REPORT

DURHAM YORK ENERGY CENTRE

COURTICE, ONTARIO

2021 Q4 AMBIENT AIR QUALITY MONITORING REPORT
RWDI #1803743
March 11, 2022

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:

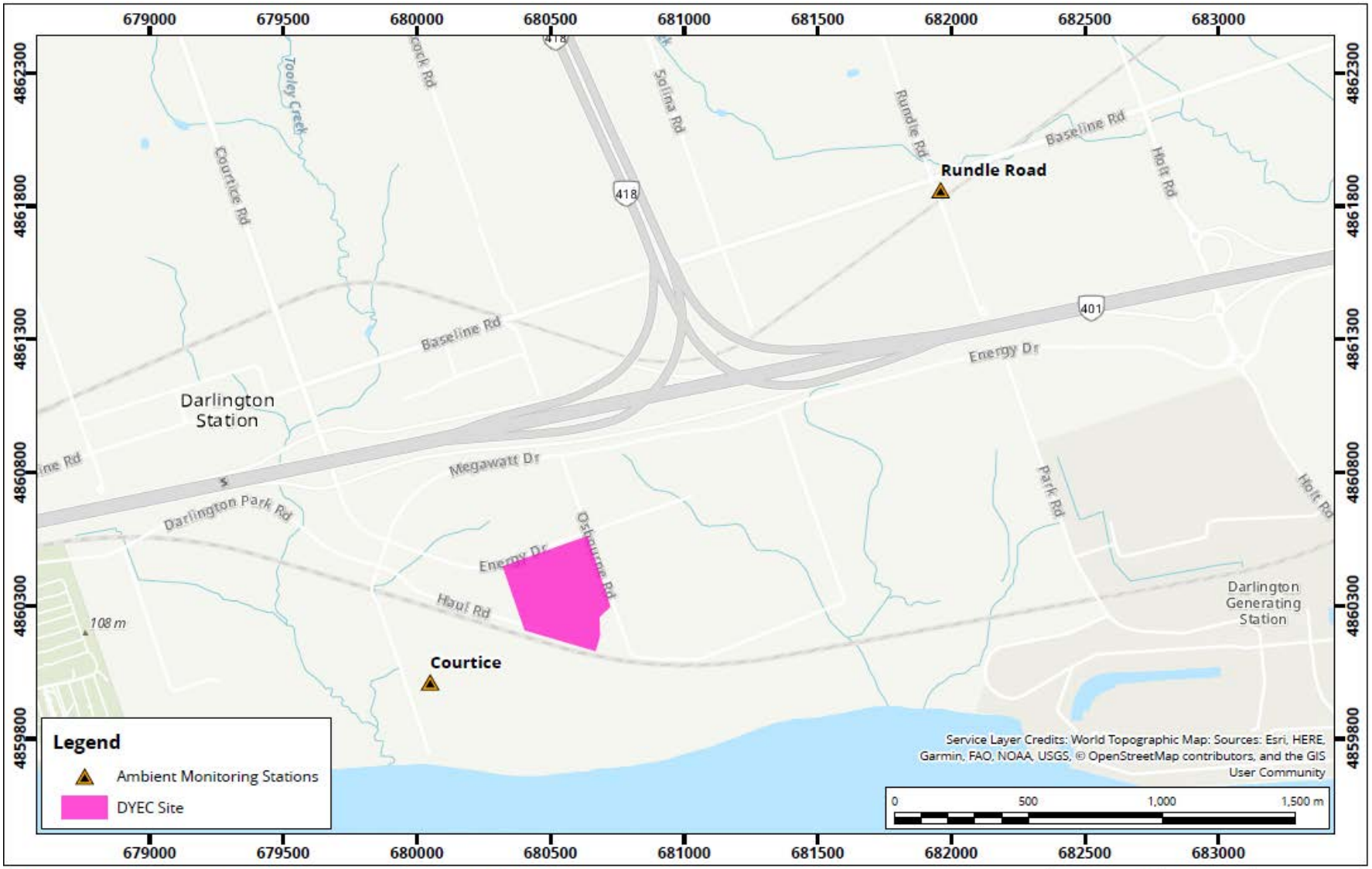
- Quantify any measurable ground level concentrations resulting from emissions from the DYEC cumulative to local air quality, including validating the predicted concentrations from the dispersion modelling conducted in the Environmental Assessment (2009a);
- Monitor concentration levels of EFW-related 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 ($PM_{2.5}$), Nitrogen Oxides (NO_X) and Sulfur Dioxide (SO_2). In addition, both discretely monitor the following air quality parameters: Total Suspended Particulate (TSP), Metals, Dioxins and Furans (D&F) and Polycyclic Aromatic Hydrocarbons (PAHs).

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 Courtice Station collects the following meteorological parameters: wind speed, wind direction, ambient temperature, ambient pressure, precipitation and relative humidity. The meteorological towers at both stations are approximately 10 meters tall.

Throughout this monitoring period there were seventy-two (72) exceedance events of the rolling 10-minute SO_2 AAQC and thirty-two (32) exceedance events of the rolling 1-hour SO_2 AAQC at the Courtice station. There was one (1) exceedance of the Benzo(a) Pyrene AAQC, which occurred on October 13th at the Courtice Station, and four (4) exceedances of the Benzo(a) Pyrene AAQC, which occurred on October 1st, October 13th, November 6th and November 30th at the Rundle Road Station. Data recovery rates were acceptable and valid for all measured Q4 parameters.



DYEC Site and Ambient Monitoring Station Locations

True North

Drawn by: DJH | Figure: 1

Approx. Scale: 1:20,000

Date Revised: Apr 17, 2020

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

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 01:45 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 PM2.5 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.

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/m³		The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
	Annual	8.8 µg/m³		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 were no MECP audits conducted in Q4 of 2021.

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 2021 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: wind speed, wind direction, relative humidity, ambient temperature, ambient pressure and precipitation. The meteorological tower at the station is at a height of approximately 10 meters tall. The Courtice Station maintained a minimum 97.9% of data collection for all of the parameters measured during Q4. 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 2021

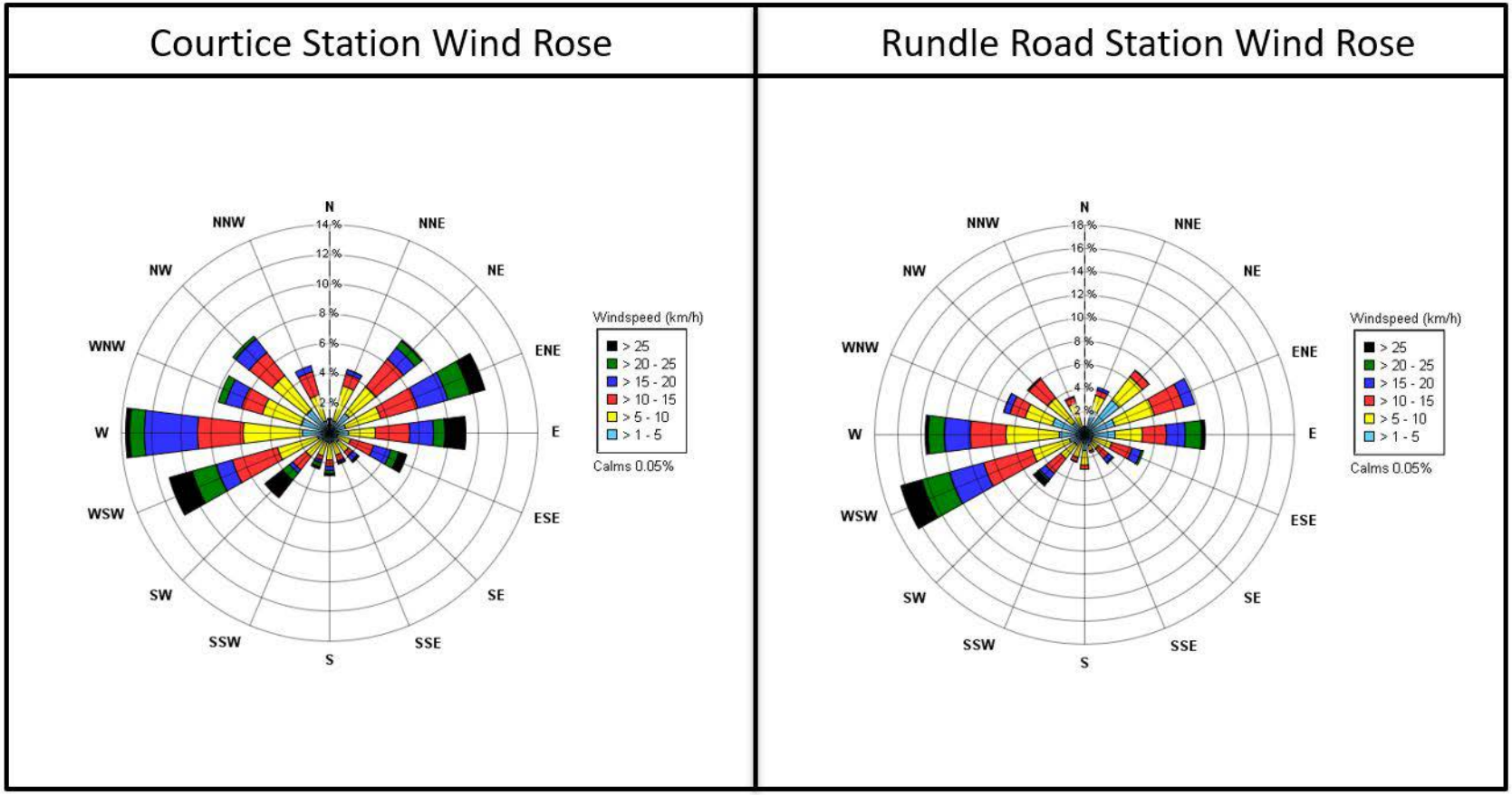


Table 2. Hourly Statistics from the Courtice Meteorological Station

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	33.2	21.2	100.0	30.1	9.8	0.3	3.5	38.4	29.3	0.0	10.9	13.4	83.0	29.7	0.2	146.5	100.0	97.7	100.0	100.0	100.0	100.0
November	34.0	14.2	100.0	30.2	2.7	0.7	-6.1	36.2	29.4	0.0	10.4	4.0	73.3	29.7	0.1	67.9	100.0	97.5	100.0	100.0	100.0	100.0
December	50.0	11.3	100.0	30.3	6.8	0.7	-10.8	37.0	28.8	0.0	14.5	1.3	71.0	29.7	0.1	57.6	100.0	98.4	100.0	100.0	100.0	100.0
Q4 Arithmetic Mean											11.9	6.3	75.8	29.7	0.1	272.0	100.0	97.9	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 94.2% 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	25.9	21.4	100.0	9.5	0.0	2.7	41.8	0.0	8.5	12.9	85.3	0.2	158.9	100.0	94.1	100.0	100.0	100.0
November	25.1	14.1	100.0	2.8	0.0	-7.2	39.0	0.0	8.4	3.4	78.5	0.1	61.3	100.0	90.6	100.0	100.0	100.0
December	44.8	13.1	100.0	7.7	0.4	-12.5	40.6	0.0	11.7	0.8	76.6	0.1	71.4	100.0	97.8	100.0	100.0	100.0
Q4 Arithmetic Mean									9.5	5.7	80.2	0.1	291.6	100.0	94.2	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. At the Courtice Station, there were seventy-two (72) exceedance events of the rolling 10-minute SO_2 AAQC and thirty-two (32) exceedance events of the 1-hour SO_2 AAQC 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	91.0	19.7	78.8	66.3	23.1	50.1	12.0	18.8	8.8	10.1	8.8	3.3	5.7	1.8	4.0	2.9	98.0	96.5	96.5	96.5	99.3
November	275.9	34.5	78.5	55.9	32.8	134.1	20.4	46.3	23.0	23.3	11.3	5.8	11.3	4.4	6.9	3.2	99.9	99.6	99.6	99.6	99.6
December	168.3	29.2	28.8	28.8	28.8	105.6	19.7	29.5	13.9	15.9	12.0	5.9	6.9	1.5	5.6	2.4	99.7	99.7	99.7	99.7	99.7
Q4 Arithmetic Mean												5.0	8.0	2.6	5.5	2.8	99.2	98.6	98.6	98.6	99.5

[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	16.7	17.9	42.7	16.3	32.1	11.8	9.7	19.0	4.3	15.1	1.4	4.0	3.7	0.9	3.1	0.3	99.9	97.3	97.3	97.3	99.7
November	17.2	36.9	40.8	20.5	24.5	9.1	14.9	23.1	7.6	15.8	1.0	5.8	6.0	1.3	4.7	0.2	99.9	99.7	99.7	99.7	99.7
December	13.8	29.3	28.8	28.8	27.6	10.0	20.6	21.2	8.0	14.5	1.2	6.1	5.9	1.1	4.8	0.2	99.9	99.7	99.7	99.7	99.7
Q4 Arithmetic Mean												5.3	5.2	1.1	4.2	0.3	99.9	98.9	98.9	98.9	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	4	0		0	4		0	0	N/A	0		N/A	0	
November	43	0		0	18		0	0	N/A	0		N/A	0	
December	25	0		0	10		0	0	N/A	0		N/A	0	
Q4 Total	72	0		0	32		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 (98.6% 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 32.8 ppb, which is 16.4% of the AAQC. The highest NO_2 value seen among the rolling 24-hour averages was 23.3 ppb, which is 23.3% 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.

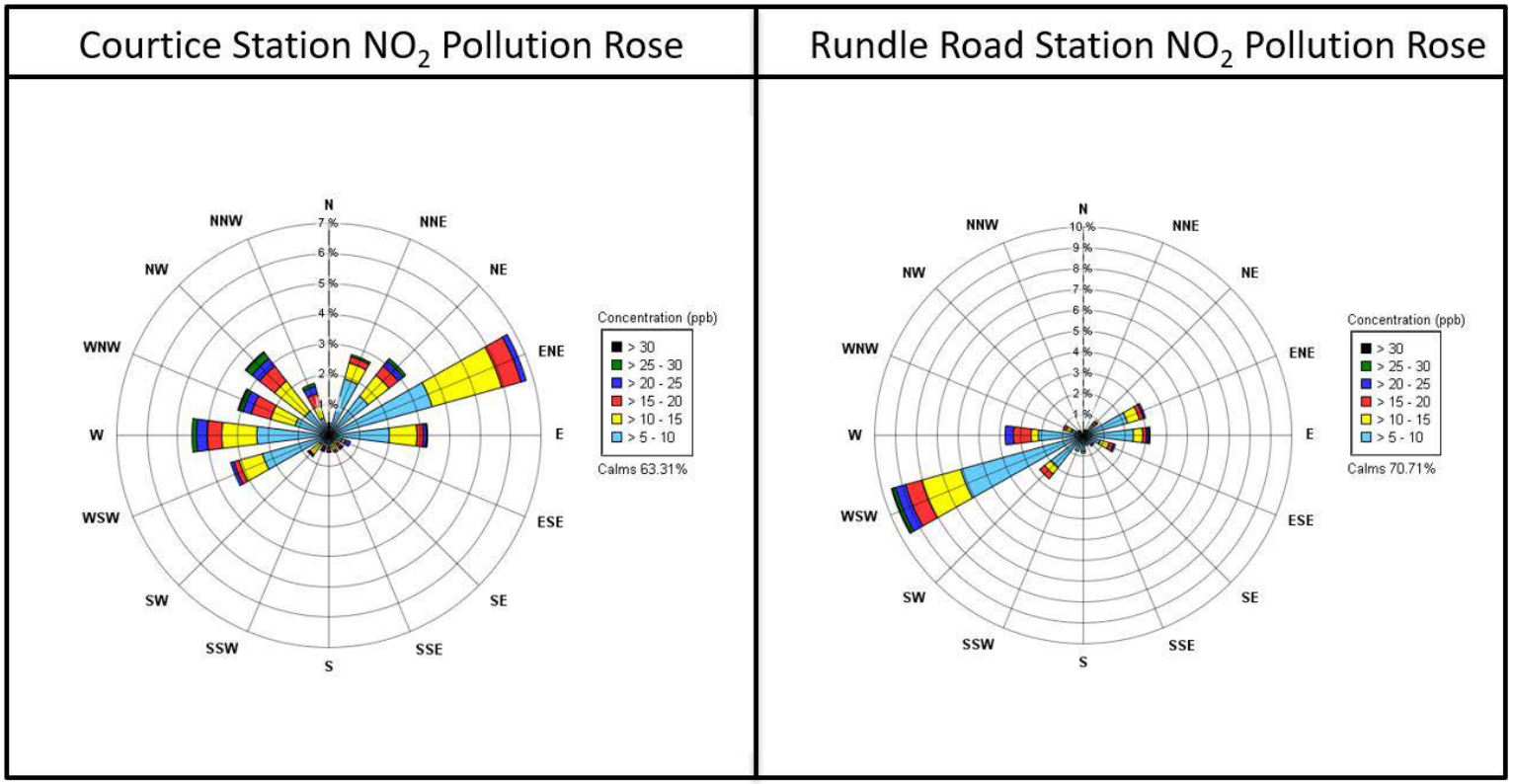
The Courtice Station pollution rose in **Figure 5** shows the majority of the NO_2 impacts were largely from the north-northeast to east and west-southwest to northwest directions. The Station is downwind of the DYEC when winds are from the northeast and east-northeast directions, which happened frequently during the monitoring period, therefore it is likely that the DYEC partially contributed to the observed concentrations. There are additional impacts from the west-southwest to northwest which indicates reception from the surrounding industry along the lakeshore.

5.3.2 Rundle Road Station Results

Data recovery levels were high for oxides of nitrogen (98.9% 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 32.1 ppb, which is 16.1% of the AAQC. The highest NO_2 value seen among the rolling 24-hour averages was 15.8 ppb, which is 15.8% 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 southwest to west, which is downwind of the DYEC but also partially in line with high traffic areas and urban background. It is likely that the DYEC was a partial contributor to NO_2 levels observed at the station.

Figure 5. Pollution Roses of Hourly Average NO_2 Concentrations – October to December 2021



5.4 Sulphur Dioxide Results

5.4.1 Courtice Station Results

Data recovery levels were high for sulphur dioxide (99.5% valid data). Monitoring results were compared to the AAQC for 10-minute and 1-hour rolling average periods. In 2021, 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 275.9 ppb, which is 411.8% of the AAQC. The highest SO_2 value seen among the 1-hour rolling averages was 134.1 ppb, which is 335.3% of the AAQC. There were seventy-two (72) exceedance events of the rolling 10-minute AAQC and thirty-two (32) exceedance events of the rolling 1-hour 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 north-northeast to east directions. The events were possibly a result of emissions from industrial sources along the lakeshore with contributions from the DYEC in the east-northeast to east directions. The Courtice Station pollution rose in **Figure 7** shows that <0.01% of the 5-min SO_2 events are elevated >67 ppb occurred from the north-northwest to north-northeast directions. It is possible that the DYEC contributed to SO_2 concentrations >67 ppb from the east-northeast but the majority of the exceedance concentrations were measured coming from the north.

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 G**. 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 impact on 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 17.2 ppb, which is 25.7% of the AAQC. The highest SO_2 value seen among the 1-hour rolling averages was 11.8 ppb, which is 29.5% of the 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 east-southeast, east and north. 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 nearby. The Rundle Road Station pollution rose in **Figure 7** shows that no 5-min SO_2 events elevated >67 ppb occurred in Q4 of 2021.

Figure 6. Pollution Roses of Hourly Average SO_2 Concentrations – October to December 2021

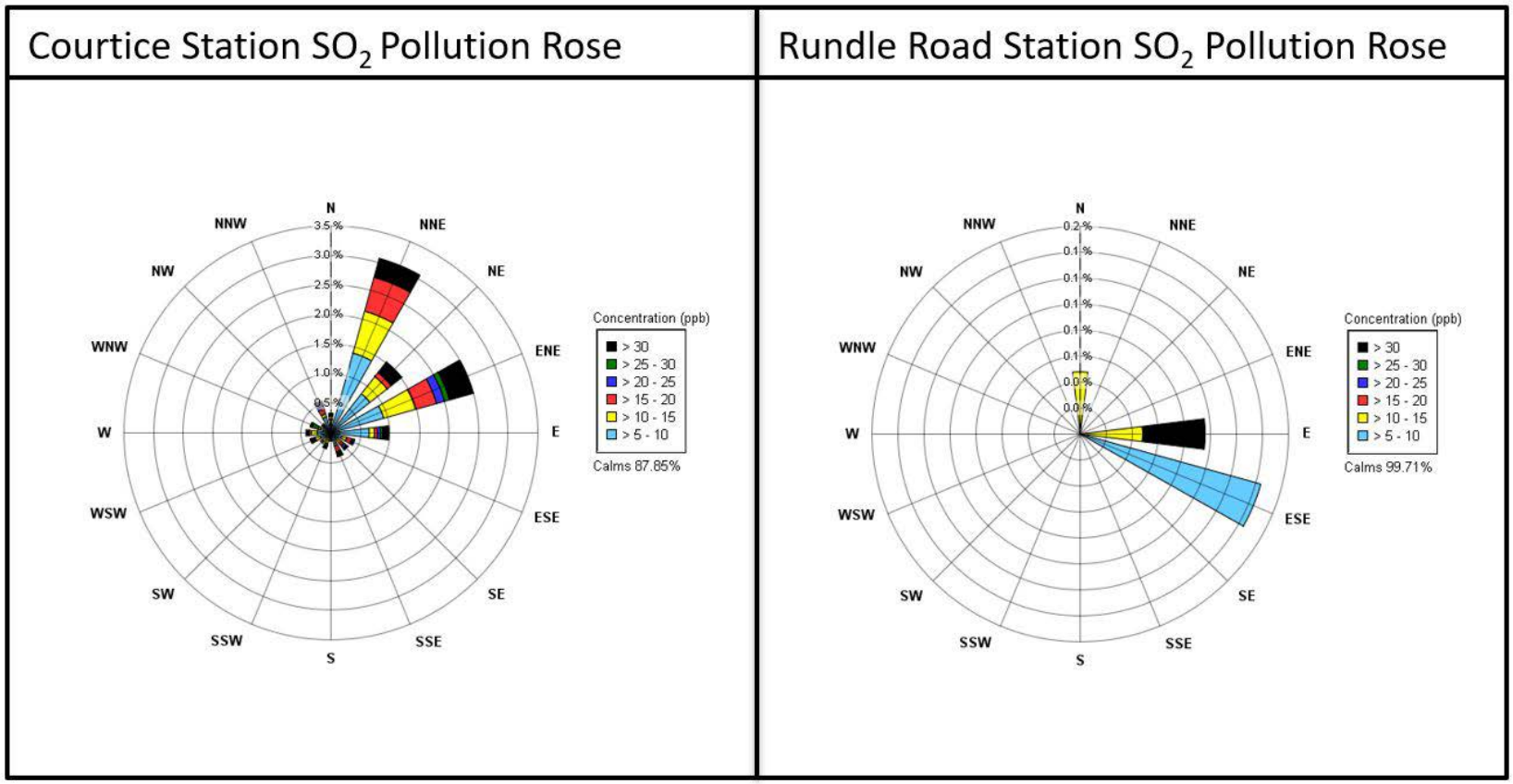
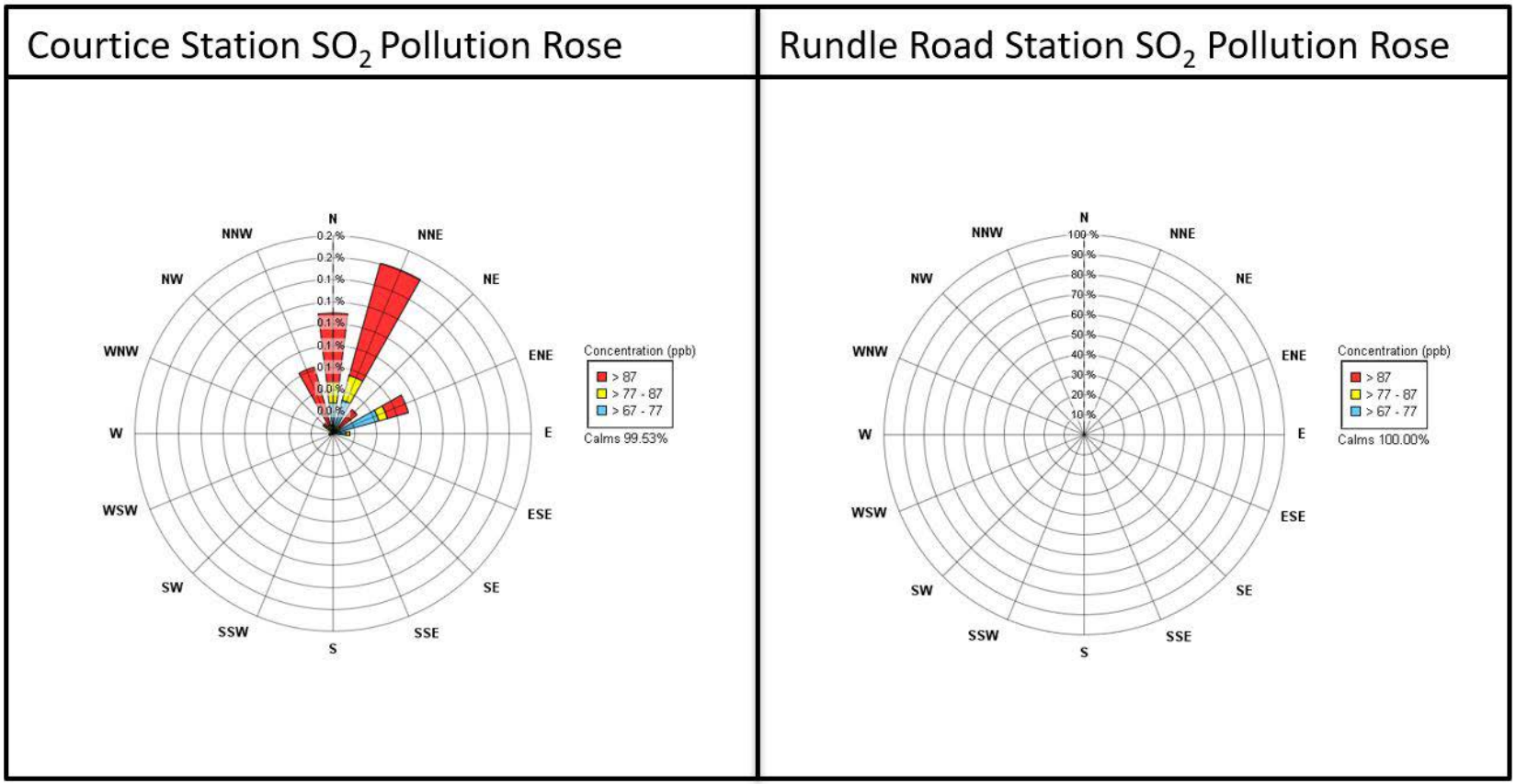


Figure 7. Pollution Roses of 5-minute Average SO_2 Concentrations >67 ppb – October to December 2021



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 (99.2% 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 34.5 µg/m^3 and the highest value seen among the 24-hour rolling averages was 20.4 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.

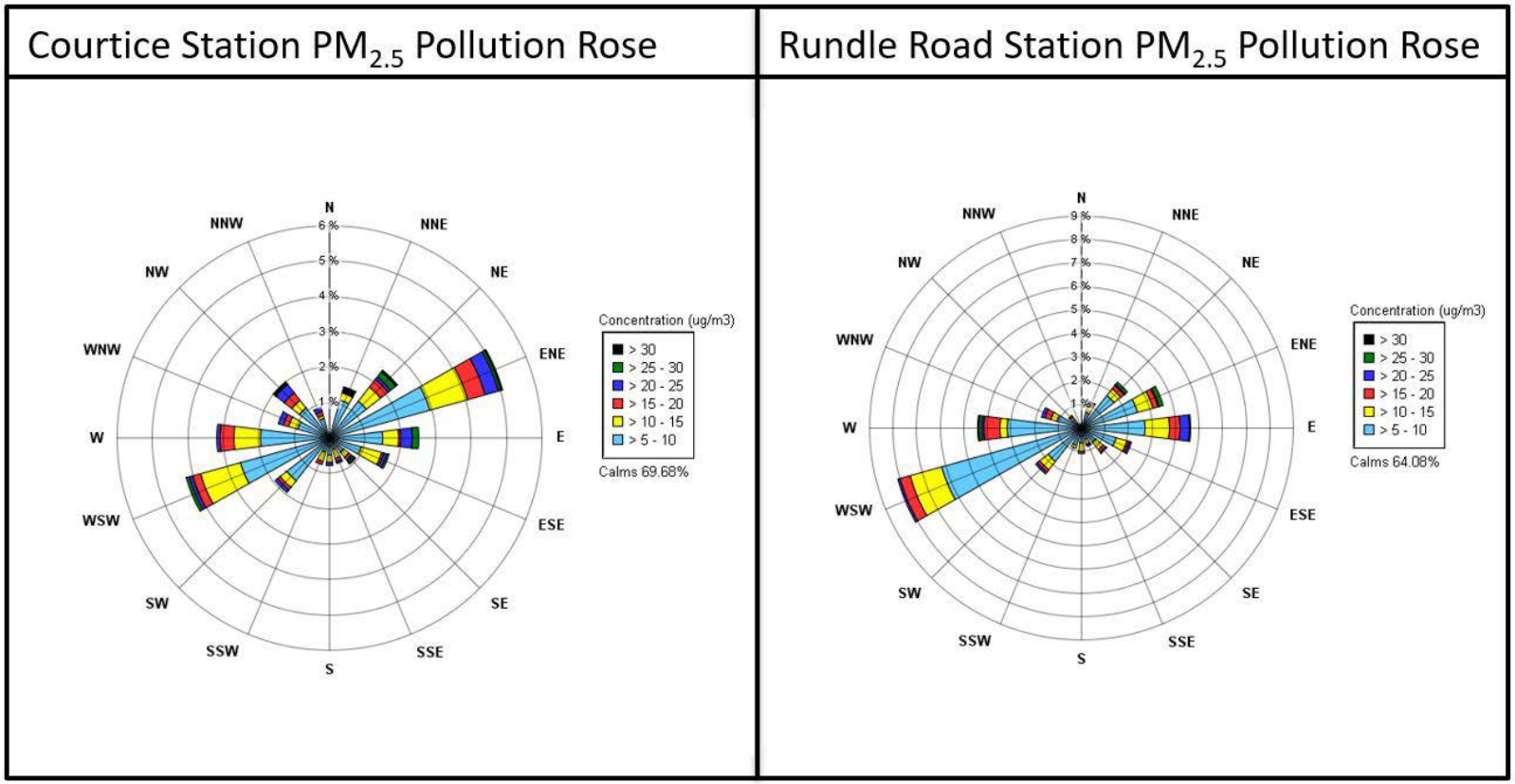
The Courtice Station pollution rose in **Figure 8** shows that the majority of elevated $PM_{2.5}$ events at Courtice occurred when winds were from the northeast to east-southeast, which places the station partially downwind of the DYEC during the sample period. Other contributions from the southwest to northwest are in line with nearby industries.

5.5.2 Rundle Road Station Results

Data recovery levels were high for particulate matter less than 2.5 microns (99.9% valid data). The highest $PM_{2.5}$ value seen among the 1-hour rolling averages was 36.9 µg/m^3 and the highest value seen among the 24-hour rolling averages was 20.6 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 southwest to west-northwest, which places the station partially downwind of the DYEC during the sample period. Other contributions from the northeast to east-southeast are in line with high traffic areas and urban background.

Figure 8. Pollution Roses of Hourly Average $PM_{2.5}$ Concentrations – October to December 2021



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 1, 7, 13, 19, 25, 31, November 6, 12, 18, 24, 30 and December 6, 12, 18, 24, and 30, 2021.

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	7.15	15.11	0.03	37.97	24.54	19.41	37.97	16	100
Total Mercury (Hg)	µg/m³	*2*	*2*	0	6.28E-06	7.60E-06	2.79E-06	1.65E-05	1.65E-05	1.41E-05	6.60E-06	16	100
Aluminum (Al)	µg/m³	*4.8*	-	0	9.70E-02	1.15E-01	3.11E-02	2.71E-01	2.01E-01	1.63E-01	2.71E-01	16	100
Antimony (Sb)	µg/m³	*25*	*25*	0	8.40E-04	1.06E-03	3.29E-04	3.10E-03	3.10E-03	1.72E-03	1.11E-03	16	100
Arsenic (As)	µg/m³	*0.3*	*0.3*	0	9.33E-04	9.57E-04	8.67E-04	2.01E-03	9.14E-04	8.87E-04	2.01E-03	16	100
Barium (Ba)	µg/m³	*10*	*10*	0	6.74E-03	8.49E-03	2.38E-03	2.10E-02	2.10E-02	1.37E-02	7.20E-03	16	100
Beryllium (Be)	µg/m³	*0.01*	*0.01*	0	1.57E-05	1.65E-05	1.39E-05	4.28E-05	1.52E-05	4.28E-05	1.50E-05	16	100
Bismuth (Bi)	µg/m³	-	-	-	5.30E-04	5.30E-04	5.02E-04	5.48E-04	5.48E-04	5.32E-04	5.42E-04	16	100
Boron (B)	µg/m³	*120*	-	0	4.77E-03	5.11E-03	4.18E-03	1.55E-02	1.55E-02	4.43E-03	4.51E-03	16	100
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	0	1.05E-04	1.10E-04	5.44E-05	1.69E-04	1.47E-04	1.52E-04	1.69E-04	16	100
Chromium (Cr)	µg/m³	*0.5*	-	0	1.84E-03	2.16E-03	9.48E-04	4.53E-03	4.53E-03	3.11E-03	2.41E-03	16	100
Cobalt (Co)	µg/m³	*0.1*	*0.1*	0	9.52E-05	1.07E-04	3.45E-05	2.12E-04	2.12E-04	1.35E-04	1.46E-04	16	100
Copper (Cu)	µg/m³	*50*	-	0	1.71E-02	2.33E-02	4.33E-03	5.93E-02	5.93E-02	5.54E-02	4.16E-02	16	100
Iron (Fe)	µg/m³	*4*	-	0	2.95E-01	3.55E-01	1.07E-01	7.92E-01	7.92E-01	5.07E-01	3.51E-01	16	100
Lead (Pb)	µg/m³	*0.5*	*0.5*	0	2.59E-03	2.79E-03	1.04E-03	4.00E-03	3.89E-03	4.00E-03	3.48E-03	16	100
Magnesium (Mg)	µg/m³	-	-	-	1.54E-01	1.77E-01	4.91E-02	4.29E-01	4.29E-01	2.19E-01	2.42E-01	16	100
Manganese (Mn)	µg/m³	*0.4*	-	0	7.90E-03	9.24E-03	2.04E-03	2.53E-02	2.53E-02	1.14E-02	8.03E-03	16	100
Molybdenum (Mo)	µg/m³	*120*	-	0	1.12E-03	1.40E-03	3.41E-04	3.03E-03	3.03E-03	2.88E-03	2.97E-03	16	100
Nickel (Ni)	µg/m³	*0.2*	-	0	9.99E-04	1.08E-03	5.20E-04	1.96E-03	1.96E-03	1.40E-03	1.02E-03	16	100
Phosphorus (P)	µg/m³	-	-	-	2.21E-01	2.21E-01	2.09E-01	2.28E-01	2.28E-01	2.22E-01	2.26E-01	16	100
Selenium (Se)	µg/m³	*10*	*10*	0	5.12E-04	6.07E-04	3.63E-04	1.93E-03	1.18E-03	1.93E-03	3.91E-04	16	100
Silver (Ag)	µg/m³	*1*	*1*	0	3.13E-05	3.36E-05	2.51E-05	8.05E-05	8.05E-05	5.78E-05	2.71E-05	16	100
Strontium (Sr)	µg/m³	*120*	-	0	2.86E-03	3.63E-03	8.67E-04	1.05E-02	6.76E-03	4.51E-03	1.05E-02	16	100
Thallium (Tl)	µg/m³	-	-	-	2.93E-05	3.09E-05	2.51E-05	7.00E-05	7.00E-05	2.66E-05	5.42E-05	16	100
Tin (Sn)	µg/m³	*10*	*10*	0	9.36E-04	1.19E-03	1.67E-04	3.46E-03	1.85E-03	3.46E-03	1.02E-03	16	100
Titanium (Ti)	µg/m³	*120*	-	0	5.48E-03	6.41E-03	3.07E-03	1.25E-02	1.25E-02	8.79E-03	1.02E-02	16	100
Uranium (Ur)	µg/m³	*1.5*	-	0	1.33E-05	1.73E-05	5.03E-06	6.08E-05	3.01E-05	3.19E-05	6.08E-05	16	100
Vanadium (V)	µg/m³	*2*	*1*	0	1.47E-03	1.47E-03	1.39E-03	1.52E-03	1.52E-03	1.48E-03	1.50E-03	16	100
Zinc (Zn)	µg/m³	*120*	-	0	3.44E-02	3.79E-02	1.61E-02	6.94E-02	6.94E-02	6.74E-02	6.86E-02	16	100
Zirconium (Zr)	µg/m³	*20*	-	0	5.89E-04	5.89E-04	5.58E-04	6.09E-04	6.09E-04	5.91E-04	6.02E-04	16	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	21.21	24.12	24.88	0.03	0.03	10.69	17.21	16	100
Total Mercury (Hg)	µg/m³	*2*	*2*	0	8.25E-06	1.31E-05	1.38E-05	1.87E-05	2.87E-06	3.04E-06	1.18E-05	16	100
Aluminum (Al)	µg/m³	*4.8*	-	0	1.96E-01	1.51E-01	1.16E-01	3.05E-01	3.10E-02	6.19E-02	1.09E-01	16	100
Antimony (Sb)	µg/m³	*25*	*25*	0	8.25E-04	3.06E-03	1.28E-03	1.65E-03	2.76E-04	2.98E-04	1.18E-03	16	100
Arsenic (As)	µg/m³	*0.3*	*0.3*	0	4.36E-03	8.96E-04	9.01E-04	8.75E-04	8.62E-04	9.11E-04	8.87E-04	16	100
Barium (Ba)	µg/m³	*10*	*10*	0	1.11E-02	8.84E-03	1.49E-02	2.01E-02	1.95E-03	3.04E-03	1.27E-02	16	100
Beryllium (Be)	µg/m³	*0.01*	*0.01*	0	1.47E-05	1.49E-05	1.50E-05	1.46E-05	1.44E-05	1.52E-05	1.48E-05	16	100
Bismuth (Bi)	µg/m³	-	-	-	5.30E-04	5.37E-04	5.41E-04	5.25E-04	5.17E-04	5.46E-04	5.32E-04	16	100
Boron (B)	µg/m³	*120*	-	0	1.47E-02	4.48E-03	4.51E-03	4.38E-03	4.31E-03	4.55E-03	4.44E-03	16	100
Cadmium (Cd)	µg/m³	*0.025*	*0.025*	0	9.84E-05	9.01E-05	1.39E-04	1.35E-04	5.40E-05	7.95E-05	1.43E-04	16	100
Chromium (Cr)	µg/m³	*0.5*	-	0	2.95E-03	2.51E-03	2.64E-03	4.78E-03	9.77E-04	1.03E-03	3.19E-03	16	100
Cobalt (Co)	µg/m³	*0.1*	*0.1*	0	5.39E-04	1.27E-04	1.53E-04	2.73E-04	5.86E-05	5.16E-05	1.36E-04	16	100
Copper (Cu)	µg/m³	*50*	-	0	8.43E-02	5.10E-02	5.33E-02	1.67E-02	4.66E-03	4.49E-03	5.75E-02	16	100
Iron (Fe)	µg/m³	*4*	-	0	6.07E-01	4.46E-01	5.06E-01	8.87E-01	9.94E-02	1.48E-01	5.06E-01	16	100
Lead (Pb)	µg/m³	*0.5*	*0.5*	0	2.73E-03	2.77E-03	4.36E-03	4.33E-03	1.70E-03	2.40E-03	3.09E-03	16	100
Magnesium (Mg)	µg/m³	-	-	-	3.24E-01	1.89E-01	2.48E-01	4.86E-01	5.06E-02	1.07E-01	2.05E-01	16	100
Manganese (Mn)	µg/m³	*0.4*	-	0	1.44E-02	9.25E-03	1.20E-02	2.81E-02	1.73E-03	4.73E-03	1.04E-02	16	100
Molybdenum (Mo)	µg/m³	*120*	-	0	3.26E-03	1.65E-03	2.45E-03	8.05E-04	3.91E-04	3.64E-04	2.51E-03	16	100
Nickel (Ni)	µg/m³	*0.2*	-	0	2.84E-03	1.28E-03	1.51E-03	1.97E-03	1.12E-03	1.00E-03	1.54E-03	16	100
Phosphorus (P)	µg/m³	-	-	-	2.21E-01	2.24E-01	2.25E-01	2.19E-01	2.16E-01	2.28E-01	2.22E-01	16	100
Selenium (Se)	µg/m³	*10*	*10*	0	3.83E-04	3.88E-04	9.01E-04	8.75E-04	3.74E-04	3.95E-04	1.77E-03	16	100
Silver (Ag)	µg/m³	*1*	*1*	0	2.65E-05	2.69E-05	5.47E-05	6.30E-05	2.59E-05	2.73E-05	2.66E-05	16	100
Strontium (Sr)	µg/m³	*120*	-	0	1.08E-02	6.45E-03	5.23E-03	1.03E-02	8.62E-04	2.25E-03	4.20E-03	16	100
Thallium (Tl)	µg/m³	-	-	-	2.65E-05	2.69E-05	2.70E-05	2.63E-05	2.59E-05	2.73E-05	2.66E-05	16	100
Tin (Sn)	µg/m³	*10*	*10*	0	1.23E-03	9.13E-04	1.24E-03	1.96E-03	5.75E-04	5.22E-04	3.12E-03	16	100
Titanium (Ti)	µg/m³	*120*	-	0	9.43E-03	7.76E-03	7.81E-03	1.46E-02	3.16E-03	3.34E-03	7.69E-03	16	100
Uranium (Ur)	µg/m³	*1.5*	-	0	1.40E-05	2.51E-05	1.23E-05	1.94E-05	5.34E-06	5.22E-06	9.58E-06	16	100
Vanadium (V)	µg/m³	*2*	*1*	0	1.47E-03	1.49E-03	1.50E-03	1.46E-03	1.44E-03	1.52E-03	1.48E-03	16	100
Zinc (Zn)	µg/m³	*120*	-	0	3.69E-02	4.30E-02	5.19E-02	1.09E-01	1.64E-02	3.99E-02	2.96E-02	16	100
Zirconium (Zr)	µg/m³	*20*	-	0	5.89E-04	5.97E-04	6.01E-04	5.83E-04	5.75E-04	6.07E-04	5.91E-04	16	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 1, 13, 25, November 6, 18, 30 and December 12 and 24, 2021.

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 during Q4 of 2021. There were no other exceedances of any of the AAQC's or HHRA Criteria.

The exceedance occurred on October 13th, 2021. Since the winds were predominantly coming from the WSW, the Courtice Station was upwind of the DYEC during the sampling period. It is unlikely that the measured BaP exceedance is attributable to the Energy Centre operations.

The exceedance documentation is attached in **Appendix F**. **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	7.62E+00	1.82E+00	2.26E+01	2.26E+01	9.01E+00	7.47E+00	8	100
2-Methylnaphthalene	ng/m³	10000	0	1.26E+01	2.73E+00	3.73E+01	3.73E+01	1.52E+01	1.20E+01	8	100
Acenaphthene	ng/m³	-	-	3.55E+00	3.32E-01	1.16E+01	1.16E+01	2.37E+00	1.22E+00	8	100
Acenaphthylene	ng/m³	3500	0	2.93E-01	3.30E-02	1.21E+00	1.21E+00	2.49E-01	1.67E-01	8	100
Anthracene	ng/m³	200	0	2.09E-01	2.10E-02	6.73E-01	6.73E-01	1.98E-01	5.49E-02	8	100
Benzo(a)Anthracene	ng/m³	-	-	2.71E-02	8.89E-03	5.80E-02	5.80E-02	3.25E-02	2.26E-02	8	100
Benzo(a)fluorene	ng/m³	-	-	4.90E-02	1.52E-02	8.64E-02	7.70E-02	8.64E-02	3.11E-02	8	100
Benzo(a)Pyrene (Historically High)	ng/m³	0.05	1	3.11E-02	1.08E-02	6.15E-02	6.15E-02	3.80E-02	2.97E-02	8	100
Benzo(b)Fluoranthene	ng/m³	-	-		2.15E-02	1.07E-01	1.07E-01	9.13E-02	8.49E-02	8	100
Benzo(b)fluorene	ng/m³	-	-	3.85E-02	7.61E-03	8.71E-02	5.65E-02	8.71E-02	1.91E-02	8	100
Benzo(e)Pyrene	ng/m³	-	-	5.00E-02	2.05E-02	8.34E-02	7.10E-02	8.34E-02	4.80E-02	8	100
Benzo(g,h,i)Perylene	ng/m³	-	-	3.97E-02	1.55E-02	6.42E-02	5.62E-02	6.42E-02	4.24E-02	8	100
Benzo(k)Fluoranthene	ng/m³	-	-	4.79E-02	1.39E-02	7.79E-02	7.79E-02	6.11E-02	4.94E-02	8	100
Biphenyl	ng/m³	-	-	4.12E+00	1.40E+00	1.45E+01	1.45E+01	3.55E+00	3.72E+00	8	100
Chrysene	ng/m³	-	-	1.02E-01	3.41E-02	1.98E-01	1.98E-01	1.31E-01	1.12E-01	8	100
Dibenzo(a,h)Anthracene	ng/m³	-	-	5.79E-03	2.92E-04	1.50E-02	1.50E-02	8.13E-03	6.10E-03	8	100
Fluoranthene	ng/m³	-	-	7.00E-01	2.76E-01	1.55E+00	1.55E+00	5.96E-01	5.49E-01	8	100
Fluorene	ng/m³	-	-	2.50E+00	4.88E-01	7.97E+00	7.97E+00	1.70E+00	1.29E+00	8	100
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	4.09E-02	1.50E-02	6.48E-02	5.96E-02	6.48E-02	4.94E-02	8	100
Naphthalene	ng/m³	22500	0	3.75E+01	1.09E+01	1.02E+02	1.02E+02	5.09E+01	2.37E+01	8	100
o-Terphenyl	ng/m³	-	-	1.60E-02	8.85E-03	3.28E-02	3.28E-02	2.35E-02	1.76E-02	8	100
Perylene	ng/m³	-	-	4.49E-03	2.92E-04	1.06E-02	8.26E-03	1.06E-02	5.57E-03	8	100
Phenanthrene	ng/m³	-	-	4.00E+00	8.06E-01	1.32E+01	1.32E+01	3.07E+00	2.26E+00	8	100
Pyrene	ng/m³	-	-	3.72E-01	1.52E-01	7.79E-01	7.79E-01	4.76E-01	2.35E-01	8	100
Tetralin	ng/m³	-	-	3.00E+00	8.10E-01	6.57E+00	3.94E+00	6.57E+00	3.63E+00	8	100
Total PAH	ng/m³	-	-	7.70E+01	2.45E+01	2.16E+02	2.16E+02	6.15E+01	9.40E+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 four (4) exceedances of the Benzo(a) Pyrene AAQC during Q4 of 2021. There were no other exceedances of any of the AAQC's or HHRA Criteria.

