E+00	8	100
2-Methylnaphthalene	*10000*	0	2.31E+01	4.18E+00	5.41E+01	5.41E+01	2.91E+01	1.26E+01	8	100
Acenaphthene	-	-	1.47E+01	1.26E+00	4.04E+01	4.04E+01	1.62E+01	1.14E+01	8	100
Acenaphthylene	*3500*	0	2.06E-01	7.95E-02	4.02E-01	3.85E-01	4.02E-01	1.26E-01	8	100
Anthracene	*200*	0	1.04E+00	7.64E-02	2.62E+00	2.62E+00	1.25E+00	5.54E-01	8	100
Benzo(a)Anthracene	-	-	5.35E-02	8.76E-03	1.40E-01	1.40E-01	3.99E-02	1.22E-02	8	100
Benzo(a)fluorene	-	-	1.33E-01	1.64E-03	2.80E-01	2.80E-01	2.30E-01	2.91E-02	8	100
Benzo(a)Pyrene	*0.05*	0	1.68E-02	2.49E-03	3.57E-02	1.59E-02	3.20E-02	3.57E-02	8	100
Benzo(b)Fluoranthene	-	-	6.04E-02	1.42E-02	1.40E-01	1.40E-01	4.98E-02	2.94E-02	8	100
Benzo(b)fluorene	-	-	1.02E-01	1.64E-03	2.80E-01	2.80E-01	8.04E-02	1.48E-02	8	100
Benzo(e)Pyrene	-	-	1.02E-01	7.33E-03	2.80E-01	2.80E-01	5.05E-02	2.84E-02	8	100
Benzo(g,h,i)Perylene	-	-	5.64E-02	1.31E-02	1.40E-01	1.40E-01	3.32E-02	3.57E-02	8	100
Benzo(k)Fluoranthene	-	-	5.44E-02	8.61E-03	1.40E-01	1.40E-01	2.78E-02	3.80E-02	8	100
Biphenyl	-	-	5.33E+00	1.01E+00	1.32E+01	1.32E+01	6.72E+00	2.63E+00	8	100
Chrysene	-	-	8.18E-02	2.93E-02	1.40E-01	1.40E-01	1.32E-01	5.08E-02	8	100
Dibenzo(a,h)Anthracene	-	-	4.60E-02	1.78E-03	1.40E-01	1.40E-01	1.93E-02	1.08E-02	8	100
Fluoranthene	-	-	4.95E+00	5.82E-01	1.35E+01	1.35E+01	6.08E+00	1.71E+00	8	100
Indeno(1,2,3-cd)Pyrene	-	-	5.80E-02	7.39E-03	1.40E-01	1.40E-01	5.95E-02	2.08E-02	8	100
Naphthalene	*22500*	0	3.15E+01	1.08E+01	7.42E+01	7.42E+01	4.01E+01	2.05E+01	8	100
o-Terphenyl	-	-	9.02E-02	7.70E-03	2.80E-01	2.80E-01	1.82E-02	1.22E-02	8	100
Perylene	-	-	8.33E-02	8.20E-04	2.80E-01	2.80E-01	5.52E-03	1.52E-03	8	100
Phenanthrene	-	-	2.17E+01	2.32E+00	5.81E+01	5.81E+01	2.96E+01	8.56E+00	8	100
Pyrene	-	-	2.02E+00	3.00E-01	5.38E+00	5.38E+00	2.61E+00	9.18E-01	8	100
Tetralin	-	-	1.98E+00	1.12E+00	3.36E+00	3.36E+00	2.36E+00	1.95E+00	8	100
Total PAH[4]	-	-	1.19E+02	2.52E+01	2.92E+02	2.92E+02	1.48E+02	6.76E+01	8	100

Table B7: Summary of Sample Flow Rate and Sample Duration for TSP

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)
July 1, 2018	18052310	1397	1582	18052312	1435	1625	18052311	1417	1605
July 7, 2018	18061341	1399	1584	18061339	1440	1631	18061340	1421	1610
July 13, 2018	18061344	1400	1586	18061396	1440	1631	18061345	1425	1614
July 19, 2018	Invalid Sample			18061397	1437	1628	18061398	1426	1615
July 25, 2018	18061593	1401	1587	18070418	1438	1628	Invalid Sample		
July 31, 2018	18061596	1440	1630	18070419	1440	1630	18061594	1440	1630
August 6, 2018	738027	1401	1630	738029	1436	1630	738028	1451	1630
August 12, 2018	738031	1400	1630	738033	1433	1630	738032	1439	1630
August 18, 2018	738035	1397	1630	738037	1430	1630	738036	1434	1630
August 24, 2018	738039	1402	1630	738041	1438	1630	738040	1448	1630
August 30, 2018	738043	1395	1630	738045	1435	1630	738044	1450	1630
September 5, 2018	738047	1393	1630	738049	1434	1630	738048	1444	1630
September 11, 2018	738308	1400	1630	738310	1435	1630	738309	1437	1630
September 17, 2018	738312	1403	1630	738314	1435	1630	738313	1446	1630
September 23, 2018	738316	1393	1630	738318	1433	1630	738317	1454	1630
September 29, 2018	738320	1401	1630	738322	1434	1630	738321	1446	1630

Table B8: 2018 Courtice Station Q3 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1 Jul 18	7 Jul 18	13 Jul 18	19 Jul 18	25 Jul 18	31 Jul 18	6 Aug-18	12 Aug-18	18 Aug-18	24 Aug-18	30 Aug-18	5 Sep-18	11 Sep-18	17 Sep-18	23 Sep-18	29 Sep-18
Particulate (TSP)	µg/m^3	*120*	*120*	41.5	32.1	54.4		25.7	31.2	35.3	18.8	17.7	39.4	25.2	52.0	14.5	28.0	21.6	10.2
Total Mercury (Hg)	µg/m^3	*2*	*2*	6.32E-06	6.31E-06	6.30E-06		6.30E-06	6.13E-06	1.33E-05	5.52E-06	4.41E-06	2.04E-05	4.97E-06	3.86E-06	7.36E-07	2.48E-05	2.26E-05	8.28E-06
Aluminum (Al)	µg/m^3	*4.8*	-	1.32E-01	2.08E-01	4.12E-01		1.00E-01	1.35E-01	1.14E-01	6.10E-02	6.90E-02	1.98E-01	1.70E-01	3.78E-01	8.70E-02	2.43E-01	1.40E-01	8.90E-02
Antimony (Sb)	µg/m^3	*25*	*25*	3.16E-03	3.16E-03	3.15E-03		3.15E-03	3.07E-03	7.70E-04	1.20E-03	4.50E-04	1.55E-03	6.40E-04	1.27E-03	6.50E-04	1.44E-03	8.00E-04	6.00E-04
Arsenic (As)	µg/m^3	*0.3*	*0.3*	1.90E-03	1.89E-03	1.89E-03		1.89E-03	1.84E-03	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04
Barium (Ba)	µg/m^3	*10*	*10*	1.54E-02	6.94E-03	1.15E-02		6.62E-03	6.07E-03	7.30E-03	6.90E-03	3.30E-03	1.79E-02	7.50E-03	1.34E-02	8.30E-03	1.54E-02	7.30E-03	5.00E-03
Beryllium (Be)	µg/m^3	*0.01*	*0.01*	3.16E-04	3.16E-04	3.15E-04		3.15E-04	3.07E-04	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05
Bismuth (Bi)	µg/m^3	-	-	1.90E-03	1.89E-03	1.89E-03		1.89E-03	1.84E-03	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04
Boron (B)	µg/m^3	*120*	-	1.90E-03	1.89E-03	1.89E-03		1.89E-03	1.84E-03	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02
Cadmium (Cd)	µg/m^3	*0.025*	*0.025*	6.32E-04	6.31E-04	6.30E-04		6.30E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04
Chromium (Cr)	µg/m^3	*0.5*	-	3.73E-03	1.58E-03	3.40E-03		4.41E-03	1.53E-03	4.90E-03	6.40E-03	5.60E-03	9.50E-03	7.70E-03	8.00E-03	7.30E-03	6.40E-03	8.30E-03	4.90E-03
Cobalt (Co)	µg/m^3	*0.1*	*0.1*	6.32E-04	6.31E-04	6.30E-04		6.30E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04
Copper (Cu)	µg/m^3	*50*	-	3.65E-02	1.98E-02	3.37E-02		3.00E-02	1.59E-02	2.15E-02	3.54E-02	2.81E-02	3.56E-02	2.28E-02	4.03E-02	2.92E-02	3.70E-02	4.55E-02	1.43E-02
Iron (Fe)	µg/m^3	*4*	-	3.87E-01	5.23E-01	1.03E+00		3.49E-01	3.29E-01	3.15E-01	2.77E-01	1.79E-01	6.76E-01	4.22E-01	1.04E+00	2.84E-01	4.69E-01	2.53E+00	1.97E-01
Lead (Pb)	µg/m^3	*0.5*	*0.5*	3.10E-03	9.47E-04	3.03E-03		1.95E-03	2.64E-03	2.70E-03	1.90E-03	9.20E-04	5.40E-03	4.10E-03	3.60E-03	9.20E-04	3.70E-03	2.40E-03	2.20E-03
Magnesium (Mg)	µg/m^3	-	-	1.86E-01	2.30E-01	4.36E-01		1.32E-01	1.66E-01	2.79E-01	1.29E-01	8.20E-02	4.25E-01	2.09E-01	4.00E-01	1.29E-01	3.50E-01	2.27E-01	1.42E-01
Manganese (Mn)	µg/m^3	*0.4*	-	1.07E-02	1.29E-02	2.54E-02		9.83E-03	1.04E-02	1.40E-02	6.46E-03	4.66E-03	2.27E-02	1.26E-02	3.03E-02	7.28E-03	1.15E-02	2.31E-02	6.40E-03
Molybdenum (Mo)	µg/m^3	*120*	-	9.48E-04	9.47E-04	9.46E-04		9.45E-04	9.20E-04	1.19E-03	1.92E-03	1.38E-03	2.12E-03	1.37E-03	2.29E-03	1.10E-03	1.95E-03	1.62E-03	7.80E-04
Nickel (Ni)	µg/m^3	*0.2*	-	9.48E-04	9.47E-04	9.46E-04		9.45E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	2.20E-03	9.20E-04	9.20E-04	2.00E-03	9.20E-04
Phosphorus (P)	µg/m^3	-	-	3.54E-02	2.97E-02	3.78E-02		3.91E-02	3.44E-02	5.40E-01	2.30E-01	2.30E-01	4.70E-01	2.30E-01	4.80E-01	2.30E-01	6.30E-01	4.90E-01	4.80E-01
Selenium (Se)	µg/m^3	*10*	*10*	3.16E-03	3.16E-03	3.15E-03		3.15E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03
Silver (Ag)	µg/m^3	*1*	*1*	1.58E-03	1.58E-03	1.58E-03		1.58E-03	1.53E-03	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04
Strontium (Sr)	µg/m^3	*120*	-	7.65E-03	6.19E-03	1.10E-02		3.47E-03	5.95E-03	9.00E-03	4.10E-03	2.10E-03	9.10E-03	7.90E-03	1.73E-02	4.80E-03	6.90E-03	4.00E-03	2.50E-03
Thallium (Tl)	µg/m^3	-	-	3.16E-03	3.16E-03	3.15E-03		3.15E-03	3.07E-03	2.76E-05	2.96E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05
Tin (Sn)	µg/m^3	*10*	*10*	3.16E-03	3.16E-03	3.15E-03		3.15E-03	3.07E-03	7.10E-04	7.10E-04	8.60E-04	1.77E-03	3.07E-04	1.09E-03	8.10E-04	1.48E-03	9.70E-04	8.10E-04
Titanium (Ti)	µg/m^3	*120*	-	7.58E-03	1.52E-02	2.46E-02		3.15E-03	6.75E-03	3.37E-03	3.37E-03	3.37E-03	3.37E-03	3.37E-03	2.65E-02	3.37E-03	3.37E-03	3.37E-03	3.37E-03
Uranium (Ur)	µg/m^3	*1.5*	-	1.42E-04	1.42E-04	1.42E-04		1.42E-04	1.38E-04	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05
Vanadium (V)	µg/m^3	*2*	*1*	1.58E-03	1.58E-03	1.58E-03		1.58E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03
Zinc (Zn)	µg/m^3	*120*	-	2.06E-02	1.63E-02	2.64E-02		1.16E-01	1.99E-02	3.48E-02	2.73E-02	1.67E-02	7.92E-02	2.70E-02	5.27E-02	2.76E-02	2.79E-02	4.75E-02	2.90E-02
Zirconium (Zr)	µg/m^3	*20*	-	1.58E-03	1.58E-03	1.58E-03		1.58E-03	1.53E-03	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	1.20E-03	6.13E-04	6.13E-04	6.13E-04	6.13E-04

