REPORT

DURHAM YORK ENERGY CENTRE

COURTICE, ONTARIO

2020 Q4 AMBIENT AIR QUALITY MONITORING REPORT

RWDI #1803743

February 9, 2021

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 Durham Region and York Region (the Regions) to conduct discrete and continuous air quality ambient monitoring at the Durham York Energy Centre (DYEC) monitoring stations. The facility address is 1835 Energy Drive, Clarington, Ontario. The DYEC is a facility that manages post diversion municipal solid waste from Durham Region and York Region 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. Two (2) monitoring stations were established to monitor ambient air quality around the DYEC and quantify the background ambient air quality levels and DYEC contributed emissions to ambient air quality levels.

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

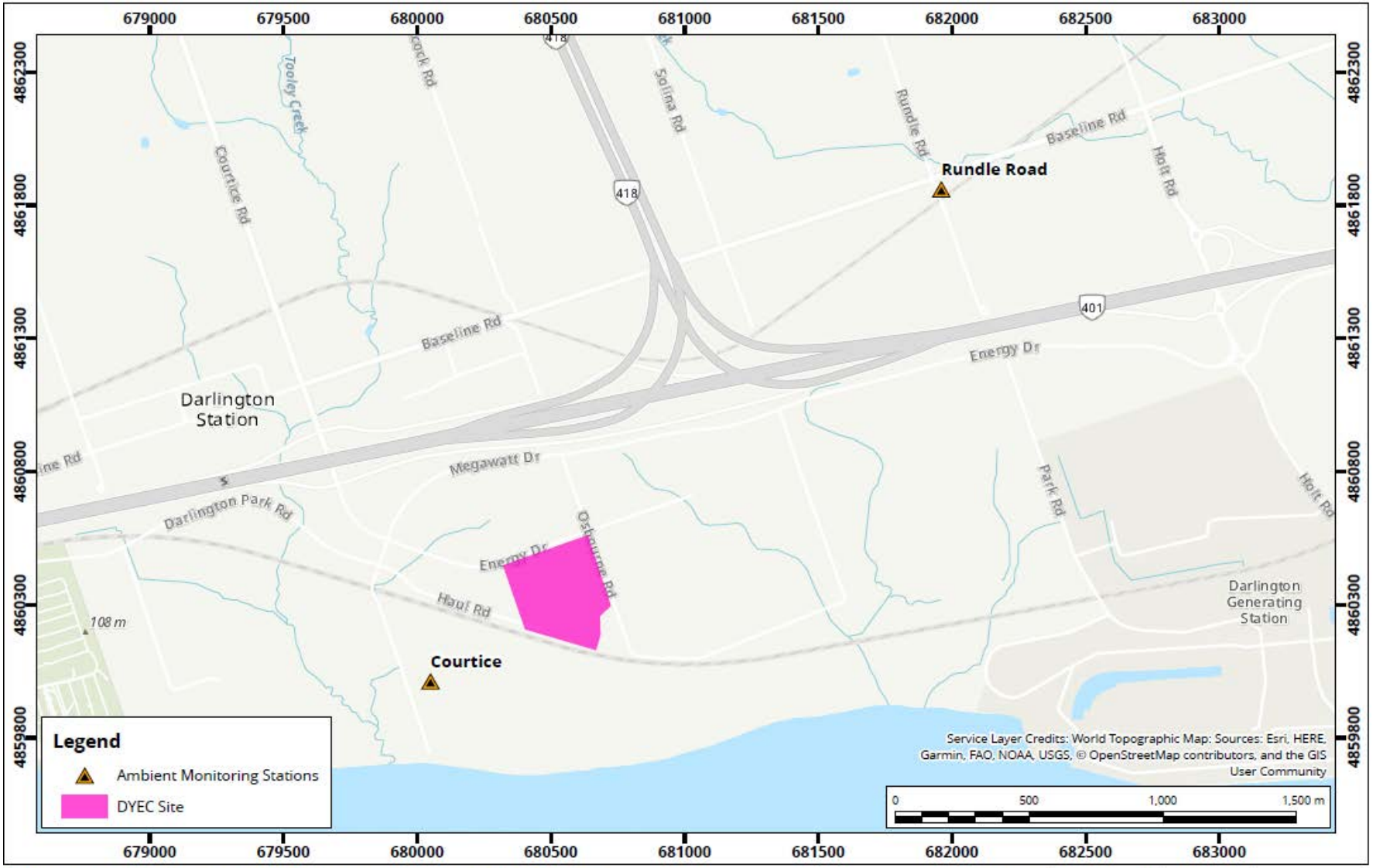
- Quantify any measurable ground level concentrations resulting from emissions from the DYEC cumulative to local air quality, including validating the predicted concentrations from the dispersion modelling conducted in the Environmental Assessment (2009a);
- Monitor concentration levels of EFW-related air contaminants in nearby residential areas; and,
- 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. 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. 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 (PM2.5), 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).

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.

Throughout this monitoring period there were three (3) exceedances of the AAQC for Benzo(a) Pyrene which occurred on December 17th at the Courtice Station and November 11th and December 29th at the Rundle Road Station. There was one (1) exceedance event of the rolling 10-minute SO_2 AAQC at the Courtice Station which occurred on December 18th at 10:20. Data recovery rates were acceptable and valid for all measured Q4 parameters.



DYEC Site and Ambient Monitoring Station Locations

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

True North

Project #: 1803743

Drawn by: DJH	Figure: 1
Approx. Scale:	1:20,000
Date Revised:	Apr 17, 2020

1.1 Sampling Locations

The Station sites were selected in consultation with a working group that included representatives from the MECP, the Region of Durham, York Region, and the Energy from Waste Advisory Committee (EFWAC), as required by Condition 11.3 of the Environmental Assessment Notice of Approval. 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. Pictures of the two (2) Stations are presented as Figure 2 and 3.

Figure 2. Rundle Road Station

Figure 3. Courtice 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.

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 1:45 and ending at 02:15. The checks consisted of a 10-minute zero check, a 10-minute span check and a 10-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.

The instrument collects data using its own data acquisition system (DAS) on a 5-minute interval. Data is collected from the instrument directly to an EnviDAS logger at 1-min, 5-min and 60-min intervals. The logger can be accessed remotely, and all instrument parameters can be examined as well as the measurement data. This allows the tracking of instrument performance. Data was also collected at 1-minute intervals by an external datalogger using analog output connections as a back-up. The measurement data was averaged using Envista processing software over a 1-hour and 24-hour period to compare to the applicable ambient air quality criteria.

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 1:45 and ending at 02:15. The checks consisted of a 10-minute zero check, a 10-minute span check and a 10-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.

The instrument collects data using its own data acquisition system (DAS) on a 5-minute interval. Data is collected from the instrument directly to an EnviDAS logger at 1-min, 5-min and 60-min intervals. The logger can be accessed remotely, and all instrument parameters can be examined as well as the measurement data. This allows the tracking of instrument performance. Data was also collected at 1-minute intervals by an external datalogger using analog output connections as a back-up. The measurement data was averaged using Envista processing software over a 1-hour and 24-hour period to compare to the applicable ambient air quality criteria.

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.

The instrument collects data using its own data acquisition system (DAS) on a 5-minute interval. Data is collected from the instrument directly to an EnviDAS logger at 1-min, 5-min and 60-min intervals. The logger can be accessed remotely, and all instrument parameters can be examined as well as the measurement data. This allows the tracking of instrument performance. Data was also collected at 1-minute intervals by an external datalogger using analog output connections as a back-up. The measurement data was averaged using Envista processing software over a 1-hour and 24-hour period to compare to the applicable ambient air quality criteria.

2.4 TSP High Volume Air Samplers

The Tisch TE-5170 Total Suspended Particulate (TSP) high volume (Hi-Vol) air samplers were outfitted with a TSP gabled 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. In the latter part of 2019, the pin-based wheel timer was modified with an automated relay system controlled by a data logger to toggle the sampler on and off, and the chart recorder system was replaced by a digital pressure transducer to record the blower output pressure. Teflon coated glass fibre filters are outfitted at the top of the hi-vol samplers where air is drawn through the filter, thereby collecting TSP. Each Hi-Vol is calibrated quarterly (every three months) to ensure accuracy and validity of the volume of air drawn through the sampler.

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

2.5 Polyurethane Foam Samplers

The D&F, 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. Each PUF sampler is equipped with a mass flow controller, which can sustain 8 CFM of flow over the sampling period, an elapsed timer and a wheel timer for starting and stopping each sample. In the latter part of 2019, the pin-based wheel timer was modified with an automated relay system controlled by a data logger to toggle the sampler on and off, and the chart recorder system was replaced by a digital pressure transducer to record the blower output pressure. Each PUF sampler is calibrated quarterly (every three months) to ensure accuracy and validity of the volume of air drawn through the sampler.

The filter and PUF media/glassware is proofed and analyzed by ALS Laboratories in Burlington, Ontario. 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 Road and Courtice Stations. This is done so that a vector could be associated with the applicable contaminant concentrations. The Rundle Road 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. New AAQC's for SO_2 were implemented in 2020, including a 10-minute rolling average AAQC of 67 ppb, a 1-hour rolling average AAQC of 40ppb and an annual AAQC of 4 ppb. There is no longer a 24-hour rolling average AAQC for SO_2.

Environment Canada has established a Canadian Ambient Air Quality Standard (CAAQS) which are health-based air quality objectives for the outdoor air (Environment Canada, 2013). The current CAAQS' for $PM_{2.5}$ are 27 µg/m^3 for the 3-year average of annual 98th percentile 24-hour concentration, and 8.8 µg/m^3 for the 3-year average of annual average concentrations (in effect as of 2020). The CAAQS' are listed in **Table 1**. No direct comparison to the 2020 CAAQS' is appropriate for this report, as the standards are only applicable to 3-year averaged data which is provided in the annual reports.

Table 1. $PM_{2.5}$, SO_2 and NO_2 CAAQS' by Implementation Year

Parameter	Averaging Time	Year Applied		Statistical Form
		2020	2025	
Fine Particulate Matter ($PM_{2.5}$)	24-hour	27 µg/m^3		The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
	Annual	8.8 µg/m^3		The 3-year average of the annual average of all 1-hour concentrations
Sulphur Dioxide (SO_2)	1-hour	70 ppb	65 ppb	The 3-year average of the annual 99th percentile of the SO_2 daily maximum 1-hour average concentrations
	Annual	5 ppb	4 ppb	The average over a single calendar year of all 1-hour average SO_2 concentrations
Nitrogen Dioxide (NO_2)	1-hour	60 ppb	42 ppb	The 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations
	Annual	17 ppb	12 ppb	The average over a single calendar year of all 1-hour average concentrations

(CCME,2019)

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

4 MECP AUDITS

There was no MECP audit during Q4.

5 SUMMARY OF AMBIENT MEASUREMENTS

Ambient air quality monitoring results for all contaminants sampled at the Courtice and Rundle Road Stations are discussed herein. Summary statistics from October to December 2020 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 Courtice Station maintained a minimum 100% of data collection for all of the parameters measured during Q4. One hour of data was lost due to an overwriting issue with the WPCP software during the daylight savings shift on November 1st. Hourly statistics from the meteorological station are presented in **Table 2**. A wind rose showing trends in wind speed and wind direction during Q4 is provided in **Figure 4**.

Figure 4. Wind Roses of Hourly Wind Speed and Wind Direction – October to December 2020

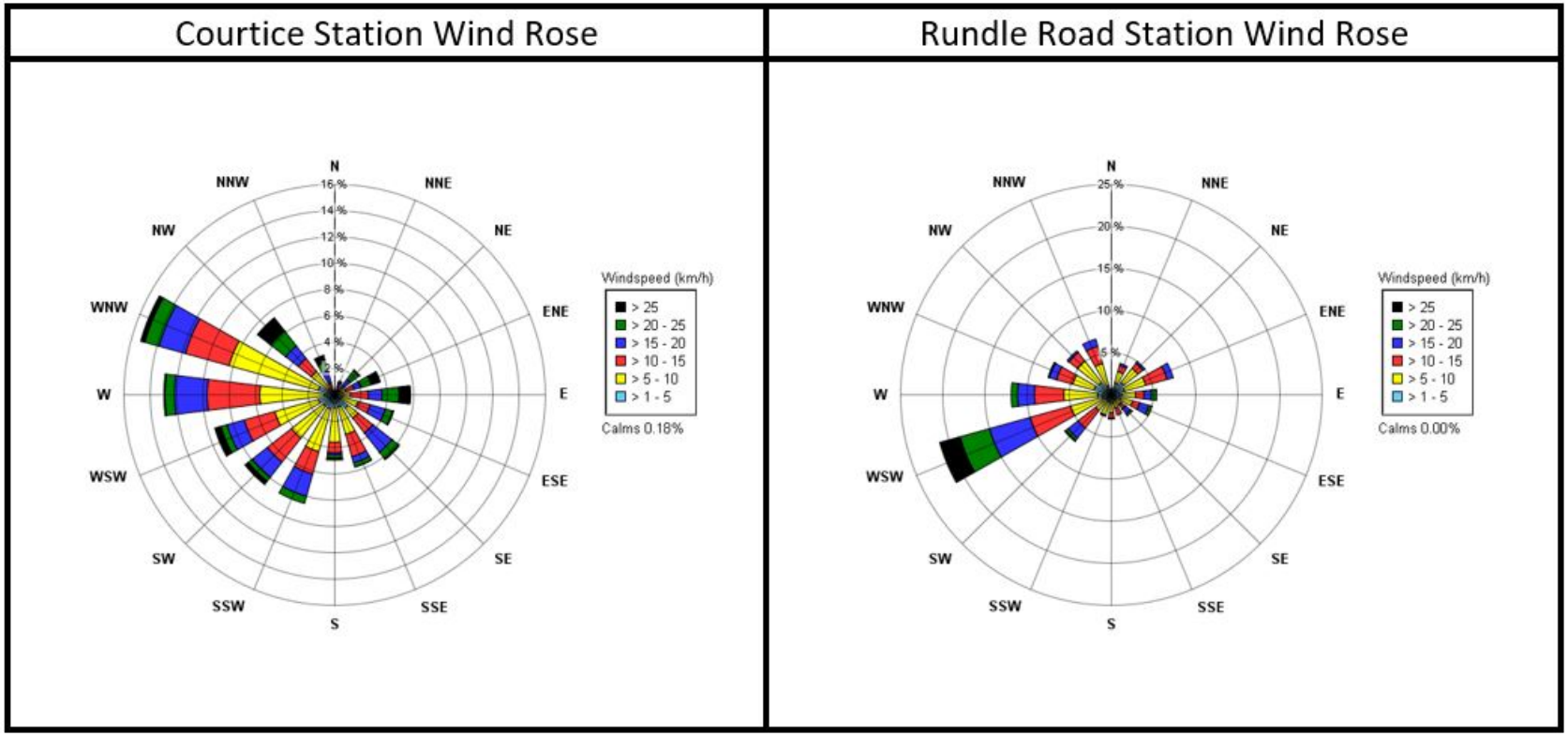


Table 2: Hourly Statistics from the Courtice Station and WPCP (WS and WD) Meteorological Station

Courtice Station MET Statistics	Maximum 1 hr Mean					Minimum 1 hr Mean					Monthly Mean					Total	% valid hours					
Parameter	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain	Rain	WS	WD	Temp	RH	Pres	Rain
Units	(km/hr)	(°C)	(%)	"Hg	mm	(km/hr)	(°C)	(%)	"Hg	mm	(km/hr)	(°C)	(%)	"Hg	mm	mm	(%)					
October	32	20	97	30.2	2.8	0	-4	32	29.2	0.0	12	9	74	29.8	0.1	56.0	100.0	100.0	100.0	100.0	100.0	100.0
November	49	17	97	30.3	2.8	1	-6	43	29.0	0.0	12	6	72	29.8	0.1	57.8	99.9	99.9	100.0	100.0	100.0	100.0
December	43	8	97	30.2	2.6	0	-11	35	29.1	0.0	14	0	73	29.7	0.1	56.5	100.0	100.0	100.0	100.0	100.0	100.0
Q4 Arithmetic Mean											13	5	73	29.7	0.1	170.3	100.0	100.0	100.0	100.0	100.0	100.0

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 a minimum 96.2% data collection for all of the meteorological parameters measured during Q4. Hourly statistics from the meteorological station is presented in **Table 3**. A wind rose showing trends in wind speed and wind direction during Q4 is provided in **Figure 4**.

Table 3: Hourly Statistics from the Rundle Road Meteorological Station

Rundle Road Station MET Statistics	Maximum 1 hr Mean				Minimum 1 hr Mean				Monthly Mean				Total	% Valid Hours				
Parameter	WS	Temp	RH	Rain	WS	Temp	RH	Rain	WS	Temp	RH	Rain	Rain	WS	WD	Temp	RH	Rain
Units	(km/hr)	(°C)	(%)	mm	(km/hr)	(°C)	(%)	mm	(km/hr)	(°C)	(%)	mm	mm	(%)				
October	27	21	100	3.1	0	-6	30	0.0	9	9	76	0.1	64.0	100.0	95.0	100.0	100.0	100.0
November	46	19	100	5.8	0	-6	42	0.0	11	6	73	0.1	61.0	100.0	97.6	100.0	100.0	100.0
December	32	8	100	3.1	0	-12	36	0.0	11	-1	76	0.1	59.3	98.1	96.0	100.0	100.0	100.0
Q4 Arithmetic Mean									11	5	75	0.1	184.3	99.4	96.2	100.0	100.0	100.0

5.2 NO_X, SO_2 and $PM_{2.5}$ Summary Table Results

Table 4 provides a summary of Maximum 1-hour Rolling Means, Maximum 24-hour Rolling Means, Monthly Means, Quarterly Means and Percent valid data for the Courtice Station. **Table 5** provides a summary of Maximum 1-hour Means, Maximum 24-hour Means, Monthly Means, Quarterly Means and Percent valid data for the Rundle Road Station. **Table 6** provides a summary of exceedance statistics for both Courtice and Rundle Road Stations. There was one (1) exceedance event of the rolling 10-minute SO_2 AAQC at the Courtice Station and no exceedance events at the Rundle Road Station in Q4.

Table 4: Summary of Courtice Station Continuous Data Statistics

Courtice Monitoring Station Data Statistics	Maximum Rolling 10 min Mean	Maximum Rolling 1 hr Mean					Maximum 24 hr Rolling Mean					Monthly Mean					% Valid Hours				
Compound	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	$PM_{2.5}$	NO_x	NO	NO_2	SO_2
Units	ppb	($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				(%)				
AAQC/CAAQS	67				200	40	27[A]			100											
October	66.3	26.4	51.6	37.7	27.2	36.7	11.6	21.8	13.0	13.7	6.3	3.6	6.4	2.0	4.5	1.9	99.7	99.7	99.7	99.7	99.7
November	43.0	35.7	51.7	35.4	32.9	17.0	28.6	21.3	5.7	16.3	3.5	7.5	6.0	1.2	4.9	1.1	99.9	99.3	99.3	99.3	99.6
December	70.0	34.0	80.2	55.3	34.9	36.7	20.7	32.2	15.6	16.6	4.1	6.8	7.1	1.5	5.8	0.9	99.7	99.6	99.6	99.6	99.7
Q4 Arithmetic Mean												6.0	6.5	1.6	5.0	1.3	99.8	99.5	99.5	99.5	99.7

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

Table 5: Summary of Rundle Road Station Continuous Data Statistics

Rundle Road Monitoring Station Data Statistics	Maximum Rolling 10 min Mean	Maximum Rolling 1 hr Mean					Maximum 24 hr Rolling Mean					Monthly Mean					% Valid Hours				
Compound	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	$PM_{2.5}$	NO_x	NO	NO_2	SO_2
Units	ppb	($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				(%)				
AAQC/CAAQS	67				200	40	27[A]			100											
October	43.3	59.3	37.7	15.9	21.8	29.9	8.7	9.1	2.7	8.3	3.1	3.3	3.7	0.8	3.1	0.2	99.9	99.7	99.7	99.7	99.7
November	22.8	39.6	36.0	14.9	23.6	17.5	23.1	13.6	4.9	10.8	2.4	6.8	6.1	0.9	5.4	0.4	99.7	99.6	99.6	99.6	99.7
December	31.1	41.8	35.6	23.2	25.1	15.3	21.7	16.6	4.3	13.7	0.8	6.7	5.7	0.8	5.2	0.3	99.9	99.7	99.7	99.7	99.7
Q4 Arithmetic Mean												5.6	5.2	0.9	4.6	0.3	99.8	99.7	99.7	99.7	99.7

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

Table 6: Summary of Exceedance Statistics

Event Statistics	Rolling Mean > 10 min AAQC for Courtice	Rolling Mean > 10 min AAQC for Rundle Road	Mean > 1 hr AAQC for Courtice Monitoring Station			Mean > 1 hr AAQC for Rundle Road Monitoring Station			Rolling Mean > 24 hr AAQC for Courtice Monitoring Station			Rolling Mean > 24 hr AAQC for Rundle Road Monitoring Station		
Compound	SO_2	SO_2	$PM_{2.5}$	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.			No.			No.		
October	0	0		0	0		0	0	N/A	0		N/A	0	
November	0	0		0	0		0	0	N/A	0		N/A	0	
December	1	0		0	0		0	0	N/A	0		N/A	0	
Q4 Total	1	0		0	0		0	0	N/A	0		N/A	0	

5.3 Oxides of Nitrogen Results

5.3.1 Courtice Station Results

Data recovery levels were high for oxides of nitrogen (99.5% valid data). 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 rolling 1-hour and 24-hour averaged data. The highest NO_2 value seen among the 1-hour rolling averages was 34.9 ppb, which is 17.5% of the AAQC. The highest NO_2 value seen among the rolling 24-hour averages was 16.6 ppb, which is 16.6% of the AAQC. The measurements are summarized in **Table 4** above. A pollution rose is presented in **Figure 5** for the Courtice Station during Q4 composed of hourly average NO_2 concentrations. A pollution rose indicates the percentage of time that the wind originates from a given direction coupled with the pollutant measurement for that time in either ppb or micrograms per meter cubed. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation.

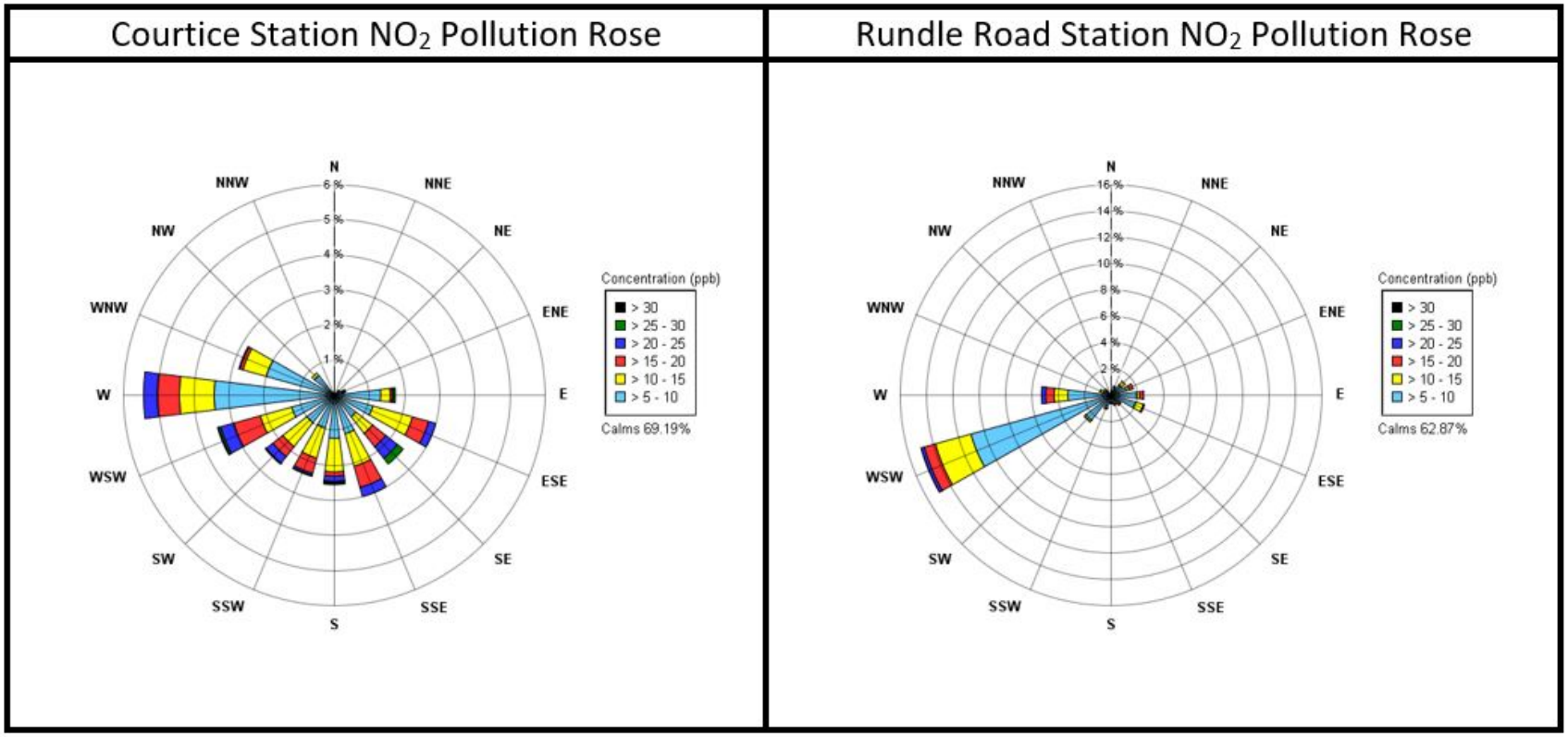
The Courtice Station pollution rose in **Figure 5** shows the majority of the NO_2 impacts were largely between the ESE and W directions. The Station would be downwind of the DYEC if winds were from the northeast and east-northeast components, which happened to be very minimal, therefore it is unlikely that any significant impact came from the DYEC. There are larger impacts from the W which indicates likely impacts from the surrounding industry along the lakeshore, and from the ESE-SW which is likely from long range transport across the lake.

5.3.2 Rundle Road Station Results

Data recovery levels were high for oxides of nitrogen (99.7% valid data). There were no exceedances above the AAQC values for the entirety of the sampling period for rolling 1-hour and 24-hour averaged data. The highest NO_2 value seen among the 1-hour rolling averages was 25.1 ppb, which is 12.6% of the AAQC. The highest NO_2 value seen among the rolling 24-hour averages was 13.7 ppb, which is 13.7% of the AAQC. The measurements are summarized in **Table 5** above. A pollution rose is presented in **Figure 5** for the Rundle Road Station during Q4 composed of hourly average NO_2 concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation.

The Rundle Road Station pollution rose in **Figure 5** shows that the majority of elevated NO_2 events at the Rundle Road Station occurred when winds were from the west and west-southwest, which is in line with high traffic areas and urban background, with a possible contribution from DYEC in the WSW quadrant. It is unlikely that the DYEC was a major contributor to NO_2 levels at the station.

Figure 5. Pollution Roses of Hourly Average NO_2 Concentrations – October to December 2020



5.4 Sulphur Dioxide Results

5.4.1 Courtice Station Results

Data recovery levels were high for sulphur dioxide (99.7% valid data). Monitoring results were compared to the AAQC for 10-minute and 1-hour rolling average periods. In 2020, there have been more frequent SO_2 concentrations elevated above the AAQC's than in previous years due to the new limits imposed at the start of 2020. The highest SO_2 value seen among the 10-min rolling averages was 70.0 ppb, which is 104.5% of the AAQC. The highest SO_2 value seen among the 1-hour rolling averages was 36.7 ppb, which is 91.8% of the AAQC. There was one (1) exceedance event of the rolling 10-minute AAQC. A table outlining the interpretation of the exceedance period can be found in **Appendix E.**

The SO_2 statistical results are summarized in **Table 4** above. A pollution rose is presented in **Figure 6** for the Courtice Station during Q4 composed of hourly average SO_2 concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation. A pollution rose is presented in **Figure 7** for the Courtice Station during Q4 composed of 5-minute average SO_2 concentrations with levels below 67 ppb omitted to illustrate directionality of exceedance concentrations.

The Courtice Station pollution rose in **Figure 6** shows that the majority of elevated SO_2 events at Courtice occurred from the E to S directions. The events were possibly a result of emissions from long range transport across the lake and a contribution from the ESE direction which would possibly originate from industrial sources along the lakeshore. It is unlikely that any significant contribution of measured SO_2 came from the DYEC. The Courtice Station pollution rose in **Figure 7** shows that <0.01% of the 5-min SO_2 events which are elevated >67 ppb occurred from the ESE and E directions. The conclusion about the sources is the same as **Figure 6**, and it is unlikely that any significant contribution of measured SO_2 came from the DYEC.

Durham Region staff have provided a Technical Memorandum summarizing the DYEC SO_2 continuous emissions monitoring system (CEMS) data during the exceedance events recorded at the Courtice and Rundle Road Ambient Monitoring Stations for Q4, which is included in **Appendix F**. The Memorandum indicates that based on the in-stack concentration levels measured by the CEMS, that there were no unusual levels in SO_2 emissions during the ambient Station exceedance events and that the facility's contribution to ambient air quality would be expected to be quite low.

5.4.2 Rundle Road Station Results

Data recovery levels were high for sulphur dioxide (99.7% valid data). Monitoring results were compared to the AAQC for 10-minute and 1-hour rolling average periods. The highest SO_2 value seen among the 10-min rolling averages was 43.3 ppb, which is 64.6% of the AAQC. The highest SO_2 value seen among the 1-hour rolling averages was 29.9 ppb, which is 74.8% of the AAQC. There were no exceedance events of the rolling 10-minute AAQC or the rolling 1-hour AAQC.

The SO_2 statistical results are summarized in **Table 5** above. A pollution rose is presented in **Figure 6** for the Rundle Road Station during Q4 composed of hourly average SO_2 concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation. A pollution rose is presented in **Figure 7** for the Rundle Road Station during Q4 composed of 5-minute average SO_2 concentrations with levels below 67 ppb omitted to illustrate directionality of exceedance concentrations.

The Rundle Road Station pollution rose in **Figure 6** shows that the majority of elevated SO_2 events at the Rundle Road Station occurred when winds were from the ESE. The pollution rose indicates that the DYEC was a not major contributor to SO_2 levels at the station and that the levels may be related to other industrial activity. The Rundle Road Station pollution rose in **Figure 7** shows that no 5-min SO_2 events occurred which had elevated >67 ppb concentrations. The conclusion about the sources is the same as **Figure 6** and it is unlikely that any significant contribution of measured SO_2 came from the DYEC.