The first exceedance occurred on October 1st, 2021. Since the winds were predominantly coming from the SW and the NW, the Rundle Road Station was downwind of the DYEC during part of the sampling period. This date falls within the fall outage period at DYEC, when the facility was not operational, therefore the measured BaP exceedance is likely not attributable to the regular Energy Centre operations.

The second exceedance occurred on October 13th, 2021. Since the winds were predominantly coming from the WSW, the Rundle Road Station was downwind of the DYEC during part of the sampling period. It is possible that the measured BaP exceedance is partially attributable to the Energy Centre operations.

The third exceedance occurred on November 6th, 2021. Since the winds were predominantly coming from the SSW, SSE and ENE, the Rundle Road Station was downwind of the DYEC during part of the sampling period. It is possible that the measured BaP exceedance is partially attributable to the Energy Centre operations.

The fourth exceedance occurred on November 30th, 2021. Since the winds were predominantly coming from the W, WSW and NE to ESE, the Rundle Road Station was downwind of the DYEC during part of the sampling period. It is possible that the measured BaP exceedance is partially attributable to the Energy Centre operations.

The exceedance documentation is attached in **Appendix F**. **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	5.20E+00	1.97E+00	9.10E+00	8.79E+00	9.10E+00	3.23E+00	8	100
2-Methylnaphthalene	ng/m³	10000	0	7.69E+00	2.79E+00	1.46E+01	1.30E+01	1.46E+01	4.59E+00	8	100
Acenaphthene	ng/m³	-	-	1.65E+00	8.21E-01	4.83E+00	4.83E+00	1.62E+00	8.70E-01	8	100
Acenaphthylene	ng/m³	3500	0	2.74E-01	5.76E-02	7.21E-01	7.21E-01	4.95E-01	2.09E-01	8	100
Anthracene	ng/m³	200	0	2.06E-01	3.49E-02	4.07E-01	4.07E-01	2.85E-01	2.70E-01	8	100
Benzo(a)Anthracene	ng/m³	-	-	4.58E-02	9.43E-03	7.52E-02	7.52E-02	7.09E-02	5.35E-02	8	100
Benzo(a)fluorene	ng/m³	-	-	7.72E-02	2.37E-02	1.43E-01	7.57E-02	1.42E-01	1.43E-01	8	100
Benzo(a)Pyrene (Historically High)	ng/m³	0.05	4	4.52E-02	1.20E-02	7.52E-02	7.32E-02	7.52E-02	2.75E-02	8	100
Benzo(b)Fluoranthene	ng/m³	-	-	1.09E-01	2.46E-02	2.11E-01	2.11E-01	1.73E-01	1.50E-01	8	100
Benzo(b)fluorene	ng/m³	-	-	6.09E-02	9.40E-03	1.10E-01	6.12E-02	1.10E-01	1.02E-01	8	100
Benzo(e)Pyrene	ng/m³	-	-	8.37E-02	2.18E-02	1.59E-01	1.59E-01	1.58E-01	9.31E-02	8	100
Benzo(g,h,i)Perylene	ng/m³	-	-	6.46E-02	1.43E-02	1.29E-01	9.13E-02	1.29E-01	7.76E-02	8	100
Benzo(k)Fluoranthene	ng/m³	-	-	8.72E-02	2.18E-02	1.51E-01	1.22E-01	1.51E-01	1.24E-01	8	100
Biphenyl	ng/m³	-	-	3.36E+00	1.30E+00	9.41E+00	9.41E+00	4.15E+00	3.00E+00	8	100
Chrysene	ng/m³	-	-	1.49E-01	3.49E-02	2.30E-01	2.24E-01	2.30E-01	1.98E-01	8	100
Dibenzo(a,h)Anthracene	ng/m³	-	-	1.15E-02	3.01E-04	2.46E-02	1.55E-02	2.46E-02	1.12E-02	8	100
Fluoranthene	ng/m³	-	-	7.79E-01	3.79E-01	1.93E+00	1.93E+00	7.06E-01	9.24E-01	8	100
Fluorene	ng/m³	-	-	1.60E+00	7.47E-01	4.16E+00	4.16E+00	1.54E+00	1.44E+00	8	100
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	6.69E-02	1.52E-02	1.28E-01	8.36E-02	1.28E-01	9.70E-02	8	100
Naphthalene	ng/m³	22500	0	2.63E+01	9.55E+00	4.71E+01	4.67E+01	4.71E+01	2.26E+01	8	100
o-Terphenyl	ng/m³	-	-	1.55E-02	8.07E-03	3.53E-02	3.53E-02	2.68E-02	1.34E-02	8	100
Perylene	ng/m³	-	-	9.92E-03	3.01E-04	2.44E-02	1.49E-02	2.44E-02	8.43E-03	8	100

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
Phenanthrene	ng/m³	-	-	3.06E+00	1.31E+00	7.26E+00	7.26E+00	3.22E+00	3.08E+00	8	100
Pyrene	ng/m³	-	-	4.56E-01	2.10E-01	8.77E-01	8.77E-01	5.63E-01	6.01E-01	8	100
Tetralin	ng/m³	-	-	2.25E+00	6.36E-01	4.49E+00	3.09E+00	4.49E+00	1.37E+00	8	100
Total PAH	ng/m³	-	-	5.37E+01	2.03E+01	9.58E+01	9.58E+01	8.87E+01	4.30E+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 1, 25, November 18 and December 12, 2021.

Appendix H contains a memo from ALS discussing the loss of a D&F sample set for the Q3 monitoring period.

An error in the laboratory procedure caused the October 1st, 2021, D&F sample at the Rundle Road Station to be reported as a false exceedance. It was requested that the sample be rerun to rule out any lab error, and that is when it was confirmed by the lab that the original report results were biased high due to instrument carry-over. Processing and analysis were done from the archived portion of the raw extract for both Courtice and Rundle Road station samples. Entry of this new data confirmed that there was no exceedance of the D&F AAQC or upper risk threshold (URT). The ALS email correspondence regarding the error can be found in **Appendix I**.

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	-	-	-	9.07E-04	4.84E-04	1.27E-03	1.27E-03	1.01E-03	4.84E-04	4	100
1,2,3,7,8-PeCDD	pg/m^3	-	-	-	1.07E-03	7.55E-04	1.67E-03	1.67E-03	1.10E-03	7.62E-04	4	100
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	-	2.92E-04	7.62E-05	7.61E-04	2.42E-04	7.61E-04	7.62E-05	4	100
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	-	5.02E-04	2.57E-04	1.07E-03	3.48E-04	1.07E-03	3.37E-04	4	100
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	-	4.57E-04	1.50E-04	1.06E-03	3.03E-04	1.06E-03	3.14E-04	4	100
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	-	7.73E-04	5.25E-04	1.15E-03	8.42E-04	1.15E-03	5.25E-04	4	100
OCDD	pg/m^3	-	-	-	9.23E-05	4.05E-05	1.75E-04	1.75E-04	1.09E-04	4.45E-05	4	100
2,3,7,8-TCDF	pg/m^3	-	-	-	1.16E-04	6.45E-05	1.52E-04	1.52E-04	1.44E-04	6.45E-05	4	100
1,2,3,7,8-PeCDF	pg/m^3	-	-	-	5.68E-05	2.64E-05	1.27E-04	1.27E-04	3.49E-05	2.64E-05	4	100
2,3,4,7,8-PeCDF	pg/m^3	-	-	-	7.37E-04	1.14E-04	1.73E-03	1.73E-03	7.25E-04	1.14E-04	4	100
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	-	3.12E-04	8.01E-05	7.01E-04	3.79E-04	7.01E-04	8.94E-05	4	100
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	-	2.93E-04	5.57E-05	8.39E-04	8.39E-04	2.11E-04	5.57E-05	4	100
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	-	3.38E-04	1.09E-04	7.36E-04	7.36E-04	3.78E-04	1.09E-04	4	100
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	-	2.77E-04	8.80E-05	6.44E-04	2.73E-04	6.44E-04	8.80E-05	4	100
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	-	1.46E-04	4.98E-05	3.24E-04	3.24E-04	1.37E-04	7.42E-05	4	100
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	-	3.61E-05	6.89E-06	5.92E-05	5.61E-05	5.92E-05	6.89E-06	4	100
OCDF	pg/m^3	-	-	-	6.30E-06	1.18E-06	1.77E-05	1.77E-05	3.81E-06	2.48E-06	4	100
Total Toxic Equivalency	pg TEQ/m^3	*0.1 1*[1]	-	0	6.41E-03	3.17E-03	9.48E-03	9.48E-03	9.30E-03	3.17E-03	4	100

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

5.8.2 Rundle Road Station Results

Data recovery levels were 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	-	-	-	8.26E-04	4.98E-04	1.55E-03	1.55E-03	4.98E-04	6.74E-04	4	100
1,2,3,7,8-PeCDD	pg/m^3	-	-	-	4.95E-03	4.26E-04	1.25E-02	1.25E-02	5.89E-03	9.53E-04	4	100
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	-	1.52E-03	4.89E-05	3.60E-03	2.35E-03	3.60E-03	1.09E-04	4	100
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	-	2.14E-03	1.10E-04	5.53E-03	2.81E-03	5.53E-03	1.20E-04	4	100
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	-	1.84E-03	1.18E-04	4.40E-03	4.40E-03	2.66E-03	1.76E-04	4	100
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	-	2.15E-03	4.90E-04	4.20E-03	3.37E-03	4.20E-03	4.90E-04	4	100
OCDD	pg/m^3	-	-	-	1.44E-04	4.09E-05	3.19E-04	3.19E-04	1.73E-04	4.43E-05	4	100
2,3,7,8-TCDF	pg/m^3	-	-	-	1.46E-04	8.80E-05	2.57E-04	1.39E-04	2.57E-04	8.80E-05	4	100
1,2,3,7,8-PeCDF	pg/m^3	-	-	-	9.36E-05	2.08E-05	2.59E-04	6.97E-05	2.59E-04	2.46E-05	4	100
2,3,4,7,8-PeCDF	pg/m^3	-	-	-	2.90E-03	2.03E-04	1.04E-02	6.50E-04	1.04E-02	3.17E-04	4	100
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	-	1.13E-03	4.89E-05	3.56E-03	8.17E-04	3.56E-03	9.97E-05	4	100
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	-	9.91E-04	3.94E-05	3.14E-03	7.28E-04	3.14E-03	5.57E-05	4	100
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	-	8.62E-04	6.78E-05	2.42E-03	8.67E-04	2.42E-03	9.53E-05	4	100
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	-	4.95E-04	7.62E-05	1.61E-03	2.17E-04	1.61E-03	7.62E-05	4	100
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	-	4.48E-04	3.00E-05	1.28E-03	3.99E-04	1.28E-03	7.95E-05	4	100
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	-	7.59E-05	5.05E-06	2.04E-04	8.54E-05	2.04E-04	8.80E-06	4	100
OCDF	pg/m^3	-	-	-	1.01E-05	9.46E-07	1.93E-05	1.93E-05	1.86E-05	1.50E-06	4	100
Total Toxic Equivalency	pg TEQ/m^3	*0.1* *1*[1]	-	0	2.07E-02	2.44E-03	4.57E-02	3.13E-02	4.57E-02	3.41E-03	4	100

Notes: 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 October 20th, 2021 thirteen hours of the $PM_{2.5}$ continuous data at the Courtice station from 00:00 to 13:00 was invalidated due to a decrease in the analyzer flow rate.

7 CONCLUSIONS

This Q4 report provides a summary of the ambient air quality data collected at the Courtice and Rundle Road Stations. There were seventy-two (72) exceedance events of the rolling 10-minute SO_2 AAQC and thirty-two (32) exceedance events of the rolling 1-hour SO_2 AAQC at the Courtice Station. There was one (1) exceedance of the Benzo(a) Pyrene AAQC, which occurred on October 13th at the Courtice Station, and four (4) exceedances of the Benzo(a) Pyrene AAQC, which occurred on October 1st, October 13th, November 6th and November 30th at the Rundle Road Station. Data recovery rates were acceptable and valid for all measured Q4 continuous and 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

Table A1: 2021 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 Data				
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	91.0	19.7	78.8	66.3	23.1	50.1	12.0	18.8	8.8	10.1	8.8	3.3	5.7	1.8	4.0	2.9	98.0	96.5	96.5	96.5	99.3
November	275.9	34.5	78.5	55.9	32.8	134.1	20.4	46.3	23.0	23.3	11.3	5.8	11.3	4.4	6.9	3.2	99.9	99.6	99.6	99.6	99.6
December	168.3	29.2	28.8	28.8	28.8	105.6	19.7	29.5	13.9	15.9	12.0	5.9	6.9	1.5	5.6	2.4	99.7	99.7	99.7	99.7	99.7
Q4 Arithmetic Mean												5.0	8.0	2.6	5.5	2.8	99.2	98.6	98.6	98.6	99.5

Rundle Monitoring Station Data Statistics	Maximum 10 min Rolling Mean	Maximum 1 hr Rolling Mean					Maximum 24 hr Rolling Mean					Monthly Mean					Valid Data				
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	16.7	17.9	42.7	16.3	32.1	11.8	9.7	19.0	4.3	15.1	1.4	4.0	3.7	0.9	3.1	0.3	99.9	97.3	97.3	97.3	99.7
November	17.2	36.9	40.8	20.5	24.5	9.1	14.9	23.1	7.6	15.8	1.0	5.8	6.0	1.3	4.7	0.2	99.9	99.7	99.7	99.7	99.7
December	13.8	29.3	28.8	28.8	27.6	10.0	20.6	21.2	8.0	14.5	1.2	6.1	5.9	1.1	4.8	0.2	99.9	99.7	99.7	99.7	99.7
Q4 Arithmetic Mean												5.3	5.2	1.1	4.2	0.3	99.9	98.9	98.9	98.9	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	4	0		0	4		0	0	N/A	0		N/A	0	
November	43	0		0	18		0	0	N/A	0		N/A	0	
December	25	0		0	10		0	0	N/A	0		N/A	0	
Q4 Total	72	0		0	32		0	0	N/A	0		N/A	0	

Courtice Station MET Statistics	Maximum 1 hr Mean					Minimum 1 hr Mean					Monthly Mean					Total	Valid Data					
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	33.2	21.2	100.0	30.1	9.8	0.3	3.5	38.4	29.3	0.0	10.9	13.4	83.0	29.7	0.2	146.5	100.0	97.7	100.0	100.0	100.0	100.0
November	34.0	14.2	100.0	30.2	2.7	0.7	-6.1	36.2	29.4	0.0	10.4	4.0	73.3	29.7	0.1	67.9	100.0	97.5	100.0	100.0	100.0	100.0
December	50.0	11.3	100.0	30.3	6.8	0.7	-10.8	37.0	28.8	0.0	14.5	1.3	71.0	29.7	0.1	57.6	100.0	98.4	100.0	100.0	100.0	100.0
Q4 Arithmetic Mean											11.9	6.3	75.8	29.7	0.1	272.0	100.0	97.9	100.0	100.0	100.0	100.0

Rundle Station MET Statistics	Maximum 1 hr Mean				Minimum 1 hr Mean				Monthly Mean				Total	Valid Data				
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	25.9	21.4	100.0	9.5	0.0	2.7	41.8	0.0	8.5	12.9	85.3	0.2	158.9	100.0	94.1	100.0	100.0	100.0
November	25.1	14.1	100.0	2.8	0.0	-7.2	39.0	0.0	8.4	3.4	78.5	0.1	61.3	100.0	90.6	100.0	100.0	100.0
December	44.8	13.1	100.0	7.7	0.4	-12.5	40.6	0.0	11.7	0.8	76.6	0.1	71.4	100.0	97.8	100.0	100.0	100.0
Q4 Arithmetic Mean									9.5	5.7	80.2	0.1	291.6	100.0	94.2	100.0	100.0	100.0

Table A2: 2021 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	3.3	19.7	12.0	729	98.0
November	N/A	5.8	34.5	20.4	719	99.9
December	N/A	5.9	29.2	19.7	742	99.7

Table A3: 2021 Q4 Station Rundle 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	4.0	17.9	9.7	743	99.9
November	N/A	5.8	36.9	14.9	719	99.9
December	N/A	6.1	29.3	20.6	743	99.9

Table A4: 2021 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	5.7	78.8	18.8	718	96.5
November	N/A	N/A	11.3	78.5	46.3	717	99.6
December	N/A	N/A	6.9	28.8	29.5	742	99.7

Table A5: 2021 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	42.7	19.0	724	97.3
November	N/A	N/A	6.0	40.8	23.1	718	99.7
December	N/A	N/A	5.9	28.8	21.2	742	99.7

Table A6: 2021 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	1.8	66.3	8.8	718	96.5
November	N/A	N/A	4.4	55.9	23.0	717	99.6
December	N/A	N/A	1.5	28.8	13.9	742	99.7

Table A7: 2021 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	0.9	16.3	4.3	724	97.3
November	N/A	N/A	1.3	20.5	7.6	718	99.7
December	N/A	N/A	1.1	28.8	8.0	742	99.7

Table A8: 2021 Q4 Station Courtice Monitoring Results for NO2

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_2	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	4.0	23.1	10.1	718	96.5
November	0	0	6.9	32.8	23.3	717	99.6
December	0	0	5.6	28.8	15.9	742	99.7

Table A9: 2021 Q4 Station Rundle Monitoring Results for NO2

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_2	NO_2	NO_2	NO_2	NO_2	NO_2	NO_2
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	3.1	32.1	15.1	724	97.3
November	0	0	4.7	24.5	15.8	718	99.7
December	0	0	4.8	27.6	14.5	742	99.7

Table A10: 2021 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	4	4	2.9	91.0	50.1	8.8	739	99.3
November	43	18	3.2	275.9	134.1	11.3	717	99.6
December	25	10	2.4	168.3	105.6	12.0	742	99.7

Table A11: 2021 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	0.3	16.7	11.8	1.4	742	99.7
November	0	0	0.2	17.2	9.1	1.0	718	99.7
December	0	0	0.2	13.8	10.0	1.2	742	99.7

Table A12: 2021 Q4 Courtice Meterological Station Windspeed Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Valid Data
Month	Wind Speed	Wind Speed	Wind Speed	Wind Speed
	(km/hr)	(km/hr)	(km/hr)	(%)
October	33.2	0.3	10.9	100.0
November	34.0	0.7	10.4	100.0
December	50.0	0.7	14.5	100.0

Table A13: 2021 Q4 Rundle Meterological Station Windspeed Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Valid Hours
Month	Wind Speed	Wind Speed	Wind Speed	Wind Speed
	(km/hr)	(km/hr)	(km/hr)	(%)
October	25.9	0.0	8.5	100.0
November	25.1	0.0	8.4	100.0
December	44.8	0.4	11.7	100.0

Table A14: 2021 Q4 Courtice Meterological Station Wind Direction Data Summary

MET Statistics	Valid Data
Month	Wind Direction
	(%)
October	97.7
November	97.5
December	98.4

Table A15: 2021 Q4 Rundle Meterological Station Wind Direction Data Summary

MET Statistics	Valid Data
Month	Wind Direction
	(%)
October	94.1
November	90.6
December	97.8

Table A16: 2021 Q4 Courtice Meterological Station Temperature Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Valid Data
Month	Temperature	Temperature	Temperature	Temperature
	(°C)	(°C)	(°C)	(%)
October	21.2	3.5	13.4	100.0
November	14.2	-6.1	4.0	100.0
December	11.3	-10.8	1.3	100.0

Table A17: 2021 Q4 Rundle Meterological Station Temperature Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Valid Data
Month	Temperature	Temperature	Temperature	Temperature
	(°C)	(°C)	(°C)	(%)
October	21.4	2.7	12.9	100.0
November	14.1	-7.2	3.4	100.0
December	13.1	-12.5	0.8	100.0

Table A18: 2021 Q4 Courtice Meterological Station Relative Humidity Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Valid Data
Month	Relative Humidity	Relative Humidity	Relative Humidity	Relative Humidity
	(%)	(%)	(%)	(%)
October	100.0	38.4	83.0	100.0
November	100.0	36.2	73.3	100.0
December	100.0	37.0	71.0	100.0

Table A19: 2021 Q4 Rundle Meterological Station Relative Humidity Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Valid Data
Month	Relative Humidity	Relative Humidity	Relative Humidity	Relative Humidity
	(%)	(%)	(%)	(%)
October	100.0	41.8	85.3	100.0
November	100.0	39.0	78.5	100.0
December	100.0	40.6	76.6	100.0

Table A20: 2021 Q4 Courtice Meterological Station Precipitation Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Total	Valid Data
Month	Precipitation	Precipitation	Precipitation	Precipitation	Precipitation
	(mm)	(mm)	(mm)	(mm)	%
October	9.8	0.0	0.2	146.5	100.0
November	2.7	0.0	0.1	67.9	100.0
December	6.8	0.0	0.1	57.6	100.0

Table A21: 2021 Q4 Rundle Meterological Station Precipitation Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Total	Valid Data
Month	Precipitation	Precipitation	Precipitation	Precipitation	Precipitation
	(mm)	(mm)	(mm)	(mm)	%
October	9.5	0.0	0.2	158.9	100.0
November	2.8	0.0	0.1	61.3	100.0
December	7.7	0.0	0.1	71.4	100.0

Table A22: 2021 Q4 Courtice Meterological Station Pressure Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Valid Data
Month	Pressure	Pressure	Pressure	Pressure
	("Hg)	("Hg)	("Hg)	(%)
October	30.1	29.3	29.7	100.0
November	30.2	29.4	29.7	100.0
December	30.3	28.8	29.7	100.0

APPENDIX B

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

Sample Date	Courtice			Rundle		
	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume
	No.	(min)	(m^3)	No.	(min)	(m^3)
October 1, 2021	L2647796-2	1440	330	L2647796-1	1440	323
October 25, 2021	L2657674-3	1440	343	L2657674-2	1440	332
November 18, 2021	L2665080-2	1440	331	L2665080-1	1440	317
December 12, 2021	L2673220-2	1440	341	L2673220-1	1440	333

Table B2: 2021 Courtice Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1-Oct-21	25-Oct-21	18-Nov-21	12-Dec-21	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 TEQ/m^3	-	-	1.27E-03	8.61E-04	1.01E-03	4.84E-04	-	9.07E-04	4.84E-04	1.27E-03	1.27E-03	1.01E-03	4.84E-04	4	100
1,2,3,7,8-PeCDD	pg TEQ/m^3	-	-	1.67E-03	7.55E-04	1.10E-03	7.62E-04	-	1.07E-03	7.55E-04	1.67E-03	1.67E-03	1.10E-03	7.62E-04	4	100
1,2,3,4,7,8-HxCDD	pg TEQ/m^3	-	-	2.42E-04	8.61E-05	7.61E-04	7.62E-05	-	2.92E-04	7.62E-05	7.61E-04	2.42E-04	7.61E-04	7.62E-05	4	100
1,2,3,6,7,8-HxCDD	pg TEQ/m^3	-	-	3.48E-04	2.57E-04	1.07E-03	3.37E-04	-	5.02E-04	2.57E-04	1.07E-03	3.48E-04	1.07E-03	3.37E-04	4	100
1,2,3,7,8,9-HxCDD	pg TEQ/m^3	-	-	3.03E-04	1.50E-04	1.06E-03	3.14E-04	-	4.57E-04	1.50E-04	1.06E-03	3.03E-04	1.06E-03	3.14E-04	4	100
1,2,3,4,6,7,8-HpCDD	pg TEQ/m^3	-	-	8.42E-04	5.74E-04	1.15E-03	5.25E-04	-	7.73E-04	5.25E-04	1.15E-03	8.42E-04	1.15E-03	5.25E-04	4	100
OCDD	pg TEQ/m^3	-	-	1.75E-04	4.05E-05	1.09E-04	4.45E-05	-	9.23E-05	4.05E-05	1.75E-04	1.75E-04	1.09E-04	4.45E-05	4	100
2,3,7,8-TCDF	pg TEQ/m^3	-	-	1.52E-04	1.04E-04	1.44E-04	6.45E-05	-	1.16E-04	6.45E-05	1.52E-04	1.52E-04	1.44E-04	6.45E-05	4	100
1,2,3,7,8-PeCDF	pg TEQ/m^3	-	-	1.27E-04	3.85E-05	3.49E-05	2.64E-05	-	5.68E-05	2.64E-05	1.27E-04	1.27E-04	3.49E-05	2.64E-05	4	100
2,3,4,7,8-PeCDF	pg TEQ/m^3	-	-	1.73E-03	3.81E-04	7.25E-04	1.14E-04	-	7.37E-04	1.14E-04	1.73E-03	1.73E-03	7.25E-04	1.14E-04	4	100
1,2,3,4,7,8-HxCDF	pg TEQ/m^3	-	-	3.79E-04	8.01E-05	7.01E-04	8.94E-05	-	3.12E-04	8.01E-05	7.01E-04	3.79E-04	7.01E-04	8.94E-05	4	100
1,2,3,6,7,8-HxCDF	pg TEQ/m^3	-	-	8.39E-04	6.50E-05	2.11E-04	5.57E-05	-	2.93E-04	5.57E-05	8.39E-04	8.39E-04	2.11E-04	5.57E-05	4	100
2,3,4,6,7,8-HxCDF	pg TEQ/m^3	-	-	7.36E-04	1.30E-04	3.78E-04	1.09E-04	-	3.38E-04	1.09E-04	7.36E-04	7.36E-04	3.78E-04	1.09E-04	4	100
1,2,3,7,8,9-HxCDF	pg TEQ/m^3	-	-	2.73E-04	1.03E-04	6.44E-04	8.80E-05	-	2.77E-04	8.80E-05	6.44E-04	2.73E-04	6.44E-04	8.80E-05	4	100
1,2,3,4,6,7,8-HpCDF	pg TEQ/m^3	-	-	3.24E-04	4.98E-05	1.37E-04	7.42E-05	-	1.46E-04	4.98E-05	3.24E-04	3.24E-04	1.37E-04	7.42E-05	4	100
1,2,3,4,7,8,9-HpCDF	pg TEQ/m^3	-	-	5.61E-05	2.24E-05	5.92E-05	6.89E-06	-	3.61E-05	6.89E-06	5.92E-05	5.61E-05	5.92E-05	6.89E-06	4	100
OCDF	pg TEQ/m^3	-	-	1.77E-05	1.18E-06	3.81E-06	2.48E-06	-	6.30E-06	1.18E-06	1.77E-05	1.77E-05	3.81E-06	2.48E-06	4	100
Total Toxic Equivalency	pg TEQ/m^3	*0.1 1* [1]	-	9.48E-03	3.70E-03	9.30E-03	3.17E-03	0	6.41E-03	3.17E-03	9.48E-03	9.48E-03	9.30E-03	3.17E-03	4	100

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

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

Table B3: 2021 Rundle Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1-Oct-21	25-Oct-21	18-Nov-21	12-Dec-21	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 TEQ/m^3	-	-	1.55E-03	5.84E-04	4.98E-04	6.74E-04	-	8.26E-04	4.98E-04	1.55E-03	1.55E-03	4.98E-04	6.74E-04	4	100
1,2,3,7,8-PeCDD	pg TEQ/m^3	-	-	1.25E-02	4.26E-04	5.89E-03	9.53E-04	-	4.95E-03	4.26E-04	1.25E-02	1.25E-02	5.89E-03	9.53E-04	4	100
1,2,3,4,7,8-HxCDD	pg TEQ/m^3	-	-	2.35E-03	4.89E-05	3.60E-03	1.09E-04	-	1.52E-03	4.89E-05	3.60E-03	2.35E-03	3.60E-03	1.09E-04	4	100
1,2,3,6,7,8-HxCDD	pg TEQ/m^3	-	-	2.81E-03	1.10E-04	5.53E-03	1.20E-04	-	2.14E-03	1.10E-04	5.53E-03	2.81E-03	5.53E-03	1.20E-04	4	100
1,2,3,7,8,9-HxCDD	pg TEQ/m^3	-	-	4.40E-03	1.18E-04	2.66E-03	1.76E-04	-	1.84E-03	1.18E-04	4.40E-03	4.40E-03	2.66E-03	1.76E-04	4	100
1,2,3,4,6,7,8-HpCDD	pg TEQ/m^3	-	-	3.37E-03	5.17E-04	4.20E-03	4.90E-04	-	2.15E-03	4.90E-04	4.20E-03	3.37E-03	4.20E-03	4.90E-04	4	100
OCDD	pg TEQ/m^3	-	-	3.19E-04	4.09E-05	1.73E-04	4.43E-05	-	1.44E-04	4.09E-05	3.19E-04	3.19E-04	1.73E-04	4.43E-05	4	100
2,3,7,8-TCDF	pg TEQ/m^3	-	-	1.39E-04	9.94E-05	2.57E-04	8.80E-05	-	1.46E-04	8.80E-05	2.57E-04	1.39E-04	2.57E-04	8.80E-05	4	100
1,2,3,7,8-PeCDF	pg TEQ/m^3	-	-	6.97E-05	2.08E-05	2.59E-04	2.46E-05	-	9.36E-05	2.08E-05	2.59E-04	6.97E-05	2.59E-04	2.46E-05	4	100
2,3,4,7,8-PeCDF	pg TEQ/m^3	-	-	6.50E-04	2.03E-04	1.04E-02	3.17E-04	-	2.90E-03	2.03E-04	1.04E-02	6.50E-04	1.04E-02	3.17E-04	4	100
1,2,3,4,7,8-HxCDF	pg TEQ/m^3	-	-	8.17E-04	4.89E-05	3.56E-03	9.97E-05	-	1.13E-03	4.89E-05	3.56E-03	8.17E-04	3.56E-03	9.97E-05	4	100
1,2,3,6,7,8-HxCDF	pg TEQ/m^3	-	-	7.28E-04	3.94E-05	3.14E-03	5.57E-05	-	9.91E-04	3.94E-05	3.14E-03	7.28E-04	3.14E-03	5.57E-05	4	100
2,3,4,6,7,8-HxCDF	pg TEQ/m^3	-	-	8.67E-04	6.78E-05	2.42E-03	9.53E-05	-	8.62E-04	6.78E-05	2.42E-03	8.67E-04	2.42E-03	9.53E-05	4	100
1,2,3,7,8,9-HxCDF	pg TEQ/m^3	-	-	2.17E-04	7.73E-05	1.61E-03	7.62E-05	-	4.95E-04	7.62E-05	1.61E-03	2.17E-04	1.61E-03	7.62E-05	4	100
1,2,3,4,6,7,8-HpCDF	pg TEQ/m^3	-	-	3.99E-04	3.00E-05	1.28E-03	7.95E-05	-	4.48E-04	3.00E-05	1.28E-03	3.99E-04	1.28E-03	7.95E-05	4	100
1,2,3,4,7,8,9-HpCDF	pg TEQ/m^3	-	-	8.54E-05	5.05E-06	2.04E-04	8.80E-06	-	7.59E-05	5.05E-06	2.04E-04	8.54E-05	2.04E-04	8.80E-06	4	100
OCDF	pg TEQ/m^3	-	-	1.93E-05	9.46E-07	1.86E-05	1.50E-06	-	1.01E-05	9.46E-07	1.93E-05	1.93E-05	1.86E-05	1.50E-06	4	100
Total Toxic Equivalency	pg TEQ/m^3	*0.1* *1* [1]	-	3.13E-02	2.44E-03	4.57E-02	3.41E-03	0	2.07E-02	2.44E-03	4.57E-02	3.13E-02	4.57E-02	3.41E-03	4	100

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

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

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 1, 2021	L2647796-2	1440	330	L2647796-1	1440	323
October 13, 2021	L2652496-2	1440	317	L2652496-1	1440	317
October 25, 2021	L2657674-3	1440	343	L2657674-2	1440	332
November 6, 2021	L2655487-3	1440	334	L2655487-2	1440	332
November 18, 2021	L2665080-2	1440	331	L2665080-1	1440	317
November 30, 2021	L2663690-3	1439	332	L2663690-2	1438	323
December 12, 2021	L2673220-2	1440	341	L2673220-1	1440	333
December 24, 2021	L2675973-1	1440	344	L2675973-2	1440	331

Table B5: 2021 Courtice Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1 Oct-21	13 Oct-21	25 Oct-21	6 Nov 21	18 Nov 21	30 Nov 21	12 Dec 21	24 Dec 21	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*	-	2.26E+01	9.18E+00	2.65E+00	5.69E+00	2.54E+00	9.01E+00	1.82E+00	7.47E+00	0	7.62E+00	1.82E+00	2.26E+01	2.26E+01	9.01E+00	7.47E+00	8	100
2-Methylnaphthalene	ng/m^3	*10000*	-	3.73E+01	1.56E+01	4.17E+00	9.88E+00	4.26E+00	1.52E+01	2.73E+00	1.20E+01	0	1.26E+01	2.73E+00	3.73E+01	3.73E+01	1.52E+01	1.20E+01	8	100
Acenaphthene	ng/m^3	-	-	1.16E+01	7.67E+00	2.34E+00	2.37E+00	1.16E+00	1.70E+00	3.32E-01	1.22E+00	-	3.55E+00	3.32E-01	1.16E+01	1.16E+01	2.37E+00	1.22E+00	8	100
Acenaphthylene	ng/m^3	*3500*	-	1.21E+00	3.12E-01	1.01E-01	2.03E-01	6.95E-02	2.49E-01	3.30E-02	1.67E-01	0	2.93E-01	3.30E-02	1.21E+00	1.21E+00	2.49E-01	1.67E-01	8	100
Anthracene	ng/m^3	*200*	-	6.73E-01	4.07E-01	1.49E-01	1.34E-01	3.11E-02	1.98E-01	2.10E-02	5.49E-02	0	2.09E-01	2.10E-02	6.73E-01	6.73E-01	1.98E-01	5.49E-02	8	100
Benzo(a)Anthracene	ng/m^3	-	-	3.39E-02	5.80E-02	8.89E-03	2.99E-02	1.26E-02	3.25E-02	2.26E-02	1.81E-02	-	2.71E-02	8.89E-03	5.80E-02	5.80E-02	3.25E-02	2.26E-02	8	100
Benzo(a)fluorene	ng/m^3	-	-	6.67E-02	7.70E-02	1.52E-02	6.68E-02	2.59E-02	8.64E-02	2.27E-02	3.11E-02	-	4.90E-02	1.52E-02	8.64E-02	7.70E-02	8.64E-02	3.11E-02	8	100
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	*1*	4.06E-02	6.15E-02	1.08E-02	3.80E-02	1.58E-02	2.47E-02	2.97E-02	2.75E-02	1	3.11E-02	1.08E-02	6.15E-02	6.15E-02	3.80E-02	2.97E-02	8	100
Benzo(b)Fluoranthene	ng/m^3	-	-	7.42E-02	1.07E-01	2.15E-02	7.99E-02	2.87E-02	9.13E-02	4.35E-02	8.49E-02	-		2.15E-02	1.07E-01	1.07E-01	9.13E-02	8.49E-02	8	100
Benzo(b)fluorene	ng/m^3	-	-	4.64E-02	5.65E-02	7.61E-03	8.71E-02	3.17E-02	4.34E-02	1.66E-02	1.91E-02	-	3.85E-02	7.61E-03	8.71E-02	5.65E-02	8.71E-02	1.91E-02	8	100
Benzo(e)Pyrene	ng/m^3	-	-	5.61E-02	7.10E-02	2.05E-02	5.21E-02	3.47E-02	8.34E-02	3.45E-02	4.80E-02	-	5.00E-02	2.05E-02	8.34E-02	7.10E-02	8.34E-02	4.80E-02	8	100
Benzo(g,h,i)Perylene	ng/m^3	-	-	3.97E-02	5.62E-02	1.55E-02	4.07E-02	2.44E-02	6.42E-02	3.45E-02	4.24E-02	-	3.97E-02	1.55E-02	6.42E-02	5.62E-02	6.42E-02	4.24E-02	8	100
Benzo(k)Fluoranthene	ng/m^3	-	-	6.58E-02	7.79E-02	1.39E-02	5.48E-02	2.37E-02	6.11E-02	3.70E-02	4.94E-02	-	4.79E-02	1.39E-02	7.79E-02	7.79E-02	6.11E-02	4.94E-02	8	100
Biphenyl	ng/m^3	-	-	1.45E+01	4.10E+00	1.64E+00	2.43E+00	1.67E+00	3.55E+00	1.40E+00	3.72E+00	-	4.12E+00	1.40E+00	1.45E+01	1.45E+01	3.55E+00	3.72E+00	8	100
Chrysene	ng/m^3	-	-	1.15E-01	1.98E-01	3.41E-02	1.07E-01	4.53E-02	1.31E-01	7.21E-02	1.12E-01	-	1.02E-01	3.41E-02	1.98E-01	1.98E-01	1.31E-01	1.12E-01	8	100
Dibenzo(a,h)Anthracene	ng/m^3	-	-	7.48E-03	1.50E-02	2.92E-04	2.99E-04	3.14E-03	8.13E-03	5.92E-03	6.10E-03	-	5.79E-03	2.92E-04	1.50E-02	1.50E-02	8.13E-03	6.10E-03	8	100
Fluoranthene	ng/m^3	-	-	1.55E+00	1.54E+00	4.34E-01	3.65E-01	2.76E-01	5.96E-01	2.83E-01	5.49E-01	-	7.00E-01	2.76E-01	1.55E+00	1.55E+00	5.96E-01	5.49E-01	8	100
Fluorene	ng/m^3	-	-	7.97E+00	4.67E+00	1.35E+00	1.56E+00	9.49E-01	1.70E+00	4.88E-01	1.29E+00	-	2.50E+00	4.88E-01	7.97E+00	7.97E+00	1.70E+00	1.29E+00	8	100
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	4.55E-02	5.96E-02	1.50E-02	3.47E-02	2.12E-02	6.48E-02	3.67E-02	4.94E-02	-	4.09E-02	1.50E-02	6.48E-02	5.96E-02	6.48E-02	4.94E-02	8	100
Naphthalene	ng/m^3	*22500*	*22500*	1.02E+02	5.14E+01	1.09E+01	3.17E+01	1.42E+01	5.09E+01	1.47E+01	2.37E+01	0	3.75E+01	1.09E+01	1.02E+02	1.02E+02	5.09E+01	2.37E+01	8	100
o-Terphenyl	ng/m^3	-	-	1.22E-02	3.28E-02	9.88E-03	1.16E-02	8.85E-03	2.35E-02	1.13E-02	1.76E-02	-	1.60E-02	8.85E-03	3.28E-02	3.28E-02	2.35E-02	1.76E-02	8	100
Perylene	ng/m^3	-	-	3.03E-04	8.26E-03	2.92E-04	1.06E-02	3.56E-03	5.15E-03	5.57E-03	2.21E-03	-	4.49E-03	2.92E-04	1.06E-02	8.26E-03	1.06E-02	5.57E-03	8	100
Phenanthrene	ng/m^3	-	-	1.32E+01	7.32E+00	2.13E+00	2.02E+00	1.27E+00	3.07E+00	8.06E-01	2.26E+00	-	4.00E+00	8.06E-01	1.32E+01	1.32E+01	3.07E+00	2.26E+00	8	100
Pyrene	ng/m^3	-	-	7.79E-01	7.10E-01	2.24E-01	2.44E-01	1.52E-01	4.76E-01	1.60E-01	2.35E-01	-	3.72E-01	1.52E-01	7.79E-01	7.79E-01	4.76E-01	2.35E-01	8	100
Tetralin	ng/m^3	-	-	1.85E+00	3.94E+00	8.10E-01	4.22E+00	1.62E+00	6.57E+00	1.39E+00	3.63E+00	-	3.00E+00	8.10E-01	6.57E+00	3.94E+00	6.57E+00	3.63E+00	8	100
Total PAH[4]	ng/m^3	-	-	215.94	107.76	27.07	61.46	28.45	93.98	24.54	56.78	-	77.00	24.54	215.94	215.94	61.46	93.98	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: 2021 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1 Oct 21	13 Oct 21	25 Oct 21	6 Nov 21	18 Nov 21	30 Nov 21	12 Dec 21	24 Dec 21	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*	-	8.79E+00	8.52E+00	1.97E+00	4.19E+00	3.13E+00	9.10E+00	2.65E+00	3.23E+00	0	5.20E+00	1.97E+00	9.10E+00	8.79E+00	9.10E+00	3.23E+00	8	100
2-Methylnaphthalene	ng/m^3	*10000*	-	1.08E+01	1.30E+01	2.79E+00	6.54E+00	5.08E+00	1.46E+01	4.12E+00	4.59E+00	0	7.69E+00	2.79E+00	1.46E+01	1.30E+01	1.46E+01	4.59E+00	8	100
Acenaphthene	ng/m^3	-	-	1.85E+00	4.83E+00	9.16E-01	1.62E+00	1.15E+00	1.17E+00	8.21E-01	8.70E-01	-	1.65E+00	8.21E-01	4.83E+00	4.83E+00	1.62E+00	8.70E-01	8	100
Acenaphthylene	ng/m^3	*3500*	-	7.21E-01	3.34E-01	7.47E-02	1.66E-01	1.35E-01	4.95E-01	5.76E-02	2.09E-01	0	2.74E-01	5.76E-02	7.21E-01	7.21E-01	4.95E-01	2.09E-01	8	100
Anthracene	ng/m^3	*200*	-	3.28E-01	4.07E-01	9.28E-02	1.18E-01	1.15E-01	2.85E-01	3.49E-02	2.70E-01	0	2.06E-01	3.49E-02	4.07E-01	4.07E-01	2.85E-01	2.70E-01	8	100
Benzo(a)Anthracene	ng/m^3	-	-	7.52E-02	6.06E-02	9.43E-03	4.67E-02	2.75E-02	7.09E-02	2.24E-02	5.35E-02	-	4.58E-02	9.43E-03	7.52E-02	7.52E-02	7.09E-02	5.35E-02	8	100
Benzo(a)fluorene	ng/m^3	-	-	5.94E-02	7.57E-02	2.37E-02	9.19E-02	5.74E-02	1.42E-01	2.46E-02	1.43E-01	-	7.72E-02	2.37E-02	1.43E-01	7.57E-02	1.42E-01	1.43E-01	8	100
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	*1*	5.67E-02	7.32E-02	1.20E-02	6.54E-02	2.63E-02	7.52E-02	2.56E-02	2.75E-02	4	4.52E-02	1.20E-02	7.52E-02	7.32E-02	7.52E-02	2.75E-02	8	100
Benzo(b)Fluoranthene	ng/m^3	-	-	2.11E-01	1.14E-01	2.46E-02	9.79E-02	4.86E-02	1.73E-01	5.44E-02	1.50E-01	-	1.09E-01	2.46E-02	2.11E-01	2.11E-01	1.73E-01	1.50E-01	8	100
Benzo(b)fluorene	ng/m^3	-	-	3.72E-02	6.12E-02	9.40E-03	1.10E-01	7.19E-02	7.46E-02	2.08E-02	1.02E-01	-	6.09E-02	9.40E-03	1.10E-01	6.12E-02	1.10E-01	1.02E-01	8	100
Benzo(e)Pyrene	ng/m^3	-	-	1.59E-01	7.76E-02	2.18E-02	7.56E-02	4.89E-02	1.58E-01	3.59E-02	9.31E-02	-	8.37E-02	2.18E-02	1.59E-01	1.59E-01	1.58E-01	9.31E-02	8	100
Benzo(g,h,i)Perylene	ng/m^3	-	-	9.13E-02	6.50E-02	1.43E-02	6.14E-02	4.07E-02	1.29E-01	3.72E-02	7.76E-02	-	6.46E-02	1.43E-02	1.29E-01	9.13E-02	1.29E-01	7.76E-02	8	100
Benzo(k)Fluoranthene	ng/m^3	-	-	1.22E-01	9.09E-02	2.18E-02	8.77E-02	5.33E-02	1.51E-01	4.71E-02	1.24E-01	-	8.72E-02	2.18E-02	1.51E-01	1.22E-01	1.51E-01	1.24E-01	8	100
Biphenyl	ng/m^3	-	-	9.41E+00	3.72E+00	1.30E+00	1.95E+00	1.75E+00	4.15E+00	1.61E+00	3.00E+00	-	3.36E+00	1.30E+00	9.41E+00	9.41E+00	4.15E+00	3.00E+00	8	100
Chrysene	ng/m^3	-	-	2.24E-01	2.00E-01	3.49E-02	1.39E-01	8.68E-02	2.30E-01	7.81E-02	1.98E-01	-	1.49E-01	3.49E-02	2.30E-01	2.24E-01	2.30E-01	1.98E-01	8	100
Dibenzo(a,h)Anthracene	ng/m^3	-	-	1.55E-02	1.51E-02	3.01E-04	1.19E-02	6.59E-03	2.46E-02	7.06E-03	1.12E-02	-	1.15E-02	3.01E-04	2.46E-02	1.55E-02	2.46E-02	1.12E-02	8	100
Fluoranthene	ng/m^3	-	-	9.78E-01	1.93E+00	4.07E-01	4.28E-01	4.76E-01	7.06E-01	3.79E-01	9.24E-01	-	7.79E-01	3.79E-01	1.93E+00	1.93E+00	7.06E-01	9.24E-01	8	100
Fluorene	ng/m^3	-	-	1.78E+00	4.16E+00	7.47E-01	1.20E+00	1.14E+00	1.54E+00	7.85E-01	1.44E+00	-	1.60E+00	7.47E-01	4.16E+00	4.16E+00	1.54E+00	1.44E+00	8	100
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	8.36E-02	6.50E-02	1.52E-02	7.02E-02	3.85E-02	1.28E-01	3.77E-02	9.70E-02	-	6.69E-02	1.52E-02	1.28E-01	8.36E-02	1.28E-01	9.70E-02	8	100
Naphthalene	ng/m^3	*22500*	*22500*	2.72E+01	4.67E+01	9.55E+00	2.58E+01	1.64E+01	4.71E+01	1.55E+01	2.26E+01	0	2.63E+01	9.55E+00	4.71E+01	4.67E+01	4.71E+01	2.26E+01	8	100
o-Terphenyl	ng/m^3	-	-	8.67E-03	3.53E-02	8.07E-03	1.05E-02	9.81E-03	2.68E-02	1.34E-02	1.17E-02	-	1.55E-02	8.07E-03	3.53E-02	3.53E-02	2.68E-02	1.34E-02	8	100
Perylene	ng/m^3	-	-	1.49E-02	9.15E-03	3.01E-04	1.05E-02	6.91E-03	2.44E-02	4.74E-03	8.43E-03	-	9.92E-03	3.01E-04	2.44E-02	1.49E-02	2.44E-02	8.43E-03	8	100
Phenanthrene	ng/m^3	-	-	4.37E+00	7.26E+00	1.46E+00	1.86E+00	1.91E+00	3.22E+00	1.31E+00	3.08E+00	-	3.06E+00	1.31E+00	7.26E+00	7.26E+00	3.22E+00	3.08E+00	8	100
Pyrene	ng/m^3	-	-	5.88E-01	8.77E-01	2.10E-01	2.92E-01	3.09E-01	5.63E-01	2.10E-01	6.01E-01	-	4.56E-01	2.10E-01	8.77E-01	8.77E-01	5.63E-01	6.01E-01	8	100
Tetralin	ng/m^3	-	-	2.20E+00	3.09E+00	6.36E-01	2.98E+00	2.11E+00	4.49E+00	1.37E+00	1.11E+00	-	2.25E+00	6.36E-01	4.49E+00	3.09E+00	4.49E+00	1.37E+00	8	100
Total PAH[4]	ng/m^3	-	-	70.20	95.78	20.34	48.03	34.20	88.74	29.26	43.02	-	53.70	20.34	95.78	95.78	88.74	43.02	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 1, 2021	L2647808-4	1440	1679	L2647808-2	1440	1697
October 7, 2021	L2652482-4	1440	1642	L2652482-2	1440	1675
October 13, 2021	L2652482-3	1440	1653	L2652482-1	1440	1664
October 19, 2021	L2656900-4	1440	1701	L2656900-2	1440	1714
October 25, 2021	L2656900-3	1440	1710	L2656900-1	1440	1740
October 31, 2021	L2661635-1	1440	1673	L2661635-3	1440	1647
November 6, 2021	L2661635-2	1440	1706	L2661635-4	1440	1691
November 12, 2021	L2665096-3	1440	1712	L2665096-1	1440	1720
November 18, 2021	L2665096-4	1440	1692	L2665096-2	1440	1671
November 24, 2021	L2669037-3	1440	1721	L2669037-1	1440	1706
November 30, 2021	L2669037-4	1440	1731	L2669037-2	1440	1718
December 6, 2021	L2673223-3	1440	1700	L2673223-1	1440	1680
December 12, 2021	L2673223-4	1440	1731	L2673223-2	1440	1682
December 18, 2021	L2675976-2	1440	1793	L2675976-4	1440	1770
December 24, 2021	L2675976-1	1440	1662	L2675976-3	1440	1687
December 30, 2021	L2677337-1	1440	1666	L2677337-3	1440	1656