Invalid Sample

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

Table B8: 2018 Courtice Con't

Contaminant	MECP Criteria ($\mu g/m^3$)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	*120*	0	27.1	29.8	10.2	54.4	54.4	39.4	52.0	15	94
Total Mercury (Hg)	*2*	0	6.94E-06	9.35E-06	7.36E-07	2.48E-05	6.32E-06	2.04E-05	2.48E-05	15	94
Aluminum (Al)	*4.8*	0	1.44E-01	1.69E-01	6.10E-02	4.12E-01	4.12E-01	1.98E-01	3.78E-01	15	94
Antimony (Sb)	*25*	0	1.33E-03	1.67E-03	4.50E-04	3.16E-03	3.16E-03	1.55E-03	1.44E-03	15	94
Arsenic (As)	*0.3*	0	1.17E-03	1.24E-03	9.20E-04	1.90E-03	1.90E-03	9.20E-04	9.20E-04	15	94
Barium (Ba)	*10*	0	8.36E-03	9.25E-03	3.30E-03	1.79E-02	1.54E-02	1.79E-02	1.54E-02	15	94
Beryllium (Be)	*0.01*	0	6.66E-05	1.25E-04	3.07E-05	3.16E-04	3.16E-04	3.07E-05	3.07E-05	15	94
Bismuth (Bi)	-	-	8.31E-04	9.96E-04	5.52E-04	1.90E-03	1.90E-03	5.52E-04	5.52E-04	15	94
Boron (B)	*120*	0	6.57E-03	8.81E-03	1.84E-03	1.23E-02	1.90E-03	1.23E-02	1.23E-02	15	94
Cadmium (Cd)	*0.025*	0	6.18E-04	6.18E-04	6.13E-04	6.32E-04	6.32E-04	6.13E-04	6.13E-04	15	94
Chromium (Cr)	*0.5*	0	4.95E-03	5.58E-03	1.53E-03	9.50E-03	4.41E-03	9.50E-03	8.30E-03	15	94
Cobalt (Co)	*0.1*	0	6.18E-04	6.18E-04	6.13E-04	6.32E-04	6.32E-04	6.13E-04	6.13E-04	15	94
Copper (Cu)	*50*	0	2.82E-02	2.97E-02	1.43E-02	4.55E-02	3.65E-02	3.56E-02	4.55E-02	15	94
Iron (Fe)	*4*	0	4.55E-01	6.00E-01	1.79E-01	2.53E+00	1.03E+00	6.76E-01	2.53E+00	15	94
Lead (Pb)	*2*	0	2.32E-03	2.63E-03	9.20E-04	5.40E-03	3.10E-03	5.40E-03	3.70E-03	15	94
Magnesium (Mg)	-	-	2.09E-01	2.35E-01	8.20E-02	4.36E-01	4.36E-01	4.25E-01	4.00E-01	15	94
Manganese (Mn)	*0.4*	0	1.20E-02	1.39E-02	4.66E-03	3.03E-02	2.54E-02	2.27E-02	3.03E-02	15	94
Molybdenum (Mo)	*120*	0	1.28E-03	1.36E-03	7.80E-04	2.29E-03	9.48E-04	2.12E-03	2.29E-03	15	94
Nickel (Ni)	*0.2*	0	1.03E-03	1.08E-03	9.20E-04	2.20E-03	9.48E-04	9.20E-04	2.20E-03	15	94
Phosphorus (P)	-	-	1.69E-01	2.79E-01	2.97E-02	6.30E-01	3.91E-02	5.40E-01	6.30E-01	15	94
Selenium (Se)	*10*	0	3.09E-03	3.09E-03	3.07E-03	3.16E-03	3.16E-03	3.07E-03	3.07E-03	15	94
Silver (Ag)	*1*	0	5.28E-04	7.27E-04	3.07E-04	1.58E-03	1.58E-03	3.07E-04	3.07E-04	15	94
Strontium (Sr)	*120*	0	5.88E-03	6.80E-03	2.10E-03	1.73E-02	1.10E-02	9.10E-03	1.73E-02	15	94
Thallium (Tl)	-	-	1.34E-04	1.06E-03	2.76E-05	3.16E-03	3.16E-03	2.96E-05	2.76E-05	15	94
Tin (Sn)	*10*	0	1.33E-03	1.68E-03	3.07E-04	3.16E-03	3.16E-03	1.77E-03	1.48E-03	15	94
Titanium (Ti)	*120*	0	5.37E-03	7.61E-03	3.15E-03	2.65E-02	2.46E-02	3.37E-03	2.65E-02	15	94
Uranium (Ur)	*1.5*	0	5.10E-05	6.75E-05	3.07E-05	1.42E-04	1.42E-04	3.07E-05	3.07E-05	15	94
Vanadium (V)	*2*	0	1.55E-03	1.55E-03	1.53E-03	1.58E-03	1.58E-03	1.53E-03	1.53E-03	15	94
Zinc (Zn)	*120*	0	3.21E-02	3.79E-02	1.63E-02	1.16E-01	1.16E-01	7.92E-02	5.27E-02	15	94
Zirconium (Zr)	*20*	0	8.77E-04	9.71E-04	6.13E-04	1.58E-03	1.58E-03	6.13E-04	1.20E-03	15	94

Table B9: 2018 Rundle Station Q3 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1-Jul 18	7-Jul 18	13 Jul 18	19 Jul 18	25 Jul 18	31 Jul 18	6-Aug-18	12 Aug-18	18 Aug-18	24 Aug-18	30 Aug-18	5-Sep 18	11 Sep 18	17 Sep 18	23 Sep 18	29 Sep 18
Particulate (TSP)	µg/m^3	*120*	*120*	52.7	44.6	67.4	64.5	40.3	37.9	56.0	31.7	24.0	109.0	29.3	82.0	93.0	66.7	25.4	32.3
Total Mercury (Hg)	µg/m^3	*2*	*2*	6.15E-06	6.13E-06	6.13E-06	9.83E-05	6.14E-06	6.13E-06	1.33E-05	5.52E-06	3.86E-06	1.10E-05	9.38E-06	3.31E-06	2.76E-06	2.76E-05	1.49E-05	1.27E-05
Aluminum (Al)	µg/m^3	*4.8*	-	2.08E-01	2.18E-01	4.25E-01	4.19E-01	2.42E-01	2.07E-01	2.76E-01	1.07E-01	5.40E-02	3.12E-01	1.45E-01	4.88E-01	5.99E-01	5.38E-01	1.80E-01	2.57E-01
Antimony (Sb)	µg/m^3	*25*	*25*	3.08E-03	3.07E-03	3.07E-03	2.64E-02	3.07E-03	3.07E-03	6.00E-04	1.23E-03	2.50E-04	1.99E-03	3.00E-04	1.02E-03	3.40E-04	1.42E-03	7.30E-04	5.00E-04
Arsenic (As)	µg/m^3	*0.3*	*0.3*	1.85E-03	1.84E-03	1.84E-03	2.06E-02	1.84E-03	1.84E-03	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04
Barium (Ba)	µg/m^3	*10*	*10*	1.84E-02	4.84E-03	1.16E-02	1.61E-02	1.02E-02	1.07E-02	7.40E-03	5.40E-03	4.70E-03	1.43E-02	6.40E-03	1.31E-02	7.50E-03	1.72E-02	9.00E-03	5.50E-03
Beryllium (Be)	µg/m^3	*0.01*	*0.01*	3.08E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-05	3.07E-05	3.07E-05	6.60E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05
Bismuth (Bi)	µg/m^3	-	-	1.85E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04
Boron (B)	µg/m^3	*120*	-	1.85E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02
Cadmium (Cd)	µg/m^3	*0.025*	*0.025*	6.15E-04	6.13E-04	6.13E-04	4.73E-03	6.14E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04
Chromium (Cr)	µg/m^3	*0.5*	-	1.54E-03	1.53E-03	5.21E-03	3.93E-03	1.54E-03	1.53E-03	5.00E-03	6.80E-03	5.50E-03	6.30E-03	6.40E-03	7.10E-03	6.60E-03	8.20E-03	7.20E-03	6.50E-03
Cobalt (Co)	µg/m^3	*0.1*	*0.1*	6.15E-04	6.13E-04	6.13E-04	6.14E-04	6.14E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04
Copper (Cu)	µg/m^3	*50*	-	3.78E-02	1.12E-02	1.50E-02	2.52E-02	1.71E-02	7.73E-03	1.45E-02	1.49E-02	1.25E-02	1.60E-02	1.54E-02	1.90E-02	2.23E-02	3.81E-02	2.70E-02	9.20E-03
Iron (Fe)	µg/m^3	*4*	-	5.19E-01	4.21E-01	1.39E+00	9.77E-01	5.56E-01	4.67E-01	4.30E-01	3.01E-01	1.46E-01	6.68E-01	2.55E-01	9.71E-01	8.69E-01	8.66E-01	3.72E-01	3.48E-01
Lead (Pb)	µg/m^3	*0.5*	*0.5*	3.63E-03	9.20E-04	2.08E-03	3.96E-01	9.21E-04	2.64E-03	3.00E-03	3.80E-03	9.20E-04	3.10E-03	9.20E-04	3.30E-03	2.00E-03	3.40E-03	2.80E-03	9.20E-04
Magnesium (Mg)	µg/m^3	-	-	2.99E-01	2.78E-01	4.87E-01	5.22E-01	3.02E-01	2.52E-01	4.36E-01	2.15E-01	1.19E-01	6.37E-01	2.04E-01	4.83E-01	6.24E-01	7.67E-01	3.31E-01	2.75E-01
Manganese (Mn)	µg/m^3	*0.4*	-	1.45E-02	1.27E-02	2.70E-02	2.79E-02	1.69E-02	1.20E-02	2.12E-02	9.02E-03	4.99E-03	2.79E-02	8.94E-03	2.92E-02	2.79E-02	2.48E-02	1.10E-02	1.17E-02
Molybdenum (Mo)	µg/m^3	*120*	-	9.23E-04	9.20E-04	9.20E-04	9.22E-04	9.21E-04	9.20E-04	7.30E-04	8.40E-04	6.60E-04	7.30E-04	6.70E-04	8.50E-04	1.14E-03	1.37E-03	9.30E-04	3.07E-04
Nickel (Ni)	µg/m^3	*0.2*	-	9.23E-04	9.20E-04	2.33E-03	2.46E-03	9.21E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	2.20E-03	9.20E-04	9.20E-04
Phosphorus (P)	µg/m^3	-	-	4.55E-02	3.07E-02	4.29E-02	5.10E-02	5.53E-02	4.54E-02	5.70E-01	2.30E-01	2.30E-01	2.30E-01	2.30E-01	2.30E-01	2.30E-01	6.40E-01	5.70E-01	1.07E+00
Selenium (Se)	µg/m^3	*10*	*10*	3.08E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03
Silver (Ag)	µg/m^3	*1*	*1*	1.54E-03	1.53E-03	1.53E-03	1.06E-02	1.54E-03	1.53E-03	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04
Strontium (Sr)	µg/m^3	*120*	-	1.33E-02	1.07E-02	1.77E-02	1.66E-02	1.07E-02	1.10E-02	9.50E-03	1.00E-02	4.90E-03	2.84E-02	8.40E-03	2.51E-02	4.00E-02	2.72E-02	1.02E-02	1.11E-02
Thallium (Tl)	µg/m^3	-	-	3.08E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05
Tin (Sn)	µg/m^3	*10*	*10*	3.08E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	6.20E-04	1.15E-03	3.07E-04	3.09E-02	3.07E-04	9.10E-04	3.07E-04	1.63E-03	1.01E-03	3.07E-04
Titanium (Ti)	µg/m^3	*120*	-	9.85E-03	1.04E-02	1.90E-02	2.09E-02	1.54E-02	9.82E-03	3.37E-03	3.37E-03	3.37E-03	8.50E-03	3.37E-03	2.52E-02	2.52E-02	1.37E-02	3.37E-03	7.40E-03
Uranium (Ur)	µg/m^3	*1.5*	-	1.38E-04	1.38E-04	1.38E-04	1.38E-04	1.38E-04	1.38E-04	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05
Vanadium (V)	µg/m^3	*2*	*1*	1.54E-03	1.53E-03	1.53E-03	1.54E-03	1.54E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03
Zinc (Zn)	µg/m^3	*120*	-	2.42E-02	1.37E-02	2.12E-02	1.12E-01	1.61E-02	1.70E-02	2.73E-02	3.48E-02	9.80E-03	4.14E-02	1.77E-02	3.95E-02	1.47E-02	3.45E-02	3.31E-02	2.24E-02
Zirconium (Zr)	µg/m^3	*20*	-	1.54E-03	1.53E-03	1.53E-03	1.54E-03	1.54E-03	1.53E-03	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04

