



# DURHAM YORK ENERGY CENTRE

COURTICE, ONTARIO

# 2019 Q4 AMBIENT AIR QUALITY MONITORING REPORT RWDI #1803743 February 10, 2020

### SUBMITTED TO:

The Director, Legislative Services-Regional Clerk or Designate,

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

CC:

Gioseph Anello Gioseph.anello@durham.ca

Lyndsay Waller Lyndsay.Waller@durham.ca

Andrew Evans Andrew.Evans@durham.ca

### SUBMITTED BY:

John DeYoe, B.A. Air Quality Specialist – Principal John.DeYoe@rwdi.com

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



This document is intended for the sole use of the party to whom it is addressed and may contain information that is privileged and/or confidential. If you have received this in error, please notify us immediately. Accessible document formats provided upon request. © RWDI name and logo are registered trademarks in Canada and the United States of America



# TABLE OF CONTENTS

AIR QUALITY CRITERIA AND STANDARDS. MECP AUDITS SUMMARY OF AMBIENT MEASUREMENTS Meteorological Station Results Courtice Station Results Rundle Road Station Results.	7 7 7 8 9
AIR QUALITY CRITERIA AND STANDARDS. MECP AUDITS SUMMARY OF AMBIENT MEASUREMENTS. Meteorological Station Results Courtice Station Results	7 7 7
AIR QUALITY CRITERIA AND STANDARDS	7 7 7
AIR QUALITY CRITERIA AND STANDARDS MECP AUDITS SUMMARY OF AMBIENT MEASUREMENTS	7 7 7
AIR QUALITY CRITERIA AND STANDARDS	7 7
AIR QUALITY CRITERIA AND STANDARDS	7
Meteorological Towers	6
Polyurethane Foam Samplers	6
TSP High Volume Air Samplers	6
SHARP 5030 PM <sub>2.5</sub> Analyzers	5
Sulphur Dioxide Analyzers	5
Nitrogen Oxide Analyzers	4
SAMPLING METHODOLOGY	4
Sampling Locations	3
	1
	INTRODUCTION Sampling Locations SAMPLING METHODOLOGY Nitrogen Oxide Analyzers Sulphur Dioxide Analyzers SHARP 5030 PM <sub>2.5</sub> Analyzers TSP High Volume Air Samplers Polyurethane Foam Samplers

)	17	.1
4		4

5.3	Oxides of Nitrogen Results	
5.3.1	Courtice Station Results	12
5.3.2	Rundle Road Station Results	13
5.4	Sulphur Dioxide Results	
5.4.1	Courtice Station Results	15
5.4.2	Rundle Road Station Results	15
5.5	Fine Particulate Matter (PM <sub>2.5</sub> ) Results	
5.5.1	Courtice Station Results	17
5.5.2	Rundle Road Station Results	17
5.6	TSP and Metals Hi-Vol Results	
5.6.1	Courtice Station Results	19
5.6.2	Rundle Road Station Results	21
5.7	PAH Results	22
5.7.1	Courtice Station Results	22
5.7.2	Rundle Road Station Results	23
5.8	Dioxin and Furan Results	24
5.8.1	Courtice Station Results	24
5.8.2	Rundle Road Station Results	25
6	DATA REQUESTS	26
6.1	Courtice Road Station	26
6.2	Rundle Road Station	27
7	CONCLUSIONS	28
8	REFERENCES	28



# LIST OF TABLES

- Table 1:
   Hourly Statistics from the Courtice WPCP Meteorological Station
- Table 2:Hourly Statistics from the Rundle Road Meteorological Station
- Table 3:
   Summary of Percent Valid Data for Courtice Station
- Table 4:
   Summary of Percent Valid Data for Rundle Road Station
- Table 5:Summary of Exceedance Statistics
- Table 6: Summary of TSP Sampler Courtice Station
- Table 7:Summary of TSP Sampler Rundle Road Station
- Table 8:
   Statistics Summary of PAH Results for Courtice Station
- Table 9:
   Statistics Summary of PAH Results for Rundle Road Station
- Table 10:
   Courtice Station Q4 Monitoring Results for Dioxins and Furans
- Table 11:
   Rundle Road Station Q4 Monitoring Results for Dioxins and Furans

# LIST OF FIGURES

- Figure 1: DYEC Site and Ambient Monitoring Station Locations
- Figure 2: Rundle Road Station
- Figure 3: Courtice Station
- Figure 4: Courtice and Rundle Wind Roses
- Figure 5: Pollution Roses of Hourly Average NO<sub>2</sub> Concentrations October to December 2019
- Figure 6: Pollution Roses of Hourly Average SO<sub>2</sub> Concentrations October to December 2019
- Figure 7: Pollution Roses of Hourly Average PM<sub>2.5</sub> Concentrations October to December 2019

# RN

# LIST OF APPENDICES

Appendix	A1:	2019 Summary Statistics for Q4
••	A2:	2019 Q4 Station Courtice Monitoring Results for PM <sub>2.5</sub>
	A3:	2019 Q4 Station Rundle Monitoring Results for PM <sub>2.5</sub>
	A4:	2019 Q4 Station Courtice Monitoring Results for NO <sub>X</sub>
	A5:	2019 Q4 Station Rundle Monitoring Results for NO <sub>X</sub>
	A6:	2019 Q4 Station Courtice Monitoring Results for NO
	A7:	2019 Q4 Station Rundle Monitoring Results for NO
	A8:	2019 Q4 Station Courtice Monitoring Results for NO <sub>2</sub>
	A9:	2019 Q4 Station Rundle Monitoring Results for NO <sub>2</sub>
	A10:	2019 Q4 Station Courtice Monitoring Results for SO <sub>2</sub>
	A11:	2019 Q4 Station Rundle Monitoring Results for SO <sub>2</sub>
	A12:	2019 Q4 Courtice Meteorological Station Windspeed Data Summary
	A13:	2019 Q4 Rundle Meteorological Station Windspeed Data Summary
	A14:	2019 Q4 Courtice Meteorological Station Wind Direction Data Summary
	A15:	2019 Q4 Rundle Meteorological Station Wind Direction Data Summary
	A16:	2019 Q4 Courtice Meteorological Station Temperature Data Summary
	A17:	2019 Q4 Rundle Meteorological Station Temperature Data Summary
	A18:	2019 Q4 Courtice Meteorological Station Relative Humidity Summary
	A19:	2019 Q4 Rundle Meteorological Station Relative Humidity Summary
	A20:	2019 Q4 Courtice Meteorological Station Precipitation Data Summary
	A21:	2019 Q4 Rundle Meteorological Station Precipitation Data Summary
	A22:	2019 Q4 Courtice Meteorological Station Pressure Data Summary
Appendix	<b>B1</b> :	Summary of Sample Flow Rate and Sample Duration for Dioxins & Furans
	B2:	2019 Courtice Station Q4 Monitoring Results for Dioxins & Furans
	B3:	2019 Rundle Station Q4 Monitoring Results for Dioxins & Furans
	B4:	Summary of Sample Flow Rate and Sample Duration for Polycyclic Aromatic Hydrocarbons (PAH)
	B5:	Courtice Station Q4 Monitoring Results for PAH's
	B6:	Rundle Station Q4 Monitoring Results for PAH's
	B7:	Summary of Sample Flow Rate and Sample Duration for Total Suspended Particulate (TSP) and
		Metals
	B8:	2019 Courtice Station Q4 Monitoring Results for TSP and Metals
	B9:	2019 Rundle Station Q4 Monitoring Results for TSP and Metals
Appendix	C:	2019 Q4 Courtice and Rundle Road Station Zero Graphs

Appendix D1:	4th Quarter Edit Log for PM <sub>2.5</sub> at Courtice Station
D2:	4th Quarter Edit Log for PM <sub>2.5</sub> at Rundle Road Station
D3:	4th Quarter Edit Log for NO <sub>X</sub> at Courtice Station
D4:	4th Quarter Edit Log for NO <sub>X</sub> at Rundle Road Station
D5:	4th Quarter Edit Log for SO <sub>2</sub> at Courtice Station
D6:	4th Quarter Edit Log for SO <sub>2</sub> at Rundle Road Station
D7:	4th Quarter Edit Log for Meteorological Parameters at Courtice Station
D8:	4th Quarter Edit Log for Meteorological Parameters at Rundle Road Station
D9:	4th Quarter Edit Log for Non-Continuous at Courtice Station
D10:	4th Quarter Edit Log for Non-Continuous at Rundle Station
Appendix E1:	November 17th Exceedance Documentation for Courtice and Rundle Road Stations
E2:	December 23 <sup>rd</sup> Exceedance Documentation for Courtice and Rundle Road Stations

# **1** INTRODUCTION

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

Condition 11 of the Environmental Assessment Notice of Approval and Condition 7(4) of the Environmental Compliance Approval (ECA) requires ambient air monitoring to be undertaken by the DYEC. An Ambient Air Monitoring and Reporting Plan was prepared and approved by the Ministry of Environment, Conservation and Parks (MECP) to satisfy these conditions. 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 October 31, 2018. RWDI has overseen the operation of the stations on behalf of the Region of Durham since August 1, 2018.

The Courtice and Rundle Road Stations continuously monitor the following air quality parameters: Particulate Matter less than 2.5 microns (PM2.5), Nitrogen Oxides (NO<sub>X</sub>) and Sulfur Dioxide (SO<sub>2</sub>). In addition, both discretely monitor the following air quality parameters: Total Suspended Particulate (TSP), Metals, Dioxins and Furans (D&F) and Polycyclic Aromatic Hydrocarbons (PAHs).

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

Throughout this monitoring period, there were four (4) exceedances of the AAQC for Benzo(a) Pyrene in Q4; two (2) occurred on November 17 at the Courtice and Rundle Road stations, and two (2) occurred on December 23 at the Courtice and Rundle Road station. Data recovery rates were acceptable and valid for all measured Q4 parameters with the exception of wind direction (50.6% valid for Q4) and PAH's (71% valid for Q4) at the Rundle Road station.

Q4 AMBIENT AIR QUALITY MONITORING REPORT THE REGIONAL MUNICIPALITY OF DURHAM

RWDI#1803743 February 10, 2020







# **1.1 Sampling Locations**

The Station sites were selected in consultation with MECP and Region of Durham representatives at the onset of the program and were chosen based on considerations of nearby receptors and agreeability with MECP siting criteria. The Courtice Station is predominantly upwind of the DYEC and is located on the Courtice WPCP property just southwest of the DYEC. The Rundle Road Station is predominantly downwind of the DYEC and is located just southeast of the intersection of Baseline Road and Rundle Road just northeast of the DYEC. 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<sub>2.5</sub> analyzer), Teledyne Nitrogen Oxides Analyzer Model T200 (NO<sub>X</sub> analyzer), and a Teledyne Sulfur Dioxide Analyzer Model T100 (SO<sub>2</sub> 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<sub>X</sub>) 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<sub>X</sub>) (the sum of NO and NO<sub>2</sub>), and nitrogen dioxide (NO<sub>2</sub>). 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<sub>3</sub>). The NO and O<sub>3</sub> 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<sub>X</sub> (NO+NO<sub>2</sub>) measurement, sample gas is periodically bypassed through a heated molybdenum converter cartridge that converts any NO<sub>2</sub> 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<sub>2</sub> producing a NO<sub>X</sub> measurement. The resultant NO<sub>2</sub> determination is the NO<sub>X</sub> measurement subtracted from the NO measurement.

The NO<sub>x</sub> analyzers were zero and span checked daily using the internal zero and span (IZS) system and calibrated once a month using either EPA protocol span gases and a dilution system or an ESA permeation tube calibrator. Automatic IZS checks were performed on a daily basis commencing at approximately 1:45 on one day and ending at 02:10 the same day. The checks consisted of a 10-minute zero check, a 10-minute span check and a 5-minute purge. These checks provide a way to monitor daily performance of the analyzer using an external charcoal and purafil zeroing cartridge for the zero, and an internal permeation oven with a permeation tube for the span. These IZS checks are not for calibration purposes but are merely a diagnostic tool to identify instrument drift.

The instrument collects data using its own data acquisition system (DAS) on a 5-minute interval. Data is collected from the instrument directly which is attached to an Envidas computer. The computer 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<sub>2</sub>) Analyzer is a microprocessor-controlled analyzer that determines the concentration of SO<sub>2</sub> in a sample gas drawn through the instrument. In the sample chamber, sample gas is excited by ultraviolet light causing the SO<sub>2</sub> to absorb energy from the light and move to an active state (SO<sub>2</sub>\*). These active SO<sub>2</sub>\* molecules must decay into a stable state back to SO<sub>2</sub>, 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<sub>2</sub> present in the sample gas.

The SO<sub>2</sub> 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 on one day and ending at 02:10 the same day. The checks consisted of a 10-minute zero check, a 10-minute span check and a 5-minute purge. These checks provide a way to monitor daily performance of the analyzer using an external charcoal and purafil zeroing cartridge for the zero, and an internal permeation oven with a permeation tube for the span. These IZS checks are not for calibration purposes but are merely a diagnostic tool to identify instrument drift.

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

# 2.3 SHARP 5030 PM<sub>2.5</sub> 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<sub>2.5</sub> 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 which is attached to an Envidas computer. The computer 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 TSP (Total Suspended Particulate) high volumetric air samplers (Hi-Vols) were outfitted with a TSP inlet capable of collecting particulate of all aerodynamic diameters. Each Hi-Vol is equipped with a mass flow controller, which ensures a flow rate of 40 cubic feet per minute (CFM). The previous timer and chart recorder system has been replaced with an automated relay system controlled by a data logger to toggle the sampler on and off. The chart recorder system was replaced by a digital pressure transducer that records the blower output pressure (flow) during the sample duration. The Hi-Vols have Teflon coated glass fibre filters that are outfitted at the top of the sampler, and air is drawn through the filter, thereby collecting all TSP. All of the TSP Hi-Vols operate on a six-day cycle, each consisting of 24-hour (midnight to midnight) samples, concurrent with the National Air Pollution Surveillance (NAPS) schedule. Each Hi-Vol is calibrated monthly to ensure accuracy and validity of the volume of air drawn through the filter.

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

# 2.5 Polyurethane Foam Samplers

The Dioxins, Furans, and PAH samples were collected using Tisch TE-1000 samplers which are listed as reference devices for U.S. EPA Methods TO-9 and TO-13. The samplers use a collection filter that is 'backed-up' by a polyurethane foam (PUF) plug. The airborne compounds present in the particulate phase are collected on the Teflon coated glass fibre filter and any compounds present in the vapour phase are absorbed in the PUF plug. At the start of August 2019, the PUF media was changed to include two PUF plugs enclosing XAD material. This was a recommendation from ALS Laboratories to achieve lower detection limits due to the stability of the compounds being absorbed into the XAD material. Each PUF sampler is equipped with a blower which can sustain 8 cubic feet per minute (CFM) of flow over the sampling duration. The previous timer system has been replaced with an automated relay system controlled by a data logger to toggle the sampler on and off. A digital pressure transducer that records the blower output pressure (flow) during the sample duration was also added. All PUF samplers operate on a twelve-day cycle, each consisting of 24-hour (midnight to midnight) samples, concurrent with the NAPS schedule. Every twelve days, the PUF plugs and filters are analyzed for PAH's, and every twenty-four days they are analyzed for both PAH's and D&F's. Each PUF sampler is calibrated monthly to ensure accuracy and validity of the volume of air drawn through the filters.

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

# 2.6 Meteorological Towers

Meteorological data was collected from the Rundle and Courtice Stations. This is done so that a vector could be associated with the applicable contaminant concentrations. The Rundle and Courtice Stations are outfitted with a Campbell Scientific HMP60 Temperature / Relative Humidity probe, and a Texas Instruments TE525M rain gauge. Meteorological data was collected at 1-minute intervals and was averaged using Envista processing software over a 1-hour period.



# 3 AIR QUALITY CRITERIA AND STANDARDS

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

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

# 4 MECP AUDITS

There was no MECP audit during Q4.

# 5 SUMMARY OF AMBIENT MEASUREMENTS

Ambient air quality monitoring results for all contaminants sampled at the Courtice and Rundle Road Stations are discussed herein. Summary statistics from October 1, 2019 to December 31, 2019 are presented in a summary format below and in a more detailed matrix format in **Appendix A** for continuous measurements and **Appendix B** for discrete measurements.



# 5.1 Meteorological Station Results

# **5.1.1 Courtice Station Results**

The Courtice Station collected the following meteorological parameters: relative humidity, ambient temperature, ambient pressure and precipitation. For purposes of this report, wind speed and wind direction data for the Courtice Station have been obtained from the adjacent Courtice Water Pollution Control Plant (WPCP) meteorological tower, which is approximately 20 meters tall. The Courtice Station maintained a minimum 99.9% of data collection for all of the parameters measured during Q4. It should be noted that the wind direction data from the WPCP station is configured as 'blowing to' as opposed to 'blowing from', which is more commonly seen. The direction reference was changed by WPCP staff on November 14 at 11:00 to agree with the Rundle Road station as 'blowing from'. The WPCP wind direction data was adjusted from 'blowing to' to 'blowing from' in the windrose figures attached in the time period of October 1 to November 14 at 11:00 but was left unadjusted in the raw data tables and statistics. Hourly statistics from the meteorological station are presented in Table 1. A wind rose showing trends in wind speed and wind direction during Q4 is provided in **Figure 4**.

Courtice Station MET Statistics		Maximu	ım 1 hr N	lean		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			(%	6)		
October	69	23	97	30.2	8.7	0	1	36	29.0	0.0	13	11	74	29.7	0.1	104.3	100.0	100.0	99.9	99.9	99.9	99.7
November	61	9	96	30.4	2.1	0	-15	39	29.1	0.0	13	1	71	29.8	0.0	28.5	100.0	100.0	99.9	96.6	99.9	100.0
December	42	8	96	30.4	3.4	1	-18	44	29.0	0.0	13	-1	73	29.7	0.1	69.2	99.6	99.6	100.0	100.0	100.0	100.0
Q4 Arithmetic Mean											13	4	73	29.7	0.1	202.0	99.9	99.9	99.9	99.9	99.9	99.9

#### Table 1: Hourly Statistics from the Courtice Station and WPCP (WS and WD) Meteorological Station

### 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 50.6% data collection for all of the meteorological parameters measured during Q4. Hourly statistics from the meteorological station is presented in Table 2. A wind rose showing trends in wind speed and wind direction during Q4 is provided in **Figure 4**. The wind rose incorporated wind speed and wind direction data from the Courtice Station from October 1 to November 14 at 12:00 due to a wind head malfunction at the Rundle Station during that time. The missing data was a result of a wiring issue at the Rundle station that was resolved on November 14.

#### Table 2: Hourly Statistics from the Rundle Road Meteorological Station

Rundle Station MET Statistics	ation MET stics Maximum 1 hr Mean					Minimum 1 hr Mean				Monthly Mean				% 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	46	25	99	13.3	0	0	35	0.0	9	10	77	0.2	132.6	99.7	3.6	99.7	99.7	99.9
November	41	10	99	3.0	0	-16	40	0.0	10	1	75	0.0	25.5	99.9	53.2	100.0	100.0	100.0
December	36	8	99	3.7	0	-18	45	0.0	11	-1	77	0.1	58.2	100.0	96.4	100.0	100.0	100.0
Q4 Arithmetic Mean									10	3	76	0.1	216.3	99.9	50.6	99.9	99.9	100.0



Q4 AMBIENT AIR QUALITY MONITORING REPORT THE REGIONAL MUNICIPALITY OF DURHAM RWDI #1803743 February 10, 2020

Figure 4. Wind Roses of Hourly Wind Speed and Wind Direction – October to December 2019



Note: Rundle Station Wind Rose incorporated wind speed and direction data from the Courtice Station from October 1 to November 14.



# 5.2 NO<sub>x</sub>, SO<sub>2</sub> and PM<sub>2.5</sub> Summary Table Results

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

Courtice Monitoring Station Data Statistics		Мах	imum 1 hr	Mean		Maximum 24 hr Rolling Mean				Monthly Mean					% Valid Hours					
Compound	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>
Units	(µg/m³)		ŗ	opb		(µg/m³) ppb				(µg/m³)	) Ppb				(%)					
AAQC					250	28 <sup>A</sup> 100 100			100											
October	16	16 75 58			49	11	27	16	12	12	5	8	2	6	2	99.3	99.5	99.5	99.5	99.5
November	43	77	50	30	54	29	39	20	21	19	8	9	3	7	2	99.7	99.7	99.7	99.7	90.0
December	46	46 58 29			31	25	20	5	16	9	8	9	1	8	2	99.9	99.7	99.7	99.7	99.7
Q4 Arithmetic Mean										7	9	2	7	2	99.6	99.6	99.6	99.6	96.5	

#### Table 3: Summary of Percent Valid Data for Courtice Station

<sup>A</sup> The 24-hour PM<sub>2.5</sub> criterion applies to the 98<sup>th</sup> percentile over 3 consecutive years.

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

Rundle Monitoring Station Data Statistics		Мах	imum 1 hr	Mean		Maximum 24 hr Rolling Mean				Monthly Mean					% Valid Hours					
Compound	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>
Units	(µg/m <sup>3</sup> )	m <sup>3</sup> ) ppb				(µg/m³) ppb				(µg/m <sup>3</sup> )		F	pp		(%)					
AAQC		200 2			250	28 <sup>A</sup>	100 100													
October	22	33	22	16	12	9	8	3	7	2	4	4	1	3	0	97.8	98.5	98.5	98.5	92.6
November	36	22         33         22           36         276         219			5	23	28	15	15	1	7	8	2	6	0	99.7	99.6	99.6	99.6	99.0
December	49 37 17 26 7			7	25	19 3 16 1			1	7	7	1	6	0	99.7	99.2	99.2	99.2	99.7	
Q4 Arithmetic Mean										6	6	1	5	0	99.1	99.1	99.1	99.1	97.1	

<sup>A</sup> The 24-hour PM<sub>2.5</sub> criterion applies to the 98th percentile over 3 consecutive years.