Figure 6. Pollution Roses of Hourly Average SO_2 Concentrations – October to December 2020

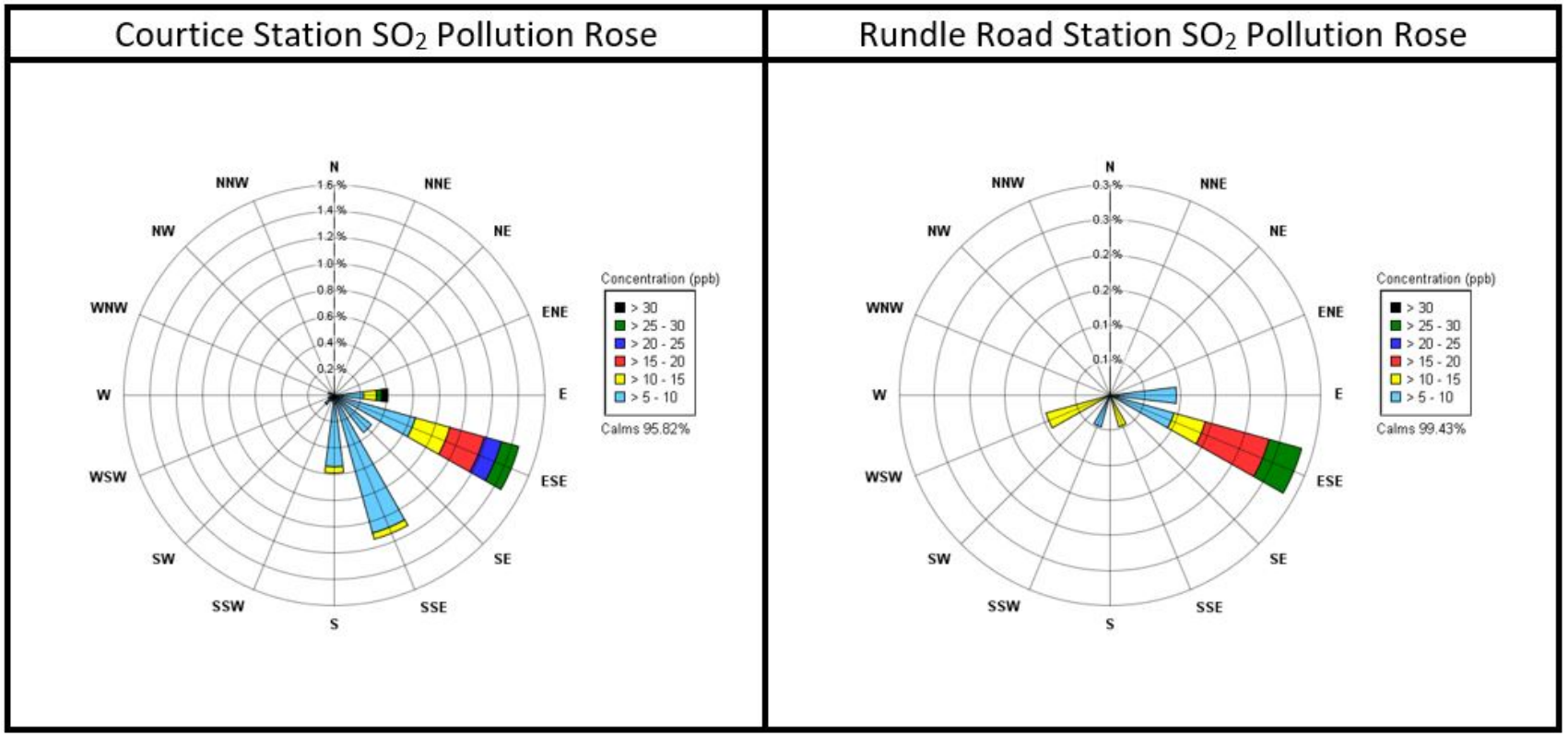
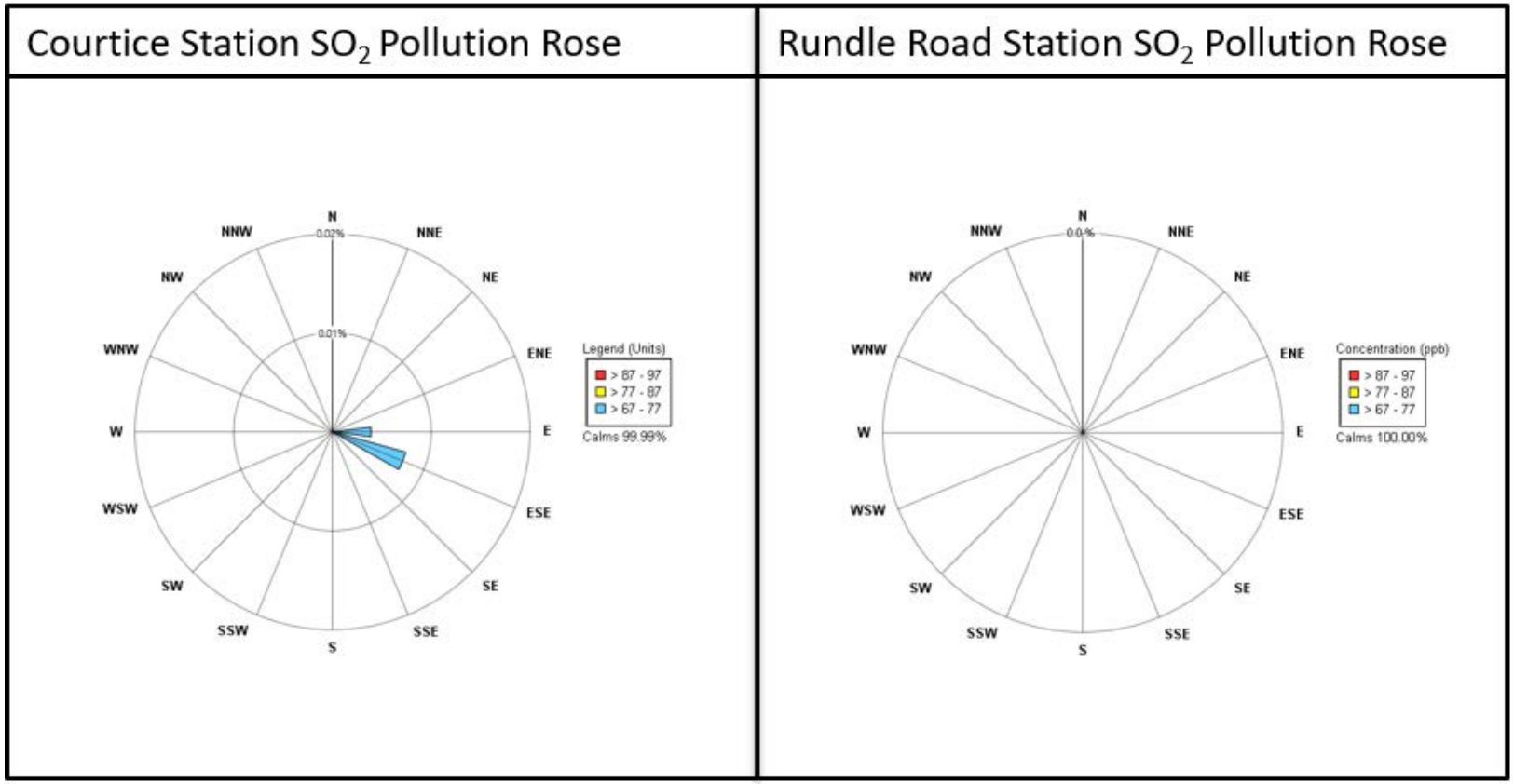


Figure 7. Pollution Roses of 5-minute Average SO_2 Concentrations >67 ppb – October to December 2020



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 (99.8% valid data). There is no 1-hour AAQC or standard for $PM_{2.5}$, but there is a 24-hour CAAQS of 27 µg/m^3 for the 3-year average of the annual 98th percentile 24-hour concentrations, and 8.8 µg/m^3 for the 3-year average of the annual average concentrations (in effect as of 2020). Note that since the reported data is only quarterly and the CAAQS is applicable to 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 rolling averages was 35.7 µg/m^3 and the highest value seen among the 24-hour rolling averages was 28.6 µg/m^3. The results are summarized in **Table 4** above. A pollution rose is presented in **Figure 8** for the Courtice Station during Q4 composed of hourly average $PM_{2.5}$ concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 µg/m^3 were omitted from the graphic wind rose representation.

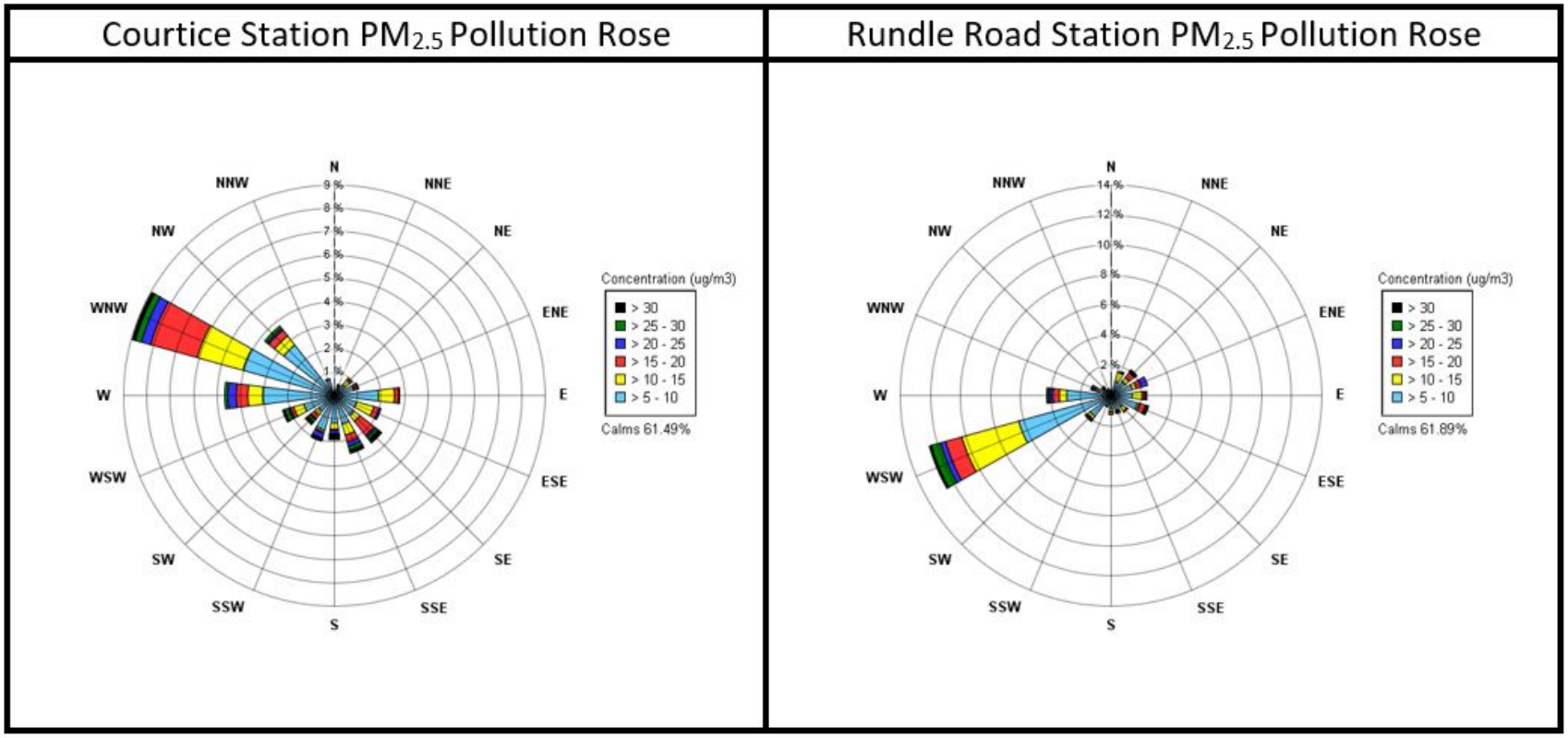
The Courtice Station pollution rose in **Figure 8** shows that the majority of elevated $PM_{2.5}$ events at Courtice were largely from the W-NW. Elevated $PM_{2.5}$ measurements were likely related to urban background, roadway emissions and other nearby industrial sources.

5.5.2 Rundle Road Station Results

Data recovery levels were high for particulate matter less than 2.5 microns (99.8% valid data). The highest $PM_{2.5}$ value seen among the 1-hour rolling averages was 59.3 µg/m^3 and the highest value seen among the 24-hour rolling averages was 23.1 µg/m^3. The results are summarized in **Table 5** above. A pollution rose is presented in **Figure 8** for the Rundle Road Station during Q4 composed of hourly average $PM_{2.5}$ concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 µg/m^3 were omitted from the graphic wind rose representation.

The Rundle Road pollution rose in **Figure 8** shows that the majority of elevated $PM_{2.5}$ events at the Rundle Road Station occurred when winds were from the WSW, which is in line with high traffic areas and urban background, with a possible contribution from the DYEC.

Figure 8. Pollution Roses of Hourly Average $PM_{2.5}$ Concentrations – October to December 2020



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 Q4 with the sample days being: October 6, 12, 18, 24, 30, November 5, 11, 17, 23, 29 and December 5, 11, 17, 23, 29.

5.6.1 Courtice Station Results

Data recovery levels were high for the TSP sampler at the Courtice Station (100% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for TSP, mercury or metals during Q4. **Table 7** is a summary of the statistics for this station.

Table 7: Summary of TSP Sampler Courtice Station

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	µg/m³	*120*	*120*	0	14.79	16.48	6.25	33.91	21.73	23.80	33.91	15	100
Total Mercury (Hg)	µg/m³	*2*	*2*	0	6.36E-06	8.18E-06	2.89E-06	1.60E-05	1.43E-05	1.57E-05	1.60E-05	15	100
Aluminum (Al)	µg/m³	*4.8*	-	0	7.79E-02	9.07E-02	2.77E-02	1.75E-01	1.60E-01	1.75E-01	1.53E-01	15	100
Antimony (Sb)	µg/m³	*25*	*25*	0	6.08E-04	7.36E-04	2.98E-04	2.61E-03	6.49E-04	2.61E-03	1.41E-03	15	100
Arsenic (As)	µg/m³	*0.3*	*0.3*	0	9.56E-04	1.00E-03	8.67E-04	2.59E-03	8.94E-04	2.59E-03	9.09E-04	15	100
Barium (Ba)	µg/m³	*10*	*10*	0	4.44E-03	4.89E-03	1.80E-03	9.15E-03	5.32E-03	8.43E-03	9.15E-03	15	100
Beryllium (Be)	µg/m³	*0.01*	*0.01*	0	2.97E-05	2.97E-05	2.89E-05	3.03E-05	2.98E-05	3.02E-05	3.03E-05	15	100
Bismuth (Bi)	µg/m³	-	-	-	5.35E-04	5.35E-04	5.20E-04	5.45E-04	5.36E-04	5.43E-04	5.45E-04	15	100
Boron (B)	µg/m³	*120*	-	0	1.19E-02	1.19E-02	1.16E-02	1.21E-02	1.19E-02	1.21E-02	1.21E-02	15	100
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	0	7.29E-04	9.71E-04	5.78E-04	5.45E-03	5.96E-04	5.45E-03	6.06E-04	15	100
Chromium (Cr)	µg/m³	*0.5*	-	0	3.02E-03	3.28E-03	1.47E-03	4.64E-03	3.82E-03	4.64E-03	3.94E-03	15	100
Cobalt (Co)	µg/m³	*0.1*	*0.1*	0	5.94E-04	5.94E-04	5.78E-04	6.06E-04	5.96E-04	6.04E-04	6.06E-04	15	100
Copper (Cu)	µg/m³	*50*	-	0	1.48E-02	1.88E-02	5.25E-03	4.70E-02	1.34E-02	4.38E-02	4.70E-02	15	100
Iron (Fe)	µg/m³	*4*	-	0	2.44E-01	2.83E-01	8.35E-02	7.16E-01	4.85E-01	7.16E-01	3.88E-01	15	100
Lead (Pb)	µg/m³	*0.5*	*0.5*	0	2.01E-03	2.32E-03	8.67E-04	5.03E-03	3.71E-03	3.34E-03	5.03E-03	15	100
Magnesium (Mg)	µg/m³	-	-	-	1.28E-01	1.47E-01	3.00E-02	3.11E-01	2.03E-01	3.11E-01	2.49E-01	15	100
Manganese (Mn)	µg/m³	*0.4*	-	0	6.63E-03	7.74E-03	1.98E-03	1.60E-02	1.19E-02	1.60E-02	1.01E-02	15	100
Molybdenum (Mo)	µg/m³	*120*	-	0	8.92E-04	1.05E-03	2.94E-04	3.01E-03	8.34E-04	3.01E-03	1.82E-03	15	100
Nickel (Ni)	µg/m³	*0.2*	-	0	1.57E-03	1.70E-03	8.77E-04	2.95E-03	1.85E-03	2.95E-03	1.94E-03	15	100
Phosphorus (P)	µg/m³	-	-	-	2.23E-01	2.23E-01	2.17E-01	2.27E-01	2.23E-01	2.26E-01	2.27E-01	15	100
Selenium (Se)	µg/m³	*10*	*10*	0	2.97E-03	2.97E-03	2.89E-03	3.03E-03	2.98E-03	3.02E-03	3.03E-03	15	100
Silver (Ag)	µg/m³	*1*	*1*	0	2.97E-04	2.97E-04	2.89E-04	3.03E-04	2.98E-04	3.02E-04	3.03E-04	15	100
Strontium (Sr)	µg/m³	*120*	-	0	2.32E-03	2.80E-03	8.77E-04	5.88E-03	5.66E-03	3.87E-03	5.88E-03	15	100
Thallium (Tl)	µg/m³	-	-	-	2.67E-05	2.67E-05	2.60E-05	2.73E-05	2.68E-05	2.72E-05	2.73E-05	15	100
Tin (Sn)	µg/m³	*10*	*10*	0	7.30E-04	8.53E-04	2.99E-04	2.47E-03	8.25E-04	2.47E-03	1.33E-03	15	100
Titanium (Ti)	µg/m³	*120*	-	0	4.20E-03	4.64E-03	3.22E-03	1.07E-02	8.24E-03	7.03E-03	1.07E-02	15	100
Uranium (Ur)	µg/m³	*1.5*	-	0	2.97E-05	2.97E-05	2.89E-05	3.03E-05	2.98E-05	3.02E-05	3.03E-05	15	100
Vanadium (V)	µg/m³	*2*	*1*	0	1.49E-03	1.49E-03	1.45E-03	1.52E-03	1.49E-03	1.51E-03	1.52E-03	15	100
Zinc (Zn)	µg/m³	*120*	-	0	2.68E-02	3.30E-02	9.02E-03	8.79E-02	3.07E-02	8.79E-02	7.09E-02	15	100
Zirconium (Zr)	µg/m³	*20*	-	0	5.94E-04	5.94E-04	5.78E-04	6.06E-04	5.96E-04	6.04E-04	6.06E-04	15	100

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 Q4. **Table 8** is a summary of the Station statistics.

Table 8: Summary of TSP Sampler Rundle Road Station

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	µg/m³	*120*	*120*	0	18.0	19.4	8.5	33.7	24.3	33.7	33.0	15	100
Total Mercury (Hg)	µg/m³	*2*	*2*	0	6.75E-06	8.77E-06	2.88E-06	2.26E-05	1.68E-05	9.63E-06	2.26E-05	15	100
Aluminum (Al)	µg/m³	*4.8*	-	0	1.09E-01	1.22E-01	3.93E-02	2.47E-01	1.90E-01	2.47E-01	1.72E-01	15	100
Antimony (Sb)	µg/m³	*25*	*25*	0	5.42E-04	6.36E-04	2.58E-04	1.44E-03	8.68E-04	1.13E-03	1.44E-03	15	100
Arsenic (As)	µg/m³	*0.3*	*0.3*	0	1.10E-03	1.63E-03	8.63E-04	1.11E-02	1.11E-02	9.21E-04	1.81E-03	15	100
Barium (Ba)	µg/m³	*10*	*10*	0	5.16E-03	5.69E-03	2.30E-03	1.08E-02	7.34E-03	9.87E-03	1.08E-02	15	100
Beryllium (Be)	µg/m³	*0.01*	*0.01*	0	2.95E-05	2.95E-05	2.88E-05	3.07E-05	2.94E-05	3.07E-05	3.02E-05	15	100
Bismuth (Bi)	µg/m³	-	-	-	5.31E-04	5.31E-04	5.18E-04	5.53E-04	5.29E-04	5.53E-04	5.44E-04	15	100
Boron (B)	µg/m³	*120*	-	0	1.18E-02	1.18E-02	1.15E-02	1.23E-02	1.18E-02	1.23E-02	1.21E-02	15	100
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	0	6.64E-04	7.87E-04	5.75E-04	3.55E-03	5.88E-04	3.55E-03	6.05E-04	15	100
Chromium (Cr)	µg/m³	*0.5*	-	0	3.00E-03	3.26E-03	1.45E-03	4.39E-03	4.08E-03	4.39E-03	3.92E-03	15	100
Cobalt (Co)	µg/m³	*0.1*	*0.1*	0	6.20E-04	6.35E-04	5.75E-04	1.27E-03	5.88E-04	6.14E-04	1.27E-03	15	100
Copper (Cu)	µg/m³	*50*	-	0	1.82E-02	2.50E-02	6.89E-03	7.30E-02	5.03E-02	7.30E-02	1.49E-02	15	100
Iron (Fe)	µg/m³	*4*	-	0	2.77E-01	3.01E-01	1.03E-01	5.45E-01	4.27E-01	5.45E-01	3.88E-01	15	100
Lead (Pb)	µg/m³	*0.5*	*0.5*	0	1.78E-03	2.16E-03	8.63E-04	4.80E-03	4.54E-03	3.38E-03	4.80E-03	15	100
Magnesium (Mg)	µg/m³	-	-	-	1.69E-01	1.83E-01	7.86E-02	3.67E-01	2.33E-01	3.67E-01	2.26E-01	15	100
Manganese (Mn)	µg/m³	*0.4*	-	0	7.82E-03	8.71E-03	3.39E-03	1.96E-02	1.17E-02	1.96E-02	1.15E-02	15	100
Molybdenum (Mo)	µg/m³	*120*	-	0	9.25E-04	1.01E-03	2.90E-04	1.74E-03	1.17E-03	1.74E-03	1.46E-03	15	100
Nickel (Ni)	µg/m³	*0.2*	-	0	1.40E-03	1.54E-03	8.69E-04	2.26E-03	2.10E-03	2.26E-03	2.11E-03	15	100
Phosphorus (P)	µg/m³	-	-	-	2.21E-01	2.21E-01	2.16E-01	2.30E-01	2.20E-01	2.30E-01	2.27E-01	15	100
Selenium (Se)	µg/m³	*10*	*10*	0	2.95E-03	2.95E-03	2.88E-03	3.07E-03	2.94E-03	3.07E-03	3.02E-03	15	100
Silver (Ag)	µg/m³	*1*	*1*	0	2.95E-04	2.95E-04	2.88E-04	3.07E-04	2.94E-04	3.07E-04	3.02E-04	15	100
Strontium (Sr)	µg/m³	*120*	-	0	3.93E-03	4.28E-03	2.00E-03	7.28E-03	6.58E-03	7.28E-03	5.22E-03	15	100
Thallium (Tl)	µg/m³	-	-	-	2.66E-05	2.66E-05	2.59E-05	2.76E-05	2.65E-05	2.76E-05	2.72E-05	15	100
Tin (Sn)	µg/m³	*10*	*10*	0	7.13E-04	8.06E-04	2.94E-04	1.64E-03	8.15E-04	1.64E-03	1.52E-03	15	100
Titanium (Ti)	µg/m³	*120*	-	0	5.86E-03	6.60E-03	3.20E-03	1.20E-02	1.04E-02	1.20E-02	1.04E-02	15	100
Uranium (Ur)	µg/m³	*1.5*	-	0	2.95E-05	2.95E-05	2.88E-05	3.07E-05	2.94E-05	3.07E-05	3.02E-05	15	100
Vanadium (V)	µg/m³	*2*	*1*	0	1.48E-03	1.48E-03	1.44E-03	1.54E-03	1.47E-03	1.54E-03	1.51E-03	15	100
Zinc (Zn)	µg/m³	*120*	-	0	2.28E-02	2.82E-02	8.95E-03	6.26E-02	3.93E-02	6.26E-02	4.51E-02	15	100
Zirconium (Zr)	µg/m³	*20*	-	0	5.90E-04	5.90E-04	5.75E-04	6.14E-04	5.88E-04	6.14E-04	6.05E-04	15	100

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 Q4 with the sample days being: October 6, 18, 30, November 11, 23 and December 5, 17 and 29.

5.7.1 Courtice Station Results

Data recovery levels were high for the PAH results at the Courtice Station (100% valid data). There was one (1) exceedance of the Benzo(a) Pyrene AAQC on December 17th. There were no other exceedances of any of the AAQC's or HHRA Criteria. According to the Courtice meteorological data, the Courtice Station was not upwind or downwind of the DYEC during the sampling period. Since the winds were predominantly coming from the SSE, it is likely that the measured BaP exceedances may be attributed to sources other than the Energy Centre operations such as other activity along the lakeshore and possible long range transport across the lake. The exceedance documentation is attached in **Appendix E**. **Table 9** outlines the statistics summary for this station.

Table 9: Statistics Summary of PAH Results for Courtice Station

Contaminant	Units	MECP Criteria (µg/m³)	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	ng/m³	12000	0	3.78E+00	1.57E+00	6.95E+00	2.33E+00	6.95E+00	6.18E+00	8	100
2-Methylnaphthalene	ng/m³	10000	0	5.01E+00	2.23E+00	9.51E+00	3.44E+00	9.51E+00	7.13E+00	8	100
Acenaphthene	ng/m³	-	-	5.56E-01	4.07E-01	9.70E-01	9.70E-01	6.12E-01	5.30E-01	8	100
Acenaphthylene	ng/m³	3500	0	3.70E-01	1.38E-02	1.62E+00	1.79E-01	2.90E-01	1.62E+00	8	100
Anthracene	ng/m³	200	0	8.80E-02	3.44E-02	1.83E-01	8.10E-02	1.38E-01	1.83E-01	8	100
Benzo(a)Anthracene	ng/m³	-	-	2.93E-02	1.15E-02	9.46E-02	2.31E-02	1.89E-02	9.46E-02	8	100
Benzo(a)fluorene	ng/m³	-	-	4.37E-02	1.46E-02	1.26E-01	2.93E-02	4.14E-02	1.26E-01	8	100
Benzo(a)Pyrene (Historically High)	ng/m³	0.05	1	3.56E-02	1.52E-02	9.24E-02	3.27E-02	3.68E-02	9.24E-02	8	100
Benzo(b)Fluoranthene	ng/m³	-	-	8.86E-02	4.59E-02	2.82E-01	7.14E-02	4.98E-02	2.82E-01	8	100
Benzo(b)fluorene	ng/m³	-	-	3.92E-02	9.94E-03	9.94E-02	5.48E-02	3.07E-02	9.94E-02	8	100
Benzo(e)Pyrene	ng/m³	-	-	5.97E-02	2.58E-02	1.97E-01	4.21E-02	4.73E-02	1.97E-01	8	100
Benzo(g,h,i)Perylene	ng/m³	-	-	6.01E-02	2.50E-02	2.00E-01	4.18E-02	5.43E-02	2.00E-01	8	100
Benzo(k)Fluoranthene	ng/m³	-	-	6.82E-02	2.96E-02	2.15E-01	5.26E-02	4.63E-02	2.15E-01	8	100
Biphenyl	ng/m³	-	-	1.82E+00	1.06E+00	2.88E+00	1.36E+00	2.88E+00	2.73E+00	8	100
Chrysene	ng/m³	-	-	1.15E-01	3.91E-02	4.10E-01	9.05E-02	7.01E-02	4.10E-01	8	100
Dibenzo(a,h)Anthracene	ng/m³	-	-	9.04E-03	2.56E-03	2.02E-02	4.70E-03	1.82E-02	2.02E-02	8	100
Fluoranthene	ng/m³	-	-	4.13E-01	2.16E-01	8.39E-01	3.88E-01	4.79E-01	8.39E-01	8	100
Fluorene	ng/m³	-	-	8.44E-01	4.97E-01	1.16E+00	1.16E+00	8.35E-01	1.06E+00	8	100
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	6.78E-02	2.76E-02	1.94E-01	8.59E-02	4.09E-02	1.94E-01	8	100
Naphthalene	ng/m³	22500	0	2.15E+01	1.45E+01	3.47E+01	1.59E+01	2.65E+01	3.47E+01	8	100
o-Terphenyl	ng/m³	-	-	1.44E-02	4.68E-03	2.23E-02	2.23E-02	2.22E-02	1.83E-02	8	100
Perylene	ng/m³	-	-	4.02E-03	3.03E-04	1.84E-02	4.43E-03	3.26E-04	1.84E-02	8	100
Phenanthrene	ng/m³	-	-	1.63E+00	2.67E-01	2.60E+00	2.60E+00	1.79E+00	2.49E+00	8	100
Pyrene	ng/m³	-	-	2.62E-01	1.45E-01	6.09E-01	1.79E-01	3.01E-01	6.09E-01	8	100
Tetralin	ng/m³	-	-	2.71E+00	9.05E-01	7.10E+00	2.28E+00	7.10E+00	2.15E+00	8	100
Total PAH	ng/m³	-	-	3.96E+01	2.62E+01	6.18E+01	2.81E+01	5.48E+01	6.18E+01	8	100

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

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 two (2) exceedances of the Benzo(a) Pyrene AAQC which occurred on November 11th and December 29th. There were no other exceedances of any of the AAQC's or HHRA Criteria. According to the Rundle meteorological data, the Rundle Road Station was downwind of the DYEC during part of the November 11th sampling period. Since the winds were predominantly coming from the Southwest and West-southwest, it is likely that the measured BaP exceedances may be partially attributed to the DYEC and sources other than the Energy Centre operations. According to the Rundle Road meteorological data, the Rundle Station was not upwind or downwind of the DYEC during the December 29th sampling period. Since the winds were predominantly coming from the West through North-northwest, it is likely that the measured BaP exceedances may be attributed to sources other than the Energy Centre operations. The exceedance documentation is attached in **Appendix E**. **Table 10** outlines the statistics summary for this station.

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

Contaminant	Units	MECP Criteria (µg/m³)	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	ng/m³	*12000*	0	4.69E+00	2.36E+00	7.73E+00	4.06E+00	7.73E+00	5.25E+00	8	100
2-Methylnaphthalene	ng/m³	*10000*	0	6.32E+00	3.04E+00	1.08E+01	6.50E+00	1.08E+01	6.07E+00	8	100
Acenaphthene	ng/m³	-	-	1.49E+00	2.03E-01	3.68E+00	3.68E+00	3.24E+00	4.06E-01	8	100
Acenaphthylene	ng/m³	*3500*	0	3.12E-01	2.41E-02	8.55E-01	3.13E-01	3.38E-01	8.55E-01	8	100
Anthracene	ng/m³	*200*	0	1.29E-01	7.25E-02	2.39E-01	2.06E-01	2.39E-01	1.19E-01	8	100
Benzo(a)Anthracene	ng/m³	-	-	4.14E-02	1.76E-02	1.59E-01	2.25E-02	2.18E-02	1.59E-01	8	100
Benzo(a)fluorene	ng/m³	-	-	4.63E-02	2.11E-02	1.05E-01	3.44E-02	4.66E-02	1.05E-01	8	100
Benzo(a)Pyrene (Historically High)	ng/m³	*0.05*	2	5.44E-02	2.21E-02	1.82E-01	3.99E-02	5.34E-02	1.82E-01	8	100
Benzo(b)Fluoranthene	ng/m³	-	-	1.00E-01	4.89E-02	2.36E-01	9.75E-02	5.59E-02	2.36E-01	8	100
Benzo(b)fluorene	ng/m³	-	-	4.18E-02	1.41E-02	8.11E-02	8.11E-02	2.47E-02	6.86E-02	8	100
Benzo(e)Pyrene	ng/m³	-	-	6.76E-02	3.13E-02	1.74E-01	3.87E-02	5.41E-02	1.74E-01	8	100
Benzo(g,h,i)Perylene	ng/m³	-	-	6.60E-02	3.04E-02	1.81E-01	4.92E-02	5.89E-02	1.81E-01	8	100
Benzo(k)Fluoranthene	ng/m³	-	-	7.98E-02	2.70E-02	2.22E-01	7.31E-02	5.35E-02	2.22E-01	8	100
Biphenyl	ng/m³	-	-	4.34E+00	1.31E+00	1.93E+01	2.25E+00	1.93E+01	2.95E+00	8	100
Chrysene	ng/m³	-	-	1.40E-01	6.67E-02	3.40E-01	9.54E-02	8.40E-02	3.40E-01	8	100
Dibenzo(a,h)Anthracene	ng/m³	-	-	8.27E-03	4.40E-03	1.74E-02	5.63E-03	5.14E-03	1.74E-02	8	100
Fluoranthene	ng/m³	-	-	5.70E-01	2.65E-01	8.61E-01	7.71E-01	8.61E-01	5.94E-01	8	100
Fluorene	ng/m³	-	-	1.48E+00	4.90E-01	2.81E+00	2.81E+00	2.75E+00	8.81E-01	8	100
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	8.11E-02	3.10E-02	1.71E-01	1.37E-01	4.23E-02	1.71E-01	8	100
Naphthalene	ng/m³	*22500*	0	2.52E+01	2.00E+01	3.02E+01	2.50E+01	3.02E+01	2.83E+01	8	100
o-Terphenyl	ng/m³	-	-	1.48E-02	5.04E-03	2.52E-02	2.52E-02	2.06E-02	1.14E-02	8	100
Perylene	ng/m³	-	-	7.23E-03	3.02E-04	3.05E-02	4.12E-03	1.65E-03	3.05E-02	8	100
Phenanthrene	ng/m³	-	-	2.90E+00	1.20E+00	5.60E+00	5.47E+00	5.60E+00	1.83E+00	8	100
Pyrene	ng/m³	-	-	3.45E-01	1.88E-01	5.28E-01	3.62E-01	4.01E-01	5.28E-01	8	100
Tetralin	ng/m³	-	-	4.15E+00	1.49E+00	1.68E+01	3.13E+00	1.68E+01	2.02E+00	8	100
Total PAH	ng/m³	-	-	5.26E+01	3.30E+01	9.04E+01	5.18E+01	9.04E+01	5.05E+01	8	100

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

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 Q4 with the sample days being: October 6, October 30, November 23 and December 17, 2020.

5.8.1 Courtice Station Results

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

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

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	No. > Criteria	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	pg/m^3	-	-	-	1.45E-03	3.66E-04	2.79E-03	2.79E-03	3.66E-04	2.21E-03	4	100
1,2,3,7,8-PeCDD	pg/m^3	-	-	-	4.59E-03	1.64E-03	1.20E-02	2.94E-03	1.83E-03	1.20E-02	4	100
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	-	2.79E-04	1.38E-04	5.36E-04	2.13E-04	2.29E-04	5.36E-04	4	100
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	-	8.56E-04	1.80E-04	2.32E-03	5.85E-04	3.35E-04	2.32E-03	4	100
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	-	4.36E-04	1.33E-04	1.28E-03	1.97E-04	1.33E-04	1.28E-03	4	100
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	-	1.40E-03	1.20E-04	3.82E-03	7.18E-04	9.39E-04	3.82E-03	4	100
OCDD	pg/m^3	-	-	-	1.29E-04	3.18E-05	3.04E-04	8.82E-05	9.13E-05	3.04E-04	4	100
2,3,7,8-TCDF	pg/m^3	-	-	-	1.74E-04	1.14E-04	2.37E-04	2.30E-04	1.14E-04	2.37E-04	4	100
1,2,3,7,8-PeCDF	pg/m^3	-	-	-	4.91E-05	2.79E-05	6.62E-05	5.74E-05	2.79E-05	6.62E-05	4	100
2,3,4,7,8-PeCDF	pg/m^3	-	-	-	6.66E-04	2.25E-04	1.26E-03	4.18E-04	1.26E-03	7.57E-04	4	100
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	-	2.10E-04	6.03E-05	4.29E-04	2.13E-04	1.39E-04	4.29E-04	4	100
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	-	2.16E-04	1.83E-04	3.00E-04	1.97E-04	1.83E-04	3.00E-04	4	100
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	-	4.07E-04	8.38E-05	8.17E-04	2.13E-04	5.12E-04	8.17E-04	4	100
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	-	1.96E-04	6.40E-05	2.52E-04	2.46E-04	6.40E-05	2.52E-04	4	100
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	-	1.10E-04	5.28E-05	1.70E-04	1.18E-04	1.70E-04	1.01E-04	4	100
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	-	3.33E-05	1.47E-05	5.39E-05	2.62E-05	3.84E-05	5.39E-05	4	100
OCDF	pg/m^3	-	-	-	6.34E-06	2.36E-06	1.03E-05	1.03E-05	6.51E-06	6.15E-06	4	100
Total Toxic Equivalency	pg TEQ/m^3	*0.1 1[1]*	-	0	1.12E-02	6.13E-03	2.54E-02	6.81E-03	6.44E-03	2.54E-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
Arithmetic mean is not provided as data validity criteria were not met

5.8.2 Rundle Road Station Results

Data recovery levels were high for the D&F 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 D&F's during Q4. **Table 12** is a summary of the statistics for this station.