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

Table B9: 2018 Rundle Con't

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	*120*	0	48.3	53.6	24.0	109.0	67.4	109.0	93.0	16	100
Total Mercury (Hg)	*2*	0	8.76E-06	1.46E-05	2.76E-06	9.83E-05	9.83E-05	1.33E-05	2.76E-05	16	100
Aluminum (Al)	*4.8*	0	2.49E-01	2.92E-01	5.40E-02	5.99E-01	4.25E-01	3.12E-01	5.99E-01	16	100
Antimony (Sb)	*25*	0	1.36E-03	3.13E-03	2.50E-04	2.64E-02	2.64E-02	1.99E-03	1.42E-03	16	100
Arsenic (As)	*0.3*	0	1.39E-03	2.44E-03	9.20E-04	2.06E-02	2.06E-02	9.20E-04	9.20E-04	16	100
Barium (Ba)	*10*	0	9.20E-03	1.02E-02	4.70E-03	1.84E-02	1.84E-02	1.43E-02	1.72E-02	16	100
Beryllium (Be)	*0.01*	0	7.63E-05	1.36E-04	3.07E-05	3.08E-04	3.08E-04	6.60E-05	3.07E-05	16	100
Bismuth (Bi)	-	-	8.67E-04	1.04E-03	5.52E-04	1.85E-03	1.85E-03	5.52E-04	5.52E-04	16	100
Boron (B)	*120*	0	6.03E-03	8.36E-03	1.84E-03	1.23E-02	1.85E-03	1.23E-02	1.23E-02	16	100
Cadmium (Cd)	*0.025*	0	6.97E-04	8.71E-04	6.13E-04	4.73E-03	4.73E-03	6.13E-04	6.13E-04	16	100
Chromium (Cr)	*0.5*	0	4.33E-03	5.06E-03	1.53E-03	8.20E-03	5.21E-03	6.80E-03	8.20E-03	16	100
Cobalt (Co)	*0.1*	0	6.14E-04	6.14E-04	6.13E-04	6.15E-04	6.15E-04	6.13E-04	6.13E-04	16	100
Copper (Cu)	*50*	0	1.72E-02	1.89E-02	7.73E-03	3.81E-02	3.78E-02	1.60E-02	3.81E-02	16	100
Iron (Fe)	*4*	0	5.14E-01	5.97E-01	1.46E-01	1.39E+00	1.39E+00	6.68E-01	9.71E-01	16	100
Lead (Pb)	*2*	0	2.76E-03	2.69E-02	9.20E-04	3.96E-01	3.96E-01	3.80E-03	3.40E-03	16	100
Magnesium (Mg)	-	-	3.49E-01	3.89E-01	1.19E-01	7.67E-01	5.22E-01	6.37E-01	7.67E-01	16	100
Manganese (Mn)	*0.4*	0	1.59E-02	1.80E-02	4.99E-03	2.92E-02	2.79E-02	2.79E-02	2.92E-02	16	100
Molybdenum (Mo)	*120*	0	8.25E-04	8.60E-04	3.07E-04	1.37E-03	9.23E-04	8.40E-04	1.37E-03	16	100
Nickel (Ni)	*0.2*	0	1.10E-03	1.18E-03	9.20E-04	2.46E-03	2.46E-03	9.20E-04	2.20E-03	16	100
Phosphorus (P)	-	-	1.63E-01	2.81E-01	3.07E-02	1.07E+00	5.53E-02	5.70E-01	1.07E+00	16	100
Selenium (Se)	*10*	0	3.07E-03	3.07E-03	3.07E-03	3.08E-03	3.08E-03	3.07E-03	3.07E-03	16	100
Silver (Ag)	*1*	0	6.33E-04	1.33E-03	3.07E-04	1.06E-02	1.06E-02	3.07E-04	3.07E-04	16	100
Strontium (Sr)	*120*	0	1.38E-02	1.59E-02	4.90E-03	4.00E-02	1.77E-02	2.84E-02	4.00E-02	16	100
Thallium (Tl)	-	-	1.62E-04	1.17E-03	2.76E-05	3.08E-03	3.08E-03	2.76E-05	2.76E-05	16	100
Tin (Sn)	*10*	0	1.41E-03	3.49E-03	3.07E-04	3.09E-02	3.08E-03	3.09E-02	1.63E-03	16	100
Titanium (Ti)	*120*	0	8.87E-03	1.14E-02	3.37E-03	2.52E-02	2.09E-02	8.50E-03	2.52E-02	16	100
Uranium (Ur)	*1.5*	0	5.39E-05	7.10E-05	3.07E-05	1.38E-04	1.38E-04	3.07E-05	3.07E-05	16	100
Vanadium (V)	*2*	0	1.53E-03	1.53E-03	1.53E-03	1.54E-03	1.54E-03	1.53E-03	1.53E-03	16	100
Zinc (Zn)	*120*	0	2.49E-02	2.99E-02	9.80E-03	1.12E-01	1.12E-01	4.14E-02	3.95E-02	16	100
Zirconium (Zr)	*20*	0	8.65E-04	9.59E-04	6.13E-04	1.54E-03	1.54E-03	6.13E-04	6.13E-04	16	100