#### Table 5: Summary of Exceedance Statistics

Event Statistics	Mean Courtice	> 1 hr AA Monitorin	QC for g Station	Mean Rundle	> 1 hr AA Monitorin	QC for g Station	Rollir AAQ Mon	ng Mean > C for Cou itoring Sta	24 hr rtice tion	Rolling Mean > 24 hr AAQC for Rundle Monitoring Station				
Compound	PM2.5	NO <sub>2</sub>	SO <sub>2</sub>	PM2.5	NO <sub>2</sub>	SO <sub>2</sub>	PM2.5	NO <sub>2</sub>	SO <sub>2</sub>	PM2.5	NO <sub>2</sub>	SO <sub>2</sub>		
Units	No.			No.				No.		No.				
October		0	0		0	0	N/A	0	0	N/A	0	0		
November		0	0		0	0	N/A	0	0	N/A	0	0		
December	-	0	0		0	0	N/A	0	0	N/A	0	0		
Q4 Arithmetic Mean	0 0			0	0	N/A	0	0	N/A	0	0			

# 5.3 Oxides of Nitrogen Results

### 5.3.1 Courtice Station Results

Data recovery levels were high for oxides of nitrogen (99.6% valid data). Monitoring results were compared to the AAQC for NO<sub>2</sub> 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<sub>X</sub>). There were no exceedances above the AAQC values for the entirety of the sampling period for 1-hour and 24-hour averaged data. The highest NO<sub>2</sub> value seen among the 1-hour averages was 30 ppb, which is 15% of the AAQC. The highest NO<sub>2</sub> value seen among the rolling 24-hour averages was 21 ppb, which is 21% of the AAQC. The measurements are summarized in Table 3 above. A pollution rose is presented in **Figure 5** for the Courtice Station during Q4 composed of hourly average NO<sub>2</sub> concentrations. A pollution rose indicates the percentage of time that the wind originates from a given direction coupled with the pollutant measurement for that time in either ppb or micrograms per meter cubed. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation.

The pollution rose from the Courtice Station shows the majority of the NO<sub>2</sub> impacts were very similar to the general distribution of winds. The northeast and eastnortheast components could be from DYEC and other traffic activity in that direction with the other parts of that lobe likely attributed to roadway traffic emissions. There are also some larger impacts from the west and west-southwest which is likely from surrounding industry along the lakeshore and roadway traffic emissions.



# 5.3.2 Rundle Road Station Results

Data recovery levels were high for oxides of nitrogen (99.1% valid data). There were no exceedances above the AAQC values for the entirety of the sampling period for 1-hour and 24-hour averaged data. The highest NO<sub>2</sub> value seen among the 1-hour averages was 57 ppb, which is 28.5% of the AAQC. The highest NO<sub>2</sub> value seen among the rolling 24-hour averages was 16 ppb, which is 16% of the AAQC. The measurements are summarized in Table 4 above. A pollution rose is presented in **Figure 5** for the Rundle Road Station during Q4 composed of hourly average NO<sub>2</sub> concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation. The pollution rose was composed of Courtice WD data from October 1 00:00 – November 14 12:00 and Rundle Road WD data from November 14 13:00 – December 31 23:00, as there was a windhead wiring issue at the Rundle Road station that occurred at the start of October and was resolved mid-November.

The pollution rose below shows that the majority of elevated NO<sub>2</sub> events at the Rundle Station occurred when winds were from the west and west-southwest which is in line with high traffic areas and urban background with a possible contribution from DYEC in the WSW quadrant. It is more likely that the DYEC was not a major contributor to NO<sub>2</sub> levels at the station.

Q4 AMBIENT AIR QUALITY MONITORING REPORT THE REGIONAL MUNICIPALITY OF DURHAM RWDI #1803743 February 10, 2020



#### Figure 5. Pollution Roses of Hourly Average NO<sub>2</sub> Concentrations – October to December 2019



Note: Rundle Station NO<sub>2</sub> Pollution Rose incorporated wind speed and direction data from the Courtice Station from October 1 to November 14.

# 5.4 Sulphur Dioxide Results

## 5.4.1 Courtice Station Results

Data recovery levels were high for sulphur dioxide (96.5% valid data). Monitoring results were compared to the AAQC for 1-hour and 24-hour rolling averaging periods. There were no exceedances above these AAQC values for the entirety of the sampling period for 1-hour and 24-hour averaged data. The highest SO<sub>2</sub> value seen among the 1-hour averages was 54 ppb, which is 21.6% of the AAQC. The highest SO<sub>2</sub> value seen among the 24-hour rolling averages was 19 ppb, which is 19% of the AAQC. The results are summarized in Table 3 above. A pollution rose is presented in **Figure 6** for the Courtice Station during Q4 composed of hourly average SO<sub>2</sub> concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation.

The pollution rose below shows that the majority of elevated SO<sub>2</sub> events at Courtice occurred from the North to the South directions along the Eastern quadrants. The events were possibly a result of emissions from the waste water treatment plant, roadway emissions, the DYEC and other industrial sources in the area. These elevated levels are well below the AAQC criteria.

### 5.4.2 Rundle Road Station Results

Data recovery levels were high for sulphur dioxide (97.1% valid data). Monitoring results were compared to the AAQC for 1-hour and 24-hour averaging periods. There were no exceedances above these AAQC values for the entirety of the sampling period for 1-hour and 24-hour averaged data. The highest SO<sub>2</sub> value seen among the 1-hour averages was 12 ppb, which is 4.8% of the AAQC. The highest SO<sub>2</sub> value seen among the 24-hour rolling averages was 2 ppb, which is 2% of the AAQC. The highest SO<sub>2</sub> value seen among the 24-hour rolling averages was 2 ppb, which is 2% of the AAQC. The results are summarized in Table 4 above. A pollution rose is presented in **Figure 6** for the Rundle Road Station during Q4 composed of hourly average SO<sub>2</sub> concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5 ppb were omitted from the graphic wind rose representation. The pollution rose was composed of Courtice WD data from October 1 00:00 – November 14 12:00 and Rundle Road WD data from November 14 13:00 – December 31 23:00, as there was a windhead wiring issue at the Rundle Road station that occurred at the start of October and was resolved mid-November.

The pollution rose below shows that the majority of elevated SO<sub>2</sub> events at the Rundle Station occurred when winds were from the east to south-southeast. The pollution rose indicates that the DYEC was a not major contributor to SO<sub>2</sub> levels at the station and that the levels may be related to other industrial activity.

Q4 AMBIENT AIR QUALITY MONITORING REPORT THE REGIONAL MUNICIPALITY OF DURHAM RWDI #1803743 February 10, 2020



#### Figure 6. Pollution Roses of Hourly Average SO<sub>2</sub> Concentrations October to December 2019



Note: Rundle Station SO<sub>2</sub> Pollution Rose incorporated wind speed and direction data from the Courtice Station from October 1 to November 14.



# 5.5 Fine Particulate Matter (PM<sub>2.5</sub>) Results

### 5.5.1 Courtice Station Results

Data recovery levels were high for particulate matter less than 2.5 microns (99.6% valid data). There is no 1-hour AAQC or standard for PM<sub>2.5</sub>, but there is a 24-hour CAAQS standard of 28  $\mu$ g/m<sup>3</sup> for the 3-year average of annual 98<sup>th</sup> percentile 24-hour concentrations, and 10  $\mu$ g/m<sup>3</sup> for the 3-year average of annual average concentrations (in effect as of 2015). Note that since the reported data has not surpassed the 3-year average, the CAAQS' for PM<sub>2.5</sub> was not applicable to the data. The highest PM<sub>2.5</sub> value seen among the 1-hour averages was 46  $\mu$ g/m<sup>3</sup> and the highest value seen among the rolling 24-hour averages was 29  $\mu$ g/m<sup>3</sup>. The results are summarized in Table 3 above. A pollution rose is presented in **Figure 7** for the Courtice Station during Q4 composed of hourly average PM<sub>2.5</sub> concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5  $\mu$ g/m<sup>3</sup> were omitted from the graphic wind rose representation.

The pollution rose below shows that the majority of elevated PM<sub>2.5</sub> events at Courtice were fairly similar to the general distribution of winds with a slight predominance in the west-northwest vector. Elevated PM<sub>2.5</sub> measurements were related to urban background, roadway emissions, possibly emissions from the DYEC and other nearby industrial sources.

### 5.5.2 Rundle Road Station Results

Data recovery levels were high for particulate matter less than 2.5 microns (99.1% valid data). The highest  $PM_{2.5}$  value seen among the 1-hour averages was 49  $\mu$ g/m<sup>3</sup> and the highest value seen among the rolling 24-hour averages was 25  $\mu$ g/m<sup>3</sup>. The results are summarized in Table 4 above. A pollution rose is presented in **Figure 7** for the Rundle Road Station during Q4 composed of hourly average  $PM_{2.5}$  concentrations. In order to show where possible major sources of pollutants are coming from, levels below 5  $\mu$ g/m<sup>3</sup> were omitted from the graphic wind rose representation. The pollution rose was composed of Courtice WD data from October 1 00:00 – November 14 12:00 and Rundle Road WD data from November 14 13:00 – December 31 23:00, as there was a windhead wiring issue at the Rundle Road station that occurred at the start of October and was resolved mid-November.

The pollution rose below shows that the majority of elevated PM<sub>2.5</sub> events at the Rundle Station occurred when winds were from westerly direction and followed the general distribution of winds. It is unlikely that the elevated PM<sub>2.5</sub> measurements were related to emissions from the DYEC and were more likely related to nearby roadway construction or other sources.

Q4 AMBIENT AIR QUALITY MONITORING REPORT THE REGIONAL MUNICIPALITY OF DURHAM RWDI #1803743 February 10, 2020



Figure 7. Pollution Roses of Hourly Average PM<sub>2.5</sub> Concentrations – October to December 2019



Note: Rundle Station PM<sub>2.5</sub> Pollution Rose incorporated wind speed and direction data from the Courtice Station from October 1 to November 14.



# 5.6 TSP and Metals Hi-Vol Results

All of the TSP Hi-Vols operated on a discrete schedule every 6 days according to the NAPS schedule during Q4 with the sample days being: October 6, 12, 18, 24, 30, November 5, 11, 17, 23, 29, and December 5, 11, 17, 23, and 29, 2019.

## 5.6.1 Courtice Station Results

Data recovery levels were high for the TSP sampler at the Courtice Station (93% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for TSP, mercury or metals during Q4. Table 6 is a summary of the statistics for this station.

#### Table 6: Summary of TSP Sampler Courtice Station

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	No. > Criteria	Geometric Mean	Arithmetic Mean	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	13.39	14.74	5.70	33.95	17.53	16.65	33.95	14	93
Total Mercury (Hg)	µg/m³	2	2	0	1.06E-05	1.27E-05	3.04E-06	2.99E-05	2.45E-05	1.23E-05	2.99E-05	14	93
Aluminum (Al)	µg/m³	4.8	-	0	8.27E-02	9.19E-02	4.40E-02	2.50E-01	1.06E-01	1.37E-01	2.50E-01	14	93
Antimony (Sb)	µg/m³	25	25	0	7.55E-04	8.20E-04	3.70E-04	1.93E-03	9.90E-04	8.94E-04	1.93E-03	14	93
Arsenic (As)	µg/m³	0.3	0.3	0	9.88E-04	1.05E-03	9.00E-04	2.76E-03	9.24E-04	9.32E-04	2.76E-03	14	93
Barium (Ba)	µg/m³	10	10	0	6.55E-03	6.81E-03	3.45E-03	1.15E-02	8.07E-03	8.14E-03	1.15E-02	14	93
Beryllium (Be)	µg/m³	0.01	0.01	0	3.05E-05	3.05E-05	3.00E-05	3.11E-05	3.08E-05	3.11E-05	3.06E-05	14	93
Bismuth (Bi)	µg/m³	-	-	-	5.48E-04	5.48E-04	5.40E-04	5.59E-04	5.55E-04	5.59E-04	5.51E-04	14	93
Boron (B)	µg/m³	120	-	0	1.22E-02	1.22E-02	1.20E-02	1.24E-02	1.23E-02	1.24E-02	1.23E-02	14	93
Cadmium (Cd)	µg/m³	0.025	0.025	0	6.09E-04	6.09E-04	6.00E-04	6.21E-04	6.16E-04	6.21E-04	6.13E-04	14	93
Chromium (Cr)	µg/m³	0.5	-	0	1.82E-03	1.95E-03	1.50E-03	3.84E-03	1.54E-03	3.62E-03	3.84E-03	14	93
Cobalt (Co)	µg/m³	0.1	0.1	0	6.09E-04	6.09E-04	6.00E-04	6.21E-04	6.16E-04	6.21E-04	6.13E-04	14	93
Copper (Cu)	µg/m³	50	-	0	1.52E-02	1.67E-02	6.98E-03	3.62E-02	2.97E-02	3.62E-02	1.70E-02	14	93
Iron (Fe)	µg/m³	4	-	0	2.56E-01	2.75E-01	1.51E-01	4.97E-01	3.41E-01	4.00E-01	4.97E-01	14	93
Lead (Pb)	µg/m³	0.5	0.5	0	2.20E-03	2.62E-03	9.00E-04	6.17E-03	4.15E-03	6.17E-03	4.47E-03	14	93
Magnesium (Mg)	µg/m³	-	-	-	1.31E-01	1.47E-01	6.60E-02	4.14E-01	1.48E-01	2.11E-01	4.14E-01	14	93
Manganese (Mn)	µg/m³	0.4	-	0	6.53E-03	7.58E-03	3.28E-03	1.84E-02	9.24E-03	1.44E-02	1.84E-02	14	93
Molybdenum (Mo)	µg/m³	120	-	0	7.68E-04	8.70E-04	3.03E-04	1.92E-03	1.16E-03	1.92E-03	9.66E-04	14	93
Nickel (Ni)	µg/m³	0.2	-	0	9.14E-04	9.14E-04	9.00E-04	9.32E-04	9.24E-04	9.32E-04	9.19E-04	14	93
Phosphorus (P)	µg/m³	-	-	-	2.28E-01	2.28E-01	2.25E-01	2.33E-01	2.31E-01	2.33E-01	2.30E-01	14	93
Selenium (Se)	µg/m³	10	10	0	3.05E-03	3.05E-03	3.00E-03	3.11E-03	3.08E-03	3.11E-03	3.06E-03	14	93
Silver (Ag)	µg/m³	1	1	0	3.05E-04	3.05E-04	3.00E-04	3.11E-04	3.08E-04	3.11E-04	3.06E-04	14	93
Strontium (Sr)	µg/m³	120	-	0	2.81E-03	3.06E-03	1.86E-03	7.62E-03	4.37E-03	4.17E-03	7.62E-03	14	93
Thallium (TI)	µg/m³	-	-	-	2.74E-05	2.74E-05	2.70E-05	2.80E-05	2.77E-05	2.80E-05	2.76E-05	14	93
Tin (Sn)	µg/m³	10	10	0	7.12E-04	8.36E-04	3.00E-04	1.51E-03	1.41E-03	1.06E-03	1.51E-03	14	93
Titanium (Ti)	µg/m³	120	-	0	4.14E-03	4.59E-03	3.30E-03	1.14E-02	7.39E-03	8.58E-03	1.14E-02	14	93
Uranium (Ur)	µg/m³	1.5	-	0	3.05E-05	3.05E-05	3.00E-05	3.11E-05	3.08E-05	3.11E-05	3.06E-05	14	93
Vanadium (V)	µg/m³	2	1	0	1.52E-03	1.52E-03	1.50E-03	1.55E-03	1.54E-03	1.55E-03	1.53E-03	14	93
Zinc (Zn)	µg/m³	120	-	0	3.72E-02	4.14E-02	1.67E-02	9.43E-02	6.11E-02	9.43E-02	6.35E-02	14	93
Zirconium (Zr)	µg/m³	20	-	0	6.09E-04	6.09E-04	6.00E-04	6.21E-04	6.16E-04	6.21E-04	6.13E-04	14	93

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 7 is a summary of the statistics for this 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)	ua/m <sup>3</sup>	120	120	0	16.7	20.9	71	81 7	18 7	34.4	81 7	15	100
Total Mercury (Hg)	μα/m <sup>3</sup>	2	2	0	1 11E-05	1 37E-05	3.04E-06	3 26E-05	2 24E-05	1 58E-05	3 26E-05	15	100
	μα/m <sup>3</sup>	4.8	-	0	1.03E-01	1.38E-01	4 67E-02	6.64E-01	1 62E-01	2.07E-01	6.64E-01	15	100
Antimony (Sb)	μα/m <sup>3</sup>	25	25	0	5 92E-04	7 18E-04	2 26E-04	2.06E-03	9 99E-04	1.02E-03	2.06E-03	15	100
Arsenic (As)	μα/m <sup>3</sup>	0.3	0.3	0	1.02E-03	1 17E-03	8 99E-04	4 79E-03	9.32E-04	9 15E-04	4 79E-03	15	100
Barium (Ba)	μα/m <sup>3</sup>	10	10	0	6.64E-03	7.51E-03	2 71E-03	1.36E-02	1 20E-02	1 22E-02	1.36E-02	15	100
Bervllium (Be)	μα/m <sup>3</sup>	0.01	0.01	0	3.04E-05	3.04E-05	3.00E-05	3 11E-05	3 11E-05	3.05E-05	3.07E-05	15	100
Bismuth (Bi)	μg/m <sup>3</sup>	-	-	-	5.48E-04	5.48E-04	5.39E-04	5.59E-04	5.59E-04	5.49E-04	5.53E-04	15	100
Boron (B)	ua/m <sup>3</sup>	120	-	0	1.22E-02	1.22E-02	1.20E-02	1.24E-02	1.24E-02	1.22E-02	1.23E-02	15	100
Cadmium (Cd)	ua/m <sup>3</sup>	0.025	0.025	0	6.09E-04	6.09E-04	5.99E-04	6.21E-04	6.21E-04	6.10E-04	6.15E-04	15	100
Chromium (Cr)	ua/m <sup>3</sup>	0.5	-	0	2.20E-03	2.67E-03	1.51E-03	8.54E-03	1.55E-03	5.75E-03	8.54E-03	15	100
Cobalt (Co)	ua/m <sup>3</sup>	0.1	0.1	0	6.09E-04	6.09E-04	5.99E-04	6.21E-04	6.21E-04	6.10E-04	6.15E-04	15	100
Copper (Cu)	µg/m <sup>3</sup>	50	-	0	2.09E-02	2.79E-02	6.66E-03	8.54E-02	5.41E-02	8.54E-02	5.64E-02	15	100
Iron (Fe)	µg/m <sup>3</sup>	4	-	0	2.84E-01	3.46E-01	1.11E-01	1.25E+00	4.11E-01	5.96E-01	1.25E+00	15	100
Lead (Pb)	µg/m <sup>3</sup>	0.5	0.5	0	2.00E-03	2.38E-03	9.10E-04	5.81E-03	2.86E-03	3.95E-03	5.81E-03	15	100
Magnesium (Mg)	µg/m <sup>3</sup>	-	-	-	1.61E-01	2.12E-01	7.96E-02	9.90E-01	2.51E-01	3.28E-01	9.90E-01	15	100
Manganese (Mn)	µg/m³	0.4	-	0	7.35E-03	1.07E-02	3.12E-03	5.56E-02	1.25E-02	1.93E-02	5.56E-02	15	100
Molybdenum (Mo)	µg/m³	120	-	0	7.15E-04	9.20E-04	3.01E-04	2.12E-03	1.41E-03	2.12E-03	1.98E-03	15	100
Nickel (Ni)	µg/m³	0.2	-	0	1.08E-03	1.16E-03	8.99E-04	2.30E-03	9.32E-04	2.30E-03	2.09E-03	15	100
Phosphorus (P)	µg/m³	-	-	-	2.28E-01	2.28E-01	2.25E-01	2.33E-01	2.33E-01	2.29E-01	2.30E-01	15	100
Selenium (Se)	µg/m³	10	10	0	3.04E-03	3.04E-03	3.00E-03	3.11E-03	3.11E-03	3.05E-03	3.07E-03	15	100
Silver (Ag)	µg/m³	1	1	0	3.04E-04	3.04E-04	3.00E-04	3.11E-04	3.11E-04	3.05E-04	3.07E-04	15	100
Strontium (Sr)	µg/m³	120	-	0	3.57E-03	5.64E-03	9.04E-04	3.13E-02	6.32E-03	8.02E-03	3.13E-02	15	100
Thallium (TI)	µg/m³	-	-	-	2.74E-05	2.74E-05	2.70E-05	2.80E-05	2.80E-05	2.75E-05	2.77E-05	15	100
Tin (Sn)	µg/m³	10	10	0	9.38E-04	1.19E-03	3.05E-04	4.30E-03	1.10E-03	1.39E-03	4.30E-03	15	100
Titanium (Ti)	µg/m³	120	-	0	4.87E-03	6.36E-03	3.30E-03	2.52E-02	9.81E-03	1.22E-02	2.52E-02	15	100
Uranium (Ur)	µg/m <sup>3</sup>	1.5	-	0	3.04E-05	3.04E-05	3.00E-05	3.11E-05	3.11E-05	3.05E-05	3.07E-05	15	100
Vanadium (V)	µg/m³	2	1	0	1.52E-03	1.52E-03	1.50E-03	1.55E-03	1.55E-03	1.53E-03	1.54E-03	15	100
Zinc (Zn)	µg/m³	120	-	0	2.03E-02	2.37E-02	7.16E-03	5.33E-02	2.61E-02	5.33E-02	4.54E-02	15	100
Zirconium (Zr)	µg/m <sup>3</sup>	20	-	0	6.09E-04	6.09E-04	5.99E-04	6.21E-04	6.21E-04	6.10E-04	6.15E-04	15	100

#### Table 7: Summary of TSP Sampler Rundle Road Station

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 12, 24, November 5, 17, 29, December 11, and 23, 2019.