Table B8: 2021 Courtice Station Q4 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1 Oct 21	7 Oct 21	13 Oct 21	19 Oct 21	25 Oct 21	31 Oct 21	6 Nov 21	12 Nov 21	18 Nov 21	24 Nov 21	30 Nov 21	6 Dec-21	12 Dec-21	18 Dec-21	24 Dec-21	30 Dec-21	MECP Criteria ($\mu g/m^3$)	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	$\mu g/m^3$	*120*	*120*	20.43	24.54	19.24	0.03	0.03	9.03	19.28	12.50	14.30	18.30	19.41	11.18	5.95	10.88	37.97	18.73	*120*	0	7.15	15.11	0.03	37.97	24.54	19.41	37.97	16	100
Mercury (Hg)	$\mu g/m^3$	*2*	*2*	1.13E-05	9.74E-06	1.27E-05	1.65E-05	1.11E-05	2.99E-06	1.41E-05	7.59E-06	2.96E-06	8.13E-06	6.35E-06	2.94E-06	2.89E-06	2.79E-06	3.01E-06	6.60E-06	*2*	0	6.28E-06	7.60E-06	2.79E-06	1.65E-05	1.65E-05	1.41E-05	6.60E-06	16	100
Aluminum (Al)	$\mu g/m^3$	*4.8*	-	1.73E-01	1.72E-01	1.06E-01	2.01E-01	3.11E-02	3.93E-02	1.63E-01	1.03E-01	9.93E-02	1.23E-01	5.83E-02	7.12E-02	4.37E-02	7.31E-02	2.71E-01	1.08E-01	*4.8*	0	9.70E-02	1.15E-01	3.11E-02	2.71E-01	2.01E-01	1.63E-01	2.71E-01	16	100
Antimony (Sb)	$\mu g/m^3$	*25*	*25*	1.63E-03	3.10E-03	1.20E-03	1.41E-03	3.98E-04	3.59E-04	1.72E-03	4.15E-04	4.14E-04	1.34E-03	1.57E-03	7.41E-04	3.29E-04	3.35E-04	1.11E-03	8.94E-04	*25*	0	8.40E-04	1.06E-03	3.29E-04	3.10E-03	3.10E-03	1.72E-03	1.11E-03	16	100
Arsenic (As)	$\mu g/m^3$	*0.3*	*0.3*	8.93E-04	9.14E-04	9.07E-04	8.82E-04	8.77E-04	8.97E-04	8.79E-04	8.76E-04	8.87E-04	8.72E-04	8.67E-04	8.82E-04	8.67E-04	2.01E-03	9.03E-04	9.00E-04	*0.3*	0	9.33E-04	9.57E-04	8.67E-04	2.01E-03	9.14E-04	8.87E-04	2.01E-03	16	100
Barium (Ba)	$\mu g/m^3$	*10*	*10*	2.10E-02	1.07E-02	1.14E-02	1.68E-02	3.37E-03	3.34E-03	1.35E-02	4.89E-03	5.77E-03	1.15E-02	1.37E-02	3.23E-03	2.38E-03	2.64E-03	4.28E-03	7.20E-03	*10*	0	6.74E-03	8.49E-03	2.38E-03	2.10E-02	2.10E-02	1.37E-02	7.20E-03	16	100
Beryllium (Be)	$\mu g/m^3$	*0.01*	*0.01*	1.49E-05	1.52E-05	1.51E-05	1.47E-05	1.46E-05	1.49E-05	4.28E-05	1.46E-05	1.48E-05	1.45E-05	1.44E-05	1.47E-05	1.44E-05	1.39E-05	1.50E-05	1.50E-05	*0.01*	0	1.57E-05	1.65E-05	1.39E-05	4.28E-05	1.52E-05	4.28E-05	1.50E-05	16	100
Bismuth (Bi)	$\mu g/m^3$	-	-	5.36E-04	5.48E-04	5.44E-04	5.29E-04	5.26E-04	5.38E-04	5.28E-04	5.26E-04	5.32E-04	5.23E-04	5.20E-04	5.29E-04	5.20E-04	5.02E-04	5.42E-04	5.40E-04	-	-	5.30E-04	5.30E-04	5.02E-04	5.48E-04	5.48E-04	5.32E-04	5.42E-04	16	100
Boron (B)	$\mu g/m^3$	*120*	-	1.55E-02	4.57E-03	4.54E-03	4.41E-03	4.39E-03	4.48E-03	4.40E-03	4.38E-03	4.43E-03	4.36E-03	4.33E-03	4.41E-03	4.33E-03	4.18E-03	4.51E-03	4.50E-03	*120*	0	4.77E-03	5.11E-03	4.18E-03	1.55E-02	1.55E-02	4.43E-03	4.51E-03	16	100
Cadmium (Cd)	$\mu g/m^3$	*0.025*	*0.025*	1.13E-04	1.27E-04	1.00E-04	1.47E-04	6.96E-05	6.75E-05	1.52E-04	8.41E-05	5.44E-05	1.52E-04	9.99E-05	1.69E-04	8.43E-05	1.31E-04	1.11E-04	1.06E-04	*0.025*	0	1.05E-04	1.10E-04	5.44E-05	1.69E-04	1.47E-04	1.52E-04	1.69E-04	16	100
Chromium (Cr)	$\mu g/m^3$	*0.5*	-	3.75E-03	4.26E-03	2.48E-03	4.53E-03	9.94E-04	1.02E-03	3.11E-03	9.93E-04	1.00E-03	2.56E-03	2.25E-03	1.00E-03	9.82E-04	9.48E-04	2.41E-03	2.28E-03	*0.5*	0	1.84E-03	2.16E-03	9.48E-04	4.53E-03	4.53E-03	3.11E-03	2.41E-03	16	100
Cobalt (Co)	$\mu g/m^3$	*0.1*	*0.1*	2.12E-04	1.38E-04	1.11E-04	1.99E-04	3.45E-05	5.14E-05	1.35E-04	7.65E-05	7.86E-05	1.29E-04	9.65E-05	1.16E-04	3.99E-05	8.14E-05	1.46E-04	7.08E-05	*0.1*	0	9.52E-05	1.07E-04	3.45E-05	2.12E-04	2.12E-04	1.35E-04	1.46E-04	16	100
Copper (Cu)	$\mu g/m^3$	*50*	-	5.93E-02	1.54E-02	3.48E-02	1.61E-02	6.37E-03	1.58E-02	5.54E-02	1.13E-02	7.15E-03	1.57E-02	5.02E-02	1.99E-02	4.33E-03	6.86E-03	1.22E-02	4.16E-02	*50*	0	1.71E-02	2.33E-02	4.33E-03	5.93E-02	5.93E-02	5.54E-02	4.16E-02	16	100
Iron (Fe)	$\mu g/m^3$	*4*	-	7.92E-01	7.25E-01	3.95E-01	6.64E-01	1.07E-01	1.42E-01	4.46E-01	2.04E-01	2.29E-01	5.07E-01	3.33E-01	1.67E-01	1.26E-01	1.66E-01	3.30E-01	3.51E-01	*4*	0	2.95E-01	3.55E-01	1.07E-01	7.92E-01	7.92E-01	5.07E-01	3.51E-01	16	100
Lead (Pb)	$\mu g/m^3$	*0.5*	*0.5*	3.59E-03	3.05E-03	3.62E-03	3.89E-03	1.36E-03	1.90E-03	3.19E-03	1.71E-03	1.04E-03	4.00E-03	4.00E-03	2.68E-03	3.48E-03	3.06E-03	2.00E-03	1.99E-03	*2*	0	2.59E-03	2.79E-03	1.04E-03	4.00E-03	3.89E-03	4.00E-03	3.48E-03	16	100
Magnesium (Mg)	$\mu g/m^3$	-	-	3.35E-01	1.99E-01	2.12E-01	4.29E-01	4.91E-02	9.03E-02	2.19E-01	1.31E-01	1.36E-01	2.15E-01	9.99E-02	1.16E-01	1.02E-01	1.28E-01	2.42E-01	1.21E-01	-	-	1.54E-01	1.77E-01	4.91E-02	4.29E-01	4.29E-01	2.19E-01	2.42E-01	16	100
Manganese (Mn)	$\mu g/m^3$	*0.4*	-	1.81E-02	1.18E-02	1.04E-02	2.53E-02	2.04E-03	4.63E-03	1.03E-02	6.13E-03	6.91E-03	1.14E-02	8.20E-03	6.12E-03	8.03E-03	4.70E-03	7.88E-03	5.89E-03	*0.4*	0	7.90E-03	9.24E-03	2.04E-03	2.53E-02	2.53E-02	1.14E-02	8.03E-03	16	100
Molybdenum (Mo)	$\mu g/m^3$	*120*	-	3.03E-03	1.10E-03	1.94E-03	1.16E-03	4.62E-04	1.04E-03	2.88E-03	7.18E-04	4.96E-04	1.32E-03	2.21E-03	1.06E-03	3.41E-04	4.52E-04	1.14E-03	2.97E-03	*120*	0	1.12E-03	1.40E-03	3.41E-04	3.03E-03	3.03E-03	2.88E-03	2.97E-03	16	100
Nickel (Ni)	$\mu g/m^3$	*0.2*	-	1.76E-03	1.62E-03	1.63E-03	1.96E-03	8.19E-04	9.44E-04	1.40E-03	6.72E-04	6.68E-04	1.17E-03	1.01E-03	6.94E-04	5.20E-04	6.58E-04	1.02E-03	7.74E-04	*0.2*	0	9.99E-04	1.08E-03	5.20E-04	1.96E-03	1.96E-03	1.40E-03	1.02E-03	16	100
Phosphorus (P)	$\mu g/m^3$	-	-	2.23E-01	2.28E-01	2.27E-01	2.20E-01	2.19E-01	2.24E-01	2.20E-01	2.19E-01	2.22E-01	2.18E-01	2.17E-01	2.21E-01	2.17E-01	2.09E-01	2.26E-01	2.25E-01	-	-	2.21E-01	2.21E-01	2.09E-01	2.28E-01	2.28E-01	2.22E-01	2.26E-01	16	100
Selenium (Se)	$\mu g/m^3$	*10*	*10*	3.87E-04	3.96E-04	9.07E-04	1.18E-03	3.80E-04	3.89E-04	1.93E-03	3.80E-04	3.84E-04	3.78E-04	1.10E-03	3.82E-04	3.76E-04	3.63E-04	3.91E-04	3.90E-04	*10*	0	5.12E-04	6.07E-04	3.63E-04	1.93E-03	1.18E-03	1.93E-03	3.91E-04	16	100
Silver (Ag)	$\mu g/m^3$	*1*	*1*	2.68E-05	2.74E-05	2.72E-05	8.05E-05	2.63E-05	2.69E-05	5.45E-05	2.63E-05	2.66E-05	2.61E-05	5.78E-05	2.65E-05	2.60E-05	2.51E-05	2.71E-05	2.70E-05	*1*	0	3.13E-05	3.36E-05	2.51E-05	8.05E-05	8.05E-05	5.78E-05	2.71E-05	16	100
Strontium (Sr)	$\mu g/m^3$	*120*	-	5.72E-03	6.76E-03	3.69E-03	4.76E-03	8.77E-04	8.97E-04	4.51E-03	2.51E-03	1.77E-03	3.49E-03	2.25E-03	2.53E-03	8.67E-04	2.29E-03	1.05E-02	4.62E-03	*120*	0	2.86E-03	3.63E-03	8.67E-04	1.05E-02	6.76E-03	4.51E-03	1.05E-02	16	100
Thallium (Tl)	$\mu g/m^3$	-	-	2.68E-05	7.00E-05	2.72E-05	2.65E-05	2.63E-05	2.69E-05	2.64E-05	2.63E-05	2.66E-05	2.61E-05	2.60E-05	2.65E-05	2.60E-05	2.51E-05	5.42E-05	2.70E-05	-	-	2.93E-05	3.09E-05	2.51E-05	7.00E-05	7.00E-05	2.66E-05	5.42E-05	16	100
Tin (Sn)	$\mu g/m^3$	*10*	*10*	1.76E-03	1.32E-03	1.17E-03	1.85E-03	4.33E-04	4.24E-04	3.46E-03	1.89E-03	4.91E-04	1.32E-03	1.73E-03	6.88E-04	6.01E-04	1.67E-04	7.34E-04	1.02E-03	*10*	0	9.36E-04	1.19E-03	1.67E-04	3.46E-03	1.85E-03	3.46E-03	1.02E-03	16	100
Titanium (Ti)	$\mu g/m^3$	*120*	-	1.25E-02	1.16E-02	7.26E-03	1.18E-02	3.22E-03	3.29E-03	8.79E-03	3.21E-03	3.25E-03	7.55E-03	3.18E-03	3.24E-03	3.18E-03	3.07E-03	1.02E-02	7.20E-03	*120*	0	5.48E-03	6.41E-03	3.07E-03	1.25E-02	1.25E-02	8.79E-03	1.02E-02	16	100
Uranium (Ur)	$\mu g/m^3$	*1.5*	-	2.61E-05	3.01E-05	1.14E-05	1.76E-05	5.03E-06	5.86E-06	3.19E-05	8.82E-06	1.14E-05	1.41E-05	7.05E-06	7.41E-06	6.18E-06	1.10E-05	6.08E-05	2.20E-05	*1.5*	0	1.33E-05	1.73E-05	5.03E-06	6.08E-05	3.01E-05	3.19E-05	6.08E-05	16	100
Vanadium (V)	$\mu g/m^3$	*2*	*1*	1.49E-03	1.52E-03	1.51E-03	1.47E-03	1.46E-03	1.49E-03	1.47E-03	1.46E-03	1.48E-03	1.45E-03	1.44E-03	1.47E-03	1.44E-03	1.39E-03	1.50E-03	1.50E-03	*2*	0	1.47E-03	1.47E-03	1.39E-03	1.52E-03	1.52E-03	1.48E-03	1.50E-03	16	100
Zinc (Zn)	$\mu g/m^3$	*120*	-	4.50E-02	3.12E-02	3.90E-02	6.94E-02	1.70E-02	2.74E-02	2.80E-02	2.53E-02	1.61E-02	6.74E-02	3.12E-02	4.76E-02	2.28E-02	6.86E-02	3.95E-02	3.13E-02	*120*	0	3.44E-02	3.79E-02	1.61E-02	6.94E-02	6.94E-02	6.74E-02	6.86E-02	16	100
Zirconium (Zr)	$\mu g/m^3$	*20*	-	5.96E-04	6.09E-04	6.05E-04	5.88E-04	5.85E-04	5.98E-04	5.86E-04	5.84E-04	5.91E-04	5.81E-04	5.78E-04	5.88E-04	5.78E-04	5.58E-04	6.02E-04	6.00E-04	*20*	0	5.89E-04	5.89E-04	5.58E-04	6.09E-04	6.09E-04	5.91E-04	6.02E-04	16	100

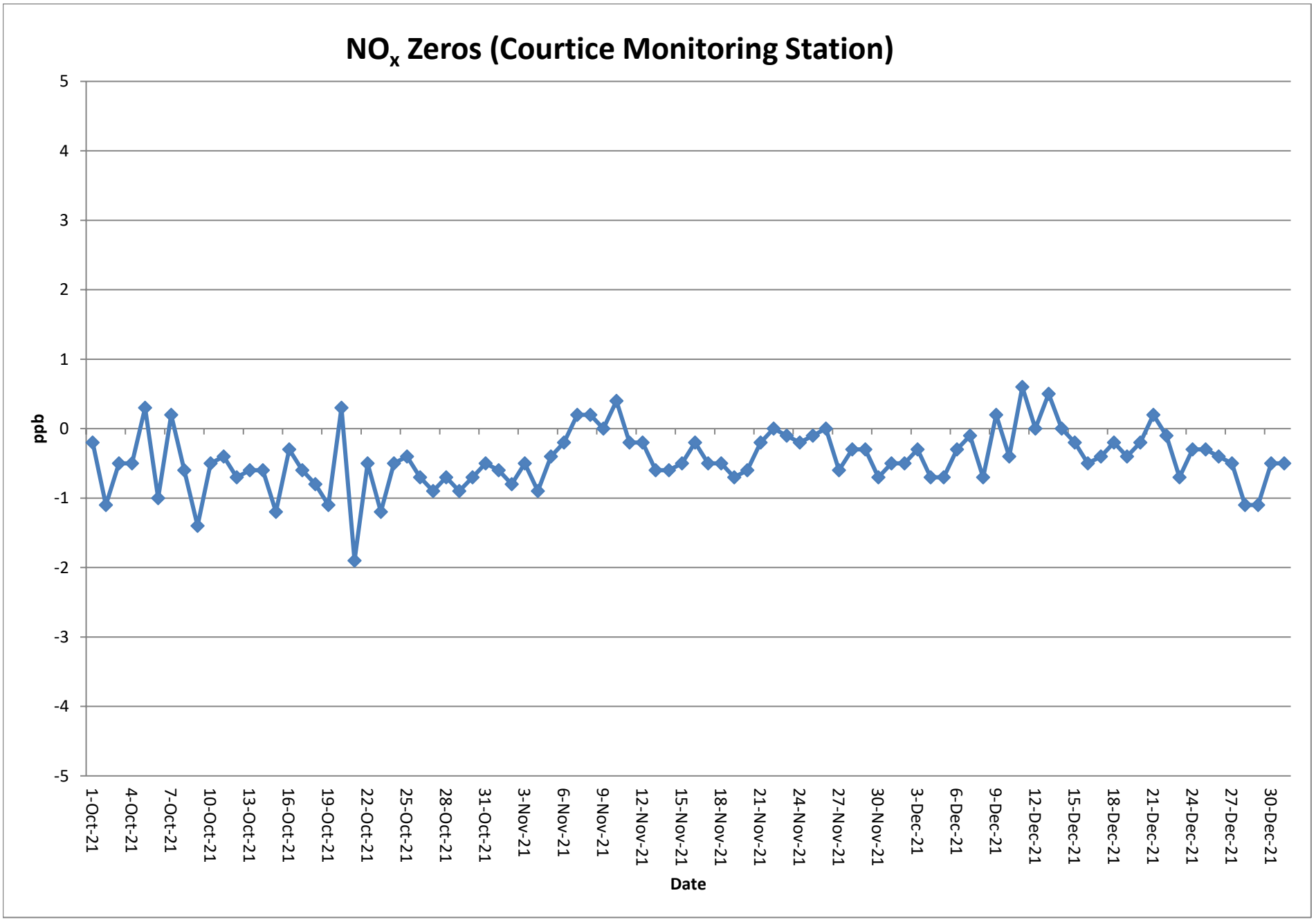
NOTE: All non-detectable results were reported as 1/2 of the detection limit

Table B9: 2021 Rundle Station Q4 Monitoring Results for TSP and Metals

Contaminant	Units	*MECP Criteria*	*HHRA Health Based Criteria*	1 Oct-21	7 Oct-21	13 Oct-21	19 Oct-21	25 Oct-21	31 Oct-21	6 Nov 21	12 Nov 21	18 Nov 21	24 Nov 21	30 Nov 21	6 Dec 21	12 Dec 21	18 Dec 21	24 Dec 21	30 Dec 21	MECP Criteria ($\mu g/m^3$)	No. > Criteria	Geometric Mean	Arithmetic Mean	Q4 Minimum Concentration	Q4 Maximum Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
Particulate (TSP)	$\mu g/m^3$	*120*	*120*	21.21	24.12	24.88	0.03	0.03	10.69	17.21	14.83	23.16	20.69	19.15	20.77	8.86	13.95	9.96	11.53	*120*	0	7.4	15.1	0.0	24.9	24.9	23.2	20.8	16	100
Mercury (Hg)	$\mu g/m^3$	*2*	*2*	8.25E-06	1.31E-05	1.38E-05	1.87E-05	2.87E-06	3.04E-06	1.18E-05	6.98E-06	2.99E-06	7.62E-06	2.91E-06	8.33E-06	1.07E-05	1.02E-05	8.30E-06	3.02E-06	*2*	0	6.96E-06	8.29E-06	2.87E-06	1.87E-05	1.87E-05	1.18E-05	1.07E-05	16	100
Aluminum (Al)	$\mu g/m^3$	*4.8*	-	1.96E-01	1.51E-01	1.16E-01	3.05E-01	3.10E-02	6.19E-02	1.09E-01	9.94E-02	1.81E-01	1.57E-01	6.93E-02	1.39E-01	6.84E-02	6.38E-02	4.11E-02	5.95E-02	*4.8*	0	9.72E-02	1.15E-01	3.10E-02	3.05E-01	3.05E-01	1.81E-01	1.39E-01	16	100
Antimony (Sb)	$\mu g/m^3$	*25*	*25*	8.25E-04	3.06E-03	1.28E-03	1.65E-03	2.76E-04	2.98E-04	1.18E-03	5.29E-04	5.21E-04	1.15E-03	1.50E-03	5.54E-04	3.86E-04	2.82E-04	3.85E-04	5.25E-04	*25*	0	6.95E-04	8.99E-04	2.76E-04	3.06E-03	3.06E-03	1.50E-03	5.54E-04	16	100
Arsenic (As)	$\mu g/m^3$	*0.3*	*0.3*	4.36E-03	8.96E-04	9.01E-04	8.75E-04	8.62E-04	9.11E-04	8.87E-04	8.72E-04	8.98E-04	8.79E-04	8.73E-04	8.93E-04	8.92E-04	1.29E-01	8.89E-04	9.06E-04	*0.3*	0	1.34E-03	9.14E-03	8.62E-04	1.29E-01	4.36E-03	8.98E-04	1.29E-01	16	100
Barium (Ba)	$\mu g/m^3$	*10*	*10*	1.11E-02	8.84E-03	1.49E-02	2.01E-02	1.95E-03	3.04E-03	1.27E-02	7.33E-03	7.42E-03	1.15E-02	1.31E-02	5.82E-03	2.84E-03	1.83E-03	2.88E-03	5.14E-03	*10*	0	6.41E-03	8.15E-03	1.83E-03	2.01E-02	2.01E-02	1.31E-02	5.82E-03	16	100
Beryllium (Be)	$\mu g/m^3$	*0.01*	*0.01*	1.47E-05	1.49E-05	1.50E-05	1.46E-05	1.44E-05	1.52E-05	1.48E-05	1.45E-05	1.50E-05	1.47E-05	1.46E-05	1.49E-05	1.49E-05	1.41E-05	1.48E-05	1.51E-05	*0.01*	0	1.48E-05	1.48E-05	1.41E-05	1.52E-05	1.52E-05	1.50E-05	1.51E-05	16	100
Bismuth (Bi)	$\mu g/m^3$	-	-	5.30E-04	5.37E-04	5.41E-04	5.25E-04	5.17E-04	5.46E-04	5.32E-04	5.23E-04	5.39E-04	5.28E-04	5.24E-04	5.36E-04	5.35E-04	5.08E-04	5.33E-04	5.43E-04	-	-	5.31E-04	5.31E-04	5.08E-04	5.46E-04	5.46E-04	5.39E-04	5.43E-04	16	100
Boron (B)	$\mu g/m^3$	*120*	-	1.47E-02	4.48E-03	4.51E-03	4.38E-03	4.31E-03	4.55E-03	4.44E-03	4.36E-03	4.49E-03	4.40E-03	4.37E-03	4.46E-03	4.46E-03	4.24E-03	4.45E-03	4.53E-03	*120*	0	4.77E-03	5.07E-03	4.24E-03	1.47E-02	1.47E-02	4.49E-03	4.53E-03	16	100
Cadmium (Cd)	$\mu g/m^3$	*0.025*	*0.025*	9.84E-05	9.01E-05	1.39E-04	1.35E-04	5.40E-05	7.95E-05	1.43E-04	5.23E-05	8.08E-05	1.40E-04	9.84E-05	1.64E-04	1.56E-04	1.94E-04	1.02E-04	1.21E-04	*0.025*	0	1.08E-04	1.15E-04	5.23E-05	1.94E-04	1.39E-04	1.43E-04	1.94E-04	16	100
Chromium (Cr)	$\mu g/m^3$	*0.5*	-	2.95E-03	2.51E-03	2.64E-03	4.78E-03	9.77E-04	1.03E-03	3.19E-03	9.88E-04	1.02E-03	2.52E-03	1.98E-03	1.01E-03	2.14E-03	2.54E-03	1.01E-03	1.03E-03	*0.5*	0	1.76E-03	2.02E-03	9.77E-04	4.78E-03	4.78E-03	3.19E-03	2.54E-03	16	100
Cobalt (Co)	$\mu g/m^3$	*0.1*	*0.1*	5.39E-04	1.27E-04	1.53E-04	2.73E-04	5.86E-05	5.16E-05	1.36E-04	8.43E-05	1.28E-04	1.46E-04	7.63E-05	1.58E-04	5.11E-05	6.27E-05	4.03E-05	4.83E-05	*0.1*	0	1.02E-04	1.33E-04	4.03E-05	5.39E-04	5.39E-04	1.46E-04	1.58E-04	16	100
Copper (Cu)	$\mu g/m^3$	*50*	-	8.43E-02	5.10E-02	5.33E-02	1.67E-02	4.66E-03	4.49E-03	5.75E-02	7.09E-03	1.26E-02	2.24E-02	3.22E-02	7.26E-03	1.78E-02	8.02E-03	5.33E-03	1.41E-02	*50*	0	1.62E-02	2.49E-02	4.49E-03	8.43E-02	8.43E-02	5.75E-02	1.78E-02	16	100
Iron (Fe)	$\mu g/m^3$	*4*	-	6.07E-01	4.46E-01	5.06E-01	8.87E-01	9.94E-02	1.48E-01	5.06E-01	2.45E-01	3.21E-01	4.57E-01	2.83E-01	2.68E-01	2.19E-01	1.63E-01	9.84E-02	1.44E-01	*4*	0	2.78E-01	3.37E-01	9.84E-02	8.87E-01	8.87E-01	5.06E-01	2.68E-01	16	100
Lead (Pb)	$\mu g/m^3$	*0.5*	*0.5*	2.73E-03	2.77E-03	4.36E-03	4.33E-03	1.70E-03	2.40E-03	3.09E-03	1.62E-03	1.36E-03	4.06E-03	3.96E-03	2.49E-03	6.96E-03	2.93E-03	2.08E-03	2.05E-03	*2*	0	2.79E-03	3.06E-03	1.36E-03	6.96E-03	4.36E-03	4.06E-03	6.96E-03	16	100
Magnesium (Mg)	$\mu g/m^3$	-	-	3.24E-01	1.89E-01	2.48E-01	4.86E-01	5.06E-02	1.07E-01	2.05E-01	1.46E-01	2.23E-01	2.69E-01	1.08E-01	1.90E-01	1.45E-01	1.20E-01	6.46E-02	8.15E-02	-	-	1.57E-01	1.85E-01	5.06E-02	4.86E-01	4.86E-01	2.69E-01	1.90E-01	16	100
Manganese (Mn)	$\mu g/m^3$	*0.4*	-	1.44E-02	9.25E-03	1.20E-02	2.81E-02	1.73E-03	4.73E-03	1.04E-02	6.63E-03	1.02E-02	1.21E-02	6.98E-03	8.69E-03	1.00E-02	3.76E-03	2.17E-03	5.33E-03	*0.4*	0	7.41E-03	9.15E-03	1.73E-03	2.81E-02	2.81E-02	1.21E-02	1.00E-02	16	100
Molybdenum (Mo)	$\mu g/m^3$	*120*	-	3.26E-03	1.65E-03	2.45E-03	8.05E-04	3.91E-04	3.64E-04	2.51E-03	4.24E-04	8.92E-04	1.25E-03	1.55E-03	4.70E-04	9.57E-04	2.71E-04	4.09E-04	8.15E-04	*120*	0	8.73E-04	1.16E-03	2.71E-04	3.26E-03	3.26E-03	2.51E-03	9.57E-04	16	100
Nickel (Ni)	$\mu g/m^3$	*0.2*	-	2.84E-03	1.28E-03	1.51E-03	1.97E-03	1.12E-03	1.00E-03	1.54E-03	6.57E-04	8.20E-04	1.12E-03	8.32E-04	9.35E-04	6.48E-04	5.37E-04	4.56E-04	7.25E-04	*0.2*	0	1.00E-03	1.12E-03	4.56E-04	2.84E-03	2.84E-03	1.54E-03	9.35E-04	16	100
Phosphorus (P)	$\mu g/m^3$	-	-	2.21E-01	2.24E-01	2.25E-01	2.19E-01	2.16E-01	2.28E-01	2.22E-01	2.18E-01	2.24E-01	2.20E-01	2.18E-01	2.23E-01	2.23E-01	2.12E-01	2.22E-01	2.26E-01	-	-	2.21E-01	2.21E-01	2.12E-01	2.28E-01	2.28E-01	2.24E-01	2.26E-01	16	100
Selenium (Se)	$\mu g/m^3$	*10*	*10*	3.83E-04	3.88E-04	9.01E-04	8.75E-04	3.74E-04	3.95E-04	1.77E-03	3.78E-04	3.89E-04	3.81E-04	9.90E-04	3.87E-04	3.86E-04	3.67E-04	3.85E-04	3.93E-04	*10*	0	4.98E-04	5.72E-04	3.67E-04	1.77E-03	9.01E-04	1.77E-03	3.93E-04	16	100
Silver (Ag)	$\mu g/m^3$	*1*	*1*	2.65E-05	2.69E-05	5.47E-05	6.30E-05	2.59E-05	2.73E-05	2.66E-05	2.62E-05	2.69E-05	2.64E-05	2.62E-05	2.68E-05	2.68E-05	2.54E-05	2.67E-05	2.72E-05	*1*	0	2.93E-05	3.06E-05	2.54E-05	6.30E-05	6.30E-05	2.69E-05	2.72E-05	16	100
Strontium (Sr)	$\mu g/m^3$	*120*	-	1.08E-02	6.45E-03	5.23E-03	1.03E-02	8.62E-04	2.25E-03	4.20E-03	2.67E-03	4.55E-03	5.04E-03	2.85E-03	5.60E-03	2.56E-03	2.43E-03	8.89E-04	2.36E-03	*120*	0	3.44E-03	4.32E-03	8.62E-04	1.08E-02	1.08E-02	5.04E-03	5.60E-03	16	100
Thallium (Tl)	$\mu g/m^3$	-	-	2.65E-05	2.69E-05	2.70E-05	2.63E-05	2.59E-05	2.73E-05	2.66E-05	2.62E-05	2.69E-05	2.64E-05	2.62E-05	2.68E-05	2.68E-05	2.54E-05	2.67E-05	2.72E-05	-	-	2.66E-05	2.66E-05	2.54E-05	2.73E-05	2.73E-05	2.69E-05	2.72E-05	16	100
Tin (Sn)	$\mu g/m^3$	*10*	*10*	1.23E-03	9.13E-04	1.24E-03	1.96E-03	5.75E-04	5.22E-04	3.12E-03	8.90E-04	7.90E-04	1.25E-03	1.64E-03	7.74E-04	8.09E-04	1.69E-04	6.76E-04	9.36E-04	*10*	0	9.17E-04	1.09E-03	1.69E-04	3.12E-03	1.96E-03	3.12E-03	9.36E-04	16	100
Titanium (Ti)	$\mu g/m^3$	*120*	-	9.43E-03	7.76E-03	7.81E-03	1.46E-02	3.16E-03	3.34E-03	7.69E-03	3.20E-03	7.78E-03	8.79E-03	3.20E-03	7.14E-03	3.27E-03	3.11E-03	3.26E-03	3.32E-03	*120*	0	5.29E-03	6.05E-03	3.11E-03	1.46E-02	1.46E-02	8.79E-03	7.14E-03	16	100
Uranium (Ur)	$\mu g/m^3$	*1.5*	-	1.40E-05	2.51E-05	1.23E-05	1.94E-05	5.34E-06	5.22E-06	9.58E-06	8.31E-06	1.09E-05	1.37E-05	7.86E-06	1.59E-05	7.91E-06	5.76E-06	3.09E-05	1.41E-05	*1.5*	0	1.13E-05	1.29E-05	5.22E-06	3.09E-05	2.51E-05	1.37E-05	3.09E-05	16	100
Vanadium (V)	$\mu g/m^3$	*2*	*1*	1.47E-03	1.49E-03	1.50E-03	1.46E-03	1.44E-03	1.52E-03	1.48E-03	1.45E-03	1.50E-03	1.47E-03	1.46E-03	1.49E-03	1.49E-03	1.41E-03	1.48E-03	1.51E-03	*2*	0	1.48E-03	1.48E-03	1.41E-03	1.52E-03	1.52E-03	1.50E-03	1.51E-03	16	100
Zinc (Zn)	$\mu g/m^3$	*120*	-	3.69E-02	4.30E-02	5.19E-02	1.09E-01	1.64E-02	3.99E-02	2.96E-02	2.70E-02	2.28E-02	7.85E-02	3.41E-02	7.98E-02	5.67E-02	1.27E-01	4.91E-02	4.02E-02	*120*	0	4.54E-02	5.26E-02	1.64E-02	1.27E-01	1.09E-01	7.85E-02	1.27E-01	16	100
Zirconium (Zr)	$\mu g/m^3$	*20*	-	5.89E-04	5.97E-04	6.01E-04	5.83E-04	5.75E-04	6.07E-04	5.91E-04	5.81E-04	5.98E-04	5.86E-04	5.82E-04	5.95E-04	5.95E-04	5.65E-04	5.93E-04	6.04E-04	*20*	0	5.90E-04	5.90E-04	5.65E-04	6.07E-04	6.07E-04	5.98E-04	6.04E-04	16	100

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

APPENDIX C


NOx Zeros (Courtice Monitoring Station)
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-3
-4
-5
ppb
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7-Oct-21
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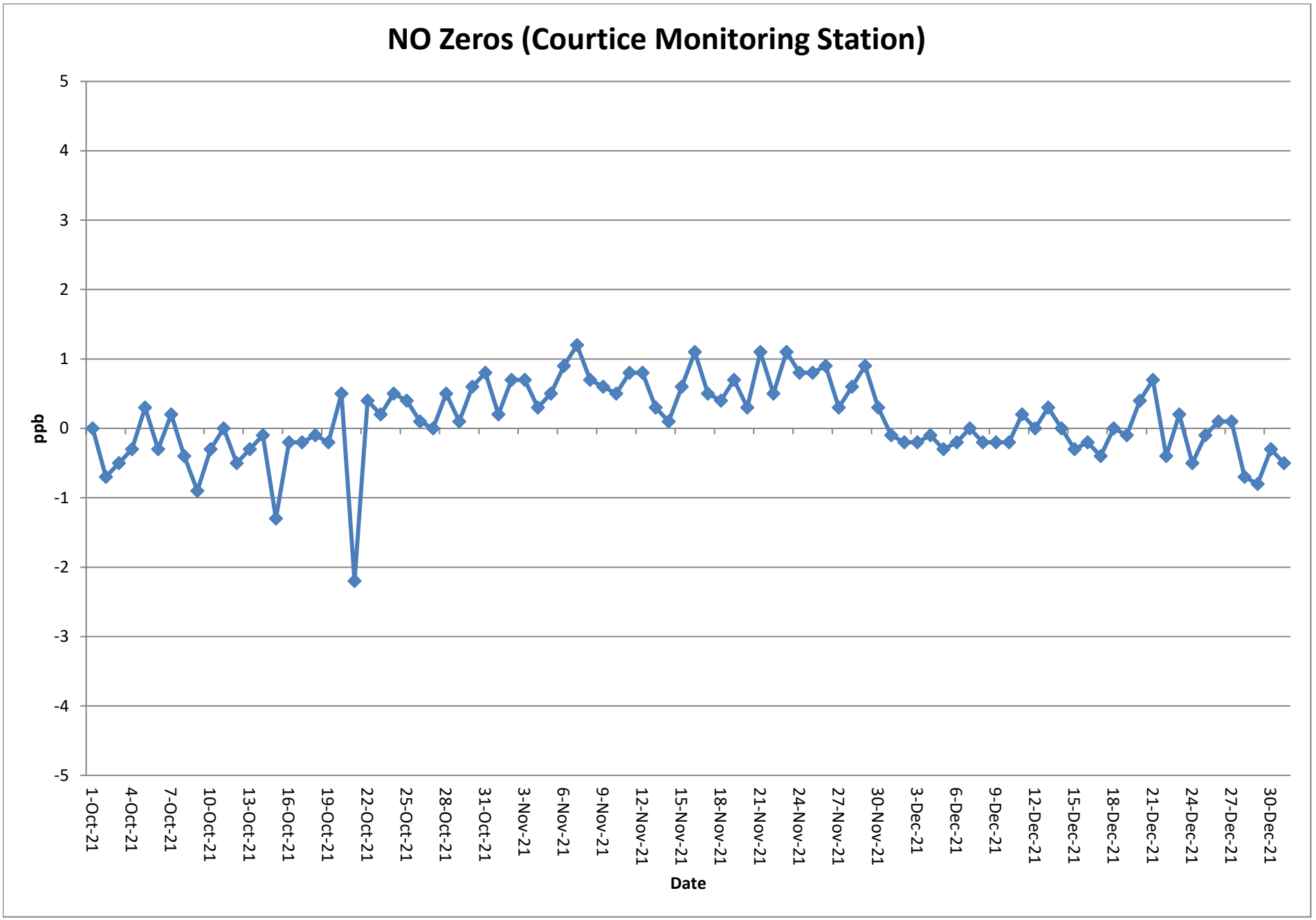
Date


NO Zeros (Courtice Monitoring Station)
ppb
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-1
-2
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-4
-5
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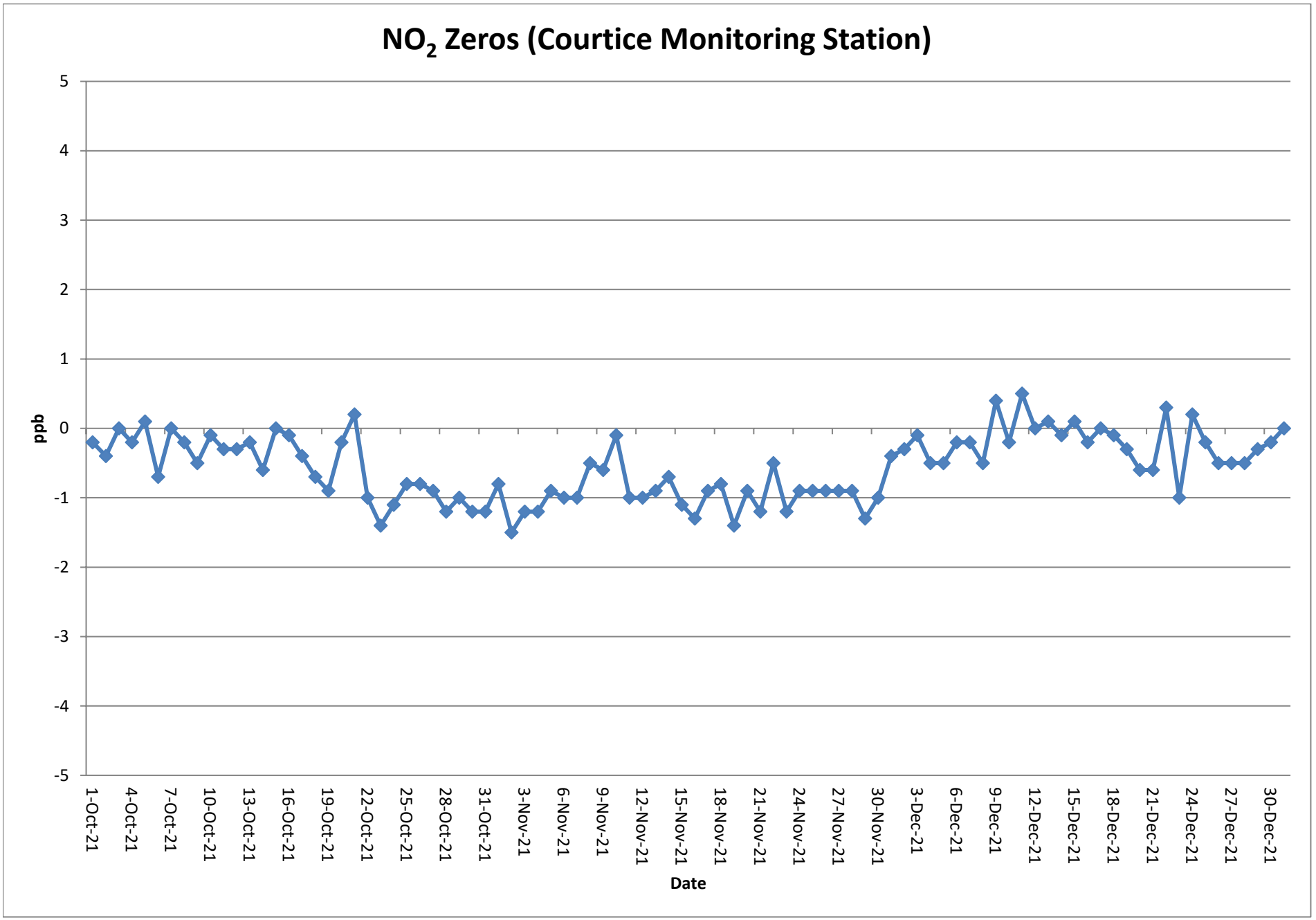
NO2 Zeros (Courtice Monitoring Station)
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-5
ppb
1-Oct-21
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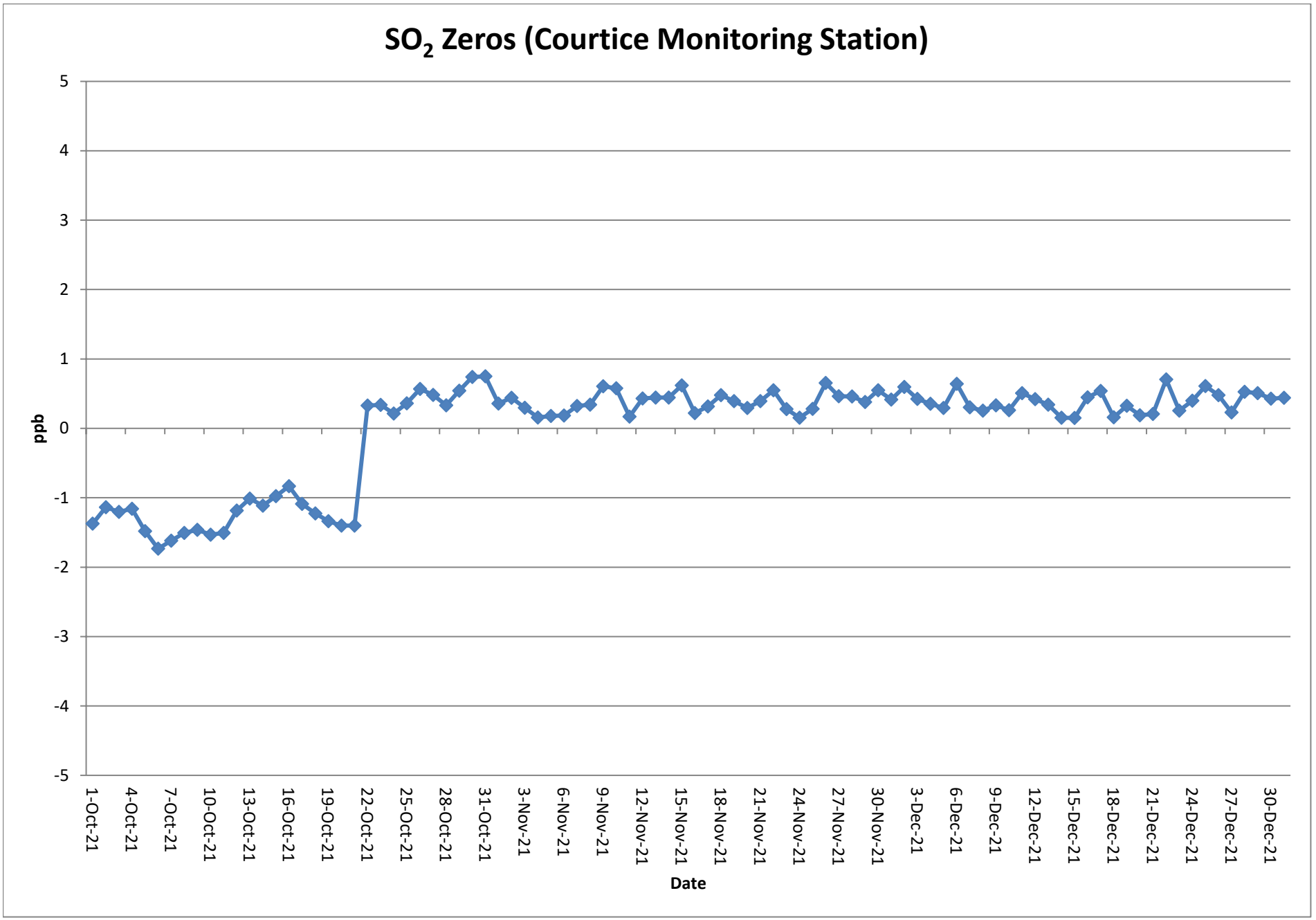
30-Dec-21
Date