Table B10: 2018 Fenceline Station Q3 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1-Jul 18	7-Jul 18	13 Jul 18	19 Jul 18	25 Jul 18	31 Jul 18	6-Aug-18	12 Aug-18	18 Aug-18	24 Aug-18	30 Aug-18	5-Sep 18	11 Sep 18	17 Sep 18	23 Sep 18	29 Sep 18
Particulate (TSP)	µg/m^3	*120*	*120*	40.8	78.9	93.6	91.0		35.3	27.9	21.0	18.7	43.8	42.8	47.9	17.9	39.2	21.9	13.5
Total Mercury (Hg)	µg/m^3	*2*	*2*	1.87E-05	6.21E-06	6.20E-06	2.48E-05		6.13E-06	1.44E-05	8.28E-06	7.20E-03	2.43E-05	1.05E-05	1.43E-05	7.36E-07	3.03E-05	3.03E-05	8.83E-06
Aluminum (Al)	µg/m^3	*4.8*	-	1.36E-01	6.27E-01	6.57E-01	6.14E-01		1.77E-01	1.10E-01	7.20E-02	4.20E-02	2.38E-01	2.31E-01	2.72E-01	7.80E-02	3.34E-01	1.27E-01	9.50E-02
Antimony (Sb)	µg/m^3	*25*	*25*	3.12E-03	3.11E-03	3.10E-03	3.10E-03		3.07E-03	9.20E-04	1.94E-03	4.40E-04	2.07E-03	7.60E-04	1.47E-03	7.90E-04	2.03E-03	7.40E-04	7.90E-04
Arsenic (As)	µg/m^3	*0.3*	*0.3*	1.87E-03	1.86E-03	1.86E-03	1.86E-03		1.84E-03	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04
Barium (Ba)	µg/m^3	*10*	*10*	1.57E-02	1.10E-02	1.73E-02	1.68E-02		1.02E-02	7.10E-03	8.10E-03	4.40E-03	2.31E-02	1.11E-02	1.28E-02	9.60E-03	2.11E-02	6.10E-03	6.10E-03
Beryllium (Be)	µg/m^3	*0.01*	*0.01*	3.12E-04	3.11E-04	3.10E-04	3.10E-04		3.07E-04	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05
Bismuth (Bi)	µg/m^3	-	-	1.87E-03	1.86E-03	1.86E-03	1.86E-03		1.84E-03	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04	5.52E-04
Boron (B)	µg/m^3	*120*	-	4.18E-03	1.86E-03	1.86E-03	1.86E-03		1.84E-03	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	2.60E-02	1.23E-02	1.23E-02
Cadmium (Cd)	µg/m^3	*0.025*	*0.025*	6.23E-04	6.21E-04	6.20E-04	6.19E-04		6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04
Chromium (Cr)	µg/m^3	*0.5*	-	1.56E-03	3.35E-03	1.05E-02	5.95E-03		1.53E-03	5.70E-03	7.30E-03	6.10E-03	1.02E-02	8.80E-03	9.10E-03	9.70E-03	1.16E-02	6.40E-03	6.10E-03
Cobalt (Co)	µg/m^3	*0.1*	*0.1*	6.23E-04	6.21E-04	6.20E-04	6.19E-04		6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04
Copper (Cu)	µg/m^3	*50*	-	2.37E-02	1.62E-02	1.91E-02	1.54E-02		1.87E-02	1.16E-02	1.17E-02	9.10E-03	2.22E-02	1.38E-02	2.06E-02	3.64E-02	7.23E-02	2.92E-02	3.61E-02
Iron (Fe)	µg/m^3	*4*	-	3.38E-01	1.09E+00	1.74E+00	1.24E+00		4.50E-01	2.31E-01	2.92E-01	1.34E-01	7.73E-01	5.63E-01	7.61E-01	2.54E-01	8.72E-01	3.01E-01	2.41E-01
Lead (Pb)	µg/m^3	*0.5*	*0.5*	6.54E-03	2.80E-03	5.95E-03	4.21E-03		3.25E-03	3.40E-03	2.20E-03	9.20E-04	4.70E-03	9.20E-04	4.60E-03	2.00E-03	7.00E-03	1.90E-03	2.50E-03
Magnesium (Mg)	µg/m^3	-	-	1.98E-01	5.86E-01	7.99E-01	7.37E-01		2.52E-01	2.39E-01	1.60E-01	9.40E-02	4.17E-01	2.43E-01	3.42E-01	1.91E-01	5.35E-01	2.15E-01	1.58E-01
Manganese (Mn)	µg/m^3	*0.4*	-	1.10E-02	3.34E-02	6.63E-02	4.68E-02		1.69E-02	1.20E-02	8.86E-03	4.86E-03	2.71E-02	1.98E-02	3.20E-02	7.84E-03	3.56E-02	8.80E-03	9.13E-03
Molybdenum (Mo)	µg/m^3	*120*	-	9.35E-04	9.32E-04	9.29E-04	9.29E-04		9.20E-04	6.50E-04	6.30E-04	3.07E-04	1.33E-03	8.90E-04	8.10E-04	1.65E-03	3.89E-03	1.57E-03	1.72E-03
Nickel (Ni)	µg/m^3	*0.2*	-	9.35E-04	2.17E-03	2.35E-03	1.86E-03		9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	2.10E-03	9.20E-04	9.20E-04
Phosphorus (P)	µg/m^3	-	-	3.55E-02	7.21E-02	5.70E-02	6.94E-02		4.23E-02	5.80E-01	2.30E-01	2.30E-01	2.30E-01	2.30E-01	2.30E-01	2.30E-01	6.60E-01	4.90E-01	1.12E+00
Selenium (Se)	µg/m^3	*10*	*10*	3.12E-03	3.11E-03	3.10E-03	3.10E-03		3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03	3.07E-03
Silver (Ag)	µg/m^3	*1*	*1*	1.56E-03	1.55E-03	1.55E-03	1.55E-03		1.53E-03	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.07E-04
Strontium (Sr)	µg/m^3	*120*	-	6.98E-03	1.51E-02	2.45E-02	2.04E-02		7.98E-03	4.20E-03	5.70E-03	3.10E-03	1.00E-02	9.90E-03	1.30E-02	7.40E-03	1.65E-02	6.20E-03	3.40E-03
Thallium (Tl)	µg/m^3	-	-	3.12E-03	3.11E-03	3.10E-03	3.10E-03		3.07E-03	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05	2.76E-05
Tin (Sn)	µg/m^3	*10*	*10*	3.12E-03	3.11E-03	3.10E-03	3.10E-03		3.07E-03	9.10E-04	7.90E-04	3.07E-04	2.20E-03	6.40E-04	1.12E-03	8.70E-04	2.03E-03	3.07E-04	1.15E-03
Titanium (Ti)	µg/m^3	*120*	-	8.10E-03	4.29E-02	3.47E-02	3.47E-02		9.82E-03	3.37E-03	3.37E-03	3.37E-03	3.37E-03	3.37E-03	1.60E-02	3.37E-03	1.27E-02	3.37E-03	3.37E-03
Uranium (Ur)	µg/m^3	*1.5*	-	1.40E-04	1.40E-04	1.39E-04	1.39E-04		1.38E-04	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05
Vanadium (V)	µg/m^3	*2*	*1*	1.56E-03	1.55E-03	1.55E-03	1.55E-03		1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03
Zinc (Zn)	µg/m^3	*120*	-	5.22E-02	2.25E-02	2.94E-02	3.99E-02		2.56E-02	2.35E-02	1.75E-02	9.90E-03	8.36E-02	2.01E-02	4.44E-02	2.08E-02	4.52E-02	1.74E-02	3.01E-02
Zirconium (Zr)	µg/m^3	*20*	-	1.56E-03	1.55E-03	1.55E-03	1.55E-03		1.53E-03	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	6.13E-04	1.30E-03	6.13E-04	6.13E-04