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

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	No. > Criteria	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	pg/m^3	-	-	-	1.83E-03	4.68E-04	4.27E-03	2.04E-03	4.68E-04	4.27E-03	4	100
1,2,3,7,8-PeCDD	pg/m^3	-	-	-	3.39E-03	1.79E-03	6.49E-03	2.04E-03	3.23E-03	6.49E-03	4	100
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	-	1.07E-03	1.89E-04	3.16E-03	4.51E-04	4.77E-04	3.16E-03	4	100
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	-	8.83E-04	1.57E-04	2.85E-03	2.69E-04	2.57E-04	2.85E-03	4	100
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	-	1.15E-03	1.73E-04	3.01E-03	6.81E-04	7.49E-04	3.01E-03	4	100
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	-	1.14E-03	3.14E-04	2.06E-03	1.10E-03	1.10E-03	2.06E-03	4	100
OCDD	pg/m^3	-	-	-	1.74E-04	3.28E-05	4.89E-04	9.40E-05	8.18E-05	4.89E-04	4	100
2,3,7,8-TCDF	pg/m^3	-	-	-	2.46E-04	4.78E-05	4.59E-04	2.04E-04	2.75E-04	4.59E-04	4	100
1,2,3,7,8-PeCDF	pg/m^3	-	-	-	7.71E-05	3.49E-05	1.52E-04	8.02E-05	4.12E-05	1.52E-04	4	100
2,3,4,7,8-PeCDF	pg/m^3	-	-	-	1.29E-03	6.18E-04	2.18E-03	7.55E-04	1.59E-03	2.18E-03	4	100
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	-	3.82E-04	1.66E-04	8.54E-04	2.83E-04	1.66E-04	8.54E-04	4	100
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	-	3.90E-04	6.57E-05	8.07E-04	2.67E-04	4.20E-04	8.07E-04	4	100
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	-	6.68E-04	1.00E-04	2.17E-03	2.99E-04	1.01E-04	2.17E-03	4	100
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	-	4.71E-04	2.33E-04	1.03E-03	3.30E-04	2.33E-04	1.03E-03	4	100
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	-	1.18E-04	3.88E-05	2.06E-04	4.72E-05	1.79E-04	2.06E-04	4	100
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	-	5.85E-05	3.17E-06	1.58E-04	4.56E-05	3.17E-06	1.58E-04	4	100
OCDF	pg/m^3	-	-	-	6.94E-06	2.45E-06	1.66E-05	5.19E-06	2.45E-06	1.66E-05	4	100
Total Toxic Equivalency	pg TEQ/m^3	*0.1* *1*[1]	-	0	1.33E-02	6.36E-03	3.04E-02	7.27E-03	9.38E-03	3.04E-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 Continuous Monitoring

On November 11th during the November calibration visit, a slight flow problem was identified in the SO_2 monitor. The issue was traced back to a clog in a solenoid valve. The clog was cleared out and the instrument recalibrated. The instrument response was within the 10% span tolerance during the takeout calibration and no data was lost due to this malfunction. The sample intake manifold was cleaned as thoroughly as possible in an attempt to prevent the issue from recurring, and the instrument was left in good working order.

6.2 Discrete Monitoring

In Early November, permanent ladders were installed at both stations as well as new bird deterrents over the Hi-Vol openings.

7 CONCLUSIONS

This Q4 report provides a summary of the ambient air quality data collected at the Courtice and Rundle Road Stations. Throughout this monitoring period there were three (3) exceedances of the AAQC for Benzo(a) Pyrene which occurred on December 17th at the Courtice Station and November 11th and December 29th at the Rundle Road Station. There was one (1) exceedance event of the rolling 10-minute SO_2 AAQC at the Courtice Station which occurred on December 18th at 10:20, and no exceedance events at the Rundle Road Station. Data recovery rates were acceptable and valid for all measured Q4 continuous parameters and all discrete parameters.

8 REFERENCES

1. Canadian Council of Ministers of the Environment (CCME), 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. Canadian Council of Ministers of the Environment (CCME), 2019. Guidance Document on Air Zone Management. PN 1593 978-1-77202-050-2 PDF

3. Ontario Ministry of the Environment and Climate Change, 2018. [Technical Assessment and Standards Development Branch] Ontario Air Standards for Sulphur Dioxide (SO_2). [Online]

4. 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
2020 Q4
STATISTICS

Table A1: 2020 Summary Statistics for Q4

Courtice Monitoring Station Data Statistics	Maximum 10 min Rolling Mean	Maximum 1 hr Rolling Mean					Maximum 24 hr Rolling Mean					Monthly Mean					% valid hours				
Compound	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	$PM_{2.5}$	NO_x	NO	NO_2	SO_2
Units	ppb	($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				(%)				
AAQC/CAAQS	67				200	40	27[A]			100											
October	66.3	26.4	51.6	37.7	27.2	36.7	11.6	21.8	13.0	13.7	6.3	3.6	6.4	2.0	4.5	1.9	99.7	99.7	99.7	99.7	99.7
November	43.0	35.7	51.7	35.4	32.9	17.0	28.6	21.3	5.7	16.3	3.5	7.5	6.0	1.2	4.9	1.1	99.9	99.3	99.3	99.3	99.6
December	70.0	34.0	80.2	55.3	34.9	36.7	20.7	32.2	15.6	16.6	4.1	6.8	7.1	1.5	5.8	0.9	99.7	99.6	99.6	99.6	99.7
Q4 Arithmetic Mean												6.0	6.5	1.6	5.0	1.3	99.8	99.5	99.5	99.5	99.7

Rundle Monitoring Station Data Statistics	Maximum 10 min Rolling Mean	Maximum 1 hr Rolling Mean					Maximum 24 hr Rolling Mean					Monthly Mean					% valid hours				
Compound	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	$PM_{2.5}$	NO_x	NO	NO_2	SO_2
Units	ppb	($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				($\mu g/m^3$)	ppb				(%)				
AAQC/CAAQS	67				200	40	27[A]			100											
October	43.3	59.3	37.7	15.9	21.8	29.9	8.7	9.1	2.7	8.3	3.1	3.3	3.7	0.8	3.1	0.2	99.9	99.7	99.7	99.7	99.7
November	22.8	39.6	36.0	14.9	23.6	17.5	23.1	13.6	4.9	10.8	2.4	6.8	6.1	0.9	5.4	0.4	99.7	99.6	99.6	99.6	99.7
December	31.1	41.8	35.6	23.2	25.1	15.3	21.7	16.6	4.3	13.7	0.8	6.7	5.7	0.8	5.2	0.3	99.9	99.7	99.7	99.7	99.7
Q4 Arithmetic Mean												5.6	5.2	0.9	4.6	0.3	99.8	99.7	99.7	99.7	99.7

Event Statistics	Rolling Mean > 10 min AAQC for Courtice	Rolling Mean > 10 min AAQC for Rundle	Rolling Mean > 1 hr AAQC for Courtice			Rolling Mean > 1 hr AAQC for Rundle			Rolling Mean > 24 hr AAQC for Courtice Monitoring Station			Rolling Mean > 24 hr AAQC for Rundle Monitoring Station		
Compound	SO_2	SO_2	$PM_{2.5}$	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.			No.			No.		
October	0	0		0	0		0	0	N/A	0		N/A	0	
November	0	0		0	0		0	0	N/A	0		N/A	0	
December	1	0		0	0		0	0	N/A	0		N/A	0	
Q4 Total	1	0		0	0		0	0	N/A	0		N/A	0	

Courtice Station MET Statistics	Maximum 1 hr Mean					Minimum 1 hr Mean					Monthly Mean					Total	% valid hours					
Parameter	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain	WS	Temp	RH	Pres	Rain	Rain	WS	WD	Temp	RH	Pres	Rain
Units	(km/hr)	(°C)	(%)	"Hg	mm	(km/hr)	(°C)	(%)	"Hg	mm	(km/hr)	(°C)	(%)	"Hg	mm	mm	(%)					
October	32	20	97	30.2	2.8	0	-4	32	29.2	0.0	12	9	74	29.8	0.1	56.0	100.0	100.0	100.0	100.0	100.0	100.0
November	49	17	97	30.3	2.8	1	-6	43	29.0	0.0	12	6	72	29.8	0.1	57.8	99.9	99.9	100.0	100.0	100.0	100.0
December	43	8	97	30.2	2.6	0	-11	35	29.1	0.0	14	0	73	29.7	0.1	56.5	100.0	100.0	100.0	100.0	100.0	100.0
Q4 Arithmetic Mean											13	5	73	29.7	0.1	170.3	100.0	100.0	100.0	100.0	100.0	100.0

Rundle Station MET Statistics	Maximum 1 hr Mean				Minimum 1 hr Mean				Monthly Mean				Total	% valid hours				
Parameter	WS	Temp	RH	Rain	WS	Temp	RH	Rain	WS	Temp	RH	Rain	Rain	WS	WD	Temp	RH	Rain
Units	(km/hr)	(°C)	(%)	mm	(km/hr)	(°C)	(%)	mm	(km/hr)	(°C)	(%)	mm	mm	(%)				
October	27	21	100	3.1	0	-6	30	0.0	9	9	76	0.1	64.0	100.0	95.0	100.0	100.0	100.0
November	46	19	100	5.8	0	-6	42	0.0	11	6	73	0.1	61.0	100.0	97.6	100.0	100.0	100.0
December	32	8	100	3.1	0	-12	36	0.0	11	-1	76	0.1	59.3	98.1	96.0	100.0	100.0	100.0
Q4 Arithmetic Mean									11	5	75	0.1	184.3	99.4	96.2	100.0	100.0	100.0

Table A2: 2020 Q4 Station Courtice Monitoring Results for PM2.5

Data Statistics	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Rolling Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$
	No.	(ug/m^3)	(ug/m^3)	(ug/m^3)	No.	%
October	N/A	3.6	26.4	11.6	742	99.7
November	N/A	7.5	35.7	28.6	719	99.9
December	N/A	6.8	34.0	20.7	742	99.7

Table A3: 2020 Q4 Station Rundle Monitoring Results for PM2.5

Data Statistics	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$
	No.	(ug/m^3)	(ug/m^3)	(ug/m^3)	No.	%
October	N/A	3.3	59.3	8.7	743	99.9
November	N/A	6.8	39.6	23.1	718	99.7
December	N/A	6.7	41.8	21.7	743	99.9

Table A4: 2020 Q4 Station Courtice Monitoring Results for NOx

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Rolling Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO_x	NO_x	NO_x	NO_x	NO_x	NO_x	NO_x
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	6.4	51.6	21.8	742	99.7
November	N/A	N/A	6.0	51.7	21.3	715	99.3
December	N/A	N/A	7.1	80.2	32.2	741	99.6

Table A5: 2020 Q4 Station Rundle Monitoring Results for NOx

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Rolling Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO_x	NO_x	NO_x	NO_x	NO_x	NO_x	NO_x
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	3.7	37.7	9.1	742	99.7
November	N/A	N/A	6.1	36.0	13.6	717	99.6
December	N/A	N/A	5.7	35.6	16.6	742	99.7

Table A6: 2020 Q4 Station Courtice Monitoring Results for NO

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Rolling Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO	NO	NO	NO	NO	NO	NO
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	2.0	37.7	13.0	742	99.7
November	N/A	N/A	1.2	35.4	5.7	715	99.3
December	N/A	N/A	1.5	55.3	15.6	741	99.6

Table A7: 2020 Q4 Station Rundle Monitoring Results for NO

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Rolling Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO	NO	NO	NO	NO	NO	NO
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	0.8	15.9	2.7	742	99.7
November	N/A	N/A	0.9	14.9	4.9	717	99.6
December	N/A	N/A	0.8	23.2	4.3	742	99.7

Table A8: 2020 Q4 Station Courtice Monitoring Results for NO2

Data Statistics	Events > 1 hr AAQC	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Rolling Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	4.5	27.2	13.7	742	99.7
November	0	0	4.9	32.9	16.3	715	99.3
December	0	0	5.8	34.9	16.6	741	99.6

Table A9: 2020 Q4 Station Rundle Monitoring Results for NO2

Data Statistics	Events > 1 hr AAQC	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Rolling Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	3.1	21.8	8.3	742	99.7
November	0	0	5.4	23.6	10.8	717	99.6
December	0	0	5.2	25.1	13.7	742	99.7

Table A10: 2020 Q4 Station Courtice Monitoring Results for SO2

Data Statistics	Events > 10 min AAQC	Events > 1 hr AAQC	Arithmetic Mean	Maximum 10 min Rolling Mean	Maximum 1 hr Rolling 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	SO_2
	No.	No.	(ppb)	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	1.9	66.3	36.7	6.3	742	99.7
November	0	0	1.1	43.0	17.0	3.5	717	99.6
December	1	0	0.9	70.0	36.7	4.1	742	99.7

Table A11: 2020 Q4 Station Rundle Monitoring Results for SO2

Data Statistics	Events > 10 min AAQC	Events > 1 hr AAQC	Arithmetic Mean	Maximum 10 min Rolling Mean	Maximum 1 hr Rolling 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	SO_2
	No.	No.	(ppb)	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	0.2	43.3	29.9	3.1	742	99.7
November	0	0	0.4	22.8	17.5	2.4	718	99.7
December	0	0	0.3	31.1	15.3	0.8	742	99.7

Table A12: 2020 Q4 Courtice Meterological Station Windspeed Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Wind Speed	Wind Speed	Wind Speed	Wind Speed
	(km/hr)	(km/hr)	(km/hr)	(%)
October	31.6	0.4	11.6	100.0
November	48.9	1.0	12.3	99.9
December	43.3	0.2	13.7	100.0

Table A13: 2020 Q4 Rundle Meterological Station Windspeed Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Wind Speed	Wind Speed	Wind Speed	Wind Speed
	(km/hr)	(km/hr)	(km/hr)	(%)
October	27.1	0.2	9.0	100.0
November	45.9	0.1	11.5	100.0
December	32.3	0.3	11.1	98.1

Table A14: 2020 Q4 Courtice Meterological Station Wind Direction Data Summary

MET Statistics	% valid hours
Month	Wind Direction
	(%)
October	100.0
November	99.9
December	100.0

Table A15: 2020 Q4 Rundle Meterological Station Wind Direction Data Summary

MET Statistics	% valid hours
Month	Wind Direction
	(%)
October	95.0
November	97.6
December	96.0

Table A16: 2020 Q4 Courtice Meterological Station Temperature Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Temperature	Temperature	Temperature	Temperature
	(°C)	(°C)	(°C)	(%)
October	19.7	-4.4	9.2	100.0
November	17.1	-5.7	6.2	100.0
December	7.8	-10.9	0.0	100.0

Table A17: 2020 Q4 Rundle Meterological Station Temperature Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Temperature	Temperature	Temperature	Temperature
	(°C)	(°C)	(°C)	(%)
October	21.1	-6.1	8.8	100.0
November	18.6	-6.1	5.9	100.0
December	8.4	-11.7	-0.6	100.0

Table A18: 2020 Q4 Courtice Meterological Station Relative Humidity Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	% valid hours
Month	Relative Humidity	Relative Humidity	Relative Humidity	Relative Humidity
	(%)	(%)	(%)	(%)
October	97.1	31.6	74.4	100.0
November	97.2	42.6	72.3	100.0
December	96.9	34.7	73.2	100.0

Table A19: 2020 Q4 Rundle Meterological Station Relative Humidity Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	% valid hours
Month	Relative Humidity	Relative Humidity	Relative Humidity	Relative Humidity
	(%)	(%)	(%)	(%)
October	100.0	30.4	75.9	100.0
November	100.0	41.7	72.9	100.0
December	100.0	35.6	76.1	100.0

Table A20: 2020 Q4 Courtice Meterological Station Precipitation Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Total	% valid hours
Month	Precipitation	Precipitation	Precipitation	Precipitation	Precipitation
	(mm)	(mm)	(mm)	(mm)	(mm)
October	2.8	0.0	0.1	56.0	100.0
November	2.8	0.0	0.1	57.8	100.0
December	2.6	0.0	0.1	56.5	100.0

Table A21: 2020 Q4 Rundle Meterological Station Precipitation Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Total	% valid hours
Month	Precipitation	Precipitation	Precipitation	Precipitation	Precipitation
	(mm)	(mm)	(mm)	(mm)	(mm)
October	3.1	0.0	0.1	64.0	100.0
November	5.8	0.0	0.1	61.0	100.0
December	3.1	0.0	0.1	59.3	100.0

Table A22: 2020 Q4 Courtice Meterological Station Pressure Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Pressure	Pressure	Pressure	Pressure
	(mmHg)	(mmHg)	(mmHg)	(%)
October	30.2	29.2	29.8	100.0
November	30.3	29.0	29.8	100.0
December	30.2	29.1	29.7	100.0

APPENDIX B
2020 Q4 MONITORING RESULTS

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

Sample Date	Courtice			Rundle		
	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume
	No.	(min)	(m^3)	No.	(min)	(m^3)
October 6, 2020	L2508748-2	1440	305	L2508748-4	1440	318
October 30, 2020	L2518543-2	1440	340	L2518543-3	1440	335
November 23, 2020	L2528152-3	1440	328	L2528152-2	1440	331
December 17, 2020	L2534976-3	1440	317	L2534976-2	1440	316

Table B2: 2020 Courtice Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	6-Oct-20	30-Oct-20	23-Nov-20	17-Dec-20	No. > Criteria	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	pg/m^3	-	-	2.79E-03	4.26E-04	3.66E-04	2.21E-03	-	1.45E-03	3.66E-04	2.79E-03	2.79E-03	3.66E-04	2.21E-03	4	100
1,2,3,7,8-PeCDD	pg/m^3	-	-	1.64E-03	2.94E-03	1.83E-03	1.20E-02	-	4.59E-03	1.64E-03	1.20E-02	2.94E-03	1.83E-03	1.20E-02	4	100
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	2.13E-04	1.38E-04	2.29E-04	5.36E-04	-	2.79E-04	1.38E-04	5.36E-04	2.13E-04	2.29E-04	5.36E-04	4	100
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	1.80E-04	5.85E-04	3.35E-04	2.32E-03	-	8.56E-04	1.80E-04	2.32E-03	5.85E-04	3.35E-04	2.32E-03	4	100
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	1.97E-04	1.35E-04	1.33E-04	1.28E-03	-	4.36E-04	1.33E-04	1.28E-03	1.97E-04	1.33E-04	1.28E-03	4	100
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	1.20E-04	7.18E-04	9.39E-04	3.82E-03	-	1.40E-03	1.20E-04	3.82E-03	7.18E-04	9.39E-04	3.82E-03	4	100
OCDD	pg/m^3	-	-	3.18E-05	8.82E-05	9.13E-05	3.04E-04	-	1.29E-04	3.18E-05	3.04E-04	8.82E-05	9.13E-05	3.04E-04	4	100
2,3,7,8-TCDF	pg/m^3	-	-	2.30E-04	1.15E-04	1.14E-04	2.37E-04	-	1.74E-04	1.14E-04	2.37E-04	2.30E-04	1.14E-04	2.37E-04	4	100
1,2,3,7,8-PeCDF	pg/m^3	-	-	4.48E-05	5.74E-05	2.79E-05	6.62E-05	-	4.91E-05	2.79E-05	6.62E-05	5.74E-05	2.79E-05	6.62E-05	4	100
2,3,4,7,8-PeCDF	pg/m^3	-	-	4.18E-04	2.25E-04	1.26E-03	7.57E-04	-	6.66E-04	2.25E-04	1.26E-03	4.18E-04	1.26E-03	7.57E-04	4	100
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	2.13E-04	6.03E-05	1.39E-04	4.29E-04	-	2.10E-04	6.03E-05	4.29E-04	2.13E-04	1.39E-04	4.29E-04	4	100
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	1.97E-04	1.85E-04	1.83E-04	3.00E-04	-	2.16E-04	1.83E-04	3.00E-04	1.97E-04	1.83E-04	3.00E-04	4	100
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	2.13E-04	8.38E-05	5.12E-04	8.17E-04	-	4.07E-04	8.38E-05	8.17E-04	2.13E-04	5.12E-04	8.17E-04	4	100
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	2.46E-04	2.24E-04	6.40E-05	2.52E-04	-	1.96E-04	6.40E-05	2.52E-04	2.46E-04	6.40E-05	2.52E-04	4	100
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	5.28E-05	1.18E-04	1.70E-04	1.01E-04	-	1.10E-04	5.28E-05	1.70E-04	1.18E-04	1.70E-04	1.01E-04	4	100
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	2.62E-05	1.47E-05	3.84E-05	5.39E-05	-	3.33E-05	1.47E-05	5.39E-05	2.62E-05	3.84E-05	5.39E-05	4	100
OCDF	pg/m^3	-	-	2.36E-06	1.03E-05	6.51E-06	6.15E-06	-	6.34E-06	2.36E-06	1.03E-05	1.03E-05	6.51E-06	6.15E-06	4	100
Total Toxic Equivalency	$pg\ TEQ/m^3$	*0.1* *1* [1]	-	6.81E-03	6.13E-03	6.44E-03	2.54E-02	0	1.12E-02	6.13E-03	2.54E-02	6.81E-03	6.44E-03	2.54E-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

Table B3: 2020 Rundle Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	6-Oct-20	30-Oct-20	23-Nov-20	17-Dec-20	No. > Criteria	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	pg/m^3	-	-	2.04E-03	5.22E-04	4.68E-04	4.27E-03	-	1.83E-03	4.68E-04	4.27E-03	2.04E-03	4.68E-04	4.27E-03	4	100
1,2,3,7,8-PeCDD	pg/m^3	-	-	2.04E-03	1.79E-03	3.23E-03	6.49E-03	-	3.39E-03	1.79E-03	6.49E-03	2.04E-03	3.23E-03	6.49E-03	4	100
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	1.89E-04	4.51E-04	4.77E-04	3.16E-03	-	1.07E-03	1.89E-04	3.16E-03	4.51E-04	4.77E-04	3.16E-03	4	100
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	1.57E-04	2.69E-04	2.57E-04	2.85E-03	-	8.83E-04	1.57E-04	2.85E-03	2.69E-04	2.57E-04	2.85E-03	4	100
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	1.73E-04	6.81E-04	7.49E-04	3.01E-03	-	1.15E-03	1.73E-04	3.01E-03	6.81E-04	7.49E-04	3.01E-03	4	100
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	3.14E-04	1.10E-03	1.10E-03	2.06E-03	-	1.14E-03	3.14E-04	2.06E-03	1.10E-03	1.10E-03	2.06E-03	4	100
OCDD	pg/m^3	-	-	3.28E-05	9.40E-05	8.18E-05	4.89E-04	-	1.74E-04	3.28E-05	4.89E-04	9.40E-05	8.18E-05	4.89E-04	4	100
2,3,7,8-TCDF	pg/m^3	-	-	2.04E-04	4.78E-05	2.75E-04	4.59E-04	-	2.46E-04	4.78E-05	4.59E-04	2.04E-04	2.75E-04	4.59E-04	4	100
1,2,3,7,8-PeCDF	pg/m^3	-	-	8.02E-05	3.49E-05	4.12E-05	1.52E-04	-	7.71E-05	3.49E-05	1.52E-04	8.02E-05	4.12E-05	1.52E-04	4	100
2,3,4,7,8-PeCDF	pg/m^3	-	-	7.55E-04	6.18E-04	1.59E-03	2.18E-03	-	1.29E-03	6.18E-04	2.18E-03	7.55E-04	1.59E-03	2.18E-03	4	100
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	2.83E-04	2.24E-04	1.66E-04	8.54E-04	-	3.82E-04	1.66E-04	8.54E-04	2.83E-04	1.66E-04	8.54E-04	4	100
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	2.67E-04	6.57E-05	4.20E-04	8.07E-04	-	3.90E-04	6.57E-05	8.07E-04	2.67E-04	4.20E-04	8.07E-04	4	100
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	2.99E-04	1.00E-04	1.01E-04	2.17E-03	-	6.68E-04	1.00E-04	2.17E-03	2.99E-04	1.01E-04	2.17E-03	4	100
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	3.30E-04	2.93E-04	2.33E-04	1.03E-03	-	4.71E-04	2.33E-04	1.03E-03	3.30E-04	2.33E-04	1.03E-03	4	100
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	4.72E-05	3.88E-05	1.79E-04	2.06E-04	-	1.18E-04	3.88E-05	2.06E-04	4.72E-05	1.79E-04	2.06E-04	4	100
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	4.56E-05	2.69E-05	3.17E-06	1.58E-04	-	5.85E-05	3.17E-06	1.58E-04	4.56E-05	3.17E-06	1.58E-04	4	100
OCDF	pg/m^3	-	-	5.19E-06	3.49E-06	2.45E-06	1.66E-05	-	6.94E-06	2.45E-06	1.66E-05	5.19E-06	2.45E-06	1.66E-05	4	100
Total Toxic Equivalency	pg TEQ/m^3	*0.1 1* [1]	-	7.27E-03	6.36E-03	9.38E-03	3.04E-02	0	1.33E-02	6.36E-03	3.04E-02	7.27E-03	9.38E-03	3.04E-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

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)
October 6, 2020	L2508748-2	1440	305	L2508748-4	1440	318
October 18, 2020	L2513911-3	1440	304	L2513911-2	1440	323
October 30, 2020	L2518543-2	1440	340	L2518543-3	1440	335
November 11, 2020	L25214017-2	1440	307	L25214017-3	1440	309
November 23, 2020	L2528152-3	1440	328	L2528152	1440	331
December 5, 2020	L2534522-2	1440	330	L2534522-3	1440	333
December 17, 2020	L2534976-3	1440	317	L2534976-2	1440	316
December 29, 2020	L2542309-2	1440	280	L2542309-3	1440	303

Table B5: 2020 Courtice Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	6-Oct-20	18-Oct-20	30-Oct-20	11-Nov-20	23-Nov-20	5-Dec-20	17-Dec-20	29-Dec-20	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	ng/m^3	*12000*	-	1.57E+00	1.97E+00	2.33E+00	3.36E+00	6.95E+00	3.58E+00	6.18E+00	4.32E+00	0	3.78E+00	1.57E+00	6.95E+00	2.33E+00	6.95E+00	6.18E+00	8	100
2-Methylnaphthalene	ng/m^3	*10000*	-	2.23E+00	2.99E+00	3.44E+00	4.59E+00	9.51E+00	4.73E+00	7.13E+00	5.50E+00	0	5.01E+00	2.23E+00	9.51E+00	3.44E+00	9.51E+00	7.13E+00	8	100
Acenaphthene	ng/m^3	-	-	9.70E-01	5.59E-01	4.18E-01	6.12E-01	4.60E-01	5.30E-01	4.89E-01	4.07E-01	-	5.56E-01	4.07E-01	9.70E-01	9.70E-01	6.12E-01	5.30E-01	8	100
Acenaphthylene	ng/m^3	*3500*	-	3.19E-02	1.38E-02	1.79E-01	1.34E-01	2.90E-01	2.51E-01	1.62E+00	4.39E-01	0	3.70E-01	1.38E-02	1.62E+00	1.79E-01	2.90E-01	1.62E+00	8	100
Anthracene	ng/m^3	*200*	-	8.10E-02	5.36E-02	3.44E-02	1.38E-01	7.01E-02	9.30E-02	1.83E-01	5.07E-02	0	8.80E-02	3.44E-02	1.83E-01	8.10E-02	1.38E-01	1.83E-01	8	100
Benzo(a)Anthracene	ng/m^3	-	-	1.99E-02	2.31E-02	1.15E-02	1.89E-02	1.61E-02	2.34E-02	9.46E-02	2.71E-02	-	2.93E-02	1.15E-02	9.46E-02	2.31E-02	1.89E-02	9.46E-02	8	100
Benzo(a)fluorene	ng/m^3	-	-	2.30E-02	2.93E-02	1.46E-02	4.14E-02	3.05E-02	5.55E-02	1.26E-01	2.88E-02	-	4.37E-02	1.46E-02	1.26E-01	2.93E-02	4.14E-02	1.26E-01	8	100
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	*1*	3.03E-02	3.27E-02	1.52E-02	3.68E-02	2.84E-02	1.85E-02	9.24E-02	3.08E-02	1	3.56E-02	1.52E-02	9.24E-02	3.27E-02	3.68E-02	9.24E-02	8	100
Benzo(b)Fluoranthene	ng/m^3	-	-	6.46E-02	7.14E-02	4.59E-02	4.98E-02	4.60E-02	6.06E-02	2.82E-01	8.86E-02	-	8.86E-02	4.59E-02	2.82E-01	7.14E-02	4.98E-02	2.82E-01	8	100
Benzo(b)fluorene	ng/m^3	-	-	5.48E-02	5.10E-02	9.94E-03	3.07E-02	1.72E-02	3.61E-02	9.94E-02	1.47E-02	-	3.92E-02	9.94E-03	9.94E-02	5.48E-02	3.07E-02	9.94E-02	8	100
Benzo(e)Pyrene	ng/m^3	-	-	2.73E-02	4.21E-02	2.58E-02	3.49E-02	4.73E-02	3.70E-02	1.97E-01	6.64E-02	-	5.97E-02	2.58E-02	1.97E-01	4.21E-02	4.73E-02	1.97E-01	8	100
Benzo(g,h,i)Perylene	ng/m^3	-	-	2.50E-02	4.18E-02	2.52E-02	3.26E-02	5.43E-02	3.52E-02	2.00E-01	6.71E-02	-	6.01E-02	2.50E-02	2.00E-01	4.18E-02	5.43E-02	2.00E-01	8	100
Benzo(k)Fluoranthene	ng/m^3	-	-	2.96E-02	5.26E-02	3.24E-02	3.88E-02	4.63E-02	4.76E-02	2.15E-01	8.36E-02	-	6.82E-02	2.96E-02	2.15E-01	5.26E-02	4.63E-02	2.15E-01	8	100
Biphenyl	ng/m^3	-	-	1.15E+00	1.36E+00	1.06E+00	1.75E+00	2.88E+00	2.18E+00	2.73E+00	1.51E+00	-	1.82E+00	1.06E+00	2.88E+00	1.36E+00	2.88E+00	2.73E+00	8	100
Chrysene	ng/m^3	-	-	6.69E-02	9.05E-02	4.50E-02	3.91E-02	7.01E-02	8.64E-02	4.10E-01	1.15E-01	-	1.15E-01	3.91E-02	4.10E-01	9.05E-02	7.01E-02	4.10E-01	8	100
Dibenzo(a,h)Anthracene	ng/m^3	-	-	2.56E-03	4.70E-03	3.32E-03	1.82E-02	4.15E-03	1.33E-02	2.02E-02	5.89E-03	-	9.04E-03	2.56E-03	2.02E-02	4.70E-03	1.82E-02	2.02E-02	8	100
Fluoranthene	ng/m^3	-	-	3.28E-01	3.88E-01	2.16E-01	4.79E-01	3.75E-01	3.67E-01	8.39E-01	3.12E-01	-	4.13E-01	2.16E-01	8.39E-01	3.88E-01	4.79E-01	8.39E-01	8	100
Fluorene	ng/m^3	-	-	1.16E+00	1.09E+00	4.97E-01	7.92E-01	8.35E-01	7.61E-01	1.06E+00	5.61E-01	-	8.44E-01	4.97E-01	1.16E+00	1.16E+00	8.35E-01	1.06E+00	8	100
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	8.59E-02	6.68E-02	2.76E-02	3.25E-02	4.09E-02	3.61E-02	1.94E-01	5.93E-02	-	6.78E-02	2.76E-02	1.94E-01	8.59E-02	4.09E-02	1.94E-01	8	100
Naphthalene	ng/m^3	*22500*	*22500*	1.45E+01	1.58E+01	1.59E+01	2.23E+01	2.65E+01	2.09E+01	3.47E+01	2.12E+01	0	2.15E+01	1.45E+01	3.47E+01	1.59E+01	2.65E+01	3.47E+01	8	100
o-Terphenyl	ng/m^3	-	-	2.23E-02	1.64E-02	4.68E-03	1.45E-02	2.22E-02	1.83E-02	7.76E-03	9.00E-03	-	1.44E-02	4.68E-03	2.23E-02	2.23E-02	2.22E-02	1.83E-02	8	100
Perylene	ng/m^3	-	-	4.43E-03	3.78E-03	1.71E-03	3.26E-04	3.05E-04	3.03E-04	1.84E-02	2.89E-03	-	4.02E-03	3.03E-04	1.84E-02	4.43E-03	3.26E-04	1.84E-02	8	100
Phenanthrene	ng/m^3	-	-	2.60E+00	1.96E+00	1.03E+00	2.67E-01	1.79E+00	1.55E+00	2.49E+00	1.35E+00	-	1.63E+00	2.67E-01	2.60E+00	2.60E+00	1.79E+00	2.49E+00	8	100
Pyrene	ng/m^3	-	-	1.55E-01	1.79E-01	1.45E-01	2.35E-01	3.01E-01	2.60E-01	6.09E-01	2.11E-01	-	2.62E-01	1.45E-01	6.09E-01	1.79E-01	3.01E-01	6.09E-01	8	100
Tetralin	ng/m^3	-	-	9.05E-01	1.29E+00	2.28E+00	7.10E+00	4.36E+00	1.85E+00	1.77E+00	2.15E+00	-	2.71E+00	9.05E-01	7.10E+00	2.28E+00	7.10E+00	2.15E+00	8	100
Total PAH[4]	ng/m^3	-	-	26.15	28.13	27.73	42.15	54.77	37.52	61.76	38.63	-	3.96E+01	2.62E+01	6.18E+01	2.81E+01	5.48E+01	6.18E+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 Upper Risk Thresholds