### **5.7.1** Courtice Station Results

Data recovery levels were high for the PAH results at the Courtice Station (86% valid data). There were two (2) exceedances of the Benzo(a) Pyrene AAQC on November 17 and December 23, 2019 at the Courtice station. In both instances the exceedances occurred at both stations while the station was not downwind from the DYEC. This would indicate that the exceedances were not a result of activities at the DYEC. There were no other exceedances of any of the AAQC's or HHRA Criteria. The exceedance documentation is attached in **Appendix E**. Table 8 outlines the statistics summary for this station.

#### Table 8: 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	2.37E+00	1.64E+00	2.91E+00	2.91E+00	2.79E+00	2.65E+00	6	86
2-Methylnaphthalene	ng/m³	10000	0	3.31E+00	1.77E+00	4.25E+00	4.00E+00	4.25E+00	3.80E+00	6	86
Acenaphthene	ng/m³	-	-	4.10E-01	2.86E-01	7.53E-01	7.53E-01	3.01E-01	4.47E-01	6	86
Acenaphthylene	ng/m³	3500	0	1.41E-01	1.43E-02	3.29E-01	1.26E-01	3.29E-01	1.66E-01	6	86
Anthracene	ng/m³	200	0	3.71E-02	2.26E-02	5.13E-02	5.13E-02	4.46E-02	4.14E-02	6	86
Benzo(a)Anthracene	ng/m <sup>3</sup>	-	-	3.11E-02	8.34E-03	8.71E-02	8.34E-03	2.90E-02	8.71E-02	6	86
Benzo(a)fluorene	ng/m³	-	-	3.21E-02	3.13E-04	7.84E-02	3.13E-04	3.87E-02	7.84E-02	6	86
Benzo(a)Pyrene (Historically High)	ng/m³	0.05	2	3.78E-02	4.83E-03	9.85E-02	8.28E-03	6.93E-02	9.85E-02	6	86
Benzo(b)Fluoranthene	ng/m³	-	-	5.52E-02	3.12E-02	1.32E-01	3.50E-02	4.26E-02	1.32E-01	6	86
Benzo(b)fluorene	ng/m³	-	-	2.22E-02	3.13E-04	6.28E-02	3.13E-04	2.22E-02	6.28E-02	6	86
Benzo(e)Pyrene	ng/m³	-	-	5.16E-02	2.32E-02	1.07E-01	2.32E-02	4.94E-02	1.07E-01	6	86
Benzo(g,h,i)Perylene	ng/m <sup>3</sup>	-	-	5.93E-02	2.39E-02	1.22E-01	2.39E-02	6.16E-02	1.22E-01	6	86
Benzo(k)Fluoranthene	ng/m³	-	-	6.75E-02	1.84E-02	1.34E-01	1.84E-02	9.73E-02	1.34E-01	6	86
Biphenyl	ng/m³	-	-	1.15E+00	4.44E-01	1.82E+00	1.19E+00	1.24E+00	1.82E+00	6	86
Chrysene	ng/m³	-	-	1.06E-01	4.75E-02	2.17E-01	4.75E-02	1.19E-01	2.17E-01	6	86
Dibenzo(a,h)Anthracene	ng/m <sup>3</sup>	-	-	6.40E-03	3.13E-04	1.62E-02	3.13E-04	3.21E-03	1.62E-02	6	86
Fluoranthene	ng/m³	-	-	3.90E-01	2.12E-01	6.46E-01	3.69E-01	3.87E-01	6.46E-01	6	86
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	6.09E-02	2.53E-02	1.21E-01	2.53E-02	5.65E-02	1.21E-01	6	86
Naphthalene	ng/m³	22500	0	2.05E+01	1.13E+01	4.47E+01	1.55E+01	1.67E+01	4.47E+01	6	86
o-Terphenyl	ng/m <sup>3</sup>	-	-	9.83E-03	5.64E-03	1.66E-02	9.88E-03	1.09E-02	1.66E-02	6	86
Perylene	ng/m³	-	-	9.28E-03	3.13E-04	2.30E-02	3.13E-04	8.57E-03	2.30E-02	6	86
Phenanthrene	ng/m <sup>3</sup>	-	-	1.18E+00	7.47E-01	1.84E+00	1.84E+00	1.15E+00	1.53E+00	6	86
Pyrene	ng/m <sup>3</sup>	-	-	2.36E-01	1.42E-01	3.30E-01	2.14E-01	2.35E-01	3.30E-01	6	86
Tetralin	ng/m <sup>3</sup>	-	-	1.86E+00	6.24E-01	3.04E+00	1.90E+00	3.04E+00	2.22E+00	6	86
Fluorene <sup>1</sup>	ng/m³	-	-	-	4.22E-01	4.22E-01	-	-	4.22E-01	1	14
Total PAH	ng/m <sup>3</sup>	-	-	3.22E+01	1.98E+01	5.89E+01	2.90E+01	2.78E+01	5.89E+01	6	86

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

[1] Fluorene was reported only once on the December 11th sampling event. The fluorene levels below instrument response were not listed on the analytical reports.



## 5.7.2 Rundle Road Station Results

Data recovery levels were low for the PAH results at the Rundle Road Station (71% valid data). There were two (2) exceedances of the Benzo(a) Pyrene AAQC on November 17 and December 23, 2019 at the Rundle Road station. There were no other exceedances of any of the AAQC's or HHRA Criteria. In both instances the exceedances occurred at both stations while the station was not downwind from the DYEC. This would indicate that the exceedances were not a result of activities at the DYEC. The exceedance documentation is attached in **Appendix E**. Table 8 outlines the statistics summary for this station. The percent valid data was not greater than 75%, therefore the arithmetic mean is not reported.

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	
1-Methylnaphthalene	ng/m <sup>3</sup>	12000	0	-	2.57E+00	4.45E+00	4.45E+00	2.91E+00	2.69E+00	5	
2-Methylnaphthalene	ng/m <sup>3</sup>	10000	0	-	3.69E+00	6.69E+00	6.69E+00	4.29E+00	3.90E+00	5	
Acenaphthene	ng/m <sup>3</sup>	-	-	-	3.24E-01	3.10E+00	3.10E+00	1.38E+00	7.34E-01	5	
Acenaphthylene	ng/m <sup>3</sup>	3500	0	-	8.60E-02	4.51E-01	1.41E-01	4.51E-01	1.11E-01	5	
Anthracene	ng/m <sup>3</sup>	200	0	-	5.03E-02	2.09E-01	2.09E-01	5.84E-02	6.01E-02	5	
Benzo(a)Anthracene	ng/m <sup>3</sup>	-	-	-	9.42E-03	9.31E-02	1.57E-02	4.45E-02	9.31E-02	5	
Benzo(a)fluorene	ng/m <sup>3</sup>	-	-	-	3.25E-04	8.28E-02	1.68E-02	5.24E-02	8.28E-02	5	
Benzo(a)Pyrene	ng/m <sup>3</sup>	0.05	2	-	7.21E-03	1.11E-01	1.62E-02	8.11E-02	1.11E-01	5	
Benzo(b)Fluoranthene	ng/m <sup>3</sup>	-	-	-	3.50E-02	1.55E-01	4.29E-02	5.67E-02	1.55E-01	5	
Benzo(b)fluorene	ng/m <sup>3</sup>	-	-	-	3.25E-04	6.56E-02	3.22E-03	2.95E-02	6.56E-02	5	
Benzo(e)Pyrene	ng/m <sup>3</sup>	-	-	-	2.23E-02	1.16E-01	3.41E-02	6.55E-02	1.16E-01	5	
Benzo(g,h,i)Perylene	ng/m <sup>3</sup>	-	-	-	2.53E-02	1.32E-01	3.38E-02	7.65E-02	1.32E-01	5	
Benzo(k)Fluoranthene	ng/m <sup>3</sup>	-	-	-	1.60E-02	1.47E-01	2.14E-02	1.27E-01	1.47E-01	5	
Biphenyl	ng/m <sup>3</sup>	-	-	-	1.32E+00	1.80E+00	1.60E+00	1.41E+00	1.80E+00	8	
Chrysene	ng/m <sup>3</sup>	-	-	-	4.61E-02	2.23E-01	4.79E-02	1.84E-01	2.23E-01	5	
Dibenzo(a,h)Anthracene	ng/m <sup>3</sup>	-	-	-	3.25E-04	1.64E-02	7.85E-03	5.78E-03	1.64E-02	5	
Fluoranthene	ng/m <sup>3</sup>	-	-	-	3.11E-01	8.18E-01	8.18E-01	6.01E-01	7.34E-01	5	
Indeno(1,2,3-cd)Pyrene	ng/m <sup>3</sup>	-	-	-	1.99E-02	1.35E-01	2.23E-02	7.62E-02	1.35E-01	5	
Naphthalene	ng/m <sup>3</sup>	22500	0	-	1.66E+01	4.14E+01	2.05E+01	2.06E+01	4.14E+01	5	
o-Terphenyl	ng/m <sup>3</sup>	-	-	-	5.68E-03	1.57E-02	1.02E-02	7.26E-03	1.57E-02	5	
Perylene	ng/m <sup>3</sup>	-	-	-	3.17E-04	2.39E-02	3.22E-03	1.05E-02	2.39E-02	5	
Phenanthrene	ng/m <sup>3</sup>	-	-	-	1.43E+00	4.12E+00	4.12E+00	2.18E+00	2.02E+00	5	
Pyrene	ng/m <sup>3</sup>	-	-	-	1.87E-01	3.81E-01	3.77E-01	3.32E-01	3.81E-01	5	
Tetralin	ng/m <sup>3</sup>	-	-	-	1.52E+00	3.29E+00	1.97E+00	3.29E+00	2.21E+00	5	
Fluorene <sup>1</sup>	ng/m <sup>3</sup>	-	-	-	-	-	-	-	-	-	$\square$
Total PAH	ng/m <sup>3</sup>	-	-	-	3.17E+01	5.73E+01	4.07E+01	3.70E+01	5.73E+01	5	

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

[1] Fluorene was not detected in any of the Rundle Road Samples. The fluorene levels below instrument response were not listed on the analytical reports.



% Valid data
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
71
-
71

# 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 12, November 5, November 29, and December 23, 2019.

### **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 10 is a summary of the statistics for this station.

 Table 10: 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 <sup>3</sup>	-	-	-	2.01E-03	1.07E-03	3.44E-03	3.44E-03	2.19E-03	1.34E-03	4	100
1,2,3,7,8-PeCDD	pg/m <sup>3</sup>	-	-	-	1.67E-03	8.13E-04	2.25E-03	1.88E-03	1.72E-03	2.25E-03	4	100
1,2,3,4,7,8-HxCDD	pg/m <sup>3</sup>	-	-	-	3.30E-04	1.25E-04	5.59E-04	1.25E-04	4.19E-04	5.59E-04	4	100
1,2,3,6,7,8-HxCDD	pg/m <sup>3</sup>	-	-	-	6.76E-04	1.16E-04	1.43E-03	1.16E-04	1.43E-03	5.86E-04	4	100
1,2,3,7,8,9-HxCDD	pg/m <sup>3</sup>	-	-	-	2.94E-04	1.25E-04	5.11E-04	1.25E-04	3.29E-04	5.11E-04	4	100
1,2,3,4,6,7,8-HpCDD	pg/m <sup>3</sup>	-	-	-	1.12E-03	4.22E-04	2.05E-03	4.22E-04	1.22E-03	2.05E-03	4	100
OCDD	pg/m <sup>3</sup>	-	-	-	1.07E-04	4.84E-05	2.09E-04	4.84E-05	9.40E-05	2.09E-04	4	100
2,3,7,8-TCDF	pg/m <sup>3</sup>	-	-	-	2.01E-04	1.08E-04	3.18E-04	2.50E-04	1.25E-04	3.18E-04	4	100
1,2,3,7,8-PeCDF	pg/m <sup>3</sup>	-	-	-	7.11E-05	3.34E-05	1.25E-04	5.16E-05	7.41E-05	1.25E-04	4	100
2,3,4,7,8-PeCDF	pg/m <sup>3</sup>	-	-	-	6.43E-04	2.98E-04	1.51E-03	4.59E-04	3.01E-04	1.51E-03	4	100
1,2,3,4,7,8-HxCDF	pg/m <sup>3</sup>	-	-	-	2.39E-04	9.79E-05	5.44E-04	1.11E-04	2.04E-04	5.44E-04	4	100
1,2,3,6,7,8-HxCDF	pg/m <sup>3</sup>	-	-	-	1.95E-04	1.06E-04	2.59E-04	1.06E-04	2.59E-04	2.25E-04	4	100
2,3,4,6,7,8-HxCDF	pg/m <sup>3</sup>	-	-	-	2.55E-04	9.49E-05	6.10E-04	1.13E-04	2.04E-04	6.10E-04	4	100
1,2,3,7,8,9-HxCDF	pg/m <sup>3</sup>	-	-	-	2.12E-04	9.04E-05	3.87E-04	1.34E-04	2.35E-04	3.87E-04	4	100
1,2,3,4,6,7,8-HpCDF	pg/m <sup>3</sup>	-	-	-	1.11E-04	3.13E-05	2.65E-04	3.75E-05	1.10E-04	2.65E-04	4	100
1,2,3,4,7,8,9-HpCDF	pg/m <sup>3</sup>	-	-	-	2.35E-05	3.92E-06	6.01E-05	2.03E-05	9.56E-06	6.01E-05	4	100
OCDF	pg/m <sup>3</sup>	-	-	-	3.89E-06	9.38E-07	7.19E-06	9.38E-07	3.87E-06	7.19E-06	4	100
Total Toxic Equivalency	pg TEQ/m <sup>3</sup>	0.1 1 <sup>[1]</sup>	-	0	8.16E-03	5.11E-03	1.16E-02	7.43E-03	8.54E-03	1.16E-02	4	100

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

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



# 5.8.2 Rundle Road Station Results

Data recovery levels were acceptable for the D&F results at the Courtice Station (75% valid data). There were no exceedances of any of the AAQC's or HHRA Criteria for any of the D&F's during Q4. Table 11 is a summary of the statistics for this station.

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 <sup>3</sup>	-	-	-	2.71E-03	1.37E-03	3.73E-03	3.73E-03	3.02E-03	1.37E-03	3	75
1,2,3,7,8-PeCDD	pg/m <sup>3</sup>	-	-	-	6.31E-03	2.54E-03	1.38E-02	1.38E-02	2.54E-03	2.57E-03	3	75
1,2,3,4,7,8-HxCDD	pg/m <sup>3</sup>	-	-	-	3.10E-04	2.70E-04	3.73E-04	3.73E-04	2.70E-04	2.87E-04	3	75
1,2,3,6,7,8-HxCDD	pg/m <sup>3</sup>	-	-	-	9.54E-04	5.24E-04	1.21E-03	1.12E-03	5.24E-04	1.21E-03	3	75
1,2,3,7,8,9-HxCDD	pg/m <sup>3</sup>	-	-	-	8.72E-04	5.56E-04	1.22E-03	8.41E-04	5.56E-04	1.22E-03	3	75
1,2,3,4,6,7,8-HpCDD	pg/m <sup>3</sup>	-	-	-	1.47E-03	6.20E-04	2.13E-03	6.20E-04	1.66E-03	2.13E-03	3	75
OCDD	pg/m <sup>3</sup>	-	-	-	1.37E-04	6.27E-05	2.10E-04	6.27E-05	1.38E-04	2.10E-04	3	75
2,3,7,8-TCDF	pg/m <sup>3</sup>	-	-	-	2.05E-04	1.18E-04	2.76E-04	2.76E-04	2.22E-04	1.18E-04	3	75
1,2,3,7,8-PeCDF	pg/m <sup>3</sup>	-	-	-	6.53E-05	4.14E-05	1.07E-04	4.14E-05	4.76E-05	1.07E-04	3	75
2,3,4,7,8-PeCDF	pg/m <sup>3</sup>	-	-	-	1.19E-03	4.43E-04	1.72E-03	1.41E-03	4.43E-04	1.72E-03	3	75
1,2,3,4,7,8-HxCDF	pg/m <sup>3</sup>	-	-	-	5.83E-04	1.90E-04	1.02E-03	1.02E-03	1.90E-04	5.38E-04	3	75
1,2,3,6,7,8-HxCDF	pg/m <sup>3</sup>	-	-	-	3.90E-04	1.75E-04	5.03E-04	5.03E-04	1.75E-04	4.92E-04	3	75
2,3,4,6,7,8-HxCDF	pg/m <sup>3</sup>	-	-	-	4.66E-04	1.90E-04	7.52E-04	4.55E-04	1.90E-04	7.52E-04	3	75
1,2,3,7,8,9-HxCDF	pg/m <sup>3</sup>	-	-	-	3.02E-04	1.81E-04	5.19E-04	5.19E-04	2.06E-04	1.81E-04	3	75
1,2,3,4,6,7,8-HpCDF	pg/m <sup>3</sup>	-	-	-	2.28E-04	3.81E-05	3.28E-04	3.28E-04	3.81E-05	3.17E-04	3	75
1,2,3,4,7,8,9-HpCDF	pg/m <sup>3</sup>	-	-	-	9.28E-05	1.90E-05	1.93E-04	1.93E-04	1.90E-05	6.65E-05	3	75
OCDF	pg/m <sup>3</sup>	-	-	-	5.76E-06	1.81E-06	1.18E-05	1.18E-05	1.81E-06	3.67E-06	3	75
Total Toxic Equivalency	pg TEQ/m <sup>3</sup>	0.1 1 <sup>[1]</sup>	_	0	1.63E-02	1.02E-02	2.53E-02	2.53E-02	1.02E-02	1.33E-02	3	75

Table 11: Rundle Road	Station	Q4 Monitoring	Results for	Dioxins and Furans
	otation	Q T Montoring		

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



# 6 DATA REQUESTS

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

Appendix C contains monthly IZS zero trends for the NO<sub>X</sub> and SO<sub>2</sub> analyzers at the Courtice and Rundle Road Stations.

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

# 6.1 Courtice Road Station

On October 2, pressure transducers and relays were installed in the PS1 and hivol units. The CR1000 logger was rewired and reprogrammed to accommodate measurement of hivol and PS1 motor pressure. The Envidas logging layout was also modified to accept these pressure measurements in the logging channels.

On October 11, relay bypass switches were installed for the PS1 and hivol units.

On October 24, the CR1000 data logger failed to initiate the hivol and PS1 run due to a programming error. The TSP/Metals and PUF samples were invalidated for the October 24 sampling day.

On November 10-11, low overnight SO<sub>2</sub> spans were observed, which prompted an unscheduled visit on November 12 to check the analyzer performance. A takeout calibration was performed, and the instrument was outside of the 10% span tolerance. Upon troubleshooting the SO<sub>2</sub> analyzer, it was discovered that there were dead flies in the shutter assembly which had caused a UV output shift. Maintenance was performed and the unit was recalibrated. Data was invalidated from when the UV output shifted which occurred after the autospan sequence (02:15) on November 10.

On November 22 during a site visit, it was noted that there was a UV lamp warning on the SO<sub>2</sub> instrument. A takeout calibration was performed, and the instrument was within the 10% span tolerance. The issue was investigated the same day and determined to be flies in the shutter assembly again. Maintenance was performed and the unit was recalibrated.

# 6.2 Rundle Road Station

During a visit on October 1, it was discovered that the SHARP tape was broken; the tape was respooled and reattached that same day. It is believed that the tape broke on September 28.

On October 1, the NO<sub>X</sub> unit was removed for annual maintenance, however the unit put in its place had stability issues, so the original unit was reinstalled.

On October 2, pressure transducers and relays were installed in the PS1 and hivol units. The CR1000 logger was rewired and reprogrammed to accommodate measurement of hivol and PS1 motor pressure. The Envidas logging channels were also modified to accept these pressure measurements.

On October 11, relay bypass switches were installed for the PS1 and hivol units.

On October 30, a high overnight SO<sub>2</sub> span was observed, which prompted an unscheduled visit the next day to check the analyzer performance. A takeout calibration was performed, and the instrument was outside of the 10% span tolerance. Upon troubleshooting the SO<sub>2</sub> analyzer, it was discovered that there were dead flies in the shutter assembly which had caused a UV output shift. Maintenance was performed and the unit was recalibrated. Data was invalidated from when the UV output shifted which occurred at 15:00 on October 29.

On November 7, it was noted by the field technician that the PS1 motor would not turn on. After some troubleshooting, it was discovered that the motor brushes were worn down. They were replaced and the unit was recalibrated on November 11. The PUF sample for November 5 was invalidated.

On November 13, during a calibration visit to the station, it was noted that the UV output had shifted again on the SO<sub>2</sub> unit. A takeout calibration was performed, and the instrument was within the 10% span tolerance. The SO<sub>2</sub> analyzer shutter assembly was inspected for flies; in which some were found, removed and the unit was recalibrated.

On November 14, it was discovered that the wiring for the wind direction component of the wind data was wired incorrectly and was outputting erroneous values. The wires were corrected, and the proper offset was applied in the datalogger program. Wind direction data from October 2 – November 14 was invalidated.

The PS1 (PUF) sample was invalidated on December 11, due to an issue with the relay switch resulting in a 9 hour run time.

An RWDI field technician responded to the station on December 17 after a few days of declining overnight autospan values. It was determined that the permeation device was depleted and a new one was installed the same day.



# 7 CONCLUSIONS

This Q4 report provides a summary of the ambient air quality data collected at the Courtice and Rundle Road Stations. Throughout this monitoring period, there were four (4) exceedances of the AAQC for Benzo(a) Pyrene in Q4; two (2) occurred on November 17 at the Courtice and Rundle Road stations, and two (2) occurred on December 23 at the Courtice and Rundle Road station. In both instances the exceedances occurred at both stations while neither station was downwind from the DYEC. This would indicate that the exceedances were not a result of activities at the DYEC. Data recovery rates were acceptable and valid for all measured Q4 parameters with the exception of wind direction (50.6% valid for Q4) and PAH's (71% valid for Q4) at the Rundle Road station.