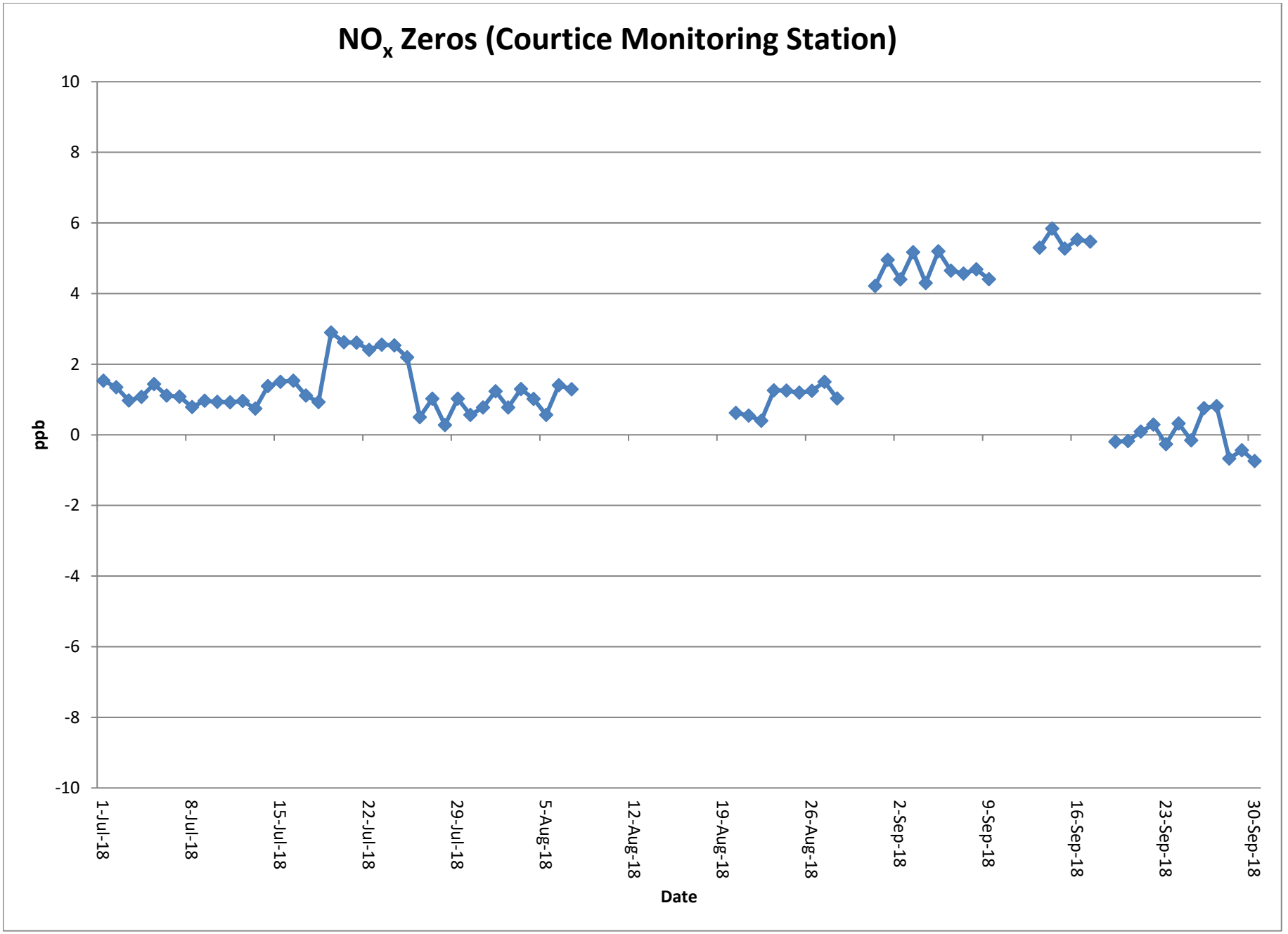
Invalid Sample

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

Table B10: 2018 Fenceline Con't

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Q3 Maximum Concentration	July Maximum Concentration	August Maximum Concentration	September Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	*120*	0	35.7	42.3	13.5	93.6	93.6	43.8	47.9	15	94
Total Mercury (Hg)	*2*	0	1.66E-05	4.94E-04	7.36E-07	7.20E-03	2.48E-05	7.20E-03	3.03E-05	15	94
Aluminum (Al)	*4.8*	0	1.84E-01	2.54E-01	4.20E-02	6.57E-01	6.57E-01	2.38E-01	3.34E-01	15	94
Antimony (Sb)	*25*	0	1.51E-03	1.83E-03	4.40E-04	3.12E-03	3.12E-03	2.07E-03	2.03E-03	15	94
Arsenic (As)	*0.3*	0	1.16E-03	1.23E-03	9.20E-04	1.87E-03	1.87E-03	9.20E-04	9.20E-04	15	94
Barium (Ba)	*10*	0	1.08E-02	1.20E-02	4.40E-03	2.31E-02	1.73E-02	2.31E-02	2.11E-02	15	94
Beryllium (Be)	*0.01*	0	6.63E-05	1.24E-04	3.07E-05	3.12E-04	3.12E-04	3.07E-05	3.07E-05	15	94
Bismuth (Bi)	-	-	8.27E-04	9.87E-04	5.52E-04	1.87E-03	1.87E-03	5.52E-04	5.52E-04	15	94
Boron (B)	*120*	0	7.25E-03	9.87E-03	1.84E-03	2.60E-02	4.18E-03	1.23E-02	2.60E-02	15	94
Cadmium (Cd)	*0.025*	0	6.15E-04	6.15E-04	6.13E-04	6.23E-04	6.23E-04	6.13E-04	6.13E-04	15	94
Chromium (Cr)	*0.5*	0	5.99E-03	6.93E-03	1.53E-03	1.16E-02	1.05E-02	1.02E-02	1.16E-02	15	94
Cobalt (Co)	*0.1*	0	6.15E-04	6.15E-04	6.13E-04	6.23E-04	6.23E-04	6.13E-04	6.13E-04	15	94
Copper (Cu)	*50*	0	2.04E-02	2.37E-02	9.10E-03	7.23E-02	2.37E-02	2.22E-02	7.23E-02	15	94
Iron (Fe)	*4*	0	4.82E-01	6.19E-01	1.34E-01	1.74E+00	1.74E+00	7.73E-01	8.72E-01	15	94
Lead (Pb)	*2*	0	2.99E-03	3.53E-03	9.20E-04	7.00E-03	6.54E-03	4.70E-03	7.00E-03	15	94
Magnesium (Mg)	-	-	2.87E-01	3.44E-01	9.40E-02	7.99E-01	7.99E-01	4.17E-01	5.35E-01	15	94
Manganese (Mn)	*0.4*	0	1.73E-02	2.27E-02	4.86E-03	6.63E-02	6.63E-02	2.71E-02	3.56E-02	15	94
Molybdenum (Mo)	*120*	0	1.02E-03	1.21E-03	3.07E-04	3.89E-03	9.35E-04	1.33E-03	3.89E-03	15	94
Nickel (Ni)	*0.2*	0	1.15E-03	1.24E-03	9.20E-04	2.35E-03	2.35E-03	9.20E-04	2.10E-03	15	94
Phosphorus (P)	-	-	1.88E-01	3.00E-01	3.55E-02	1.12E+00	7.21E-02	5.80E-01	1.12E+00	15	94
Selenium (Se)	*10*	0	3.08E-03	3.08E-03	3.07E-03	3.12E-03	3.12E-03	3.07E-03	3.07E-03	15	94
Silver (Ag)	*1*	0	5.26E-04	7.21E-04	3.07E-04	1.56E-03	1.56E-03	3.07E-04	3.07E-04	15	94
Strontium (Sr)	*120*	0	8.59E-03	1.03E-02	3.10E-03	2.45E-02	2.45E-02	1.00E-02	1.65E-02	15	94
Thallium (Tl)	-	-	1.33E-04	1.05E-03	2.76E-05	3.12E-03	3.12E-03	2.76E-05	2.76E-05	15	94
Tin (Sn)	*10*	0	1.32E-03	1.72E-03	3.07E-04	3.12E-03	3.12E-03	2.20E-03	2.03E-03	15	94
Titanium (Ti)	*120*	0	7.52E-03	1.24E-02	3.37E-03	4.29E-02	4.29E-02	3.37E-03	1.60E-02	15	94
Uranium (Ur)	*1.5*	0	5.08E-05	6.69E-05	3.07E-05	1.40E-04	1.40E-04	3.07E-05	3.07E-05	15	94
Vanadium (V)	*2*	0	1.54E-03	1.54E-03	1.53E-03	1.56E-03	1.56E-03	1.53E-03	1.53E-03	15	94
Zinc (Zn)	*120*	0	2.81E-02	3.21E-02	9.90E-03	8.36E-02	5.22E-02	8.36E-02	4.52E-02	15	94
Zirconium (Zr)	*20*	0	8.78E-04	9.71E-04	6.13E-04	1.56E-03	1.56E-03	6.13E-04	1.30E-03	15	94