SO2 Zeros (Courtice Monitoring Station)
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-4
-5
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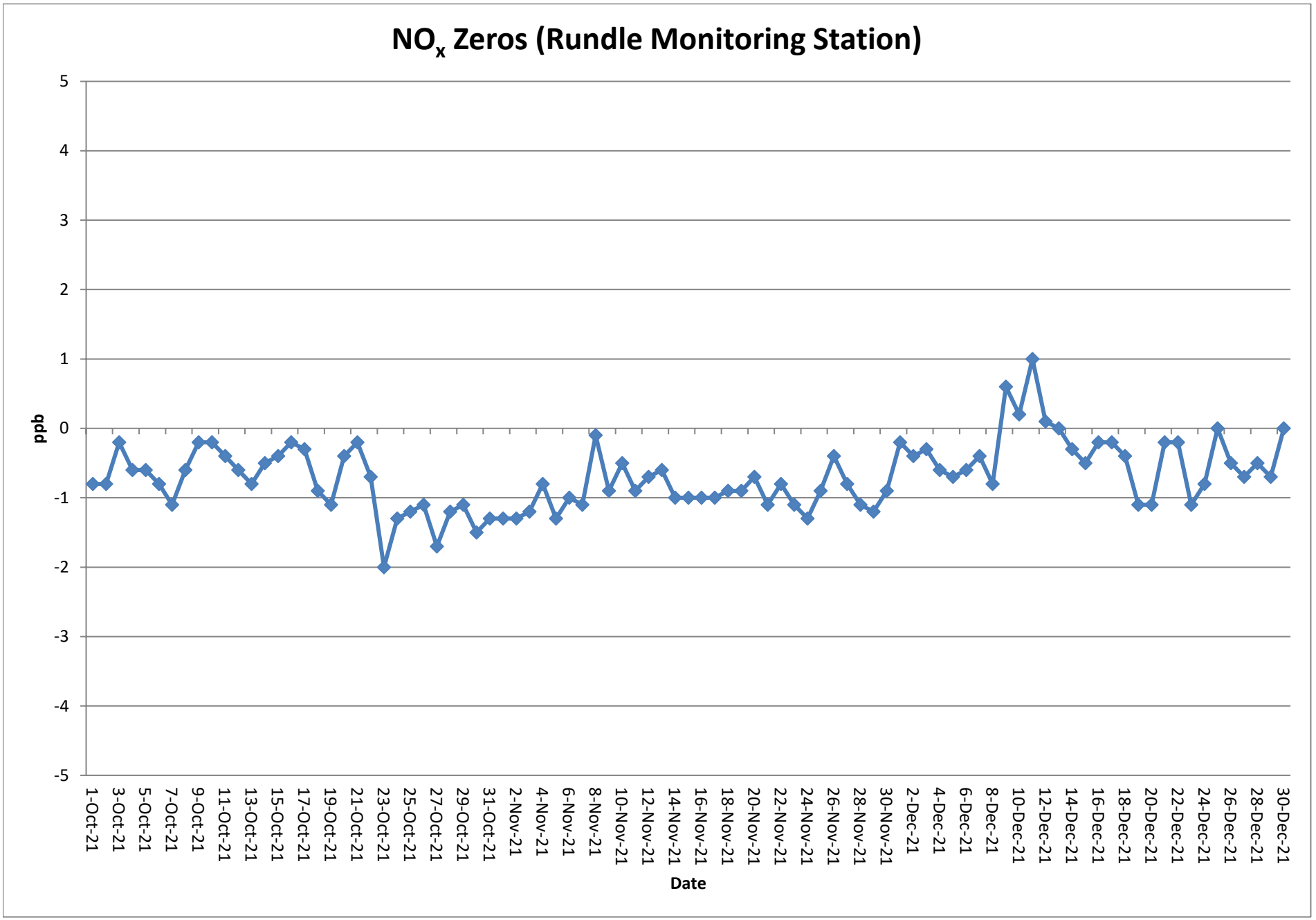
Date


NOx Zeros (Rundle Monitoring Station)
ppb
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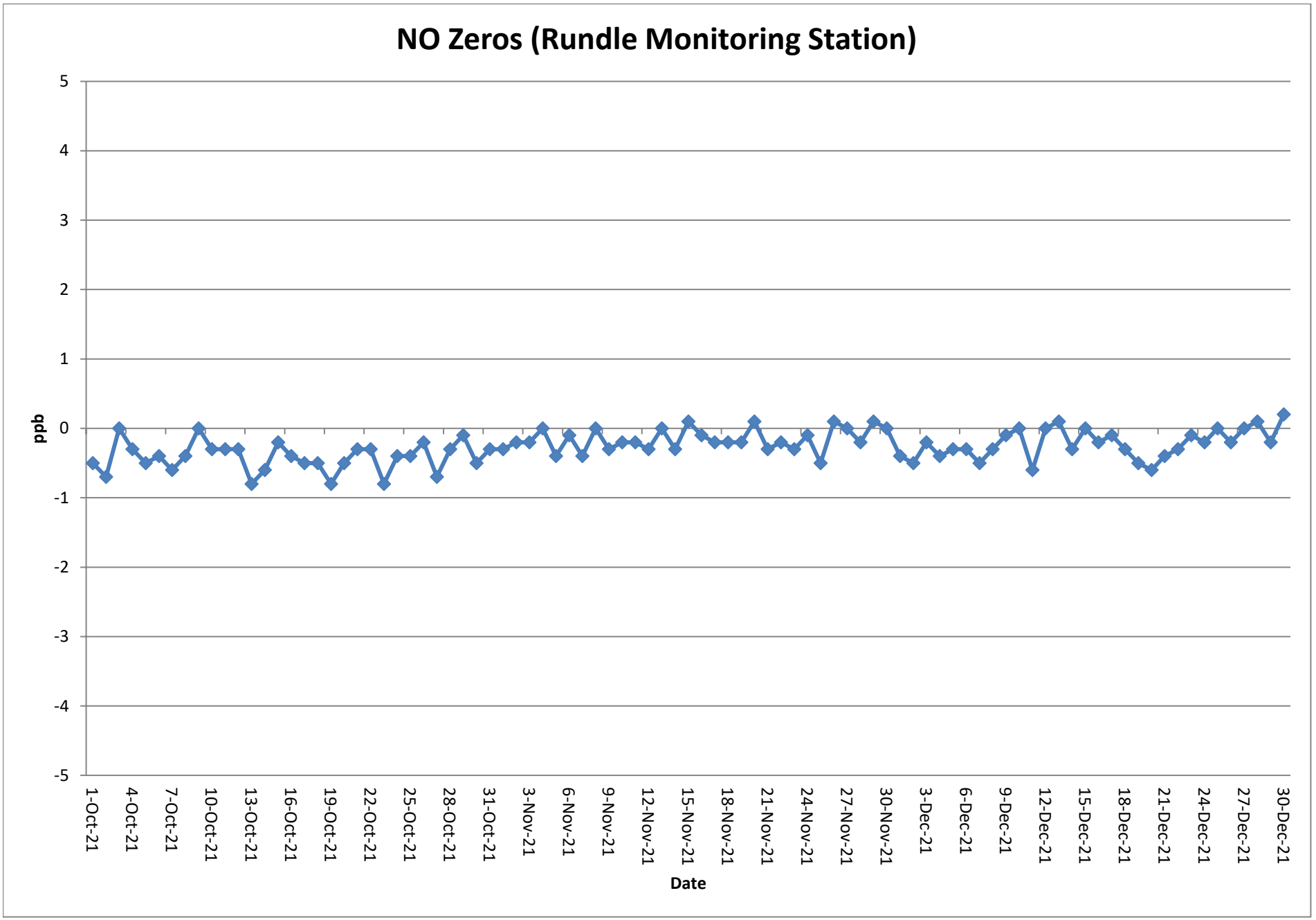
NO Zeros (Rundle Monitoring Station)
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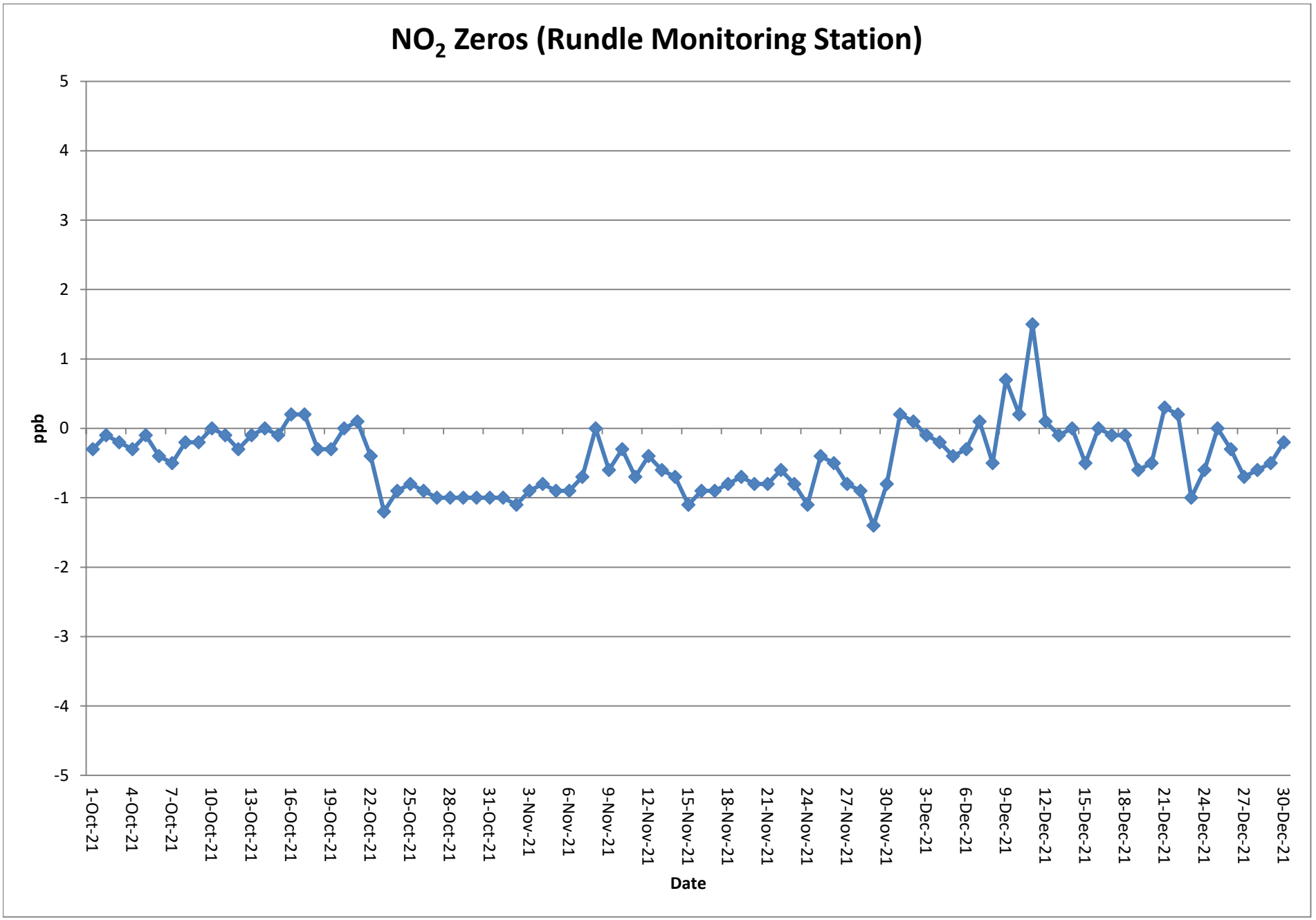
NO2 Zeros (Rundle Monitoring Station)
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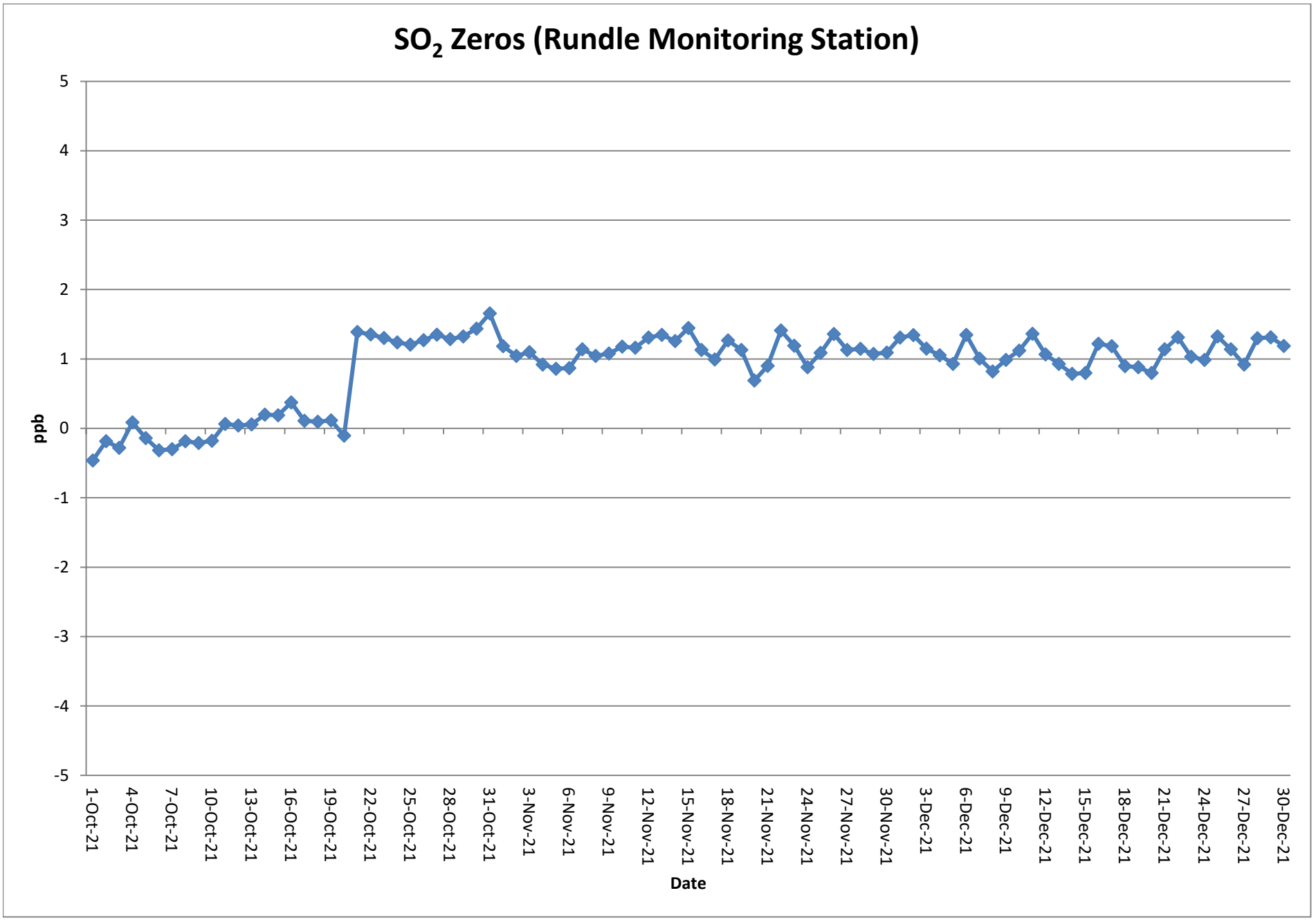
Date


SO2 Zeros (Rundle Monitoring Station)
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27-Dec-21
30-Dec-21
Date

APPENDIX D

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, 2021		End Date: December 31, 2021			All testing done in EST		
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	
1	11/11/2021	MPA	Deleted Hours	20/10/2021	00:00	20/10/2021	13:00	13	Invalid Data - Low Flow
2	20/10/2021	SRS	Deleted Hours	20/10/2021	14:00	20/10/2021	16:00	2	Monthly Calibration
3	11/11/2021	MPA	Zero correction	01/10/2021	00:00	01/11/2021	00:00	-	Correcting values <0 to 0
4	30/11/2021	SRS	Deleted Hours	30/11/2021	15:00	30/11/2021	16:00	1	Monthly Calibration
5	22/12/2021	SRS	Deleted Hours	22/12/2021	12:00	22/12/2021	14:00	2	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, 2021		End Date: December 31, 2021			All testing done in EST			
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	
1	21/10/2021	SRS	Deleted Hours	21/10/2021	11:00	21/10/2021	12:00	1	Monthly Calibration
2	11/11/2021	MPA	Zero correction	01/10/2021	00:00	01/11/2021	00:00	-	Correcting values <0 to 0
3	30/11/2021	SRS	Deleted Hours	30/11/2021	18:00	30/11/2021	19:00	1	Monthly Calibration
4	22/12/2021	SRS	Deleted Hours	22/12/2021	17:00	22/12/2021	18:00	1	Monthly Calibration
5	06/01/2022	MPA	Zero correction	01/12/2021	00:00	01/01/2022	00:00	-	Correcting values <0 to 0

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, 2021	End Date: December 31, 2021		All testing done in EST					
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	
1	20/10/2021	SRS	Deleted Hours	20/10/2021	13:00	20/10/2021	14:00	1	Calibration and Annual Maintenance
2	21/10/2021	SRS	Deleted Hours	20/10/2021	14:00	21/10/2021	13:00	23	Analyzer Stabalization Period after Annual Maintenance
3	21/10/2021	SRS	Deleted Hours	21/10/2021	13:00	21/10/2021	15:00	2	Monthly Calibration after Annual Maintenance
4	11/11/2021	MPA	Zero correction	01/10/2021	00:00	01/11/2021	00:00	-	Correcting values <0 to 0
5	30/11/2021	SRS	Deleted Hours	30/11/2021	13:00	30/11/2021	16:00	3	Monthly Calibration
6	10/12/2021	MPA	Zero correction	01/11/2021	00:00	01/12/2021	00:00	-	Correcting values <0 to 0
7	22/12/2021	SRS	Deleted Hours	22/12/2021	11:00	22/12/2021	13:00	2	Monthly Calibration
8	06/01/2022	MPA	Zero correction	01/12/2021	00:00	01/01/2022	00:00	-	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, 2021		End Date: December 31, 2021		All testing done in EST			
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	
1	20/10/2021	SRS	Deleted Hours	20/10/2021	16:00	20/10/2021	17:00	1	Calibration and Annual Maintenance
2	21/10/2021	SRS	Deleted Hours	20/10/2021	17:00	21/10/2021	10:00	17	Analyzer Stabalization Period after Annual Maintenance
3	21/10/2021	SRS	Deleted Hours	21/10/2021	10:00	21/10/2021	12:00	2	Monthly Calibration after Annual Maintenance
4	11/11/2021	MPA	Zero correction	01/10/2021	00:00	01/11/2021	00:00	-	Correcting values <0 to 0
5	30/11/2021	SRS	Deleted Hours	30/11/2021	16:00	30/11/2021	18:00	2	Monthly Calibration
6	10/12/2021	MPA	Zero correction	01/11/2021	00:00	01/12/2021	00:00	-	Correcting values <0 to 0
7	22/12/2021	SRS	Deleted Hours	22/12/2021	15:00	22/12/2021	17:00	2	Monthly Calibration
8	06/01/2022	MPA	Zero correction	01/12/2021	00:00	01/01/2022	00:00	-	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, 2021		End Date: December 31, 2021			All testing done in EST		
Edit #	**Edit Date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	
1	21/10/2021	SRS	Deleted Hours	21/10/2021	12:00	21/10/2021	17:00	5	Monthly Calibration and Annual Maintenance
2	12/11/2021	MPA	Zero offset adjustment	01/10/2021	00:00	21/10/2021	12:00	-	Correcting zero drift
3	11/11/2021	MPA	Zero correction	01/10/2021	00:00	01/11/2021	00:00	-	Correcting values <0 to 0
4	30/11/2021	SRS	Deleted Hours	30/11/2021	13:00	30/11/2021	16:00	3	Monthly Calibration
5	10/12/2021	MPA	Zero correction	01/11/2021	00:00	01/12/2021	00:00	-	Correcting values <0 to 0
6	22/12/2021	SRS	Deleted Hours	22/12/2021	12:00	22/12/2021	14:00	2	Monthly Calibration
7	06/01/2022	MPA	Zero correction	01/12/2021	00:00	01/01/2022	00:00	-	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, 2021		End Date: December 31, 2021			All testing done in EST			
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	
1	20/10/2021	SRS	Deleted Hours	20/10/2021	16:00	20/10/2021	18:00	2	Monthly Calibration
2	11/11/2021	MPA	Zero offset adjustment	01/10/2021	00:00	20/10/2021	16:00	-	Correcting zero drift
3	11/11/2021	MPA	Zero correction	01/10/2021	00:00	01/11/2021	00:00	-	Correcting values <0 to 0
4	30/11/2021	SRS	Deleted Hours	30/11/2021	17:00	30/11/2021	19:00	2	Monthly Calibration
5	10/12/2021	MPA	Zero correction	01/11/2021	00:00	01/12/2021	00:00	-	Correcting values <0 to 0
6	22/12/2021	SRS	Deleted Hours	22/12/2021	16:00	22/12/2021	18:00	2	Monthly Calibration
7	06/01/2022	MPA	Zero correction	01/12/2021	00:00	01/01/2022	00:00	-	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, 2021		End Date: December 31, 2021		All testing done in EST			
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	

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, 2021	End Date: December 31, 2021		All testing done in EST					
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	

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, 2021	End Date: December 31, 2021		All testing done in EST					
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	

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, 2021		End Date: December 31, 2021			All testing done in EST		
Edit #	**Edit date (dd/mm/yyyy)**	**Editor s Name**	**Edit Action**	**Starting**		**Ending**		**Duration**	**Reason**
				Date (dd/mm/yyyy)	**Hour (xx:xx)**	**Date (dd/mm/yyyy)**	**Hour (xx:xx)**	**Deleted Hours**	

APPENDIX E

Table E1. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on October 1, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
1/10/2021 17:50	31.442	46.354	
1/10/2021 17:55	87.841	59.642	
1/10/2021 18:00	52.442	**70.142**	1
1/10/2021 18:05	70.798	61.62	
1/10/2021 18:10	17.362	44.08	
1/10/2021 18:15	13.604	15.483	
1/10/2021 18:20	10.734	12.169	
1/10/2021 18:25	6.411	8.573	
1/10/2021 18:30	5.512	5.962	
1/10/2021 18:35	83.675	44.594	
1/10/2021 18:40	44.255	63.965	
1/10/2021 18:45	48.552	46.404	
1/10/2021 18:50	39.955	44.254	
1/10/2021 18:55	103.746	71.851	2
1/10/2021 19:00	75.81	**89.778**	
1/10/2021 19:05	29.464	52.637	
1/10/2021 19:10	31.679	30.572	
1/10/2021 19:15	24.639	28.159	
1/10/2021 19:20	14.8	19.72	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E2. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on October 4, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
4/10/2021 23:00	8.865	10.019	
4/10/2021 23:05	5.425	7.145	
4/10/2021 23:10	2.474	3.95	
4/10/2021 23:15	1.875	2.175	
4/10/2021 23:20	1.926	1.901	
4/10/2021 23:25	76.155	39.041	3
4/10/2021 23:30	63.73	**69.943**	
4/10/2021 23:35	29.528	46.629	
4/10/2021 23:40	30.071	29.8	
4/10/2021 23:45	22.329	26.2	
4/10/2021 23:50	12.185	17.257	
4/10/2021 23:55	7.99	10.088	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E3. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on October 23, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
23/10/2021 18:25	11.58	6.436	
23/10/2021 18:30	98.42	55	
23/10/2021 18:35	83.62	**91.02**	
23/10/2021 18:40	38.034	60.827	4
23/10/2021 18:45	23.412	30.723	
23/10/2021 18:50	7.602	15.507	
23/10/2021 18:55	3.152	5.377	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E4. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 3, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
3/11/2021 22:05	20.504	10.655	
3/11/2021 22:10	75.718	48.111	
3/11/2021 22:15	64.742	70.23	5
3/11/2021 22:20	110.058	**87.4**	
3/11/2021 22:25	55.333	**82.696**	6
3/11/2021 22:30	11.715	33.524	
3/11/2021 22:35	87.814	49.765	
3/11/2021 22:40	94.648	**91.231**	7
3/11/2021 22:45	23.152	58.9	
3/11/2021 22:50	8.105	15.629	
3/11/2021 22:55	57.943	33.024	
3/11/2021 23:00	18.495	38.219	
3/11/2021 23:05	50.109	34.302	
3/11/2021 23:10	166.786	**108.448**	8
3/11/2021 23:15	37.257	102.022	
3/11/2021 23:20	11.612	24.435	
3/11/2021 23:25	5.382	8.497	
3/11/2021 23:30	3.743	4.563	
3/11/2021 23:35	2.425	3.084	
3/11/2021 23:40	7.024	4.725	
3/11/2021 23:45	143.881	75.453	9
3/11/2021 23:50	32.045	**87.963**	
3/11/2021 23:55	17.913	24.979	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E5. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 4, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
4/11/2021 6:55	4.495	4.588	
4/11/2021 7:00	7.452	5.974	
4/11/2021 7:05	27.213	17.333	
4/11/2021 7:10	114.247	70.73	10
4/11/2021 7:15	53.21	**83.729**	
4/11/2021 7:20	76.545	64.878	11
4/11/2021 7:25	111.945	94.245	
4/11/2021 7:30	82.907	**97.426**	12
4/11/2021 7:35	101.692	**92.3**	
4/11/2021 7:40	51.602	76.647	
4/11/2021 7:45	44.375	47.989	
4/11/2021 7:50	32.133	38.254	
4/11/2021 7:55	58.964	45.549	
4/11/2021 8:00	34.956	46.96	
4/11/2021 8:05	17.998	26.477	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E6. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 4, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
4/11/2021 18:05	0.716	0.478	
4/11/2021 18:10	1.807	1.262	
4/11/2021 18:15	0.831	1.319	
4/11/2021 18:20	358.995	179.913	13
4/11/2021 18:25	192.754	**275.875**	
4/11/2021 18:30	53.256	**123.005**	14
4/11/2021 18:35	33.844	43.55	
4/11/2021 18:40	5.783	19.814	
4/11/2021 18:45	3.414	4.599	
4/11/2021 18:50	2.753	3.084	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E7. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on November 5, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
5/11/2021 0:10	1.572	1.112	
5/11/2021 0:15	3.115	2.344	
5/11/2021 0:20	59.379	31.247	
5/11/2021 0:25	92.66	**76.02**	15
5/11/2021 0:30	9.128	50.894	
5/11/2021 0:35	3.946	6.537	
5/11/2021 0:40	2.106	3.026	
5/11/2021 0:45	1.703	1.905	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E8. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 5, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
5/11/2021 6:10	0.987	2.672	
5/11/2021 6:15	11.06	6.024	
5/11/2021 6:20	210.475	110.768	16
5/11/2021 6:25	15.275	**112.875**	
5/11/2021 6:30	110.662	62.969	
5/11/2021 6:35	18.755	64.709	
5/11/2021 6:40	12.204	15.48	
5/11/2021 6:45	5.583	8.894	
5/11/2021 6:50	7.92	6.752	
5/11/2021 6:55	5.035	6.478	
5/11/2021 7:00	7.744	6.39	
5/11/2021 7:05	2.898	5.321	
5/11/2021 7:10	128.637	65.768	
5/11/2021 7:15	103.298	**115.968**	17
5/11/2021 7:20	15.124	59.211	
5/11/2021 7:25	40.552	27.838	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E9. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on November 5, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
5/11/2021 20:10	0.446	0.442	
5/11/2021 20:15	82.161	41.304	
5/11/2021 20:20	255.66	**168.911**	18
5/11/2021 20:25	71.1	163.38	
5/11/2021 20:30	15.41	43.255	
5/11/2021 20:35	5.26	10.335	
5/11/2021 20:40	4.023	4.642	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E10. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 7, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
7/11/2021 7:40	2.8	3.304	
7/11/2021 7:45	20.816	11.808	
7/11/2021 7:50	268.827	144.822	19
7/11/2021 7:55	139.822	**204.325**	
7/11/2021 8:00	19.426	**79.624**	20
7/11/2021 8:05	12.557	15.992	
7/11/2021 8:10	8.979	10.768	
7/11/2021 8:15	7.236	8.108	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E11. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 8, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
8/11/2021 6:05	0.59	0.599	
8/11/2021 6:10	0.556	0.573	
8/11/2021 6:15	256.002	128.279	21
8/11/2021 6:20	184.705	**220.354**	
8/11/2021 6:25	268.981	**226.843**	22
8/11/2021 6:30	52.225	160.603	
8/11/2021 6:35	111.586	81.906	23
8/11/2021 6:40	197.336	**154.461**	
8/11/2021 6:45	155.43	**176.383**	24
8/11/2021 6:50	94.963	125.197	
8/11/2021 6:55	140.19	**117.577**	25
8/11/2021 7:00	50.471	95.331	
8/11/2021 7:05	14.326	32.399	
8/11/2021 7:10	82.942	48.634	
8/11/2021 7:15	142.024	**112.483**	26
8/11/2021 7:20	35.092	88.558	
8/11/2021 7:25	122.287	78.69	27
8/11/2021 7:30	110.462	**116.375**	
8/11/2021 7:35	207.807	**159.135**	28
8/11/2021 7:40	63.742	135.775	
8/11/2021 7:45	15.575	39.659	
8/11/2021 7:50	11.317	13.446	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E12. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 11, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
11/11/2021 14:25	16.071	9.993	
11/11/2021 14:30	30.649	23.36	
11/11/2021 14:35	58.914	44.782	
11/11/2021 14:40	71.333	65.124	
11/11/2021 14:45	67.639	69.486	29
11/11/2021 14:50	82.684	**75.162**	
11/11/2021 14:55	82.217	**82.451**	30
11/11/2021 15:00	44.847	63.532	
11/11/2021 15:05	39.054	41.951	
11/11/2021 15:10	21.212	30.133	
11/11/2021 15:15	29.236	25.224	
11/11/2021 15:20	74.121	51.679	
11/11/2021 15:25	74.505	74.313	31
11/11/2021 15:30	98.989	**86.747**	
11/11/2021 15:35	100.848	**99.919**	32
11/11/2021 15:40	77.941	89.395	
11/11/2021 15:45	70.367	**74.154**	33
11/11/2021 15:50	73.304	71.836	
11/11/2021 15:55	68.341	**70.823**	34
11/11/2021 16:00	37.638	52.99	
11/11/2021 16:05	48.961	43.3	
11/11/2021 16:10	51.219	50.09	
11/11/2021 16:15	49.777	50.498	
11/11/2021 16:20	37.894	43.836	
11/11/2021 16:25	29.28	33.587	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E13. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 14, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
14/11/2021 17:55	1.577	0.913	
14/11/2021 18:00	38.066	19.822	
14/11/2021 18:05	133.586	85.826	35
14/11/2021 18:10	87.831	**110.709**	
14/11/2021 18:15	23.34	55.586	
14/11/2021 18:20	34.711	29.026	
14/11/2021 18:25	13.907	24.309	
14/11/2021 18:30	11.938	12.923	
14/11/2021 18:35	27.572	19.755	
14/11/2021 18:40	13.773	20.673	
14/11/2021 18:45	62.968	38.371	
14/11/2021 18:50	26.095	44.532	
14/11/2021 18:55	11.512	18.804	
14/11/2021 19:00	37.51	24.511	
14/11/2021 19:05	170.479	103.995	36
14/11/2021 19:10	78.475	**124.477**	
14/11/2021 19:15	49.417	63.946	
14/11/2021 19:20	46.362	47.89	
14/11/2021 19:25	31.399	38.881	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E14. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on November 16, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
16/11/2021 03:00	0.407	1.713	
16/11/2021 03:05	62.281	31.344	
16/11/2021 03:10	84.175	**73.228**	37
16/11/2021 03:15	8.472	46.324	
16/11/2021 03:20	3.371	5.922	
16/11/2021 03:25	1.828	2.6	
16/11/2021 03:30	1.986	1.907	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E15. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 16, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
16/11/2021 05:35	1.628	1.211	
16/11/2021 05:40	3.615	2.622	
16/11/2021 05:45	294.834	149.225	38
16/11/2021 05:50	135.42	**215.127**	
16/11/2021 05:55	44.026	**89.723**	39
16/11/2021 06:00	66.244	55.135	
16/11/2021 06:05	8.479	37.362	
16/11/2021 06:10	31.977	20.228	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E16. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on November 21, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
21/11/2021 05:55	2.894	2.675	
21/11/2021 06:00	41.163	22.029	
21/11/2021 06:05	128.033	**84.598**	
21/11/2021 06:10	5.988	67.011	40
21/11/2021 06:15	3.241	4.615	
21/11/2021 06:20	2.322	2.782	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E17. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 23, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
23/11/2021 18:10	1.369	1.56	
23/11/2021 18:15	19.994	10.682	
23/11/2021 18:20	135.791	77.893	41
23/11/2021 18:25	149.191	**142.491**	
23/11/2021 18:30	92.821	121.006	42
23/11/2021 18:35	64.355	**78.588**	
23/11/2021 18:40	26.556	45.456	
23/11/2021 18:45	8.343	17.45	
23/11/2021 18:50	3.996	6.17	
23/11/2021 18:55	6.3	5.148	
23/11/2021 19:00	34.781	20.541	
23/11/2021 19:05	55.974	45.378	
23/11/2021 19:10	69.604	62.789	
23/11/2021 19:15	14.204	41.904	
23/11/2021 19:20	49.081	31.643	
23/11/2021 19:25	61.012	55.047	
23/11/2021 19:30	81.41	71.211	43
23/11/2021 19:35	116.933	**99.172**	
23/11/2021 19:40	89.854	**103.394**	44
23/11/2021 19:45	11.085	50.47	
23/11/2021 19:50	11.569	11.327	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E18. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on November 29, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
29/11/2021 06:40	0.082	0.389	
29/11/2021 06:45	60.007	30.045	
29/11/2021 06:50	168.774	114.391	
29/11/2021 06:55	79.48	**124.127**	45
29/11/2021 07:00	83.129	**81.305**	
29/11/2021 07:05	46.866	64.998	46
29/11/2021 07:10	16.179	31.523	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E19. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on November 30, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
30/11/2021 09:45	0.876	0.862	
30/11/2021 09:50	0.855	0.866	
30/11/2021 09:55	143.74	**72.298**	
30/11/2021 10:00	24.199	83.97	47
30/11/2021 10:05	40.408	32.304	
30/11/2021 10:10	8.386	24.397	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E20. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on December 5, 2021

Date & Time EST	SO_2 5-min Avg. ppb	SO_2 10-min Running Avg. ppb	
5/12/2021 8:15	13.36	12.993	
5/12/2021 8:20	87.972	50.666	
5/12/2021 8:25	160.502	**124.237**	48
5/12/2021 8:30	41.453	100.978	
5/12/2021 8:35	57.838	49.646	49
5/12/2021 8:40	113.853	**85.846**	
5/12/2021 8:45	144.651	129.252	50
5/12/2021 8:50	165.345	**154.998**	
5/12/2021 8:55	171.25	**168.298**	51
5/12/2021 9:00	110.607	140.929	
5/12/2021 9:05	88.855	**99.731**	52
5/12/2021 9:10	52.249	70.552	
5/12/2021 9:15	72.825	62.537	
5/12/2021 9:20	64.148	**68.487**	53
5/12/2021 9:25	59.855	62.002	
5/12/2021 9:30	45.955	52.905	
5/12/2021 9:35	50.732	48.344	
5/12/2021 9:40	13.852	32.292	
5/12/2021 9:45	121.141	67.497	54
5/12/2021 9:50	106.215	**113.678**	
5/12/2021 9:55	101.795	**104.005**	55
5/12/2021 10:00	57.831	79.813	
5/12/2021 10:05	10.651	34.241	
5/12/2021 10:10	7.129	8.89	
5/12/2021 10:15	142.248	74.689	56
5/12/2021 10:20	34.732	**88.49**	
5/12/2021 10:25	9.541	22.137	
5/12/2021 10:30	5.661	7.601	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E21. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on December 7, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
7/12/2021 14:40	0.324	1.222	
7/12/2021 14:45	121.022	60.673	
7/12/2021 14:50	21.741	**71.382**	57
7/12/2021 14:55	4.382	13.062	
7/12/2021 15:00	1.796	3.089	
7/12/2021 15:05	1.306	1.551	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E22. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on December 7, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
7/12/2021 17:10	52.506	49.203	
7/12/2021 17:15	80.775	66.641	
7/12/2021 17:20	59.487	**70.131**	58
7/12/2021 17:25	47.422	53.455	
7/12/2021 17:30	22.205	34.814	
7/12/2021 17:35	71.292	46.749	
7/12/2021 17:40	32.209	51.751	
7/12/2021 17:45	7.776	19.993	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E23. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on December 8, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
8/12/2021 9:40	3.847	3.759	
8/12/2021 9:45	88.152	46	
8/12/2021 9:50	51.406	**69.779**	59
8/12/2021 9:55	55.673	53.54	
8/12/2021 10:00	78.219	66.946	
8/12/2021 10:05	24.903	51.561	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E24. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on December 9, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
9/12/2021 9:30	4.013	6.137	
9/12/2021 9:35	14.095	9.054	
9/12/2021 9:40	203.811	108.953	
9/12/2021 9:45	42.274	**123.043**	60
9/12/2021 9:50	35.983	39.129	
9/12/2021 9:55	11.925	23.954	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E25. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on December 10, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
10/12/2021 17:30	6.316	36.98	
10/12/2021 17:35	124.658	65.487	
10/12/2021 17:40	94.946	**109.802**	61
10/12/2021 17:45	35.584	65.265	
10/12/2021 17:50	55.568	45.576	
10/12/2021 17:55	9.02	32.294	
10/12/2021 18:00	7.29	8.155	
10/12/2021 18:05	5.216	6.253	
10/12/2021 18:10	3.914	4.565	
10/12/2021 18:15	32.249	18.082	
10/12/2021 18:20	97.988	65.119	
10/12/2021 18:25	23.443	60.716	
10/12/2021 18:30	19.712	21.578	
10/12/2021 18:35	72.479	46.096	
10/12/2021 18:40	94.022	**83.251**	62
10/12/2021 18:45	34.356	64.189	
10/12/2021 18:50	107.707	**71.032**	63
10/12/2021 18:55	15.102	61.405	
10/12/2021 19:00	13.001	14.052	
10/12/2021 19:05	6.773	9.887	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E26. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on December 11, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
11/12/2021 1:05	41.206	32.748	
11/12/2021 1:10	70.588	55.897	
11/12/2021 1:15	75.804	**73.196**	64
11/12/2021 1:20	66.097	70.951	
11/12/2021 1:25	52.589	59.343	
11/12/2021 1:30	55.359	53.974	
11/12/2021 1:35	60.909	58.134	
11/12/2021 1:40	70.968	65.939	
Internal Zero/ Span Checks: 1:45 - 2:15			
11/12/2021 2:20	71.978	**72.41**	65
11/12/2021 2:25	72.208	72.093	
11/12/2021 2:30	65.904	**69.056**	66
11/12/2021 2:35	54.905	60.405	
11/12/2021 2:40	28.575	41.74	
11/12/2021 2:45	10.807	19.691	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E27. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on December 14, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
14/12/2021 07:15	10.337	6.333	
14/12/2021 07:20	72.835	41.586	
14/12/2021 07:25	68.625	**70.73**	67
14/12/2021 07:30	31.985	50.305	
14/12/2021 07:35	5.637	18.811	
14/12/2021 07:40	3.366	4.502	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E28. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Periods on December 19, 2021

Date & Time EST	SO_2 5-min Avg. ppb	SO_2 10-min Running Avg. ppb	
19/12/2021 18:20	38.01	60.431	
19/12/2021 18:25	94.555	66.283	
19/12/2021 18:30	229.208	**161.882**	68
19/12/2021 18:35	40.77	134.989	
19/12/2021 18:40	11.028	25.899	
19/12/2021 18:45	30.359	20.694	
19/12/2021 18:50	80.229	55.294	
19/12/2021 18:55	82.661	**81.445**	69
19/12/2021 19:00	8.171	45.416	
19/12/2021 19:05	4.801	6.486	
19/12/2021 19:10	3.124	3.963	
19/12/2021 19:15	2.619	2.872	
19/12/2021 19:20	2.668	2.644	
19/12/2021 19:25	63.562	33.115	
19/12/2021 19:30	125.337	94.45	70
19/12/2021 19:35	140.041	**132.689**	
19/12/2021 19:40	72.177	**106.109**	71
19/12/2021 19:45	13.781	42.979	
19/12/2021 19:50	7.122	10.452	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E29. SO_2 Courtice Monitoring Station 10-min Running Average Exceedance Period on December 29, 2021

Date & Time	SO_2 5-min Avg.	SO_2 10-min Running Avg.	
EST	ppb	ppb	
29/12/2021 14:50	1.404	1.148	
29/12/2021 14:55	1.791	1.598	
29/12/2021 15:00	204.687	103.239	72
29/12/2021 15:05	35.037	**119.862**	
29/12/2021 15:10	10.942	22.99	
29/12/2021 15:15	3.568	7.255	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E30. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on October 1, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.	
EST	ppb	ppb	
1/10/2021 17:35	9.38	6.75	
1/10/2021 17:40	64.25	11.91	
1/10/2021 17:45	61.27	16.84	
1/10/2021 17:50	31.44	19.23	
1/10/2021 17:55	87.84	26.30	
1/10/2021 18:00	52.44	30.41	
1/10/2021 18:05	70.80	36.06	
1/10/2021 18:10	17.36	37.28	
1/10/2021 18:15	13.60	38.21	
1/10/2021 18:20	10.73	38.86	
1/10/2021 18:25	6.41	36.30	
1/10/2021 18:30	5.51	35.92	
1/10/2021 18:35	83.68	42.11	
1/10/2021 18:40	44.26	40.45	
1/10/2021 18:45	48.55	39.386	
1/10/2021 18:50	39.96	40.10	
1/10/2021 18:55	103.75	41.42	
1/10/2021 19:00	75.81	43.37	
1/10/2021 19:05	29.46	39.92	
1/10/2021 19:10	31.68	41.12	
1/10/2021 19:15	24.64	42.04	
1/10/2021 19:20	14.80	42.38	
1/10/2021 19:25	47.62	45.81	
1/10/2021 19:30	31.75	**48.00**	1
1/10/2021 19:35	28.14	**43.37**	
1/10/2021 19:40	26.58	41.89	
1/10/2021 19:45	22.27	39.71	
1/10/2021 19:50	8.89	37.12	
1/10/2021 19:55	32.23	31.16	
1/10/2021 20:00	9.63	25.64	
1/10/2021 20:05	7.10	23.78	2
1/10/2021 20:10	14.00	22.30	
1/10/2021 20:15	12.53	21.30	
1/10/2021 20:20	15.27	21.33	
1/10/2021 20:25	7.88	18.02	
1/10/2021 20:30	6.67	15.93	
1/10/2021 20:35	4.73	13.98	
1/10/2021 20:40	3.61	12.07	
1/10/2021 20:45	16.30	11.57	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E31. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on October 8, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.	
EST	ppb	ppb	
8/10/2021 20:20	24.79	19.88	
8/10/2021 20:25	26.61	21.48	
8/10/2021 20:30	35.85	23.67	
8/10/2021 20:35	43.48	25.94	
8/10/2021 20:40	37.95	27.24	
8/10/2021 20:45	35.56	28.33	
8/10/2021 20:50	30.14	28.70	
8/10/2021 20:55	28.53	29.07	
8/10/2021 21:00	25.72	29.19	
8/10/2021 21:05	52.85	31.88	
8/10/2021 21:10	57.73	35.09	
8/10/2021 21:15	57.65	38.07	
8/10/2021 21:20	62.20	41.19	
8/10/2021 21:25	51.52	43.27	
8/10/2021 21:30	51.98	44.609	
8/10/2021 21:35	45.14	44.75	
8/10/2021 21:40	37.11	44.68	
8/10/2021 21:45	42.75	45.28	
8/10/2021 21:50	42.71	46.33	3
8/10/2021 21:55	52.46	48.32	
8/10/2021 22:00	47.08	**50.10**	
8/10/2021 22:05	34.96	48.61	
8/10/2021 22:10	32.11	46.47	
8/10/2021 22:15	27.81	43.99	
8/10/2021 22:20	24.04	**40.81**	
8/10/2021 22:25	12.22	37.53	
8/10/2021 22:30	10.87	34.11	
8/10/2021 22:35	12.51	31.39	
8/10/2021 22:40	13.00	29.38	
8/10/2021 22:45	11.83	26.80	
8/10/2021 22:50	10.70	24.13	4
8/10/2021 22:55	10.22	20.61	
8/10/2021 23:00	9.85	17.51	
8/10/2021 23:05	9.63	15.40	
8/10/2021 23:10	9.73	13.53	
8/10/2021 23:15	11.16	12.15	
8/10/2021 23:20	15.73	11.45	
8/10/2021 23:25	14.14	11.61	
8/10/2021 23:30	16.34	12.07	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E32. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on November 3, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.
EST	ppb	ppb
3/11/2021 21:40	3.86	4.51
3/11/2021 21:45	7.64	4.77
3/11/2021 21:50	9.60	5.41
3/11/2021 21:55	3.12	5.64
3/11/2021 22:00	0.81	5.70
3/11/2021 22:05	20.50	7.29
3/11/2021 22:10	75.72	13.30
3/11/2021 22:15	64.74	18.51
3/11/2021 22:20	110.06	27.58
3/11/2021 22:25	55.33	31.42
3/11/2021 22:30	11.72	30.94
3/11/2021 22:35	87.81	37.58
3/11/2021 22:40	94.65	45.14
3/11/2021 22:45	23.15	46.43
3/11/2021 22:50	8.11	46.31
3/11/2021 22:55	57.94	50.88
3/11/2021 23:00	18.50	52.35
3/11/2021 23:05	50.11	54.82
3/11/2021 23:10	166.79	**62.41**
3/11/2021 23:15	37.26	60.12
3/11/2021 23:20	11.61	51.91
3/11/2021 23:25	5.38	47.75
3/11/2021 23:30	3.74	47.09
3/11/2021 23:35	2.43	39.971
3/11/2021 23:40	7.02	32.67
3/11/2021 23:45	143.88	**42.73**
3/11/2021 23:50	32.05	44.73
3/11/2021 23:55	17.91	41.39
4/11/2021 0:00	34.09	42.69
4/11/2021 0:05	6.84	39.08
4/11/2021 0:10	5.09	25.61
4/11/2021 0:15	41.45	25.96
4/11/2021 0:20	33.35	27.77
4/11/2021 0:25	6.97	27.90
4/11/2021 0:30	3.14	27.85
4/11/2021 0:35	2.29	27.84
4/11/2021 0:40	2.90	27.50
4/11/2021 0:45	2.16	15.69
4/11/2021 0:50	1.75	13.16