# 8 **REFERENCES**

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



# APPENDIX A



#### Table A1: 2019 Summary Statistics for Q4

Courtice Monitoring Station Data Statistics		Maxim	um 1 hr	Mean		М	aximum	24 hr Ro	olling Me	an		Mc	onthly M	ean			%	valid hou	ırs	
Compound	PM <sub>2.5</sub> NO <sub>x</sub> NO NO <sub>2</sub> SO <sub>2</sub>				SO <sub>2</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	NO	$NO_2$	SO <sub>2</sub>
Units	(µg/m³) ppb					(µg/m <sup>3</sup> )		р	b		(µg/m <sup>3</sup> )		р	pb				(%)		
AAQC	200 250					28 <sup>A</sup>			100	100										
October	16	75	58	30	49	11	27	16	12	12	5	8	2	6	2	99.3	99.5	99.5	99.5	99.5
November	43	77	50	30	54	29	39	20	21	19	8	9	3	7	2	99.7	99.7	99.7	99.7	90.0
December	46 58 29 30 31				31	25	20	5	16	9	8	9	1	8	2	99.9	99.7	99.7	99.7	99.7
Q4 Arithmetic Mean											7	9	2	7	2	99.6	99.6	99.6	99.6	96.5

Rundle Monitoring		Maxim	ium 1 hr	Mean		М	aximum	24 hr Ro	olling Me	an		Mo	onthly M	ean			%	valid hou	urs	
Station Data Statistics																				
Compound	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NOx	NO	NO <sub>2</sub>	SO <sub>2</sub>
Units	(µg/m³) ppb					(µg/m³)		р	pb		(µg/m³)		р	pb				(%)		
AAQC	200 250					28 <sup>A</sup>			100	100										
October	22	33	22	16	12	9	8	3	7	2	4	4	1	3	0	97.8	98.5	98.5	98.5	92.6
November	36	276	219	57	5	23	28	15	15	1	7	8	2	6	0	99.7	99.6	99.6	99.6	99.0
December	49	37	17	26	7	25	19	3	16	1	7	7	1	6	0	99.7	99.2	99.2	99.2	99.7
Q4 Arithmetic Mean											6	6	1	5	0	99.1	99.1	99.1	99.1	97.1

Event Statistics	Mean >	1 hr AA	QC for	Mean	> 1 hr AA	QC for	Rolling	g Mean >	≥ 24 hr	Rollin	g Mean >	• 24 hr
Compound	PM <sub>2.5</sub>	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	NO <sub>2</sub>	SO <sub>2</sub>
Units		No.			No.			No.			No.	
October		0	0		0	0	N/A	0	0	N/A	0	0
November		0	0		0	0	N/A	0	0	N/A	0	0
December		0	0		0	0	N/A	0	0	N/A	0	0
Q4 Total		0	0		0	0	N/A	0	0	N/A	0	0

Courtice Station MET		Maxim	um 1 hr	Mean			Minin	um 1 hr	Mean			Mo	nthly M	02n		Total			% valid	hours		
Statistics		IVIAAIIII		Wearr			IVIIIIII		Wearr			IVIC		ean		TOLAI			70 valid	nours		
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			(9	6)		
October	69	23	97	30.2	8.7	0	1	36	29.0	0.0	13	11	74	29.7	0.1	104.3	100.0	100.0	99.9	99.9	99.9	99.7
November	61	9	96	30.4	2.1	0	-15	39	29.1	0.0	13	1	71	29.8	0.0	28.5	100.0	100.0	99.9	96.6	99.9	100.0
December	42	8	96	30.4	3.4	1	-18	44	29.0	0.0	13	-1	73	29.7	0.1	69.2	99.6	99.6	100.0	100.0	100.0	100.0
Q4 Arithmetic Mean											13	4	73	29.7	0.1	202.0	99.9	99.9	99.9	99.9	99.9	99.9

Rundle Station MET Statistics	Ma	aximum	1 hr Mea	n	Ν	linimum	1 hr Me	an		Monthl	y Mean		Total		%	valid hou	urs		
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	46	25	99	13.3	0	0	35	0.0	9	10	77	0.2	132.6	99.7	3.6	99.7	99.7	99.9	
November	41	10	99	3.0	0	-16	40	0.0	10	1	75	0.0	25.5	99.9	53.2	100.0	100.0	100.0	
December	36	8	99	3.7	0	-18	45	0.0	11	-1	77	0.1	58.2	100.0	96.4	100.0	100.0	100.0	
Q4 Arithmetic Mean									10	3	76	0.1	216.3	99.9	50.6	99.9	99.9	100.0	
# Table A2: 2019 Q4 Station Courtice Monitoring Results for PM<sub>2.5</sub>

Data Statistics	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>
	No.	(ug/m <sup>3</sup> )	(ug/m <sup>3</sup> )	(ug/m <sup>3</sup> )	No.	%
October	N/A	5	16	11	739	99.3
November	N/A	8	43	29	718	99.7
December	N/A	8	46	25	743	99.9

# Table A3: 2019 Q4 Station Rundle Monitoring Results for PM<sub>2.5</sub>

Data Statistics	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>	PM <sub>2.5</sub>
Wonth	No.	(ug/m <sup>3</sup> )	(ug/m <sup>3</sup> )	(ug/m <sup>3</sup> )	No.	%
October	N/A	4	22	9	728	97.8
November	N/A	7	36	23	718	99.7
December	N/A	7	49	25	742	99.7

### Table A4: 2019 Q4 Station Courtice Monitoring Results for NOx

Data Statistics	Events > 1 hr	Events > 24 hr	Arithmotic Moon	Maximum 1 hr	Maximum 24 hr	Number of valid	% valid data	
Data Statistics	AAQC	AAQC	Antimetic Mean	Mean	Rolling Mean	Hours	70 Valid Udla	
Month	NO <sub>x</sub>							
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%	
October	N/A	N/A	8	75	27	740	99.5	
November	N/A	N/A	9	77	39	718	99.7	
December	N/A	N/A	9	58	20	742	99.7	

# Table A5: 2019 Q4 Station Rundle Monitoring Results for NOx

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO <sub>x</sub>	NO <sub>x</sub>	NO <sub>x</sub>	NO <sub>x</sub>	NO <sub>x</sub>	NO <sub>x</sub>	NO <sub>x</sub>
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	4	33	8	733	98.5
November	N/A	N/A	8	276	28	717	99.6
December	N/A	N/A	7	37	19	738	99.2

### Table A6: 2019 Q4 Station Courtice Monitoring Results for NO

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO	NO	NO	NO	NO	NO	NO
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	2	58	16	740	99.5
November	N/A	N/A	3	50	20	718	99.7
December	N/A	N/A	1	29	5	742	99.7

# Table A7: 2019 Q4 Station Rundle Monitoring Results for NO

Data Statistics	Events > 1 hr AAQC	Events > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO	NO	NO	NO	NO	NO	NO
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	N/A	N/A	1	22	3	733	98.5
November	N/A	N/A	2	219	15	717	99.6
December	N/A	N/A	1	17	3	738	99.2

### Table A8: 2019 Q4 Station Courtice Monitoring Results for NO<sub>2</sub>

Data Statistics	Events > 1 hr AAQC	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>
Wonth	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	6	30	12	740	99.5
November	0	0	7	30	21	718	99.7
December	0	0	8	30	16	742	99.7

### Table A9: 2019 Q4 Station Rundle Monitoring Results for NO<sub>2</sub>

Data Statistics	Events > 1 hr AAQC	Rolling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>
Wonth	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	3	16	7	733	98.5
November	0	0	6	57	15	717	99.6
December	0	0	6	26	16	738	99.2

### Table A10: 2019 Q4 Station Courtice Monitoring Results for SO<sub>2</sub>

Data Statistics	Events > 1 hr AAQC	Rollling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>
WORth	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	2.0	49	12	740	99.5
November	0	0	1.7	54	19	648	90.0
December	0	0	1.8	31	9	742	99.7

### Table A11: 2019 Q4 Station Rundle Monitoring Results for SO<sub>2</sub>

Data Statistics	Events > 1 hr AAQC	Rollling Mean > 24 hr AAQC	Arithmetic Mean	Maximum 1 hr Mean	Maximum 24 hr Rolling Mean	Number of valid Hours	% valid data
Month	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>	SO <sub>2</sub>
	No.	No.	(ppb)	(ppb)	(ppb)	No.	%
October	0	0	0.3	12	2	689	92.6
November	0	0	0.3	5	1	713	99.0
December	0	0	0.4	7	1	742	99.7

# Table A12: 2019 Q4 Courtice Meterological Station Windspeed Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Wind Speed	Wind Speed	Wind Speed	Wind Speed
Workth	(km/hr)	(km/hr)	(km/hr)	(%)
October	69	0	13	100.0
November	61	0	13	100.0
December	42	1	13	99.6

# Table A13: 2019 Q4 Rundle Meterological Station Windspeed Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours
Month	Wind Speed	Wind Speed	Wind Speed	Wind Speed
Workti	(km/hr)	(km/hr)	(km/hr)	(%)
October	46	0	9	99.7
November	41	0	10	99.9
December	36	0	11	100.0

### Table A14: 2019 Q4 Courtice Meterological Station Wind Direction Data Summary

MET Statistics	% valid hours
Month	Wind Direction
Month	(%)
October	100.0
November	100.0
December	99.6

### Table A15: 2019 Q4 Rundle Meterological Station Wind Direction Data Summary

MET Statistics	% valid hours					
Month	Wind Direction					
Month	(%)					
October	3.6					
November	53.2					
December	96.4					

# Table A16: 2019 Q4 Courtice Meterological Station Temperature Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours		
Month	Temperature	Temperature	Temperature	Temperature		
Workti	(°C)	(°C)	(°C)	(%)		
October	23	1	11	99.9		
November	9	-15	1	99.9		
December	8	-18	-1	100.0		

# Table A17: 2019 Q4 Rundle Meterological Station Temperature Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours		
Month	Temperature	Temperature	Temperature	Temperature		
Month	(°C)	(°C)	(°C)	(%)		
October	25	0	10	99.7		
November	10	-16	1	100.0		
December	8	-18	-1	100.0		

# Table A18: 2019 Q4 Courtice Meterological Station Relative Humidity Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	% valid hours	
Month	Relative Humidity	Relative Humidity	Relative Humidity	Relative Humidity	
Workin	(%)	(%)	(%)	(%)	
October	97	36	74	99.9	
November	96	39	71	96.6	
December	96	44	73	100.0	

# Table A19: 2019 Q4 Rundle Meterological Station Relative Humidity Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	% valid hours
Month	Relative Humidity	Relative Humidity	Relative Humidity	Relative Humidity
Workti	(%)	(%)	(%)	(%)
October	99	35	77	99.7
November	99	40	75	100.0
December	99	45	77	100.0

# Table A20: 2019 Q4 Courtice Meterological Station Precipitation Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Total	% valid hours	
Month	Precipitation	Precipitation	Precipitation	Precipitation	Precipitation	
Worktr	(mm)	(mm)	(mm)	(mm)	(mm)	
October	8.7	0.0	0.1	104.3	99.7	
November	2.1	0.0	0.0	28.5	100.0	
December	3.4	0.0	0.1	69.2	100.0	

# Table A21: 2019 Q4 Rundle Meterological Station Precipitation Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Monthly Mean	Total	% valid hours	
Month	Precipitation	Precipitation	Precipitation	Precipitation	Precipitation	
Wonth	(mm)	(mm)	(mm)	(mm)	(mm)	
October	13.3	0.0	0.2	132.6	99.9	
November	3.0	0.0	0.0	25.5	100.0	
December	3.7	0.0	0.1	58.2	100.0	

### Table A22: 2019 Q4 Courtice Meterological Station Pressure Data Summary

MET Statistics	Maximum 1 hr Mean	Minimum 1 hr	Quarterly Mean	% valid hours	
Month	Pressure	Pressure	Pressure	Pressure	
Month	(mmHg)	(mmHg)	(mmHg)	(%)	
October	30.2	29.0	29.7	99.9	
November	30.4	29.1	29.8	99.9	
December	30.4	29.0	29.7	100.0	



# APPENDIX B



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

		Courtice		Rundle					
Sample Date	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume (m <sup>3</sup> )			
	No.	(min)	(m <sup>3</sup> )	No.	(min)				
October 12, 2019	L2367570-1	1442	320	L2367570-2	1443	308			
November 5, 2019	L2379576-2	1442	332	Invalid Sample					
November 29, 2019	L2391934-1	1441	319	L2391934-2	1442	315			
December 23, 2019	L2400442-1	L2400442-1 1440 333		L2400442-2	1441	331			

# Table B2: 2019 Courtice Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	12-Oct-19	5-Nov-19	29-Nov-19	23-Dec-19	MECP 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 <sup>3</sup>	-	-	3.44E-03	1.07E-03	2.19E-03	1.34E-03	-	-	2.01E-03	1.07E-03	3.44E-03	3.44E-03	2.19E-03	1.34E-03	4	100
10/12/2019	pg/m <sup>3</sup>	-	-	1.88E-03	8.13E-04	1.72E-03	2.25E-03	-	-	1.67E-03	8.13E-04	2.25E-03	1.88E-03	1.72E-03	2.25E-03	4	100
1,2,3,4,7,8-HxCDD	pg/m <sup>3</sup>	-	-	1.25E-04	4.19E-04	2.19E-04	5.59E-04	-	-	3.30E-04	1.25E-04	5.59E-04	1.25E-04	4.19E-04	5.59E-04	4	100
1,2,3,6,7,8-HxCDD	pg/m <sup>3</sup>	-	-	1.16E-04	5.78E-04	1.43E-03	5.86E-04	-	-	6.76E-04	1.16E-04	1.43E-03	1.16E-04	1.43E-03	5.86E-04	4	100
1,2,3,7,8,9-HxCDD	pg/m <sup>3</sup>	-	-	1.25E-04	2.11E-04	3.29E-04	5.11E-04	-	-	2.94E-04	1.25E-04	5.11E-04	1.25E-04	3.29E-04	5.11E-04	4	100
1,2,3,4,6,7,8-HpCDD	pg/m <sup>3</sup>	-	-	4.22E-04	8.01E-04	1.22E-03	2.05E-03	-	-	1.12E-03	4.22E-04	2.05E-03	4.22E-04	1.22E-03	2.05E-03	4	100
OCDD	pg/m <sup>3</sup>	-	-	4.84E-05	7.83E-05	9.40E-05	2.09E-04	-	-	1.07E-04	4.84E-05	2.09E-04	4.84E-05	9.40E-05	2.09E-04	4	100
2,3,7,8-TCDF	pg/m <sup>3</sup>	-	-	2.50E-04	1.08E-04	1.25E-04	3.18E-04	-	-	2.01E-04	1.08E-04	3.18E-04	2.50E-04	1.25E-04	3.18E-04	4	100
1,2,3,7,8-PeCDF	pg/m <sup>3</sup>	-	-	5.16E-05	7.41E-05	3.34E-05	1.25E-04	-	-	7.11E-05	3.34E-05	1.25E-04	5.16E-05	7.41E-05	1.25E-04	4	100
2,3,4,7,8-PeCDF	pg/m <sup>3</sup>	-	-	4.59E-04	2.98E-04	3.01E-04	1.51E-03	-	-	6.43E-04	2.98E-04	1.51E-03	4.59E-04	3.01E-04	1.51E-03	4	100
1,2,3,4,7,8-HxCDF	pg/m <sup>3</sup>	-	-	1.11E-04	9.79E-05	2.04E-04	5.44E-04	-	-	2.39E-04	9.79E-05	5.44E-04	1.11E-04	2.04E-04	5.44E-04	4	100
1,2,3,6,7,8-HxCDF	pg/m <sup>3</sup>	-	-	1.06E-04	2.59E-04	1.88E-04	2.25E-04	-	-	1.95E-04	1.06E-04	2.59E-04	1.06E-04	2.59E-04	2.25E-04	4	100
2,3,4,6,7,8-HxCDF	pg/m <sup>3</sup>	-	-	1.13E-04	9.49E-05	2.04E-04	6.10E-04	-	-	2.55E-04	9.49E-05	6.10E-04	1.13E-04	2.04E-04	6.10E-04	4	100
1,2,3,7,8,9-HxCDF	pg/m <sup>3</sup>	-	-	1.34E-04	9.04E-05	2.35E-04	3.87E-04	-	-	2.12E-04	9.04E-05	3.87E-04	1.34E-04	2.35E-04	3.87E-04	4	100
1,2,3,4,6,7,8-HpCDF	pg/m <sup>3</sup>	-	-	3.75E-05	1.10E-04	3.13E-05	2.65E-04	-	-	1.11E-04	3.13E-05	2.65E-04	3.75E-05	1.10E-04	2.65E-04	4	100
1,2,3,4,7,8,9-HpCDF	pg/m <sup>3</sup>	-	-	2.03E-05	3.92E-06	9.56E-06	6.01E-05	-	-	2.35E-05	3.92E-06	6.01E-05	2.03E-05	9.56E-06	6.01E-05	4	100
OCDF	pg/m <sup>3</sup>	-	-	9.38E-07	3.56E-06	3.87E-06	7.19E-06	-	-	3.89E-06	9.38E-07	7.19E-06	9.38E-07	3.87E-06	7.19E-06	4	100
Total Toxic Equivalency	pg TEQ/m <sup>3</sup>	0.1 1 <sup>[1]</sup>	-	7.43E-03	5.11E-03	8.54E-03	1.16E-02	0.1	0	8.16E-03	5.11E-03	1.16E-02	7.43E-03	8.54E-03	1.16E-02	4	100

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

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

# Table B3: 2019 Rundle Station Q4 Monitoring Results for Dioxins & Furans

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	12-Oct-19	5-Nov-19	29-Nov-19	23-Dec-19	MECP 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 <sup>3</sup>	-	-	3.73E-03		3.02E-03	1.37E-03	-	-	2.71E-03	1.37E-03	3.73E-03	3.73E-03	3.02E-03	1.37E-03	3	75
10/12/2019	pg/m <sup>3</sup>	-	-	1.38E-02		2.54E-03	2.57E-03	-	-	6.31E-03	2.54E-03	1.38E-02	1.38E-02	2.54E-03	2.57E-03	3	75
1,2,3,4,7,8-HxCDD	pg/m <sup>3</sup>	-	-	3.73E-04		2.70E-04	2.87E-04	-	-	3.10E-04	2.70E-04	3.73E-04	3.73E-04	2.70E-04	2.87E-04	3	75
1,2,3,6,7,8-HxCDD	pg/m <sup>3</sup>	-	-	1.12E-03		5.24E-04	1.21E-03	-	-	9.54E-04	5.24E-04	1.21E-03	1.12E-03	5.24E-04	1.21E-03	3	75
1,2,3,7,8,9-HxCDD	pg/m <sup>3</sup>	-	-	8.41E-04		5.56E-04	1.22E-03	-	-	8.72E-04	5.56E-04	1.22E-03	8.41E-04	5.56E-04	1.22E-03	3	75
1,2,3,4,6,7,8-HpCDD	pg/m <sup>3</sup>	-	-	6.20E-04		1.66E-03	2.13E-03	-	-	1.47E-03	6.20E-04	2.13E-03	6.20E-04	1.66E-03	2.13E-03	3	75
OCDD	pg/m <sup>3</sup>	-	-	6.27E-05		1.38E-04	2.10E-04	-	-	1.37E-04	6.27E-05	2.10E-04	6.27E-05	1.38E-04	2.10E-04	3	75
2,3,7,8-TCDF	pg/m <sup>3</sup>	-	-	2.76E-04	ole	2.22E-04	1.18E-04	-	-	2.05E-04	1.18E-04	2.76E-04	2.76E-04	2.22E-04	1.18E-04	3	75
1,2,3,7,8-PeCDF	pg/m <sup>3</sup>	-	-	4.14E-05	ame	4.76E-05	1.07E-04	-	-	6.53E-05	4.14E-05	1.07E-04	4.14E-05	4.76E-05	1.07E-04	3	75
2,3,4,7,8-PeCDF	pg/m <sup>3</sup>	-	-	1.41E-03	q	4.43E-04	1.72E-03	-	-	1.19E-03	4.43E-04	1.72E-03	1.41E-03	4.43E-04	1.72E-03	3	75
1,2,3,4,7,8-HxCDF	pg/m <sup>3</sup>	-	-	1.02E-03	vali	1.90E-04	5.38E-04	-	-	5.83E-04	1.90E-04	1.02E-03	1.02E-03	1.90E-04	5.38E-04	3	75
1,2,3,6,7,8-HxCDF	pg/m <sup>3</sup>	-	-	5.03E-04	<u> </u>	1.75E-04	4.92E-04	-	-	3.90E-04	1.75E-04	5.03E-04	5.03E-04	1.75E-04	4.92E-04	3	75
2,3,4,6,7,8-HxCDF	pg/m <sup>3</sup>	-	-	4.55E-04		1.90E-04	7.52E-04	-	-	4.66E-04	1.90E-04	7.52E-04	4.55E-04	1.90E-04	7.52E-04	3	75
1,2,3,7,8,9-HxCDF	pg/m <sup>3</sup>	-	-	5.19E-04		2.06E-04	1.81E-04	-	-	3.02E-04	1.81E-04	5.19E-04	5.19E-04	2.06E-04	1.81E-04	3	75
1,2,3,4,6,7,8-HpCDF	pg/m <sup>3</sup>	-	-	3.28E-04		3.81E-05	3.17E-04	-	-	2.28E-04	3.81E-05	3.28E-04	3.28E-04	3.81E-05	3.17E-04	3	75
1,2,3,4,7,8,9-HpCDF	pg/m <sup>3</sup>	-	-	1.93E-04	1	1.90E-05	6.65E-05	-	-	9.28E-05	1.90E-05	1.93E-04	1.93E-04	1.90E-05	6.65E-05	3	75
OCDF	pg/m <sup>3</sup>	-	-	1.18E-05		1.81E-06	3.67E-06	-	-	5.76E-06	1.81E-06	1.18E-05	1.18E-05	1.81E-06	3.67E-06	3	75
Total Toxic Equivalency	pg TEQ/m <sup>3</sup>	0.1 1 <sup>[1]</sup>	-	2.53E-02		1.02E-02	1.33E-02	0.1	0	1.63E-02	1.02E-02	2.53E-02	2.53E-02	1.02E-02	1.33E-02	3	75