APPENDIX C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8
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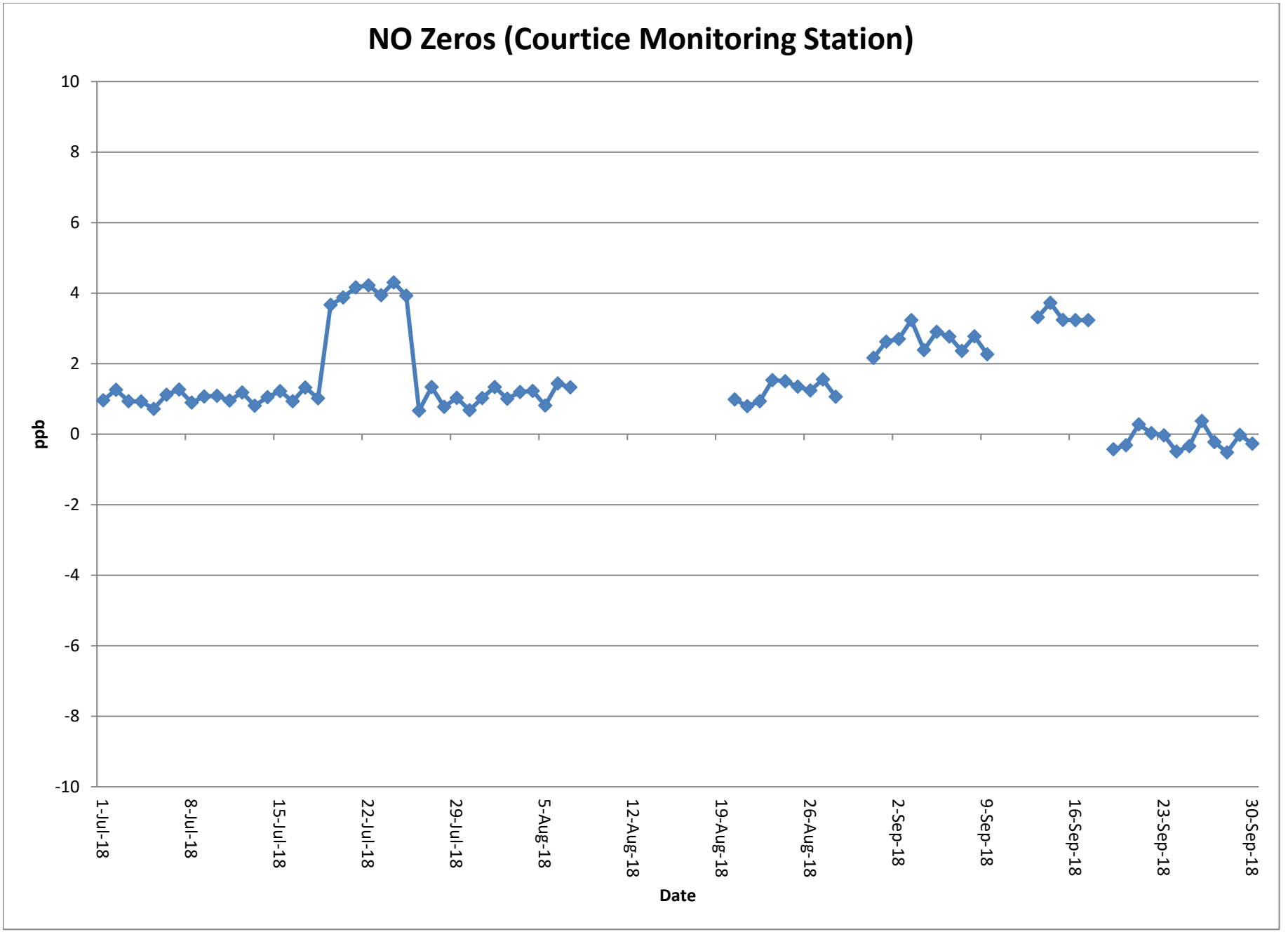
4
2
0
-2
-4
-6
-8
-10
ppb
1-Jul-18
8-Jul-18
15-Jul-18
22-Jul-18
29-Jul-18
5-Aug-18
12-Aug-18
19-Aug-18
26-Aug-18
2-Sep-18
9-Sep-18
16-Sep-18
23-Sep-18
30-Sep-18
Date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8
6
4
2
0
-2
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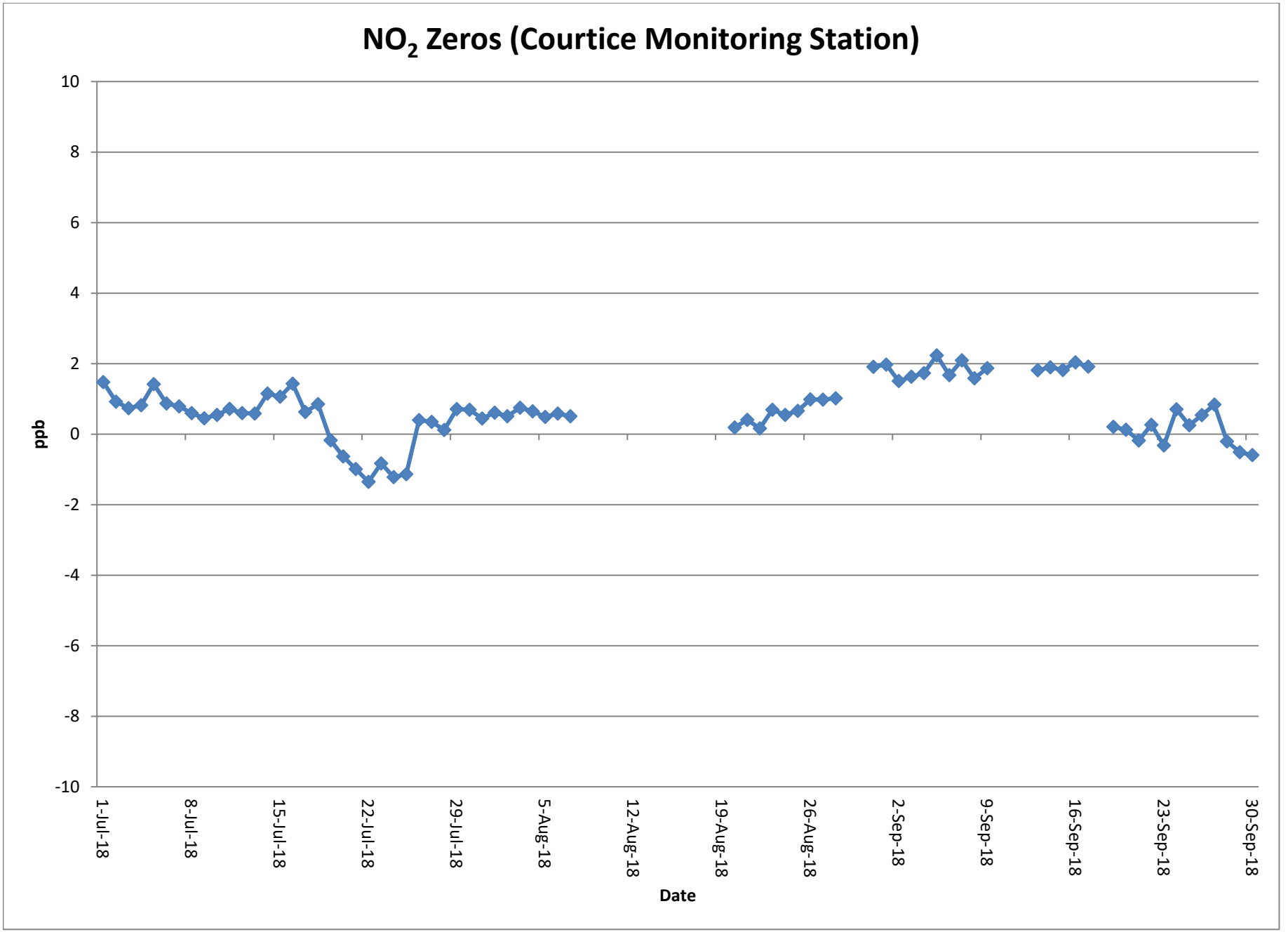
-8
-10
ppb
1-Jul-18
8-Jul-18
15-Jul-18
22-Jul-18
29-Jul-18
5-Aug-18
12-Aug-18
19-Aug-18
26-Aug-18
2-Sep-18
9-Sep-18
16-Sep-18
23-Sep-18
30-Sep-18
Date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2
0
-2
-4
-6
-8
-10
ppb
1-Jul-18
8-Jul-18
15-Jul-18
22-Jul-18
29-Jul-18
5-Aug-18
12-Aug-18
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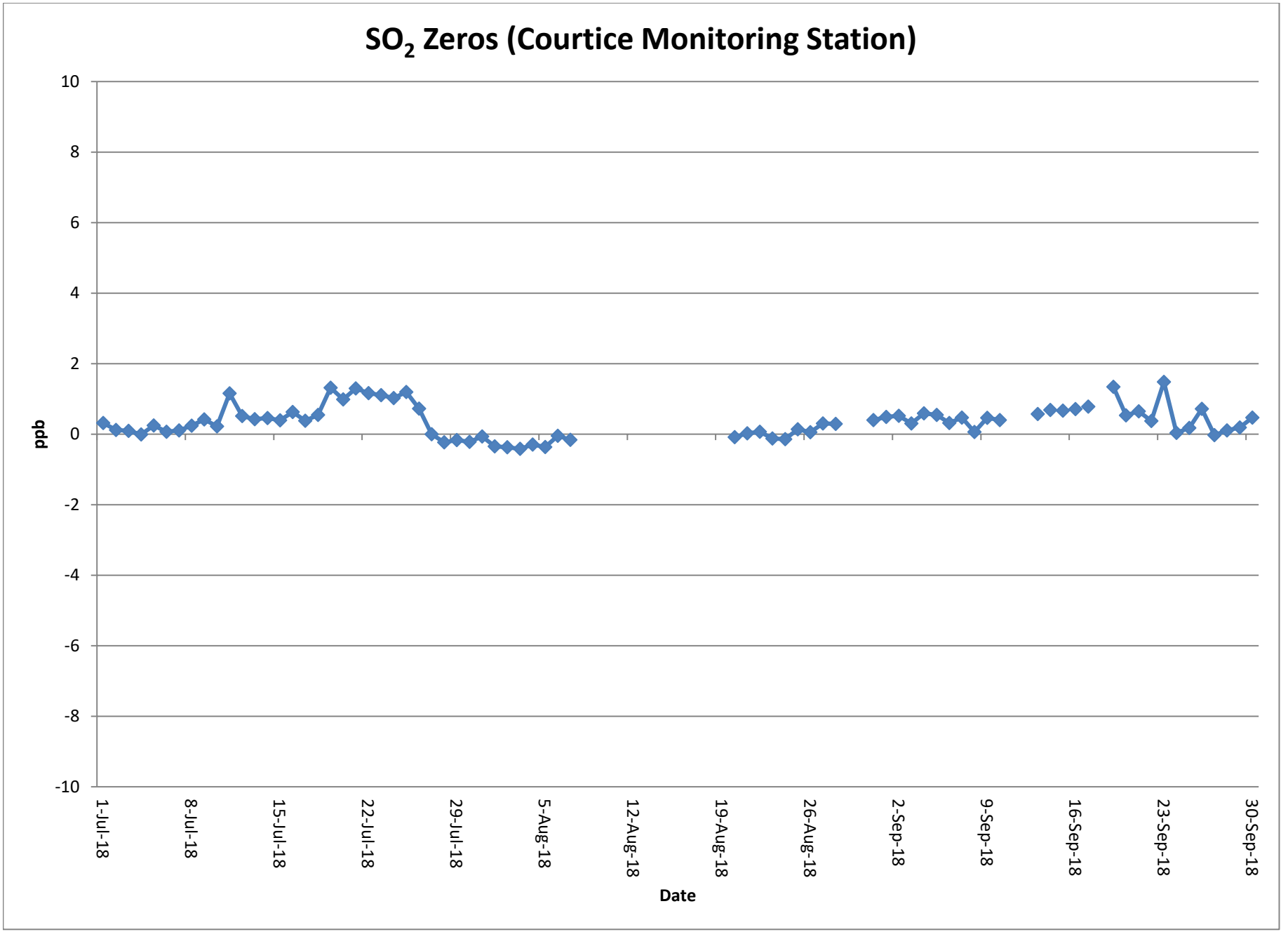
26-Aug-18
2-Sep-18
9-Sep-18
16-Sep-18
23-Sep-18
30-Sep-18
Date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4
2
0
-2
-4
-6
-8
-10
ppb
1-Jul-18
8-Jul-18
15-Jul-18
22-Jul-18
29-Jul-18
5-Aug-18
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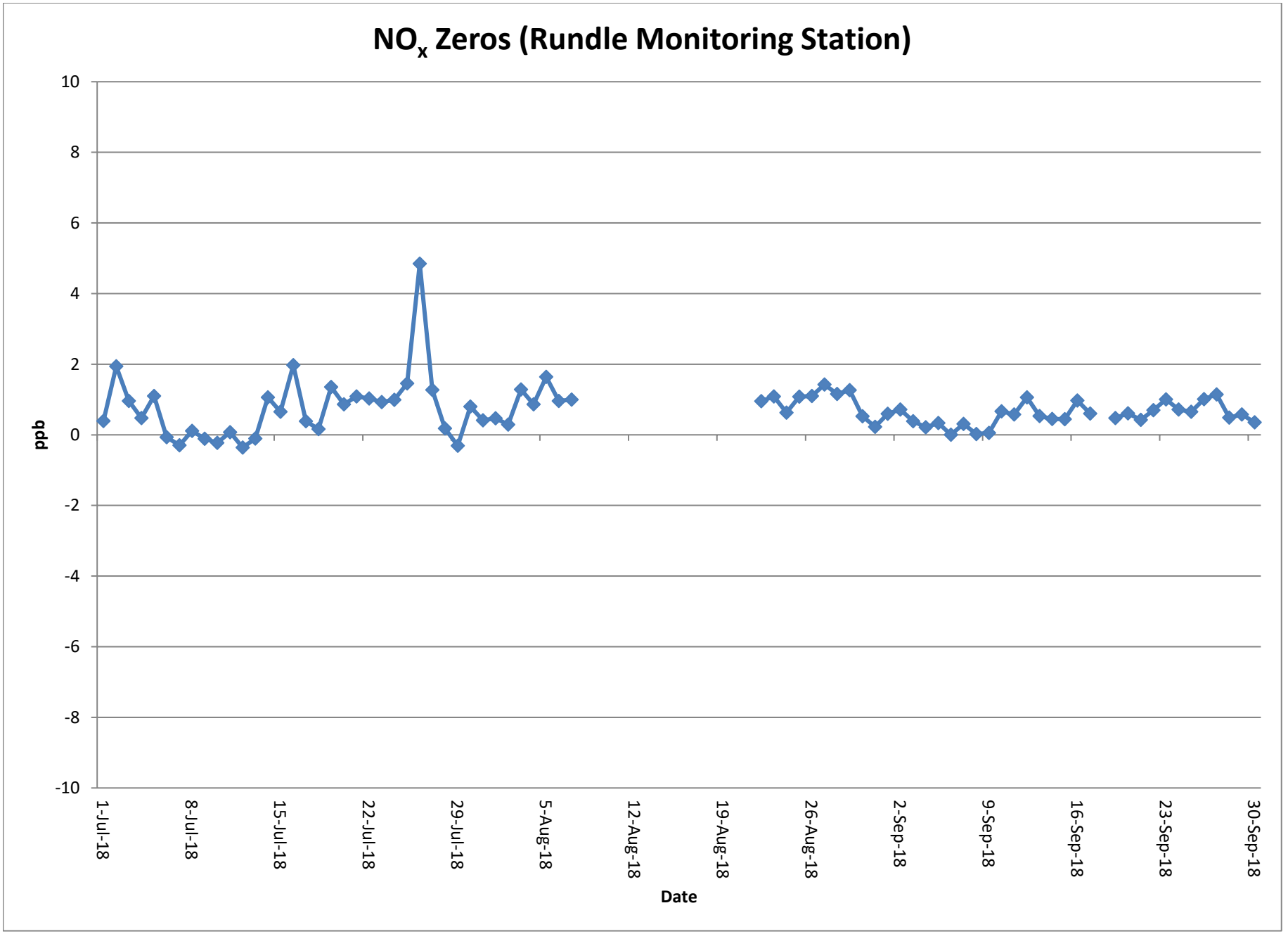
26-Aug-18
2-Sep-18
9-Sep-18
16-Sep-18
23-Sep-18
30-Sep-18
Date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4
2
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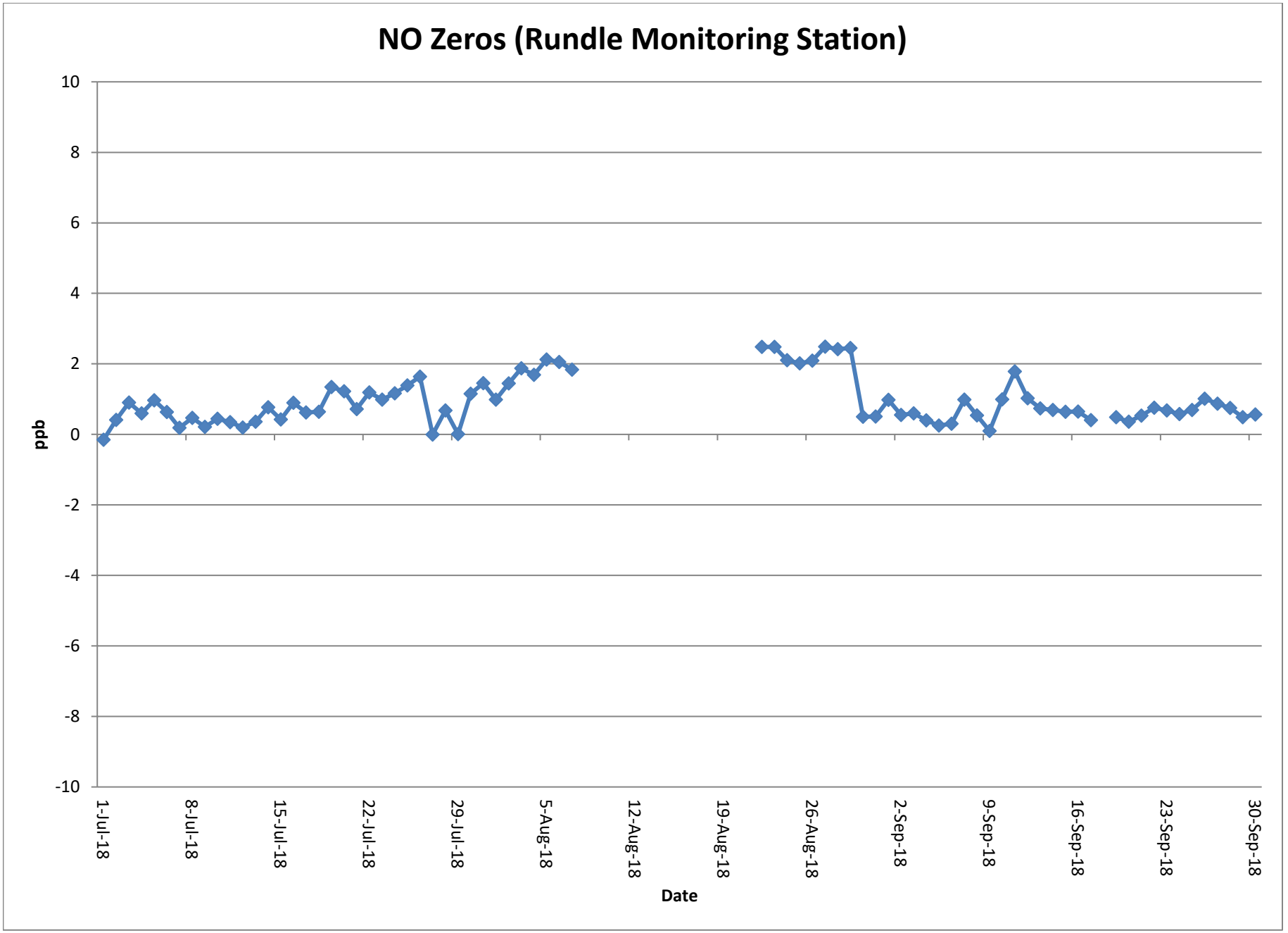
-10
ppb
1-Jul-18
8-Jul-18
15-Jul-18
22-Jul-18
29-Jul-18
5-Aug-18
12-Aug-18
19-Aug-18
26-Aug-18
2-Sep-18
9-Sep-18
16-Sep-18
23-Sep-18
30-Sep-18
Date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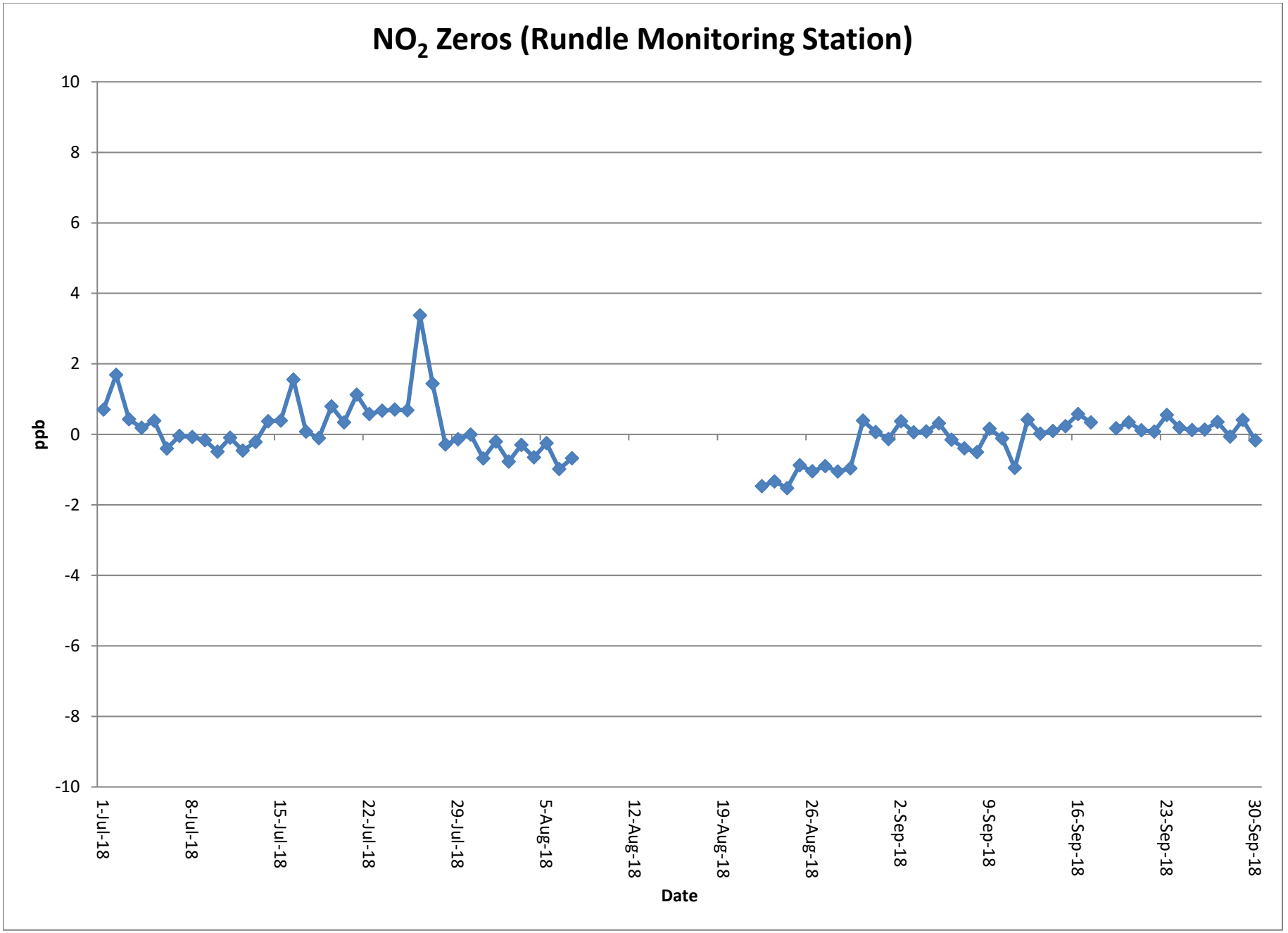
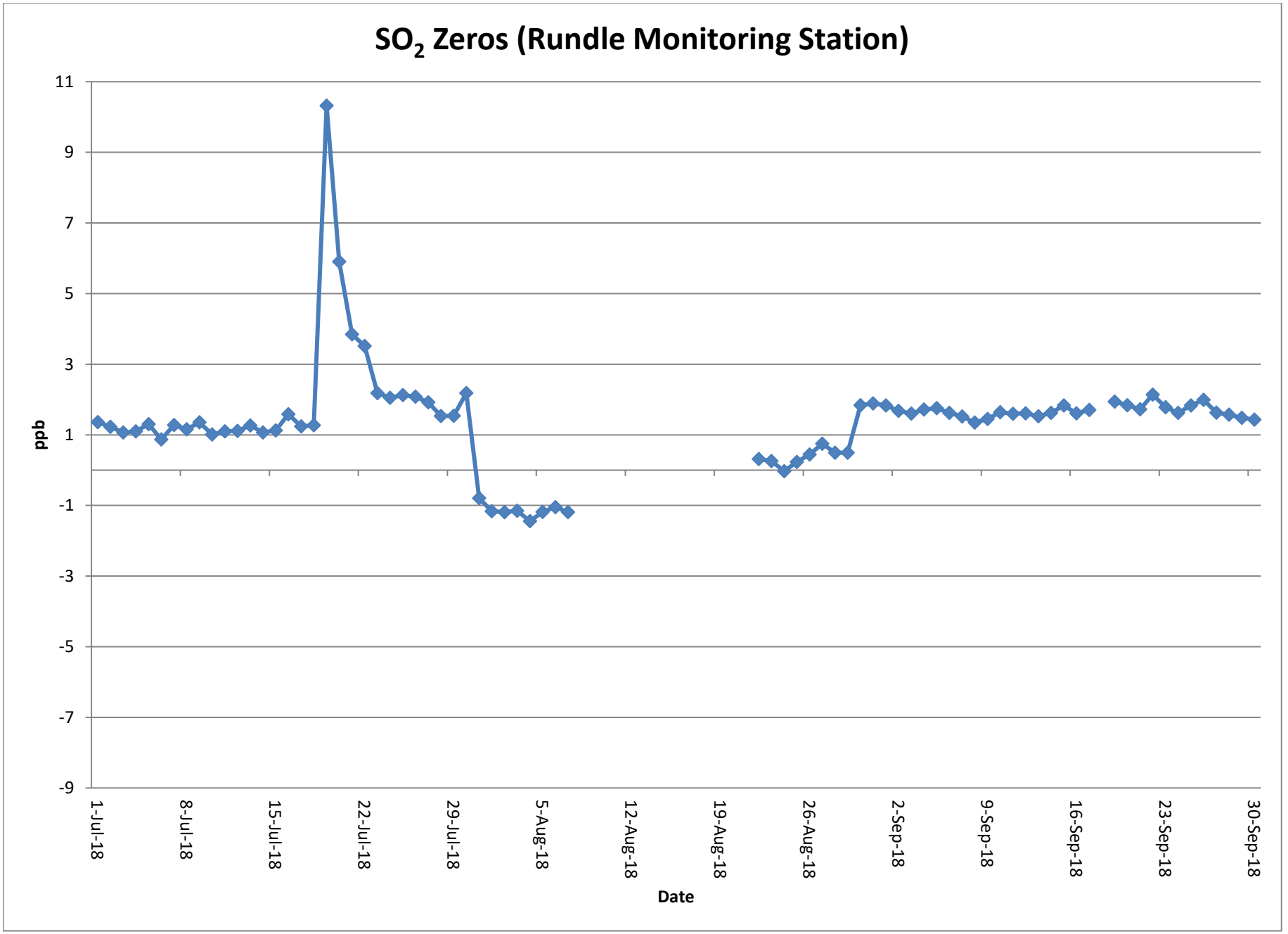
8
6
4
2
0
-2
-4
-6
-8
-10
ppb
1-Jul-18
8-Jul-18
15-Jul-18
22-Jul-18
29-Jul-18
5-Aug-18
12-Aug-18
19-Aug-18
26-Aug-18
2-Sep-18
9-Sep-18
16-Sep-18
23-Sep-18
30-Sep-18
Date