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

[4] Total PAH sums all PAH contaminants

Table B6: 2020 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	6-Oct-20	18-Oct-20	30-Oct-20	11-Nov-20	23-Nov-20	5-Dec-20	17-Dec-20	29-Dec-20	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	ng/m^3	*12000*	-	3.81E+00	4.06E+00	2.36E+00	5.47E+00	7.73E+00	4.02E+00	4.81E+00	5.25E+00	0	4.69E+00	2.36E+00	7.73E+00	4.06E+00	7.73E+00	5.25E+00	8	100
2-Methylnaphthalene	ng/m^3	*10000*	-	5.60E+00	6.50E+00	3.04E+00	8.06E+00	1.08E+01	4.89E+00	5.60E+00	6.07E+00	0	6.32E+00	3.04E+00	1.08E+01	6.50E+00	1.08E+01	6.07E+00	8	100
Acenaphthene	ng/m^3	-	-	3.02E+00	3.68E+00	2.03E-01	3.24E+00	7.13E-01	2.43E-01	4.05E-01	4.06E-01	-	1.49E+00	2.03E-01	3.68E+00	3.68E+00	3.24E+00	4.06E-01	8	100
Acenaphthylene	ng/m^3	*3500*	-	4.75E-02	2.41E-02	3.13E-01	1.29E-01	3.38E-01	2.32E-01	5.54E-01	8.55E-01	0	3.12E-01	2.41E-02	8.55E-01	3.13E-01	3.38E-01	8.55E-01	8	100
Anthracene	ng/m^3	*200*	-	2.06E-01	1.41E-01	7.25E-02	2.39E-01	8.52E-02	7.54E-02	9.59E-02	1.19E-01	0	1.29E-01	7.25E-02	2.39E-01	2.06E-01	2.39E-01	1.19E-01	8	100
Benzo(a)Anthracene	ng/m^3	-	-	1.96E-02	2.25E-02	1.93E-02	1.76E-02	2.18E-02	2.01E-02	5.09E-02	1.59E-01	-	4.14E-02	1.76E-02	1.59E-01	2.25E-02	2.18E-02	1.59E-01	8	100
Benzo(a)fluorene	ng/m^3	-	-	2.47E-02	3.44E-02	2.11E-02	4.66E-02	3.53E-02	4.11E-02	6.23E-02	1.05E-01	-	4.63E-02	2.11E-02	1.05E-01	3.44E-02	4.66E-02	1.05E-01	8	100
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	*1*	3.55E-02	3.99E-02	2.88E-02	5.34E-02	2.34E-02	2.21E-02	4.97E-02	1.82E-01	2	5.44E-02	2.21E-02	1.82E-01	3.99E-02	5.34E-02	1.82E-01	8	100
Benzo(b)Fluoranthene	ng/m^3	-	-	7.45E-02	9.75E-02	5.91E-02	4.89E-02	5.59E-02	5.17E-02	1.78E-01	2.36E-01	-	1.00E-01	4.89E-02	2.36E-01	9.75E-02	5.59E-02	2.36E-01	8	100
Benzo(b)fluorene	ng/m^3	-	-	6.16E-02	8.11E-02	1.41E-02	2.47E-02	1.85E-02	2.68E-02	3.89E-02	6.86E-02	-	4.18E-02	1.41E-02	8.11E-02	8.11E-02	2.47E-02	6.86E-02	8	100
Benzo(e)Pyrene	ng/m^3	-	-	3.13E-02	3.87E-02	3.40E-02	3.56E-02	5.41E-02	3.51E-02	1.38E-01	1.74E-01	-	6.76E-02	3.13E-02	1.74E-01	3.87E-02	5.41E-02	1.74E-01	8	100
Benzo(g,h,i)Perylene	ng/m^3	-	-	3.04E-02	4.92E-02	3.49E-02	3.33E-02	5.89E-02	3.30E-02	1.07E-01	1.81E-01	-	6.60E-02	3.04E-02	1.81E-01	4.92E-02	5.89E-02	1.81E-01	8	100
Benzo(k)Fluoranthene	ng/m^3	-	-	2.70E-02	7.31E-02	4.12E-02	3.88E-02	5.35E-02	3.90E-02	1.44E-01	2.22E-01	-	7.98E-02	2.70E-02	2.22E-01	7.31E-02	5.35E-02	2.22E-01	8	100
Biphenyl	ng/m^3	-	-	1.83E+00	2.25E+00	1.31E+00	1.93E+01	2.91E+00	2.95E+00	2.14E+00	2.02E+00	-	4.34E+00	1.31E+00	1.93E+01	2.25E+00	1.93E+01	2.95E+00	8	100
Chrysene	ng/m^3	-	-	8.14E-02	9.54E-02	6.84E-02	6.67E-02	8.40E-02	7.93E-02	3.04E-01	3.40E-01	-	1.40E-01	6.67E-02	3.40E-01	9.54E-02	8.40E-02	3.40E-01	8	100
Dibenzo(a,h)Anthracene	ng/m^3	-	-	5.63E-03	4.40E-03	4.54E-03	4.56E-03	5.14E-03	9.73E-03	1.48E-02	1.74E-02	-	8.27E-03	4.40E-03	1.74E-02	5.63E-03	5.14E-03	1.74E-02	8	100
Fluoranthene	ng/m^3	-	-	7.45E-01	7.71E-01	2.65E-01	8.61E-01	4.38E-01	3.21E-01	5.63E-01	5.94E-01	-	5.70E-01	2.65E-01	8.61E-01	7.71E-01	8.61E-01	5.94E-01	8	100
Fluorene	ng/m^3	-	-	2.50E+00	2.81E+00	4.90E-01	2.75E+00	1.16E+00	6.94E-01	5.79E-01	8.81E-01	-	1.48E+00	4.90E-01	2.81E+00	2.81E+00	2.75E+00	8.81E-01	8	100
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	1.37E-01	8.14E-02	3.64E-02	3.10E-02	4.23E-02	3.51E-02	1.15E-01	1.71E-01	-	8.11E-02	3.10E-02	1.71E-01	1.37E-01	4.23E-02	1.71E-01	8	100
Naphthalene	ng/m^3	*22500*	*22500*	2.08E+01	2.50E+01	2.00E+01	2.72E+01	3.02E+01	2.56E+01	2.42E+01	2.83E+01	0	2.52E+01	2.00E+01	3.02E+01	2.50E+01	3.02E+01	2.83E+01	8	100
o-Terphenyl	ng/m^3	-	-	2.52E-02	2.04E-02	5.04E-03	2.06E-02	1.98E-02	1.14E-02	7.03E-03	9.04E-03	-	1.48E-02	5.04E-03	2.52E-02	2.52E-02	2.06E-02	1.14E-02	8	100
Perylene	ng/m^3	-	-	4.12E-03	3.34E-03	3.19E-03	1.65E-03	3.02E-04	9.85E-03	4.91E-03	3.05E-02	-	7.23E-03	3.02E-04	3.05E-02	4.12E-03	1.65E-03	3.05E-02	8	100
Phenanthrene	ng/m^3	-	-	5.47E+00	4.15E+00	1.20E+00	5.60E+00	2.08E+00	1.37E+00	1.54E+00	1.83E+00	-	2.90E+00	1.20E+00	5.60E+00	5.47E+00	5.60E+00	1.83E+00	8	100
Pyrene	ng/m^3	-	-	3.62E-01	3.47E-01	1.88E-01	4.01E-01	3.56E-01	2.24E-01	3.54E-01	5.28E-01	-	3.45E-01	1.88E-01	5.28E-01	3.62E-01	4.01E-01	5.28E-01	8	100
Tetralin	ng/m^3	-	-	1.66E+00	1.49E+00	3.13E+00	1.68E+01	4.68E+00	2.02E+00	1.60E+00	1.79E+00	-	4.15E+00	1.49E+00	1.68E+01	3.13E+00	1.68E+01	2.02E+00	8	100
Total PAH[4]	ng/m^3	-	-	46.62	51.82	32.96	90.40	61.90	43.08	43.70	50.55	-	5.26E+01	3.30E+01	9.04E+01	5.18E+01	9.04E+01	5.05E+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 Upper Risk Thresholds

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

[4] Total PAH sums all PAH contaminants

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

Sample Date	Courtice			Rundle		
	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume
	No.	(min)	(m^3)	No.	(min)	(m^3)
October 6, 2020	740842	1440	1678	740841	1440	1716
October 12, 2020	740844	1440	1698	740845	1440	1727
October 18, 2020	740846	1440	1696	740847	1440	1717
October 24, 2020	741021	1440	1710	740848	1440	1701
October 30, 2020	741023	1440	1730	741022	1440	1717
November 5, 2020	741025	1440	1706	741024	1440	1662
November 11, 2020	741027	1440	1705	741026	1440	1739
November 17, 2020	741029	1440	1663	741028	1440	1636
November 23, 2020	741031	1440	1661	741030	1440	1709
November 29, 2020	741033	1440	1656	741032	1440	1628
December 5, 2020	741034	1440	1663	741035	1440	1653
December 11, 2020	741037	1440	1650	741036	1440	1708
December 17, 2020	741039	1440	1684	741038	1440	1723
December 23, 2020	741041	1440	1664	741040	1440	1713
December 29, 2020	741043	1440	1675	741042	1440	1667

Table B8: 2020 Courtice Station Q4 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	6-Oct-20	12-Oct-20	18-Oct-20	24-Oct-20	30-Oct-20	5-Nov-20	11-Nov-20	17-Nov-20	23-Nov-20	29-Nov-20	5-Dec-20	11-Dec-20	17-Dec-20	23-Dec-20	29-Dec-20	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	µg/m^3	*120*	*120*	16.81	18.73	13.15	7.49	21.73	23.80	13.31	12.03	15.11	14.01	8.90	30.73	33.91	6.25	11.22	*120*	0	14.79	16.48	6.25	33.91	21.73	23.80	33.91	15	100
Total Mercury (Hg)	µg/m^3	*2*	*2*	1.43E-05	1.12E-05	1.30E-05	2.92E-06	2.89E-06	1.06E-05	2.93E-06	3.01E-06	1.57E-05	7.25E-06	3.01E-06	1.39E-05	1.60E-05	3.00E-06	2.99E-06	*2*	0	6.36E-06	8.18E-06	2.89E-06	1.60E-05	1.43E-05	1.57E-05	1.60E-05	15	100
Aluminum (Al)	µg/m^3	*4.8*	-	1.04E-01	1.60E-01	6.25E-02	4.21E-02	1.38E-01	1.75E-01	1.06E-01	1.11E-01	6.86E-02	5.92E-02	2.77E-02	7.64E-02	1.53E-01	3.06E-02	4.78E-02	*4.8*	0	7.79E-02	9.07E-02	2.77E-02	1.75E-01	1.60E-01	1.75E-01	1.53E-01	15	100
Antimony (Sb)	µg/m^3	*25*	*25*	6.38E-04	4.77E-04	6.49E-04	2.98E-04	3.64E-04	1.01E-03	5.81E-04	4.63E-04	2.61E-03	7.31E-04	4.09E-04	1.41E-03	6.35E-04	3.13E-04	4.54E-04	*25*	0	6.08E-04	7.36E-04	2.98E-04	2.61E-03	6.49E-04	2.61E-03	1.41E-03	15	100
Arsenic (As)	µg/m^3	*0.3*	*0.3*	8.94E-04	8.83E-04	8.84E-04	8.77E-04	8.67E-04	8.79E-04	8.80E-04	9.02E-04	2.59E-03	9.06E-04	9.02E-04	9.09E-04	8.91E-04	9.01E-04	8.96E-04	*0.3*	0	9.56E-04	1.00E-03	8.67E-04	2.59E-03	8.94E-04	2.59E-03	9.09E-04	15	100
Barium (Ba)	µg/m^3	*10*	*10*	4.23E-03	4.06E-03	3.36E-03	2.28E-03	5.32E-03	7.21E-03	5.10E-03	4.57E-03	8.43E-03	2.72E-03	3.61E-03	9.15E-03	6.71E-03	1.80E-03	4.84E-03	*10*	0	4.44E-03	4.89E-03	1.80E-03	9.15E-03	5.32E-03	8.43E-03	9.15E-03	15	100
Beryllium (Be)	µg/m^3	*0.01*	*0.01*	2.98E-05	2.94E-05	2.95E-05	2.92E-05	2.89E-05	2.93E-05	2.93E-05	3.01E-05	3.01E-05	3.02E-05	3.01E-05	3.03E-05	2.97E-05	3.00E-05	2.99E-05	*0.01*	0	2.97E-05	2.97E-05	2.89E-05	3.03E-05	2.98E-05	3.02E-05	3.03E-05	15	100
Bismuth (Bi)	µg/m^3	-	-	5.36E-04	5.30E-04	5.31E-04	5.26E-04	5.20E-04	5.28E-04	5.28E-04	5.41E-04	5.42E-04	5.43E-04	5.41E-04	5.45E-04	5.34E-04	5.41E-04	5.37E-04	-	-	5.35E-04	5.35E-04	5.20E-04	5.45E-04	5.36E-04	5.43E-04	5.45E-04	15	100
Boron (B)	µg/m^3	*120*	-	1.19E-02	1.18E-02	1.18E-02	1.17E-02	1.16E-02	1.17E-02	1.17E-02	1.20E-02	1.20E-02	1.21E-02	1.20E-02	1.21E-02	1.19E-02	1.20E-02	1.19E-02	*120*	0	1.19E-02	1.19E-02	1.16E-02	1.21E-02	1.19E-02	1.21E-02	1.21E-02	15	100
Cadmium (Cd)	µg/m^3	*0.025*	*0.025*	5.96E-04	5.89E-04	5.90E-04	5.85E-04	5.78E-04	5.45E-03	5.87E-04	6.01E-04	1.38E-03	6.04E-04	6.01E-04	6.06E-04	5.94E-04	6.01E-04	5.97E-04	*0.025*	0	7.29E-04	9.71E-04	5.78E-04	5.45E-03	5.96E-04	5.45E-03	6.06E-04	15	100
Chromium (Cr)	µg/m^3	*0.5*	-	1.49E-03	1.47E-03	1.47E-03	3.27E-03	3.82E-03	3.87E-03	4.16E-03	4.03E-03	4.64E-03	4.47E-03	3.55E-03	3.94E-03	3.62E-03	1.50E-03	3.82E-03	*0.5*	0	3.02E-03	3.28E-03	1.47E-03	4.64E-03	3.82E-03	4.64E-03	3.94E-03	15	100
Cobalt (Co)	µg/m^3	*0.1*	*0.1*	5.96E-04	5.89E-04	5.90E-04	5.85E-04	5.78E-04	5.86E-04	5.87E-04	6.01E-04	6.02E-04	6.04E-04	6.01E-04	6.06E-04	5.94E-04	6.01E-04	5.97E-04	*0.1*	0	5.94E-04	5.94E-04	5.78E-04	6.06E-04	5.96E-04	6.04E-04	6.06E-04	15	100
Copper (Cu)	µg/m^3	*50*	-	1.26E-02	7.83E-03	5.25E-03	8.95E-03	1.34E-02	1.48E-02	1.70E-02	4.38E-02	1.75E-02	5.50E-03	2.66E-02	1.59E-02	4.70E-02	7.39E-03	3.79E-02	*50*	0	1.48E-02	1.88E-02	5.25E-03	4.70E-02	1.34E-02	4.38E-02	4.70E-02	15	100
Iron (Fe)	µg/m^3	*4*	-	2.07E-01	4.85E-01	1.39E-01	1.26E-01	2.94E-01	3.99E-01	2.90E-01	2.65E-01	7.16E-01	1.58E-01	1.76E-01	3.47E-01	3.88E-01	8.35E-02	1.77E-01	*4*	0	2.44E-01	2.83E-01	8.35E-02	7.16E-01	4.85E-01	7.16E-01	3.88E-01	15	100
Lead (Pb)	µg/m^3	*0.5*	*0.5*	2.09E-03	2.89E-03	3.71E-03	8.77E-04	8.67E-04	3.34E-03	2.40E-03	1.80E-03	3.01E-03	2.96E-03	2.04E-03	5.03E-03	1.96E-03	9.01E-04	8.96E-04	*2*	0	2.01E-03	2.32E-03	8.67E-04	5.03E-03	3.71E-03	3.34E-03	5.03E-03	15	100
Magnesium (Mg)	µg/m^3	-	-	2.03E-01	1.83E-01	1.18E-01	7.02E-02	1.79E-01	3.11E-01	1.82E-01	1.56E-01	1.38E-01	1.09E-01	6.61E-02	1.33E-01	2.49E-01	3.00E-02	8.36E-02	-	-	1.28E-01	1.47E-01	3.00E-02	3.11E-01	2.03E-01	3.11E-01	2.49E-01	15	100
Manganese (Mn)	µg/m^3	*0.4*	-	1.19E-02	9.07E-03	6.54E-03	2.51E-03	8.55E-03	1.60E-02	8.56E-03	8.24E-03	1.11E-02	4.71E-03	3.37E-03	1.01E-02	1.00E-02	1.98E-03	3.46E-03	*0.4*	0	6.63E-03	7.74E-03	1.98E-03	1.60E-02	1.19E-02	1.60E-02	1.01E-02	15	100
Molybdenum (Mo)	µg/m^3	*120*	-	8.34E-04	2.94E-04	2.95E-04	6.43E-04	7.51E-04	1.11E-03	9.38E-04	3.01E-03	1.32E-03	7.25E-04	9.62E-04	1.82E-03	1.01E-03	9.01E-04	1.07E-03	*120*	0	8.92E-04	1.05E-03	2.94E-04	3.01E-03	8.34E-04	3.01E-03	1.82E-03	15	100
Nickel (Ni)	µg/m^3	*0.2*	-	8.94E-04	8.83E-04	8.84E-04	8.77E-04	1.85E-03	2.11E-03	2.05E-03	2.16E-03	2.95E-03	2.42E-03	1.86E-03	1.94E-03	1.90E-03	9.01E-04	1.85E-03	*0.2*	0	1.57E-03	1.70E-03	8.77E-04	2.95E-03	1.85E-03	2.95E-03	1.94E-03	15	100
Phosphorus (P)	µg/m^3	-	-	2.23E-01	2.21E-01	2.21E-01	2.19E-01	2.17E-01	2.20E-01	2.20E-01	2.25E-01	2.26E-01	2.26E-01	2.25E-01	2.27E-01	2.23E-01	2.25E-01	2.24E-01	-	-	2.23E-01	2.23E-01	2.17E-01	2.27E-01	2.23E-01	2.26E-01	2.27E-01	15	100
Selenium (Se)	µg/m^3	*10*	*10*	2.98E-03	2.94E-03	2.95E-03	2.92E-03	2.89E-03	2.93E-03	2.93E-03	3.01E-03	3.01E-03	3.02E-03	3.01E-03	3.03E-03	2.97E-03	3.00E-03	2.99E-03	*10*	0	2.97E-03	2.97E-03	2.89E-03	3.03E-03	2.98E-03	3.02E-03	3.03E-03	15	100
Silver (Ag)	µg/m^3	*1*	*1*	2.98E-04	2.94E-04	2.95E-04	2.92E-04	2.89E-04	2.93E-04	2.93E-04	3.01E-04	3.01E-04	3.02E-04	3.01E-04	3.03E-04	2.97E-04	3.00E-04	2.99E-04	*1*	0	2.97E-04	2.97E-04	2.89E-04	3.03E-04	2.98E-04	3.02E-04	3.03E-04	15	100
Strontium (Sr)	µg/m^3	*120*	-	3.46E-03	4.53E-03	8.84E-04	8.77E-04	5.66E-03	3.87E-03	2.70E-03	2.77E-03	2.17E-03	1.87E-03	9.02E-04	3.21E-03	5.88E-03	9.01E-04	2.39E-03	*120*	0	2.32E-03	2.80E-03	8.77E-04	5.88E-03	5.66E-03	3.87E-03	5.88E-03	15	100
Thallium (Tl)	µg/m^3	-	-	2.68E-05	2.65E-05	2.65E-05	2.63E-05	2.60E-05	2.64E-05	2.64E-05	2.71E-05	2.71E-05	2.72E-05	2.71E-05	2.73E-05	2.67E-05	2.70E-05	2.69E-05	-	-	2.67E-05	2.67E-05	2.60E-05	2.73E-05	2.68E-05	2.72E-05	2.73E-05	15	100
Tin (Sn)	µg/m^3	*10*	*10*	7.15E-04	6.48E-04	8.25E-04	7.02E-04	6.94E-04	9.38E-04	1.06E-03	1.14E-03	2.47E-03	7.25E-04	3.01E-04	1.33E-03	6.53E-04	3.00E-04	2.99E-04	*10*	0	7.30E-04	8.53E-04	2.99E-04	2.47E-03	8.25E-04	2.47E-03	1.33E-03	15	100
Titanium (Ti)	µg/m^3	*120*	-	3.28E-03	8.24E-03	3.24E-03	3.22E-03	7.51E-03	7.03E-03	3.23E-03	3.31E-03	3.31E-03	3.32E-03	3.31E-03	3.33E-03	1.07E-02	3.31E-03	3.28E-03	*120*	0	4.20E-03	4.64E-03	3.22E-03	1.07E-02	8.24E-03	7.03E-03	1.07E-02	15	100
Uranium (Ur)	µg/m^3	*1.5*	-	2.98E-05	2.94E-05	2.95E-05	2.92E-05	2.89E-05	2.93E-05	2.93E-05	3.01E-05	3.01E-05	3.02E-05	3.01E-05	3.03E-05	2.97E-05	3.00E-05	2.99E-05	*1.5*	0	2.97E-05	2.97E-05	2.89E-05	3.03E-05	2.98E-05	3.02E-05	3.03E-05	15	100
Vanadium (V)	µg/m^3	*2*	*1*	1.49E-03	1.47E-03	1.47E-03	1.46E-03	1.45E-03	1.47E-03	1.47E-03	1.50E-03	1.51E-03	1.51E-03	1.50E-03	1.52E-03	1.48E-03	1.50E-03	1.49E-03	*2*	0	1.49E-03	1.49E-03	1.45E-03	1.52E-03	1.49E-03	1.51E-03	1.52E-03	15	100
Zinc (Zn)	µg/m^3	*120*	-	2.03E-02	3.07E-02	1.34E-02	1.38E-02	1.87E-02	5.06E-02	3.80E-02	5.20E-02	8.79E-02	2.86E-02	9.02E-03	7.09E-02	2.39E-02	2.28E-02	1.42E-02	*120*	0	2.68E-02	3.30E-02	9.02E-03	8.79E-02	3.07E-02	8.79E-02	7.09E-02	15	100
Zirconium (Zr)	µg/m^3	*20*	-	5.96E-04	5.89E-04	5.90E-04	5.85E-04	5.78E-04	5.86E-04	5.87E-04	6.01E-04	6.02E-04	6.04E-04	6.01E-04	6.06E-04	5.94E-04	6.01E-04	5.97E-04	*20*	0	5.94E-04	5.94E-04	5.78E-04	6.06E-04	5.96E-04	6.04E-04	6.06E-04	15	100

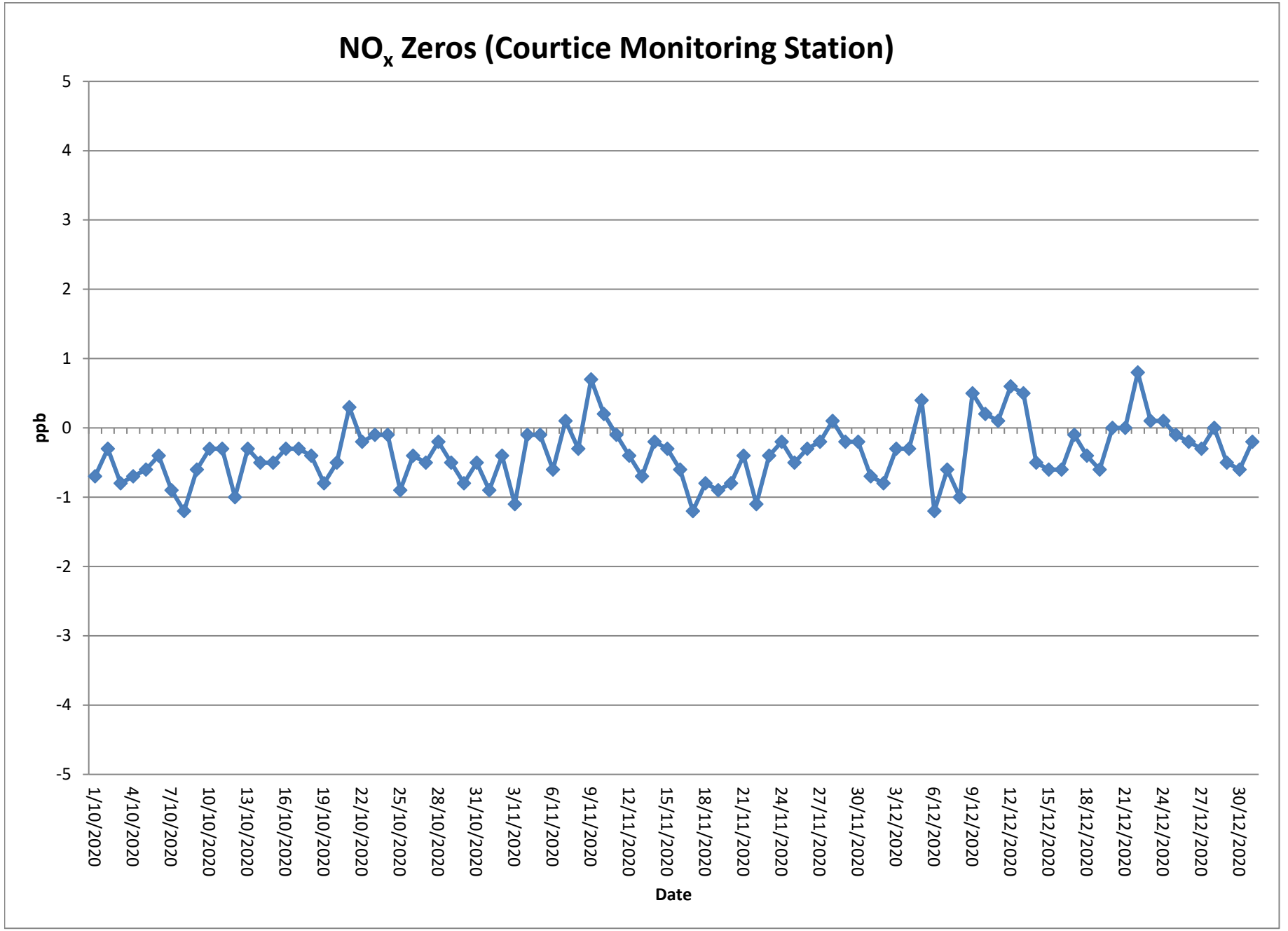
NOTE: All non-detectable results were reported as 1/2 of the detection limit

Table B9: 2020 Rundle Station Q4 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	6-Oct-20	12-Oct-20	18-Oct-20	24-Oct-20	30-Oct-20	5-Nov-20	11-Nov-20	17-Nov-20	23-Nov-20	29-Nov-20	5-Dec-20	11-Dec-20	17-Dec-20	23-Dec-20	29-Dec-20	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	µg/m^3	*120*	*120*	21.79	20.61	14.68	9.58	24.34	33.69	20.53	20.48	14.04	15.85	8.53	33.02	26.00	17.28	11.10	*120*	0	18.0	19.4	8.5	33.7	24.3	33.7	33.0	15	100
Mercury (Hg)	µg/m^3	*2*	*2*	1.40E-05	1.68E-05	1.34E-05	2.94E-06	2.91E-06	9.63E-06	2.88E-06	6.72E-06	8.19E-06	7.37E-06	3.02E-06	1.52E-05	2.26E-05	2.92E-06	3.00E-06	*2*	0	6.75E-06	8.77E-06	2.88E-06	2.26E-05	1.68E-05	9.63E-06	2.26E-05	15	100
Aluminum (Al)	µg/m^3	*4.8*	-	1.18E-01	1.90E-01	8.85E-02	6.70E-02	1.21E-01	2.47E-01	1.40E-01	1.75E-01	6.09E-02	9.09E-02	3.93E-02	1.09E-01	1.49E-01	1.72E-01	6.24E-02	*4.8*	0	1.09E-01	1.22E-01	3.93E-02	2.47E-01	1.90E-01	2.47E-01	1.72E-01	15	100
Antimony (Sb)	µg/m^3	*25*	*25*	8.04E-04	3.82E-04	8.68E-04	2.70E-04	2.68E-04	1.13E-03	5.52E-04	3.61E-04	9.83E-04	9.89E-04	3.02E-04	1.44E-03	4.35E-04	5.02E-04	2.58E-04	*25*	0	5.42E-04	6.36E-04	2.58E-04	1.44E-03	8.68E-04	1.13E-03	1.44E-03	15	100
Arsenic (As)	µg/m^3	*0.3*	*0.3*	8.74E-04	8.69E-04	8.74E-04	1.11E-02	8.74E-04	9.03E-04	8.63E-04	9.17E-04	8.78E-04	9.21E-04	9.07E-04	1.81E-03	8.71E-04	8.76E-04	9.00E-04	*0.3*	0	1.10E-03	1.63E-03	8.63E-04	1.11E-02	1.11E-02	9.21E-04	1.81E-03	15	100
Barium (Ba)	µg/m^3	*10*	*10*	7.34E-03	4.75E-03	5.65E-03	2.53E-03	4.08E-03	9.87E-03	5.87E-03	4.89E-03	8.84E-03	4.91E-03	2.30E-03	1.08E-02	5.92E-03	4.90E-03	2.76E-03	*10*	0	5.16E-03	5.69E-03	2.30E-03	1.08E-02	7.34E-03	9.87E-03	1.08E-02	15	100
Beryllium (Be)	µg/m^3	*0.01*	*0.01*	2.91E-05	2.90E-05	2.91E-05	2.94E-05	2.91E-05	3.01E-05	2.88E-05	3.06E-05	2.93E-05	3.07E-05	3.02E-05	2.93E-05	2.90E-05	2.92E-05	3.00E-05	*0.01*	0	2.95E-05	2.95E-05	2.88E-05	3.07E-05	2.94E-05	3.07E-05	3.02E-05	15	100
Bismuth (Bi)	µg/m^3	-	-	5.24E-04	5.21E-04	5.24E-04	5.29E-04	5.24E-04	5.42E-04	5.18E-04	5.50E-04	5.27E-04	5.53E-04	5.44E-04	5.27E-04	5.22E-04	5.25E-04	5.40E-04	-	-	5.31E-04	5.31E-04	5.18E-04	5.53E-04	5.29E-04	5.53E-04	5.44E-04	15	100
Boron (B)	µg/m^3	*120*	-	1.17E-02	1.16E-02	1.16E-02	1.18E-02	1.16E-02	1.20E-02	1.15E-02	1.22E-02	1.17E-02	1.23E-02	1.21E-02	1.17E-02	1.16E-02	1.17E-02	1.20E-02	*120*	0	1.18E-02	1.18E-02	1.15E-02	1.23E-02	1.18E-02	1.23E-02	1.21E-02	15	100
Cadmium (Cd)	µg/m^3	*0.025*	*0.025*	5.83E-04	5.79E-04	5.82E-04	5.88E-04	5.82E-04	3.55E-03	5.75E-04	6.11E-04	5.85E-04	6.14E-04	6.05E-04	5.85E-04	5.80E-04	5.84E-04	6.00E-04	*0.025*	0	6.64E-04	7.87E-04	5.75E-04	3.55E-03	5.88E-04	3.55E-03	6.05E-04	15	100
Chromium (Cr)	µg/m^3	*0.5*	-	1.46E-03	1.45E-03	1.46E-03	1.47E-03	4.08E-03	4.39E-03	4.14E-03	4.34E-03	4.04E-03	4.18E-03	3.81E-03	3.92E-03	3.02E-03	3.79E-03	3.36E-03	*0.5*	0	3.00E-03	3.26E-03	1.45E-03	4.39E-03	4.08E-03	4.39E-03	3.92E-03	15	100
Cobalt (Co)	µg/m^3	*0.1*	*0.1*	5.83E-04	5.79E-04	5.82E-04	5.88E-04	5.82E-04	6.02E-04	5.75E-04	6.11E-04	5.85E-04	6.14E-04	1.27E-03	5.85E-04	5.80E-04	5.84E-04	6.00E-04	*0.1*	0	6.20E-04	6.35E-04	5.75E-04	1.27E-03	5.88E-04	6.14E-04	1.27E-03	15	100
Copper (Cu)	µg/m^3	*50*	-	4.35E-02	8.63E-03	5.03E-02	2.59E-02	2.60E-02	6.01E-02	7.30E-02	8.19E-03	1.73E-02	9.89E-03	8.77E-03	1.23E-02	9.58E-03	6.89E-03	1.49E-02	*50*	0	1.82E-02	2.50E-02	6.89E-03	7.30E-02	5.03E-02	7.30E-02	1.49E-02	15	100
Iron (Fe)	µg/m^3	*4*	-	3.28E-01	4.27E-01	2.73E-01	1.75E-01	2.41E-01	5.45E-01	3.65E-01	3.88E-01	2.66E-01	2.96E-01	1.03E-01	3.88E-01	2.85E-01	3.05E-01	1.26E-01	*4*	0	2.77E-01	3.01E-01	1.03E-01	5.45E-01	4.27E-01	5.45E-01	3.88E-01	15	100
Lead (Pb)	µg/m^3	*0.5*	*0.5*	2.39E-03	2.26E-03	4.54E-03	8.82E-04	8.74E-04	3.07E-03	8.63E-04	2.02E-03	2.63E-03	3.38E-03	2.00E-03	4.80E-03	8.71E-04	8.76E-04	9.00E-04	*2*	0	1.78E-03	2.16E-03	8.63E-04	4.80E-03	4.54E-03	3.38E-03	4.80E-03	15	100
Magnesium (Mg)	µg/m^3	-	-	2.33E-01	2.03E-01	1.51E-01	1.06E-01	2.10E-01	3.67E-01	2.13E-01	2.57E-01	1.17E-01	1.54E-01	7.86E-02	1.87E-01	2.26E-01	1.58E-01	9.00E-02	-	-	1.69E-01	1.83E-01	7.86E-02	3.67E-01	2.33E-01	3.67E-01	2.26E-01	15	100
Manganese (Mn)	µg/m^3	*0.4*	-	1.17E-02	7.99E-03	9.44E-03	3.76E-03	7.92E-03	1.96E-02	9.78E-03	1.20E-02	7.20E-03	8.48E-03	3.39E-03	1.15E-02	8.65E-03	5.78E-03	3.48E-03	*0.4*	0	7.82E-03	8.71E-03	3.39E-03	1.96E-02	1.17E-02	1.96E-02	1.15E-02	15	100
Molybdenum (Mo)	µg/m^3	*120*	-	1.17E-03	2.90E-04	1.16E-03	5.88E-04	1.11E-03	1.74E-03	1.73E-03	7.33E-04	8.19E-04	1.04E-03	7.86E-04	1.46E-03	7.54E-04	8.76E-04	8.40E-04	*120*	0	9.25E-04	1.01E-03	2.90E-04	1.74E-03	1.17E-03	1.74E-03	1.46E-03	15	100
Nickel (Ni)	µg/m^3	*0.2*	-	8.74E-04	8.69E-04	8.74E-04	8.82E-04	2.10E-03	2.23E-03	2.07E-03	2.26E-03	2.17E-03	2.21E-03	1.81E-03	2.11E-03	8.71E-04	8.76E-04	9.00E-04	*0.2*	0	1.40E-03	1.54E-03	8.69E-04	2.26E-03	2.10E-03	2.26E-03	2.11E-03	15	100
Phosphorus (P)	µg/m^3	-	-	2.19E-01	2.17E-01	2.18E-01	2.20E-01	2.18E-01	2.26E-01	2.16E-01	2.29E-01	2.19E-01	2.30E-01	2.27E-01	2.20E-01	2.18E-01	2.19E-01	2.25E-01	-	-	2.21E-01	2.21E-01	2.16E-01	2.30E-01	2.20E-01	2.30E-01	2.27E-01	15	100
Selenium (Se)	µg/m^3	*10*	*10*	2.91E-03	2.90E-03	2.91E-03	2.94E-03	2.91E-03	3.01E-03	2.88E-03	3.06E-03	2.93E-03	3.07E-03	3.02E-03	2.93E-03	2.90E-03	2.92E-03	3.00E-03	*10*	0	2.95E-03	2.95E-03	2.88E-03	3.07E-03	2.94E-03	3.07E-03	3.02E-03	15	100
Silver (Ag)	µg/m^3	*1*	*1*	2.91E-04	2.90E-04	2.91E-04	2.94E-04	2.91E-04	3.01E-04	2.88E-04	3.06E-04	2.93E-04	3.07E-04	3.02E-04	2.93E-04	2.90E-04	2.92E-04	3.00E-04	*1*	0	2.95E-04	2.95E-04	2.88E-04	3.07E-04	2.94E-04	3.07E-04	3.02E-04	15	100
Strontium (Sr)	µg/m^3	*120*	-	4.08E-03	5.44E-03	2.10E-03	2.00E-03	6.58E-03	7.28E-03	4.72E-03	6.36E-03	2.34E-03	2.95E-03	2.60E-03	4.92E-03	5.22E-03	4.96E-03	2.70E-03	*120*	0	3.93E-03	4.28E-03	2.00E-03	7.28E-03	6.58E-03	7.28E-03	5.22E-03	15	100
Thallium (Tl)	µg/m^3	-	-	2.62E-05	2.61E-05	2.62E-05	2.65E-05	2.62E-05	2.71E-05	2.59E-05	2.75E-05	2.63E-05	2.76E-05	2.72E-05	2.63E-05	2.61E-05	2.63E-05	2.70E-05	-	-	2.66E-05	2.66E-05	2.59E-05	2.76E-05	2.65E-05	2.76E-05	2.72E-05	15	100
Tin (Sn)	µg/m^3	*10*	*10*	7.58E-04	6.95E-04	8.15E-04	2.94E-04	7.57E-04	1.02E-03	5.75E-04	1.10E-03	1.64E-03	8.60E-04	3.02E-04	1.52E-03	6.38E-04	8.17E-04	3.00E-04	*10*	0	7.13E-04	8.06E-04	2.94E-04	1.64E-03	8.15E-04	1.64E-03	1.52E-03	15	100
Titanium (Ti)	µg/m^3	*120*	-	6.99E-03	1.04E-02	3.20E-03	3.23E-03	7.57E-03	1.20E-02	6.90E-03	1.04E-02	3.22E-03	3.38E-03	3.33E-03	7.03E-03	1.04E-02	7.59E-03	3.30E-03	*120*	0	5.86E-03	6.60E-03	3.20E-03	1.20E-02	1.04E-02	1.20E-02	1.04E-02	15	100
Uranium (Ur)	µg/m^3	*1.5*	-	2.91E-05	2.90E-05	2.91E-05	2.94E-05	2.91E-05	3.01E-05	2.88E-05	3.06E-05	2.93E-05	3.07E-05	3.02E-05	2.93E-05	2.90E-05	2.92E-05	3.00E-05	*1.5*	0	2.95E-05	2.95E-05	2.88E-05	3.07E-05	2.94E-05	3.07E-05	3.02E-05	15	100
Vanadium (V)	µg/m^3	*2*	*1*	1.46E-03	1.45E-03	1.46E-03	1.47E-03	1.46E-03	1.50E-03	1.44E-03	1.53E-03	1.46E-03	1.54E-03	1.51E-03	1.46E-03	1.45E-03	1.46E-03	1.50E-03	*2*	0	1.48E-03	1.48E-03	1.44E-03	1.54E-03	1.47E-03	1.54E-03	1.51E-03	15	100
Zinc (Zn)	µg/m^3	*120*	-	2.31E-02	3.10E-02	3.93E-02	1.09E-02	9.14E-03	5.45E-02	1.50E-02	4.76E-02	6.26E-02	3.26E-02	8.95E-03	4.51E-02	1.49E-02	1.86E-02	9.60E-03	*120*	0	2.28E-02	2.82E-02	8.95E-03	6.26E-02	3.93E-02	6.26E-02	4.51E-02	15	100
Zirconium (Zr)	µg/m^3	*20*	-	5.83E-04	5.79E-04	5.82E-04	5.88E-04	5.82E-04	6.02E-04	5.75E-04	6.11E-04	5.85E-04	6.14E-04	6.05E-04	5.85E-04	5.80E-04	5.84E-04	6.00E-04	*20*	0	5.90E-04	5.90E-04	5.75E-04	6.14E-04	5.88E-04	6.14E-04	6.05E-04	15	100