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E33. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Period on November 4, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.
EST	ppb	ppb
4/11/2021 6:20	0.898	1.83
4/11/2021 6:25	1.019	1.37
4/11/2021 6:30	1.197	1.10
4/11/2021 6:35	13.26	2.08
4/11/2021 6:40	14.66	3.21
4/11/2021 6:45	5.90	3.60
4/11/2021 6:50	4.68	3.90
4/11/2021 6:55	4.50	4.20
4/11/2021 7:00	7.45	4.74
4/11/2021 7:05	27.21	6.93
4/11/2021 7:10	114.25	16.37
4/11/2021 7:15	53.21	20.69
4/11/2021 7:20	76.55	26.99
4/11/2021 7:25	111.95	36.23
4/11/2021 7:30	82.91	43.04
4/11/2021 7:35	101.692	50.41
4/11/2021 7:40	51.602	53.49
4/11/2021 7:45	44.375	56.70
4/11/2021 7:50	32.133	58.99
4/11/2021 7:55	58.964	63.52
4/11/2021 8:00	34.956	**65.816**
4/11/2021 8:05	17.998	65.05
4/11/2021 8:10	32.929	58.27
4/11/2021 8:15	13.353	54.95
4/11/2021 8:20	6.17	49.09
4/11/2021 8:25	4.267	40.112
4/11/2021 8:30	4.063	33.542

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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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E34. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Period on November 4, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.
EST	ppb	ppb
4/11/2021 17:15	0.129	0.10
4/11/2021 17:20	0.142	0.10
4/11/2021 17:25	0.12	0.09
4/11/2021 17:30	0.07	0.09
4/11/2021 17:35	0.10	0.09
4/11/2021 17:40	0.07	0.09
4/11/2021 17:45	0.08	0.09
4/11/2021 17:50	0.06	0.10
4/11/2021 17:55	0.18	0.10
4/11/2021 18:00	0.24	0.12
4/11/2021 18:05	0.72	0.17
4/11/2021 18:10	1.81	0.31
4/11/2021 18:15	0.83	0.37
4/11/2021 18:20	359.00	30.27
4/11/2021 18:25	192.75	46.33
4/11/2021 18:30	53.256	50.76
4/11/2021 18:35	33.844	53.57
4/11/2021 18:40	5.783	54.05
4/11/2021 18:45	3.414	54.32
4/11/2021 18:50	2.753	54.55
4/11/2021 18:55	2.581	54.75
4/11/2021 19:00	1.66	54.87
4/11/2021 19:05	1.323	**54.917**
4/11/2021 19:10	1.087	54.86
4/11/2021 19:15	1.104	54.88
4/11/2021 19:20	13.946	26.125
4/11/2021 19:25	13.358	11.176

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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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E35. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Period on November 5, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.
EST	ppb	ppb
5/11/2021 6:00	2.126	3.83
5/11/2021 6:05	4.356	4.09
5/11/2021 6:10	0.987	4.11
5/11/2021 6:15	11.06	4.93
5/11/2021 6:20	210.48	22.23
5/11/2021 6:25	15.28	22.07
5/11/2021 6:30	110.66	30.56
5/11/2021 6:35	18.76	31.48
5/11/2021 6:40	12.20	32.37
5/11/2021 6:45	5.58	32.76
5/11/2021 6:50	7.92	33.35
5/11/2021 6:55	5.04	33.70
5/11/2021 7:00	7.74	34.17
5/11/2021 7:05	2.90	34.05
5/11/2021 7:10	128.64	44.69
5/11/2021 7:15	103.298	**52.374**
5/11/2021 7:20	15.124	36.10
5/11/2021 7:25	40.552	38.20
5/11/2021 7:30	15.238	30.25
5/11/2021 7:35	5.962	29.18
5/11/2021 7:40	5.34	28.61
5/11/2021 7:45	6.81	28.71
5/11/2021 7:50	3.827	28.37
5/11/2021 7:55	3.728	28.26
5/11/2021 8:00	3.473	27.907
5/11/2021 8:05	3.321	27.94
5/11/2021 8:10	3.429	17.509

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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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E36. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Period on November 7, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.
EST	ppb	ppb
7/11/2021 6:45	1.333	1.07
7/11/2021 6:50	0.929	1.06
7/11/2021 6:55	2.063	1.10
7/11/2021 7:00	33.00	3.59
7/11/2021 7:05	3.49	3.80
7/11/2021 7:10	1.38	3.85
7/11/2021 7:15	12.50	4.83
7/11/2021 7:20	1.83	4.93
7/11/2021 7:25	1.31	4.98
7/11/2021 7:30	2.22	5.12
7/11/2021 7:35	3.81	5.38
7/11/2021 7:40	2.80	5.56
7/11/2021 7:45	20.82	7.18
7/11/2021 7:50	268.83	29.50
7/11/2021 7:55	139.82	40.98
7/11/2021 8:00	19.426	39.85
7/11/2021 8:05	12.557	40.61
7/11/2021 8:10	8.979	41.24
7/11/2021 8:15	7.236	40.80
7/11/2021 8:20	9.327	41.43
7/11/2021 8:25	10.469	42.19
7/11/2021 8:30	10.714	42.90
7/11/2021 8:35	11.231	43.52
7/11/2021 8:40	6.435	**43.82**
7/11/2021 8:45	7.296	42.69
7/11/2021 8:50	7.582	20.923
7/11/2021 8:55	6.799	9.838

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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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E37. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on November 8, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.	
EST	ppb	ppb	
8/11/2021 5:15	1.15	2.13	
8/11/2021 5:20	0.76	2.15	
8/11/2021 5:25	0.70	2.17	
8/11/2021 5:30	0.77	2.20	
8/11/2021 5:35	0.73	2.20	
8/11/2021 5:40	0.81	2.20	
8/11/2021 5:45	0.68	2.21	
8/11/2021 5:50	0.60	1.88	
8/11/2021 5:55	0.58	1.30	
8/11/2021 6:00	0.61	0.94	
8/11/2021 6:05	0.59	0.83	
8/11/2021 6:10	0.56	0.71	
8/11/2021 6:15	256.00	21.95	
8/11/2021 6:20	184.71	37.28	
8/11/2021 6:25	268.98	59.63	
8/11/2021 6:30	52.23	63.92	
8/11/2021 6:35	111.59	73.16	
8/11/2021 6:40	197.34	89.54	
8/11/2021 6:45	155.43	102.43	
8/11/2021 6:50	94.96	110.30	
8/11/2021 6:55	140.19	121.93	11
8/11/2021 7:00	50.47	126.09	
8/11/2021 7:05	14.33	127.23	
8/11/2021 7:10	82.94	**134.10**	
8/11/2021 7:15	142.02	124.60	
8/11/2021 7:20	35.09	112.13	
8/11/2021 7:25	122.29	59.63	
8/11/2021 7:30	110.46	104.76	
8/11/2021 7:35	207.81	**112.78**	
8/11/2021 7:40	63.74	101.65	
8/11/2021 7:45	15.58	89.99	
8/11/2021 7:50	11.32	83.02	
8/11/2021 7:55	58.54	76.22	12
8/11/2021 8:00	10.92	72.92	
8/11/2021 8:05	8.64	72.45	
8/11/2021 8:10	36.20	68.55	
8/11/2021 8:15	62.81	61.95	
8/11/2021 8:20	21.86	60.85	
8/11/2021 8:25	13.06	51.74	
8/11/2021 8:30	9.74	43.35	
8/11/2021 8:35	8.08	26.71	
8/11/2021 8:40	6.99	21.98	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E38. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on November 11, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.	
EST	ppb	ppb	
11/11/2021 13:55	0.36	0.57	
11/11/2021 14:00	0.47	0.57	
11/11/2021 14:05	0.52	0.58	
11/11/2021 14:10	0.44	0.58	
11/11/2021 14:15	1.36	0.65	
11/11/2021 14:20	3.91	0.95	
11/11/2021 14:25	16.07	2.26	
11/11/2021 14:30	30.65	4.77	
11/11/2021 14:35	58.91	9.60	
11/11/2021 14:40	71.33	15.43	
11/11/2021 14:45	67.64	21.01	
11/11/2021 14:50	82.68	27.86	
11/11/2021 14:55	82.22	34.68	
11/11/2021 15:00	44.85	38.38	
11/11/2021 15:05	39.05	41.59	
11/11/2021 15:10	21.21	41.59	
11/11/2021 15:15	29.24	43.32	
11/11/2021 15:20	74.12	45.65	
11/11/2021 15:25	74.51	51.50	
11/11/2021 15:30	98.99	56.37	
11/11/2021 15:35	100.85	62.06	13
11/11/2021 15:40	77.94	65.56	
11/11/2021 15:45	70.37	66.11	
11/11/2021 15:50	73.30	**66.34**	
11/11/2021 15:55	68.34	65.55	
11/11/2021 16:00	37.64	64.40	
11/11/2021 16:05	48.96	63.80	
11/11/2021 16:10	51.22	64.62	
11/11/2021 16:15	49.78	67.12	
11/11/2021 16:20	37.89	**68.83**	
11/11/2021 16:25	29.28	65.82	
11/11/2021 16:30	25.24	62.05	
11/11/2021 16:35	23.47	55.90	14
11/11/2021 16:40	13.21	49.45	
11/11/2021 16:45	14.80	44.06	
11/11/2021 16:50	15.95	39.43	
11/11/2021 16:55	13.50	34.65	
11/11/2021 17:00	10.50	30.08	
11/11/2021 17:05	10.01	27.82	
11/11/2021 17:10	13.54	24.57	
11/11/2021 17:15	19.11	21.43	
11/11/2021 17:20	25.41	18.88	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E39. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on November 14, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.	
EST	ppb	ppb	
14/11/2021 17:45	0.29	0.39	
14/11/2021 17:50	0.25	0.38	
14/11/2021 17:55	1.58	0.48	
14/11/2021 18:00	38.07	3.61	
14/11/2021 18:05	133.59	14.71	
14/11/2021 18:10	87.83	21.99	
14/11/2021 18:15	23.34	23.90	
14/11/2021 18:20	34.71	26.76	
14/11/2021 18:25	13.91	27.88	
14/11/2021 18:30	11.94	28.85	
14/11/2021 18:35	27.57	31.12	
14/11/2021 18:40	13.77	32.24	
14/11/2021 18:45	62.97	37.46	
14/11/2021 18:50	26.10	39.61	
14/11/2021 18:55	11.51	40.44	
14/11/2021 19:00	37.51	40.40	
14/11/2021 19:05	170.48	43.47	
14/11/2021 19:10	78.48	42.69	
14/11/2021 19:15	49.42	44.86	
14/11/2021 19:20	46.36	45.83	
14/11/2021 19:25	31.40	47.29	15
14/11/2021 19:30	27.12	48.56	
14/11/2021 19:35	53.71	50.74	
14/11/2021 19:40	13.90	**50.75**	
14/11/2021 19:45	22.43	47.37	
14/11/2021 19:50	40.41	48.56	
14/11/2021 19:55	55.28	52.21	
14/11/2021 20:00	51.81	**53.40**	
14/11/2021 20:05	8.32	39.89	
14/11/2021 20:10	5.36	33.79	
14/11/2021 20:15	5.59	30.14	
14/11/2021 20:20	5.90	26.77	
14/11/2021 20:25	5.27	24.59	16
14/11/2021 20:30	3.72	22.64	
14/11/2021 20:35	2.95	18.41	
14/11/2021 20:40	3.45	17.54	
14/11/2021 20:45	3.62	15.97	
14/11/2021 20:50	3.66	12.91	
14/11/2021 20:55	1.94	8.47	
14/11/2021 21:00	18.59	5.70	
14/11/2021 21:05	9.80	5.82	
14/11/2021 21:10	11.39	6.32	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E40. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Period on November 16, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.
EST	ppb	ppb
16/11/2021 04:45	0.129	2.51
16/11/2021 04:50	0.142	2.55
16/11/2021 04:55	0.12	2.37
16/11/2021 05:00	0.07	2.21
16/11/2021 05:05	0.10	1.94
16/11/2021 05:10	0.07	1.90
16/11/2021 05:15	0.08	1.86
16/11/2021 05:20	0.06	1.79
16/11/2021 05:25	0.18	1.72
16/11/2021 05:30	0.24	1.62
16/11/2021 05:35	0.72	1.61
16/11/2021 05:40	1.81	1.74
16/11/2021 05:45	0.83	25.88
16/11/2021 05:50	359.00	36.87
16/11/2021 05:55	192.75	40.46
16/11/2021 06:00	66.244	45.89
16/11/2021 06:05	8.479	46.51
16/11/2021 06:10	31.977	49.11
16/11/2021 06:15	6.604	49.60
16/11/2021 06:20	6.692	50.09
16/11/2021 06:25	6.156	50.54
16/11/2021 06:30	16.892	51.88
16/11/2021 06:35	15.896	53.07
16/11/2021 06:40	5.833	**53.254**
16/11/2021 06:45	3.733	29.00
16/11/2021 06:50	3.167	17.975
16/11/2021 06:55	2.976	14.554

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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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E41. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on November 23, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.	
EST	ppb	ppb	
23/11/2021 17:20	3.32	7.50	
23/11/2021 17:25	0.92	7.56	
23/11/2021 17:30	2.21	7.74	
23/11/2021 17:35	1.43	7.85	
23/11/2021 17:40	3.37	8.12	
23/11/2021 17:45	52.23	12.47	
23/11/2021 17:50	65.12	17.89	
23/11/2021 17:55	26.64	20.10	
23/11/2021 18:00	3.56	20.40	
23/11/2021 18:05	1.75	20.51	
23/11/2021 18:10	1.37	16.14	
23/11/2021 18:15	19.99	15.16	
23/11/2021 18:20	135.79	26.20	
23/11/2021 18:25	149.19	38.55	
23/11/2021 18:30	92.82	46.11	
23/11/2021 18:35	64.36	51.35	
23/11/2021 18:40	26.56	53.28	
23/11/2021 18:45	8.34	49.62	
23/11/2021 18:50	4.00	44.53	
23/11/2021 18:55	6.30	42.84	
23/11/2021 19:00	34.78	45.44	
23/11/2021 19:05	55.97	49.96	
23/11/2021 19:10	69.60	**55.64**	
23/11/2021 19:15	14.20	55.16	
23/11/2021 19:20	49.08	47.93	
23/11/2021 19:25	61.01	40.59	18
23/11/2021 19:30	81.41	39.64	
23/11/2021 19:35	116.93	44.02	
23/11/2021 19:40	89.85	49.29	
23/11/2021 19:45	11.09	49.52	
23/11/2021 19:50	11.57	50.15	
23/11/2021 19:55	56.57	54.34	
23/11/2021 20:00	43.77	**55.09**	
23/11/2021 20:05	9.64	51.23	
23/11/2021 20:10	5.05	45.85	
23/11/2021 20:15	3.71	44.97	
23/11/2021 20:20	2.79	41.12	
23/11/2021 20:25	2.38	36.23	
23/11/2021 20:30	2.00	29.61	19
23/11/2021 20:35	1.62	20.00	
23/11/2021 20:40	2.83	12.75	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E42. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on November 29, 2021

Date & Time	SO_2 5-min Avg.	SO_2 1-hr Running Avg.	
EST	ppb	ppb	
29/11/2021 06:05	0.31	0.52	
29/11/2021 06:10	0.28	0.45	
29/11/2021 06:15	0.30	0.41	
29/11/2021 06:20	0.35	0.35	
29/11/2021 06:25	0.48	0.34	
29/11/2021 06:30	1.64	0.45	
29/11/2021 06:35	0.70	0.48	
29/11/2021 06:40	0.08	0.42	
29/11/2021 06:45	60.01	5.39	
29/11/2021 06:50	168.77	19.45	
29/11/2021 06:55	79.48	26.06	
29/11/2021 07:00	83.13	32.96	
29/11/2021 07:05	46.87	36.84	
29/11/2021 07:10	16.18	38.17	
29/11/2021 07:15	110.11	47.32	
29/11/2021 07:20	23.59	49.25	
29/11/2021 07:25	10.97	50.13	
29/11/2021 07:30	72.36	56.02	
29/11/2021 07:35	27.79	58.28	
29/11/2021 07:40	6.62	**58.82**	
29/11/2021 07:45	3.76	54.14	
29/11/2021 07:50	3.35	40.35	
29/11/2021 07:55	2.80	33.96	
29/11/2021 08:00	2.44	27.24	
29/11/2021 08:05	4.00	23.66	
29/11/2021 08:10	3.25	22.59	20
29/11/2021 08:15	7.97	14.08	
29/11/2021 08:20	11.27	13.05	
29/11/2021 08:25	20.08	13.81	
29/11/2021 08:30	57.84	12.60	
29/11/2021 08:35	62.39	15.48	
29/11/2021 08:40	68.71	20.65	
29/11/2021 08:45	43.54	23.97	
29/11/2021 08:50	58.29	28.55	
29/11/2021 08:55	37.35	31.43	
29/11/2021 09:00	11.24	32.16	
29/11/2021 09:05	11.12	32.75	
29/11/2021 09:10	11.18	33.41	
29/11/2021 09:15	33.77	35.56	
29/11/2021 09:20	56.47	39.33	
29/11/2021 09:25	42.50	**41.20**	
29/11/2021 09:30	16.31	37.74	
29/11/2021 09:35	6.88	33.11	
29/11/2021 09:40	5.95	27.88	
29/11/2021 09:45	3.80	24.57	
29/11/2021 09:50	3.13	19.98	
29/11/2021 09:55	2.75	17.09	21
29/11/2021 10:00	2.51	16.36	
29/11/2021 10:05	2.10	15.61	
29/11/2021 10:10	1.86	14.84	
29/11/2021 10:15	2.09	12.20	
29/11/2021 10:20	1.92	7.65	
29/11/2021 10:25	2.10	4.28	
29/11/2021 10:30	45.69	6.73	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E43. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Period on November 30, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.
EST	ppb	ppb
30/11/2021 09:40	0.848	1.49
30/11/2021 09:45	0.876	1.41
30/11/2021 09:50	0.855	1.27
30/11/2021 09:55	143.74	13.00
30/11/2021 10:00	24.20	14.87
30/11/2021 10:05	40.41	18.12
30/11/2021 10:10	8.39	18.72
30/11/2021 10:15	4.66	19.02
30/11/2021 10:20	3.02	19.18
30/11/2021 10:25	2.54	19.31
30/11/2021 10:30	33.71	22.03
30/11/2021 10:35	68.35	27.63
30/11/2021 10:40	56.43	32.27
30/11/2021 10:45	61.61	37.33
30/11/2021 10:50	47.66	**41.227**
30/11/2021 10:55	7.449	29.87
30/11/2021 11:00	11.434	28.81
30/11/2021 11:05	5.406	25.89
30/11/2021 11:10	6.362	25.72
30/11/2021 11:15	3.572	25.63
30/11/2021 11:20	2.657	25.60
30/11/2021 11:25	2.037	25.56
30/11/2021 11:30	1.846	22.90
30/11/2021 11:35	1.729	17.35
30/11/2021 11:40	1.632	12.78
30/11/2021 11:45	1.484	7.772
30/11/2021 11:50	1.467	3.923

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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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E44. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on December 5, 2021

Date & Time	SO_2 5-min Avg.	SO_2 1-hr Running Avg.	
EST	ppb	ppb	
5/12/2021 7:25	13.28	10.78	
5/12/2021 7:30	1.36	10.70	
5/12/2021 7:35	39.70	13.98	
5/12/2021 7:40	8.12	14.65	
5/12/2021 7:45	2.16	14.81	
5/12/2021 7:50	19.57	15.44	
5/12/2021 7:55	56.38	18.39	
5/12/2021 8:00	19.61	19.75	
5/12/2021 8:05	2.94	19.21	
5/12/2021 8:10	12.63	17.15	
5/12/2021 8:15	13.36	17.39	
5/12/2021 8:20	87.97	23.09	
5/12/2021 8:25	160.50	35.36	
5/12/2021 8:30	41.45	38.70	
5/12/2021 8:35	57.84	40.21	
5/12/2021 8:40	113.85	49.02	
5/12/2021 8:45	144.65	60.90	
5/12/2021 8:50	165.35	73.04	
5/12/2021 8:55	171.25	82.62	
5/12/2021 9:00	110.61	90.20	
5/12/2021 9:05	88.86	97.36	
5/12/2021 9:10	52.25	100.66	
5/12/2021 9:15	72.83	**105.617**	
5/12/2021 9:20	64.15	103.63	
5/12/2021 9:25	59.86	95.24	
5/12/2021 9:30	45.96	95.62	23
5/12/2021 9:35	50.73	**95.027**	
5/12/2021 9:40	13.85	86.69	
5/12/2021 9:45	121.14	84.74	
5/12/2021 9:50	106.22	79.81	
5/12/2021 9:55	101.80	74.02	
5/12/2021 10:00	57.83	69.62	
5/12/2021 10:05	10.65	63.10	
5/12/2021 10:10	7.13	59.34	
5/12/2021 10:15	142.25	65.13	
5/12/2021 10:20	34.73	62.68	
5/12/2021 10:25	9.54	58.49	
5/12/2021 10:30	5.66	55.13	24
5/12/2021 10:35	4.16	**51.246**	
5/12/2021 10:40	3.60	50.39	
5/12/2021 10:45	33.66	43.10	
5/12/2021 10:50	16.65	35.64	
5/12/2021 10:55	37.39	30.27	
5/12/2021 11:00	19.79	27.10	
5/12/2021 11:05	7.84	26.87	
5/12/2021 11:10	4.87	26.68	
5/12/2021 11:15	4.17	15.17	
5/12/2021 11:20	19.65	13.91	
5/12/2021 11:25	3.73	13.43	
5/12/2021 11:30	18.46	14.50	25
5/12/2021 11:35	14.81	15.38	
5/12/2021 11:40	32.38	17.78	
5/12/2021 11:45	14.51	16.19	
5/12/2021 11:50	19.65	16.44	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E45. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on December 7, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.	
EST	ppb	ppb	
7/12/2021 16:20	24.80	18.17	
7/12/2021 16:25	6.55	18.28	
7/12/2021 16:30	16.91	19.54	
7/12/2021 16:35	69.09	25.14	
7/12/2021 16:40	36.91	28.17	
7/12/2021 16:45	20.09	28.18	
7/12/2021 16:50	3.98	23.65	
7/12/2021 16:55	2.25	19.24	
7/12/2021 17:00	41.18	22.12	
7/12/2021 17:05	45.90	25.66	
7/12/2021 17:10	52.51	27.24	
7/12/2021 17:15	80.78	33.41	
7/12/2021 17:20	59.49	36.30	
7/12/2021 17:25	47.42	39.71	
7/12/2021 17:30	22.21	40.15	26
7/12/2021 17:35	71.29	40.33	
7/12/2021 17:40	32.21	39.94	
7/12/2021 17:45	7.78	38.92	
7/12/2021 17:50	7.02	39.17	
7/12/2021 17:55	21.31	40.76	
7/12/2021 18:00	52.15	41.67	
7/12/2021 18:05	46.68	**41.74**	
7/12/2021 18:10	47.63	41.33	
7/12/2021 18:15	50.87	38.84	
7/12/2021 18:20	34.28	36.74	
7/12/2021 18:25	63.85	38.11	
7/12/2021 18:30	52.39	**40.62**	27
7/12/2021 18:35	42.91	38.26	
7/12/2021 18:40	47.24	39.51	
7/12/2021 18:45	6.22	39.38	
7/12/2021 18:50	4.08	39.13	
7/12/2021 18:55	3.25	37.63	
7/12/2021 19:00	2.19	33.47	
7/12/2021 19:05	2.10	29.75	
7/12/2021 19:10	1.88	25.94	
7/12/2021 19:15	2.11	21.87	
7/12/2021 19:20	3.42	19.30	
7/12/2021 19:25	3.78	14.30	
7/12/2021 19:30	4.40	10.30	
7/12/2021 19:35	1.75	6.87	
7/12/2021 19:40	1.20	3.03	
7/12/2021 19:45	1.84	2.67	

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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E46. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Period on December 10, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.
EST	ppb	ppb
10/12/2021 17:10	3.279	7.36
10/12/2021 17:15	1.892	7.45
10/12/2021 17:20	1.705	7.51
10/12/2021 17:25	67.64	13.07
10/12/2021 17:30	6.32	13.52
10/12/2021 17:35	124.66	23.84
10/12/2021 17:40	94.95	31.68
10/12/2021 17:45	35.58	34.57
10/12/2021 17:50	55.57	39.12
10/12/2021 17:55	9.02	39.78
10/12/2021 18:00	7.29	34.36
10/12/2021 18:05	5.22	34.43
10/12/2021 18:10	3.91	34.48
10/12/2021 18:15	32.25	37.01
10/12/2021 18:20	97.99	**45.033**
10/12/2021 18:25	23.443	41.35
10/12/2021 18:30	19.712	42.47
10/12/2021 18:35	72.479	38.12
10/12/2021 18:40	94.022	38.04
10/12/2021 18:45	34.356	37.938
10/12/2021 18:50	107.707	42.28
10/12/2021 18:55	15.102	42.79
10/12/2021 19:00	13.001	43.27
10/12/2021 19:05	6.773	43.40
10/12/2021 19:10	5.629	43.54
10/12/2021 19:15	4.882	41.26
10/12/2021 19:20	4.41	33.46

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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 reported
}	Range of running average values during exceedance period
#	Exceedance number

Table E47. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on December 11, 2021

Date & Time	SO_2 5-min Avg.	SO_2 1-hr Running Avg.	
EST	ppb	ppb	
11/12/2021 0:05	35.51	5.88	
11/12/2021 0:10	36.89	8.80	
11/12/2021 0:15	45.63	12.45	
11/12/2021 0:20	56.28	17.00	
11/12/2021 0:25	56.35	21.54	
11/12/2021 0:30	59.20	26.32	
11/12/2021 0:35	43.89	29.85	
11/12/2021 0:40	25.79	31.88	
11/12/2021 0:45	18.61	33.30	
11/12/2021 0:50	19.42	34.70	
11/12/2021 0:55	14.98	35.52	
11/12/2021 1:00	24.29	36.40	
11/12/2021 1:05	41.21	36.88	
11/12/2021 1:10	70.59	39.69	
11/12/2021 1:15	75.80	42.20	
11/12/2021 1:20	66.10	43.02	
11/12/2021 1:25	52.59	42.71	
11/12/2021 1:30	55.36	42.39	
11/12/2021 1:35	60.91	43.80	
11/12/2021 1:40	70.97	47.57	
11/12/2021 1:45	Zero	50.20	
11/12/2021 1:50	Zero	53.28	
11/12/2021 1:55	Span	**57.53**	
11/12/2021 2:00	Span	-	
11/12/2021 2:05	Purge	-	
11/12/2021 2:10	Purge	-	
11/12/2021 2:15	72.84	-	
11/12/2021 2:20	71.98	-	
11/12/2021 2:25	72.21	-	
11/12/2021 2:30	65.90	-	
11/12/2021 2:35	54.91	-	
11/12/2021 2:40	28.58	-	
11/12/2021 2:45	10.81	-	
11/12/2021 2:50	6.30	-	
11/12/2021 2:55	7.25	**43.42**	
11/12/2021 3:00	10.06	40.08	
11/12/2021 3:05	7.53	37.12	
11/12/2021 3:10	5.61	34.50	
11/12/2021 3:15	4.20	28.78	
11/12/2021 3:20	2.98	23.03	
11/12/2021 3:25	2.69	17.23	
11/12/2021 3:30	2.61	11.96	
11/12/2021 3:35	2.42	7.58	
11/12/2021 3:40	2.40	5.40	
11/12/2021 3:45	2.20	4.69	
11/12/2021 3:50	2.02	4.33	
11/12/2021 3:55	2.68	3.95	
11/12/2021 4:00	5.89	3.60	

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 reported
	Range of running average values during exceedance period
#	Exceedance number

Table E48. SO_2 Courtice Monitoring Station 1-Hour Running Average Exceedance Periods on December 19, 2021

Date & Time	SO_2 5 min Avg.	SO_2 1 hr Running Avg.	
EST	ppb	ppb	
19/12/2021 17:20	2.30	10.00	
19/12/2021 17:25	2.04	10.16	
19/12/2021 17:30	0.94	10.24	
19/12/2021 17:35	0.43	10.26	
19/12/2021 17:40	0.32	10.29	
19/12/2021 17:45	0.88	10.35	
19/12/2021 17:50	0.22	10.25	
19/12/2021 17:55	7.49	7.46	
19/12/2021 18:00	35.24	7.34	
19/12/2021 18:05	41.76	8.40	
19/12/2021 18:10	42.97	11.48	
19/12/2021 18:15	82.85	18.12	
19/12/2021 18:20	38.01	21.10	
19/12/2021 18:25	94.56	28.81	
19/12/2021 18:30	229.21	47.83	
19/12/2021 18:35	40.77	51.19	
19/12/2021 18:40	11.03	52.08	
19/12/2021 18:45	30.36	54.54	
19/12/2021 18:50	80.23	61.21	
19/12/2021 18:55	82.66	**67.47**	
19/12/2021 19:00	8.17	65.22	
19/12/2021 19:05	4.80	62.14	
19/12/2021 19:10	3.12	58.81	
19/12/2021 19:15	2.62	52.13	
19/12/2021 19:20	2.67	49.18	
19/12/2021 19:25	63.56	46.60	
19/12/2021 19:30	125.34	37.94	
19/12/2021 19:35	140.04	46.22	
19/12/2021 19:40	72.18	**51.31**	
19/12/2021 19:45	13.78	49.93	
19/12/2021 19:50	7.12	43.84	
19/12/2021 19:55	23.90	38.94	
19/12/2021 20:00	16.79	39.66	
19/12/2021 20:05	5.71	39.74	
19/12/2021 20:10	3.04	39.73	
19/12/2021 20:15	2.58	39.73	
19/12/2021 20:20	2.16	39.68	
19/12/2021 20:25	1.53	34.51	
19/12/2021 20:30	1.39	24.18	
19/12/2021 20:35	1.60	12.65	
19/12/2021 20:40	1.65	6.77	
19/12/2021 20:45	1.38	5.74	
19/12/2021 20:50	1.27	5.25	

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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 reported
}	Range of running average values during exceedance period
#	Exceedance number

APPENDIX F

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:	2021-10-01	**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
RE:	**Exceedance Report – Benzo(a)Pyrene October 1, 2021 Region of Durham, DYEC**	

On December 1, 2021 the results from ALS Environmental were received regarding the PAH results from the October 1, 2021 sampling event. On December 2, 2021, the results were entered and assessed, and it was found that there was one (1) measured Benzo(a)Pyrene (BaP) concentration in excess of the 24-hour AAQC on the October 1st sampling date.

On Friday, October 1, 2021, there was one (1) exceedances of the BaP 24-hour AAQC, which occurred at the Rundle Road Station, measured at the onsite PUF PS-1 samplers. Attached is a figure depicting the wind rose (indicating the wind speed and direction during the sampling day), and the location of the sampling stations relative to the DYEC.

The following summarizes the BaP concentrations and onsite conditions during the October 1st sampling date:

1. The guideline concentration for BaP is 0.00005 ug/m^3. The measured concentration at the Rundle Road sampler was 0.000057 µg/m^3.
2. During the sampling day the wind was predominantly from the SW as well as the WNW and NNW, as recorded at the Rundle Road Meteorological Tower. One-hour average wind speeds at Rundle Road Meteorological Tower ranged from 0.02 km/h to 13.73 km/h.
3. The Rundle Road meteorological data suggests that the winds were predominantly coming from the SW and the NW, which places the Rundle Road Station downwind of the DYEC during part of the sampling period. This date falls within the fall outage period at DYEC, when the facility was not operational, therefore the measured BaP exceedance is likely not attributable to the regular Energy Centre operations.

At the Rundle Road Station, the NO_2 hourly values were less than 4% of the criteria for the same period. The $PM_{2.5}$ 24-hour average value was 4.8 micrograms per cubic metre at the Rundle Road Station.

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

Respectfully submitted by:

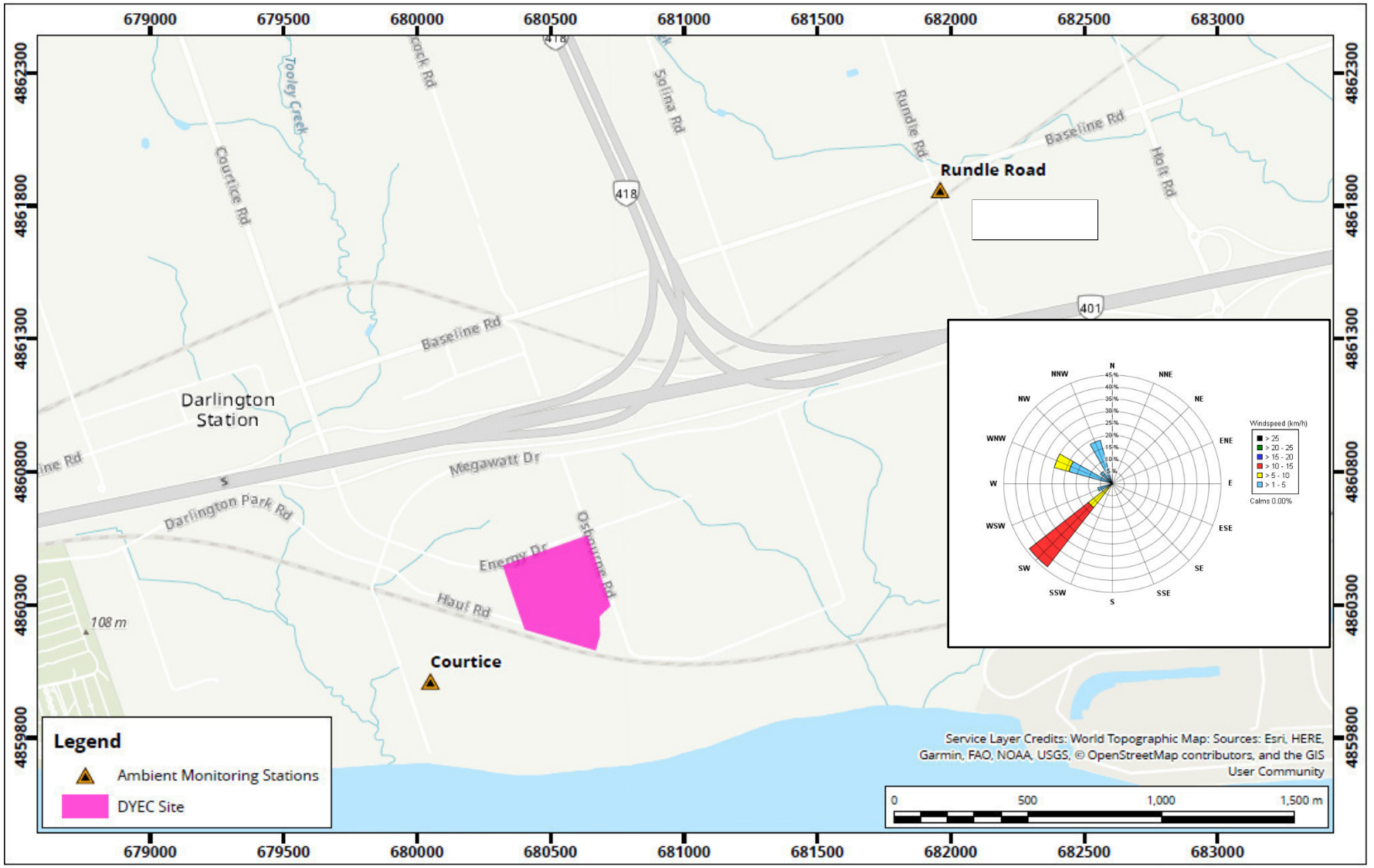
RWDI AIR Inc.

Claire Finoro, P.Eng., B.Sc. (Eng.)
Project Manager

CIF/kta

Attach.

ATTACHMENTS



DYEC Site and Ambient Monitoring Station Locations

True North

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

Drawn by:	Figure: 1
Approx. Scale:	1:20,000
Date Revised:	

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#:	L2647796		Guelph, ON, N1G 4P6
Date of Report	1-Dec-21		Canada
Date of Sample Receipt	6-Oct-21	**Client Contact:**	Claire Finoro
		Client Project ID:	DYEC

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

***** REVISED REPORT *****

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:
PAH targets edited on individual sample tabs to match COC

***** ORIGINAL COMMENTS *****

Sample "RUNDLE-DX/PAH-OCT01" (lab id L2647796-1) appears to be non compliant to the MECP (24 hour) criteria.

Multiple labeled surrogates (Extraction Standards) had recoveries that were below the method acceptance criteria. Native results (and sampling standards) calculated by Isotope Dilution are inherently recovery corrected so no impact to overall data quality is expected.

Certified by:

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		Method Blank		RUNDLE-DX/PAH-OCT01		COURTICE-DX/PAH-OCT01		BLANK-DX/PAH-OCT01		Laboratory Control Sample	
ALS Sample ID	WG3632387-1		WG3632387-4		L2647796-1		L2647796-2		L2647796-3		WG3632387-2	
Sample Size	1		1		1		1		1		1	
Sample units	sample		sample		sample		sample		sample		n/a	
Moisture Content	n/a		n/a		n/a		n/a		n/a		n/a	
Matrix	QC		QC		Puf		Puf		Puf		QC	
Sampling Date	n/a		n/a		1-Oct-21		1-Oct-21		1-Oct-21		n/a	
Extraction Date	8-Oct-21		9-Oct-21		10-Oct-21		11-Oct-21		12-Oct-21		13-Oct-21	
Target Analytes	ng/sample		ng/sample		ng/sample		ng/sample		ng/sample		%	
Naphthalene	253		175	B	8790		33700		356	B	261	B
2-Methylnaphthalene	24.5		12.6	B	3490		12300		90.1	B	116	B
1-Methylnaphthalene	12.3		7.03	B	2840		7470		53.3	B	123	
Acenaphthylene	<0.2	U	<0.2	U	233	M	399	R	<0.2	U	100	
Acenaphthene	<0.2	U	<0.2	U	599		3840		2.59		26	
Fluorene	<0.2	U	<0.2	U	576		2630		2.40		56	
Phenanthrene	2.53		<0.2	U	1410		4340		7.34	B	104	
Anthracene	<0.2	U	<0.2	U	106		222		<0.2	U	123	M
Fluoranthene	<0.2	U	<0.2	U	316		513		<0.2	U	93	
Pyrene	<0.2	U	<0.2	U	190		257		<0.2	U	93	
Benzo(a)Anthracene	<0.2	U	<0.2	U	24.3		11.2	M	<0.2	U	108	R
Chrysene	<0.2	U	<0.2	U	72.3		38.0		<0.2	U	100	
Benzo(b)Fluoranthene	<0.2	U	<0.2	U	68.0	M	24.5	M	<0.2	U	83	
Benzo(k)Fluoranthene	<0.2	U	<0.2	U	39.4	M	21.7	M	<0.2	U	112	M
Benzo(e)Pyrene	<0.2	U	<0.2	U	51.4	M	18.5		<0.2	U	93	
Benzo(a)Pyrene	<0.2	U	<0.2	U	18.3		13.4	M	<0.2	U	108	
Perylene	<0.2	U	<0.2	U	4.81	M	<0.2	U	<0.2	U	95	
Indeno(1,2,3-cd)Pyrene	<0.2	U	<0.2	U	27.0		15.0		<0.2	U	89	
Dibenzo(a,h)Anthracene	<0.2	U	<0.2	U	5.02		2.47		<0.2	U	96	
Benzo(g,h,i)Perylene	<0.2	U	<0.2	U	29.5		13.1	M	<0.2	U	87	
Additional Analytes												
Tetralin	46.2		17.9	B	709		609		64.7	M,B	NS	
Biphenyl	11.8		3.54	B	3040		4780		32.6	B	NS	
o-Terphenyl	<0.2	U	<0.2	U	2.80		4.03		<0.2	U	NS	
Benzo(a)fluorene	<0.2	U	<0.2	U	19.2	M	22.0	M	<0.2	U	NS	
Benzo(b)fluorene	<0.2	U	<0.2	U	12.0		15.3		<0.2	U	NS	
Field Sampling Standards	% Rec		% Rec		% Rec		% Rec		% Rec		% Rec	
1-Methylnaphthalene-D10	NS		NS		81		54	R	82		NS	
Fluorene D10	NS		NS		54		42		58		NS	
Terphenyl D14(Surr.)	NS		NS		111	R	115	R	108	R	NS	
Extraction Standards	% Rec		% Rec		% Rec		% Rec		% Rec		% Rec	
Naphthalene D8	3	R	6	R	2		5	M	3	M	6	R
2-Methylnaphthalene-D10	8		18		6		23		4		8	
Acenaphthylene D8	46		71		35		52		25		25	
Phenanthrene D10	138		155		71		93		81		119	
Anthracene-D10	99		125		55		81		67		83	
Fluoranthene D10	165		217		99	R	124	R	110	R	129	M
Benz(a)Anthracene-D12	131		232		89		136		116		118	
Chrysene D12	155	R	229	R	96	R	128	M	107	R	149	M
Benzo(b)Fluoranthene-D12	179		243		99		128		113		149	
Benzo(k)Fluoranthene-D12	113	R	154	R	72	R	98	M	74	M	108	
Benzo(a)Pyrene D12	109	R	178	R	69	R	117	M,R	93	R	99	R
Perylene D12	123		193		72		111		98		112	
Indeno(1,2,3,cd)Pyrene-D12	118		223		77		126		107		111	
Dibenz(a,h)Anthracene-D14	102		200		75	M	106		95		108	
Benzo(g,h,i)Perylene D12	133		223		85		129		109		128	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 compound was not spiked

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a
ALS Sample ID	WG3632387-1	Extraction Date	8-Oct-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3632387

Approved:
Peter Nguyen
--e-signature--
12-Nov-2021

Run Information	Run 1
Filename	211104A90.D
Run Date	11/9/2021 18:24
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.92	253	
2-Methylnaphthalene	3.53	24.5	
1-Methylnaphthalene	3.66	12.3	
Acenaphthylene	4.73	<0.2	U
Acenaphthene	5.04	<0.2	U
Fluorene	5.99	<0.2	U
Phenanthrene	8.24	2.53	
Anthracene	8.36	<0.2	U
Fluoranthene	11.68	<0.2	U
Pyrene	12.33	<0.2	U
Benzo(a)Anthracene	NotFnd	<0.2	U
Chrysene	NotFnd	<0.2	U
Benzo(b)Fluoranthene	NotFnd	<0.2	U
Benzo(k)Fluoranthene	NotFnd	<0.2	U
Benzo(e)Pyrene	NotFnd	<0.2	U
Benzo(a)Pyrene	NotFnd	<0.2	U
Perylene	NotFnd	<0.2	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<0.2	U
Dibenzo(a,h)Anthracene	NotFnd	<0.2	U
Benzo(g,h,i)Perylene	NotFnd	<0.2	U
Additional Analytes			
Tetralin	2.79	46.2	
Biphenyl	4.09	11.8	
o-Terphenyl	9.53	<0.2	U
Benzo(a)fluorene	NotFnd	<0.2	U
Benzo(b)fluorene	NotFnd	<0.2	U

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	100	2.90	3.4	R	50-150
2-Methylnaphthalene-D10	100	3.50	7.8		50-150
Acenaphthylene D8	100	4.71	45.6		50-150
Phenanthrene D10	100	8.19	137.9		50-150
Anthracene-D10	100	8.31	99.4		50-150
Fluoranthene D10	100	11.63	165.3		50-150
Benz(a)Anthracene-D12	100	16.18	130.5		50-150
Chrysene D12	100	16.30	155.0	R	50-150
Benzo(b)Fluoranthene-D12	100	19.52	178.6		50-150
Benzo(k)Fluoranthene-D12	100	19.60	112.7	R	50-150
Benzo(a)Pyrene D12	100	20.41	108.8	R	50-150
Perylene D12	100	20.65	122.9		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.32	118.1		50-150
Dibenz(a,h)Anthracene-D14	100	24.49	102.4		50-150
Benzo(g,h,i)Perylene D12	100	25.36	132.6		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.
NS	Indicates that this compound was not spiked

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a
ALS Sample ID	WG3632387-4	Extraction Date	9-Oct-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3632387