NO2 Zeros (Rundle Monitoring Station)
10
8
6
4
2
0
-2
-4
-6
-8
-10
ppb
1-Jul-18
8-Jul-18
15-Jul-18
22-Jul-18
29-Jul-18
5-Aug-18
12-Aug-18
19-Aug-18
26-Aug-18
2-Sep-18
9-Sep-18
16-Sep-18
23-Sep-18
30-Sep-18
Date


SO2 Zeros (Rundle Monitoring Station)
11
9
7
5
3
1
-1
-3
-5
-7
-9
ppb
1-Jul-18
8-Jul-18
15-Jul-18
22-Jul-18
29-Jul-18
5-Aug-18
12-Aug-18
19-Aug-18
26-Aug-18
2-Sep-18
9-Sep-18
16-Sep-18
23-Sep-18
30-Sep-18
Date

APPENDIX D

Table D1: 3rd 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:** July 1, 2018		**End Date:** September 30, 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	23/08/2018	VML	Deleted Hours	26/07/2018	9:00	26/07/2018	10:00	Scheduled site wide power shutdown
2	23/08/2018	VML	Deleted Hours	26/07/2018	12:00	26/07/2018	13:00	Monthly Calibration
3	31/08/2018	VML	Manual Data Input	08/08/2018	07:00	20/08/2018	13:00	Missing datalogger data during this time period due to critical memory failure. Manual input of data from unit DAS during this time period.
4	07/09/2018	VML	Deleted Hours	31/08/2018	10:00	31/08/2018	12:00	Monthly Calibration and Cleaning the Inlet Head
5	19/10/2018	VML	Deleted Hours	18/09/2018	11:00	18/09/2018	13:00	Monthly Calibration and Cleaning the Inlet Head
6	19/10/2018	VML	Deleted Hours	20/09/2018	9:00	20/09/2018	10:00	Suspected Power Failure/Equipment Shutoff
7	19/10/2018	VML	Deleted Hours	26/09/2018	11:00	26/09/2018	12:00	Ministry of Environment, Conservation and Parks (MECP) Audit