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

APPENDIX C
2020 Q4 COURTICE AND RUNDLE ROAD STATIONS ZERO GRAPHS


NOx Zeros (Courtice Monitoring Station)
ppb
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-1
-2
-3
-4
-5
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19/10/2020
22/10/2020
25/10/2020
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31/10/2020
3/11/2020
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9/11/2020
12/11/2020
15/11/2020
18/11/2020
21/11/2020
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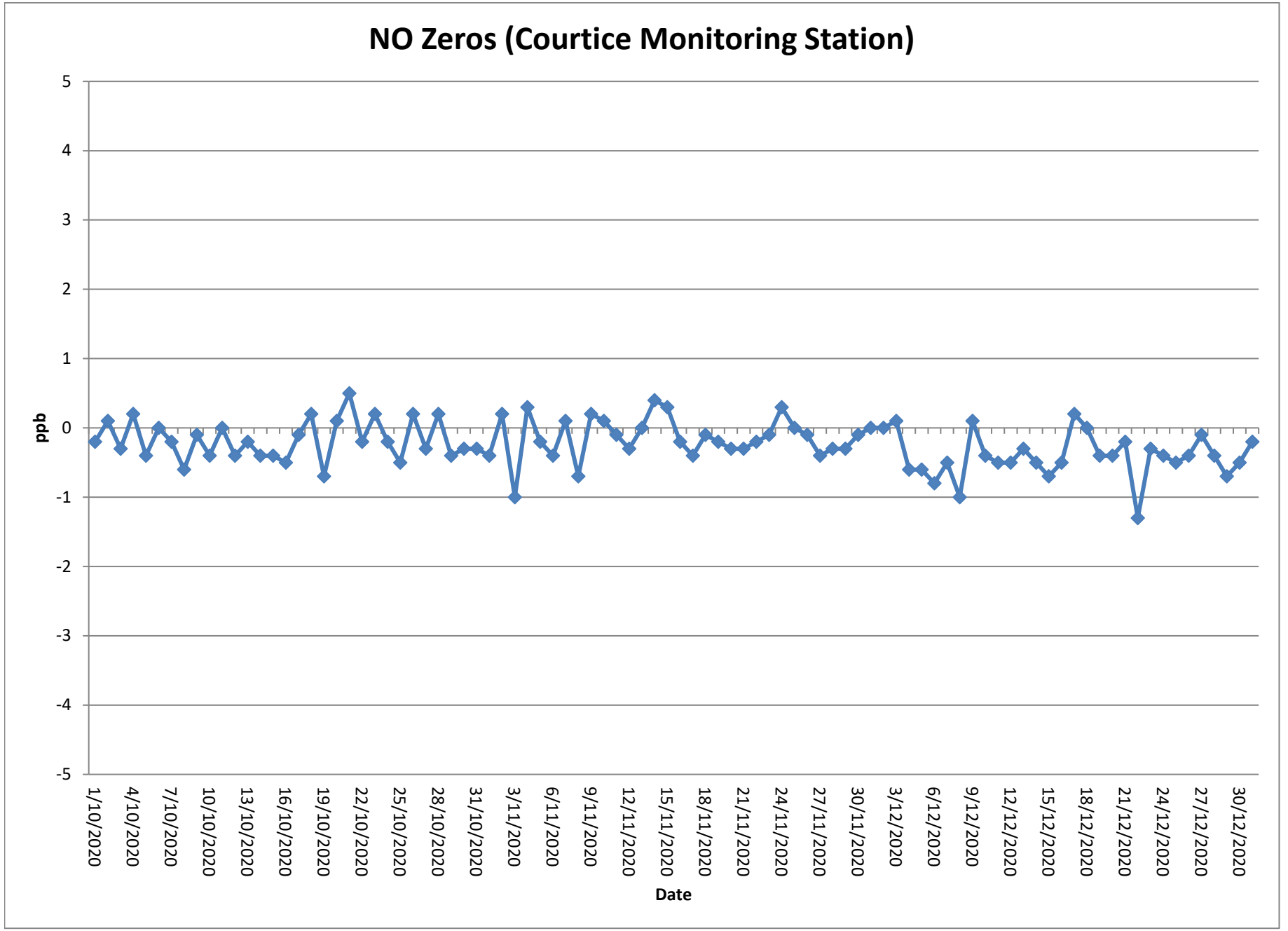
24/12/2020
27/12/2020
30/12/2020
Date


NO Zeros (Courtice Monitoring Station)
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-1
-2
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-5
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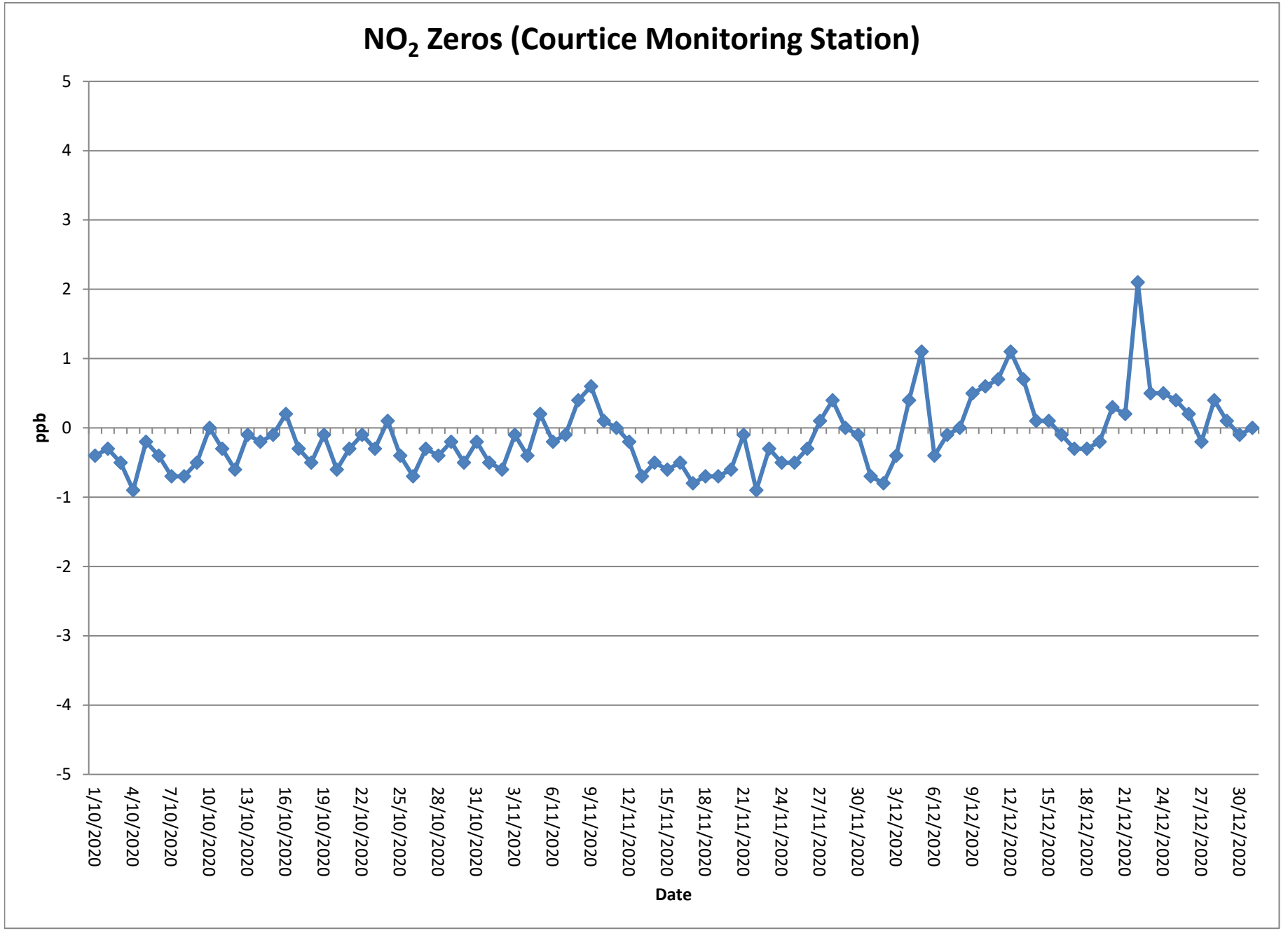
21/12/2020
24/12/2020
27/12/2020
30/12/2020
Date


NO2 Zeros (Courtice Monitoring Station)
ppb
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1/10/2020
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7/10/2020
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24/12/2020
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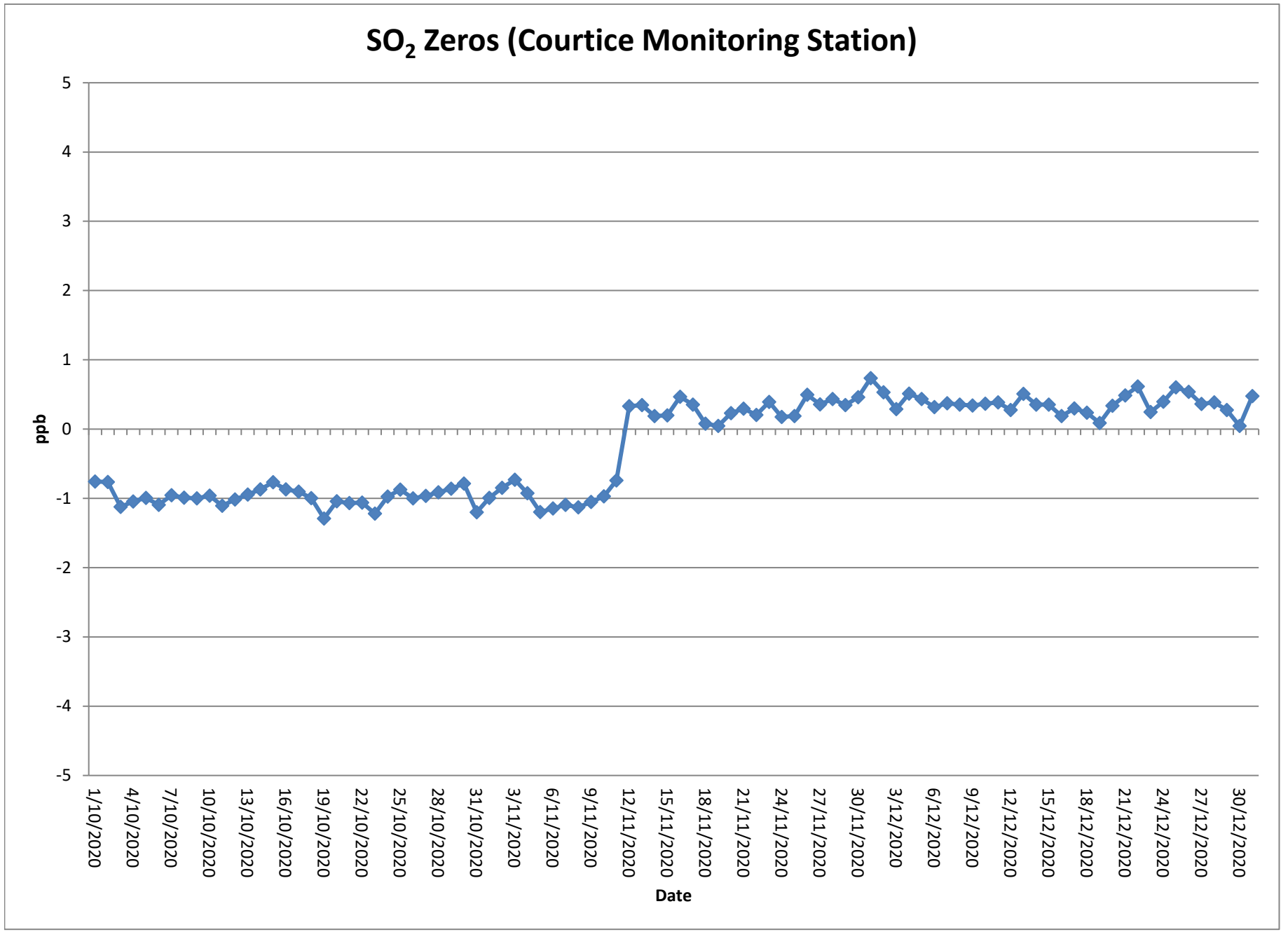
30/12/2020
Date


SO2 Zeros (Courtice Monitoring Station)
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1/10/2020
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10/10/2020
13/10/2020
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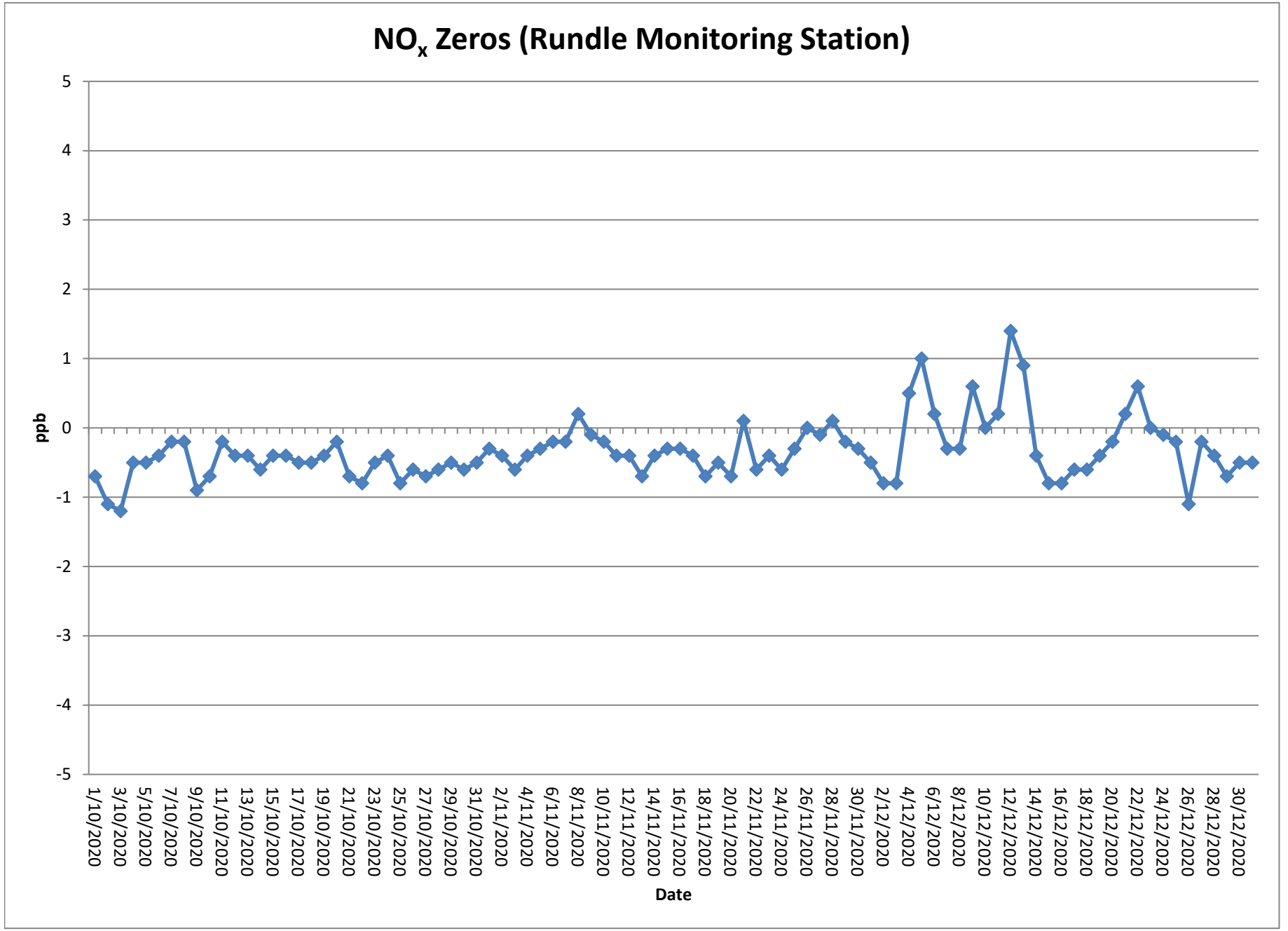
NOx Zeros (Rundle Monitoring Station)
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-2
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23/10/2020
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31/10/2020
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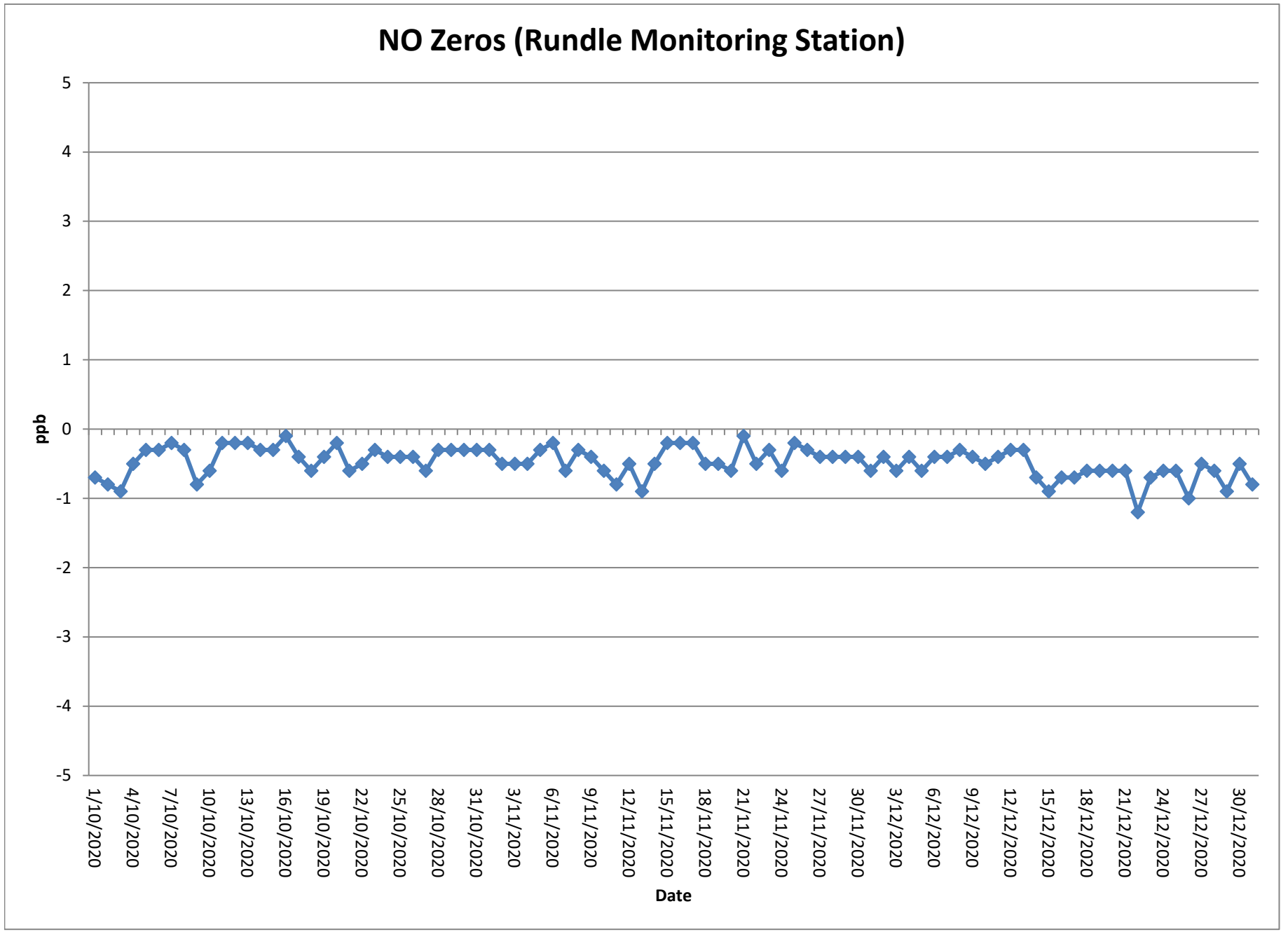
28/12/2020
30/12/2020
Date


NO Zeros (Rundle Monitoring Station)
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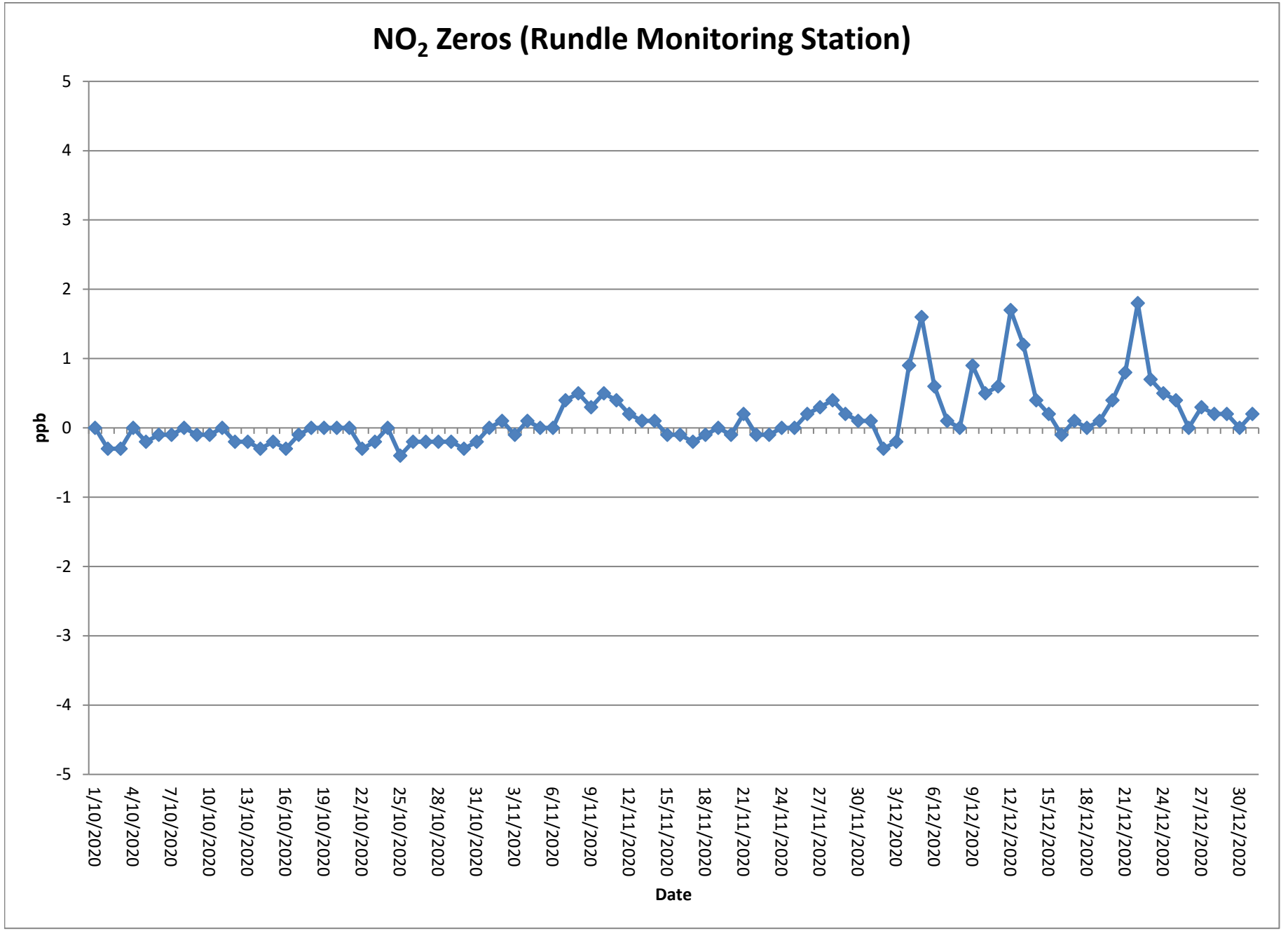
NO2 Zeros (Rundle Monitoring Station)
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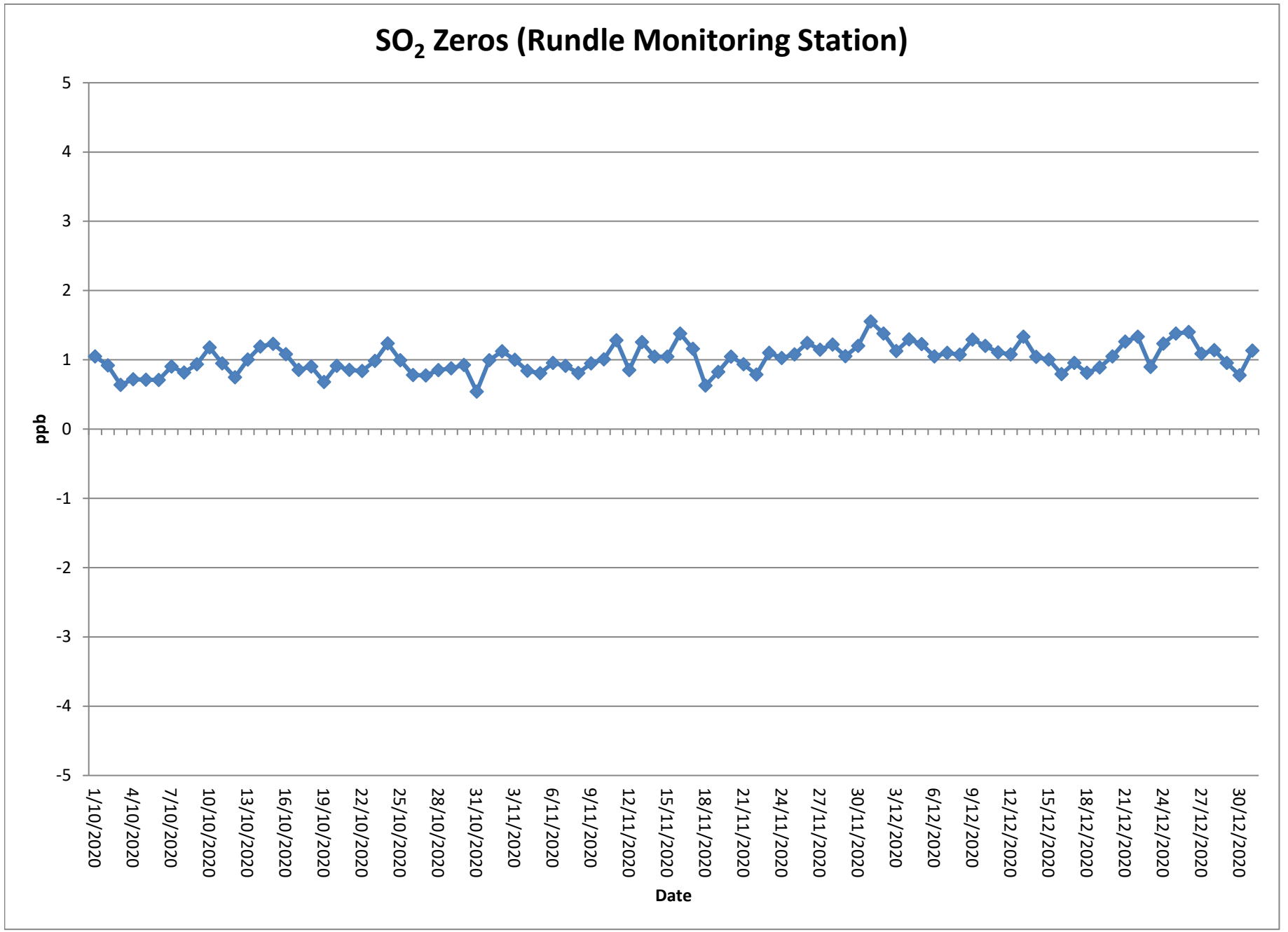
30/12/2020
Date


SO2 Zeros (Rundle Monitoring Station)
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1/10/2020
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9/12/2020
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Date

APPENDIX D 2020
Q4 EDIT LOGS

Table D1: Q4 Edit Log for $PM_{2.5}$ at Courtice Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller	**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca				
Station Number: 45201				**Station Name:** Courtice Station				
Station Address: 100 Osbourne Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: $PM_{2.5}$		**Instrument Make & Model:** Thermo Scientific Model 5030 SHARP Monitor				**s/n:** E 1563		
Data Edit Period	Start Date: October 1, 2020			End Date: December 31, 2020			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	08/10/2020	SRS	Deleted Hours	08/10/2020	11:00	08/10/2020	13:00	Monthly Calibration
2	19/11/2020	VML	Zero correction	01/10/2020	00:00	31/10/2020	23:00	Correcting values <0 to 0
3	24/11/2020	SRS	Deleted Hours	24/11/2020	12:00	24/11/2020	13:00	Monthly Calibration
4	03/12/2020	SRS	Deleted Hours	03/12/2020	12:00	03/12/2020	14:00	Monthly Calibration

Table D2: Q4 Edit Log for $PM_{2.5}$ at Rundle Road Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller		**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca			
Station Number: 45200				**Station Name:** Rundle Road Station				
Station Address: Rundle Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: $PM_{2.5}$			**Instrument Make & Model:** Thermo Scientific Model 5030 SHARP Monitor				**s/n:** E 1569	
Data Edit Period		Start Date: October 1, 2020		End Date: December 31, 2020			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	08/10/2020	SRS	Deleted Hours	08/10/2020	16:00	08/10/2020	17:00	Monthly Calibration
2	19/11/2020	VML	Zero correction	01/10/2020	00:00	31/10/2020	23:00	Correcting values <0 to 0
3	24/11/2020	SRS	Deleted Hours	24/11/2020	13:00	24/11/2020	15:00	Monthly Calibration
4	03/12/2020	SRS	Deleted Hours	03/12/2020	16:00	03/12/2020	17:00	Monthly Calibration

Table D3: Q4 Edit Log for NO_X at Courtice Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller	**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca				
Station Number: 45201			**Station Name:** Courtice Station					
Station Address: 100 Osbourne Road			**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON					
Pollutants or Parameter: NOx		**Instrument Make & Model:** Teledyne Nitrogen Oxide Analyzer Model T200				**s/n:** 675		
Data Edit Period	Start Date: October 1, 2020		End Date: December 31, 2020			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	08/10/2020	SRS	Deleted Hours	08/10/2020	11:00	08/10/2020	13:00	Monthly Calibration
2	19/11/2020	VML	Zero correction	01/10/2020	00:00	31/10/2020	23:00	Correcting values <0 to 0
3	11/11/2020	SRS	Deleted Hours	11/11/2020	12:00	11/11/2020	17:00	Monthly Calibration
4	21/12/2020	VML	Zero correction	01/11/2020	00:00	30/11/2020	23:00	Correcting values <0 to 0
5	03/12/2020	SRS	Deleted Hours	03/12/2020	11:00	03/12/2020	14:00	Monthly Calibration
6	11/01/2021	VML	Zero correction	01/12/2020	00:00	31/12/2020	23:00	Correcting values <0 to 0

Table D4: Q4 Edit Log for NO_X at Rundle Road Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller	**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca				
Station Number: 45200				**Station Name:** Rundle Road Station				
Station Address: Rundle Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: NOx		**Instrument Make & Model:** Teledyne Nitrogen Oxide Analyzer Model T200					**s/n:** 676	
Data Edit Period	Start Date: October 1, 2020			End Date: December 31, 2020			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	08/10/2020	SRS	Deleted Hours	08/10/2020	15:00	08/10/2020	17:00	Monthly Calibration
2	19/11/2020	VML	Zero correction	01/10/2020	00:00	31/10/2020	23:00	Correcting values <0 to 0
3	11/11/2020	SRS	Deleted Hours	12/11/2020	13:00	12/11/2020	16:00	Monthly Calibration
4	21/12/2020	VML	Zero correction	01/11/2020	00:00	30/11/2020	23:00	Correcting values <0 to 0
5	03/12/2020	SRS	Deleted Hours	03/12/2020	15:00	03/12/2020	17:00	Monthly Calibration
6	11/01/2021	VML	Zero correction	01/12/2020	00:00	31/12/2020	23:00	Correcting values <0 to 0

Table D5: Q4 Edit Log for SO_2 at Courtice Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller	**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca				
Station Number: 45201			**Station Name:** Courtice Station					
Station Address: 100 Osbourne Road			**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON					
Pollutants or Parameter: SO_2		**Instrument Make & Model:** Teledyne Sulfur Dioxide Analyzer Model T100				**s/n:** 565		
Data Edit Period	Start Date: October 1, 2020		End Date: December 31, 2020		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	08/10/2020	SRS	Deleted Hours	08/10/2020	12:00	08/10/2020	14:00	Monthly Calibration
2	19/11/2020	VML	Zero offset adjustment	08/10/2020	14:00	11/11/2020	16:00	Correcting zero drift based on takeout calibration
3	11/19/2020	VML	Zero correction	01/10/2020	00:00	31/10/2020	23:00	Correcting values <0 to 0
4	11/11/2020	SRS	Deleted Hours	11/11/2020	16:00	11/11/2020	19:00	Monthly Calibration
5	21/12/2020	VML	Zero correction	01/11/2020	00:00	30/11/2020	23:00	Correcting values <0 to 0
6	03/12/2020	SRS	Deleted Hours	03/12/2020	13:00	03/12/2020	15:00	Monthly Calibration
7	11/01/2021	VML	Zero correction	01/12/2020	00:00	31/12/2020	23:00	Correcting values <0 to 0

Table D6: Q4 Edit Log for SO_2 at Rundle Road Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller	**Phone:** (905) 404-0888 ext 4107	**Email:** Lyndsay.Waller@Durham.ca					
Station Number: 45200			**Station Name:** Rundle Road Station					
Station Address: Rundle Road			**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON					
Pollutants or Parameter: SO_2		**Instrument Make & Model:** Teledyne Sulfur Dioxide Analyzer Model T100					**s/n:** 566	
Data Edit Period	Start Date: October 1, 2020		End Date: December 31, 2020			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	08/10/2020	SRS	Deleted Hours	08/10/2020	16:00	08/10/2020	18:00	Monthly Calibration
2	19/11/2020	VML	Zero correction	01/10/2020	00:00	31/10/2020	23:00	Correcting values <0 to 0
3	11/11/2020	SRS	Deleted Hours	12/11/2020	15:00	12/11/2020	17:00	Monthly Calibration
4	21/12/2020	VML	Zero correction	01/11/2020	00:00	30/11/2020	23:00	Correcting values <0 to 0
5	03/12/2020	SRS	Deleted Hours	03/12/2020	16:00	03/12/2020	18:00	Monthly Calibration
6	11/01/2021	VML	Zero correction	01/12/2020	00:00	31/12/2020	23:00	Correcting values <0 to 0

Table D7: Q4 Edit Log for Meteorological Parameters at Courtice Road Station

Emitter's Name: Durham York Energy Centre								
Contact	**Name:** Ms. Lyndsay Waller	**Phone:** (905) 404-0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca				
Station Number: 45201				**Station Name:** Courtice Station				
Station Address: 100 Osbourne Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: WS, WD, Ambient T, P, RH and Rain		**Instrument Make & Model:** Miscellaneous Meterological Instrumentation				**s/n:** N/A		
Data Edit Period		Start Date: October 1, 2020		End Date: December 31, 2020		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	19/11/2020	VML	Deleted Hours	01/11/2020	01:00	01/11/2020	02:00	Hour of data lost due to overwriting data during daylight savings time change

Table D8: Q4 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: 45200				**Station Name:** Rundle Station				
Station Address: Rundle Road				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: WS, WD, Ambient T, P, RH and Rain			**Instrument Make & Model:** Miscellaneous Meterological Instrumentation				**s/n:** N/A	
Data Edit Period		Start Date: October 1, 2020		End Date: December 31, 2020			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	11/01/2021	VML	Deleted Hours	25/12/2020	05:00	25/12/2020	19:00	Suspected frozen windhead. Invalidated WS and WD data during this time.