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

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

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

		Courtice		Rundle								
Sample Date	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume						
	No.	(min)	(m <sup>3</sup> )	No.	(min)	(m³)						
October 12, 2019	L2367570-1	1442	320	L2367570-2	1443	308						
October 24, 2019		Invalid Sample		L2374041-1	1442	311						
November 5, 2019	L2379576-2	1442	332		Invalid Sample							
November 17, 2019	L2385830-1	1441	336	L2385830-2	1441	328						
November 29, 2019	L2391934-1	1441	319	L2391934-2	1442	315						
December 11, 2019	L2396320-1	1443	329		Invalid Sample							
December 23, 2019	L2400442-1	1440	333	L2400422-2	1441	331						

# Table B5: 2019 Courtice Station Q4 Monitoring Results for PAHs

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	12-Oct-19	24-Oct-19	5-Nov-19	17-Nov-19	29-Nov-19	11-Dec-19	23-Dec-19	MECP Criteria	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	ng/m <sup>3</sup>	12000	-	2.91E+00		2.79E+00	1.64E+00	1.89E+00	2.35E+00	2.65E+00	12000	0	2.37E+00	1.64E+00	2.91E+00	2.91E+00	2.79E+00	2.65E+00	6	86
2-Methylnaphthalene	ng/m <sup>3</sup>	10000	-	4.00E+00	1	4.25E+00	1.77E+00	2.39E+00	3.80E+00	3.66E+00	10000	0	3.31E+00	1.77E+00	4.25E+00	4.00E+00	4.25E+00	3.80E+00	6	86
10/12/2019	ng/m <sup>3</sup>	-	-	7.53E-01	1	3.01E-01	2.90E-01	2.86E-01	4.47E-01	3.84E-01	-	-	4.10E-01	2.86E-01	7.53E-01	7.53E-01	3.01E-01	4.47E-01	6	86
Acenaphthylene	ng/m <sup>3</sup>	3500	-	1.26E-01	1	9.10E-02	1.43E-02	3.29E-01	1.19E-01	1.66E-01	3500	0	1.41E-01	1.43E-02	3.29E-01	1.26E-01	3.29E-01	1.66E-01	6	86
Anthracene	ng/m <sup>3</sup>	200	-	5.13E-02	1	4.46E-02	2.26E-02	3.20E-02	3.07E-02	4.14E-02	200	0	3.71E-02	2.26E-02	5.13E-02	5.13E-02	4.46E-02	4.14E-02	6	86
Benzo(a)Anthracene	ng/m <sup>3</sup>	-	-	8.34E-03	1	1.44E-02	2.90E-02	8.78E-03	3.89E-02	8.71E-02	-	-	3.11E-02	8.34E-03	8.71E-02	8.34E-03	2.90E-02	8.71E-02	6	86
Benzo(a)fluorene	ng/m <sup>3</sup>	-	-	3.13E-04		6.36E-03	3.87E-02	2.81E-02	4.10E-02	7.84E-02	-	-	3.21E-02	3.13E-04	7.84E-02	3.13E-04	3.87E-02	7.84E-02	6	86
Benzo(a)Pyrene (Historically High)	ng/m <sup>3</sup>	0.05 <sup>[1]</sup> 5 <sup>[2]</sup> 1.1 <sup>[3]</sup>	1	8.28E-03		1.98E-02	6.93E-02	4.83E-03	2.57E-02	9.85E-02	0.05	2	3.78E-02	4.83E-03	9.85E-02	8.28E-03	6.93E-02	9.85E-02	6	86
Benzo(b)Fluoranthene	ng/m <sup>3</sup>	-	-	3.50E-02	]	3.22E-02	4.26E-02	3.12E-02	5.81E-02	1.32E-01	-	-	5.52E-02	3.12E-02	1.32E-01	3.50E-02	4.26E-02	1.32E-01	6	86
Benzo(b)fluorene	ng/m <sup>3</sup>	-	-	3.13E-04	۵	3.01E-03	2.22E-02	1.76E-02	2.71E-02	6.28E-02	-	-	2.22E-02	3.13E-04	6.28E-02	3.13E-04	2.22E-02	6.28E-02	6	86
Benzo(e)Pyrene	ng/m <sup>3</sup>	-	-	2.32E-02	ldu	3.31E-02	4.94E-02	3.98E-02	5.78E-02	1.07E-01	-	-	5.16E-02	2.32E-02	1.07E-01	2.32E-02	4.94E-02	1.07E-01	6	86
Benzo(g,h,i)Perylene	ng/m <sup>3</sup>	-	-	2.39E-02	Sar	3.73E-02	6.16E-02	3.48E-02	7.66E-02	1.22E-01	-	-	5.93E-02	2.39E-02	1.22E-01	2.39E-02	6.16E-02	1.22E-01	6	86
Benzo(k)Fluoranthene	ng/m <sup>3</sup>	-	-	1.84E-02	lid	3.16E-02	9.73E-02	4.83E-02	7.57E-02	1.34E-01	-	-	6.75E-02	1.84E-02	1.34E-01	1.84E-02	9.73E-02	1.34E-01	6	86
Biphenyl	ng/m <sup>3</sup>	-	-	1.19E+00	nva	1.13E+00	1.24E+00	1.09E+00	4.44E-01	1.82E+00	-	-	1.15E+00	4.44E-01	1.82E+00	1.19E+00	1.24E+00	1.82E+00	6	86
Chrysene	ng/m <sup>3</sup>	-	-	4.75E-02	] =	4.76E-02	1.19E-01	5.99E-02	1.47E-01	2.17E-01	-	-	1.06E-01	4.75E-02	2.17E-01	4.75E-02	1.19E-01	2.17E-01	6	86
Dibenzo(a,h)Anthracene	ng/m <sup>3</sup>	-	-	3.13E-04		2.89E-03	3.21E-03	2.82E-03	1.30E-02	1.62E-02	-	-	6.40E-03	3.13E-04	1.62E-02	3.13E-04	3.21E-03	1.62E-02	6	86
Fluoranthene	ng/m <sup>3</sup>	-	-	3.69E-01	]	2.12E-01	3.87E-01	3.35E-01	3.89E-01	6.46E-01	-	-	3.90E-01	2.12E-01	6.46E-01	3.69E-01	3.87E-01	6.46E-01	6	86
Indeno(1,2,3-cd)Pyrene	ng/m <sup>3</sup>	-	-	2.53E-02		2.78E-02	5.65E-02	3.61E-02	9.85E-02	1.21E-01	-	-	6.09E-02	2.53E-02	1.21E-01	2.53E-02	5.65E-02	1.21E-01	6	86
Naphthalene	ng/m <sup>3</sup>	22500	22500	1.55E+01		1.61E+01	1.67E+01	1.13E+01	1.88E+01	4.47E+01	22500	0	2.05E+01	1.13E+01	4.47E+01	1.55E+01	1.67E+01	4.47E+01	6	86
o-Terphenyl	ng/m <sup>3</sup>	-	-	9.88E-03		1.09E-02	7.56E-03	5.64E-03	8.45E-03	1.66E-02	-	-	9.83E-03	5.64E-03	1.66E-02	9.88E-03	1.09E-02	1.66E-02	6	86
Perylene	ng/m <sup>3</sup>	-	-	3.13E-04		1.42E-03	8.57E-03	3.13E-04	2.21E-02	2.30E-02	-	-	9.28E-03	3.13E-04	2.30E-02	3.13E-04	8.57E-03	2.30E-02	6	86
Phenanthrene	ng/m <sup>3</sup>	-	-	1.84E+00	]	7.47E-01	1.15E+00	1.03E+00	7.69E-01	1.53E+00	-	-	1.18E+00	7.47E-01	1.84E+00	1.84E+00	1.15E+00	1.53E+00	6	86
Pyrene	ng/m <sup>3</sup>	-	-	2.14E-01	]	1.42E-01	2.35E-01	2.21E-01	2.74E-01	3.30E-01	-	-	2.36E-01	1.42E-01	3.30E-01	2.14E-01	2.35E-01	3.30E-01	6	86
Tetralin	ng/m <sup>3</sup>	-	-	1.90E+00	]	1.66E+00	3.04E+00	6.24E-01	2.22E+00	1.69E+00	-	-	1.86E+00	6.24E-01	3.04E+00	1.90E+00	3.04E+00	2.22E+00	6	86
Fluorene	ng/m <sup>3</sup>	-	-	-		-	-	-	4.22E-01	-	-	-	-	4.22E-01	4.22E-01	-	-	4.22E-01	1	14
Total PAH <sup>[4]</sup>	ng/m <sup>3</sup>	-	-	29.033		2.78E+01	2.71E+01	1.98E+01	3.07E+01	5.89E+01	-	-	3.22E+01	1.98E+01	5.89E+01	2.90E+01	2.78E+01	5.89E+01	6	86

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

Fluorene was reported only once on the December 11<sup>th</sup> sampling event. The fluorene levels below instrument response were not listed on the analytical reports. Indicates an exceedance of the AAQC

[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: 2019 Rundle Station Q4 Monitoring Results for PAHs

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	12-Oct-19	24-Oct-19	5-Nov-19	17-Nov-19	29-Nov-19	11-Dec-19	23-Dec-19	MECP Criteria	No. > Criteria	Arithmetic Mean	Minimum Q4 Concentration	Maximum Q4 Concentration	October Maximum Concentration	November Maximum Concentration	December Maximum Concentration	Number of Valid Samples	% Valid data
1-Methylnaphthalene	ng/m <sup>3</sup>	12000	-	4.45E+00	4.15E+00		2.57E+00	2.91E+00		2.69E+00	12000	0	-	2.57E+00	4.45E+00	4.45E+00	2.91E+00	2.69E+00	5	71
2-Methylnaphthalene	ng/m <sup>3</sup>	10000	-	6.69E+00	6.46E+00		3.69E+00	4.29E+00		3.90E+00	10000	0	-	3.69E+00	6.69E+00	6.69E+00	4.29E+00	3.90E+00	5	71
10/12/2019	ng/m <sup>3</sup>	-	-	3.10E+00	1.37E+00		1.38E+00	3.24E-01		7.34E-01	-	-	-	3.24E-01	3.10E+00	3.10E+00	1.38E+00	7.34E-01	5	71
Acenaphthylene	ng/m <sup>3</sup>	3500	-	1.41E-01	1.09E-01		8.60E-02	4.51E-01		1.11E-01	3500	0	-	8.60E-02	4.51E-01	1.41E-01	4.51E-01	1.11E-01	5	71
Anthracene	ng/m <sup>3</sup>	200	-	2.09E-01	1.58E-01		5.03E-02	5.84E-02		6.01E-02	200	0	-	5.03E-02	2.09E-01	2.09E-01	5.84E-02	6.01E-02	5	71
Benzo(a)Anthracene	ng/m <sup>3</sup>	-	-	9.42E-03	1.57E-02		4.45E-02	1.83E-02		9.31E-02	-	-	-	9.42E-03	9.31E-02	1.57E-02	4.45E-02	9.31E-02	5	71
Benzo(a)fluorene	ng/m <sup>3</sup>	-	-	3.25E-04	1.68E-02		5.24E-02	3.40E-02		8.28E-02	-	-	-	3.25E-04	8.28E-02	1.68E-02	5.24E-02	8.28E-02	5	71
Benzo(a)Pyrene	ng/m <sup>3</sup>	0.05 <sup>[1]</sup> 5 <sup>[2]</sup> 1.1 <sup>[3]</sup>	1	7.21E-03	1.62E-02		8.11E-02	7.46E-03		1.11E-01	0.05	2	-	7.21E-03	1.11E-01	1.62E-02	8.11E-02	1.11E-01	5	71
Benzo(b)Fluoranthene	ng/m <sup>3</sup>	-	-	4.29E-02	3.50E-02		5.67E-02	4.10E-02		1.55E-01	-	-	-	3.50E-02	1.55E-01	4.29E-02	5.67E-02	1.55E-01	5	71
Benzo(b)fluorene	ng/m <sup>3</sup>	-	-	3.25E-04	3.22E-03	a	2.95E-02	2.18E-02	a	6.56E-02	-	-	-	3.25E-04	6.56E-02	3.22E-03	2.95E-02	6.56E-02	5	71
Benzo(e)Pyrene	ng/m <sup>3</sup>	-	-	2.23E-02	3.41E-02	ldu	6.55E-02	5.17E-02	du	1.16E-01	-	-	-	2.23E-02	1.16E-01	3.41E-02	6.55E-02	1.16E-01	5	71
Benzo(g,h,i)Perylene	ng/m <sup>3</sup>	-	-	2.53E-02	3.38E-02	San	7.65E-02	4.73E-02	San	1.32E-01	-	-	-	2.53E-02	1.32E-01	3.38E-02	7.65E-02	1.32E-01	5	71
Benzo(k)Fluoranthene	ng/m <sup>3</sup>	-	-	1.60E-02	2.14E-02	lid	1.27E-01	9.05E-02	lid	1.47E-01	-	-	-	1.60E-02	1.47E-01	2.14E-02	1.27E-01	1.47E-01	5	71
Biphenyl	ng/m <sup>3</sup>	-	-	1.60E+00	1.32E+00	nva	1.41E+00	1.37E+00	nva	1.80E+00	-	-	-	1.32E+00	1.80E+00	1.60E+00	1.41E+00	1.80E+00	8	71
Chrysene	ng/m <sup>3</sup>	-	-	4.61E-02	4.79E-02	=	1.84E-01	8.73E-02	=	2.23E-01	-	-	-	4.61E-02	2.23E-01	4.79E-02	1.84E-01	2.23E-01	5	71
Dibenzo(a,h)Anthracene	ng/m <sup>3</sup>	-	-	3.25E-04	7.85E-03		4.76E-03	5.78E-03		1.64E-02	-	-	-	3.25E-04	1.64E-02	7.85E-03	5.78E-03	1.64E-02	5	71
Fluoranthene	ng/m <sup>3</sup>	-	-	8.18E-01	3.11E-01		6.01E-01	3.68E-01		7.34E-01	-	-	-	3.11E-01	8.18E-01	8.18E-01	6.01E-01	7.34E-01	5	71
Indeno(1,2,3-cd)Pyrene	ng/m <sup>3</sup>	-	-	1.99E-02	2.23E-02		7.62E-02	5.21E-02		1.35E-01	-	-	-	1.99E-02	1.35E-01	2.23E-02	7.62E-02	1.35E-01	5	71
Naphthalene	ng/m <sup>3</sup>	22500	22500	1.75E+01	2.05E+01		2.06E+01	1.66E+01		4.14E+01	22500	0	-	1.66E+01	4.14E+01	2.05E+01	2.06E+01	4.14E+01	5	71
o-Terphenyl	ng/m <sup>3</sup>	-	-	1.02E-02	9.87E-03		7.26E-03	5.68E-03		1.57E-02	-	-	-	5.68E-03	1.57E-02	1.02E-02	7.26E-03	1.57E-02	5	71
Perylene	ng/m <sup>3</sup>	-	-	3.25E-04	3.22E-03		1.05E-02	3.17E-04		2.39E-02	-	-	-	3.17E-04	2.39E-02	3.22E-03	1.05E-02	2.39E-02	5	71
Phenanthrene	ng/m <sup>3</sup>	-	-	4.12E+00	1.61E+00		2.18E+00	1.43E+00		2.02E+00	-	-	-	1.43E+00	4.12E+00	4.12E+00	2.18E+00	2.02E+00	5	71
Pyrene	ng/m <sup>3</sup>	-	-	3.77E-01	1.87E-01		3.32E-01	2.57E-01		3.81E-01	-	-	-	1.87E-01	3.81E-01	3.77E-01	3.32E-01	3.81E-01	5	71
Tetralin	ng/m <sup>3</sup>	-	-	1.52E+00	1.97E+00		3.29E+00	3.21E+00		2.21E+00	-	-	-	1.52E+00	3.29E+00	1.97E+00	3.29E+00	2.21E+00	5	71
Fluorene	ng/m <sup>3</sup>	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-	-	-
Total PAH <sup>[4]</sup>	ng/m <sup>3</sup>	-	-	4.07E+01	3.84E+01		3.70E+01	3.17E+01		5.73E+01	-	-	-	3.17E+01	5.73E+01	4.07E+01	3.70E+01	5.73E+01	5	71

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

Fluorene was not detected in any of the Rundle Road Samples. The fluorene levels below instrument response were not listed on the analytical reports. Indicates an exceedance of the AAQC

[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

		Courtice	-	Rundle							
Sample Date	Filter ID	Sample Duration	Sample Volume	Filter ID	Sample Duration	Sample Volume					
	No.	(min)	(m <sup>3</sup> )	No.	(min)	(m³)					
October 6, 2019	739860	1441	1637	739859	1440	1610					
October 12, 2019	739866	1443	1631	739861	1443	1640					
October 18, 2019	739863	1442	1623	739862	1442	1634					
October 24, 2019		Invalid Sample	-	739864 1444 16							
October 30, 2019	739865	1442	1647	739978	1442	1634					
November 5, 2019	739980	1442	1610	739979	1441	1652					
November 11, 2019	739982	1441	1654	739981	1442	1659					
November 17, 2019	739984	1441	1648	739983	1441	1652					
November 23, 2019	739986	1441	1632	739985	1442	1646					
November 29, 2019	739988	1441	1667	739987	1442	1639					
December 5, 2019	739990	1445	1638	739989	1442	1645					
December 11, 2019	739992	1441	1667	739991	1442	1627					
December 17, 2019	740228	1441	1632	740227	1442	1650					
December 23, 2019	739994	1441	1656	739993	1441	1669					
December 29, 2019	739996	1441	1638	739995	1441	1649					