Approved:
Peter Nguyen
--e-signature--
12-Nov-2021

Run Information	Run 1
Filename	211104A91.D
Run Date	11/9/2021 19:02
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.92	175	B
2-Methylnaphthalene	3.53	12.6	B
1-Methylnaphthalene	3.66	7.03	B
Acenaphthylene	4.73	<0.2	U
Acenaphthene	5.04	<0.2	U
Fluorene	5.99	<0.2	U
Phenanthrene	8.24	<0.2	U
Anthracene	NotFnd	<0.2	U
Fluoranthene	NotFnd	<0.2	U
Pyrene	12.33	<0.2	U
Benzo(a)Anthracene	NotFnd	<0.2	U
Chrysene	NotFnd	<0.2	U
Benzo(b)Fluoranthene	NotFnd	<0.2	U
Benzo(k)Fluoranthene	NotFnd	<0.2	U
Benzo(e)Pyrene	NotFnd	<0.2	U
Benzo(a)Pyrene	NotFnd	<0.2	U
Perylene	NotFnd	<0.2	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<0.2	U
Dibenzo(a,h)Anthracene	NotFnd	<0.2	U
Benzo(g,h,i)Perylene	NotFnd	<0.2	U
Additional Analytes			
Tetralin	2.79	17.9	B
Biphenyl	4.09	3.54	B
o-Terphenyl	9.53	<0.2	U
Benzo(a)fluorene	13.49	<0.2	U
Benzo(b)fluorene	13.71	<0.2	U

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	100	2.91	5.5	R	50-150
2-Methylnaphthalene-D10	100	3.50	18.0		50-150
Acenaphthylene D8	100	4.71	70.9		50-150
Phenanthrene D10	100	8.19	155.3		50-150
Anthracene-D10	100	8.31	125.3		50-150
Fluoranthene D10	100	11.63	216.5		50-150
Benz(a)Anthracene-D12	100	16.18	231.6		50-150
Chrysene D12	100	16.29	229.4	R	50-150
Benzo(b)Fluoranthene-D12	100	19.52	243.3		50-150
Benzo(k)Fluoranthene-D12	100	19.61	154.2	R	50-150
Benzo(a)Pyrene D12	100	20.41	178.2	R	50-150
Perylene D12	100	20.66	192.6		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.32	222.9		50-150
Dibenz(a,h)Anthracene-D14	100	24.49	200.4		50-150
Benzo(g,h,i)Perylene D12	100	25.36	223.1		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.
NS	Indicates that this compound was not spiked

ALS Life Sciences

Sample Analysis Report

Sample Name	RUNDLE-DX/PAH-OCT01	Sampling Date	01-Oct-21 00:00
ALS Sample ID	L2647796-1	Extraction Date	10-Oct-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	WG3632387

Approved:
Peter Nguyen
--e-signature--
12-Nov-2021

Run Information	Run 1
Filename	211104A92.D
Run Date	11/9/2021 19:40
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.92	8790	
2-Methylnaphthalene	3.53	3490	
1-Methylnaphthalene	3.65	2840	
Acenaphthylene	4.73	233	M
Acenaphthene	5.04	599	
Fluorene	5.99	576	
Phenanthrene	8.24	1410	
Anthracene	8.36	106	
Fluoranthene	11.68	316	
Pyrene	12.33	190	
Benzo(a)Anthracene	16.25	24.3	
Chrysene	16.37	72.3	
Benzo(b)Fluoranthene	19.60	68.0	M
Benzo(k)Fluoranthene	19.65	39.4	M
Benzo(e)Pyrene	20.33	51.4	M
Benzo(a)Pyrene	20.47	18.3	
Perylene	20.72	4.81	M
Indeno(1,2,3-cd)Pyrene	24.41	27.0	
Dibenzo(a,h)Anthracene	24.62	5.02	
Benzo(g,h,i)Perylene	25.48	29.5	
Additional Analytes			
Tetralin	2.79	709	
Biphenyl	4.09	3040	
o-Terphenyl	9.53	2.80	
Benzo(a)fluorene	13.50	19.2	M
Benzo(b)fluorene	13.72	12.0	

Field Sampling Standards	ng spiked		% Rec		
1-Methylnaphthalene-D10	300	3.62	81		
Fluorene D10	300	5.93	54		
Terphenyl D14(Surr.)	300	13.13	111	R	

Extraction Standards			% Rec		Limits
Naphthalene D8	100	2.90	2.4		50-150
2-Methylnaphthalene-D10	100	3.50	6.2		50-150
Acenaphthylene D8	100	4.71	34.8		50-150
Phenanthrene D10	100	8.19	71.0		50-150
Anthracene-D10	100	8.31	55.2		50-150
Fluoranthene D10	100	11.63	98.6	R	50-150
Benz(a)Anthracene-D12	100	16.18	88.9		50-150
Chrysene D12	100	16.30	95.8	R	50-150
Benzo(b)Fluoranthene-D12	100	19.52	99.1		50-150
Benzo(k)Fluoranthene-D12	100	19.61	71.8	R	50-150
Benzo(a)Pyrene D12	100	20.41	68.9	R	50-150
Perylene D12	100	20.66	72.4		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.32	77.4		50-150
Dibenz(a,h)Anthracene-D14	100	24.49	74.7	M	50-150
Benzo(g,h,i)Perylene D12	100	25.36	84.8		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-OCT01	Sampling Date	01-Oct-21 00:00
ALS Sample ID	L2647796-2	Extraction Date	11-Oct-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	WG3632387

Approved:
Peter Nguyen
--e-signature--
12-Nov-2021

Run Information	Run 1	Run 2
Filename	211104A93.D	
Run Date	11/9/2021 20:17	
Final Volume	0.1 mL	
Dilution Factor	1	
Analysis Units	ng/sample	
Instrument	MSD-5	
Column	HP-5MS US1263126H	

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.92	33700	
2-Methylnaphthalene	3.53	12300	
1-Methylnaphthalene	3.66	7470	
Acenaphthylene	4.73	399	R
Acenaphthene	5.04	3840	
Fluorene	6.00	2630	
Phenanthrene	8.25	4340	
Anthracene	8.36	222	
Fluoranthene	11.69	513	
Pyrene	12.33	257	
Benzo(a)Anthracene	16.25	11.2	M
Chrysene	16.37	38.0	
Benzo(b)Fluoranthene	19.60	24.5	M
Benzo(k)Fluoranthene	19.65	21.7	M
Benzo(e)Pyrene	20.33	18.5	
Benzo(a)Pyrene	20.47	13.4	M
Perylene	20.72	<0.2	U
Indeno(1,2,3-cd)Pyrene	24.41	15.0	
Dibenzo(a,h)Anthracene	24.62	2.47	
Benzo(g,h,i)Perylene	25.48	13.1	M
Additional Analytes			
Tetralin	2.79	609	
Biphenyl	4.09	4780	
o-Terphenyl	9.53	4.03	
Benzo(a)fluorene	13.50	22.0	M
Benzo(b)fluorene	13.72	15.3	

Field Sampling Standards	ng spiked		% Rec		Limits
1-Methylnaphthalene-D10	300	3.62	54	R	
Fluorene D10	300	5.93	42		
Terphenyl D14(Surr.)	300	13.13	115	R	
Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	100	2.90	4.9	M	50-150
2-Methylnaphthalene-D10	100	3.50	23.4		50-150
Acenaphthylene D8	100	4.71	52.3		50-150
Phenanthrene D10	100	8.19	92.8		50-150
Anthracene-D10	100	8.32	81.1		50-150
Fluoranthene D10	100	11.63	124.1	R	50-150
Benz(a)Anthracene-D12	100	16.18	136.0		50-150
Chrysene D12	100	16.30	128.1	M	50-150
Benzo(b)Fluoranthene-D12	100	19.52	127.5		50-150
Benzo(k)Fluoranthene-D12	100	19.61	97.5	M	50-150
Benzo(a)Pyrene D12	100	20.41	117.1	M R	50-150
Perylene D12	100	20.66	110.7		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.32	125.7		50-150
Dibenz(a,h)Anthracene-D14	100	24.49	105.5		50-150
Benzo(g,h,i)Perylene D12	100	25.36	128.7		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	BLANK-DX/PAH-OCT01	Sampling Date	01-Oct-21 00:00
ALS Sample ID	L2647796-3	Extraction Date	12-Oct-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	WG3632387

Approved:
Peter Nguyen
--e-signature--
12-Nov-2021

Run Information	Run 1
Filename	211104A94.D
Run Date	11/9/2021 20:55
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.92	356	B
2-Methylnaphthalene	3.53	90.1	B
1-Methylnaphthalene	3.66	53.3	B
Acenaphthylene	4.73	<0.2	U
Acenaphthene	5.04	2.59	
Fluorene	5.99	2.40	
Phenanthrene	8.24	7.34	B
Anthracene	8.36	<0.2	U
Fluoranthene	11.68	<0.2	U
Pyrene	12.33	<0.2	U
Benzo(a)Anthracene	NotFnd	<0.2	U
Chrysene	NotFnd	<0.2	U
Benzo(b)Fluoranthene	NotFnd	<0.2	U
Benzo(k)Fluoranthene	NotFnd	<0.2	U
Benzo(e)Pyrene	NotFnd	<0.2	U
Benzo(a)Pyrene	NotFnd	<0.2	U
Perylene	NotFnd	<0.2	U
Indeno(1,2,3-cd)Pyrene	24.41	<0.2	U
Dibenzo(a,h)Anthracene	NotFnd	<0.2	U
Benzo(g,h,i)Perylene	NotFnd	<0.2	U
Additional Analytes			
Tetralin	2.80	64.7 M	B
Biphenyl	4.09	32.6	B
o-Terphenyl	9.53	<0.2	U
Benzo(a)fluorene	NotFnd	<0.2	U
Benzo(b)fluorene	NotFnd	<0.2	U

Field Sampling Standards	ng spiked		% Rec		
1-Methylnaphthalene-D10	300	3.62	82		
Fluorene D10	300	5.93	58		
Terphenyl D14(Surr.)	300	13.13	108	R	

Extraction Standards			% Rec		Limits
Naphthalene D8	100	2.91	3.0 M		50-150
2-Methylnaphthalene-D10	100	3.50	4.2		50-150
Acenaphthylene D8	100	4.71	24.5		50-150
Phenanthrene D10	100	8.19	81.4		50-150
Anthracene-D10	100	8.32	66.8		50-150
Fluoranthene D10	100	11.63	110.1	R	50-150
Benz(a)Anthracene-D12	100	16.18	115.5		50-150
Chrysene D12	100	16.30	107.3	R	50-150
Benzo(b)Fluoranthene-D12	100	19.52	112.8		50-150
Benzo(k)Fluoranthene-D12	100	19.60	73.6 M		50-150
Benzo(a)Pyrene D12	100	20.41	93.1	R	50-150
Perylene D12	100	20.66	97.7		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.32	107.4		50-150
Dibenz(a,h)Anthracene-D14	100	24.49	94.8		50-150
Benzo(g,h,i)Perylene D12	100	25.36	108.9		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	WG3632387-2	Extraction Date	13-Oct-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	WG3632387

Approved:
Peter Nguyen
--e-signature--
12-Nov-2021

Run Information	Run 1
Filename	211104A88.D
Run Date	11/9/2021 17:08
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	ug spiked	Ret. Time	%	Flags	Limits
Naphthalene	100	2.91	261.2	B	50-150
2-Methylnaphthalene	100	3.53	116.4	B	50-150
1-Methylnaphthalene	100	3.65	123.3		50-150
Acenaphthylene	100	4.73	100.3		50-150
Acenaphthene	100	5.03	25.6		50-150
Fluorene	100	5.99	56.3		50-150
Phenanthrene	100	8.24	103.7		50-150
Anthracene	100	8.36	123	M	50-150
Fluoranthene	100	11.69	93.2		50-150
Pyrene	100	12.34	93.4		50-150
Benzo(a)Anthracene	100	16.24	108.3	R	50-150
Chrysene	100	16.37	100.4		50-150
Benzo(b)Fluoranthene	100	19.59	82.9		50-150
Benzo(k)Fluoranthene	100	19.66	112.1	M	50-150
Benzo(e)Pyrene	100	20.33	93.1		50-150
Benzo(a)Pyrene	100	20.47	108.2		50-150
Perylene	100	20.72	95.2		50-150
Indeno(1,2,3-cd)Pyrene	100	24.41	89.3		50-150
Dibenzo(a,h)Anthracene	100	24.62	95.7		50-150
Benzo(g,h,i)Perylene	100	25.48	87		50-150
Additional Analytes					
Tetralin	100	2.79	42.5	M B	
Biphenyl	100	4.09	239.2		
o-Terphenyl	100	NotFnd	0	M R	
Benzo(a)fluorene	100	13.44	0.4		
Benzo(b)fluorene	100	NotFnd	0	M R	
Field Sampling Standards	**ng spiked**		**% Rec**		
1-Methylnaphthalene-D10			NS		
Fluorene D10			NS		
Terphenyl D14(Surr.)			NS		
Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	100	2.90	5.7	R	30-150
2-Methylnaphthalene-D10	100	3.49	7.7		30-150
Acenaphthylene D8	100	4.70	25.1		30-150
Phenanthrene D10	100	8.19	118.6		50-150
Anthracene-D10	100	8.31	82.7		50-150
Fluoranthene D10	100	11.63	129.2	M	50-150
Benz(a)Anthracene-D12	100	16.18	118.0		50-150
Chrysene D12	100	16.29	149.0	M	50-150
Benzo(b)Fluoranthene-D12	100	19.52	148.7		50-150
Benzo(k)Fluoranthene-D12	100	19.61	108.4		50-150
Benzo(a)Pyrene D12	100	20.41	98.6	R	30-150
Perylene D12	100	20.66	112.2		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	24.31	111.0		50-150
Dibenz(a,h)Anthracene-D14	100	24.49	108.0		50-150
Benzo(g,h,i)Perylene D12	100	25.36	128.0	M	50-150

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

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2647796-COFC
and L2647808

COC Number: 17 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	RWDI
Contact:	Matt Lantz
Phone:	519 823 1311
	Company address below will appear on the final report
Street:	600 Southgate Drive
City/Province:	Guelph, Ontario
Postal Code:	N1G 4P6
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	Matt.Lantz@rwdi.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Standard TAT is 15 business days. DTOX analysis standard TAT is 5 business days

PRIORITY (Business Days)		EMERGENCY	
	15 day [R- Regular] ☐		5 Business day - DTOX [R - Regular]
	10 day [P-50%] ☐		3 Business day - DTOX [E - 100%]
	5 day [E-100%] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information	
ALS Account # / Quote #:	
Job #:	DYEC
PO / AFE:	1803743 Phase 1000
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: Martin Town

Analysis Request

NUMBER OF CONTAINERS

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

SAMPLES ON HOLD

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	TSP, ICP on Hi-Vol Filter	PAH	DX
1	L2642554-2 - Rundle	323	01-Oct-21	24hr	Air		X	X
1	741858	1714	25-Oct-21	24hr	Air	X		
2	742042	1697	01-Oct-21	24hr	Air	X		
2	L2642554-3 - Courtice	330	01-Oct-21	24hr	Air		X	X
3	741857	1650	25-Sep-21	24hr	Air	X		
4	742041	1679	01-Oct-21	24hr	Air	X		
3	L2642554-4 - Blank		01-Oct-21	24hr	Air		X	X
5	742045		01-Oct-21	24hr	Air	X		
				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 °C
7.2°C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: M Town	Date: 05-Oct-21	Time: 11:45	Received by:	Date: 6-Oct-21	Time: 9:35	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 20

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.

21.9°C

Table B6: 2021 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	1 Oct 21	No. > Criteria
1-Methylnaphthalene	ng/m^3	*12000*	8.79	0
2-Methylnaphthalene	ng/m^3	*10000*	10.80	0
10/1/2021	ng/m^3	-	1.85	-
Acenaphthylene	ng/m^3	*3500*	0.72	0
Anthracene	ng/m^3	*200*	0.33	0
Benzo(a)Anthracene	ng/m^3	-	0.08	-
Benzo(a)fluorene	ng/m^3	-	0.06	-
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	0.06	1
Benzo(b)fluorene	ng/m^3	-	0.04	-
Benzo(e)Pyrene	ng/m^3	-	0.16	-
Benzo(g,h,i)Perylene	ng/m^3	-	0.09	-
Benzo(k)Fluoranthene	ng/m^3	-	0.12	-
Biphenyl	ng/m^3	-	9.41	-
Chrysene	ng/m^3	-	0.22	-
Dibenzo(a,h)Anthracene	ng/m^3	-	0.02	-
Fluoranthene	ng/m^3	-	0.98	-
Fluorene	ng/m^3	-	1.78	-
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	0.08	-
Naphthalene	ng/m^3	*22500*	27.21	0
o-Terphenyl	ng/m^3	-	0.01	-
Perylene	ng/m^3	-	0.01	-
Phenanthrene	ng/m^3	-	4.37	-
Pyrene	ng/m^3	-	0.59	-
Tetralin	ng/m^3	-	2.20	-
Total PAH[4]	ng/m^3	-	69.98	-

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

Station: RofD Rundle Daily: 01/10/2021 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM2.5	NO	NO2	NOX	SO2	Batt Min	Temperature	Rain	Tr_Temp	RH AVG	Rain total	WS km/hr	WD	Hi-Vol Pressure	PUF Pressure	Temperature	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
1/10/2021 0:00	2.9	0	0.2	0	0	13.2	7.4	0	22.5	89.1	0	3.07	318	4.1	55.81	280.596	41.86	8.19
1/10/2021 1:00	2.4	0	0.2	0	0	13.2	8.1	0	22.4	82.8	0	2.78	292	4.14	55.34	281.26	42.02	8.15
1/10/2021 2:00	2.2	0.3	0.2	0.4	0	13.2	7.4	0	22.3	90.5	0	1.12	<Samp	4.17	55.88	280.528	42.21	8.2
1/10/2021 3:00	2.3	0.4	1.1	1.3	0	13.2	8.7	0	22.5	80.9	0	3.67	329	4.17	55.62	281.805	42.14	8.16
1/10/2021 4:00	2.2	0.2	0.2	0.4	0	13.2	7.3	0	22.4	92.5	0	1.55	<Samp	4.16	54.86	280.502	42.18	8.13
1/10/2021 5:00	2.4	0.3	0.5	0.6	0	13.2	9	0	22.7	88.2	0	3.71	330	4.14	53.3	282.138	41.98	8
1/10/2021 6:00	2.6	0.1	1	0.8	0	13.2	9.9	0	23.3	83.6	0	4.71	300	4.12	52.98	283.074	41.79	7.97
1/10/2021 7:00	4	1.2	1.3	2.5	0	13.2	11.2	0	23.3	79.4	0	3.78	292	4.14	53.34	284.354	41.81	7.98
1/10/2021 8:00	2.4	0.3	0.4	0.6	0	13.2	13.9	0	22.9	65.3	0	4.38	342	4.12	52.28	287.078	41.47	7.87
1/10/2021 9:00	1.8	0	0	0	0	13.2	14.8	0	22.8	58.2	0	5.59	300	4.1	51.71	287.893	41.34	7.82
1/10/2021 10:00	2	1.6	2	3.5	0.011	13.2	15.2	0	22.9	57.9	0	6.58	215	4.04	50.86	288.307	40.98	7.76
1/10/2021 11:00	2.2	0.4	1.3	1.7	0.017	13.2	15.1	0	22.9	59.1	0	12	226	4.07	51.23	288.235	41.14	7.78
1/10/2021 12:00	3	0.7	1.8	2.5	0.444	13.2	15.4	0	23.1	60.4	0	13.45	228	4.07	51.37	288.509	41.11	7.79
1/10/2021 13:00	4.3	1.2	3.4	4.6	0.491	13.2	15.7	0	22.9	62.2	0	13.73	230	4.07	51.58	288.794	41.09	7.8
1/10/2021 14:00	5.3	0.9	3.5	4.4	0.805	13.2	16	0	22.9	65.5	0	13.16	227	4.06	51.51	289.133	41.03	7.79
1/10/2021 15:00	4.6	1	4.7	5.7	1.171	13.2	16.4	0	23	66.8	0	11.08	229	4.06	51.61	289.549	41.02	7.79
1/10/2021 16:00	4.4	0.9	6.4	7.3	1.231	13.2	16.5	0	22.9	69	0	7.94	234	4.05	51.01	289.663	40.96	7.75
1/10/2021 17:00	3.5	0.1	6.5	6.5	0.811	13.2	15.4	0	23.1	75.7	0	3.15	252	4.07	51.09	288.563	41.11	7.77
1/10/2021 18:00	4	2.4	5.1	7.4	0.165	13.2	12.9	0	23	85.9	0	0.76	<Samp	4.12	51.23	285.991	41.58	7.81
1/10/2021 19:00	4.5	0.9	3.2	3.7	0.065	13.2	11.5	0	23.4	99.4	0	0.02	<Samp	4.16	51.87	284.631	41.89	7.87
1/10/2021 20:00	8.8	0	2.7	2.4	0.004	13.2	10.8	0	23.2	100	0	1.06	<Samp	4.17	52.36	283.974	41.97	7.91
1/10/2021 21:00	16.4	0	2.6	2.4	0	13.2	10.4	0	23.2	100	0	1.27	<Samp	4.17	52.18	283.539	42.01	7.91
1/10/2021 22:00	16	0	2.4	1.9	0.023	13.2	10.7	0	23.3	100	0	1.35	<Samp	4.17	53.13	283.877	41.97	7.97
1/10/2021 23:00	10.6	0.3	1.6	1.7	0.023	13.2	11.7	0	23.2	100	0	1.08	<Samp	4.16	53.15	284.814	41.86	7.96
Minimum	1.8	0	0	0	0	13.2	7.3	0	22.3	57.9	0	0.02	215	4.04	50.86	280.502	40.96	7.75
MinDate	9:00	0:00	9:00	0:00	0:00	0:00	4:00	0:00	2:00	10:00	0:00	19:00	10:00	10:00	10:00	4:00	16:00	16:00
Maximum	16.4	2.4	6.5	7.4	1.231	13.2	16.5	0	23.4	100	0	13.73	342	4.17	55.88	289.663	42.21	8.2
MaxDate	21:00	18:00	17:00	18:00	16:00	0:00	16:00	0:00	19:00	20:00	0:00	13:00	8:00	2:00	2:00	16:00	2:00	2:00
Avg	4.8	0.6	2.2	2.6	0.219	13.2	12.1	0	22.9	79.7	0	5.04	272	4.12	52.72	285.284	41.61	7.92
Num	24	24	24	24	24	24	24	24	24	24	24	24	16	24	24	24	24	24
Data[%]	100	100	100	100	100	100	100	100	100	100	100	100	66.67	100	100	100	100	100
STD	4	0.6	1.9	2.3	0.4	No Data	3.1	0	0.3	14.8	0	4.4	43.9	0	1.6	3.1	0.4	0.1

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MEMORANDUM

DATE:	2021-10-13	**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
RE:	**Exceedance Report – Benzo(a)Pyrene October 13, 2021** **Region of Durham, DYEC**	

On December 1, 2021 the results from ALS Environmental were received regarding the PAH results from the October 13, 2021 sampling event. On December 2, 2021, the results were entered and assessed, and it was found that there were two (2) measured Benzo(a)Pyrene (BaP) concentrations in excess of the 24-hour AAQC on the October 13th sampling date.

October 13, 2021

On Wednesday, October 13, 2021, there were two (2) exceedances of the BaP 24-hour AAQC, which occurred at the Courtice and Rundle Road Stations, measured at the onsite PUF PS-1 samplers. Attached is a figure depicting the wind rose (indicating the wind speed and direction during the sampling day), and the location of the sampling stations relative to the DYEC.

The following summarizes the BaP concentrations and onsite conditions during the October 13th sampling date:

1. The guideline concentration for BaP is 0.00005 ug/m^3. The measured concentrations at the Courtice sampler was 0.000062 µg/m^3 and the Rundle Road sampler was 0.000073 µg/m^3.
2. During the sampling day the wind was predominantly from the WSW, as recorded at the Courtice and Rundle Road Meteorological Towers. One-hour average wind speeds at the Courtice Meteorological Tower ranged from 2.33 km/h to 12.30 km/h and at the Rundle Road Meteorological Tower from 0.97 km/h to 12.61 km/h.
3. The Courtice meteorological data suggests that the Courtice Station was upwind of the DYEC during the sampling period. Since the winds were predominantly coming from the WSW, it is unlikely that the measured BaP exceedance is attributable to the Energy Centre operations.

5. The Rundle Road meteorological data suggests that the Rundle Road Station was downwind of the DYEC during part of the sampling period. Since the winds were predominantly coming from the WSW, it is possible that the measured BaP exceedance is partially attributable to the Energy Centre operations.

At the Courtice Station, the NO_2 hourly values were less than 10% of the criteria for the same period. The $PM_{2.5}$ 24-hour average value was 4.3 micrograms per cubic metre at the Courtice Station.

At the Rundle Road Station, the NO_2 hourly values were less than 7% of the criteria for the same period. The $PM_{2.5}$ 24-hour average value was 6.5 micrograms per cubic metre at the Rundle Road Station.

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

Respectfully submitted by:

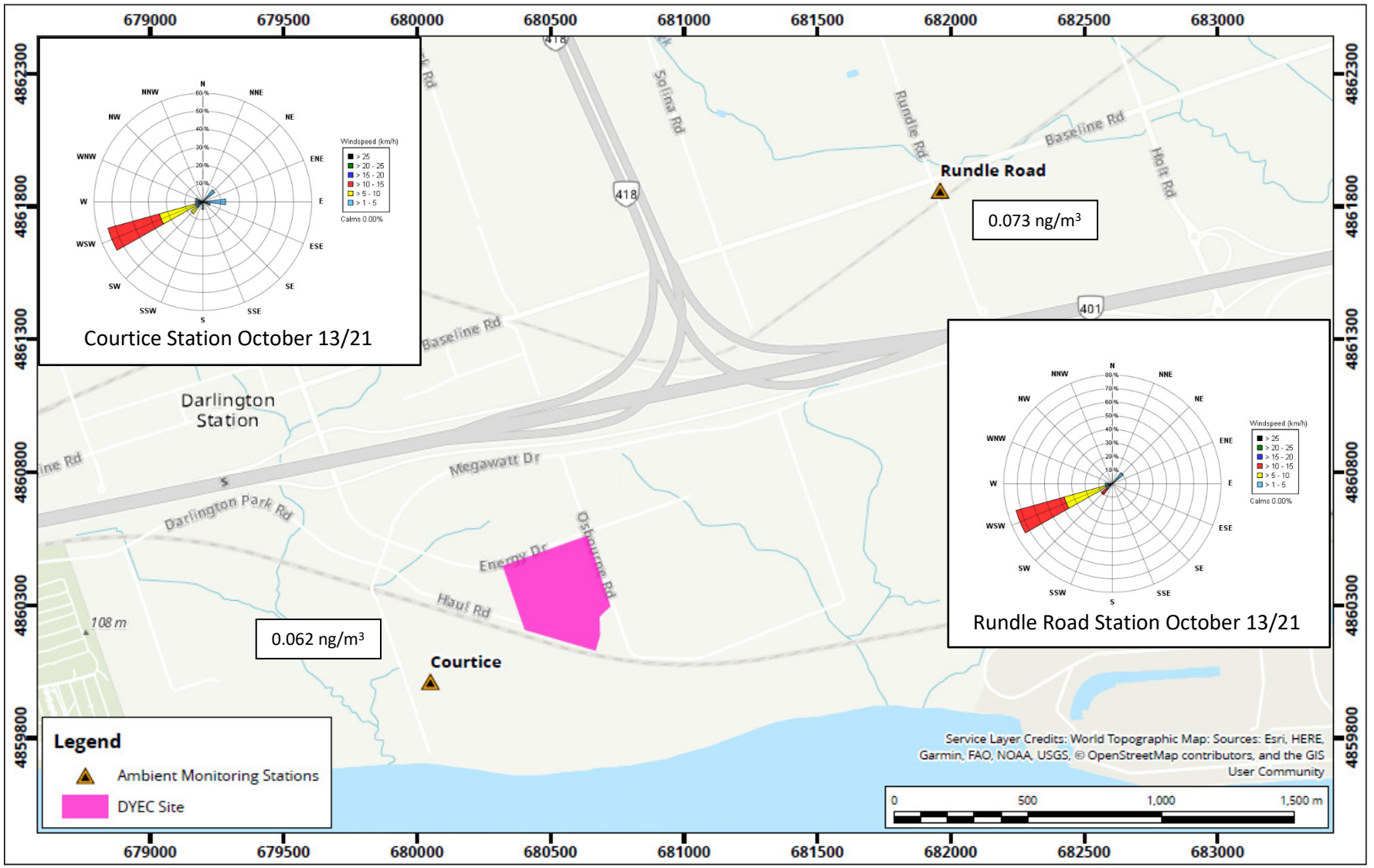
RWDI AIR Inc.

Claire Finoro, P.Eng., B.Sc. (Eng.)
Project Manager

CIF/kta

Attach.

ATTACHMENTS



DYEC Site and Ambient Monitoring Station Locations

True North

Drawn by: DAJH | Figure: 1

Approx. Scale: 1:20,000

Date Revised: Dec 8, 2021

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

Table B5: 2021 Courtice Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	13 Oct 21	No. > Criteria
1-Methylnaphthalene	ng/m^3	*12000*	9.18	0
2-Methylnaphthalene	ng/m^3	*10000*	15.62	0
10/1/2021	ng/m^3	-	7.67	-
Acenaphthylene	ng/m^3	*3500*	0.31	0
Anthracene	ng/m^3	*200*	0.41	0
Benzo(a)Anthracene	ng/m^3	-	0.06	-
Benzo(a)fluorene	ng/m^3	-	0.08	-
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	0.06	1
Benzo(b)fluorene	ng/m^3	-	0.11	-
Benzo(e)Pyrene	ng/m^3	-	0.06	-
Benzo(g,h,i)Perylene	ng/m^3	-	0.07	-
Benzo(k)Fluoranthene	ng/m^3	-	0.06	-
Biphenyl	ng/m^3	-	0.08	-
Chrysene	ng/m^3	-	4.10	-
Dibenzo(a,h)Anthracene	ng/m^3	-	0.20	-
Fluoranthene	ng/m^3	-	0.01	-
Fluorene	ng/m^3	-	1.54	-
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	4.67	-
Naphthalene	ng/m^3	*22500*	0.06	0
o-Terphenyl	ng/m^3	-	51.42	-
Perylene	ng/m^3	-	0.03	-
Phenanthrene	ng/m^3	-	0.01	-
Pyrene	ng/m^3	-	7.32	-
Tetralin	ng/m^3	-	0.71	-
Total PAH[4]	ng/m^3	-	103.82	-

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

Station: RofD Courtice Daily: 13/10/2021 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM2.5	NO	NO2	NOX	SO2	Batt Min	Temperature	Rain	Tr_Temp	RH AVG	Rain total	WS km/hr	WD	Hi-Vol Pressure	PUF Pressure	Temperature	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
13/10/2021 00:00	3.3	0	0.9	0.6	0.408	4.17	19.085	0	22.6	100	29.62	4.17	123	3.59	46.08	292.235	39.41	7.88
13/10/2021 01:00	3.3	0.3	0.6	0.8	0.42	4.41	18.445	0	22.9	100	29.62	4.41	248	3.64	47.13	291.595	39.82	7.97
13/10/2021 02:00	3.4	0.1	1	1	0.386	6.53	18.091	0	22.8	100	29.63	6.53	249	3.67	47.93	291.241	40.02	8.04
13/10/2021 03:00	3.6	0	1.6	1.3	0.448	8.84	18.036	0	22.6	100	29.64	8.84	246	3.68	48.02	291.186	40.11	8.05
13/10/2021 04:00	3.9	0.1	2.3	2.4	0.631	9.69	18.108	0	22.9	100	29.65	9.69	244	3.69	47.6	291.258	40.13	8.01
13/10/2021 05:00	4.3	0.4	3.1	3.4	0.73	11.23	18.076	0	22.8	100	29.66	11.23	241	3.69	47.15	291.226	40.19	7.98
13/10/2021 06:00	4.7	0.4	3.4	3.9	1.009	11.34	18.023	0	22.6	100	29.67	11.34	245	3.69	47	291.173	40.18	7.97
13/10/2021 07:00	4.2	0.4	3.3	3.7	0.975	10.61	18.065	0	23	100	29.67	10.61	249	3.69	46.9	291.215	40.19	7.97
13/10/2021 08:00	4.3	0.8	4.6	5.4	1.383	11.35	18.201	0	22.6	100	29.68	11.35	247	3.68	46.79	291.351	40.13	7.96
13/10/2021 09:00	4.4	1.7	5.4	7.1	1.989	12.3	18.291	0	23	100	29.68	12.3	239	3.69	47.52	291.441	40.14	8.01
13/10/2021 10:00	4.7	1.8	4.8	6.6	1.227	11.51	18.735	0	22.8	100	29.67	11.51	247	3.68	47.82	291.885	40.07	8.03
13/10/2021 11:00	5.3	2.5	4	6.4	1.061	11.18	19.338	0	22.8	99.7	29.67	11.18	249	3.67	47.46	292.488	39.98	7.99
13/10/2021 12:00	5.7	1.8	4.5	6.3	1.023	9.27	19.174	0	22.8	100	29.67	9.27	238	3.67	47.64	292.324	39.96	8.01
13/10/2021 13:00	5.6	2.1	4.7	6.8	1.065	8.39	19.165	0	22.8	100	29.66	8.39	227	3.67	48.02	292.315	39.94	8.03
13/10/2021 14:00	5.2	0.9	6.5	7.2	1.37	6.09	18.865	0	22.7	100	29.66	6.09	252	3.66	48.12	292.015	39.95	8.05
13/10/2021 15:00	5.6	1.2	11.7	12.9	1.444	3.4	18.802	0.23	22.9	100	29.67	3.4	229	3.64	48.15	291.952	39.85	8.05
13/10/2021 16:00	4.5	0.3	4	4.2	1.141	2.84	18.667	0.03	22.7	100	29.67	2.84	183	3.65	47.75	291.817	39.88	8.02
13/10/2021 17:00	3.7	0.3	5.4	5.6	0.749	2.62	18.611	0	22.8	100	29.67	2.62	280	3.61	47.14	291.761	39.65	7.98
13/10/2021 18:00	4.3	3.3	18.6	21.9	0.735	2.33	18.38	0	22.8	100	29.68	2.33	301	3.6	47.06	291.53	39.63	7.98
13/10/2021 19:00	4.1	1.4	14.8	16.1	4.084	2.67	18.452	0	22.8	100	29.68	2.67	53	3.61	47.17	291.602	39.71	7.98
13/10/2021 20:00	3.8	3.7	14	17.7	2.38	2.44	17.984	0	22.7	100	29.69	2.44	79	3.61	47.48	291.134	39.73	8.01
13/10/2021 21:00	4.5	4.3	16.3	20.6	2.168	2.73	18.161	0	22.9	100	29.68	2.73	91	3.63	47.86	291.311	39.84	8.04
13/10/2021 22:00	4.4	8.7	17	25.8	1.42	3.41	18.024	0	22.7	100	29.67	3.41	97	3.63	48.16	291.174	39.83	8.06
13/10/2021 23:00	3.3	1.8	9.7	11.4	2.029	4.03	17.808	0	22.9	100	29.66	4.03	38	3.64	48.33	290.958	39.89	8.08
Minimum	3.3	0	0.6	0.6	0.386	2.33	17.808	0	22.6	99.7	29.62	2.33	38	3.59	46.08	290.958	39.41	7.88
MinDate	00:00	00:00	01:00	00:00	02:00	18:00	23:00	00:00	00:00	11:00	00:00	18:00	23:00	00:00	00:00	23:00	00:00	00:00
Maximum	5.7	8.7	18.6	25.8	4.084	12.3	19.338	0.23	23	100	29.69	12.3	301	3.69	48.33	292.488	40.19	8.08
MaxDate	12:00	22:00	18:00	22:00	19:00	9:00	11:00	15:00	07:00	00:00	20:00	09:00	18:00	04:00	23:00	11:00	05:00	23:00
Avg	4.3	1.6	6.8	8.3	1.261	6.81	18.441	0.01	22.8	100	29.66	6.81	204	3.65	47.51	291.591	39.93	8.01
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	0.7	1.9	5.4	7	0.8	3.6	0.4	0	0.1	0.1	0	3.6	75.4	0	0.5	0.5	0.2	0

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:**	200 Southgate Dr.
ALS WO#:	L2652496		Guelph, ON. N1G 4P6
Date of Report	1-Dec-21		Canada
Date of Sample Receipt	22-Oct-21	**Client Contact:**	Claire Finoro
		Client Project ID:	DYEC

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

The client samples appear to be non compliant to the MECP (24 hour) criteria.

The samples were received in good condition at 16.6 degrees C., which is above the recommended transportation and storage temperature. However, the brief period at above the recommended temperature is not expected to bias the sample results

Certified by.

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		Method Blank		RUNDLE-PAH-OCT13		COURTICE-PAH-OCT13		Laboratory Control Sample	
ALS Sample ID	WG3641000-1		WG3641000-4		L2652496-1		L2652496-2		WG3641000-2	
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		13-Oct-21		13-Oct-21		n/a	
Extraction Date	24-Oct-21		24-Oct-21		24-Oct-21		24-Oct-21		24-Oct-21	
Target Analytes	ng/sample		ng/sample		ng/sample		ng/sample		%	
Naphthalene	26.3		2.89	RB	14800		16300	M	133	M,B
2-Methylnaphthalene	5.65		<0.20	U	4130		4950		85.3	
1-Methylnaphthalene	3.74		0.460	B	2700		2910		94.7	
Acenaphthylene	0.380	R	<0.20	U	106	M	98.8	M	94.2	
Acenaphthene	1.26		<0.20	U	1530		2430		90.3	
Fluorene	1.34		0.250	B	1320		1480		87.9	
Phenanthrene	4.46		1.01	B	2300		2320		100.3	
Anthracene	0.310		0.210	B	129		129	M	114.1	
Fluoranthene	1.03	R	<0.20	U	613		489		90.9	
Pyrene	0.810		<0.20	U	278		225		87	
Benzo(a)Anthracene	<0.20	U	<0.20	U	19.2		18.4		104.5	
Chrysene	<0.20	U	<0.20	U	63.4		62.7		93.1	
Benzo(b)Fluoranthene	<0.20	U	<0.20	U	36.0	M	34.0	M	83.3	
Benzo(k)Fluoranthene	<0.20	U	<0.20	U	28.8	M	24.7	M	101	
Benzo(e)Pyrene	<0.20	U	<0.20	U	24.6		22.5		97.3	
Benzo(a)Pyrene	<0.20	U	<0.20	U	23.2		19.5		105.9	
Perylene	<0.20	U	<0.20	U	2.90		2.62		91.1	
Indeno(1,2,3-cd)Pyrene	<0.20	U	<0.20	U	20.6		18.9		81.1	
Dibenzo(a,h)Anthracene	<0.20	U	<0.20	U	4.79		4.75	M	77.9	
Benzo(g,h,i)Perylene	<0.20	U	<0.20	U	20.6	M	17.8	M	83.4	
Additional Analytes										
Tetralin	7.11		<0.20	U	978		1250		NS	
Biphenyl	3.00		1.39	M,B	1180		1300		NS	
o-Terphenyl	<0.20	U	<0.20	U	11.2	M	10.4	M	NS	
Benzo(a)fluorene	<0.20	U	<0.20	U	24.0	M	24.4	M	NS	
Benzo(b)fluorene	<0.20	U	<0.20	U	19.4		17.9		NS	
Field Sampling Standards	% Rec		% Rec		% Rec		% Rec		% Rec	
1-Methylnaphthalene-D10	NS		NS		46		62		NS	
Fluorene D10	NS		NS		205		111		NS	
Terphenyl D14(Surr.)	NS		NS		85		120		NS	
Extraction Standards	% Rec		% Rec		% Rec		% Rec		% Rec	
Naphthalene D8	66		31		41	M	44	M	53	M
2-Methylnaphthalene-D10	85		38		58		62	M	82	M
Acenaphthylene D8	60		26		41		36		70	
Phenanthrene D10	96		34		84	M	75	M	92	
Anthracene-D10	59		21		54	R	44		60	
Fluoranthene D10	94		31		85		73	M	101	
Benz(a)Anthracene-D12	60		17		75		62		72	
Chrysene D12	81	R	23	M	81	M	69	M	103	R
Benzo(b)Fluoranthene-D12	75		23		77		62		86	
Benzo(k)Fluoranthene-D12	48	R	18	M	56	M	45	M	67	R
Benzo(a)Pyrene D12	46	R	16		57	M	40	M	55	R
Perylene D12	48		14	M	56		42		58	
Indeno(1,2,3,cd)Pyrene-D12	51		14		57		44		55	
Dibenz(a,h)Anthracene-D14	44	M	11	M	53	M	43	M	53	M
Benzo(g,h,i)Perylene D12	69	M	19	M	65	M	52	M	73	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 compound was not spiked

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a
ALS Sample ID	WG3641000-1	Extraction Date	24-Oct-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3641000

Approved:
Peter Nguyen
--e-signature--
24-Nov-2021

Run Information	Run 1
Filename	211104A260.D
Run Date	11/17/2021 15:48
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.78	26.3	
2-Methylnaphthalene	3.37	5.65	
1-Methylnaphthalene	3.48	3.74	
Acenaphthylene	4.52	0.380	R
Acenaphthene	4.81	1.26	
Fluorene	5.74	1.34	
Phenanthrene	7.94	4.46	
Anthracene	8.06	0.310	
Fluoranthene	11.34	1.03	R
Pyrene	11.99	0.810	
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	2.66	7.11	
Biphenyl	3.91	3.00	
o-Terphenyl	NotFnd	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	200	2.77	66.1		50-150
2-Methylnaphthalene-D10	200	3.34	84.7		50-150
Acenaphthylene D8	200	4.50	60.3		50-150
Phenanthrene D10	200	7.89	95.5		50-150
Anthracene-D10	200	8.01	58.7		50-150
Fluoranthene D10	200	11.29	93.6		50-150
Benz(a)Anthracene-D12	200	15.82	60.3		50-150
Chrysene D12	200	15.93	81.0	R	50-150
Benzo(b)Fluoranthene-D12	200	19.15	75.1		50-150
Benzo(k)Fluoranthene-D12	200	19.24	48.3	R	50-150
Benzo(a)Pyrene D12	200	20.03	46.3	R	50-150
Perylene D12	200	20.26	47.7		50-150
Indeno(1,2,3,cd)Pyrene-D12	200	23.71	50.6		50-150
Dibenz(a,h)Anthracene-D14	200	23.88	43.9 M		50-150
Benzo(g,h,i)Perylene D12	200	24.68	68.5 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.
NS	Indicates that this compound was not spiked

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a
ALS Sample ID	WG3641000-4	Extraction Date	24-Oct-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3641000

Approved:
Peter Nguyen
--e-signature--
24-Nov-2021

Run Information	Run 1
Filename	211104A261.D
Run Date	11/17/2021 16:26
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.78	2.89	R B
2-Methylnaphthalene	NotFnd	<0.20	U
1-Methylnaphthalene	3.48	0.460	B
Acenaphthylene	NotFnd	<0.20	U
Acenaphthene	NotFnd	<0.20	U
Fluorene	5.74	0.250	B
Phenanthrene	7.94	1.01	B
Anthracene	8.06	0.210	B
Fluoranthene	NotFnd	<0.20	U
Pyrene	NotFnd	<0.20	U
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	NotFnd	<0.20	U
Biphenyl	3.91	1.39 M	B
o-Terphenyl	NotFnd	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	200	2.77	30.8		50-150
2-Methylnaphthalene-D10	200	3.34	38.1		50-150
Acenaphthylene D8	200	4.50	25.7		50-150
Phenanthrene D10	200	7.89	34.4		50-150
Anthracene-D10	200	8.01	20.8		50-150
Fluoranthene D10	200	11.29	31.3		50-150
Benz(a)Anthracene-D12	200	15.82	16.5		50-150
Chrysene D12	200	15.94	23.4	M	50-150
Benzo(b)Fluoranthene-D12	200	19.16	23.3		50-150
Benzo(k)Fluoranthene-D12	200	19.24	17.6	M	50-150
Benzo(a)Pyrene D12	200	20.03	16.3		50-150
Perylene D12	200	20.27	13.6	M	50-150
Indeno(1,2,3,cd)Pyrene-D12	200	23.73	13.8		50-150
Dibenz(a,h)Anthracene-D14	200	23.92	10.9	M	50-150
Benzo(g,h,i)Perylene D12	200	24.69	19.2	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.
NS	Indicates that this compound was not spiked

ALS Life Sciences

Sample Analysis Report

Sample Name	RUNDLE-PAH-OCT13	Sampling Date	13-Oct-21 00:00
ALS Sample ID	L2652496-1	Extraction Date	24-Oct-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	WG3641000

Approved:
Peter Nguyen
--e-signature--
24-Nov-2021

Run Information	Run 1	Run 2
Filename	211104A264.D	211104A262.D
Run Date	11/17/2021 18:20	11/17/2021 17:04
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	10
Analysis Units	ng/sample	ng/sample
Instrument	MSD-5	MSD-5
Column	HP-5MS US1263126H	HP-5MS US1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags	Ret. Time.	Concentration ng/sample	Flags
Naphthalene				2.79	14800	
2-Methylnaphthalene				3.37	4130	
1-Methylnaphthalene				3.48	2700	
Acenaphthylene	4.51	106	M			
Acenaphthene				4.81	1530	
Fluorene				5.73	1320	
Phenanthrene				7.94	2300	
Anthracene	8.05	129				
Fluoranthene				11.34	613	
Pyrene				11.98	278	
Benzo(a)Anthracene	15.88	19.2				
Chrysene	16.00	63.4				
Benzo(b)Fluoranthene	19.22	36.0	M			
Benzo(k)Fluoranthene	19.27	28.8	M			
Benzo(e)Pyrene	19.96	24.6				
Benzo(a)Pyrene	20.09	23.2				
Perylene	20.33	2.90				
Indeno(1,2,3-cd)Pyrene	23.78	20.6				
Dibenzo(a,h)Anthracene	23.98	4.79				
Benzo(g,h,i)Perylene	24.78	20.6	M			
Additional Analytes						
Tetralin				2.67	978	
Biphenyl				3.90	1180	
o-Terphenyl	9.22	11.2				
Benzo(a)fluorene	13.15	24.0	M			
Benzo(b)fluorene	13.36	19.4				

Field Sampling Standards	ng spiked		% Rec
1-Methylnaphthalene-D10	200	3.45	46
Fluorene D10	200	5.69	204.5
Terphenyl D14(Surr.)	200	12.79	85