Table D2: 3rd 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:** July 1, 2018		**End Date:** September 30, 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	23/08/2018	VML	Deleted Hours	19/07/2018	11:00	19/07/2018	13:00	Monthly Calibration
2	31/08/2018	VML	Manual Data Input	08/08/2018	07:00	22/08/2018	21:00	Missing datalogger data during this time period due to critical memory failure. Manual input of data from unit DAS during this time period.
3	07/09/2018	VML	Deleted Hours	30/08/2018	09:00	30/08/2018	11:00	Monthly Calibration and Cleaning the Inlet Head
4	19/10/2018	VML	Deleted Hours	18/09/2018	08:00	18/09/2018	10:00	Monthly Calibration and Cleaning the Inlet Head
5	19/10/2018	VML	Deleted Hours	20/09/2018	9:00	20/09/2018	10:00	Suspected Power Failure/Equipment Shutoff
6	19/10/2018	VML	Deleted Hours	26/09/2018	12:00	26/09/2018	13:00	MECP Audit

Table D3: 3rd 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:** July 1, 2018		**End Date:** September 30, 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	23/08/2018	VML	Deleted Hours	19/07/2018	10:00	19/07/2018	11:00	Monthly Calibration. Temporary analyzer removed and original installed after service and maintenance.
2	23/08/2018	VML	Zero offset adjustment	19/07/2018	11:00	26/07/2018	09:00	Correcting zero drift
3	23/08/2018	VML	Deleted Hours	26/07/2018	09:00	26/07/2018	10:00	Scheduled site wide power shutdown
4	24/08/2018	VML	Deleted Hours	01/07/2018	00:00	08/08/2018	00:00	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 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
5	31/08/2018	VML	Zero correction	01/07/2018	00:00	01/08/2018	00:00	Correcting values <0 to 0
6	31/08/2018	VML	Manual Data Input	08/08/2018	07:00	20/08/2018	13:00	Missing datalogger data during this time period due to critical memory failure. Manual input of data from unit DAS during this time period.
7	07/09/2018	VML	Deleted Hours	20/08/2018	00:00	29/08/2018	00:00	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 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
8	07/09/2018	VML	Deleted Hours	31/08/2018	10:00	31/08/2018	12:00	Monthly Calibration
9	07/09/2018	VML	Zero correction	01/08/2018	00:00	01/09/2018	00:00	Correcting values <0 to 0
10	21/09/2018	VML	Deleted Hours	31/08/2018	23:00	10/09/2018	00:00	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 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid. On September 10, the NOx unit time was resynced to the datalogger time.
11	21/09/2018	VML	Deleted Hours	14/09/2018	00:00	18/09/2018	01:00	Due to what was believed to be a power based irregularity with the NOx unit, time based drift between the NOx unit time prompting overnight z/s response and the datalogger time recording the response developed, and 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. On September 18, the NOx unit time was resynced to the datalogger time.
12	21/09/2018	VML	Deleted Hours	18/09/2018	10:00	18/09/2018	13:00	Monthly Calibration
13	21/09/2018	VML	Zero offset adjustment	31/08/2018	12:00	18/09/2018	10:00	Correcting zero drift
14	19/10/2018	VML	Deleted Hours	20/09/2018	09:00	20/09/2018	10:00	Suspected Power Failure/Equipment Shutoff
15	19/10/2018	VML	Deleted Hours	26/09/2018	11:00	26/09/2018	12:00	MECP Audit
16	19/10/2018	VML	Zero correction	01/09/2018	00:00	01/10/2018	00:00	Correcting values <0 to 0

Table D4: 3rd 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:** July 1, 2018		**End Date:** September 30, 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	23/08/2018	VML	Deleted Hours	19/07/2018	11:00	19/07/2018	13:00	Monthly Calibration. Temporary analyzer installed and original removed for service and maintenance.
2	31/08/2018	VML	Zero correction	01/07/2018	00:00	01/08/2018	00:00	Correcting values <0 to 0
3	31/08/2018	VML	Manual Data Input	08/08/2018	07:00	22/08/2018	21:00	Missing datalogger data during this time period due to critical memory failure. Manual input of data from unit DAS during this time period.
4	07/09/2018	VML	Deleted Hours	30/08/2018	09:00	30/08/2018	11:00	Monthly Calibration. Calibrated analog output channels.
5	07/09/2018	VML	Zero correction	01/08/2018	00:00	01/09/2018	00:00	Correcting values <0 to 0
6	19/10/2018	VML	Deleted Hours	18/09/2018	08:00	18/09/2018	10:00	Monthly Calibration
7	19/10/2018	VML	Deleted Hours	20/09/2018	9:00	20/09/2018	10:00	Suspected Power Failure/Equipment Shutoff
8	19/10/2018	VML	Deleted Hours	26/09/2018	12:00	26/09/2018	13:00	MECP Audit
9	19/10/2018	VML	Zero correction	01/09/2018	00:00	01/10/2018	00:00	Correcting values <0 to 0

Table D5: 3rd 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:** July 1, 2018		**End Date:** September 30, 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	23/08/2018	VML	Deleted Hours	19/07/2018	09:00	19/07/2018	11:00	Monthly Calibration. Temporary analyzer installed and original removed for service and maintenance.
2	23/08/2018	VML	Deleted Hours	26/07/2018	09:00	26/07/2018	10:00	Scheduled site wide power shutdown
3	23/08/2018	VML	Deleted Hours	26/07/2018	12:00	26/07/2018	13:00	Temporary analyzer removed and original installed and calibrated.
4	24/08/2018	VML	Deleted Hours	01/07/2018	00:00	08/08/2018	00:00	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 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
5	31/08/2018	VML	Zero correction	01/07/2018	00:00	01/08/2018	00:00	Correcting values <0 to 0
6	31/08/2018	VML	Manual Data Input	08/08/2018	07:00	20/08/2018	13:00	Missing datalogger data during this time period due to critical memory failure. Manual input of data from unit DAS during this time period.
7	07/09/2018	VML	Deleted Hours	20/08/2018	00:00	29/08/2018	00:00	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 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
8	07/09/2018	VML	Deleted Hours	31/08/2018	10:00	31/08/2018	12:00	Monthly Calibration
9	07/09/2018	VML	Zero correction	01/08/2018	00:00	01/09/2018	00:00	Correcting values <0 to 0
10	21/09/2018	VML	Deleted Hours	31/08/2018	23:00	10/09/2018	00:00	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 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid. On September 10, the NOx unit time was resynced to the datalogger time.
11	21/09/2018	VML	Deleted Hours	13/09/2018	23:00	18/09/2018	00:00	Due to what was believed to be a power based irregularity with the SO_2 unit, time based drift between the NOx unit time prompting overnight z/s response and the datalogger time recording the response developed, and the z/s response spanned over 15 min of the 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid. On September 18, the SO_2 unit time was resynced to the datalogger time.
12	19/10/2018	VML	Deleted Hours	18/09/2018	10:00	18/09/2018	13:00	Monthly Calibration
13	19/10/2018	VML	Deleted Hours	19/09/2018	11:00	19/09/2018	12:00	Calibration: Confirmation of z/s values and test of high gas.
14	19/10/2018	VML	Deleted Hours	20/09/2018	09:00	20/09/2018	10:00	Suspected Power Failure/Equipment Shutoff
15	19/10/2018	VML	Deleted Hours	26/09/2018	11:00	26/09/2018	12:00	MECP Audit
16	19/10/2018	VML	Zero correction	01/09/2018	00:00	01/10/2018	00:00	Correcting values <0 to 0

Table D6: 3rd 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:** July 1, 2018			**End Date:** September 30, 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	23/08/2018	VML	Deleted Hours	19/07/2018	11:00	19/07/2018	13:00	Monthly Calibration. Temporary analyzer removed and original installed after service and maintenance.
2	23/08/2018	VML	Deleted Hours	26/07/2018	10:00	26/07/2018	11:00	Calibration check
3	24/08/2018	VML	Deleted Hours	26/07/2018	23:00	31/07/2018	00:00	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 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid.
4	31/08/2018	VML	Zero correction	01/07/2018	00:00	01/08/2018	00:00	Correcting values <0 to 0
5	31/08/2018	VML	Deleted Hours	08/08/2018	07:00	15/08/2018	16:00	Missing Data. Due to a datalogger issue, data was lost during this time period and was not recoverable from the unit DAS as well.
6	31/08/2018	VML	Manual Data Input	15/08/2018	16:00	22/08/2018	21:00	Missing datalogger data during this time period due to critical memory failure. Manual input of data from unit DAS during this time period.
7	07/09/2018	VML	Deleted Hours	30/08/2018	09:00	30/08/2018	11:00	Monthly Calibration
8	07/09/2018	VML	Zero correction	01/08/2018	00:00	01/09/2018	00:00	Correcting values <0 to 0
9	21/09/2018	VML	Deleted Hours	22/08/2018	23:00	18/09/2018	00:00	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 23:00-00:00 hour. Since 75% valid data was not captured, there was <Sample size required for the hour to be valid. On September 18, the SO_2 unit time was resynced to the datalogger time.
10	19/10/2018	VML	Deleted Hours	18/09/2018	08:00	18/09/2018	10:00	Monthly Calibration
11	19/10/2018	VML	Deleted Hours	19/09/2018	09:00	19/09/2018	11:00	Calibration: Confirmation of z/s values and test of high gas.
12	19/10/2018	VML	Deleted Hours	20/09/2018	9:00	20/09/2018	10:00	Suspected Power Failure/Equipment Shutoff
13	19/10/2018	VML	Deleted Hours	26/09/2018	12:00	26/09/2018	13:00	MECP Audit
14	19/10/2018	VML	Zero correction	01/09/2018	00:00	01/10/2018	00:00	Correcting values <0 to 0

Table D7: 3rd 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 Meteorological Instrumentation			**s/n:** N/A		
Data Edit Period	**Start Date:** July 1, 2018		**End Date:** September 30, 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	31/08/2018	VML	Deleted Hours	08/08/2018	07:00	20/08/2018	13:00	Missing datalogger data during this time period due to critical datalogger memory failure.
2	19/10/2018	VML	Deleted Hours	20/09/2018	9:00	20/09/2018	10:00	Suspected Power Failure/Equipment Shutoff

Table D8: 3rd 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:** July 1, 2018		**End Date:** September 30, 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	31/08/2018	VML	Deleted Hours	19/07/2018	14:00	19/07/2018	18:00	Maintenance of the wind anemometer
2	31/08/2018	VML	Deleted Hours	19/07/2018	14:00	20/07/2018	06:00	Maintenance and Repair of the wind vane
3	31/08/2018	VML	Deleted Hours	08/08/2018	07:00	22/08/2018	21:00	Missing datalogger data during this time period due to logger critical memory failure.
4	19/10/2018	VML	Deleted Hours	20/09/2018	9:00	20/09/2018	10:00	Suspected Power Failure/Equipment Shutoff