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

#### Table B8: 2019 Courtice Station Q4 Monitoring Results for TSP and Metals

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	6-Oct-19	12-Oct-19	18-Oct-19	24-Oct-19	30-Oct-19	5-Nov-19	11-Nov-19	17-Nov-19	23-Nov-19	29-Nov-19	5-Dec-19	11-Dec-19	17-Dec-19	23-Dec-19	29-Dec-19	MECP 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/m <sup>3</sup>	120	120	17.53	12.75	12.754		11.17	16.65	8.22	10.25	15.748	5.699	8.91	33.95	20.71	20.35	11.60	120	0	13.39	14.74	5.70	33.95	17.53	16.65	33.95	14	93
Total Mercury (Hg)	µg/m <sup>3</sup>	2	2	1.41E-05	2.45E-05	9.24E-06	1	3.04E-06	8.07E-06	6.65E-06	1.03E-05	1.23E-05	9.00E-06	3.05E-06	1.68E-05	1.47E-05	1.63E-05	2.99E-05	2	0	1.06E-05	1.27E-05	3.04E-06	2.99E-05	2.45E-05	1.23E-05	2.99E-05	14	93
Aluminum (Al)	µg/m <sup>3</sup>	4.8		1.02E-01	6.99E-02	1.06E-01	1	6.25E-02	9.50E-02	7.92E-02	8.74E-02	1.37E-01	5.22E-02	4.40E-02	2.50E-01	7.11E-02	5.19E-02	7.81E-02	4.8	0	8.27E-02	9.19E-02	4.40E-02	2.50E-01	1.06E-01	1.37E-01	2.50E-01	14	93
Antimony (Sb)	µg/m <sup>3</sup>	25	25	9.90E-04	7.05E-04	6.90E-04		3.70E-04	8.94E-04	7.86E-04	4.73E-04	6.86E-04	4.98E-04	8.06E-04	5.94E-04	1.18E-03	1.93E-03	8.85E-04	25	0	7.55E-04	8.20E-04	3.70E-04	1.93E-03	9.90E-04	8.94E-04	1.93E-03	14	93
Arsenic (As)	µg/m <sup>3</sup>	0.3	0.3	9.16E-04	9.20E-04	9.24E-04		9.11E-04	9.32E-04	9.07E-04	9.10E-04	9.19E-04	9.00E-04	9.16E-04	9.00E-04	2.76E-03	9.06E-04	9.16E-04	0.3	0	9.88E-04	1.05E-03	9.00E-04	2.76E-03	9.24E-04	9.32E-04	2.76E-03	14	93
Barium (Ba)	µg/m <sup>3</sup>	10	10	7.03E-03	5.33E-03	8.07E-03		5.28E-03	8.14E-03	3.45E-03	5.64E-03	8.03E-03	5.46E-03	7.51E-03	7.56E-03	1.15E-02	7.37E-03	5.07E-03	10	0	6.55E-03	6.81E-03	3.45E-03	1.15E-02	8.07E-03	8.14E-03	1.15E-02	14	93
Beryllium (Be)	µg/m³	0.01	0.01	3.05E-05	3.07E-05	3.08E-05		3.04E-05	3.11E-05	3.02E-05	3.03E-05	3.06E-05	3.00E-05	3.05E-05	3.00E-05	3.06E-05	3.02E-05	3.05E-05	0.01	0	3.05E-05	3.05E-05	3.00E-05	3.11E-05	3.08E-05	3.11E-05	3.06E-05	14	93
Bismuth (Bi)	µg/m <sup>3</sup>	-	-	5.50E-04	5.52E-04	5.55E-04		5.46E-04	5.59E-04	5.44E-04	5.46E-04	5.51E-04	5.40E-04	5.49E-04	5.40E-04	5.51E-04	5.43E-04	5.49E-04	-	-	5.48E-04	5.48E-04	5.40E-04	5.59E-04	5.55E-04	5.59E-04	5.51E-04	14	93
Boron (B)	µg/m <sup>3</sup>	120	•	1.22E-02	1.23E-02	1.23E-02		1.21E-02	1.24E-02	1.21E-02	1.21E-02	1.23E-02	1.20E-02	1.22E-02	1.20E-02	1.23E-02	1.21E-02	1.22E-02	120	0	1.22E-02	1.22E-02	1.20E-02	1.24E-02	1.23E-02	1.24E-02	1.23E-02	14	93
Cadmium (Cd)	µg/m <sup>3</sup>	0.025	0.025	6.11E-04	6.13E-04	6.16E-04		6.07E-04	6.21E-04	6.05E-04	6.07E-04	6.13E-04	6.00E-04	6.11E-04	6.00E-04	6.13E-04	6.04E-04	6.11E-04	0.025	0	6.09E-04	6.09E-04	6.00E-04	6.21E-04	6.16E-04	6.21E-04	6.13E-04	14	93
Chromium (Cr)	µg/m <sup>3</sup>	0.5		1.53E-03	1.53E-03	1.54E-03		1.52E-03	3.11E-03	1.51E-03	1.52E-03	3.62E-03	1.50E-03	1.53E-03	3.84E-03	1.53E-03	1.51E-03	1.53E-03	0.5	0	1.82E-03	1.95E-03	1.50E-03	3.84E-03	1.54E-03	3.62E-03	3.84E-03	14	93
Cobalt (Co)	µg/m³	0.1	0.1	6.11E-04	6.13E-04	6.16E-04		6.07E-04	6.21E-04	6.05E-04	6.07E-04	6.13E-04	6.00E-04	6.11E-04	6.00E-04	6.13E-04	6.04E-04	6.11E-04	0.1	0	6.09E-04	6.09E-04	6.00E-04	6.21E-04	6.16E-04	6.21E-04	6.13E-04	14	93
Copper (Cu)	µg/m³	50		2.97E-02	1.27E-02	2.04E-02		9.35E-03	1.75E-02	1.52E-02	6.98E-03	1.53E-02	3.62E-02	1.10E-02	1.70E-02	1.64E-02	1.04E-02	1.54E-02	50	0	1.52E-02	1.67E-02	6.98E-03	3.62E-02	2.97E-02	3.62E-02	1.70E-02	14	93
Iron (Fe)	µg/m <sup>3</sup>	4	-	2.83E-01	2.06E-01	3.41E-01	ble	1.51E-01	3.05E-01	1.58E-01	1.80E-01	4.00E-01	1.85E-01	2.01E-01	4.97E-01	4.58E-01	2.75E-01	2.09E-01	4	0	2.56E-01	2.75E-01	1.51E-01	4.97E-01	3.41E-01	4.00E-01	4.97E-01	14	93
Lead (Pb)	µg/m <sup>3</sup>	0.5	0.5	4.15E-03	2.76E-03	9.24E-04	San	9.11E-04	2.61E-03	6.17E-03	2.73E-03	2.88E-03	9.00E-04	9.16E-04	2.16E-03	3.06E-03	4.47E-03	2.08E-03	2	0	2.20E-03	2.62E-03	9.00E-04	6.17E-03	4.15E-03	6.17E-03	4.47E-03	14	93
Magnesium (Mg)	µg/m <sup>3</sup>	-	-	1.47E-01	1.04E-01	1.48E-01	pi	8.50E-02	2.11E-01	9.67E-02	1.21E-01	2.08E-01	6.60E-02	9.77E-02	4.14E-01	1.47E-01	1.09E-01	1.04E-01	-	-	1.31E-01	1.47E-01	6.60E-02	4.14E-01	1.48E-01	2.11E-01	4.14E-01	14	93
Manganese (Mn)	µg/m <sup>3</sup>	0.4	-	7.82E-03	7.73E-03	9.24E-03	2 N	4.13E-03	1.19E-02	3.63E-03	3.28E-03	1.44E-02	4.32E-03	3.91E-03	1.84E-02	7.72E-03	5.62E-03	4.03E-03	0.4	0	6.53E-03	7.58E-03	3.28E-03	1.84E-02	9.24E-03	1.44E-02	1.84E-02	14	93
Molybdenum (Mo)	µg/m³	120	-	1.16E-03	3.07E-04	8.63E-04		3.04E-04	9.94E-04	7.86E-04	3.03E-04	1.16E-03	1.92E-03	7.94E-04	8.40E-04	8.58E-04	9.66E-04	9.16E-04	120	0	7.68E-04	8.70E-04	3.03E-04	1.92E-03	1.16E-03	1.92E-03	9.66E-04	14	93
Nickel (Ni)	µg/m <sup>3</sup>	0.2	•	9.16E-04	9.20E-04	9.24E-04		9.11E-04	9.32E-04	9.07E-04	9.10E-04	9.19E-04	9.00E-04	9.16E-04	9.00E-04	9.19E-04	9.06E-04	9.16E-04	0.2	0	9.14E-04	9.14E-04	9.00E-04	9.32E-04	9.24E-04	9.32E-04	9.19E-04	14	93
Phosphorus (P)	µg/m <sup>3</sup>	-	-	2.29E-01	2.30E-01	2.31E-01		2.28E-01	2.33E-01	2.27E-01	2.28E-01	2.30E-01	2.25E-01	2.29E-01	2.25E-01	2.30E-01	2.26E-01	2.29E-01	-	-	2.28E-01	2.28E-01	2.25E-01	2.33E-01	2.31E-01	2.33E-01	2.30E-01	14	93
Selenium (Se)	µg/m <sup>3</sup>	10	10	3.05E-03	3.07E-03	3.08E-03		3.04E-03	3.11E-03	3.02E-03	3.03E-03	3.06E-03	3.00E-03	3.05E-03	3.00E-03	3.06E-03	3.02E-03	3.05E-03	10	0	3.05E-03	3.05E-03	3.00E-03	3.11E-03	3.08E-03	3.11E-03	3.06E-03	14	93
Silver (Ag)	µg/m³	1	1	3.05E-04	3.07E-04	3.08E-04		3.04E-04	3.11E-04	3.02E-04	3.03E-04	3.06E-04	3.00E-04	3.05E-04	3.00E-04	3.06E-04	3.02E-04	3.05E-04	1	0	3.05E-04	3.05E-04	3.00E-04	3.11E-04	3.08E-04	3.11E-04	3.06E-04	14	93
Strontium (Sr)	µg/m <sup>3</sup>	120		2.81E-03	2.08E-03	4.37E-03		1.94E-03	3.42E-03	1.93E-03	2.73E-03	4.17E-03	1.86E-03	2.08E-03	7.62E-03	3.25E-03	2.05E-03	2.56E-03	120	0	2.81E-03	3.06E-03	1.86E-03	7.62E-03	4.37E-03	4.17E-03	7.62E-03	14	93
Thallium (Tl)	µg/m <sup>3</sup>	-	-	2.75E-05	2.76E-05	2.77E-05		2.73E-05	2.80E-05	2.72E-05	2.73E-05	2.76E-05	2.70E-05	2.75E-05	2.70E-05	2.76E-05	2.72E-05	2.75E-05	-	-	2.74E-05	2.74E-05	2.70E-05	2.80E-05	2.77E-05	2.80E-05	2.76E-05	14	93
Tin (Sn)	µg/m³	10	10	1.41E-03	1.35E-03	3.08E-04		3.04E-04	1.06E-03	6.05E-04	6.67E-04	9.19E-04	3.00E-04	7.33E-04	9.00E-04	1.35E-03	1.51E-03	3.05E-04	10	0	7.12E-04	8.36E-04	3.00E-04	1.51E-03	1.41E-03	1.06E-03	1.51E-03	14	93
Titanium (Ti)	µg/m <sup>3</sup>	120		3.36E-03	3.37E-03	7.39E-03	1	3.34E-03	3.42E-03	3.33E-03	3.34E-03	8.58E-03	3.30E-03	3.36E-03	1.14E-02	3.37E-03	3.32E-03	3.36E-03	120	0	4.14E-03	4.59E-03	3.30E-03	1.14E-02	7.39E-03	8.58E-03	1.14E-02	14	93
Uranium (Ur)	µg/m <sup>3</sup>	1.5		3.05E-05	3.07E-05	3.08E-05		3.04E-05	3.11E-05	3.02E-05	3.03E-05	3.06E-05	3.00E-05	3.05E-05	3.00E-05	3.06E-05	3.02E-05	3.05E-05	1.5	0	3.05E-05	3.05E-05	3.00E-05	3.11E-05	3.08E-05	3.11E-05	3.06E-05	14	93
Vanadium (V)	µg/m <sup>3</sup>	2	1	1.53E-03	1.53E-03	1.54E-03		1.52E-03	1.55E-03	1.51E-03	1.52E-03	1.53E-03	1.50E-03	1.53E-03	1.50E-03	1.53E-03	1.51E-03	1.53E-03	2	0	1.52E-03	1.52E-03	1.50E-03	1.55E-03	1.54E-03	1.55E-03	1.53E-03	14	93
Zinc (Zn)	µg/m <sup>3</sup>	120	-	6.11E-02	4.00E-02	1.97E-02		1.83E-02	3.33E-02	9.43E-02	1.67E-02	4.19E-02	3.27E-02	4.67E-02	3.43E-02	4.14E-02	3.64E-02	6.35E-02	120	0	3.72E-02	4.14E-02	1.67E-02	9.43E-02	6.11E-02	9.43E-02	6.35E-02	14	93
Zirconium (Zr)	µg/m <sup>3</sup>	20	-	6.11E-04	6.13E-04	6.16E-04		6.07E-04	6.21E-04	6.05E-04	6.07E-04	6.13E-04	6.00E-04	6.11E-04	6.00E-04	6.13E-04	6.04E-04	6.11E-04	20	0	6.09E-04	6.09E-04	6.00E-04	6.21E-04	6.16E-04	6.21E-04	6.13E-04	14	93

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

#### Table B9: 2019 Rundle Station Q4 Monitoring Results for TSP and Metals

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	6-Oct-19	12-Oct-19	18-Oct-19	24-Oct-19	30-Oct-19	5-Nov-19	11-Nov-19	17-Nov-19	23-Nov-19	29-Nov-19	5-Dec-19	11-Dec-19	17-Dec-19	23-Dec-19	29-Dec-19	MECP 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 Valid Samples data
Particulate (TSP)	µg/m <sup>3</sup>	120	120	17.267	17.866	12.118	18.700	9.12	34.38	7.05	10.90	25.577	12.630	9.30	81.75	2.12E+01	2.50E+01	1.04E+01	120	0	16.7	20.9	7.1	81.7	18.7	34.4	81.7	15 100
Total Mercury (Hg)	µg/m <sup>3</sup>	2	2	2.24E-05	6.10E-06	1.16E-05	1.16E-05	3.06E-06	9.08E-06	7.84E-06	1.03E-05	1.58E-05	8.54E-06	3.04E-06	3.26E-05	1.52E-05	1.98E-05	2.85E-05	2	0	1.11E-05	1.37E-05	3.04E-06	3.26E-05	2.24E-05	1.58E-05	3.26E-05	15 100
Aluminum (Al)	µg/m <sup>3</sup>	4.8	-	8.51E-02	8.66E-02	9.36E-02	1.62E-01	4.96E-02	1.94E-01	8.38E-02	9.99E-02	2.07E-01	1.08E-01	6.81E-02	6.64E-01	6.24E-02	6.29E-02	4.67E-02	4.8	0	1.03E-01	1.38E-01	4.67E-02	6.64E-01	1.62E-01	2.07E-01	6.64E-01	15 100
Antimony (Sb)	µg/m³	25	25	7.08E-04	6.52E-04	2.51E-04	9.99E-04	2.26E-04	7.38E-04	2.35E-04	5.15E-04	1.02E-03	2.99E-04	5.23E-04	8.54E-04	1.20E-03	2.06E-03	4.91E-04	25	0	5.92E-04	7.18E-04	2.26E-04	2.06E-03	9.99E-04	1.02E-03	2.06E-03	15 100
Arsenic (As)	µg/m³	0.3	0.3	9.32E-04	9.15E-04	9.18E-04	9.20E-04	9.18E-04	9.08E-04	9.04E-04	9.08E-04	9.11E-04	9.15E-04	9.12E-04	9.22E-04	4.79E-03	8.99E-04	9.10E-04	0.3	0	1.02E-03	1.17E-03	8.99E-04	4.79E-03	9.32E-04	9.15E-04	4.79E-03	15 100
Barium (Ba)	µg/m <sup>3</sup>	10	10	6.02E-03	5.73E-03	4.22E-03	1.20E-02	3.43E-03	9.44E-03	2.71E-03	4.78E-03	1.22E-02	6.89E-03	6.08E-03	1.35E-02	1.36E-02	8.27E-03	3.76E-03	10	0	6.64E-03	7.51E-03	2.71E-03	1.36E-02	1.20E-02	1.22E-02	1.36E-02	15 100
Beryllium (Be)	µg/m³	0.01	0.01	3.11E-05	3.05E-05	3.06E-05	3.07E-05	3.06E-05	3.03E-05	3.01E-05	3.03E-05	3.04E-05	3.05E-05	3.04E-05	3.07E-05	3.03E-05	3.00E-05	3.03E-05	0.01	0	3.04E-05	3.04E-05	3.00E-05	3.11E-05	3.11E-05	3.05E-05	3.07E-05	15 100
Bismuth (Bi)	µg/m³	-	-	5.59E-04	5.49E-04	5.51E-04	5.52E-04	5.51E-04	5.45E-04	5.42E-04	5.45E-04	5.47E-04	5.49E-04	5.47E-04	5.53E-04	5.45E-04	5.39E-04	5.46E-04	-	-	5.48E-04	5.48E-04	5.39E-04	5.59E-04	5.59E-04	5.49E-04	5.53E-04	15 100
Boron (B)	µg/m³	120	-	1.24E-02	1.22E-02	1.22E-02	1.23E-02	1.22E-02	1.21E-02	1.21E-02	1.21E-02	1.22E-02	1.22E-02	1.22E-02	1.23E-02	1.21E-02	1.20E-02	1.21E-02	120	0	1.22E-02	1.22E-02	1.20E-02	1.24E-02	1.24E-02	1.22E-02	1.23E-02	15 100
Cadmium (Cd)	µg/m³	0.025	0.025	6.21E-04	6.10E-04	6.12E-04	6.13E-04	6.12E-04	6.05E-04	6.03E-04	6.05E-04	6.08E-04	6.10E-04	6.08E-04	6.15E-04	6.06E-04	5.99E-04	6.06E-04	0.025	0	6.09E-04	6.09E-04	5.99E-04	6.21E-04	6.21E-04	6.10E-04	6.15E-04	15 100
Chromium (Cr)	µg/m³	0.5	-	1.55E-03	1.52E-03	1.53E-03	1.53E-03	1.53E-03	5.75E-03	1.51E-03	1.51E-03	4.19E-03	3.36E-03	1.52E-03	8.54E-03	1.52E-03	3.00E-03	1.52E-03	0.5	0	2.20E-03	2.67E-03	1.51E-03	8.54E-03	1.55E-03	5.75E-03	8.54E-03	15 100
Cobalt (Co)	µg/m³	0.1	0.1	6.21E-04	6.10E-04	6.12E-04	6.13E-04	6.12E-04	6.05E-04	6.03E-04	6.05E-04	6.08E-04	6.10E-04	6.08E-04	6.15E-04	6.06E-04	5.99E-04	6.06E-04	0.1	0	6.09E-04	6.09E-04	5.99E-04	6.21E-04	6.21E-04	6.10E-04	6.15E-04	15 100
Copper (Cu)	µg/m³	50	-	2.11E-02	4.20E-02	7.59E-03	5.41E-02	8.26E-03	8.54E-02	1.45E-02	6.66E-03	2.19E-02	3.51E-02	1.08E-02	2.42E-02	1.88E-02	5.64E-02	1.20E-02	50	0	2.09E-02	2.79E-02	6.66E-03	8.54E-02	5.41E-02	8.54E-02	5.64E-02	15 100
Iron (Fe)	µg/m <sup>3</sup>	4	-	2.83E-01	2.52E-01	2.11E-01	4.11E-01	1.11E-01	4.30E-01	1.33E-01	3.24E-01	5.96E-01	2.38E-01	1.56E-01	1.25E+00	3.30E-01	2.53E-01	2.16E-01	4	0	2.84E-01	3.46E-01	1.11E-01	1.25E+00	4.11E-01	5.96E-01	1.25E+00	15 100
Lead (Pb)	µg/m <sup>3</sup>	0.5	0.5	2.86E-03	2.56E-03	9.18E-04	2.21E-03	9.18E-04	2.06E-03	2.95E-03	2.36E-03	3.95E-03	9.15E-04	9.12E-04	3.56E-03	2.79E-03	5.81E-03	9.10E-04	2	0	2.00E-03	2.38E-03	9.10E-04	5.81E-03	2.86E-03	3.95E-03	5.81E-03	15 100
Magnesium (Mg)	µg/m³	-	-	1.18E-01	1.28E-01	1.16E-01	2.51E-01	7.96E-02	2.91E-01	9.04E-02	1.45E-01	3.28E-01	1.59E-01	9.73E-02	9.90E-01	1.64E-01	1.38E-01	8.49E-02	-	-	1.61E-01	2.12E-01	7.96E-02	9.90E-01	2.51E-01	3.28E-01	9.90E-01	15 100
Manganese (Mn)	µg/m <sup>3</sup>	0.4	-	5.84E-03	6.77E-03	5.51E-03	1.25E-02	3.12E-03	1.51E-02	3.25E-03	4.36E-03	1.93E-02	7.26E-03	3.83E-03	5.56E-02	7.82E-03	6.59E-03	3.52E-03	0.4	0	7.35E-03	1.07E-02	3.12E-03	5.56E-02	1.25E-02	1.93E-02	5.56E-02	15 100
Molybdenum (Mo)	µg/m³	120	-	8.07E-04	9.15E-04	3.06E-04	1.41E-03	3.06E-04	2.12E-03	3.01E-04	3.03E-04	1.28E-03	1.40E-03	3.04E-04	1.17E-03	9.09E-04	1.98E-03	3.03E-04	120	0	7.15E-04	9.20E-04	3.01E-04	2.12E-03	1.41E-03	2.12E-03	1.98E-03	15 100
Nickel (Ni)	µg/m <sup>3</sup>	0.2	-	9.32E-04	9.15E-04	9.18E-04	9.20E-04	9.18E-04	2.30E-03	9.04E-04	9.08E-04	2.00E-03	9.15E-04	9.12E-04	2.09E-03	9.09E-04	8.99E-04	9.10E-04	0.2	0	1.08E-03	1.16E-03	8.99E-04	2.30E-03	9.32E-04	2.30E-03	2.09E-03	15 100
Phosphorus (P)	µg/m <sup>3</sup>	-	-	2.33E-01	2.29E-01	2.29E-01	2.30E-01	2.29E-01	2.27E-01	2.26E-01	2.27E-01	2.28E-01	2.29E-01	2.28E-01	2.30E-01	2.27E-01	2.25E-01	2.27E-01	-	-	2.28E-01	2.28E-01	2.25E-01	2.33E-01	2.33E-01	2.29E-01	2.30E-01	15 100
Selenium (Se)	µg/m³	10	10	3.11E-03	3.05E-03	3.06E-03	3.07E-03	3.06E-03	3.03E-03	3.01E-03	3.03E-03	3.04E-03	3.05E-03	3.04E-03	3.07E-03	3.03E-03	3.00E-03	3.03E-03	10	0	3.04E-03	3.04E-03	3.00E-03	3.11E-03	3.11E-03	3.05E-03	3.07E-03	15 100
Silver (Ag)	µg/m³	1	1	3.11E-04	3.05E-04	3.06E-04	3.07E-04	3.06E-04	3.03E-04	3.01E-04	3.03E-04	3.04E-04	3.05E-04	3.04E-04	3.07E-04	3.03E-04	3.00E-04	3.03E-04	1	0	3.04E-04	3.04E-04	3.00E-04	3.11E-04	3.11E-04	3.05E-04	3.07E-04	15 100
Strontium (Sr)	µg/m³	120	-	2.48E-03	3.54E-03	3.79E-03	6.32E-03	9.18E-04	7.93E-03	9.04E-04	3.27E-03	8.02E-03	5.19E-03	2.61E-03	3.13E-02	3.70E-03	3.77E-03	9.10E-04	120	0	3.57E-03	5.64E-03	9.04E-04	3.13E-02	6.32E-03	8.02E-03	3.13E-02	15 100
Thallium (Tl)	µg/m³	-		2.80E-05	2.74E-05	2.75E-05	2.76E-05	2.75E-05	2.72E-05	2.71E-05	2.72E-05	2.73E-05	2.75E-05	2.74E-05	2.77E-05	2.73E-05	2.70E-05	2.73E-05	-	-	2.74E-05	2.74E-05	2.70E-05	2.80E-05	2.80E-05	2.75E-05	2.77E-05	15 100
Tin (Sn)	µg/m³	10	10	7.45E-04	7.32E-04	3.06E-04	1.10E-03	3.06E-04	1.39E-03	1.08E-03	9.08E-04	1.28E-03	3.05E-04	9.12E-04	4.30E-03	1.58E-03	1.80E-03	1.15E-03	10	0	9.38E-04	1.19E-03	3.05E-04	4.30E-03	1.10E-03	1.39E-03	4.30E-03	15 100
Titanium (Ti)	µg/m³	120	-	3.42E-03	3.35E-03	3.37E-03	9.81E-03	3.37E-03	1.15E-02	3.32E-03	3.33E-03	1.22E-02	3.36E-03	3.34E-03	2.52E-02	3.33E-03	3.30E-03	3.34E-03	120	0	4.87E-03	6.36E-03	3.30E-03	2.52E-02	9.81E-03	1.22E-02	2.52E-02	15 100
Uranium (Ur)	µg/m <sup>3</sup>	1.5	-	3.11E-05	3.05E-05	3.06E-05	3.07E-05	3.06E-05	3.03E-05	3.01E-05	3.03E-05	3.04E-05	3.05E-05	3.04E-05	3.07E-05	3.03E-05	3.00E-05	3.03E-05	1.5	0	3.04E-05	3.04E-05	3.00E-05	3.11E-05	3.11E-05	3.05E-05	3.07E-05	15 100
Vanadium (V)	µg/m <sup>3</sup>	2	1	1.55E-03	1.52E-03	1.53E-03	1.53E-03	1.53E-03	1.51E-03	1.51E-03	1.51E-03	1.52E-03	1.53E-03	1.52E-03	1.54E-03	1.52E-03	1.50E-03	1.52E-03	2	0	1.52E-03	1.52E-03	1.50E-03	1.55E-03	1.55E-03	1.53E-03	1.54E-03	15 100
Zinc (Zn)	µg/m <sup>3</sup>	120	-	2.16E-02	2.61E-02	1.08E-02	2.27E-02	7.16E-03	2.43E-02	1.74E-02	1.08E-02	5.33E-02	1.31E-02	1.88E-02	4.54E-02	3.05E-02	4.10E-02	1.26E-02	120	0	2.03E-02	2.37E-02	7.16E-03	5.33E-02	2.61E-02	5.33E-02	4.54E-02	15 100
Zirconium (Zr)	µg/m <sup>3</sup>	20	-	6.21E-04	6.10E-04	6.12E-04	6.13E-04	6.12E-04	6.05E-04	6.03E-04	6.05E-04	6.08E-04	6.10E-04	6.08E-04	6.15E-04	6.06E-04	5.99E-04	6.06E-04	20	0	6.09E-04	6.09E-04	5.99E-04	6.21E-04	6.21E-04	6.10E-04	6.15E-04	15 100