Extraction Standards			% Rec	Limits		% Rec	
Naphthalene D8	200			50-150	2.77	41.3 M	
2-Methylnaphthalene-D10	200			50-150	3.34	57.9	
Acenaphthylene D8	200			50-150	4.50	41.3	
Phenanthrene D10	200			50-150	7.89	83.8 M	
Anthracene-D10	200			50-150	8.01	54.3	R
Fluoranthene D10	200			50-150	11.29	84.6	
Benz(a)Anthracene-D12	200	15.82	74.5	50-150			
Chrysene D12	200	15.92	80.8 M	50-150			
Benzo(b)Fluoranthene-D12	200	19.15	77.1	50-150			
Benzo(k)Fluoranthene-D12	200	19.23	56.3 M	50-150			
Benzo(a)Pyrene D12	200	20.03	57.4 M	50-150			
Perylene D12	200	20.26	55.9	50-150			
Indeno(1,2,3,cd)Pyrene-D12	200	23.70	56.7	50-150			
Dibenz(a,h)Anthracene-D14	200	23.86	53.1 M	50-150			
Benzo(g,h,i)Perylene D12	200	24.67	65.0 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-OCT13	Sampling Date	13-Oct-21 00:00
ALS Sample ID	L2652496-2	Extraction Date	24-Oct-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	WG3641000

Approved:
Peter Nguyen
--e-signature--
24-Nov-2021

Run Information	Run 1	Run 2
Filename	211104A265.D	211104A263.D
Run Date	11/17/2021 18:58	11/17/2021 17:42
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	10
Analysis Units	ng/sample	ng/sample
Instrument	MSD-5	MSD-5
Column	HP-5MS US1263126H	HP-5MS US1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags	Ret. Time.	Concentration ng/sample	Flags
Naphthalene				2.79	16300	M
2-Methylnaphthalene				3.37	4950	
1-Methylnaphthalene				3.48	2910	
Acenaphthylene	4.51	98.8	M			
Acenaphthene				4.81	2430	
Fluorene				5.73	1480	
Phenanthrene				7.94	2320	
Anthracene	8.05	129	M			
Fluoranthene				11.34	489	
Pyrene				11.98	225	
Benzo(a)Anthracene	15.88	18.4				
Chrysene	16.00	62.7				
Benzo(b)Fluoranthene	19.22	34.0	M			
Benzo(k)Fluoranthene	19.27	24.7	M			
Benzo(e)Pyrene	19.96	22.5				
Benzo(a)Pyrene	20.09	19.5				
Perylene	20.32	2.62				
Indeno(1,2,3-cd)Pyrene	23.78	18.9				
Dibenzo(a,h)Anthracene	23.99	4.75	M			
Benzo(g,h,i)Perylene	24.78	17.8	M			
Additional Analytes						
Tetralin				2.67	1250	
Biphenyl				3.90	1300	
o-Terphenyl	9.22	10.4				
Benzo(a)fluorene	13.15	24.4	M			
Benzo(b)fluorene	13.36	17.9				

Field Sampling Standards	ng spiked		% Rec
1-Methylnaphthalene-D10	200	3.45	61.6
Fluorene D10	200	5.68	110.9
Terphenyl D14(Surr.)	200	12.79	120

Extraction Standards			% Rec	Limits		% Rec	
Naphthalene D8	200			50-150	2.77	43.8	M
2-Methylnaphthalene-D10	200			50-150	3.34	61.9	M
Acenaphthylene D8	200			50-150	4.50	36.3	
Phenanthrene D10	200			50-150	7.89	74.5	M
Anthracene-D10	200			50-150	8.01	43.7	
Fluoranthene D10	200			50-150	11.29	73.1	M
Benz(a)Anthracene-D12	200	15.82	61.8	50-150			
Chrysene D12	200	15.93	68.6	M 50-150			
Benzo(b)Fluoranthene-D12	200	19.15	61.9	50-150			
Benzo(k)Fluoranthene-D12	200	19.23	45.1	M 50-150			
Benzo(a)Pyrene D12	200	20.03	40.0	M 50-150			
Perylene D12	200	20.26	41.8	50-150			
Indeno(1,2,3,cd)Pyrene-D12	200	23.70	43.7	50-150			
Dibenz(a,h)Anthracene-D14	200	23.87	43.2	M 50-150			
Benzo(g,h,i)Perylene D12	200	24.67	51.8	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

Laboratory Control Sample Analysis Report

Sample Name	Laboratory Control Sample	Sampling Date	n/a
ALS Sample ID	WG3641000-2	Extraction Date	24-Oct-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	WG3641000

Approved:
Peter Nguyen
--e-signature--
24-Nov-2021

Run Information	Run 1
Filename	211104A258.D
Run Date	11/17/2021 14:32
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	ug spiked	Ret. Time	%	Flags	Limits
Naphthalene	100	2.78	133	M B	50-150
2-Methylnaphthalene	100	3.37	85.3		50-150
1-Methylnaphthalene	100	3.48	94.7		50-150
Acenaphthylene	100	4.51	94.2		50-150
Acenaphthene	100	4.81	90.3		50-150
Fluorene	100	5.74	87.9		50-150
Phenanthrene	100	7.94	100.3		50-150
Anthracene	100	8.06	114.1		50-150
Fluoranthene	100	11.34	90.9		50-150
Pyrene	100	11.98	87		50-150
Benzo(a)Anthracene	100	15.88	104.5		50-150
Chrysene	100	16.00	93.1		50-150
Benzo(b)Fluoranthene	100	19.22	83.3		50-150
Benzo(k)Fluoranthene	100	19.29	101		50-150
Benzo(e)Pyrene	100	19.96	97.3		50-150
Benzo(a)Pyrene	100	20.09	105.9		50-150
Perylene	100	20.32	91.1		50-150
Indeno(1,2,3-cd)Pyrene	100	23.78	81.1		50-150
Dibenzo(a,h)Anthracene	100	23.98	77.9		50-150
Benzo(g,h,i)Perylene	100	24.78	83.4		50-150

Additional Analytes	
Tetralin	NS
Biphenyl	NS
o-Terphenyl	NS
Benzo(a)fluorene	NS
Benzo(b)fluorene	NS

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	200	2.77	53.4	M	30-150
2-Methylnaphthalene-D10	200	3.33	82.1	M	30-150
Acenaphthylene D8	200	4.50	70.4		30-150
Phenanthrene D10	200	7.89	92.0		50-150
Anthracene-D10	200	8.01	60.4		50-150
Fluoranthene D10	200	11.29	100.6		50-150
Benz(a)Anthracene-D12	200	15.82	72.2		50-150
Chrysene D12	200	15.92	103.4	R	50-150
Benzo(b)Fluoranthene-D12	200	19.15	85.6		50-150
Benzo(k)Fluoranthene-D12	200	19.23	66.5	R	50-150
Benzo(a)Pyrene D12	200	20.02	55.0	R	30-150
Perylene D12	200	20.26	57.6		50-150
Indeno(1,2,3,cd)Pyrene-D12	200	23.70	54.9		50-150
Dibenz(a,h)Anthracene-D14	200	23.86	53.4	M	50-150
Benzo(g,h,i)Perylene D12	200	24.67	72.5	M	50-150

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

L265248 L2652496

Chain of Custody (COC) / Analytical Request Form

COC Number: 17 -

Affix ALS barcode label here
(lab use only)

Page 1 of

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Canada Toll Free: 1 800 668 9878

Report To — Contact and company name below will appear on the final report

Company: RWDI
Contact: Matt Lantz
Phone: 519 823 1311

Company address below will appear on the final report

Street: 600 Southgate Drive
City/Province: Guelph, Ontario
Postal Code: N1G 4P6

Invoice To Same as Report To ☐ YES ☐ NO
Copy of Invoice with Report ☐ YES ☐ NO

Company:
Contact:

Report Format / Distribution

Select Report Format: ☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax Matt.Lantz@rwdi com
Email 2
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax
Email 2

Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

TAT is 15 business days. DTOX analysis standard TAT is 5 business days

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%]

Date and Time Required for all E&P TATs: hh:mm

tests that can not be performed according to the service level selected, you will be contacted.

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Project Information

ALS Account # / Quote #:
Job #: DYEC
PO / AFE: 1803743 Phase 1000
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center:
Major/Minor Code:
Requisitioner:
Location:
PO#
Routing Code:

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	TSP, ICP on Hi-Vol Filter	PAH	DX	SAMPLES ON HOLD
1 L26	-	317		24hr	Air			X		
1		1664	12-Oct-21	24hr	Air		X			
2 7421		1675	57-Oct-21	24hr	Air		X			
2 L264	-	317	13-Oct-21	24hr	Air			X		
3		1653	13-Oct-21	24hr	Air					
4		1642		24hr	Air		X			
				24hr	Air					
				24hr	Air					
				24hr	Air					
				24hr	Air					
				24hr	Air					
				24hr	Air					

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Samples are 10 day TAT

use

Frozen ☐ SIF Observations
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐
Coolin Initiated
NITIAL COOLER TEMPERATURES °C

use use

Released by: M L by: 0 -Oct- Time: 8:45 Received by: Date:

WHITE - LABORATORY

NOV 20

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**

Table B6: 2021 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	13 Oct 21	No. > Criteria
1-Methylnaphthalene	ng/m^3	*12000*	8.52	0
2-Methylnaphthalene	ng/m^3	*10000*	13.03	0
10/1/2021	ng/m^3	-	4.83	-
Acenaphthylene	ng/m^3	*3500*	0.33	0
Anthracene	ng/m^3	*200*	0.41	0
Benzo(a)Anthracene	ng/m^3	-	0.06	-
Benzo(a)fluorene	ng/m^3	-	0.08	-
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	0.07	1
Benzo(b)fluorene	ng/m^3	-	0.11	-
Benzo(e)Pyrene	ng/m^3	-	0.06	-
Benzo(g,h,i)Perylene	ng/m^3	-	0.08	-
Benzo(k)Fluoranthene	ng/m^3	-	0.06	-
Biphenyl	ng/m^3	-	0.09	-
Chrysene	ng/m^3	-	3.72	-
Dibenzo(a,h)Anthracene	ng/m^3	-	0.20	-
Fluoranthene	ng/m^3	-	0.02	-
Fluorene	ng/m^3	-	1.93	-
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	4.16	-
Naphthalene	ng/m^3	*22500*	0.06	0
o-Terphenyl	ng/m^3	-	46.69	-
Perylene	ng/m^3	-	0.04	-
Phenanthrene	ng/m^3	-	0.01	-
Pyrene	ng/m^3	-	7.26	-
Tetralin	ng/m^3	-	0.88	-
Total PAH[4]	ng/m^3	-	92.70	-

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

Station: RofD Rundle Daily: 13/10/2021 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM2.5	NO	NO2	NOX	SO2	Batt Min	Temperature	Rain	Tr_Temp	RH AVG	Rain total	WS km/hr	WD	Hi-Vol Pressure	PUF Pressure	Temperature	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
13/10/2021 00:00	4.5	0.8	5	5.2	0.42	13.2	17.8	0	23	100	0	1.63	<Samp	4.07	51.71	290.953	40.93	7.78
13/10/2021 01:00	6.5	6.9	12	18.8	0.534	13.2	18.1	0	23.1	100	0	6.14	240	4.1	52.57	291.274	41.08	7.84
13/10/2021 02:00	6.2	0	4.7	4.1	0.44	13.2	17.7	0	23.1	100	0.05	7.72	240	4.09	53.39	290.886	41.08	7.9
13/10/2021 03:00	7	0	5	4.5	0.427	13.2	17.6	0	23.1	100	0.01	8.6	247	4.1	53.2	290.781	41.1	7.89
13/10/2021 04:00	7.7	0	6.3	5.9	0.434	13.2	17.8	0	23.1	100	0	8.9	243	4.1	52.82	290.889	41.08	7.86
13/10/2021 05:00	9.3	1.7	10.3	11.8	0.48	13.2	17.7	0	23.1	100	0	9.84	242	4.09	51.78	290.813	41.06	7.79
13/10/2021 06:00	10.6	1.5	10.3	11.8	0.547	13.2	17.7	0	23.1	100	0	10.62	245	4.09	51.44	290.8	41.06	7.77
13/10/2021 07:00	8.7	1.8	9.4	11.2	0.596	13.2	17.7	0	23.1	100	0	10.25	247	4.09	51.18	290.85	41.04	7.75
13/10/2021 08:00	8.6	5.4	9.7	15	0.748	13.2	17.9	0	23.1	100	0	12.61	246	4.08	50.97	291.08	41.01	7.73
13/10/2021 09:00	6.8	4	9	13	0.894	13.2	18.1	0	23.2	100	0	11.63	241	4.07	51.27	291.277	40.95	7.75
13/10/2021 10:00	7	4.6	8.7	13.2	0.865	13.2	18.6	0	22.8	97.1	0	11.05	244	4.07	51.17	291.771	40.9	7.73
13/10/2021 11:00	7.4	4.4	7.4	11.7	0.81	13.2	19.4	0	23	89.6	0	11.43	245	4.06	50.74	292.596	40.79	7.69
13/10/2021 12:00	8.4	3.8	8.5	12.3	0.817	13.2	19.4	0	23	90.8	0	11.4	244	4.06	51.09	292.553	40.77	7.72
13/10/2021 13:00	7.7	2.5	7	9.5	0.821	13.2	19.4	0	23	93.4	0	10.8	233	4.05	51.29	292.529	40.74	7.73
13/10/2021 14:00	7.5	1.4	9.5	10.8	0.864	13.2	18.8	0	23.1	99.5	0	8.15	255	4.05	51.58	291.965	40.78	7.76
13/10/2021 15:00	9.1	1	12.4	13.4	0.793	13.2	18.5	0	23.1	100	0.61	4.23	247	4.05	51.45	291.686	40.82	7.76
13/10/2021 16:00	6.1	1	11.9	13	0.662	13.2	18.5	0	22.9	100	0.07	3.07	222	4.04	50.97	291.636	40.75	7.72
13/10/2021 17:00	3.6	0.4	9.4	9.6	0.602	13.2	18.3	0	23.1	100	0	3.25	270	4.05	50.59	291.44	40.81	7.7
13/10/2021 18:00	4.7	0.6	9.1	9.6	0.638	13.2	18	0	23.1	100	0	1	<Samp	4.09	50.36	291.118	41.06	7.69
13/10/2021 19:00	3.9	0.1	5	4.9	0.542	13.2	17.6	0	23.1	100	0	1.13	<Samp	4.12	50.55	290.795	41.2	7.7
13/10/2021 20:00	4.1	0.1	3.2	2.9	0.467	13.2	17.1	0	23.1	100	0	1.66	<Samp	4.12	51.04	290.252	41.25	7.74
13/10/2021 21:00	3.9	0.4	2.4	2.6	0.489	13.2	16.9	0	23.1	100	0	0.97	<Samp	4.11	51.71	290.031	41.22	7.79
13/10/2021 22:00	4.3	8.3	7.7	16	0.597	13.2	16.7	0	23.1	100	0	2.88	45	4.14	52.46	289.836	41.41	7.85
13/10/2021 23:00	3.2	0	2.5	1.9	0.43	13.2	16.6	0	23.1	100	0	2.11	36	4.13	52.68	289.703	41.37	7.86
Minimum	3.2	0	2.4	1.9	0.42	13.2	16.6	0	22.8	89.6	0	0.97	36	4.04	50.36	289.703	40.74	7.69
MinDate	23:00	02:00	21:00	23:00	00:00	00:00	23:00	00:00	10:00	11:00	00:00	21:00	23:00	16:00	18:00	23:00	13:00	11:00
Maximum	10.6	8.3	12.4	18.8	0.894	13.2	19.4	0	23.2	100	0.61	12.61	270	4.14	53.39	292.596	41.41	7.9
MaxDate	06:00	22:00	15:00	01:00	09:00	00:00	11:00	00:00	09:00	00:00	15:00	08:00	17:00	22:00	02:00	11:00	22:00	02:00
Avg	6.5	2.1	7.8	9.7	0.622	13.2	18	0	23.1	98.8	0.03	6.71	223	4.08	51.58	291.146	41.01	7.77
Num	24	24	24	24	24	24	24	24	24	24	24	24	19	24	24	24	24	24
Data[%]	100	100	100	100	100	100	100	100	100	100	100	100	79.17	100	100	100	100	100
STD	2	2.3	2.9	4.5	0.2	No Data	0.8	0	0.1	2.9	0.1	4.1	63.1	0	0.8	0.8	0.2	0.1

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Guelph ON Canada
N1G 4P6

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

MEMORANDUM

DATE:	2021-12-10	**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
RE:	**Exceedance Report – Benzo(a)Pyrene November 6, 2021 Region of Durham, DYEC**	

On December 1, 2021 the results from ALS Environmental were received regarding the PAH results from the November 6, 2021 sampling event. On December 2, 2021, the results were entered and assessed, and it was found that there was one (1) measured Benzo(a)Pyrene (BaP) concentration in excess of the 24-hour AAQC on the November 6th sampling date.

November 6, 2021

On Saturday, November 6, 2021, there was one (1) exceedance of the BaP 24-hour AAQC, which occurred at the Rundle Road Station, measured at the onsite PUF PS-1 samplers. Attached is a figure depicting the wind rose (indicating the wind speed and direction during the sampling day), and the location of the sampling stations relative to the DYEC.

The following summarizes the BaP concentrations and onsite conditions during the November 6th sampling date:

1. The guideline concentration for BaP is 0.00005 ug/m^3. The measured concentrations at the Rundle Road sampler was 0.000065 µg/m^3.
2. During the sampling day the wind was predominantly from the SSW, SSE and ENE, as recorded at the Rundle Road Meteorological Tower. One-hour average wind speeds at Rundle Road Meteorological Tower ranged from 0.38 km/h to 7.75 km/h.
3. The Rundle Road meteorological data suggests that the Rundle Road Station was downwind of the DYEC during part of the sampling period. Since the winds were predominantly coming from the SSW, SSE and ENE, it is possible that the measured BaP exceedance is partially attributable to the Energy Centre operations.

At the Rundle Road Station, the NO_2 hourly values were less than 6% of the criteria for the same period. The $PM_{2.5}$ 24-hour average value was 8.4 micrograms per cubic metre at the Rundle Road Station.

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

Respectfully submitted by:

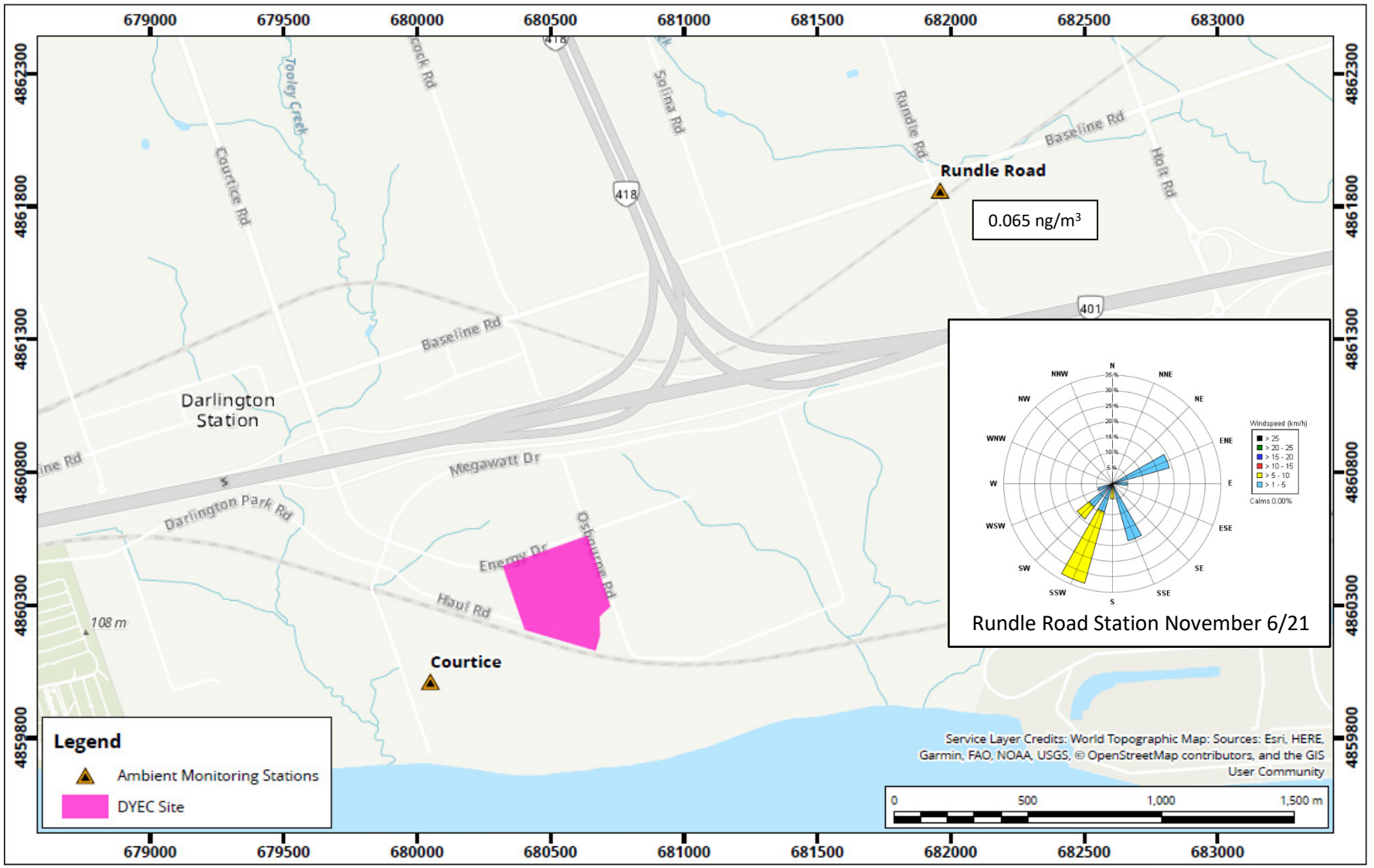
RWDI AIR Inc.

Claire Finoro, P.Eng., B.Sc. (Eng.)
Project Manager

CIF/kta

Attach.

ATTACHMENTS



DYEC Site and Ambient Monitoring Station Locations

True North

Drawn by: DAJH | Figure: 1

Approx. Scale: 1:20,000

Date Revised: Dec 8, 2021

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

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 Dr.
ALS WO#:	L2661631		Guelph, ON. N1G 4P6
Date of Report	1-Dec-21		Canada
Date of Sample Receipt	11-Nov-21	**Client Contact:**	Claire Finoro
		Client Project ID:	DYEC

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

Sample "RUNDLE-PAH-NOV6" (lab id L2661631-2) appears to be non compliant to the MECP (24 hour) criteria.

Certified by: _____

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		Method Blank		COURTICE-PAH-NOV6		RUNDLE-PAH-NOV6		Laboratory Control Sample	
ALS Sample ID	WG3657073-1		WG3657073-4		L2661631-1		L2661631-2		WG3657073-2	
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		6-Nov-21		6-Nov-21		n/a	
Extraction Date	12-Nov-21		12-Nov-21		12-Nov-21		12-Nov-21		12-Nov-21	
Target Analytes	ng/sample		ng/sample		ng/sample		ng/sample		%	
Naphthalene	364		29.9	B	10600		8570		149	B
2-Methylnaphthalene	114		9.82	B	3300		2170		91.6	B
1-Methylnaphthalene	70.2		6.45	B	1900		1390		91.5	B
Acenaphthylene	8.26	R	<2.0	U	67.9	M,B	55.1	M,B	97.9	
Acenaphthene	92.9		6.61	B	792	B	537	B	96.6	B
Fluorene	58.3		4.44	B	520	B	398	B	91.8	B
Phenanthrene	342		27.0	B	675	B	617	B	140.3	B
Anthracene	88.1		7.22	B	44.8	M,B	39.2	B	116.5	B
Fluoranthene	113		9.76	B	122	B	142	B	101.7	B
Pyrene	134		11.9	B	81.4	B	96.9	B	106.6	B
Benzo(a)Anthracene	31.4		3.08	M,B	9.99	B	15.5	B	103.9	B
Chrysene	42.0		3.57	B	35.9	B	46.0	B	99.4	B
Benzo(b)Fluoranthene	14.8	M	<2.0	U	26.7	M,B	32.5	M,B	87.2	B
Benzo(k)Fluoranthene	17.5	M	<2.0	U	18.3	M,B	29.1	M,B	107.4	B
Benzo(e)Pyrene	13.6	M	<2.0	U	17.4	B	25.1	B	98.7	B
Benzo(a)Pyrene	29.5	M	<2.0	U	12.7	B	21.7	M,B	107.8	B
Perylene	4.81	M	<2.0	U	3.53	M,B	3.50	B	91.7	
Indeno(1,2,3-cd)Pyrene	9.51	M	<2.0	U	11.6	M,B	23.3	B	68.6	B
Dibenzo(a,h)Anthracene	2.28	M	<2.0	U	<2.0	U	3.94	M,B	92	M
Benzo(g,h,i)Perylene	9.50		<2.0	U	13.6	M,B	20.4	M,B	83.1	M,B
Additional Analytes										
Tetralin	7.22		<2.0	U	1410		991		3.2	B
Biphenyl	31.0		3.15	B	811		648		104.2	B
o-Terphenyl	<2.0	U	<2.0	U	3.88		3.48		0	M,R
Benzo(a)fluorene	29.0		2.25	B	22.3	B	30.5	B	4	B
Benzo(b)fluorene	16.2		<2.0	U	29.1	M,B	36.6	M,B	5.1	M,B
Field Sampling Standards	% Rec		% Rec		% Rec		% Rec		% Rec	
1-Methylnaphthalene-D10	NS		NS		58		56		NS	
Fluorene D10	NS		NS		82		87		NS	
Terphenyl D14(Surr.)	NS		NS		127		128	M	NS	
Extraction Standards	% Rec		% Rec		% Rec		% Rec		% Rec	
Naphthalene D8	60		67		52	M	51	M	74	M
2-Methylnaphthalene-D10	101		95		68		88		101	
Acenaphthylene D8	72		67		54		55		72	
Phenanthrene D10	85		86		70		73		81	
Anthracene-D10	68		71		54		57		68	
Fluoranthene D10	100		97		95		96		97	
Benz(a)Anthracene-D12	79		65		89		96		86	
Chrysene D12	99	R	106	M	97	M	95	M	110	R
Benzo(b)Fluoranthene-D12	85		94		91		87		86	
Benzo(k)Fluoranthene-D12	81	M	104	M	77	M	68		84	M
Benzo(a)Pyrene D12	63	M	70	M	63	M	65	M	68	M
Perylene D12	63		65	M	69		71		69	
Indeno(1,2,3,cd)Pyrene-D12	101	M	114	M	82		85	M	83	
Dibenz(a,h)Anthracene-D14	77	M	77	M	81	M	78	M	85	M
Benzo(g,h,i)Perylene D12	96	M	99	M	98	M	99	M	99	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 compound was not spiked

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a
ALS Sample ID	WG3657073-1	Extraction Date	12-Nov-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3657073

Approved:
Peter Nguyen
--e-signature--
29-Nov-2021

Run Information	Run 1
Filename	21112304.D
Run Date	11/24/2021 23:58
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US:1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.78	364	
2-Methylnaphthalene	3.36	114	
1-Methylnaphthalene	3.48	70.2	
Acenaphthylene	4.51	8.26	R
Acenaphthene	4.80	92.9	
Fluorene	5.73	58.3	
Phenanthrene	7.93	342	
Anthracene	8.05	88.1	
Fluoranthene	11.33	113	
Pyrene	11.97	134	
Benzo(a)Anthracene	15.88	31.4	
Chrysene	16.01	42.0	
Benzo(b)Fluoranthene	19.26	14.8	M
Benzo(k)Fluoranthene	19.26	17.5	M
Benzo(e)Pyrene	19.96	13.6	M
Benzo(a)Pyrene	20.10	29.5	M
Perylene	20.33	4.81	M
Indeno(1,2,3-cd)Pyrene	23.83	9.51	M
Dibenzo(a,h)Anthracene	24.03	2.28	M
Benzo(g,h,i)Perylene	24.84	9.50	
Additional Analytes			
Tetralin	2.66	7.22	
Biphenyl	3.90	31.0	
o-Terphenyl	9.20	<2.0	U
Benzo(a)fluorene	13.15	29.0	
Benzo(b)fluorene	13.36	16.2	

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	100	2.77	60		50-150
2-Methylnaphthalene-D10	100	3.33	101		50-150
Acenaphthylene D8	100	4.49	72		50-150
Phenanthrene D10	100	7.88	85		50-150
Anthracene-D10	100	8.00	68		50-150
Fluoranthene D10	100	11.28	100		50-150
Benz(a)Anthracene-D12	100	15.82	79		50-150
Chrysene D12	100	15.93	99	R	50-150
Benzo(b)Fluoranthene-D12	100	19.16	85		50-150
Benzo(k)Fluoranthene-D12	100	19.24	81	M	50-150
Benzo(a)Pyrene D12	100	20.05	63	M	50-150
Perylene D12	100	20.27	63		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	23.76	101	M	50-150
Dibenz(a,h)Anthracene-D14	100	23.94	77	M	50-150
Benzo(g,h,i)Perylene D12	100	24.71	96	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.
NS	Indicates that this compound was not spiked

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a
ALS Sample ID	WG3657073-4	Extraction Date	12-Nov-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3657073

Approved:
Peter Nguyen
--e-signature--
29-Nov-2021

Run Information	Run 1
Filename	21112305.D
Run Date	11/25/2021 0:36
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US:1263126H

Target Analytes	Ret. Time	Concentration ng/sample		Flags
Naphthalene	2.78	29.9		B
2-Methylnaphthalene	3.36	9.82		B
1-Methylnaphthalene	3.48	6.45		B
Acenaphthylene	4.50	<2.0	U	
Acenaphthene	4.80	6.61		B
Fluorene	5.73	4.44		B
Phenanthrene	7.94	27.0		B
Anthracene	8.06	7.22		B
Fluoranthene	11.34	9.76		B
Pyrene	11.99	11.9		B
Benzo(a)Anthracene	15.91	3.08	M	B
Chrysene	16.02	3.57		B
Benzo(b)Fluoranthene	19.26	<2.0	U	
Benzo(k)Fluoranthene	19.30	<2.0	U	
Benzo(e)Pyrene	NotFnd	<2.0	U	
Benzo(a)Pyrene	NotFnd	<2.0	U	
Perylene	NotFnd	<2.0	U	
Indeno(1,2,3-cd)Pyrene	NotFnd	<2.0	U	
Dibenzo(a,h)Anthracene	NotFnd	<2.0	U	
Benzo(g,h,i)Perylene	NotFnd	<2.0	U	
Additional Analytes				
Tetralin	2.66	<2.0	U	
Biphenyl	3.90	3.15		B
o-Terphenyl	9.20	<2.0	U	
Benzo(a)fluorene	13.17	2.25		B
Benzo(b)fluorene	13.39	<2.0	U	

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	100	2.77	67		50-150
2-Methylnaphthalene-D10	100	3.33	95		50-150
Acenaphthylene D8	100	4.49	67		50-150
Phenanthrene D10	100	7.88	86		50-150
Anthracene-D10	100	8.01	71		50-150
Fluoranthene D10	100	11.29	97		50-150
Benz(a)Anthracene-D12	100	15.83	65		50-150
Chrysene D12	100	15.95	106	M	50-150
Benzo(b)Fluoranthene-D12	100	19.18	94		50-150
Benzo(k)Fluoranthene-D12	100	19.26	104	M	50-150
Benzo(a)Pyrene D12	100	20.07	70	M	50-150
Perylene D12	100	20.29	65	M	50-150
Indeno(1,2,3,cd)Pyrene-D12	100	23.80	114	M	50-150
Dibenz(a,h)Anthracene-D14	100	24.00	77	M	50-150
Benzo(g,h,i)Perylene D12	100	24.74	99	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.
NS	Indicates that this compound was not spiked

ALS Life Sciences

Sample Analysis Report

Sample Name	COURTICE-PAH-NOV6	Sampling Date	06-Nov-21 00:00
ALS Sample ID	L2661631-1	Extraction Date	12-Nov-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	WG3657073

Approved:
Peter Nguyen
--e-signature--
29-Nov-2021

Run Information	Run 1	Run 2
Filename	21112308.D	21112306.D
Run Date	11/25/2021 2:30	11/25/2021 1:14
Final Volume	1 mL	1 mL
Dilution Factor	1	10
Analysis Units	ng/sample	ng/sample
Instrument	MSD-5	MSD-5
Column	HP-5MS US:1263126H	HP-5MS US:1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags		Ret. Time.	Concentration ng/sample	Flags
Naphthalene					2.78	10600	
2-Methylnaphthalene					3.36	3300	
1-Methylnaphthalene	3.48	1900					
Acenaphthylene	4.50	67.9	M	B			
Acenaphthene	4.80	792		B			
Fluorene	5.73	520		B			
Phenanthrene	7.93	675		B			
Anthracene	8.04	44.8	M	B			
Fluoranthene	11.33	122		B			
Pyrene	11.97	81.4		B			
Benzo(a)Anthracene	15.88	9.99		B			
Chrysene	15.99	35.9		B			
Benzo(b)Fluoranthene	19.22	26.7	M	B			
Benzo(k)Fluoranthene	19.27	18.3	M	B			
Benzo(e)Pyrene	19.96	17.4		B			
Benzo(a)Pyrene	20.09	12.7		B			
Perylene	20.32	3.53	M	B			
Indeno(1,2,3-cd)Pyrene	23.81	11.6	M	B			
Dibenzo(a,h)Anthracene	24.01	<2.0	U				
Benzo(g,h,i)Perylene	24.79	13.6	M	B			
Additional Analytes							
Tetralin	2.66	1410					
Biphenyl	3.90	811					
o-Terphenyl	9.20	3.88					
Benzo(a)fluorene	13.14	22.3		B			
Benzo(b)fluorene	13.43	29.1	M	B			

Field Sampling Standards	ng spiked		% Rec
1-Methylnaphthalene-D10	200	3.44	58
Fluorene D10	200	5.67	82.1
Terphenyl D14(Surr.)	200	12.78	127.3

Extraction Standards			% Rec	Limits		% Rec
Naphthalene D8	100			50-150	2.77	52 M
2-Methylnaphthalene-D10	100			50-150	3.33	68.15
Acenaphthylene D8	100	4.49	54	50-150		
Phenanthrene D10	100	7.87	70	50-150		
Anthracene-D10	100	7.99	54	50-150		
Fluoranthene D10	100	11.27	95	50-150		
Benz(a)Anthracene-D12	100	15.81	89	50-150		
Chrysene D12	100	15.92	97 M	50-150		
Benzo(b)Fluoranthene-D12	100	19.15	91	50-150		
Benzo(k)Fluoranthene-D12	100	19.24	77 M	50-150		
Benzo(a)Pyrene D12	100	20.03	63 M	50-150		
Perylene D12	100	20.26	69	50-150		
Indeno(1,2,3,cd)Pyrene-D12	100	23.73	82	50-150		
Dibenz(a,h)Anthracene-D14	100	23.90	81 M	50-150		
Benzo(g,h,i)Perylene D12	100	24.69	98 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-NOV6	Sampling Date	06-Nov-21 00:00
ALS Sample ID	L2661631-2	Extraction Date	12-Nov-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	WG3657073

Approved:
Peter Nguyen
--e-signature--
29-Nov-2021

Run Information	Run 1	Run 2
Filename	21112309.D	21112307.D
Run Date	11/25/2021 3:08	11/25/2021 1:52
Final Volume	1 mL	1 mL
Dilution Factor	1	10
Analysis Units	ng/sample	ng/sample
Instrument	MSD-5	MSD-5
Column	HP-5MS US:1263126H	HP-5MS US:1263126H

Target Analytes	Ret. Time	Concentration ng/sample	Flags		Ret. Time.	Concentration ng/sample	Flags
Naphthalene					2.78	8570	
2-Methylnaphthalene					3.36	2170	
1-Methylnaphthalene	3.48	1390					
Acenaphthylene	4.50	55.1	M	B			
Acenaphthene	4.80	537		B			
Fluorene	5.72	398		B			
Phenanthrene	7.93	617		B			
Anthracene	8.04	39.2		B			
Fluoranthene	11.32	142		B			
Pyrene	11.97	96.9		B			
Benzo(a)Anthracene	15.87	15.5		B			
Chrysene	15.99	46.0		B			
Benzo(b)Fluoranthene	19.21	32.5	M	B			
Benzo(k)Fluoranthene	19.25	29.1	M	B			
Benzo(e)Pyrene	19.95	25.1		B			
Benzo(a)Pyrene	20.08	21.7	M	B			
Perylene	20.32	3.50		B			
Indeno(1,2,3-cd)Pyrene	23.79	23.3		B			
Dibenzo(a,h)Anthracene	24.02	3.94	M	B			
Benzo(g,h,i)Perylene	24.77	20.4	M	B			
Additional Analytes							
Tetralin	2.66	991					
Biphenyl	3.90	648					
o-Terphenyl	9.20	3.48					
Benzo(a)fluorene	13.14	30.5		B			
Benzo(b)fluorene	13.43	36.6	M	B			

Field Sampling Standards	ng spiked		% Rec			
1-Methylnaphthalene-D10	200	3.44	56			
Fluorene D10	200	5.67	86.6			
Terphenyl D14(Surr.)	200	12.77	127.7	M		

Extraction Standards		% Rec		Limits		% Rec	
Naphthalene D8	100			50-150	2.77	51.35	M
2-Methylnaphthalene-D10	100			50-150	3.33	87.55	
Acenaphthylene D8	100	4.49	55	50-150			
Phenanthrene D10	100	7.87	73	50-150			
Anthracene-D10	100	8.00	57	50-150			
Fluoranthene D10	100	11.27	96	50-150			
Benz(a)Anthracene-D12	100	15.80	96	50-150			
Chrysene D12	100	15.92	95	M 50-150			
Benzo(b)Fluoranthene-D12	100	19.14	87	50-150			
Benzo(k)Fluoranthene-D12	100	19.22	68	50-150			
Benzo(a)Pyrene D12	100	20.03	65	M 50-150			
Perylene D12	100	20.26	71	50-150			
Indeno(1,2,3,cd)Pyrene-D12	100	23.71	85	M 50-150			
Dibenz(a,h)Anthracene-D14	100	23.88	78	M 50-150			
Benzo(g,h,i)Perylene D12	100	24.67	99	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	WG3657073-2	Extraction Date	12-Nov-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	WG3657073

Approved:
Peter Nguyen
--e-signature--
29-Nov-2021

Run Information	Run 1
Filename	21112302.D
Run Date	11/24/2021 22:42
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS US:1263126H

Target Analytes	ug spiked	Ret. Time	%		Flags	Limits
Naphthalene	100	2.78	149		B	50-150
2-Methylnaphthalene	100	3.36	91.6		B	50-150
1-Methylnaphthalene	100	3.48	91.5		B	50-150
Acenaphthylene	100	4.51	97.9			50-150
Acenaphthene	100	4.80	96.6		B	50-150
Fluorene	100	5.73	91.8		B	50-150
Phenanthrene	100	7.93	140.3		B	50-150
Anthracene	100	8.05	116.5		B	50-150
Fluoranthene	100	11.34	101.7		B	50-150
Pyrene	100	11.98	106.6		B	50-150
Benzo(a)Anthracene	100	15.88	103.9		B	50-150
Chrysene	100	16.00	99.4		B	50-150
Benzo(b)Fluoranthene	100	19.22	87.2		B	50-150
Benzo(k)Fluoranthene	100	19.30	107.4		B	50-150
Benzo(e)Pyrene	100	19.96	98.7		B	50-150
Benzo(a)Pyrene	100	20.10	107.8		B	50-150
Perylene	100	20.33	91.7			50-150
Indeno(1,2,3-cd)Pyrene	100	23.82	68.6		B	50-150
Dibenzo(a,h)Anthracene	100	24.04	92	M		50-150
Benzo(g,h,i)Perylene	100	24.80	83.1	M	B	50-150
Additional Analytes						
Tetralin	100	2.66	3.2		B	
Biphenyl	100	3.90	104.2		B	
o-Terphenyl	100	NotFnd	0	M	R	
Benzo(a)fluorene	100	13.15	4		B	
Benzo(b)fluorene	100	13.44	5.1	M	B	
Field Sampling Standards	**ng spiked**		**% Rec**			
1-Methylnaphthalene-D10			NS			
Fluorene D10			NS			
Terphenyl D14(Surr.)			NS			
Extraction Standards			**% Rec**			**Limits**
Naphthalene D8	100	2.77	74	M		30-150
2-Methylnaphthalene-D10	100	3.33	101			30-150
Acenaphthylene D8	100	4.49	72			30-150
Phenanthrene D10	100	7.88	81			50-150
Anthracene-D10	100	8.00	68			50-150
Fluoranthene D10	100	11.28	97			50-150
Benz(a)Anthracene-D12	100	15.82	86			50-150
Chrysene D12	100	15.93	110		R	50-150
Benzo(b)Fluoranthene-D12	100	19.15	86			50-150
Benzo(k)Fluoranthene-D12	100	19.24	84	M		50-150
Benzo(a)Pyrene D12	100	20.03	68	M		30-150
Perylene D12	100	20.26	69			50-150
Indeno(1,2,3,cd)Pyrene-D12	100	23.73	83			50-150
Dibenz(a,h)Anthracene-D14	100	23.92	85	M		50-150
Benzo(g,h,i)Perylene D12	100	24.70	99	M		50-150

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

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2661635-COFC
and L2661631

COC Number: 17 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	RWDI
Contact:	Matt Lantz
Phone:	519 823 1311
	Company address below will appear on the final report
Street:	600 Southgate Drive
City/Province:	Guelph, Ontario
Postal Code:	N1G 4P6
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: Matt.Lantz@rwdi.com
Email 2:
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax:
Email 2:

Project Information

ALS Account # / Quote #:	
Job #:	DYEC
PO / AFE:	1803743 Phase 1000
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: Martin Town

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Standard TAT is 15 business days. DTOX analysis standard TAT is 5 business days

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%]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

NUMBER OF CONTAINERS

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

SAMPLES ON HOLD

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	TSP, ICP on Hi-Vol Filter	PAH	DX
1	L2655487-3 - Coostic	334	6-Nov	24hr	Air		X	
1	742053	1673	31-Oct	24hr	Air	X		
2	742054	1706	6-Nov	24hr	Air	X		
2	L2655487-2 - Rundle	332	6-Nov	24hr	Air		X	
3	742052	1647	31-Oct	24hr	Air	X		
4	742055	1691	6-Nov	24hr	Air	X		
				24hr	Air			
				24hr	Air			
				24hr	Air			
				24hr	Air			
				24hr	Air			
				24hr	Air			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

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 °C
4.0°C	

SHIPMENT RELEASE (client use)

Released by: M Town Date: 10-Nov-21 Time: 11:30

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: 15.8°C Date: 11-Nov-21 Time: 10:00

FINAL SHIPMENT RECEPTION (lab use only)

Received by: Date: Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 20

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.

Table B6: 2021 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	6-Nov-21	No. > Criteria
1-Methylnaphthalene	ng/m^3	*12000*	4.19	0
2-Methylnaphthalene	ng/m^3	*10000*	6.54	0
10/1/2021	ng/m^3	-	1.62	-
Acenaphthylene	ng/m^3	*3500*	0.17	0
Anthracene	ng/m^3	*200*	0.12	0
Benzo(a)Anthracene	ng/m^3	-	0.05	-
Benzo(a)fluorene	ng/m^3	-	0.09	-
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	0.07	1
Benzo(b)fluorene	ng/m^3	-	0.10	-
Benzo(e)Pyrene	ng/m^3	-	0.11	-
Benzo(g,h,i)Perylene	ng/m^3	-	0.08	-
Benzo(k)Fluoranthene	ng/m^3	-	0.06	-
Biphenyl	ng/m^3	-	0.09	-
Chrysene	ng/m^3	-	1.95	-
Dibenzo(a,h)Anthracene	ng/m^3	-	0.14	-
Fluoranthene	ng/m^3	-	0.01	-
Fluorene	ng/m^3	-	0.43	-
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	1.20	-
Naphthalene	ng/m^3	*22500*	0.07	0
o-Terphenyl	ng/m^3	-	25.81	-
Perylene	ng/m^3	-	0.01	-
Phenanthrene	ng/m^3	-	0.01	-
Pyrene	ng/m^3	-	1.86	-
Tetralin	ng/m^3	-	0.29	-
Total PAH[4]	ng/m^3	-	45.04	-

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

Station: RofD Rundle Daily: 06/11/2021 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM2.5	NO	NO2	NOX	SO2	Batt Min	Temperature	Rain	Tr_Temp	RH AVG	Rain total	WS km/hr	WD	Hi-Vol Pressure	PUF Pressure	Temperature	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
06/11/2021 00:00	10.5	2	3.4	5.4	-0.176	13.2	-1.9	0	22	99.7	0	0.63	<Samp	4.01	54.8	271.285	42.07	8.25
06/11/2021 01:00	10.7	3.7	4.4	8.2	-0.1	13.2	-1.7	0	21.9	99.2	0	1.04	<Samp	4.04	55.49	271.432	42.28	8.3
06/11/2021 02:00	10.9	7	8.1	15.2	-0.035	13.2	-1.6	0	22.1	92.5	0	1.78	220	4.02	55.7	271.563	42.15	8.31
06/11/2021 03:00	10.7	2.4	11.8	14.2	-0.092	13.2	-1.7	0	22	90.1	0	1.93	69	4.04	56.21	271.429	42.23	8.35
06/11/2021 04:00	10.4	6.9	8.6	15.4	-0.071	13.2	-2.2	0	21.9	94.5	0	2.76	216	4.03	56	270.988	42.24	8.34
06/11/2021 05:00	11	0	7.1	7.2	-0.11	13.2	-1.4	0	21.9	90.8	0	3.24	151	4.02	55.88	271.717	42.11	8.32
06/11/2021 06:00	11.6	0.2	4.9	5.1	-0.128	13.2	-1.6	0	22	88.7	0	3.17	98	4.03	55.88	271.56	42.18	8.32
06/11/2021 07:00	12.2	2	5	6.9	-0.112	13.2	-1.5	0	22	87.4	0	3.14	73	4.01	55.29	271.636	42.1	8.28
06/11/2021 08:00	11.8	2.4	4.8	7.2	-0.009	13.2	2.4	0	21.2	74.1	0	2.4	58	4	53.64	275.514	41.71	8.11
06/11/2021 09:00	11.4	11.7	11.7	23.4	0.501	13.2	6.6	0	22	62.2	0	2.58	75	3.97	52.78	279.723	41.23	8
06/11/2021 10:00	6.2	1.7	4.5	6.3	0.213	13.2	8.8	0	23.1	63.7	0	6.59	199	3.9	51.86	281.954	40.73	7.91
06/11/2021 11:00	4.9	1.2	2.9	4	0.124	13.2	9.4	0	22.9	64.1	0	7.28	201	3.89	51.97	282.522	40.63	7.91
06/11/2021 12:00	5.6	0.4	1.8	2.2	0.234	13.2	9.7	0	23	61.1	0	7.75	193	3.9	52.05	282.842	40.67	7.91
06/11/2021 13:00	6.6	0.3	2	2.4	0.257	13.2	9.8	0	23	60.3	0	6.68	197	3.9	52.27	282.916	40.67	7.92
06/11/2021 14:00	6.1	0.2	1.6	1.7	0.092	13.2	10.4	0	22.9	55.6	0	6.88	200	3.87	51.74	283.5	40.48	7.88
06/11/2021 15:00	5.7	0.1	2.9	3	0.005	13.2	9.6	0	23	60.3	0	5.91	178	3.9	51.56	282.738	40.67	7.87
06/11/2021 16:00	7.3	0.1	5.4	5.5	0.051	13.2	8.5	0	22.7	64.1	0	4.75	155	3.95	51.52	281.657	41	7.88
06/11/2021 17:00	8.9	0	7.6	7.5	0.001	13.2	7.9	0	22.9	65	0	4.48	156	3.97	51.07	280.991	41.16	7.86
06/11/2021 18:00	9.1	-0.1	5.2	5.1	0.08	13.2	7.8	0	22.3	68.2	0	4.52	155	3.98	51.57	280.895	41.2	7.9
06/11/2021 19:00	5.9	-0.1	4.4	4.3	0.122	13.2	7.4	0	21.7	66.7	0	3.15	212	3.97	52.21	280.557	41.19	7.95
06/11/2021 20:00	6.7	-0.2	3.4	3.2	0.095	13.2	8	0	21.5	65.5	0	4.02	208	3.95	52.39	281.186	41.02	7.95
06/11/2021 21:00	6.1	-0.1	3.5	3.4	0.226	13.2	7.6	0	21.8	66.2	0	5.7	230	3.95	52.76	280.722	41.08	7.98
06/11/2021 22:00	5.6	-0.2	1.8	1.7	0.042	13.2	3.7	0	21.9	81.1	0	1.85	258	4.01	54.23	276.808	41.67	8.14
06/11/2021 23:00	5.8	2.9	1	3.9	-0.167	13.2	1.5	0	21.9	90.3	0	0.38	<Samp	4.03	55.25	274.66	41.94	8.23
Minimum	4.9	-0.2	1	1.7	-0.176	13.2	-2.2	0	21.2	55.6	0	0.38	58	3.87	51.07	270.988	40.48	7.86
MinDate	11:00	20:00	23:00	14:00	00:00	00:00	04:00	00:00	08:00	14:00	00:00	23:00	08:00	14:00	17:00	04:00	14:00	17:00
Maximum	12.2	11.7	11.8	23.4	0.501	13.2	10.4	0	23.1	99.7	0	7.75	258	4.04	56.21	283.5	42.28	8.35
MaxDate	07:00	09:00	03:00	09:00	09:00	00:00	14:00	00:00	10:00	00:00	00:00	12:00	22:00	01:00	03:00	14:00	01:00	03:00
Avg	8.4	1.9	4.9	6.8	0.043	13.2	4.4	0	22.2	75.5	0	3.86	167	3.97	53.51	277.533	41.43	8.08
Num	24	24	24	24	24	24	24	24	24	24	24	24	21	24	24	24	24	24
Data[%]	100	100	100	100	100	100	100	100	100	100	100	100	87.5	100	100	100	100	100
STD	2.5	2.9	2.9	5.2	0.2	No Data	4.8	0	0.5	14.3	0	2.1	57.9	0.1	1.8	4.8	0.6	0.2

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:	2022-01-12	**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
RE:	**Exceedance Report – Benzo(a)Pyrene November 30, 2021 Region of Durham, DYEC**	

On January 4, 2022, the results from ALS Environmental were received regarding the PAH results from the November 30, 2021 sampling event. On January 7, 2022, the results were entered and assessed, and it was found that there was one (1) measured Benzo(a)Pyrene (BaP) concentration in excess of the 24-hour AAQC on the November 30th sampling date.