Table D9: Q4 Edit Log for Discrete Sampling at Courtice Station

Emitter's Name: Durham York Energy Center								
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: N/A		**Instrument Make & Model:** N/A					**s/n:**	
Data Edit Period	Start Date: October 1, 2020			End Date: December 31, 2020			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)**	
-	-	-	-	-	-	-	-	-

Table D10: Q4 Edit Log for Discrete Sampling at Rundle Station

Emitter's Name: Durham York Energy Center								
Contact	**Name:** Ms. Lyndsay Waller		**Phone:** (905) 404 0888 ext 4107		**Email:** Lyndsay.Waller@Durham.ca			
Station Number: 45200				**Station Name:** Rundle Station				
Station Address: Rundle Rd				**Emitter Address:** The Region of Durham, 605 Rossland Road, Whitby, ON				
Pollutants or Parameter: N/A			**Instrument Make & Model:** N/A				**s/n:**	
Data Edit Period	Start Date: October 1, 2020			End Date: December 31, 2020			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)**	
-	-	-	-	-	-	-	-	-

APPENDIX E
2020 Q4 EXCEEDANCE INFORMATION

APPENDIX E1
TABLE E1 - 10 MINUTE SO_2 RUNNING AVERAGE EXCEEDANCE AT COURTICE

Table E1. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on December 18, 2020

Date & Time	Wind Direction	SO_2 5 min Avg.	SO_2 10 min Running Avg.	
EST	°	ppb	ppb	
18/12/2020 10:05	105.2	56.666	36.879	
18/12/2020 10:10	102.65	60.348	58.507	
18/12/2020 10:15		69.251	64.799	
18/12/2020 10:20	99.53	70.833	**70.042**	1
18/12/2020 10:25		53.526	62.18	
18/12/2020 10:30	108.91	27.518	40.522	
18/12/2020 10:35		33.031	30.275	
18/12/2020 10:40	92.31	16.921	24.976	
18/12/2020 10:45		12.422	14.672	
18/12/2020 10:50	91.56	5.088	8.755	

D, T & V	Date, Time & Exceedance Value Reported (Reported exceedance is the first running avg. value highlighted)
Max	Maximum of the Range
Min	Minimum of the Range
Faded Values	These values are not used to calculate the number of reportable exceedances
	Range of 5-minute measurements that contribute to the exceedance value
	Range of running average values during exceedance period
#	Exceedance number

APPENDIX E2
NOVEMBER 11, 2020 BaP EXCEEDANCE DOCUMENTATION FOR RUNDLE ROAD

600 Southgate Drive
Guelph ON Canada
N1G 4P6

Tel: +1.519.823.1311
Fax: +1.519.823.1316
E-mail: solutions@rwdi.com

MEMORANDUM

DATE:	2020-12-17	**RWDI Reference No.:** 1803743
TO:	Gioseph Anello	**EMAIL:** Gioseph.Anello@Durham.ca
CC:	Andrew Evans	**EMAIL:** Andrew.Evans@Durham.ca
CC:	Lyndsay Waller	**EMAIL:** Lyndsay.Waller@Durham.ca
FROM:	John DeYoe	**EMAIL:** jd@rwdi.com
RE:	**Exceedance Report – Benzo(a)Pyrene November 11, 2020** **Region of Durham, DYEC**	

On December 9, 2020 the results from ALS Environmental were received regarding the PAH results from the November 11, 2020 sampling event. On December 11, 2020, the results were entered and assessed, and it was found that there was one (1) measured Benzo(a)Pyrene concentration in excess of the 24-hour AAQC on the November 11th sampling date.

November 11, 2020

On Wednesday, November 11, 2020, there was one exceedance of the Benzo(a)Pyrene 24-hour AAQC, which occurred at the Rundle Road Station measured at the onsite PUF PS-1 sampler. Attached is a figure depicting the wind rose (indicating the wind speed and direction during the sampling day), and the location of the sampling station relative to the DYEC.

The following summarizes the BaP concentrations and onsite conditions during the November 11th sampling date:

1. The guideline concentration for BaP is 0.00005 ug/m^3. The measured concentration at the Rundle Road sampler was 0.000053 µg/m^3. During the sampling day the wind was recorded predominantly from the SW and WSW as recorded at the Rundle Road Meteorological Tower. Wind speeds at Rundle tower ranged from 1.67 km/h to 20.45 km/h.

2. According to the Rundle meteorological data, the Rundle Road Station was downwind of the DYEC during part of the sampling period. Since the winds were predominantly coming from the Southwest and West-southwest, it is likely that the measured BaP exceedances may be partially attributed to the DYEC and sources other than the Energy Centre operations.

At the Rundle Road Station, the NO_2 hourly values were less than 9.15% of the criteria for the same period. The $PM_{2.5}$ 24-hour average value was 2.2 micrograms per cubic meter at the Rundle Road Station.

We have also attached the data files for the sample in question to aid with the review.

Respectfully submitted by:

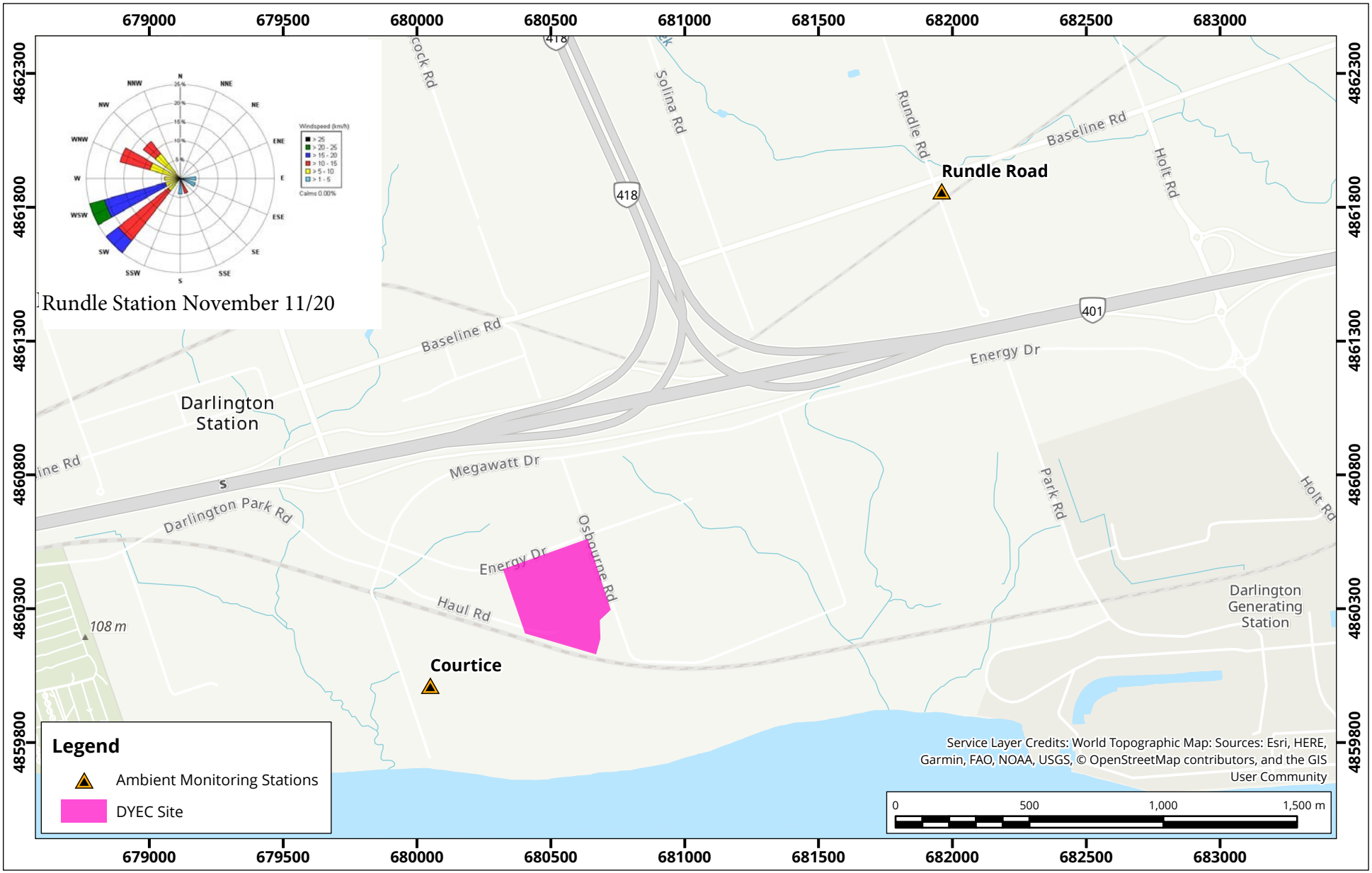
RWDI AIR Inc.

John DeYoe, B.A.
Senior Consultant / Principal

JD

Attach.

FIGURE



DYEC Site and Ambient Monitoring Station Locations

True North

Drawn by: VML	Figure: 1
Approx. Scale:	1:20,000
Date: Dec. 15/20	

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

Map Document: C:\GIS Temp - Copy\1803743\1803743_Durham_Energy_Centre.aprx

SUPPORTING DATA

1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Claire Kocharakkal	**Client Name:**	RWDI Air Inc.
ALS Project ID:	23601	**Client Address:**	600 Southgate Drive
ALS WO#:	L2530241		Guelph, ON N1G 4P6
Date of Report	9-Dec-20		Canada
Date of Sample Receipt	17-Nov-20	**Client Contact:**	John DeYoe
		Client Project ID:	DYEC

COMMENTS: **PAH by CARB method 429 (LR option)- Isotope dilution**

For the sample COURTICE-PAH-NOV11, the results for benzo[a]pyrene and benzo[e]pyrene have been reported from the analysis of a diluted extract due to an interference causing localized suppression.

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		Method Blank		RUNDLE-PAH-NOV11		COURTICE-PAH-NOV11		Laboratory Control Sample	
ALS Sample ID	WG3446475-1		WG3446475-4		L2530241-1		L2530241-2		WG3446475-2	
Sample Size	1		1		1		1		1	
Sample units	Sample		Sample		Sample		Sample		n/a	
Moisture Content	n/a		n/a		n/a		n/a		n/a	
Matrix	QC		QC		Puf		Puf		QC	
Sampling Date	n/a		n/a		11-Nov-20		11-Nov-20		n/a	
Extraction Date	18-Nov-20		18-Nov-20		18-Nov-20		18-Nov-20		18-Nov-20	
Target Analytes	**ng**		**ng**		**ng**		**ng**		**%**	
Naphthalene	2530	M	3.38	R	8390	B	6850	B	117.2	
2-Methylnaphthalene	5.98		1.46	R	2490		1410		85.8	
1-Methylnaphthalene	4.23		0.600	R	1690		1030		103.4	
Acenaphthylene	0.270	R	<0.20	U	39.8	R	41.1	R	85.2	
Acenaphthene	2.27	R	<0.20	U	1000		188		82.2	
Fluorene	1.10		<0.20	U	850		243		74.8	
Phenanthrene	4.62		0.890		1730		82.0		84.7	
Anthracene	22.8	R	<0.20	U	73.9	B	42.5	B	112.6	B
Fluoranthene	1.38	R	0.470		266		147		79.6	
Pyrene	1.46	R	0.410		124		72.1		81.6	
Benzo(a)Anthracene	<0.20	U	<0.20	U	5.44		5.81		78.5	
Chrysene	<0.20	U	<0.20	U	20.6		12.0		88.6	
Benzo(b)Fluoranthene	<0.20	U	<0.20	U	15.1	M	15.3	M	81.5	
Benzo(k)Fluoranthene	<0.20	U	<0.20	U	12.0	M	11.9	M	96	
Benzo(e)Pyrene	<0.20	U	<0.20	U	11.0		10.7		81.3	
Benzo(a)Pyrene	<0.20	U	0.280	R	16.5		11.3	R	102.2	M
Perylene	<0.20	U	<0.20	U	0.510	R	<0.20	U	88.3	
Indeno(1,2,3-cd)Pyrene	<0.20	U	<0.20	U	9.59		9.98		80.1	
Dibenzo(a,h)Anthracene	<0.20	U	<0.20	U	1.41		5.58	R	81.2	
Benzo(g,h,i)Perylene	<0.20	U	<0.20	U	10.3		10.0	R	83.5	
Additional Analytes										
Tetralin	1900	M	<0.20	U	5190	B	2180	M,B		
Biphenyl	4.07		0.310	R	5960		536			
o-Terphenyl	<0.20	U	<0.20	U	6.37		4.46			
Benzo(a)fluorene	<0.20	U	<0.20	U	14.4	M,R	12.7	M,R		
Benzo(b)fluorene	<0.20	U	<0.20	U	7.63		9.44	R		
Field Sampling Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	NS		NS		80.1		109.2		NS	
Fluorene D10	NS		NS		59.7		148.9		NS	
Terphenyl D14(Surr.)	NS		NS		99.2		101.6		NS	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Naphthalene D8	58.2	R	75.7		103.4	M	21	R	27.2	R
2-Methylnaphthalene-D10	69.1		72.7		69		46.3		34.3	
Acenaphthylene D8	80.1		89.8		67.8		59.5		39.2	
Phenanthrene D10	81.6		94.8		80.4		98.2		39.3	
Anthracene-D10	67.1		70.7		66.7		62.8		32	
Fluoranthene D10	95.2		101.7		93.4		93.6		47.6	
Benz(a)Anthracene-D12	100.6		85.2		106.2		111.7		54.2	
Chrysene D12	79.9		86.8		98.4		138.6	M	43.1	
Benzo(b)Fluoranthene-D12	100.1		111.1		92.6		92.5		50.1	
Benzo(k)Fluoranthene-D12	89.5	R	85		87.3	R	82.9	R	46.2	R
Benzo(a)Pyrene D12	88.3	R	75.8		83	R	95.7	M,R	48.7	R
Perylene D12	101.3		25.4		123.2		70.3	M,R	54	
Indeno(1,2,3,cd)Pyrene-D12	86.5		85.5		105.6		119		49.9	
Dibenz(a,h)Anthracene-D14	73		68.4		90.1		103.3		45.5	
Benzo(g,h,i)Perylene D12	78.9		83.5		91.6		99.6		45	

U	Indicates that this compound was not detected above the LOD.
M	Indicates that a peak has been manually integrated.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
NS	Indicates that this compound was not spiked in.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**		Sampling Date	n/a	
ALS Sample ID	WG3446475-1		Extraction Date	18-Nov-20	
Analysis Method	PAH by CARB 429				
Analysis Type	blank				
Sample Matrix	MEDIA				Approved:
Sample Size	1	Sample			*Andrew Reid*
Percent Moisture	n/a				--e-signature--
Split Ratio	1		Workgroup	WG3446475	02-Dec-2020

Run Information	**Run 1**
Filename	201127A06.D
Run Date	11/30/2020 9:45
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Naphthalene	2.75	2530	M
2-Methylnaphthalene	3.35	5.98	
1-Methylnaphthalene	3.47	4.23	
Acenaphthylene	4.52	0.270	R
Acenaphthene	4.82	2.27	R
Fluorene	5.76	1.10	
Phenanthrene	7.99	4.62	
Anthracene	8.11	22.8	R
Fluoranthene	11.45	1.38	R
Pyrene	12.10	1.46	R
Benzo(a)Anthracene	16.11	<0.20	U
Chrysene	16.18	<0.20	U
Benzo(b)Fluoranthene	NotFnd	<0.20	U
Benzo(k)Fluoranthene	NotFnd	<0.20	U
Benzo(e)Pyrene	NotFnd	<0.20	U
Benzo(a)Pyrene	NotFnd	<0.20	U
Perylene	NotFnd	<0.20	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<0.20	U
Dibenzo(a,h)Anthracene	NotFnd	<0.20	U
Benzo(g,h,i)Perylene	NotFnd	<0.20	U
Additional Analytes			
Tetralin	2.62	1900	M
Biphenyl	3.90	4.07	
o-Terphenyl	NotFnd	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	200	2.73	58.2	R	50-150
2-Methylnaphthalene-D10	200	3.32	69.1		50-150
Acenaphthylene D8	200	4.50	80.1		50-150
Phenanthrene D10	200	7.94	81.6		50-150
Anthracene-D10	110	8.07	67.1		50-150
Fluoranthene D10	200	11.39	95.2		50-150
Benz(a)Anthracene-D12	200	15.99	100.6		50-150
Chrysene D12	200	16.11	79.9		50-150
Benzo(b)Fluoranthene-D12	200	19.38	100.1		50-150
Benzo(k)Fluoranthene-D12	200	19.47	89.5	R	50-150
Benzo(a)Pyrene D12	200	20.28	88.3	R	50-150
Perylene D12	200	20.51	101.3		50-150
Indeno(1,2,3,cd)Pyrene-D12	200	24.14	86.5		50-150
Dibenz(a,h)Anthracene-D14	200	24.31	73.0		50-150
Benzo(g,h,i)Perylene D12	200	25.16	78.9		50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3446475-4	Extraction Date	18-Nov-20
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	REAGENT		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3446475

Approved:
Andrew Reid
--e-signature--
02-Dec-2020

Run Information	**Run 1**
Filename	201127A07.D
Run Date	11/30/2020 10:23
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Naphthalene	2.75	3.38	R
2-Methylnaphthalene	3.35	1.46	R
1-Methylnaphthalene	3.47	0.600	R
Acenaphthylene	4.52	<0.20	U
Acenaphthene	NotFnd	<0.20	U
Fluorene	5.76	<0.20	U
Phenanthrene	8.00	0.890	
Anthracene	8.12	<0.20	U
Fluoranthene	11.45	0.470	
Pyrene	12.10	0.410	
Benzo(a)Anthracene	16.11	<0.20	U
Chrysene	16.18	<0.20	U
Benzo(b)Fluoranthene	19.38	<0.20	U
Benzo(k)Fluoranthene	19.46	<0.20	U
Benzo(e)Pyrene	20.13	<0.20	U
Benzo(a)Pyrene	20.28	0.280	R
Perylene	NotFnd	<0.20	U
Indeno(1,2,3-cd)Pyrene	24.14	<0.20	U
Dibenzo(a,h)Anthracene	NotFnd	<0.20	U
Benzo(g,h,i)Perylene	25.16	<0.20	U
Additional Analytes			
Tetralin	NotFnd	<0.20	U
Biphenyl	3.90	0.310	R
o-Terphenyl	9.29	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	200	2.73	75.7	50-150
2-Methylnaphthalene-D10	200	3.32	72.7	50-150
Acenaphthylene D8	200	4.50	89.8	50-150
Phenanthrene D10	200	7.94	94.8	50-150
Anthracene-D10	110	8.07	70.7	50-150
Fluoranthene D10	200	11.40	101.7	50-150
Benz(a)Anthracene-D12	200	15.99	85.2	50-150
Chrysene D12	200	16.11	86.8	50-150
Benzo(b)Fluoranthene-D12	200	19.38	111.1	50-150
Benzo(k)Fluoranthene-D12	200	19.47	85.0	50-150
Benzo(a)Pyrene D12	200	20.28	75.8	50-150
Perylene D12	200	20.52	25.4	50-150
Indeno(1,2,3,cd)Pyrene-D12	200	24.14	85.5	50-150
Dibenz(a,h)Anthracene-D14	200	24.31	68.4	50-150
Benzo(g,h,i)Perylene D12	200	25.17	83.5	50-150

M Indicates that a peak has been manually integrated.
U Indicates that this compound was not detected above the MDL.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Sample Analysis Report

Sample Name	**RUNDLE-PAH-NOV11**	Sampling Date	11-Nov-20 00:00
ALS Sample ID	L2530241-1	Extraction Date	18-Nov-20
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Puf		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3446475

Approved:
Andrew Reid
--e-signature--
02-Dec-2020

Run Information	**Run 1**	**Run 2**
Filename	201127A10.D	201127A08.D
Run Date	11/30/2020 12:17	11/30/2020 11:01
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	20
Analysis Units	ng	ng
Instrument	MSD-5	MSD-5
Column	HP5MS USO179454H	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	**Ret. Time.**	**Concentration ng**	**Flags**
Naphthalene				2.76	8390	B
2-Methylnaphthalene				3.36	2490	
1-Methylnaphthalene				3.47	1690	
Acenaphthylene	4.52	39.8	R			
Acenaphthene				4.82	1000	
Fluorene				5.76	850	
Phenanthrene				8.00	1730	
Anthracene	8.12	73.9	B			
Fluoranthene				11.46	266	
Pyrene	12.11	124				
Benzo(a)Anthracene	16.07	5.44				
Chrysene	16.19	20.6				
Benzo(b)Fluoranthene	19.46	15.1 M				
Benzo(k)Fluoranthene	19.49	12.0 M				
Benzo(e)Pyrene	20.20	11.0				
Benzo(a)Pyrene	20.34	16.5				
Perylene	20.59	0.510	R			
Indeno(1,2,3-cd)Pyrene	24.24	9.59				
Dibenzo(a,h)Anthracene	24.44	1.41				
Benzo(g,h,i)Perylene	25.29	10.3				
Additional Analytes						
Tetralin				2.63	5190	B
Biphenyl				3.90	5960	
o-Terphenyl	9.30	6.37				
Benzo(a)fluorene	13.29	14.4 M	R			
Benzo(b)fluorene	13.51	7.63				

Field Sampling Standards	**ng spiked**		**% Rec**			**% Rec**	
1-Methylnaphthalene-D10	200	3.44	80.1				
Fluorene D10	200	5.71	59.7				
Terphenyl D14(Surr.)	200	12.92	99.2				
Extraction Standards			**% Rec**		**Limits**	**% Rec**	
Naphthalene D8	200				50-150	2.74	103.4 M
2-Methylnaphthalene-D10	200	3.33	69.0		50-150		
Acenaphthylene D8	200	4.50	67.8		50-150		
Phenanthrene D10	200	7.95	80.4		50-150		
Anthracene-D10	110	8.07	66.7		50-150		
Fluoranthene D10	200	11.40	93.4		50-150		
Benz(a)Anthracene-D12	200	16.00	106.2		50-150		
Chrysene D12	200	16.11	98.4		50-150		
Benzo(b)Fluoranthene-D12	200	19.39	92.6		50-150		
Benzo(k)Fluoranthene-D12	200	19.47	87.3	R	50-150		
Benzo(a)Pyrene D12	200	20.28	83.0	R	50-150		
Perylene D12	200	20.52	123.2		50-150		
Indeno(1,2,3,cd)Pyrene-D12	200	24.15	105.6		50-150		
Dibenz(a,h)Anthracene-D14	200	24.32	90.1		50-150		
Benzo(g,h,i)Perylene D12	200	25.17	91.6		50-150		

M	Indicates that a peak has been manually integrated
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion

ALS Life Sciences

Sample Analysis Report

Sample Name	**COURTICE-PAH-NOV11**	Sampling Date	11-Nov-20 00:00
ALS Sample ID	L2530241-2	Extraction Date	18-Nov-20
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Puf		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3446475

Approved:
Andrew Reid
--e-signature--
02-Dec-2020

Run Information	**Run 1**	**Run 2**
Filename	201127A11.D	201127A09.D
Run Date	11/30/2020 12:56	11/30/2020 11:39
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	20
Analysis Units	ng	ng
Instrument	MSD-5	MSD-5
Column	HP5MS USO179454H	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	**Ret. Time.**	**Concentration ng**	**Flags**
Naphthalene				2.76	6850	B
2-Methylnaphthalene				3.36	1410	
1-Methylnaphthalene				3.47	1030	
Acenaphthylene	4.52	41.1	R			
Acenaphthene	4.83	188				
Fluorene	5.76	243				
Phenanthrene				8.00	82.0	
Anthracene	8.12	42.5	B			
Fluoranthene	11.46	147				
Pyrene	12.11	72.1				
Benzo(a)Anthracene	16.07	5.81				
Chrysene	16.19	12.0				
Benzo(b)Fluoranthene	19.45	15.3 M				
Benzo(k)Fluoranthene	19.49	11.9 M				
Benzo(e)Pyrene				20.21	10.7	
Benzo(a)Pyrene				20.32	11.3	R
Perylene	NotFnd	<0.20	U			
Indeno(1,2,3-cd)Pyrene	24.24	9.98				
Dibenzo(a,h)Anthracene	24.48	5.58	R			
Benzo(g,h,i)Perylene	25.29	10.0	R			
Additional Analytes						
Tetralin	2.63	2180 M	B			
Biphenyl	3.90	536				
o-Terphenyl	9.30	4.46				
Benzo(a)fluorene	13.30	12.7 M	R			
Benzo(b)fluorene	13.51	9.44	R			

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	200	3.44	109.2
Fluorene D10	200	5.72	148.9
Terphenyl D14(Surr.)	200	12.92	101.6

Extraction Standards			**% Rec**		**Limits**		**% Rec**	
Naphthalene D8	200				50-150	2.74	21	R
2-Methylnaphthalene-D10	200	3.33	46.3		50-150			
Acenaphthylene D8	200	4.51	59.5		50-150			
Phenanthrene D10	200	7.95	98.2		50-150			
Anthracene-D10	110	8.07	62.8		50-150			
Fluoranthene D10	200	11.40	93.6		50-150			
Benz(a)Anthracene-D12	200	16.00	111.7		50-150			
Chrysene D12	200	16.12	138.6 M		50-150			
Benzo(b)Fluoranthene-D12	200	19.39	92.5		50-150			
Benzo(k)Fluoranthene-D12	200	19.47	82.9	R	50-150			
Benzo(a)Pyrene D12	200				50-150	20.29	95.7 M	R
Perylene D12	200	20.68	70.3 M	R	50-150			
Indeno(1,2,3,cd)Pyrene-D12	200	24.15	119.0		50-150			
Dibenz(a,h)Anthracene-D14	200	24.32	103.3		50-150			
Benzo(g,h,i)Perylene D12	200	25.18	99.6		50-150			

M	Indicates that a peak has been manually integrated
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3446475-2	Extraction Date	18-Nov-20
Analysis Method	PAH by CARB 429		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3446475

Approved:
Andrew Reid
--e-signature--
02-Dec-2020

Run Information	**Run 1**
Filename	201127A04.D
Run Date	11/30/2020 8:29
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**ug spiked**	**Ret. Time**	**Concentration %**	**Flags**	**Limits**
Naphthalene	100	2.75	117.2		50-150
2-Methylnaphthalene	100	3.35	85.8		50-150
1-Methylnaphthalene	100	3.47	103.4		50-150
Acenaphthylene	100	4.52	85.2		50-150
Acenaphthene	100	4.82	82.2		50-150
Fluorene	100	5.76	74.8		50-150
Phenanthrene	100	7.99	84.7		50-150
Anthracene	100	8.11	112.6		50-150
Fluoranthene	100	11.44	79.6		50-150
Pyrene	100	12.09	81.6		50-150
Benzo(a)Anthracene	100	16.05	78.5		50-150
Chrysene	100	16.18	88.6		50-150
Benzo(b)Fluoranthene	100	19.44	81.5		50-150
Benzo(k)Fluoranthene	100	19.51	96		50-150
Benzo(e)Pyrene	100	20.20	81.3		50-150
Benzo(a)Pyrene	100	20.33	102.2	M	50-150
Perylene	100	20.57	88.3		50-150
Indeno(1,2,3-cd)Pyrene	100	24.21	80.1		50-150
Dibenzo(a,h)Anthracene	100	24.42	81.2		50-150
Benzo(g,h,i)Perylene	100	25.26	83.5		50-150
Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	200	2.73	27.2	R	30-150
2-Methylnaphthalene-D10	200	3.32	34.3		30-150
Acenaphthylene D8	200	4.50	39.2		30-150
Phenanthrene D10	200	7.93	39.3		50-150
Anthracene-D10	110	8.07	32.0		50-150
Fluoranthene D10	200	11.38	47.6		50-150
Benz(a)Anthracene-D12	200	15.99	54.2		50-150
Chrysene D12	200	16.10	43.1		50-150
Benzo(b)Fluoranthene-D12	200	19.37	50.1		50-150
Benzo(k)Fluoranthene-D12	200	19.45	46.2	R	50-150
Benzo(a)Pyrene D12	200	20.27	48.7	R	30-150
Perylene D12	200	20.51	54.0		50-150
Indeno(1,2,3,cd)Pyrene-D12	200	24.13	49.9		50-150
Dibenz(a,h)Anthracene-D14	200	24.29	45.5		50-150
Benzo(g,h,i)Perylene D12	200	25.15	45.0		50-150

M Indicates that a peak has been manually integrated.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

Chain of Custody (COC) / Analytical Reques

L2530245-COFC

L2530241-COFC

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report	Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	RWDI	Select Report Format:	☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)	Standard TAT is 15 business days. DTOX analysis standard TAT is 5 business days
Contact:	Matt Lantz	Quality Control (QC) Report with Report	☐ YES ☐ NO	PRIORITY (Business Days): 15 day [R- Regular] ☐ / 10 day [P-50%] ☐ / 5 day [E-100%] ☐ — EMERGENCY: 5 Business day - DTOX [R - Regular] / 3 Business day - DTOX [E - 100%]
Phone:	519 823 1311	☐ Compare Results to Criteria on Report - provide details below if box checked		
	Company address below will appear on the final report	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	
Street:	600 Southgate Drive	Email 1 or Fax	Matt.Lantz@rwdi.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Guelph, Ontario	Email 2		For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N1G 4P6	Email 3		Analysis Request
Invoice To	Same as Report To ☐ YES ☐ NO	Invoice Distribution		
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	
Company:		Email 1 or Fax		
Contact:		Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:	DYEC	Major/Minor Code:	Routing Code:
PO / AFE:	1803743 Phase 1000	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: Martin Town

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Sample Air Volume (m3)	Date (dd-mmm-yy)	Sample Period	Sample Type	NUMBER OF CONTAINERS — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below: TSP, ICP on HI-Vol Filter	PAH	DX	SAMPLES ON HOLD
1	L2524017-3 - Rundle	309	11-Nov-20	24hr	Air		X		
1	741026	1739	11-Nov-20	24hr	Air	X			
2	741024	1662	05-Nov-20	24hr	Air	X			
2	L2524017-2 - Courtice	292	11-Nov-20	24hr	Air		X		
3	741027	1705	11-Nov-20	24hr	Air	X			
4	741025	1706	05-Nov-20	24hr	Air	X			
				24hr	Air				
				24hr	Air				
				24hr	Air				
				24hr	Air				
				24hr	Air				
				24hr	Air				