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



# APPENDIX C




















## APPENDIX D



## Table D1: 4th Quarter Edit Log for PM<sub>2.5</sub> at Courtice Station

Emitter's N	ame: Durham York E	nergy Centre								
Contact	Name: Ms. Lyndsay	Waller	Phone: (905) 404-0888 ext 4	4107	Email: Lyn	dsay.Waller@Durham	n.ca			
Station Nu	<b>mber:</b> 45201			Station Name: Cour	rtice Station					
Station Add	<b>iress:</b> 100 Osbourne I	Road		Emitter Address: Th	ne Region of	Durham, 605 Rosslan	id Road, Wł	iitby, ON		
Pollutants	or Parameter: PM <sub>2.5</sub>		Instrument Make & Mode	I: Thermo Scientific Mc	odel 5030 SH	ARP Monitor		<b>s/n:</b> E-1563		
Data Edit P	eriod	Start Date: Oct 1, 2019		End Date: Dec 31, 20	19			All testing done in EST		
				Starting		Ending	•			
Edit #	Edit date	Editor's Name	Edit Action	Date	Hour	Date	Hour	Reason		
	(dd/mm/yyyy)			(dd/mm/yyyy)	(xx:xx)	(dd/mm/yyyy)	(xx:xx)			
1	07/01/2020	VML	Deleted Hours	04/10/2019	23:00	04/10/2019	24:00	Anomolous data - Extreme high concentrations deemed to be false values		
2	13/11/2019	QMI	Deleted Hours	10/10/2019	17:00	10/10/2019	18:00	Power Failure		
3	23/10/2019	SRS	Deleted Hours	23/10/2019	12:00	23/10/2019	15:00	Monthly Calibration		
4	13/11/2019	QMI	Zero correction	01/10/2019	00:00	01/11/2019	00:00	Correcting values <0 to 0		
5	13/11/2019	SRS	Deleted Hours	13/11/2019	14:00	13/11/2019	16:00	Monthly Calibration		
6	03/12/2019	QMI	Zero correction	01/11/2019	00:00	01/12/2019	00:00	Correcting values <0 to 0		
7	09/12/2019	SRS	Deleted Hours	09/12/2019	18:00	09/12/2019	19:00	Monthly Calibration		

## Table D2: 4th Quarter Edit Log for PM<sub>2.5</sub> at Rundle Road Station

Emitter's N	<b>lame:</b> Durham York E	nergy Centre									
Contact	Name: Ms. Lyndsay	Waller	<b>Phone:</b> (905) 404-0888 ext 4	107	Email: Lyn	dsay.Waller@Durham	n.ca				
Station Nu	<b>mber:</b> 45200			Station Name: Rund	lle Road Sta	tion					
Station Add	dress: Rundle Road			Emitter Address: Th	Emitter Address: The Region of Durham, 605 Rossland Road, Whitby, ON						
Pollutants	or Parameter: PM <sub>2.5</sub>		Instrument Make & Model	: Thermo Scientific Mo	del 5030 SH	ARP Monitor		<b>s/n:</b> E-1569			
Data Edit P	eriod	Start Date: Oct 1, 2019		End Date: Dec 31, 20	19			All testing done in EST			
	Edit date			Starting	En		•				
Edit #	(dd/mm/yyyy)	Editor's Name	Edit Action	Date	Hour	Date	Hour	Reason			
	(44,111,333)			(dd/mm/yyyy)	(XX:XX)	(dd/mm/yyyy)	(XX:XX)				
1	01/10/2019	SRS	Deleted Hours	01/10/2019	00:00	01/10/2019	14:00	Invalid data - Filter tape broke on September 28 and was respooled on October 1			
2	22/10/2019	SRS	Deleted Hours	22/10/2019	14:00	22/10/2019	16:00	Monthly Calibration			
3	13/11/2019	QMI	Zero correction	01/10/2019	00:00	01/11/2019	00:00	Correcting values <0 to 0			
4	14/11/2019	SRS	Deleted Hours	14/11/2019	14:00	14/11/2019	16:00	Monthly Calibration			
5	04/12/2019	QMI	Zero correction	01/11/2019	00:00	01/12/2019	00:00	Correcting values <0 to 0			
6	09/12/2019	SRS	Deleted Hours	09/12/2019	15:00	09/12/2019	17:00	Monthly Calibration			

## Table D3: 4th Quarter Edit Log for NO<sub>x</sub> at Courtice Station

Emitter's N	<b>lame:</b> Durham York E	nergy Centre								
Contact	Name: Ms. Lyndsay	Waller	<b>Phone:</b> (905) 404-0888 ext 4	107	Email: Lyn	idsay.Waller@Durham	ı.ca			
Station Nu	<b>mber:</b> 45201			Station Name: Cour	tice Station					
Station Add	dress: 100 Osbourne	Road		Emitter Address: Th	e Region of	Durham, 605 Rosslan	d Road, Wh	nitby, ON		
Pollutants	or Parameter: NOx		Instrument Make & Model	: Teledyne Nitrogen O	xide Analyze	er Model T200		<b>s/n:</b> 675		
Data Edit P	eriod	Start Date: Oct 1, 2019		End Date: Dec 31, 20	19			All testing done in EST		
Edit #	Edit date		Edit Action	Starting	Hour	Ending Date		Bassan		
Ealt #	(dd/mm/yyyy)	Eultor's Name	Edit Action	(dd/mm/yyyy)	(xx:xx)	(dd/mm/yyyy)	(xx:xx)	Reason		
1	13/11/2019	QMI	Deleted Hours	10/10/2019	17:00	10/10/2019	18:00	Power Failure		
2	23/10/2019	SRS	Deleted Hours	23/10/2019	12:00	23/10/2019	15:00	Monthly Calibration		
3	13/11/2019	QMI	Zero correction	01/10/2019	00:00	01/11/2019	00:00	Correcting values <0 to 0		
4	13/11/2019	SRS	Deleted Hours	13/11/2019	15:00	13/11/2019	17:00	Monthly Calibration		
5	07/01/2020	VML	Zero offset adjustment	20/11/2019	02:15	22/11/2019	01:45	Correcting zero drift: Nov 21		
6	07/01/2020	VML	Zero offset adjustment	24/11/2019	02:15	28/11/2019	01:45	Correcting zero drift: Nov 25-27		
7	07/01/2020	VML	Zero correction	01/11/2019	00:00	01/12/2019	00:00	Correcting values <0 to 0		
8	07/01/2020	SRS	Deleted Hours	09/12/2019	18:00	09/12/2019	20:00	Monthly Calibration		
9	07/01/2020	VML	Zero offset adjustment	21/12/2019	02:15	24/12/2019	01:45	Correcting zero drift: Dec 22-23		
10	07/01/2020	VML	Zero correction	01/12/2019	00:00	01/01/2020	00:00	Correcting values <0 to 0		

## Table D4: 4th Quarter Edit Log for NO<sub>x</sub> at Rundle Road Station

Emitter's N	lame: Durham York E	nergy Centre						
Contact	Name: Ms. Lyndsay	Waller	<b>Phone:</b> (905) 404-0888 ext 4	107	Email: Lyn	dsay.Waller@Durham	n.ca	
Station Nu	<b>mber:</b> 45200			Station Name: Rund	lle Road Sta	tion		
Station Add	dress: Rundle Road			Emitter Address: Th	e Region of	Durham, 605 Rosslan	d Road, Wł	nitby, ON
Pollutants	or Parameter: NOx		Instrument Make & Model	: Teledyne Nitrogen O	xide Analyze	er Model T200		<b>s/n:</b> 676
Data Edit P	eriod	Start Date: Oct 1, 2019		End Date: Dec 31, 20	19			All testing done in EST
	Edit date			Starting		Ending		
Edit #	(dd/mm/yyyy)	Editor's Name	Edit Action	Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour	Reason
1	01/10/2019	SRS	Deleted Hours	01/10/2019	13:00	01/10/2019	18:00	Maintenance and calibration
2	02/10/2019	SRS	Deleted Hours	02/10/2019	12:00	02/10/2019	13:00	Calibration check
3	02/10/2019	SRS	Deleted Hours	02/10/2019 14:00 02/10/2019		15:00	Missing Data	
4	22/10/2019	SRS	Deleted Hours	22/10/2019	15:00	22/10/2019	17:00	Monthly Calibration
5	22/10/2019	SRS	Deleted Hours	22/10/2019	19:00	22/10/2019	21:00	Calibration: GPT
6	20/11/2019	QMI	Zero correction	01/10/2019	00:00	01/11/2019	00:00	Correcting values <0 to 0
7	14/11/2019	SRS	Deleted Hours	14/11/2019	13:00	14/11/2019	16:00	Monthly Calibration
8	07/01/2020	VML	Zero offset adjustment	24/11/2019	02:15	27/11/2019	01:45	Correcting zero drift: Nov 25-26
9	07/01/2020	VML	Zero correction	01/11/2019	00:00	01/12/2019	00:00	Correcting values <0 to 0
10	09/12/2019	SRS	Deleted Hours	09/12/2019	15:00	09/12/2019	18:00	Calibration check
11	17/12/2019	SRS	Deleted Hours	17/12/2019	17:00	17/12/2019	19:00	Maintenance and Calibration: Takeout cal performed, new permeation device installed and calibrated
12	18/12/2019	SRS	Deleted Hours	18/12/2019	13:00	18/12/2019	14:00	Calibration check
13	07/01/2020	VML	Zero offset adjustment	22/12/2019	02:15	24/12/2019	01:45	Correcting zero drift: Dec 23
14	07/01/2020	VML	Zero correction	01/12/2019	00:00	01/01/2020	00:00	Correcting values <0 to 0

## Table D5: 4th Quarter Edit Log for SO<sub>2</sub> at Courtice Station

Emitter's N	l <b>ame:</b> Durham York E	nergy Centre								
Contact	Name: Ms. Lyndsay	Waller	Phone: (905) 404-0888 ext 4	107	Email: Lyn	idsay.Waller@Durham	n.ca			
Station Nu	<b>mber:</b> 45201			Station Name: Cour	rtice Station					
Station Add	dress: 100 Osbourne	Road		Emitter Address: Th	ne Region of	Durham, 605 Rosslar	ld Road, Wl	nitby, ON		
Pollutants	or Parameter: SO <sub>2</sub>		Instrument Make & Model	: Teledyne Sulfur Diox	ide Analyzei	r Model T100		s/n: 565		
Data Edit P	eriod	Start Date: Oct 1, 2019		End Date: Dec 31, 20	19			All testing done in EST		
	Edit Date			Starting		Ending				
Edit #	(dd/mm/yyyy)	Editor's Name	Edit Action	Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/vvvv)	Hour (xx:xx)	Reason		
1	13/11/2019	QMI	Deleted Hours	10/10/2019	17:00	10/10/2019	18:00	Power Failure		
2	23/10/2019	SRS	Deleted Hours	23/10/2019	13:00	23/10/2019	16:00	Monthly Calibration		
2	13/11/2019	QMI	Zero correction	01/10/2019	00:00	01/11/2019	00:00	Correcting values <0 to 0		
3	12/11/2019	SRS	Deleted Hours	10/11/2019	02:00	12/11/2019	21:00	Invalid data, maintenance and calibration: UV output shift due to flies in shutter assembly (takeout cal outside of 10%) resulting in unit maintenance and subsequent calibration on Nov 12		
4	13/11/2019	SRS	Deleted Hours	13/11/2019	13:00	13/11/2019	15:00	Monthly Calibration		
5	07/01/2020	VML	Zero offset adjustment	20/11/2019	02:15	23/11/2019	01:45	Correcting zero drift: Nov 21-22		
6	22/11/2019	SRS	Deleted Hours	22/11/2019	15:00	22/11/2019	18:00	Calibration and maintenance: UV output shift due to flies in shutter assembly (takeout cal within 10%) resulting in unit maintenance and subsequent calibration		
7	07/01/2020	VML	Zero correction	01/11/2019	00:00	01/12/2019	00:00	Correcting values <0 to 0		
8	09/12/2019	SRS	Deleted Hours	09/12/2019	19:00	09/12/2019	21:00	Monthly Calibration		
9	07/01/2020	VML	Zero correction	01/12/2019	00:00	01/01/2020	00:00	Correcting values <0 to 0		

## Table D6: 4th Quarter Edit Log for SO<sub>2</sub> at Rundle Road Station

Emitter's N	lame: Durham York E	nergy Centre						
Contact	Name: Ms. Lyndsay	Waller	<b>Phone:</b> (905) 404-0888 ext 4	107	Email: Lyn	dsay.Waller@Durham	n.ca	
Station Nu	<b>mber:</b> 45200			Station Name: Rund	dle Road Sta	tion		
Station Ad	dress: Rundle Road			Emitter Address: Th	ne Region of	Durham, 605 Rosslar	ıd Road, Wi	nitby, ON
Pollutants	or Parameter: SO <sub>2</sub>		Instrument Make & Model	: Teledyne Sulfur Diox	ide Analyzei	r Model T100		<b>s/n:</b> 566
Data Edit P	eriod	Start Date: Oct 1, 2019		End Date: Dec 31, 20	19			All testing done in EST
	Edit date			Starting		Ending		
Edit #	(dd/mm/www)	Editor's Name	Edit Action	Date	Hour	Date	Hour	Reason
	(447111179999)			(dd/mm/yyyy)	(XX:XX)	(dd/mm/yyyy)	(XX:XX)	
1	22/10/2019	SRS	Deleted Hours	22/10/2019	13:00	22/10/2019	15:00	Monthly Calibration
2	20/11/2019	QMI	Deleted Hours	29/10/2019	15:00	31/10/2019	20:00	Invalid data, maintenance and calibration: UV output shift due to flies in shutter assembly (takeout cal outside of 10%) resulting in unit maintenance and subsequent calibration
3	20/11/2019	QMI	Zero correction	01/10/2019	00:00	01/11/2019	00:00	Correcting values <0 to 0
4	01/11/2019	SRS	Deleted Hours	01/11/2019	12:00	01/11/2019	14:00	Calibration check
5	13/11/2019	SRS	Deleted Hours	13/11/2019	17:00	13/11/2019	20:00	Calibration and maintenance: UV output shift due to flies in shutter assembly (takeout cal within 10%) resulting in unit maintenance and subsequent calibration
6	14/11/2019	SRS	Deleted Hours	14/11/2019	12:00	14/11/2019	14:00	Monthly Calibration
7	09/12/2019	QMI	Zero correction	01/11/2019	00:00	01/12/2019	00:00	Correcting values <0 to 0
8	09/12/2019	SRS	Deleted Hours	09/12/2019	16:00	09/12/2019	18:00	Monthly Calibration
9	07/01/2020	VML	Zero correction	01/12/2019	00:00	01/01/2020	00:00	Correcting values <0 to 0

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

Emitter's N	l <b>ame:</b> Durham York Er	nergy Centre							
Contact	Name: Ms. Lyndsay \	Waller	<b>Phone:</b> (905) 404-0888 ext 4 <sup>-</sup>	107	Email: Lyn	mail: Lyndsay.Waller@Durham.ca			
Station Nu	<b>mber:</b> 45201			Station Name: Court	tice Station				
Station Add	<b>dress:</b> 100 Osbourne F	Road		Emitter Address: Th	e Region of	Durham, 605 Rosslan	d Road, Wh	itby, ON	
<b>Pollutants</b> Rain	or Parameter: WS, W	D, Ambient T, P, RH and	Instrument Make & Model:	Miscellaneous Meter	ological Inst	trumentation		<b>s/n:</b> N/A	
Data Edit P	Data Edit Period Start Date: Oct 1, 201			End Date: Dec 31, 20	19			All testing done in EST	
	Edit date			Starting		Ending			
Edit #	(dd/mm/yayay)	Editor's Name	Edit Action	Date	Hour	Date	Hour	Reason	
	(dd/filli/yyyy)			(dd/mm/yyyy)	(xx:xx)	(dd/mm/yyyy)	(xx:xx)		
1	01/13/2019	VML	Deleted Hours	18/12/2019	08:00	18/12/2019	11:00	Missing Data	

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

Emitter's N	<b>ame:</b> Durham York E	nergy Centre						
Contact	Name: Ms. Lyndsay	Waller	<b>Phone:</b> (905) 404-0888 ext 4	107	Email: Lyn	dsay.Waller@Durham	i.ca	
Station Nu	<b>mber:</b> 45200			Station Name: Runc	le Station			
Station Add	<b>lress:</b> Rundle Road			Emitter Address: Th	e Region of	Durham, 605 Rosslan	id Road, Wł	itby, ON
<b>Pollutants</b> Rain	or Parameter: WS, W	D, Ambient T, P, RH and	Instrument Make & Model	: Miscellaneous Meter	ological Inst	rumentation		s/n: N/A
Data Edit P	Data Edit Period         Start Date: Oct 1, 2019			End Date: Dec 31, 2019				All testing done in EST
	Edit data			Starting		Ending		
Edit #	(dd/mm/unund)	Editor's Name	Edit Action	Date	Hour	Date	Hour	Reason
	(dd/mm/yyyy)			(dd/mm/yyyy)	(xx:xx)	(dd/mm/yyyy)	(xx:xx)	
1	02/10/2019	SRS	Deleted Hours	02/10/2019	13:00	02/10/2019	15:00	Missing data: Channels were added, instruments were rewired into the CR1000, and a new program was sent to the logger during this time
2	01/15/2019	VML	Deleted Hours	02/10/2019	15:00	14/11/2019	12:00	Invalid data: When the instruments were rewired into the CR1000, the polarity was reversed for the WD inputs which resulted in incorrectly reported WD as noted by SRS
3	14/11/2019	SRS	Deleted Hours	14/11/2019	12:00	14/11/2019	13:00	Missing data: The wiring for WD was corrected at this time and a new program was sent to the CR1000 logger.

## Table D9: 4th Quarter Edit Log for Non-Continuous at Courtice Station

Emitter's l	Name: Durham Yo	rk Energy Center						
Contact	Name: Ms. Lynds	ay Waller	<b>Phone:</b> (905) 404-08	88 ext 4107	Email: Ly	ndsay.Waller@Dur	ham.ca	
Station Nu	u <b>mber:</b> 45201			Station Name: Cou	urtice Statio	on		
Station Ac	ldress: 100 Osbou	rne Road		Emitter Address: T	he Region	of Durham, 605 Rc	ssland Ro	oad, Whitby, ON
Pollutants	or Parameter: N	/A	Instrument Make 8	Model: N/A		s/n:		
Data Edit	Period	Start Date: Oct 1	, 2019	End Date: Dec 31, 2	.019			All testing done in EST
	Edit date			Starting		Ending		
Edit #	(dd/mm/yyyy)	Editor's Name	Edit Action	Date	Hour	Date	Hour	Reason
				(dd/mm/yyyy)	(XX:XX)	(dd/mm/yyyy)	(XX:XX)	Installed prossure trapsdusers (Llive)
1	02/10/2019	SRS	Maintenance	02/10/2019	13:00	02/10/2019	15:00	and PS1)
2	11/10/2019	SRS	Maintenance	11/10/2019	18:00	11/10/2019	19:00	Installed relay bypass switching (Hivol
			Invalidated Cample					and PST)
3	25/10/2019	MT	(Hivol)	24/10/2019	00:00	24/10/2019	23:59	turn on
4	25/10/2019	MT	Invalidated Sample (PS1)	24/10/2019	00:00	24/10/2019	23:59	Invalid PS1 Sample: Units did not turn on
5	01/11/2019	SRS	Calibration (Hivol)	01/11/2019	13:00	01/11/2019	14:00	Quarterly calibration (Hivol)
6	13/11/2019	SRS	Calibration (PS1)	11/11/2019	15:00	11/11/2019	16:00	Quarterly calibration (PS1)

## Table D10: 4th Quarter Edit Log for Non-Continuous at Rundle Station

Emitter's	Name: Durham Yo	ork Energy Center						
Contact	Name: Ms. Lynds	ay Waller	<b>Phone:</b> (905) 404-08	388 ext 4107	<b>Email:</b> Ly	ndsay.Waller@Durha	am.ca	
Station N	<b>umber:</b> 45200			Station Name: Ru	undle Stati	on		
Station A	<b>ddress:</b> Rundle Rd			Emitter Address:	The Regio	n of Durham, 605 Ro	ossland Ro	oad, Whitby, ON
Pollutant	s or Parameter: N	J/A	Instrument Make	& Model: N/A				s/n:
Data Edit	Period	Start Date: Oct 1, 2	2019	End Date: Dec 31,	2019			All testing done in EST
	Edit data			Starting	5	Ending		
Edit #	(dd/mm/yyyy)	Editor's Name	Edit Action	Date	Hour	Date	Hour	Reason
	(44711117,3333)			(dd/mm/yyyy)	(XX:XX)	(dd/mm/yyyy)	(xx:xx)	
1	02/10/2019	SRS	Maintenance	02/10/2019	16:00	02/10/2019	17:00	Installed pressure transducers (Hivol and PS1)
2	11/10/2019	SRS	Maintenance	11/10/2019	16:00	11/10/2019	17:00	Installed relay bypass switching (Hivol and PS1)
3	01/11/2019	SRS	Calibration (Hivol)	01/11/2019	13:00	01/11/2019	14:00	Quarterly calibration (Hivol)
4	07/11/2019	MT	Invalidated Sample (PS1)	05/11/2019	00:00	05/11/2019	23:59	Invalid PUF Sample: Motor brushes worn out
5	11/11/2019	SRS	Maintenance and Calibration (PS1)	11/11/2019	13:00	11/11/2019	14:00	Brush replacement and quarterly calibration (PS1)
6	12/12/2019	MT	Invalidated Sample (PS1)	11/12/2019	00:00	11/12/2019	23:59	Invalid PUF Sample: PS1 only ran ~9hr. Issue with relay switch.