November 30, 2021

On Tuesday, November 30, 2021, there was one (1) exceedance of the BaP 24-hour AAQC, which occurred at the Rundle Road Station, measured at the onsite PUF PS-1 samplers. Attached is a figure depicting the wind rose (indicating the wind speed and direction during the sampling day), and the location of the sampling stations relative to the DYEC.

The following summarizes the BaP concentrations and onsite conditions during the November 30th sampling date:

1. The guideline concentration for BaP is 0.00005 ug/m^3. The measured concentrations at the Rundle Road sampler were 0.000075 µg/m^3.
2. During the sampling day the wind was predominantly from the W, WSW and NE to ESE, as recorded at the Rundle Road Meteorological Tower. One-hour average wind speeds at Rundle Road Meteorological Tower ranged from 1.04 km/h to 17.65 km/h.
3. The Rundle Road meteorological data suggests that the Rundle Road Station was downwind of the DYEC during part of the sampling period. Since the winds were predominantly coming from the W, WSW and NE to ESE, it is possible that the measured BaP exceedance is partially attributable to the Energy Centre operations.

At the Rundle Road Station, the NO_2 hourly values were less than 11% of the criteria for the same period. The $PM_{2.5}$ 24-hour average value was 11.0 micrograms per cubic metre at the Rundle Road Station.

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

Respectfully submitted by:

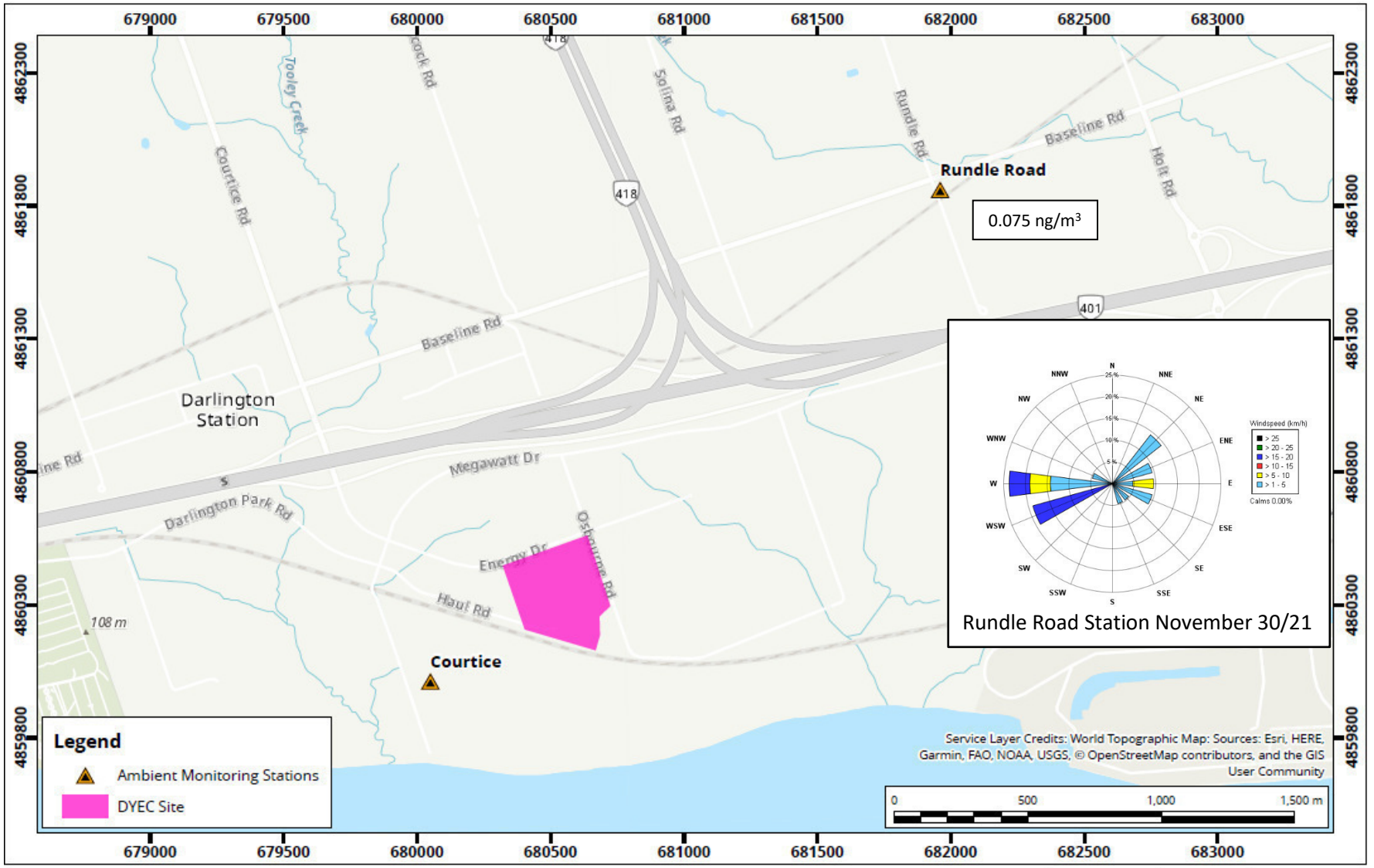
RWDI AIR Inc.

Claire Finoro, P.Eng., B.Sc. (Eng.)
Project Manager

CIF/kta

Attach.

ATTACHMENTS



DYEC Site and Ambient Monitoring Station Locations

True North

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

Drawn by: DAJH	Figure: 1
Approx. Scale:	1:20,000
Date Revised:	Jan 11, 2022

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 Dr.
ALS WO#:	L2669035		Guelph, ON N1G 4P6
Date of Report	4-Jan-22		Canada
Date of Sample Receipt	3-Dec-21	**Client Contact:**	Claire Finoro
		Client Project ID:	1803743 Phase 1000

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

Certified by:

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		Method Blank		RUNDLE-PAH NOV30		COURTICE-PAH NOV30		Laboratory Control Sample	
ALS Sample ID	WG3669494 1		WG3669494 4		L2669035 1		L2669035 2		WG3669494 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		30-Nov-21		30-Nov-21		n/a	
Extraction Date	7-Dec-21		7-Dec-21		7-Dec-21		7-Dec-21		7-Dec-21	
Target Analytes	ng/sample		ng/sample		ng/sample		ng/sample		%	
Naphthalene	8.61	M	5.89	B	15200		16900		120	
2-Methylnaphthalene	2.26		1.51	B	4700		5060		90	
1-Methylnaphthalene	1.23	M	0.750	M,B	2940		2990		96	
Acenaphthylene	<0.20	U	<0.20	U	160	R	82.8	R	106	
Acenaphthene	<0.20	U	<0.20	U	378		563		84	
Fluorene	<0.20	U	<0.20	U	497		564		84	
Phenanthrene	1.77		1.54	B	1040		1020		111	
Anthracene	<0.20	U	<0.20	U	91.9	M	65.8	M	115	
Fluoranthene	0.700		0.750	B	228		198		105	
Pyrene	<0.20	U	<0.20	U	182		158		112	
Benzo(a)Anthracene	<0.20	U	<0.20	U	22.9		10.8		101	
Chrysene	<0.20	U	<0.20	U	74.4		43.5		108	R
Benzo(b)Fluoranthene	<0.20	U	<0.20	U	55.8	M	30.3	M	97	R
Benzo(k)Fluoranthene	<0.20	U	<0.20	U	48.8	M	20.3	M	116	R
Benzo(e)Pyrene	<0.20	U	<0.20	U	50.9	R	27.7	M,R	112	M
Benzo(a)Pyrene	<0.20	U	<0.20	U	24.3		8.19	M,R	99	
Perylene	<0.20	U	<0.20	U	7.89	M,R	1.71	M	106	
Indeno(1,2,3-cd)Pyrene	<0.20	U	<0.20	U	41.5		21.5		100	
Dibenzo(a,h)Anthracene	<0.20	U	<0.20	U	7.96		2.70	R	104	
Benzo(g,h,i)Perylene	<0.20	U	<0.20	U	41.8	R	21.3	R	95	R
Additional Analytes										
Tetralin	2.86		1.31	RB	1450		2180		0	NS
Biphenyl	1.89		1.66	B	1340		1180		0	NS
o-Terphenyl	<0.20	U	<0.20	U	8.65		7.79		0	NS
Benzo(a)fluorene	<0.20	U	<0.20	U	45.9		28.7		0	NS
Benzo(b)fluorene	<0.20	U	<0.20	U	24.1		14.4		0	NS
Field Sampling Standards	% Rec		% Rec		% Rec		% Rec		% Rec	
1-Methylnaphthalene-D10	NS		NS		62		67		NS	
Fluorene D10	NS		NS		95		94		NS	
Terphenyl D14(Surr.)	NS		NS		111		112		NS	
Extraction Standards	% Rec		% Rec		% Rec		% Rec		% Rec	
Naphthalene D8	18	R	16	R	25	R	21	R	19	R
2-Methylnaphthalene-D10	24		21		28		25		25	
Acenaphthylene D8	21		19		27		21		21	
Phenanthrene D10	33		24		36		31		28	
Anthracene-D10	28		19		29		20		25	
Fluoranthene D10	36		28		40		31		33	
Benz(a)Anthracene-D12	32		27		35		22		34	
Chrysene D12	30	R	26	R	32		22		33	
Benzo(b)Fluoranthene-D12	37		34		40		29		27	
Benzo(k)Fluoranthene-D12	35	M	26	R	34		24	R	23	R
Benzo(a)Pyrene D12	38		33	R	36		27		30	
Perylene D12	35	M	31	M	29		22	M	24	
Indeno(1,2,3,cd)Pyrene-D12	36		32		33		23		27	
Dibenz(a,h)Anthracene-D14	29		26	M	29		19		23	
Benzo(g,h,i)Perylene D12	37		33	M	34		24		27	

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 the compound was not added to the sample.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a
ALS Sample ID	WG3669494 1	Extraction Date	7 Dec 21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3669494

Approved:
Peter Nguyen
e signature-
30 Dec 2021

Run Information	Run 1
Filename	211222008.D
Run Date	12/22/2021 13:48
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD 5
Column	HP 5MS US1306512H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.80	8.61	M
2-Methylnaphthalene	3.38	2.26	
1-Methylnaphthalene	3.50	1.23	M
Acenaphthylene	NotFnd	<0.20	U
Acenaphthene	NotFnd	<0.20	U
Fluorene	NotFnd	<0.20	U
Phenanthrene	7.93	1.77	
Anthracene	NotFnd	<0.20	U
Fluoranthene	11.33	0.700	
Pyrene	NotFnd	<0.20	U
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	2.68	2.86	
Biphenyl	3.92	1.89	
o-Terphenyl	NotFnd	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	100	2.79	18	R	50-150
2-Methylnaphthalene-D10	100	3.35	24		50-150
Acenaphthylene D8	100	4.50	21		50-150
Phenanthrene D10	100	7.88	33		50-150
Anthracene-D10	100	8.00	28		50-150
Fluoranthene D10	100	11.27	36		50-150
Benz(a)Anthracene-D12	100	15.80	32		50-150
Chrysene D12	100	15.92	30	R	50-150
Benzo(b)Fluoranthene-D12	100	19.14	37		50-150
Benzo(k)Fluoranthene-D12	100	19.22	35	M	50-150
Benzo(a)Pyrene D12	100	20.01	38		50-150
Perylene D12	100	20.24	35	M	50-150
Indeno(1,2,3,cd)Pyrene-D12	100	23.67	36		50-150
Dibenz(a,h)Anthracene-D14	100	23.84	29		50-150
Benzo(g,h,i)Perylene D12	100	24.63	37		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.
NS	Indicates that this compound was not spiked.

ALS Life Sciences

Sample Analysis Report

Sample Name	Method Blank	Sampling Date	n/a
ALS Sample ID	WG3669494 4	Extraction Date	7 Dec 21
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	QC		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	1	Workgroup	WG3669494

Approved:
Peter Nguyen
e signature-
30 Dec 2021

Run Information	Run 1
Filename	211222009.D
Run Date	12/22/2021 14:27
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD 5
Column	HP 5MS US1306512H

Target Analytes	Ret. Time	Concentration ng/sample	Flags
Naphthalene	2.80	5.89	B
2-Methylnaphthalene	3.38	1.51	B
1-Methylnaphthalene	3.50	0.750 M	B
Acenaphthylene	NotFnd	<0.20	U
Acenaphthene	NotFnd	<0.20	U
Fluorene	NotFnd	<0.20	U
Phenanthrene	7.93	1.54	B
Anthracene	NotFnd	<0.20	U
Fluoranthene	11.33	0.750	B
Pyrene	NotFnd	<0.20	U
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	2.68	1.31	R B
Biphenyl	3.92	1.66	B
o-Terphenyl	NotFnd	<0.20	U
Benzo(a)fluorene	NotFnd	<0.20	U
Benzo(b)fluorene	NotFnd	<0.20	U

Field Sampling Standards	ng spiked	% Rec
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			% Rec		Limits
Naphthalene D8	100	2.79	16	R	50-150
2-Methylnaphthalene-D10	100	3.35	21		50-150
Acenaphthylene D8	100	4.50	19		50-150
Phenanthrene D10	100	7.88	24		50-150
Anthracene-D10	100	8.00	19		50-150
Fluoranthene D10	100	11.28	28		50-150
Benz(a)Anthracene-D12	100	15.80	27		50-150
Chrysene D12	100	15.92	26	R	50-150
Benzo(b)Fluoranthene-D12	100	19.14	34		50-150
Benzo(k)Fluoranthene-D12	100	19.22	26	R	50-150
Benzo(a)Pyrene D12	100	20.01	33	R	50-150
Perylene D12	100	20.24	31 M		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	23.67	32		50-150
Dibenz(a,h)Anthracene-D14	100	23.85	26 M		50-150
Benzo(g,h,i)Perylene D12	100	24.63	33 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.
NS	Indicates that this compound was not spiked.

ALS Life Sciences

Sample Analysis Report

Sample Name	RUNDLE PAH-NOV30	Sampling Date	30 Nov-21 00:00
ALS Sample ID	L2669035 1	Extraction Date	7 Dec 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	WG3669494

Approved:
Peter Nguyen
e signature-
30 Dec 2021

Run Information	Run 1	Run 2
Filename	211222012.D	211222010.D
Run Date	12/22/2021 16:21	12/22/2021 15:04
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	10
Analysis Units	ng/sample	ng/sample
Instrument	MSD 5	MSD 5
Column	HP 5MS US1306512H	HP 5MS US1306512H

Target Analytes	Ret. Time	Concentration ng/sample	Flags	Ret. Time.	Concentration ng/sample	Flags
Naphthalene				2.81	15200	
2-Methylnaphthalene				3.39	4700	
1-Methylnaphthalene				3.50	2940	
Acenaphthylene	4.52	160	R			
Acenaphthene				4.82	378	
Fluorene				5.74	497	
Phenanthrene				7.93	1040	
Anthracene	8.05	91.9 M				
Fluoranthene				11.33	228	
Pyrene	11.97	182				
Benzo(a)Anthracene	15.87	22.9				
Chrysene	15.98	74.4				
Benzo(b)Fluoranthene	19.19	55.8 M				
Benzo(k)Fluoranthene	19.24	48.8 M				
Benzo(e)Pyrene	19.94	50.9	R			
Benzo(a)Pyrene	20.07	24.3				
Perylene	20.31	7.89 M	R			
Indeno(1,2,3-cd)Pyrene	23.74	41.5				
Dibenzo(a,h)Anthracene	23.96	7.96				
Benzo(g,h,i)Perylene	24.73	41.8	R			
Additional Analytes						
Tetralin				2.69	1450	
Biphenyl				3.92	1340	
o-Terphenyl	9.20	8.65				
Benzo(a)fluorene	13.14	45.9				
Benzo(b)fluorene	13.35	24.1				

Field Sampling Standards	ng spiked		% Rec			% Rec	
1-Methylnaphthalene-D10	200	3.46	62				
Fluorene D10	200	5.68	95				
Terphenyl D14(Surr.)	200	12.77	111				

Extraction Standards			% Rec	Limits		% Rec	
Naphthalene D8	100			50-150	2.79	25	R
2-Methylnaphthalene-D10	100			50-150	3.36	28	
Acenaphthylene D8	100			50-150	4.51	27	
Phenanthrene D10	100			50-150	7.88	36	
Anthracene-D10	100	8.00	29	50-150			
Fluoranthene D10	100			50-150	11.27	40	
Benz(a)Anthracene-D12	100	15.80	35	50-150			
Chrysene D12	100	15.91	32	50-150			
Benzo(b)Fluoranthene-D12	100	19.13	40	50-150			
Benzo(k)Fluoranthene-D12	100	19.22	34	50-150			
Benzo(a)Pyrene D12	100	20.00	36	50-150			
Perylene D12	100	20.24	29	50-150			
Indeno(1,2,3,cd)Pyrene-D12	100	23.66	33	50-150			
Dibenz(a,h)Anthracene-D14	100	23.82	29	50-150			
Benzo(g,h,i)Perylene D12	100	24.62	34	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-NOV30	Sampling Date	30 Nov-21 00:00
ALS Sample ID	L2669035 2	Extraction Date	7 Dec 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	WG3669494

Approved:
Peter Nguyen
e signature-
30 Dec 2021

Run Information	Run 1	Run 2
Filename	211222013.D	211222011.D
Run Date	12/22/2021 16:59	12/22/2021 15:43
Final Volume	0.1 mL	0.1 mL
Dilution Factor	1	10
Analysis Units	ng/sample	ng/sample
Instrument	MSD 5	MSD 5
Column	HP 5MS US1306512H	HP 5MS US1306512H

Target Analytes	Ret. Time	Concentration ng/sample	Flags	Ret. Time.	Concentration ng/sample	Flags
Naphthalene				2.81	16900	
2-Methylnaphthalene				3.39	5060	
1-Methylnaphthalene				3.50	2990	
Acenaphthylene	4.52	82.8	R			
Acenaphthene				4.82	563	
Fluorene				5.74	564	
Phenanthrene				7.93	1020	
Anthracene	8.05	65.8 M				
Fluoranthene				11.33	198	
Pyrene	11.97	158				
Benzo(a)Anthracene	15.87	10.8				
Chrysene	15.98	43.5				
Benzo(b)Fluoranthene	19.20	30.3 M				
Benzo(k)Fluoranthene	19.24	20.3 M				
Benzo(e)Pyrene	19.94	27.7 M	R			
Benzo(a)Pyrene	20.07	8.19 M	R			
Perylene	20.31	1.71 M				
Indeno(1,2,3-cd)Pyrene	23.75	21.5				
Dibenzo(a,h)Anthracene	23.96	2.70	R			
Benzo(g,h,i)Perylene	24.73	21.3	R			
Additional Analytes						
Tetralin				2.69	2180	
Biphenyl				3.92	1180	
o-Terphenyl	9.21	7.79				
Benzo(a)fluorene	13.14	28.7				
Benzo(b)fluorene	13.35	14.4				

Field Sampling Standards	ng spiked		% Rec
1-Methylnaphthalene-D10	200	3.46	67
Fluorene D10	200	5.68	94
Terphenyl D14(Surr.)	200	12.77	112

Extraction Standards		% Rec		Limits		% Rec	
Naphthalene D8	100			50-150	2.79	21	R
2-Methylnaphthalene-D10	100			50-150	3.36	25	
Acenaphthylene D8	100			50-150	4.51	21	
Phenanthrene D10	100			50-150	7.88	31	
Anthracene-D10	100	8.00	20	50-150			
Fluoranthene D10	100			50-150	11.28	31	
Benz(a)Anthracene-D12	100	15.80	22	50-150			
Chrysene D12	100	15.91	22	50-150			
Benzo(b)Fluoranthene-D12	100	19.13	29	50-150			
Benzo(k)Fluoranthene-D12	100	19.22	24 R	50-150			
Benzo(a)Pyrene D12	100	20.01	27	50-150			
Perylene D12	100	20.24	22 M	50-150			
Indeno(1,2,3,cd)Pyrene-D12	100	23.67	23	50-150			
Dibenz(a,h)Anthracene-D14	100	23.84	19	50-150			
Benzo(g,h,i)Perylene D12	100	24.63	24	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	WG3669494 2	Extraction Date	7 Dec 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	WG3669494

Approved:
Peter Nguyen
e signature-
30 Dec 2021

Run Information	Run 1
Filename	211222005.D
Run Date	12/22/2021 11:54
Final Volume	0.1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD 5
Column	HP 5MS US1306512H

Target Analytes	ug spiked	Ret. Time	%	Flags	Limits
Naphthalene	100	2.80	120		50-150
2-Methylnaphthalene	100	3.38	90		50-150
1-Methylnaphthalene	100	3.50	96		50-150
Acenaphthylene	100	4.52	106		50-150
Acenaphthene	100	4.82	84		50-150
Fluorene	100	5.74	84		50-150
Phenanthrene	100	7.93	111		50-150
Anthracene	100	8.05	115		50-150
Fluoranthene	100	11.33	105		50-150
Pyrene	100	11.97	112		50-150
Benzo(a)Anthracene	100	15.87	101		50-150
Chrysene	100	15.99	108	R	50-150
Benzo(b)Fluoranthene	100	19.19	97	R	50-150
Benzo(k)Fluoranthene	100	19.27	116	R	50-150
Benzo(e)Pyrene	100	19.94	112 M		50-150
Benzo(a)Pyrene	100	20.07	99		50-150
Perylene	100	20.31	106		50-150
Indeno(1,2,3-cd)Pyrene	100	23.75	100		50-150
Dibenzo(a,h)Anthracene	100	23.95	104		50-150
Benzo(g,h,i)Perylene	100	24.73	95	R	50-150
Additional Analytes					
Tetralin	100	2.68	4	B	
Biphenyl	100	3.91	119		
o-Terphenyl	100	NotFnd	0 M	R	
Benzo(a)fluorene	100	NotFnd	0 M	R	
Benzo(b)fluorene	100	NotFnd	0 M	R	
Field Sampling Standards	**ng spiked**		**% Rec**		
1-Methylnaphthalene-D10			NS		
Fluorene D10			NS		
Terphenyl D14(Surr.)			NS		
Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	100	2.79	19	R	30-150
2-Methylnaphthalene-D10	100	3.35	25		30-150
Acenaphthylene D8	100	4.50	21		30-150
Phenanthrene D10	100	7.88	28		50-150
Anthracene-D10	100	8.00	25		50-150
Fluoranthene D10	100	11.27	33		50-150
Benz(a)Anthracene-D12	100	15.80	34		50-150
Chrysene D12	100	15.91	33		50-150
Benzo(b)Fluoranthene-D12	100	19.13	27		50-150
Benzo(k)Fluoranthene-D12	100	19.22	23	R	50-150
Benzo(a)Pyrene D12	100	20.01	30		30-150
Perylene D12	100	20.24	24		50-150
Indeno(1,2,3,cd)Pyrene-D12	100	23.67	27		50-150
Dibenz(a,h)Anthracene-D14	100	23.83	23		50-150
Benzo(g,h,i)Perylene D12	100	24.62	27		50-150

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.

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2669035-COFC
and L2669037

COC Number: 17 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	RWDI
Contact:	Matt Lantz
Phone:	519 823 1311
	Company address below will appear on the final report
Street:	600 Southgate Drive
City/Province:	Guelph, Ontario
Postal Code:	N1G 4P6
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	Matt.Lantz@rwdi.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Standard TAT is 15 business days. DTOX analysis standard TAT is 5 business days

PRIORITY (Business Days)		EMERGENCY
	15 day [R- Regular] ☐	5 Business day - DTOX [R - Regular]
	10 day [P-50%] ☐	3 Business day - DTOX [E - 100%]
	5 day [E-100%] ☐	

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information	
ALS Account # / Quote #:	
Job #:	DYEC
PO / AFE:	1803743 Phase 1000
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: Martin Town

Analysis Request

NUMBER OF CONTAINERS

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

SAMPLES ON HOLD

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	TSP, ICP on Hi-Vol Filter	PAH	DX
1	L2663690-2 - Rordie	323	30-Nov-21	24hr	Air		X	
1	742061	1706	24-Nov-21	24hr	Air	X		
2	742063	1718	30-Nov-21	24hr	Air	X		
2	L2663690-3 - Cortice	332	30-Nov-21	24hr	Air		X	
3	742062	1721	24-Nov-21	24hr	Air	X		
4	742064	1731	30-Nov-21	24hr	Air	X		
				24hr	Air			
				24hr	Air			
				24hr	Air			
				24hr	Air			
				24hr	Air			
				24hr	Air			
				24hr	Air			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human consumption/ use?
☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

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 °C			
3.9°C	11.3°C						

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	02-Dec-21	1200	AARON BILTON	3-Dec-2021	9:40			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 20

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.

Table B6: 2021 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	*MECP Criteria*	30-Nov-21	No. > Criteria
1-Methylnaphthalene	ng/m^3	*12000*	9.10	0
2-Methylnaphthalene	ng/m^3	*10000*	14.55	0
Acenaphthene	ng/m^3	-	1.17	-
Acenaphthylene	ng/m^3	*3500*	0.50	0
Anthracene	ng/m^3	*200*	0.28	0
Benzo(a)Anthracene	ng/m^3	-	0.07	-
Benzo(a)fluorene	ng/m^3	-	0.14	-
Benzo(a)Pyrene (Historically High)	ng/m^3	*0.05* [1] *5* [2] *1.1* [3]	0.08	1
Benzo(b)Fluoranthene	ng/m^3	-	0.17	-
Benzo(b)fluorene	ng/m^3	-	0.07	-
Benzo(e)Pyrene	ng/m^3	-	0.16	-
Benzo(g,h,i)Perylene	ng/m^3	-	0.13	-
Benzo(k)Fluoranthene	ng/m^3	-	0.15	-
Biphenyl	ng/m^3	-	4.15	-
Chrysene	ng/m^3	-	0.23	-
Dibenzo(a,h)Anthracene	ng/m^3	-	0.02	-
Fluoranthene	ng/m^3	-	0.71	-
Fluorene	ng/m^3	-	1.54	-
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	0.13	-
Naphthalene	ng/m^3	*22500*	47.06	0
o-Terphenyl	ng/m^3	-	0.03	-
Perylene	ng/m^3	-	0.02	-
Phenanthrene	ng/m^3	-	3.22	-
Pyrene	ng/m^3	-	0.56	-
Tetralin	ng/m^3	-	4.49	-
Total PAH[4]	ng/m^3	-	88.74	-

NOTE: All non-detectable results were reported as 1/2 of t

[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

Station: RofD Rundle Daily: 30/11/2021 Type: AVG 1 Hr. [5 in! ."

Date # Ti$ e	% 2.5	&'	&' 2	&' (	S' 2	) att in	Te$ perature * A$ +ient	Rain	Tr, Te$ p	RH AVG	Rain total	- S . $ // r	- D	Hi*Vol %re! ! ure	%0 1 %re! ! ure	Te$ perature * A$ +ient	Hi2ol 1lo3	%0 1 1lo3
	u4/$ 3	pp+	pp+	pp+	pp+	Volt!	5 6	$ $	5 6	7	$ $	. $ // r	De4	in H20	in H20	8	9f$	9f$
30/11/2021 00:00	11.3	: .;	1<.5	25.=	0.2<<	13.2	*2.2	0	22.2	=>.<	0	3.: 1	2: 3	; .1>	5; .>:	2<0.=2	; 2.=	: .25
30/11/2021 01:00	=.3	1; .1	20.:	3; .=	0.35>	13.2	*2.;	0	22.1	=<.;	0	3.: 5	2>=	; .1>	5; .12	2<0.<>2	; 2.=3	: .21
30/11/2021 02:00	: .:	15.1	13.<	2: .:	0.3<;	13.2	*3.3	0	22	=: .5	0	3.:	2<3	; .1:	5; .11	2>=.: =2	; 3.0=	: .22
30/11/2021 03:00	10.>	1: .3	1=.;	3<.<	0.; 3=	13.2	*; .1	0	22	==.=	0	1.: ;	103	; .1:	5; .23	2>=.102	; 3.1<	: .2;
30/11/2021 0; :00	10.3	20.;	1: .;	3: .:	0.; : 1	13.2	*;	0	22.1	100	0	1.=:	13>	; .1<	53.; 1	2>=.115	; 3.15	: .1:
30/11/2021 05:00	=.=	1; .>	15.<	30.3	0.352	13.2	*; .1	0	22	100	0	2.1>	<>	; .1>	52.2	2>=.0<	; 3.0<	: .1
30/11/2021 0>:00	12.1	11.1	13.:	25	0.25:	13.2	*3.>	0	22	100	0	2.05	; <	; .15	51.35	2>=.505	; 2.=:	: .03
30/11/2021 0<:00	12.5	=.2	1:	2<.2	0.23:	13.2	*2.<	0	22	100	0	2.1>	110	; .1;	51.33	2<0.; >3	; 2.: 5	: .02
30/11/2021 0: :00	13.=	: .:	1>.;	25.2	0.252	13.2	*1.<	0	22	100	0	1.:	?Sa$ p	; .12	51.0;	2<1.; >>	; 2.>>	<.=:
30/11/2021 0=:00	15.:	<.:	13.5	21.3	0.2:	13.2	*1.1	0	21.=	100	0	1.=	; 2	; .0=	50.<	2<2.0<>	; 2.; >	<.=5
30/11/2021 10:00	15.<	11.=	1>.<	2: .>	0.; 11	13.2	*0.;	0	21.<	100	0	2.: 2	3;	; .0<	50.55	2<2.<<	; 2.31	<.=3
30/11/2021 11:00	=.2	>.>	13	1=.>	0.32>	13.2	0	0	21.=	100	0.0:	3.3	5:	; .0<	50.31	2<3.1=1	; 2.2=	<.=1
30/11/2021 12:00	: .;	3	=.:	12.:	0.2: :	13.2	0.;	0	22	100	0.13	3.=<	=2	; .0>	50.3=	2<3.5<:	; 2.2	<.=1
30/11/2021 13:00	>.2	5.<	5.<	11.3	0.3>2	13.2	1.1	0	21.:	100	0.02	5.1;	=>	; .0>	50.5=	2<; .2; =	; 2.11	<.=2
30/11/2021 1; :00	>	1.2	5.1	>.3	0.311	13.2	1.2	0	21.=	100	0	3.2>	1; :	; .0;	50.<	2<; .33<	; 2.05	<.=2
30/11/2021 15:00	=.>	0.5	5.:	>.;	0.25;	13.2	1.2	0	21.=	100	0.13	1.0;	?Sa$ p	; .05	50.><	2<; .32>	; 2.0<	<.=2
30/11/2021 1>:00	11.>	5 ali+	5 ali+	5 ali+	0.2><	13.2	1	0	22	100	0.02	2.2	?Sa$ p	; .03	; =.: 3	2<; .12=	; 2.01	<.: >
30/11/2021 1<:00	=.:	5 ali+	5 ali+	5 ali+	5 ali+	13.2	0.=	0	22	100	0.1<	; .<:	2>1	; .03	; =.>5	2<; .005	; 2.02	<.: 5
30/11/2021 1: :00	5 ali+	2.>	20.;	23	5 ali+	13.2	1.3	0.2	23.1	100	0.13	>.>2	2>1	; .0;	; =.=2	2<; .; 11	; 2.03	<.: >
30/11/2021 1=:00	1=.>	0.=	12.<	13.>	0.; >1	13.2	2.2	0	21.=	=<.3	0.02	1<.1;	2; :	; .05	50.>1	2<5.352	; 2	<.=
30/11/2021 20:00	1: .=	1.1	1; .5	15.>	0.3=1	13.2	2.2	0	21.=	=; .5	0	1<.5:	251	; .05	50.<1	2<5.3: 5	; 1.=:	<.=1
30/11/2021 21:00	13.1	0.=	12.=	13.=	0.2=;	13.2	2.;	0	22	: 5.<	0	1<.>5	252	; .05	51.5>	2<5.513	; 2.01	<.=<
30/11/2021 22:00	>.=	1.>	12.2	13.:	0.2: ;	13.2	2.>	0	22	: ; .:	0	1>.><	253	; .0;	52.02	2<5.<5;	; 1.=2	:
30/11/2021 23:00	3.1	0.3	10.;	10.<	0.3;	13.2	2.<	0.1	22	<=.3	0.0:	1<.1<	25=	; .0;	52.; >	2<5.: ><	; 1.=	: .02
ini$ u$	3.1	0.3	5.1	>.3	0.23:	13.2	*; .1	0	21.<	<=.3	0	1.0;	3;	; .03	; =.>5	2>=.0<	; 1.=	<.: 5
inDate	23:00	23:00	1; :00	1; :00	<:00	0:00	3:00	0:00	10:00	23:00	0:00	15:00	10:00	1>:00	1<:00	5:00	23:00	1<:00
a@$ u$	1=.>	20.;	20.:	3: .:	0.; : 1	13.2	2.<	0.2	23.1	100	0.1<	1<.>5	2: 3	; .1:	5; .>:	2<5.: ><	; 3.1<	: .25
a@Date	1=:00	; :00	1:00	; :00	; :00	0:00	23:00	1: :00	1: :00	; :00	1<:00	21:00	0:00	2:00	0:00	23:00	3:00	0:00
A24	11	<.5	13.=	21.;	0.332	13.2	*0.;	0.3	22	=<.3	0.03	>.03	1>=	; .0=	51.55	2<2.<1:	; 2.; 2	:
&u$	23	22	22	22	22	2;	2;	2;	2;	2;	2;	2;	21	2;	2;	2;	2;	2;
Data[7 "	=5.: 3	=1.><	=1.><	=1.><	=1.><	100	100	100	100	100	100	100	: <.5	100	100	100	100	100
STD	3.=	>.1	; .;	=.5	0.1	&o Data	2.3	&o Data	0.2	5.>	0.1	5.=	=1.<	0.1	1.5	2.3	0.5	0.1

APPENDIX G

Technical Memorandum

Date: **February 10, 2022**

To: **Khalid Hussein, 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)**
2021 Ambient Air Q4 Sulphur Dioxide Emissions

In support of the 2021, 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.

For the SO_2 events recorded on October 1 and 4, both boilers were offline for the fall maintenance outage.

As indicated by RWDI in the 2021 DYEC Q4 Report, the Courtice Ambient Air Station pollution rose in Figure 7 shows that less than 0.01% of the 5-minute SO_2 events are elevated above 67 parts per billion (ppb). Exceedance concentrations during Q4 were recorded

with winds occurring from the north-northwest to north-northeast directions.

Each of the date and times of the SO_2 exceedances were compared against the wind direction recorded at the Courtice Ambient Air Station as well as the SO_2 concentrations measured at the DYEC. According to the DYEC's continuous emissions monitoring system (CEMS), when ambient SO_2 standards were exceeded in each of the 72, ten-minute events and 32 hourly events at the Courtice Road Ambient Air monitoring station, SO_2 CEMS concentrations for both boilers were well below the regulatory compliance limit of 35 mg/Rm^3. During the time the events occurred, both boilers CEMS concentrations, comprised of 24-hour rolling arithmetic average, were between 0-4 mg/Rm^3.

Due to the wind direction when the SO_2 events were recorded, it is possible that there was some contribution from the DYEC, however, DYEC CEMS concentration limits were not exceeded at any point in time during Q4.

APPENDIX H

ALS Environmental
1435 Norjohn Court, Unit 1
Burlington, Ontario, Canada L7L 0E6

February 11, 2022

To: **Claire Finoro,**
P.Eng., B.Sc. (Eng)
Project Manager
RWDI

Re: Loss of samples.

Hello

After further investigation of this batch issue, we did not determine anything that had gone wrong during the processing of the samples listed below. The samples were, however, extracted during an extremely busy period, and therefore sat on the benchtop for a number of weeks after extraction before they finished processing through the prep lab. This was the only thing that we could identify as a potential cause for the loss of PAH targets, though the root cause of the dioxin losses is still unclear.

As a corrective action going forward, we will ensure samples for volatile analyses like PAHs are prioritized to be processed through the lab as soon as possible. All analysts have also received further training as a reminder to perform strict checks of the Soxhlet reflux process to ensure samples are extracting correctly overnight.

Field ID	ALS LAB ID	Sampling Date	Analysis
RUNDLE-DX/PAH-AUG14	L2629436-1	August 14, 2021	PCDD, PCDF, PAH
COURTICE-DX/PAH-AUG14	L2629436-2	August 14, 2021	PCDD, PCDF, PAH

Alastair Blythe
Client Services Manager
ALS Environmental-Burlington
T +1 905 331 3111 D +1 905 340 0823
F +1 905 331 4567
Alastair.Blythe@alsglobal.com

APPENDIX I

ALS Environmental
1435 Norjohn Court
Burlington, Ontario, Canada L7L 0E6
T +1 905 331 3111 F +1 905 331 4567

right solutions.
right partner.

March 9th, 2022

Claire Finoro
RWDI
600 Southgate Road
Guelph ON N1G 4P6
Claire.Finoro@rwdi.com

Dear Ms. Finoro

Re: CAR21962 re Missed Carry-Over and Biased Data

Thank you for your patience on the final reports for the PCDD/F data for the submission L2647796, which was originally reported biased high due to sample carry-over.

Enclosed are the details from the completed investigation and subsequent corrective and preventative actions. The root cause was assessed to be derived from inadequate processes or documentation on how individuals need to evaluate sample data with potential carry-over. Also enclosed is the additional standard operating documentation, which has been implemented as a preventative measure to ensure that such an incident does not occur again.

ALS thanks you for bringing this outlier in data to our attention since your inquiry did initiate our formal process used to ensure continuous improvement on our analytical services.

Sincerely,

Ron McLeod, Ph.D.
Technical Director, ALS Burlington
ron.mcleod@alsglobal.com

Corrective Action Report

Initiated By:	**FKHALILI**	**CAR ID:**	**CAR21962**
Initiated Date:	**18-Feb-2022**		

Request Type:	NONCONFORMANCE	**CAR Source:**	EXTERNAL
Location:	BURLINGTON	**Recheck # (if applicable):**	
Address:	1435 Norjohn Court, Unit 1, Burlington, ON, L7L 0E6 Canada	**Department:**	86245
Phone Number:	(905) 331-3111	**Account Number:**	23601
Client Contact:	Claire Finoro	**Account Name:**	RWDI AIR INC. (Guelph)
Workorder:	L2647796		

Reason: **Client complaint**

Significant NC: YES **Priority:** **Assigned To Manager:** RMCLEOD

Summary of Issue: Unexpected high DX result reported to client. There is a possibility of instrument carry over from previously run high grade sample.

(30-Nov-21) Data reported with comment about low recoveries and notice that L2647796-1 failed client spec for Dx. (16-Feb-22) Client asked for further explanation of the comment and its effect on the results, as well as if sample could be reanalyzed.
Upon further investigation of the results, it was found that the sample results were affected by instrument background from a prior higher level sample. Re-analysis of the sample was performed.

Remedial Action

Remedial Details: Both the extract and archive portions will be analyzed to investigate the issue.

1) Ron McLeod called client (17-Feb) with an update on the investigation. Will send an email 18-Feb to client explaining what happened.
2) We will clean up the archived portion of all sample extracts in the batch and clean for re-analysis. This for reporting by Feb-23.
3) Ron will report the re-injection data as preliminary data (recoveries are poor; there is potential for syringe cross contamination of the vial. The revised report needs to be 'clean' of imperfections and defendable), so that client can see the values are now below their action limit.
4) A CAR will be initiated. A copy of the CAR documentation will be sent to the client once completed. The client wishes to see a commitment on an action plan to ensure this does not happen in future.

Cause Analysis

Root Cause Investigation and Conclusion: The HRMS analyst who performed this analysis did not identify the issue of carryover from the injection of the prior sample in the sequence, which was very high level. This was not an oversight or lack of due diligence - the check for carryover was performed and this case was not deemed to be suspicious. The amount of carryover from that sample was certainly more excessive than would normally be expected during the analysis of samples on this type of instrument. A more stringent and cautious procedure needs to be implemented to identify such cases. Root Cause: Inadequate systems and documentation.

Corrective Action Report

Initiated By:	**FKHALILI**	**CAR ID:**	**CAR21962**
Initiated Date:	**18-Feb-2022**		

Corrective Action Plan	
Corrective Action Plan:	A variance was drafted and added to BU-WI-3007 GCMS Operation outlining new and more proactive procedures for assessment of instrument data for carry-over and contamination. See attached. Staff have been given a training session regarding the new procedures.
Task Required:	NO

QA Review			
QA Comment:			
QA Review By:		**QA Verification Date:**	

Audit Required:	NO	**Audit Completion Date:**	

ALS Canada Variance

NA-SP-0425

Branch:	Burlington
Variance ID:	BU-VR-0011 v01
Title:	Requirements for Assessing Instrument Carryover and Contamination
Initiator:	Bradley Reimer
Technical Authorization By:	Ron McLeod
Technical Authorization Date:	9-Mar-22

Applies to the following documents (ID and Short Name):
BU-WI-3007 GCMS Operation

Detailed Description of Variance:
Section 5.3.2.3 Checking Instrument Operation shall have the following Section added

3. Each Instrument 12-Hour run sequence and before injection of samples must include a check for potential instrument carryover and contamination. In addition, sample to sample carryover must be assessed for each sample within the sequence:

- A solvent (ideally containing labeled surrogates for exact numerical calculation of carryover) must be injected following the pre-run analysis of standard materials (Continuing Calibration Verification or Laboratory Control Sample). The solvent should be the same as that in the standard injection, and injected at the same volume.
- Carryover/contamination must be calculated in the daily check by peak area comparison, and recorded on the run log for at least a representative pair of analytes. Any contamination greater than 1% must be investigated and corrected.
- Sample-to-sample carryover assessment: If the level of a compound in a sample is less than 10% of it's level in the prior injection (by peak area) that sample must be re-injected for potential carry-over.
- Exception: An exception to the sample re-injection may be considered and approved if the target(s) of carry-over concern represent a minor contribution to the overall sample contamination. For example a 30% potential bias on OCDD may not be of concern in a sample with the PCDD/F toxic equivalence dominated by other targets. Such decisions must be approved by a supervisor and documented on the validation checklist page.
- In some cases there is evidence that the GC system has become contaminated with a compound (often a higher-boiling native analyte) so that many of the injections in a sequence are significantly impacted by this contamination. When this condition exists, data must be assessed before results can be accepted and reported.
- In some cases, comparison of patterns within samples of similar or dissimilar origin may also provide a clue as to whether results are authentic. Any pattern evidence for significant carryover requires sample reinjection. Also, compelling pattern evidence that contamination is not biased by carryover represents a potential case where reinjection may not be necessary. Such decisions must be approved by a supervisor and documented on the validation checklist page.
- Samples from various sources may have much different expected or concerning levels as well. Efforts must be made to avoid running higher level samples together with samples that are expected to contain lower levels, and to exercise diligence in identifying when levels in a lower level sample may not be authentic.

Reason and Technical Justification for Variance:

Not documented adequately previously. Response to CAR21962.

QA Reviewed By:	
Date of QA Review:	