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	Samples are 10 day TAT

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐		
Ice Packs	☑	Ice Cubes ☐	Custody seal intact	Yes ☑	
Cooling Initiated	☑				

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES			
2.1°C	11.9°C						

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 16-Nov-20	Time: 1200	Received by: AARON BURTON	Date: 17-NOV-2020	Time: 11:10	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY — NOV 201

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Station: RofD Rundle Daily: 11/11/2020 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM2.5	NO	NO2	NOX	SO2	Batt Min	Temperature - Ambient	Rain	Tr_Temp	RH AVG	Rain total	WS km/hr	WD	Hi-Vol Pressure	PUF Pressure	Temperature - Ambient	Hivol Flow	PUF Flow
	ug/m3	ppb	ppb	ppb	ppb	Volts	C°	mm	C°	%	mm	km/hr	Deg	in H20	in H20	K	cfm	cfm
11/11/2020 00:00	3.5	0	3.6	3	0.591	13.2	18.4	0	23.2	57.3	0	11.78	162.59	4.21	50.92	291.495	42.62	7.72
11/11/2020 01:00	3.2	0	5.6	4.9	0.454	13.2	16.6	0	23.4	64.4	0	3.34	177.75	4.22	49.94	289.751	42.77	7.68
11/11/2020 02:00	3.7	0	8	7.6	0.328	13.2	14.8	0	23.2	74.1	0	2.13	86.71	4.21	49.98	287.95	42.89	7.7
11/11/2020 03:00	4.7	4.7	18.3	22.9	0.48	13.2	14.7	0	23.3	75.7	0	2.98	105.1	4.22	48.77	287.817	42.98	7.62
11/11/2020 04:00	3	3.5	7.1	10.3	0.44	13.2	15.2	0	23.3	77.8	0	7.58	217.18	4.2	48.33	288.288	42.82	7.58
11/11/2020 05:00	3	0	3	2.6	0.331	13.2	14.2	0	23.2	88.2	0	10.9	215.7	4.2	48.09	287.381	42.88	7.57
11/11/2020 06:00	2.8	0	3.9	3.6	0.278	13.2	13.6	0	23.4	99	0	12.36	229.69	4.15	47.23	286.697	42.64	7.52
11/11/2020 07:00	2.5	0.1	5.6	5.6	0.277	13.2	13.8	0	23	99.9	0	10.74	232.15	4.15	46.57	286.926	42.62	7.47
11/11/2020 08:00	2	0.3	4.8	5	0.282	13.2	14.1	0	23.4	98.6	0	11.11	220.66	4.17	46.74	287.315	42.72	7.47
11/11/2020 09:00	1.5	1.8	6.7	8.5	0.292	13.2	14.7	0	23.2	97	0	18.18	246.58	4.14	46.47	287.802	42.53	7.45
11/11/2020 10:00	1.4	3.7	6.3	10.1	0.404	13.2	14	0	23.1	93.9	0	17.95	238.82	4.13	46.62	287.109	42.51	7.47
11/11/2020 11:00	1.3	1.7	4.3	6	0.606	13.2	14.4	0	23.3	77.5	0	20.53	241.09	4.15	46.18	287.528	42.62	7.43
11/11/2020 12:00	1.7	2.4	6.8	9.2	0.57	13.2	15.7	0	23.2	65.9	0	15.93	241.07	4.16	45.75	288.836	42.56	7.38
11/11/2020 13:00	1.2	1.7	5.7	7.4	0.366	13.2	16.9	0	23.3	48.3	0	17.58	234.98	4.15	44.96	289.988	42.42	7.32
11/11/2020 14:00	1.1	1.2	5.1	6.2	0.252	13.2	16.6	0	23.1	41.7	0	19.28	249.84	4.18	45.17	289.763	42.58	7.33
11/11/2020 15:00	0.7	0.1	1.7	1.6	0.161	13.2	15.7	0	23.1	41.9	0	13.94	288.97	4.19	45.94	288.813	42.73	7.4
11/11/2020 16:00	0.7	0	1.7	1.4	0.137	13.2	13	0	23.1	43.6	0	12.94	287.38	4.25	47.41	286.131	43.23	7.54
11/11/2020 17:00	1.5	0	1.8	1.4	0.068	13.2	9.8	0	23	54.6	0	9.41	307.38	4.32	48.2	282.93	43.87	7.63
11/11/2020 18:00	1.1	0	1.8	1.3	0.066	13.2	7.8	0	22.1	60	0	10.78	308.08	4.39	49.04	280.918	44.39	7.72
11/11/2020 19:00	1.3	0	1.4	1	0.036	13.2	6.4	0	21.8	61.7	0	9.34	304.9	4.42	49.71	279.562	44.68	7.79
11/11/2020 20:00	1.9	0	1.7	1.3	0.055	13.2	5.6	0	21.9	64.1	0	8.77	288.58	4.42	49.77	278.746	44.75	7.8
11/11/2020 21:00	2.4	0	2.5	2.1	0.078	13.2	4.8	0	21.8	66.2	0	6.98	272.46	4.42	49.07	277.962	44.86	7.76
11/11/2020 22:00	3.4	0.1	5.9	5.9	0.036	13.2	5.3	0	21.8	66.8	0	7.79	254.01	4.42	48.87	278.4	44.81	7.74
11/11/2020 23:00	2.6	0	0.9	0.6	0.01	13.2	6.1	0	21.7	61.1	0	9.47	282.27	4.45	49.42	279.205	44.86	7.77
Minimum	0.7	0	0.9	0.6	0.01	13.2	4.8	0	21.7	41.7	0	2.13	86.71	4.13	44.96	277.962	42.42	7.32
MinDate	15:00	00:00	23:00	23:00	23:00	00:00	21:00	00:00	23:00	14:00	00:00	02:00	02:00	10:00	13:00	21:00	13:00	13:00
Maximum	4.7	4.7	18.3	22.9	0.606	13.2	18.4	0	23.4	99.9	0.02	20.53	308.08	4.45	50.92	291.495	44.86	7.8
MaxDate	03:00	03:00	03:00	03:00	11:00	00:00	00:00	00:00	01:00	07:00	03:00	11:00	18:00	23:00	00:00	00:00	21:00	20:00
Avg	2.2	0.9	4.8	5.4	0.275	13.2	12.6	0	22.9	70	0	11.32	237.25	4.25	47.88	285.721	43.26	7.58
Num	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Data[%]	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
STD	1	1.4	3.5	4.7	0.2	No Data	4.1	0	0.6	18.1	0	5	56.5	0.1	1.7	4.1	0.9	0.1

Table B6: 2020 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	11-Nov-20	No. > Criteria
1-Methylnaphthalene	ng/m^3	*12000*	5.47	0
2-Methylnaphthalene	ng/m^3	*10000*	8.06E+00	0
Acenaphthene	ng/m^3	-	3.24E+00	-
Acenaphthylene	ng/m^3	*3500*	1.29E-01	0
Anthracene	ng/m^3	*200*	2.39E-01	0
Benzo(a)Anthracene	ng/m^3	-	1.76E-02	-
Benzo(a)fluorene	ng/m^3	-	4.66E-02	-
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	5.34E-02	1
Benzo(b)Fluoranthene	ng/m^3	-	4.89E-02	-
Benzo(b)fluorene	ng/m^3	-	2.47E-02	-
Benzo(e)Pyrene	ng/m^3	-	3.56E-02	-
Benzo(g,h,i)Perylene	ng/m^3	-	3.33E-02	-
Benzo(k)Fluoranthene	ng/m^3	-	3.88E-02	-
Biphenyl	ng/m^3	-	1.93E+01	-
Chrysene	ng/m^3	-	6.67E-02	-
Dibenzo(a,h)Anthracene	ng/m^3	-	4.56E-03	-
Fluoranthene	ng/m^3	-	8.61E-01	-
Fluorene	ng/m^3	-	2.75E+00	-
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	3.10E-02	-
Naphthalene	ng/m^3	*22500*	2.72E+01	0
o-Terphenyl	ng/m^3	-	2.06E-02	-
Perylene	ng/m^3	-	1.65E-03	-
Phenanthrene	ng/m^3	-	5.60E+00	-
Pyrene	ng/m^3	-	4.01E-01	-
Tetralin	ng/m^3	-	1.68E+01	-
Total PAH[4]	ng/m^3	-	90.40	-

APPENDIX E3
DECEMBER 17, 2020 BaP EXCEEDANCE DOCUMENTATION FOR THE COURTICE STATION & DECEMBER 29, 2020 BaP EXCEEDANCE DOCUMENTATION FOR THE RUNDLE ROAD STATION

600 Southgate Drive
Guelph ON Canada
N1G 4P6

Tel: +1.519.823.1311
Fax: +1.519.823.1316
E-mail: solutions@rwdi.com

MEMORANDUM

DATE:	2021-01-28	**RWDI Reference No.:** 1803743
TO:	Gioseph Anello	**EMAIL:** Gioseph.Anello@Durham.ca
CC:	Andrew Evans	**EMAIL:** Andrew.Evans@Durham.ca
CC:	Lyndsay Waller	**EMAIL:** Lyndsay.Waller@Durham.ca
FROM:	Claire Finoro	**EMAIL:** Claire.Finoro@rwdi.com
	John DeYoe	**EMAIL:** John.Deyoe@rwdi.com
RE:	**Exceedance Report – Benzo(a)Pyrene December 17 & 29, 2020 Region of Durham, DYEC**	

On January 15, 2021 the results from ALS Environmental were received regarding the PAH results from the December 17, 2020 sampling event. On January 18, 2021, the results were entered and assessed, and it was found that there was one (1) measured Benzo(a)Pyrene concentration in excess of the 24-hour AAQC on the December 17th sampling date at the Courtice Station. On January 20, 2021 the results from ALS Environmental were received regarding the PAH results from the December 29, 2020 sampling event. On January 20, 2021, the results were entered and assessed, and it was found that there was one (1) measured Benzo(a)Pyrene concentration in excess of the 24-hour AAQC on the December 29th sampling date at the Rundle Road Station. Below is a summary of the events:

<u>December 17, 2020</u>

On Thursday, December 17, 2020, there was one exceedance of the Benzo(a)Pyrene 24-hour AAQC, which occurred at the Courtice Station measured at the onsite PUF PS-1 sampler. Attached is a figure depicting the wind rose (indicating the wind speed and direction during the sampling day), and the location of the sampling station relative to the DYEC.

The following summarizes the BaP concentrations and onsite conditions during the December 17th sampling date:

1. The guideline concentration for BaP is 0.00005 ug/m^3. The measured concentration at the Courtice sampler was 0.000092 µg/m^3. During the sampling day the wind was recorded predominantly from the SSE as recorded at the Courtice WPCP Meteorological Tower. Wind speeds ranged from 0.27 km/h to 20.57 km/h.

2. According to the Courtice meteorological data, the Courtice Station was not upwind or downwind of the DYEC during the sampling period. Since the winds were predominantly coming from the SSE, it is likely that the measured BaP exceedances may be attributed to sources other than the Energy Centre operations.

At the Courtice Station, the NO_2 hourly values were less than 11.6% of the criteria for the same period. The $PM_{2.5}$ 24-hour average value was 5.7 micrograms per cubic meter at the Courtice Station.

December 29, 2020

On Tuesday, December 29, 2020, there was one exceedance of the Benzo(a)Pyrene 24-hour AAQC, which occurred at the Rundle Road Station measured at the onsite PUF PS-1 sampler. Attached is a figure depicting the wind rose (indicating the wind speed and direction during the sampling day), and the location of the sampling station relative to the DYEC.

The following summarizes the BaP concentrations and onsite conditions during the December 29th sampling date:

1. The guideline concentration for BaP is 0.00005 ug/m^3. The measured concentration at the Rundle sampler was 0.000182 µg/m^3. During the sampling day the wind was recorded predominantly from the W through NNW as recorded at the Rundle Road Meteorological Tower. Wind speeds at Rundle tower ranged from 0.26 km/h to 13.74 km/h.

2. According to the Rundle Road meteorological data, the Rundle Station was not upwind or downwind of the DYEC during the sampling period. Since the winds were predominantly coming from the West through North-northwest, it is likely that the measured BaP exceedances may be attributed to sources other than the Energy Centre operations.

At the Rundle Road Station, the NO_2 hourly values were less than 3.9% of the criteria for the same period. The $PM_{2.5}$ 24-hour average value was 3.8 micrograms per cubic meter at the Rundle Station.

We have also attached the data files for the sample in question to aid with the review.

Respectfully submitted by:

RWDI AIR Inc.

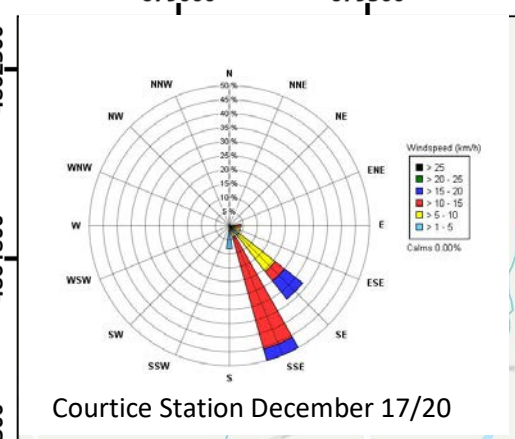
Claire Finoro, P.Eng.
Project Manager

John DeYoe, B.A.
Senior Consultant / Principal

CIF/JD

Attach.

FIGURES



Courtice Station December 17/20

DYEC Site and Ambient Monitoring Station Locations

True North

Drawn by:

Figure: 1

Approx. Scale: 1:20,000

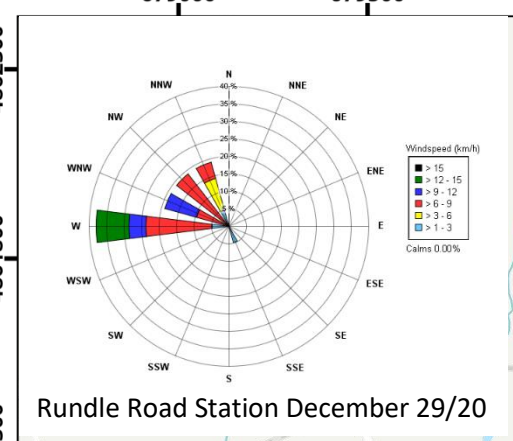
Date: Jani 1

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

Map Document: C:\GIS Temp - Copy\1803743\1803743_Durham_Energy_Centre.aprx



Rundle Road Station December 29/20

DYEC Site and Ambient Monitoring Station Locations

True North

Drawn by: DAJH | Figure: 2

Approx. Scale: 1:20,000

Date: January 21, 2021

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

Map Document: C:\GIS Temp - Copy\1803743\1803743_Durham_Energy_Centre.aprx

SUPPORTING DATA

1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Claire Kocharakkal	**Client Name:**	RWDI Air Inc.
ALS Project ID:	23601	**Client Address:**	600 Southgate Drive
ALS WO#:	L2543081		Guelph, ON N1G 4P6
Date of Report	15-Jan-21		Canada
Date of Sample Receipt	22-Dec-20	**Client Contact:**	John DeYoe
		Client Project ID:	DYEC

COMMENTS: **PAH by CARB method 429 (LR option)- Isotope dilution**

The recoveries of select labelled extraction standards were below the method control limit. The reported native target data are not expected to be biased as a result.

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		Method Blank		RUNDLE-DX/PAH-DEC17		COURTICE-DX/PAH-DEC17		Laboratory Control Sample	
ALS Sample ID	WG3465962-1		WG3465962-4		L2543081-1		L2543081-2		WG3465962-2	
Sample Size	1		1		1		1		1	
Sample units	Sample		Sample		Sample		Sample		n/a	
Moisture Content	n/a		n/a		n/a		n/a		n/a	
Matrix	MEDIA		REAGENT		PUF		PUF		QC	
Sampling Date	n/a		n/a		17-Dec-20		17-Dec-20		n/a	
Extraction Date	23-Dec-20		23-Dec-20		23-Dec-20		23-Dec-20		23-Dec-20	
Target Analytes	**ng**		**ng**		**ng**		**ng**		**%**	
Naphthalene	47.4	M	15.1	M,R	7660		11000		117.5	M
2-Methylnaphthalene	7.20		4.68		1770		2260		103.5	
1-Methylnaphthalene	5.86		3.50		1520		1960		128.2	
Acenaphthylene	0.730	R	0.860	R	175	R	515		87.8	
Acenaphthene	0.330	M	<0.20	U	128		155		74.1	
Fluorene	0.460		0.370		183		337		75.9	
Phenanthrene	2.00		1.22		488		789		91.5	
Anthracene	0.620	R	<0.20	U	30.3		57.9		87	
Fluoranthene	0.890		0.440	R	178		266		85.4	
Pyrene	0.930		0.490	R	112		193		88.7	
Benzo(a)Anthracene	<0.20	U	<0.20	U	16.1		30.0		86.9	
Chrysene	<0.20	U	<0.20	U	96.0		130		88.2	
Benzo(b)Fluoranthene	<0.20	U	<0.20	U	56.1	M	89.4	M	81.3	
Benzo(k)Fluoranthene	<0.20	U	<0.20	U	45.4	M	68.1	M	86.6	
Benzo(e)Pyrene	<0.20	U	<0.20	U	43.7		62.4		92.7	
Benzo(a)Pyrene	<0.20	U	<0.20	U	15.7		29.3		92.6	
Perylene	<0.20	U	<0.20	U	1.55		5.84	R	87.8	
Indeno(1,2,3-cd)Pyrene	<0.20	U	<0.20	U	36.3		61.4		79.3	
Dibenzo(a,h)Anthracene	<0.20	U	<0.20	U	4.67		6.41		81.1	
Benzo(g,h,i)Perylene	<0.20	U	<0.20	U	33.9		63.4		82.5	
Additional Analytes										
Tetralin	17.0		4.48		505		560			
Biphenyl	2.22		1.64		675		864			
o-Terphenyl	<0.20	U	<0.20	U	2.22		2.46			
Benzo(a)fluorene	<0.20	U	<0.20	U	19.7	M,R	40.1	M,R		
Benzo(b)fluorene	<0.20	U	<0.20	U	12.3		31.5			
Field Sampling Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	NS		NS		111.9		112.4		NS	
Fluorene D10	NS		NS		80.1		81.4		NS	
Terphenyl D14(Surr.)	NS		NS		107.9		101.8		NS	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Naphthalene D8	15.8		25.3		31.9	R	36.3	R	30.3	
2-Methylnaphthalene-D10	23.1		26.9		26.9		31.4		32.4	
Acenaphthylene D8	39.4		37.2		34.8		46.8		43.4	
Phenanthrene D10	48.0		43.6		51.9		48.2		47.0	
Anthracene-D10	46.0		41.5		44.2		48.6		45.0	
Fluoranthene D10	60.8		57.3		68.9		62.2		56.8	
Benz(a)Anthracene-D12	54.9		49.4		75.6		71.3		57.1	
Chrysene D12	56.2		56.9		72.3		62.9		59.7	
Benzo(b)Fluoranthene-D12	63.7		60.2		77.3		69.2		62.5	
Benzo(k)Fluoranthene-D12	53.8		51.8		72.5		63.2		59.7	
Benzo(a)Pyrene D12	58.2		59.5		74.3		76.0		65.9	
Perylene D12	51.4		49.8		69.4		65.9		56.4	
Indeno(1,2,3,cd)Pyrene-D12	53.6		55.7		86.2		79.1		56.4	
Dibenz(a,h)Anthracene-D14	44.3		46.7		79.1		70.1		53.2	
Benzo(g,h,i)Perylene D12	51.3		55.4		76.4		67.1		55.1	

U	Indicates that this compound was not detected above the LOD.
M	Indicates that a peak has been manually integrated.
NS	Indicates that this compound was not spiked in
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**		Sampling Date	n/a	
ALS Sample ID	WG3465962-1		Extraction Date	23-Dec-20	
Analysis Method	PAH by CARB 429				
Analysis Type	blank				
Sample Matrix	QC				Approved:
Sample Size	1	Sample			*Andrew Reid*
Percent Moisture	n/a				--e-signature--
Split Ratio	1		Workgroup	WG3465962	07-Jan-2021

Run Information	**Run 1**
Filename	210106A26.D
Run Date	1/6/2021 22:02
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Naphthalene	2.76	47.4	M
2-Methylnaphthalene	3.37	7.20	
1-Methylnaphthalene	3.48	5.86	
Acenaphthylene	4.53	0.730	R
Acenaphthene	4.84	0.330	M
Fluorene	5.79	0.460	
Phenanthrene	8.03	2.00	
Anthracene	8.14	0.620	R
Fluoranthene	11.49	0.890	
Pyrene	12.14	0.930	
Benzo(a)Anthracene	16.16	<0.20	U
Chrysene	16.23	<0.20	U
Benzo(b)Fluoranthene	NotFnd	<0.20	U
Benzo(k)Fluoranthene	NotFnd	<0.20	U
Benzo(e)Pyrene	NotFnd	<0.20	U
Benzo(a)Pyrene	NotFnd	<0.20	U
Perylene	NotFnd	<0.20	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<0.20	U
Dibenzo(a,h)Anthracene	NotFnd	<0.20	U
Benzo(g,h,i)Perylene	NotFnd	<0.20	U
Additional Analytes			
Tetralin	2.64	17.0	
Biphenyl	3.92	2.22	
o-Terphenyl	9.32	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	100	2.75	15.8	50-150
2-Methylnaphthalene-D10	100	3.33	23.1	50-150
Acenaphthylene D8	100	4.52	39.4	50-150
Phenanthrene D10	100	7.97	48.0	50-150
Anthracene-D10	100	8.10	46.0	50-150
Fluoranthene D10	100	11.43	60.8	50-150
Benz(a)Anthracene-D12	100	16.05	54.9	50-150
Chrysene D12	100	16.16	56.2	50-150
Benzo(b)Fluoranthene-D12	100	19.44	63.7	50-150
Benzo(k)Fluoranthene-D12	100	19.52	53.8	50-150
Benzo(a)Pyrene D12	100	20.33	58.2	50-150
Perylene D12	100	20.58	51.4	50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.24	53.6	50-150
Dibenz(a,h)Anthracene-D14	100	24.42	44.3	50-150
Benzo(g,h,i)Perylene D12	100	25.28	51.3	50-150

M Indicates that a peak has been manually integrated.
U Indicates that this compound was not detected above the MDL.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**		Sampling Date	n/a	
ALS Sample ID	WG3465962-4		Extraction Date	23-Dec-20	
Analysis Method	PAH by CARB 429				
Analysis Type	blank				
Sample Matrix	QC				Approved:
Sample Size	1	Sample			*Andrew Reid*
Percent Moisture	n/a				--e-signature--
Split Ratio	1		Workgroup	WG3465962	07-Jan-2021

Run Information	**Run 1**
Filename	210106A27.D
Run Date	1/6/2021 22:40
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**		**Flags**
Naphthalene	2.76	15.1	M	R
2-Methylnaphthalene	3.37	4.68		
1-Methylnaphthalene	3.48	3.50		
Acenaphthylene	4.53	0.860		R
Acenaphthene	NotFnd	<0.20		U
Fluorene	5.79	0.370		
Phenanthrene	8.03	1.22		
Anthracene	NotFnd	<0.20		U
Fluoranthene	11.49	0.440		R
Pyrene	12.15	0.490		R
Benzo(a)Anthracene	NotFnd	<0.20		U
Chrysene	NotFnd	<0.20		U
Benzo(b)Fluoranthene	NotFnd	<0.20		U
Benzo(k)Fluoranthene	NotFnd	<0.20		U
Benzo(e)Pyrene	NotFnd	<0.20		U
Benzo(a)Pyrene	NotFnd	<0.20		U
Perylene	NotFnd	<0.20		U
Indeno(1,2,3-cd)Pyrene	NotFnd	<0.20		U
Dibenzo(a,h)Anthracene	NotFnd	<0.20		U
Benzo(g,h,i)Perylene	NotFnd	<0.20		U
Additional Analytes				
Tetralin	2.64	4.48		
Biphenyl	3.92	1.64		
o-Terphenyl	9.32	<0.20		U
Benzo(a)fluorene	NotFnd	<0.20		U
Benzo(b)fluorene	NotFnd	<0.20		U

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	100	2.74	25.3	50-150
2-Methylnaphthalene-D10	100	3.33	26.9	50-150
Acenaphthylene D8	100	4.52	37.2	50-150
Phenanthrene D10	100	7.97	43.6	50-150
Anthracene-D10	100	8.10	41.5	50-150
Fluoranthene D10	100	11.44	57.3	50-150
Benz(a)Anthracene-D12	100	16.05	49.4	50-150
Chrysene D12	100	16.16	56.9	50-150
Benzo(b)Fluoranthene-D12	100	19.44	60.2	50-150
Benzo(k)Fluoranthene-D12	100	19.52	51.8	50-150
Benzo(a)Pyrene D12	100	20.33	59.5	50-150
Perylene D12	100	20.57	49.8	50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.24	55.7	50-150
Dibenz(a,h)Anthracene-D14	100	24.42	46.7	50-150
Benzo(g,h,i)Perylene D12	100	25.28	55.4	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Sample Analysis Report

Sample Name	**RUNDLE-DX/PAH-DEC17**		Sampling Date	17-Dec-20 00:00	
ALS Sample ID	L2543081-1		Extraction Date	23-Dec-20	
Analysis Method	PAH by CARB 429				
Analysis Type	sample				
Sample Matrix	Puf				Approved:
Sample Size	1	Sample			*Andrew Reid*
Percent Moisture	n/a				--e-signature--
Split Ratio	1		Workgroup	WG3465962	07-Jan-2021

Run Information	**Run 1**	**Run 2**
Filename	210106A30.D	210106A28.D
Run Date	1/7/2021 0:34	1/6/2021 23:18
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	20
Analysis Units	ng	ng
Instrument	MSD-5	MSD-5
Column	HP5MS USO179454H	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	**Ret. Time.**	**Concentration ng**	**Flags**
Naphthalene				2.79	7660	
2-Methylnaphthalene				3.39	1770	
1-Methylnaphthalene				3.50	1520	
Acenaphthylene	4.54	175	R			
Acenaphthene	4.84	128				
Fluorene				5.79	183	
Phenanthrene				8.03	488	
Anthracene	8.14	30.3				
Fluoranthene	11.48	178				
Pyrene	12.14	112				
Benzo(a)Anthracene	16.11	16.1				
Chrysene	16.23	96.0				
Benzo(b)Fluoranthene	19.50	56.1 M				
Benzo(k)Fluoranthene	19.53	45.4 M				
Benzo(e)Pyrene	20.25	43.7				
Benzo(a)Pyrene	20.40	15.7				
Perylene	20.65	1.55				
Indeno(1,2,3-cd)Pyrene	24.33	36.3				
Dibenzo(a,h)Anthracene	24.55	4.67				
Benzo(g,h,i)Perylene	25.38	33.9				
Additional Analytes						
Tetralin				2.67	505	
Biphenyl				3.93	675	
o-Terphenyl	9.32	2.22				
Benzo(a)fluorene	13.33	19.7 M	R			
Benzo(b)fluorene	13.57	12.3				

Field Sampling Standards	**ng spiked**		**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	300	3.46	111.9			
Fluorene D10	300	5.72	80.1			
Terphenyl D14(Surr.)	300	12.95	107.9			

Extraction Standards			**% Rec**	**Limits**		**% Rec**	
Naphthalene D8	100			50-150	2.78	31.9	R
2-Methylnaphthalene-D10	100			50-150	3.36	26.9	
Acenaphthylene D8	100	4.53	34.8	50-150			
Phenanthrene D10	100	7.96	51.9	50-150			
Anthracene-D10	100	8.10	44.2	50-150			
Fluoranthene D10	100	11.43	68.9	50-150			
Benz(a)Anthracene-D12	100	16.04	75.6	50-150			
Chrysene D12	100	16.15	72.3	50-150			
Benzo(b)Fluoranthene-D12	100	19.44	77.3	50-150			
Benzo(k)Fluoranthene-D12	100	19.52	72.5	50-150			
Benzo(a)Pyrene D12	100	20.33	74.3	50-150			
Perylene D12	100	20.57	69.4	50-150			
Indeno(1,2,3,cd)Pyrene-D12	100	24.24	86.2	50-150			
Dibenz(a,h)Anthracene-D14	100	24.41	79.1	50-150			
Benzo(g,h,i)Perylene D12	100	25.26	76.4	50-150			

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Sample Analysis Report

Sample Name	**COURTICE-DX/PAH-DEC17**		Sampling Date	17-Dec-20 00:00	
ALS Sample ID	L2543081-2		Extraction Date	23-Dec-20	
Analysis Method	PAH by CARB 429				
Analysis Type	sample				
Sample Matrix	Puf				Approved:
Sample Size	1	Sample			*Andrew Reid*
Percent Moisture	n/a				--e-signature--
Split Ratio	1		Workgroup	WG3465962	07-Jan-2021

Run Information	**Run 1**	**Run 2**
Filename	210106A31.D	210106A29.D
Run Date	1/7/2021 1:12	1/6/2021 23:56
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	20
Analysis Units	ng	ng
Instrument	MSD-5	MSD-5
Column	HP5MS USO179454H	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	**Ret. Time.**	**Concentration ng**	**Flags**
Naphthalene				2.79	11000	
2-Methylnaphthalene				3.39	2260	
1-Methylnaphthalene				3.50	1960	
Acenaphthylene				4.55	515	
Acenaphthene	4.84	155				
Fluorene	5.79	337				
Phenanthrene				8.03	789	
Anthracene	8.14	57.9				
Fluoranthene	11.48	266				
Pyrene	12.14	193				
Benzo(a)Anthracene	16.11	30.0				
Chrysene	16.23	130				
Benzo(b)Fluoranthene	19.50	89.4	M			
Benzo(k)Fluoranthene	19.53	68.1	M			
Benzo(e)Pyrene	20.25	62.4				
Benzo(a)Pyrene	20.40	29.3				
Perylene	20.65	5.84	R			
Indeno(1,2,3-cd)Pyrene	24.33	61.4				
Dibenzo(a,h)Anthracene	24.54	6.41				
Benzo(g,h,i)Perylene	25.38	63.4				
Additional Analytes						
Tetralin				2.67	560	
Biphenyl	3.92	864				
o-Terphenyl	9.32	2.46				
Benzo(a)fluorene	13.33	40.1	M R			
Benzo(b)fluorene	13.56	31.5				

Field Sampling Standards	**ng spiked**		**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	300	3.46	112.4			
Fluorene D10	300	5.72	81.4			
Terphenyl D14(Surr.)	300	12.95	101.8			

Extraction Standards			**% Rec**	**Limits**		**% Rec**	
Naphthalene D8	100			50-150	2.77	36.3	R
2-Methylnaphthalene-D10	100			50-150	3.36	31.4	
Acenaphthylene D8	100	4.52	46.8	50-150			
Phenanthrene D10	100	7.96	48.2	50-150			
Anthracene-D10	100	8.10	48.6	50-150			
Fluoranthene D10	100	11.43	62.2	50-150			
Benz(a)Anthracene-D12	100	16.04	71.3	50-150			
Chrysene D12	100	16.15	62.9	50-150			
Benzo(b)Fluoranthene-D12	100	19.43	69.2	50-150			
Benzo(k)Fluoranthene-D12	100	19.52	63.2	50-150			
Benzo(a)Pyrene D12	100	20.32	76.0	50-150			
Perylene D12	100	20.57	65.9	50-150			
Indeno(1,2,3,cd)Pyrene-D12	100	24.24	79.1	50-150			
Dibenz(a,h)Anthracene-D14	100	24.41	70.1	50-150			
Benzo(g,h,i)Perylene D12	100	25.26	67.1	50-150			

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**		Sampling Date	n/a	
ALS Sample ID	WG3465962-2		Extraction Date	23-Dec-20	
Analysis Method	PAH by CARB 429				
Analysis Type	LCS				
Sample Matrix	QC				Approved:
Sample Size	1	n/a			*Andrew Reid*
Percent Moisture	n/a				--e-signature--
Split Ratio	1		Workgroup	WG3465962	07-Jan-2021

Run Information	**Run 1**
Filename	210106A24.D
Run Date	1/6/2021 20:46
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**ug spiked**	**Ret. Time**	**%**	**Flags**	**Limits**
Naphthalene	100	2.76	117.5	M	50-150
2-Methylnaphthalene	100	3.36	103.5		50-150
1-Methylnaphthalene	100	3.48	128.2		50-150
Acenaphthylene	100	4.53	87.8		50-150
Acenaphthene	100	4.83	74.1		50-150
Fluorene	100	5.78	75.9		50-150
Phenanthrene	100	8.02	91.5		50-150
Anthracene	100	8.14	87		50-150
Fluoranthene	100	11.49	85.4		50-150
Pyrene	100	12.14	88.7		50-150
Benzo(a)Anthracene	100	16.11	86.9		50-150
Chrysene	100	16.24	88.2		50-150
Benzo(b)Fluoranthene	100	19.50	81.3		50-150
Benzo(k)Fluoranthene	100	19.57	86.6		50-150
Benzo(e)Pyrene	100	20.25	92.7		50-150
Benzo(a)Pyrene	100	20.39	92.6		50-150
Perylene	100	20.64	87.8		50-150
Indeno(1,2,3-cd)Pyrene	100	24.33	79.3		50-150
Dibenzo(a,h)Anthracene	100	24.54	81.1		50-150
Benzo(g,h,i)Perylene	100	25.38	82.5		50-150

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	100	2.74	30.3	30-150
2-Methylnaphthalene-D10	100	3.33	32.4	30-150
Acenaphthylene D8	100	4.51	43.4	30-150
Phenanthrene D10	100	7.96	47.0	50-150
Anthracene-D10	100	8.10	45.0	50-150
Fluoranthene D10	100	11.43	56.8	50-150
Benz(a)Anthracene-D12	100	16.05	57.1	50-150
Chrysene D12	100	16.15	59.7	50-150
Benzo(b)Fluoranthene-D12	100	19.44	62.5	50-150
Benzo(k)Fluoranthene-D12	100	19.52	59.7	50-150
Benzo(a)Pyrene D12	100	20.33	65.9	30-150
Perylene D12	100	20.57	56.4	50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.24	56.4	50-150
Dibenz(a,h)Anthracene-D14	100	24.41	53.2	50-150
Benzo(g,h,i)Perylene D12	100	25.27	55.1	50-150

M Indicates that a peak has been manually integrated.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Claire Kocharakkal	**Client Name:**	RWDI Air Inc.
ALS Project ID:	23601	**Client Address:**	600 Southgate Drive
ALS WO#:	L2545219		Guelph, ON N1G 4P6
Date of Report	20-Jan-21		Canada
Date of Sample Receipt	5-Jan-21	**Client Contact:**	John DeYoe
		Client Project ID:	DYEC

COMMENTS: **PAH by CARB method 429 (LR option)- Isotope dilution**

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		Method Blank		COURTICE-PAH-DEC29		RUNDLE-PAH-DEC29		Laboratory Control Sample	
ALS Sample ID	WG3469425-1		WG3469425-4		L2545219-1		L2545219-2		WG3469425-2	
Sample Size	1		1		1		1		1	
Sample units	Sample		Sample		Sample		Sample		n/a	
Moisture Content	n/a		n/a		n/a		n/a		n/a	
Matrix	MEDIA		REAGENT		PUF		PUF		QC	
Sampling Date	n/a		n/a		29-Dec-20		29-Dec-20		n/a	
Extraction Date	5-Jan-21		5-Jan-21		5-Jan-21		5-Jan-21		5-Jan-21	
Target Analytes	**ng**		**ng**		**ng**		**ng**		**%**	
Naphthalene	39.7		4.69	R	5940		8580		93.8	
2-Methylnaphthalene	7.76		1.60		1540		1840		105.0	
1-Methylnaphthalene	5.31		1.35	M	1210		1590		124.4	M
Acenaphthylene	0.650	R	0.340	R	123	R	259	M,R	91.9	
Acenaphthene	3.31		0.200	M	114		123		85.5	
Fluorene	1.79		0.220		157		267		79.3	
Phenanthrene	5.71		1.47		377		553		96.0	
Anthracene	0.560		<0.20	U	14.2	M	36.1		87.3	M
Fluoranthene	1.41		0.550	M	87.4		180		85.9	
Pyrene	0.930	M	0.450	M	59.0		160		86.0	
Benzo(a)Anthracene	<0.20	U	<0.20	U	7.60		48.3		86.6	
Chrysene	<0.20	U	<0.20	U	32.1		103		89.7	M
Benzo(b)Fluoranthene	0.330	M,R	<0.20	U	24.8	M	71.5	M	81.1	
Benzo(k)Fluoranthene	<0.20	U	<0.20	U	23.4	M	67.4	M	84.3	M
Benzo(e)Pyrene	<0.20	U	<0.20	U	18.6		52.7		89.1	
Benzo(a)Pyrene	0.890	R	<0.20	U	8.61	B	55.2		88.3	M
Perylene	<0.20	U	<0.20	U	0.810	M,R	9.23		83.8	
Indeno(1,2,3-cd)Pyrene	<0.20	U	<0.20	U	16.6		51.7		83.4	
Dibenzo(a,h)Anthracene	<0.20	U	<0.20	U	1.65	M	5.27		86.6	M
Benzo(g,h,i)Perylene	<0.20	U	<0.20	U	18.8	M	54.9	M	80.5	M
Additional Analytes										
Tetralin	16.3		0.900	M	603		542			
Biphenyl	2.21		0.410		424		611			
o-Terphenyl	<0.20	U	<0.20	U	2.52		2.74			
Benzo(a)fluorene	<0.20	U	<0.20	U	8.05	M	31.7	M		
Benzo(b)fluorene	<0.20	U	<0.20	U	4.12		20.8			
Field Sampling Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	NS		NS		115.8		112.6		NS	
Fluorene D10	NS		NS		86.9		86.1		NS	
Terphenyl D14(Surr.)	NS		NS		101.7		102.4		NS	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Naphthalene D8	66.8		78.5		57.1		53.8	R	68.1	
2-Methylnaphthalene-D10	54.2		64.4		46.2		42.7	M	54.8	
Acenaphthylene D8	66.9		78.5		54.8		48.3	M	69.5	
Phenanthrene D10	71.3		81.1		77.4		64.9	M,R	70.4	
Anthracene-D10	73.1	M	79.8		62.2		61.6		72.9	
Fluoranthene D10	86.0		91.2		84.9		80.2		86.2	
Benz(a)Anthracene-D12	76.5		66.6		88.1		82.1		92.0	
Chrysene D12	84.8	M	87.3	M	79.6		78.0		91.7	M
Benzo(b)Fluoranthene-D12	91.4		92.2		93.8		86.9		93.0	
Benzo(k)Fluoranthene-D12	101.7	M,R	123.9	M,R	105.0	M	97.5	M	110.3	M
Benzo(a)Pyrene D12	97.5	M	90.2	M	95.4		88.4		105.1	M
Perylene D12	89.1		82.6		90.8		85.5		101.1	
Indeno(1,2,3,cd)Pyrene-D12	73.7		79.4		90.1		90.4		89.8	
Dibenz(a,h)Anthracene-D14	73.6	M	67.9	M	87.5	M	90.6	M	103.0	M
Benzo(g,h,i)Perylene D12	83.4	M	86.8	M	93.3	M	93.3	M	98.6	M

U	Indicates that this compound was not detected above the LOD.
M	Indicates that a peak has been manually integrated.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
NS	Indicates that this standard was not spiked to sample

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3469425-1	Extraction Date	5-Jan-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	MEDIA		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3469425

Approved:
T.Patterson
--e-signature--
20-Jan-2021

Run Information	**Run 1**
Filename	210119A07.D
Run Date	1/19/2021 12:48
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Naphthalene	2.75	39.7	
2-Methylnaphthalene	3.36	7.76	
1-Methylnaphthalene	3.48	5.31	
Acenaphthylene	4.53	0.650	R
Acenaphthene	4.84	3.31	
Fluorene	5.80	1.79	
Phenanthrene	8.02	5.71	
Anthracene	8.14	0.560	
Fluoranthene	11.49	1.41	
Pyrene	12.14	0.930 M	
Benzo(a)Anthracene	NotFnd	<0.20	U
Chrysene	NotFnd	<0.20	U
Benzo(b)Fluoranthene	19.46	0.330 M	R
Benzo(k)Fluoranthene	NotFnd	<0.20	U
Benzo(e)Pyrene	NotFnd	<0.20	U
Benzo(a)Pyrene	20.36	0.890	R
Perylene	NotFnd	<0.20	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<0.20	U
Dibenzo(a,h)Anthracene	NotFnd	<0.20	U
Benzo(g,h,i)Perylene	NotFnd	<0.20	U
Additional Analytes			
Tetralin	2.63	16.3	
Biphenyl	3.92	2.21	
o-Terphenyl	9.30	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	200	2.74	66.8		50-150
2-Methylnaphthalene-D10	200	3.33	54.2		50-150
Acenaphthylene D8	200	4.51	66.9		50-150
Phenanthrene D10	200	7.96	71.3		50-150
Anthracene-D10	200	8.09	73.1 M		50-150
Fluoranthene D10	200	11.42	86.0		50-150
Benz(a)Anthracene-D12	200	16.04	76.5		50-150
Chrysene D12	200	16.15	84.8 M		50-150
Benzo(b)Fluoranthene-D12	200	19.43	91.4		50-150
Benzo(k)Fluoranthene-D12	200	19.51	101.7 M	R	50-150
Benzo(a)Pyrene D12	200	20.32	97.5 M		50-150
Perylene D12	200	20.56	89.1		50-150
Indeno(1,2,3,cd)Pyrene-D12	200	24.23	73.7		50-150
Dibenz(a,h)Anthracene-D14	200	24.41	73.6 M		50-150
Benzo(g,h,i)Perylene D12	200	25.26	83.4 M		50-150

M Indicates that a peak has been manually integrated.
U Indicates that this compound was not detected above the MDL.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3469425-4	Extraction Date	5-Jan-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	REAGENT		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3469425

Approved:
T.Patterson
--e-signature--
20-Jan-2021

Run Information	**Run 1**
Filename	210119A08.D
Run Date	1/19/2021 13:26
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Naphthalene	2.75	4.69	R
2-Methylnaphthalene	3.36	1.60	
1-Methylnaphthalene	3.48	1.35	M
Acenaphthylene	4.53	0.340	R
Acenaphthene	4.84	0.200	M
Fluorene	5.81	0.220	
Phenanthrene	8.02	1.47	
Anthracene	8.13	<0.20	U
Fluoranthene	11.48	0.550	M
Pyrene	12.14	0.450	M
Benzo(a)Anthracene	16.15	<0.20	U
Chrysene	NotFnd	<0.20	U
Benzo(b)Fluoranthene	NotFnd	<0.20	U
Benzo(k)Fluoranthene	NotFnd	<0.20	U
Benzo(e)Pyrene	NotFnd	<0.20	U
Benzo(a)Pyrene	NotFnd	<0.20	U
Perylene	NotFnd	<0.20	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<0.20	U
Dibenzo(a,h)Anthracene	NotFnd	<0.20	U
Benzo(g,h,i)Perylene	NotFnd	<0.20	U
Additional Analytes			
Tetralin	2.63	0.900	M
Biphenyl	3.92	0.410	
o-Terphenyl	9.31	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	200	2.74	78.5		50-150
2-Methylnaphthalene-D10	200	3.33	64.4		50-150
Acenaphthylene D8	200	4.51	78.5		50-150
Phenanthrene D10	200	7.96	81.1		50-150
Anthracene-D10	200	8.09	79.8		50-150
Fluoranthene D10	200	11.42	91.2		50-150
Benz(a)Anthracene-D12	200	16.04	66.6		50-150
Chrysene D12	200	16.15	87.3	M	50-150
Benzo(b)Fluoranthene-D12	200	19.43	92.2		50-150
Benzo(k)Fluoranthene-D12	200	19.52	123.9	M R	50-150
Benzo(a)Pyrene D12	200	20.32	90.2	M	50-150
Perylene D12	200	20.57	82.6		50-150
Indeno(1,2,3,cd)Pyrene-D12	200	24.23	79.4		50-150
Dibenz(a,h)Anthracene-D14	200	24.42	67.9	M	50-150
Benzo(g,h,i)Perylene D12	200	25.26	86.8	M	50-150

M Indicates that a peak has been manually integrated.
U Indicates that this compound was not detected above the MDL.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Sample Analysis Report

Sample Name	**COURTICE-PAH-DEC29**	Sampling Date	29-Dec-20
ALS Sample ID	L2545219-1	Extraction Date	5-Jan-21
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	PUF		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3469425

Approved:
T.Patterson
--e-signature--
20-Jan-2021

Run Information	**Run 1**	**Run 2**
Filename	210119A11.D	210119A09.D
Run Date	1/19/2021 15:20	1/19/2021 14:04
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	20
Analysis Units	ng	ng
Instrument	MSD-5	MSD-5
Column	HP5MS USO179454H	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	**Ret. Time.**	**Concentration ng**	**Flags**
Naphthalene				2.75	5940	
2-Methylnaphthalene				3.36	1540	
1-Methylnaphthalene				3.48	1210	
Acenaphthylene	4.53	123	R			
Acenaphthene	4.83	114				
Fluorene	5.77	157				
Phenanthrene				8.02	377	
Anthracene	8.13	14.2 M				
Fluoranthene	11.47	87.4				
Pyrene	12.13	59.0				
Benzo(a)Anthracene	16.10	7.60				
Chrysene	16.22	32.1				
Benzo(b)Fluoranthene	19.49	24.8 M				
Benzo(k)Fluoranthene	19.53	23.4 M				
Benzo(e)Pyrene	20.25	18.6				
Benzo(a)Pyrene	20.38	8.61	B			
Perylene	20.64	0.810 M	R			
Indeno(1,2,3-cd)Pyrene	24.33	16.6				
Dibenzo(a,h)Anthracene	24.56	1.65 M				
Benzo(g,h,i)Perylene	25.37	18.8 M				
Additional Analytes						
Tetralin				2.63	603	
Biphenyl	3.91	424				
o-Terphenyl	9.31	2.52				
Benzo(a)fluorene	13.34	8.05 M				
Benzo(b)fluorene	13.58	4.12				

Field Sampling Standards	**ng spiked**		**% Rec**			**% Rec**
1-Methylnaphthalene-D10	200	3.44	115.8			
Fluorene D10	200	5.72	86.9			
Terphenyl D14(Surr.)	200	12.94	101.7			
Extraction Standards			**% Rec**	**Limits**		**% Rec**
Naphthalene D8	200			50-150	2.74	57.1
2-Methylnaphthalene-D10	200			50-150	3.33	46.2
Acenaphthylene D8	200	4.51	54.8	50-150		
Phenanthrene D10	200			50-150	7.98	77.4
Anthracene-D10	200	8.08	62.2	50-150		
Fluoranthene D10	200	11.42	84.9	50-150		
Benz(a)Anthracene-D12	200	16.03	88.1	50-150		
Chrysene D12	200	16.14	79.6	50-150		
Benzo(b)Fluoranthene-D12	200	19.43	93.8	50-150		
Benzo(k)Fluoranthene-D12	200	19.51	105.0 M	50-150		
Benzo(a)Pyrene D12	200	20.32	95.4	50-150		
Perylene D12	200	20.56	90.8	50-150		
Indeno(1,2,3,cd)Pyrene-D12	200	24.23	90.1	50-150		
Dibenz(a,h)Anthracene-D14	200	24.39	87.5 M	50-150		
Benzo(g,h,i)Perylene D12	200	25.24	93.3 M	50-150		

M	Indicates that a peak has been manually integrated
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion

ALS Life Sciences

Sample Analysis Report

Sample Name	**RUNDLE-PAH-DEC29**	Sampling Date	29-Dec-20
ALS Sample ID	L2545219-2	Extraction Date	5-Jan-21
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	PUF		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3469425

Approved:
T.Patterson
--e-signature--
20-Jan-2021

Run Information	**Run 1**	**Run 2**
Filename	210119A12.D	210119A10.D
Run Date	1/19/2021 15:58	1/19/2021 14:42
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	20
Analysis Units	ng	ng
Instrument	MSD-5	MSD-5
Column	HP5MS USO179454H	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	**Ret. Time.**	**Concentration ng**	**Flags**
Naphthalene				2.75	8580	
2-Methylnaphthalene				3.36	1840	
1-Methylnaphthalene				3.48	1590	
Acenaphthylene				4.53	259 M	R
Acenaphthene	4.83	123				
Fluorene				5.78	267	
Phenanthrene				8.03	553	
Anthracene	8.13	36.1				
Fluoranthene	11.47	180				
Pyrene	12.12	160				
Benzo(a)Anthracene	16.09	48.3				
Chrysene	16.21	103				
Benzo(b)Fluoranthene	19.49	71.5 M				
Benzo(k)Fluoranthene	19.51	67.4 M				
Benzo(e)Pyrene	20.24	52.7				
Benzo(a)Pyrene	20.38	55.2				
Perylene	20.64	9.23				
Indeno(1,2,3-cd)Pyrene	24.31	51.7				
Dibenzo(a,h)Anthracene	24.55	5.27				
Benzo(g,h,i)Perylene	25.35	54.9 M				
Additional Analytes						
Tetralin				2.63	542	
Biphenyl				3.92	611	
o-Terphenyl	9.30	2.74				
Benzo(a)fluorene	13.32	31.7 M				
Benzo(b)fluorene	13.56	20.8				

Field Sampling Standards	**ng spiked**		**% Rec**			**% Rec**	
1-Methylnaphthalene-D10	200	3.44	112.6				
Fluorene D10	200	5.71	86.1				
Terphenyl D14(Surr.)	200	12.93	102.4				

Extraction Standards			**% Rec**	**Limits**		**% Rec**	
Naphthalene D8	200			50-150	2.74	53.8	R
2-Methylnaphthalene-D10	200			50-150	3.33	42.7 M	
Acenaphthylene D8	200			50-150	4.51	48.3 M	
Phenanthrene D10	200			50-150	7.98	64.9 M	R
Anthracene-D10	200	8.08	61.6	50-150			
Fluoranthene D10	200	11.41	80.2	50-150			
Benz(a)Anthracene-D12	200	16.03	82.1	50-150			
Chrysene D12	200	16.14	78.0	50-150			
Benzo(b)Fluoranthene-D12	200	19.42	86.9	50-150			
Benzo(k)Fluoranthene-D12	200	19.50	97.5 M	50-150			
Benzo(a)Pyrene D12	200	20.31	88.4	50-150			
Perylene D12	200	20.56	85.5	50-150			
Indeno(1,2,3,cd)Pyrene-D12	200	24.21	90.4	50-150			
Dibenz(a,h)Anthracene-D14	200	24.40	90.6 M	50-150			
Benzo(g,h,i)Perylene D12	200	25.24	93.3 M	50-150			

M	Indicates that a peak has been manually integrated
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3469425-2	Extraction Date	5-Jan-21
Analysis Method	PAH by CARB 429		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3469425

Approved:
T.Patterson
--e-signature--
20-Jan-2021

Run Information	**Run 1**
Filename	210119A05.D
Run Date	1/19/2021 11:32
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**ug spiked**	**Ret. Time**	**%**	**Flags**	**Limits**
Naphthalene	100	2.75	93.8		50-150
2-Methylnaphthalene	100	3.36	105.0		50-150
1-Methylnaphthalene	100	3.48	124.4	M	50-150
Acenaphthylene	100	4.53	91.9		50-150
Acenaphthene	100	4.83	85.5		50-150
Fluorene	100	5.78	79.3		50-150
Phenanthrene	100	8.02	96.0		50-150
Anthracene	100	8.13	87.3	M	50-150
Fluoranthene	100	11.47	85.9		50-150
Pyrene	100	12.13	86.0		50-150
Benzo(a)Anthracene	100	16.09	86.6		50-150
Chrysene	100	16.22	89.7	M	50-150
Benzo(b)Fluoranthene	100	19.49	81.1		50-150
Benzo(k)Fluoranthene	100	19.56	84.3	M	50-150
Benzo(e)Pyrene	100	20.24	89.1		50-150
Benzo(a)Pyrene	100	20.38	88.3	M	50-150
Perylene	100	20.63	83.8		50-150
Indeno(1,2,3-cd)Pyrene	100	24.30	83.4		50-150
Dibenzo(a,h)Anthracene	100	24.52	86.6	M	50-150
Benzo(g,h,i)Perylene	100	25.35	80.5	M	50-150

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	200	2.74	68.1	30-150
2-Methylnaphthalene-D10	200	3.33	54.8	30-150
Acenaphthylene D8	200	4.51	69.5	30-150
Phenanthrene D10	200	7.96	70.4	50-150
Anthracene-D10	200	8.09	72.9	50-150
Fluoranthene D10	200	11.42	86.2	50-150
Benz(a)Anthracene-D12	200	16.03	92.0	50-150
Chrysene D12	200	16.14	91.7	M 50-150
Benzo(b)Fluoranthene-D12	200	19.42	93.0	50-150
Benzo(k)Fluoranthene-D12	200	19.50	110.3	M 50-150
Benzo(a)Pyrene D12	200	20.31	105.1	M 30-150
Perylene D12	200	20.56	101.1	50-150
Indeno(1,2,3,cd)Pyrene-D12	200	24.21	89.8	50-150
Dibenz(a,h)Anthracene-D14	200	24.39	103.0	M 50-150
Benzo(g,h,i)Perylene D12	200	25.24	98.6	M 50-150

M Indicates that a peak has been manually integrated.

Station: RofD Courtice Daily: 17/12/2020 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM2.5	NO	NO2	NOX	SO2	Batt Min	Temperature - Ambient	Tr_Temp	RH AVG	Pressure	Rain total	Hi-Vol Pressure	PUF Pressure	Pressure
	ug/m3	ppb	ppb	ppb	ppb	Volts	C°	C°	%	in HG	mm	in H20	in H20	kPa
17/12/2020 00:00	5.1	0.2	3.9	4	0.985	13.2	-7.704	19.6	67	29.78	0	3.57	45.43	100.87
17/12/2020 01:00	5.4	0.1	3.7	3.5	2.406	13.2	-8.013	19.7	69.7	29.78	0	3.56	45.08	100.84
17/12/2020 02:00	5.2	0.9	4.7	5.4	3.725	13.2	-8.087	19.9	67.8	29.79	0	3.55	44.7	100.87
17/12/2020 03:00	4.8	0	3.3	3	3.593	13.2	-7.614	19.9	64	29.8	0	3.55	44.46	100.91
17/12/2020 04:00	3.8	0	2.9	2.4	4.764	13.2	-7.32	19.7	60.9	29.8	0	3.53	44.08	100.93
17/12/2020 05:00	3.8	0.5	3.8	4.1	4.42	13.2	-7.704	19.7	57.8	29.8	0	3.53	44.03	100.93
17/12/2020 06:00	3.4	0.1	4.9	4.9	5.598	13.2	-7.547	20	57.2	29.82	0	3.53	43.36	100.97
17/12/2020 07:00	3.9	0.1	5.4	5.4	6.121	13.2	-8.873	19.5	57.3	29.84	0	3.53	43.85	101.03
17/12/2020 08:00	4.9	0.9	5.9	6.8	4.838	13.2	-9.594	19.9	55.4	29.84	0	3.53	44.1	101.07
17/12/2020 09:00	5.5	2	4.5	6.5	5.026	13.2	-8.565	20	53.7	29.86	0	3.53	44.13	101.11
17/12/2020 10:00	4.2	1	2.6	3.6	3.515	13.2	-6.565	20	53.5	29.86	0	3.51	43.59	101.13
17/12/2020 11:00	3.1	1.2	2.8	3.9	1.993	13.2	-4.764	20	50.2	29.86	0	3.54	43.28	101.12
17/12/2020 12:00	2.2	0.7	2.6	3.3	1.953	13.2	-3.45	20.4	48.7	29.85	0	3.54	42.99	101.08
17/12/2020 13:00	1.6	0.7	2.2	2.9	1.867	13.2	-3.001	20.1	45.9	29.85	0	3.55	42.67	101.07
17/12/2020 14:00	2.3	0.5	2.3	2.7	3.151	13.2	-2.896	20.1	45	29.85	0	3.55	42.32	101.08
17/12/2020 15:00	2.8	0.2	2.7	2.9	0.884	13.2	-3.057	20	49	29.87	0	3.58	42.51	101.14
17/12/2020 16:00	3.6	0.2	4.5	4.3	1.088	13.2	-3.77	19.6	53.3	29.88	0	3.55	42.11	101.19
17/12/2020 17:00	5.5	0.5	11.5	11.8	3.096	13.2	-4.619	19.9	56.3	29.89	0	3.53	42.04	101.23
17/12/2020 18:00	7.5	2	22.5	24.5	2.018	13.2	-5.475	19.9	59	29.91	0	3.53	42.09	101.3
17/12/2020 19:00	11.4	5.7	23.2	28.9	3.289	13.2	-5.921	20.1	62.8	29.94	0	3.53	42.25	101.39
17/12/2020 20:00	20.7	3.7	19.4	23.1	3.759	13.2	-6.644	19.9	63.3	29.95	0	3.54	42.69	101.42
17/12/2020 21:00	14.8	1.2	12.2	13.4	1.951	13.2	-7.24	19.8	61.1	29.96	0	3.55	43.26	101.45
17/12/2020 22:00	5.4	0.1	6.4	6.4	4.061	13.2	-6.039	20.1	53.4	29.97	0	3.55	43.25	101.49
17/12/2020 23:00	5.2	0.4	5.3	5.5	7.925	13.2	-7.01	19.7	52.2	29.99	0	3.54	43.74	101.55
Minimum	1.6	0	2.2	2.4	0.884	13.2	-9.594	19.5	45	29.78	0	3.51	42.04	100.84
MinDate	13:00	03:00	13:00	04:00	15:00	00:00	08:00	07:00	14:00	00:00	00:00	10:00	17:00	01:00
Maximum	20.7	5.7	23.2	28.9	7.925	13.2	-2.896	20.4	69.7	29.99	0	3.58	45.43	101.55
MaxDate	20:00	19:00	19:00	19:00	23:00	00:00	14:00	12:00	01:00	23:00	00:00	15:00	00:00	23:00
Avg	5.7	1	6.8	7.6	3.418	13.2	-6.311	19.9	56.9	29.86	0	3.54	43.42	101.13
Num	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Data[%]	100	100	100	100	100	100	100	100	100	100	100	100	100	100
STD	4.2	1.3	6.2	7.3	1.7	No Data	2	0.2	6.6	0.1	0	0	1	0.2

Station: RofD Rundle Daily: 29/12/2020 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM2.5	NO	NO2	NOX	SO2	Batt Min	Temperature - Ambient	Tr_Temp	RH AVG	Rain total	WS km/hr	WD	Hi-Vol Pressure	PUF Pressure
	ug/m3	ppb	ppb	ppb	ppb	Volts	C°	C°	%	mm	km/hr	Deg	in H20	in H20
29/12/2020 00:00	1.4	0	6.6	6.2	0.046	13.2	-2.4	21.9	71.5	0	11.89	268.08	3.77	43.18
29/12/2020 01:00	1.2	0	5.2	4.6	0.013	13.2	-2.6	21.8	70.5	0	13.74	270.6	3.78	42.95
29/12/2020 02:00	1.1	0	2.2	1.6	0.005	13.2	-2.7	21.8	71.4	0	13.03	274.74	3.77	42.84
29/12/2020 03:00	0.9	0	1.6	0.9	0.003	13.2	-3.4	21.9	73.7	0	7.2	294.93	3.77	42.91
29/12/2020 04:00	0.6	0	2	1.3	0	13.2	-3.5	21.9	73.1	0	6.24	273.65	3.76	42.78
29/12/2020 05:00	0.9	0	3.6	2.9	0	13.2	-4.2	21.9	78.6	0	7.83	272.59	3.73	42.7
29/12/2020 06:00	0.8	0	3	2.4	0	13.2	-4.5	21.8	77.7	0	6.8	291.9	3.72	42.47
29/12/2020 07:00	0.8	0	5.4	5	0	13.2	-5	21.9	80.2	0	7.1	265.9	3.71	42.04
29/12/2020 08:00	1.2	0	7.8	7.4	0	13.2	-4.6	21.8	78.3	0	7.97	280.37	3.71	41.36
29/12/2020 09:00	1	0	1	0.6	0	13.2	-4.7	21.7	77.3	0	9.06	293.73	3.7	40.96
29/12/2020 10:00	1	0	0.4	0	0.007	13.2	-4.1	21.7	70.4	0	7.85	315.4	3.7	40.72
29/12/2020 11:00	0.8	0.1	1	0.7	0.003	13.2	-3.1	21.4	62.9	0	8.18	317.34	3.68	40.59
29/12/2020 12:00	0.9	0	0.8	0.5	0.001	13.2	-2.5	21.4	60.7	0.1	10.05	302.29	3.69	40.48
29/12/2020 13:00	0.8	0	0.8	0.2	0	13.2	-2.6	21.6	56.6	0	8.36	306.52	3.68	40.86
29/12/2020 14:00	0.9	0	0.8	0.4	0	13.2	-2.4	21.6	54.9	0	8.88	317.33	3.68	40.78
29/12/2020 15:00	1.2	0.1	0.8	0.6	0	13.2	-2.3	21.4	57.2	0	6.86	338.29	3.68	40.56
29/12/2020 16:00	1.7	0.3	1.6	1.3	0	13.2	-3.1	21.6	60.1	0	3.39	331.52	3.68	40.58
29/12/2020 17:00	15.9	0.2	2.3	2.3	0	13.2	-5	21.8	70.7	0	3.57	342.78	3.73	40.67
29/12/2020 18:00	16.4	0	1.4	0.8	0	13.2	-6.5	21.8	77.9	0	2.77	266.05	3.74	41.9
29/12/2020 19:00	12.3	0	1.5	0.8	0	13.2	-6.9	21.8	81.2	0	1.86	152.99	3.72	41.57
29/12/2020 20:00	9.6	0	2.1	1.5	0	13.2	-7.2	21.8	84.2	0	0.26	<Samp	3.7	41.75
29/12/2020 21:00	7	0	1.9	1.1	0	13.2	-6.8	21.9	83.8	0	0.93	<Samp	3.72	42.1
29/12/2020 22:00	6.2	0	2.2	1.6	0	13.2	-6.2	21.8	77.7	0	1.93	331.72	3.75	42.39
29/12/2020 23:00	6.1	0	2.5	1.8	0	13.2	-6.1	21.8	81.8	0	1.16	<Samp	3.77	41.92
Minimum	0.6	0	0.4	0	0	13.2	-7.2	21.4	54.9	0	0.26	152.99	3.68	40.48
MinDate	04:00	00:00	10:00	10:00	04:00	00:00	20:00	11:00	14:00	00:00	20:00	19:00	11:00	12:00
Maximum	16.4	0.3	7.8	7.4	0.046	13.2	-2.3	21.9	84.2	0.05	13.74	342.78	3.78	43.18
MaxDate	18:00	16:00	08:00	08:00	00:00	00:00	15:00	00:00	20:00	12:00	01:00	17:00	01:00	00:00
Avg	3.8	0	2.4	1.9	0.003	13.2	-4.3	21.7	72.2	0	6.54	290.89	3.72	41.71
Num	24	24	24	24	24	24	24	24	24	24	24	21	24	24
Data[%]	100	100	100	100	100	100	100	100	100	100	100	87.5	100	100
STD	4.9	0.1	1.9	1.9	0	No Data	1.6	0.2	8.8	0	3.7	39.6	0	0.9

Table B5: 2020 Courtice Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	17-Dec-20	No. > Criteria
1-Methylnaphthalene	ng/m^3	*12000*	6.18E+00	0
2-Methylnaphthalene	ng/m^3	*10000*	7.13E+00	0
Acenaphthene	ng/m^3	-	4.89E-01	-
Acenaphthylene	ng/m^3	*3500*	1.62E+00	0
Anthracene	ng/m^3	*200*	1.83E-01	0
Benzo(a)Anthracene	ng/m^3	-	9.46E-02	-
Benzo(a)fluorene	ng/m^3	-	1.26E-01	-
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	9.24E-02	1
Benzo(b)Fluoranthene	ng/m^3	-	2.82E-01	-
Benzo(b)fluorene	ng/m^3	-	9.94E-02	-
Benzo(e)Pyrene	ng/m^3	-	1.97E-01	-
Benzo(g,h,i)Perylene	ng/m^3	-	2.00E-01	-
Benzo(k)Fluoranthene	ng/m^3	-	2.15E-01	-
Biphenyl	ng/m^3	-	2.73E+00	-
Chrysene	ng/m^3	-	4.10E-01	-
Dibenzo(a,h)Anthracene	ng/m^3	-	2.02E-02	-
Fluoranthene	ng/m^3	-	8.39E-01	-
Fluorene	ng/m^3	-	1.06E+00	-
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	1.94E-01	-
Naphthalene	ng/m^3	*22500*	3.47E+01	0
o-Terphenyl	ng/m^3	-	7.76E-03	-
Perylene	ng/m^3	-	1.84E-02	-
Phenanthrene	ng/m^3	-	2.49E+00	-
Pyrene	ng/m^3	-	6.09E-01	-
Tetralin	ng/m^3	-	1.77E+00	-
Total PAH[4]	ng/m^3	-	61.76	-

Table B6: 2020 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	29-Dec-20	No. > Criteria
1-Methylnaphthalene	ng/m^3	*12000*	5.25E+00	0
2-Methylnaphthalene	ng/m^3	*10000*	6.07E+00	0
Acenaphthene	ng/m^3	-	4.06E-01	-
Acenaphthylene	ng/m^3	*3500*	8.55E-01	0
Anthracene	ng/m^3	*200*	1.19E-01	0
Benzo(a)Anthracene	ng/m^3	-	1.59E-01	-
Benzo(a)fluorene	ng/m^3	-	1.05E-01	-
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	1.82E-01	2
Benzo(b)Fluoranthene	ng/m^3	-	2.36E-01	-
Benzo(b)fluorene	ng/m^3	-	6.86E-02	-
Benzo(e)Pyrene	ng/m^3	-	1.74E-01	-
Benzo(g,h,i)Perylene	ng/m^3	-	1.81E-01	-
Benzo(k)Fluoranthene	ng/m^3	-	2.22E-01	-
Biphenyl	ng/m^3	-	2.02E+00	-
Chrysene	ng/m^3	-	3.40E-01	-
Dibenzo(a,h)Anthracene	ng/m^3	-	1.74E-02	-
Fluoranthene	ng/m^3	-	5.94E-01	-
Fluorene	ng/m^3	-	8.81E-01	-
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	1.71E-01	-
Naphthalene	ng/m^3	*22500*	2.83E+01	0
o-Terphenyl	ng/m^3	-	9.04E-03	-
Perylene	ng/m^3	-	3.05E-02	-
Phenanthrene	ng/m^3	-	1.83E+00	-
Pyrene	ng/m^3	-	5.28E-01	-
Tetralin	ng/m^3	-	1.79E+00	-
Total PAH[4]	ng/m^3	-	50.55	-

APPENDIX F
DURHAM YORK ENERGY CENTRE AMBIENT AIR Q4 SO_2 EMISSIONS TECHNICAL MEMO

Technical Memorandum

Date: **February 5, 2021**

To: **Claire Finoro, Project Manager, RWDI**

From: **Gioseph Anello, Director, Waste Management Services, Durham Region**

Copy: **L. McDowell, Director, Environmental Protection and Promotion Region, York Region**

Subject: **Durham York Energy Centre (DYEC)**
2020 Ambient Air Q4 Sulphur Dioxide Emissions

In support of the 2020 Q4 Ambient Air Quality Monitoring Report prepared by RWDI Inc., the following information is provided in relation to the performance of the DYEC during the periods of elevated sulphur dioxide (SO_2) concentrations observed at the facility's Courtice ambient air monitoring station.

The Emission Summary and Dispersion Modelling (ESDM) report submitted as part of the DYEC ECA Application modelled SO_2 concentrations at the maximum point of impingement (POI) for a facility operating at 110% maximum continuous rating (MCR) with in-stack SO_2 concentrations at the permit limit of 35 mg/m^3. Under this conservative assumed facility operating condition, the predicted maximum 1-hour average concentration at the POI was 8.62 µg/m^3, which represents 8.62% of the new ambient air standard of 100 µg/m^3, which was implemented in 2020.

According to the DYEC's continuous emissions monitoring system (CEMS), SO_2 stack concentrations were recorded at 0 mg/m^3 throughout the periods in Q4 2020 when ambient SO_2 standards were exceeded. At these measured in-stack concentration levels, the facility's contribution to ambient air quality would be expected to be less than 1% of the new standard.

In the December 18, 2020 instance where the Courtice station experienced an exceedance of the 10 minute rolling average, the wind was found to be originating from the East. The DYEC is situated NE-ENE from the Courtice station. During the time of the exceedance the DYEC was operational and the reported SO_2 CEMS in stack concentrations recorded 0 mg/Rm^3.

Considering both the wind direction and the SO_2 concentrations measured in the stack, it is unlikely that the DYEC contributed to elevated ambient SO_2 concentrations during this event. It is more likely that ambient concentrations were attributable to other industrial sources along the lakeshore area.