## **APPENDIX E1**





600 Southgate Drive Guelph ON Canada NIG 4P6 Tel: +1.519.823.1311 Fax: +1.519.823.1316 E-mail: solutions@rwdi.com

## MEMORANDUM



On December 16, 2019 the results from ALS Environmental were received regarding the PAH results from the November 17, 2019 sampling event. On December 16, 2019, the results were entered and assessed, and it was found that there was a measured Benzo(a)Pyrene concentration in excess of the 24-hour AAQC on the November 17 sampling date. Attached is the Exceedance Form PIBS 5354e for your reference. Below is a summary of the event.

### November 17, 2019

On Sunday, November 17, 2019, there were two exceedances of the Benzo(a)Pyrene 24-hour AAQC, which occurred at both the Courtice Station, and Rundle 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 station with regards to the Durham York Energy Centre.

The following summarizes the BaP concentrations and onsite conditions during the November<sup>17th</sup> sampling date.

 The guideline concentration for BaP is 0.00005 ug/m<sup>3</sup>. The measured concentration at the Courtice Station sampler was 0.000071 ug/m<sup>3</sup> and the Rundle Station sampler was 0.000083 ug/m<sup>3</sup>. During the sampling day the wind was recorded predominantly from the East to East-Southeast as recorded at the Rundle Meteorological Tower. Wind speeds ranged from 6.8 kph to 15 kph.



This document is intended for the sole use of the party to whom it is addressed and may contain information that is privileged and/or confidential. If you have received this in error, please notify us immediately. Accessible document format available upon request. <sup>©</sup> RWDI name and logo are registered trademarks in Canada and the United States of America.



Lyndsay Waller Durham York Energy Centre RWDI#1803743 DECEMBER 17, 2019

2. According to the Rundle meteorological data, the Courtice Station was possibly located downwind of the Energy Centre for part of the day but in all likelihood the exhaust plume passed north of the Courtice monitoring station for the day. The Rundle Station was located upwind of the Energy Centre during the sampling period. Since the higher exceedance was detected at Rundle Station, it is likely that the measured BaP exceedances may be attributed to sources other that the Energy Centre operations. The likely source is the industrial facility to the east of the DYEC.

At the Courtice Station, the NO<sub>2</sub> and SO<sub>2</sub> values were less than 5% of the criteria for the same period. The  $PM_{2.5}$  value was 3.6 micrograms per metre cubed or 13% of the criterion.

At the Rundle Station, the NO<sub>2</sub> and SO<sub>2</sub> values were less than 5% of the criteria for the same period. The  $PM_{2.5}$  value was 2.36 micrograms per metre cubed or 8% of the of the criterion.

The results from both stations must be due to some extremely localized temporary source or more probably, some unidentified error related to handling or analysis.

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

Respectfully submitted by:

RWDI AIR Inc.

John DeYoe, B.A. Senior Consultant / Principal

JD

Attach.





## Notification of Exceedence – Regulation 419/05 General Information and Instructions

#### **General Information**

Information requested in this notification form is collected under the authority of the Environmental Protection Act, R.S.O. 1990 (EPA) and O. Reg. 419/05 and will be used to collect information relating to a measured or modelled air related exceedence as required by s.25(9), s.28(1) and s.30(3) of O. Reg. 419/05. The Ministry of the Environment (MOE) may also request additional information.

- Questions regarding completion and submission of this notification form should be directed to your local MOE District Office. A list of these
  District Offices (including fax numbers) is available on the Ministry of the Environment Internet site at
  <a href="http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist">http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist</a>. A copy of this form may be acquired through the MOE public web site
  <a href="http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist">www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist</a>. A copy of this form may be acquired through the MOE public web site
  <a href="http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist">http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist</a>. A copy of this form may be acquired through the MOE public web site
  <a href="http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist">www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist</a>. A copy of this form may be acquired through the MOE public web site
  </a>
- 2. For notification under s.25(9) or 28(1), the completed notification form should be faxed, as soon as practicable, to the local Ministry of Environment (MOE) District Office which has jurisdiction over the area in which the facility is located.
- For notification under s. 30, the completed notification form should be immediately faxed to the local Ministry of Environment (MOE) District Office which has jurisdiction over the area which the facility is located. If the exceedance is determined outside of the business hours of the District Office then the completed notification form should be faxed to the Spills Action Center (1-800-268-6061).
- 4. Information contained in this notification form may not be considered confidential and may be made available to the public upon request. Information may be claimed as confidential but will be subject to the Freedom of Information and Protection of Privacy Act (FOIPPA) and the EBR. If you do not claim confidentiality at the time of submitting the information, the Ministry of the Environment may make the information available to the public without further notice to you.

#### Instructions

This form should be used to notify the MOE of a measured or modeled air related exceedence as required under O. Reg. 419/05. Failure to notify the MOE as required by regulation constitutes an offence under the O. Reg. 419/05 and the EPA.

The generic term "limits" in the context of this form means any numerical Point of Impingement Concentration limit set by the MOE including standards in O. Reg. 419/05 and guidelines provided by the MOE (Ministry POI Limits). For a comprehensive list of MOE POI Limits please refer to the publication titled "Summary of O. Reg. 419/05 Standards, Point of Impingement Guidelines, and Ambient Air Quality Criteria (AAQC's)" available on the Ministry of the Environment Internet site at <a href="http://www.ene.gov.on.ca/envision/gp/2424e01.htm">http://www.ene.gov.on.ca/envision/gp/2424e01.htm</a>. Note that contaminants that have guidelines limits or recommended levels for chemicals with no standard or guideline may be considered "contaminants not listed in any of Schedules 1, 2 and 3 and discharges of the contaminant may cause an adverse effect" as this language appears in O. Reg. 419/05.

This form may be used for notification of exceedences of more than one contaminant; Table 1 (or equivalent) should be completed for each contaminant. If this notification is made pursuant to s. 30 in combination with ss. 25(9) or 28(1) then this form must be submitted immediately in accordance with s.30.

#### **Regulatory Authority**

- 28. (1) A person who discharges or causes or permits the discharge of a contaminant shall, as soon as practicable, notify a provincial officer in writing if,
  - (a) the person uses an approved dispersion model to predict concentrations of the contaminant that result from the discharges and,
    - (i) the use of the model indicates that discharges of the contaminant may result in a contravention of section 18, 19 or 20, or
       (ii) the contaminant is not listed in any of Schedules 1, 2 and 3 and the use of the model indicates that discharges of the
    - contaminant may cause an adverse effect,
  - (b) measurements of air samples indicate that discharges of the contaminant may result in a contravention of section 18, 19 or 20; or (c) the contaminant is not listed in any of Schedules 1, 2 and 3 and measurements of air samples indicate that discharges of the
    - contaminant may cause an adverse effect.
- 25. (9) A person who is required under subsection (8) to complete the update of a report not later than March 31 in a year shall, as soon as practicable after that date, notify a provincial officer in writing if the person has started to use an approved dispersion model with respect to a contaminant for the purpose of completing the update but has not yet complied with section 12, and,
  - (a) the use of the model indicates that discharges of the contaminant may result in a contravention of section 18, 19 or 20; or
  - (b) the contaminant is not listed in any of Schedules 1, 2 and 3 and the use of the model indicates that discharges of the contaminant may cause an adverse effect.
- 30. (1) A person who discharges or causes or permits the discharge of a contaminant listed in Schedule 6 into the air shall comply with subsections (3) and (4) if there is reason to believe, based on any relevant information, that discharges of the contaminant may result in the concentration of the contaminant exceeding the half hour upper risk threshold or other time period upper risk threshold set out for that contaminant in Schedule 6 at a point of impingement.
  - (2) Without limiting the generality of subsection (1), the reference in that subsection to relevant information includes relevant information from predictions of a dispersion model, including,
    - (a) an approved dispersion model or other dispersion model, or
    - (b) a dispersion model that is not used in accordance with this Regulation.
  - (3) If subsection (1) applies to a discharge, the person who discharged or caused or permitted the discharge of the contaminant shall immediately notify the Director in writing.



Ministry of the Environment

1. Ministry of the Environment District Office Information

Date Form Submitted (Faxed)	Date Exceedednce Determined December 16, 2019
District Office	Fax Number
York-Durnam District Office	(905) 427-5602
Supporting information attached? X Yes No	
If yes, number of pages: 2	
2. Site Information	Rueinese Name
Lyndsay Waller	Durham York Energy Centre
North American Industry Classification System (NAICS) Code         Business Activity Description of the business           562210         Waste Treatment	<b>ption</b> siness endeavour, this may include products sold, services provided, equipment used, etc.) <b>t and Disposal</b>
Site Name Courtice AQ Station And Rundle AQ Station	MOE District Office York-Durham District Office
Address Information: Site Address - Street information (address that has civic numbering and street information includes	street number, name, type and direction) Unit Identifier (i.e. suite or apartment number)
1835 Energy Drive	
Survey Address (used for a rural location specified for a subdivided township, an unsubdivided Lot and Conc.: used to indicate location within a subdivided         Part and Reference:	ided township or unsurveyed territory) used to indicate location within an unsubdivided township or unsurveyed territory, and
township and consists of a lot number and a concession number consists of a part and Lot Conc.	a reference plan number indicating the location within that plan. Attach copy of the plan Part Reference Plan
Non Address Information (includes any additional information to clarify applicants' physica	l location)
Municipality/Unorganized Township County/District	Postal Code
Geo R	eference
Map Datum Zone Accuracy Estimate	Geo Referencing Method UTM Easting UTM Northing
Certificate of Approval Number (s) - attach a separate list if more space is required	
7306-8FDKNX	
3. Type of Notification: Limit Exceedence - Table 1 or Table 2 should be con	npleted and submitted with this notification of exceedence.
This is a notification under Section 28(1) – Notice to Provincial Officer as a result o	f modelling or measurements relating to an exceedence of. (select all that apply)
Schedule 1 Schedule 2 Schedule 3 POI 0	Guideline 🔀 Ambient Air Quality Criteria
Other Limit (explain):	
This is a notification under Section 25 (9) - Notice to Provincial Officer as a result a	n update of an Emission Summary and Dispersion Modelling Report (select all that apply)
Schedule 1 Schedule 2 Schedule 3 POI C	Suideline Ambient Air Quality Criteria
Other Limit (explain):	
Date that Refinement is anticipated to be complete (dd/mm/yyyy):	
This is a notification under Section 30 (3) - Notice to the Director as a result of an	exceedence of Upper Risk Thresholds (Schedule 6)
Yes No	
4. Follow-Up Action	
Section 28 Notifications	102
Yes	ser natement Plan Date Annowed under s 29 of Ο Reg. 419/05 (dd/mm/ωων)
No If No, please provide the following:	
Section 30 (3) Notifications for URT exceedence	
Has an Emission Summary and Dispersion Modelling (ESDM) Report been prepared in ac	cordance with s.30(4) and submitted to the Ministry?
No If No, what is the anticipated submission date for the ESDM* (dd/mm/yyy)	17

. Wodel based Assessment – please complete this section if notifying of a modelled exceedence (complete Table T)
Was an ESDM Report prepared in accordance with s.26 O. Reg. 419/05?
Yes No
If yes, was the ESDM Report prepared to fulfill (select all that apply):
s.22 of O. Reg. 419/05 - Application for Certificate of Approval under section 9 of the Environmental Protection Act
s.23 of O. Reg. 419/05 - Requirement for Schedule 4 or 5 sector facilities
s.24 of O. Reg. 419/05 - Notice issued by Director
s.25 of O. Reg. 419/05 - Requirement for updating ESDM Report
s.30(4) of O. Reg 419/05 – Required as result of URT exceedence
s.32(13) of O. Reg. 419/05 – Required as part of a Request for Alternative Standard
Other (please specify):
Was the approved dispersion model refined as required by s.12 O. Reg. 419/05 (i.e. operating conditions, emission rates)?
Yes No
Have you modelled for additional receptor locations other than the maximum POI? (please include figure showing maximum POI location)
Yes No
If Yes, specify additional locations (i.e., land use) at which the exceedence may occur (select all that apply – please include figure showing additional modelled locations):
Health Care Seniors Residence / Child Care Facility Educational Facility Dwelling Unknown
Lacetion Specified by
The Director (explain):
. Measurement Based Assessment – please complete this section if notifying of a measured exceedence (Complete Table 2 or equivalent)
Type of Monitor / Measurement Type Date of Exceedence (dd/mm/yyyy) Duration of Exceedence
PS-1 Air Sampler 17/11/2019 2 Events (24 hours)
Is the monitoring approved by the Ministry of the Environment?
Yes If yes, please describe the approval: 7306-8FDKNX
Monitoring Reference Number: (if available)
Specify the location (i.e., land use) at which the exceedence did occur (select all that appli):
Specify the location (i.e., land use) at which the exceedence did occur (select all that apply):
Specify the location (i.e., land use) at which the exceedence did occur (select all that apply):         Health Care       Seniors Residence / Long Term Care Facility         Child Care Facility       Educational Facility
Specify the location (i.e., land use) at which the exceedence did occur (select all that apply):         Health Care       Seniors Residence / Long Term Care Facility       Child Care Facility       Educational Facility       Dwelling       Unknown         Location Specified by The Director (explain):       Courtice and Rundle AQ Stations
Specify the location (i.e., land use) at which the exceedence did occur (select all that apply):         Health Care       Seniors Residence / Long Term Care Facility       Child Care Facility       Educational Facility       Dwelling       Unknown         Location Specified by The Director (explain):       Child Care Facility       Other Location (explain):       Courtice and Rundle AQ Stations         Y. Statement of Company Official       Courtice Intervention       Courtice Intervention
Specify the location (i.e., land use) at which the exceedence did occur (select all that apply):         Health Care       Seniors Residence / Long Term Care Facility       Child Care Facility       Educational Facility       Dwelling       Unknown         Location Specified by The Director (explain):       Countice and Rundle AQ Stations         Statement of Company Official       It the undersigned hereby declare that, to the best of my knowledge:
Specify the location (i.e., land use) at which the exceedence did occur (select all that apply):         Health Care       Seniors Residence / Long Term Care Facility       Child Care Facility       Educational Facility       Dwelling       Unknown         Location Specified by The Director (explain):       Courtice and Rundle AQ Stations         Statement of Company Official         I, the undersigned hereby declare that, to the best of my knowledge:         • The information contained herein and the information submitted is complete and accurate in every way and I am aware of the penalties against providing false information as per s.184(2) of the Environmental Protection Act.
Specify the location (i.e., land use) at which the exceedence did occur (select all that apply):         Health Care       Seniors Residence / Long Term Care Facility       Child Care Facility       Educational Facility       Dwelling       Unknown         Location Specified by The Director (explain):       Courtice and Rundle AQ Stations         Statement of Company Official       It undersigned hereby declare that, to the best of my knowledge:         The information contained herein and the information submitted is complete and accurate in every way and I am aware of the penalties against providing false information as per s.184(2) of the Environmental Protection Act.         I have been authorized to act on behalf of the company identified in this form for the purpose of providing this notification of exceedence under O.Reg 419/05 to the Ministry of the Environment
Specify the location (i.e., land use) at which the exceedence did occur (select all that apply):

Name of Signing Authomy (please print)		lide		
Lyndsay Waller		Operations Tec	hnician	
Civic Address (address that has civic num	bering and street informatic	on includes street number, name, type and o	lirection)	Unit Identifier (i.e. suite or apartment number)
1835 Energy Dr				
Delivery Designator: If signing authority mailing address is a Rur	al Route, Suburban Servic	e, Mobile Route or General Delivery (i.e., Ri	₹# <i>3)</i>	
Municipality	Postal Station	Province/State	Country	Postal Code
Courtice		Ontario	Canada	L1E 2R2
Telephone Number (including area code &	extension) Fax I	Number (including area code)	E-mail Addr	ess
905-404-0888 x 4107			lyndsay	waller@durham.ca
Signature		Date (dd/mm/yyyy)		

Location of Maximum POI Concentration (e.g. UTM, street address, etc.)							Land Use at Maxim	um Point of Impinger	ent (If known)
	Contaminant <sup>(a)</sup>	CAS <sup>(b)</sup> Number	Type of Assessment (Air Dispersion Model Used)	Maximum POI <sup>(c)</sup> Concentration (µg/m³)	Averaging Period (hours)	Current MOE AAQC or POI Limit (µg/m³)	Limiting Effect	Schedule (1, 2 or 3)	Percentage of MOE AAQC or POI Limit
1									
2									
3									
4									
5							-		
6									
7									
8			5 (S. 1997)						
9									
10							7		
11									
12							7		
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									

## Table 1 - Information About Modelled Air Limit Exceedence – Contaminant Information

Notes:

(a) Proper Chemical Name should be given (Abbreviations, acronyms, numeric codes, trade names and mixtures NOT ACCEPTABLE).

(b) CAS Number : Chemical Abstracts Services Number (UNIQUE Identifier for a chemical)

(c) POI Concentration : Point of Impingement Concentration

PIBS: 5354e

Last Revised: November 24, 2005

Page 4 of 5

Location of Monitor (Describe)			Date (dd/mm/yyyy)		Time Sampling Period		Land Use at Monitor		
Courtice Station (1) and Rundle Station (2)			17/11/	2019	N/A 24	-Hours	On-site at	waste water facilit	У
	Contaminant <sup>(a)</sup>	CAS <sup>(b)</sup> Number	Type of Assessment (Measurement Method)	Maximum POI (c) Concentration (µg/m³)	Averaging Period (hours)	Current MOE AAQC POI Limi (µg/m³)	Limiting Effect	Schedule (1, 2 or 3)	Percentage of MOE AAQC POI Limit
1	Benzo(a)Pyrene	50-32-8	PUF	0.000071	24	0.00005	Health	AAQS	142%
2	Benzo(a)Pyrene	50-32-8	PUF	0.000083	24	0.00005	Health	AAQS	186%
3									
4									
5							р. Т		
6							5 G.		f
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									с
19									
20									
21									

## Table 2 - Information About Measured Air Limit Exceedence – Contaminant Information

\* For additional measurement locations / sampling times, please included additional tables \*\* If you are reporting more than one exceedence, include the time of the exceedence in the contaminant column

Notes: (a) Proper Chemical Name should be given (Abbreviations, acronyms, numeric codes, trade names and mixtures NOT ACCEPTABLE).

(b) CAS Number : Chemical Abstracts Services Number (UNIQUE Identifier for a chemical)

(c) POI Concentration : Point of Impingement Concentration

PIBS: 5354e

Last Revised: November 24, 2005

Page 5 of 5



## APPENDIX E2





## Notification of Exceedence – Regulation 419/05

General Information and Instructions

#### **General Information**

Information requested in this notification form is collected under the authority of the *Environmental Protection Act*, R.S.O. 1990 (EPA) and O. Reg. 419/05 and will be used to collect information relating to a measured or modelled air related exceedence as required by s.25(9), s.28(1) and s.30(3) of O. Reg. 419/05. The Ministry of the Environment (MOE) may also request additional information.

- Questions regarding completion and submission of this notification form should be directed to your local MOE District Office. A list of these
  District Offices (including fax numbers) is available on the Ministry of the Environment Internet site at
  <a href="http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist">http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist</a>. A copy of this form may be acquired through the MOE public web site
  <a href="http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist">(www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist</a>. A copy of this form may be acquired through the MOE public web site
  <a href="http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist">(www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist</a>. A copy of this form may be acquired through the MOE public web site
  <a href="http://www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist">(www.ene.gov.on.ca/envision/org/op.htm#Reg/Dist</a>. A copy of this form may be acquired through the MOE public web site
  </a>
- 2. For notification under s.25(9) or 28(1), the completed notification form should be faxed, as soon as practicable, to the local Ministry of Environment (MOE) District Office which has jurisdiction over the area in which the facility is located.
- For notification under s. 30, the completed notification form should be immediately faxed to the local Ministry of Environment (MOE) District Office which has jurisdiction over the area which the facility is located. If the exceedance is determined outside of the business hours of the District Office then the completed notification form should be faxed to the Spills Action Center (1-800-268-6061).
- 4. Information contained in this notification form may not be considered confidential and may be made available to the public upon request. Information may be claimed as confidential but will be subject to the *Freedom of Information and Protection of Privacy Act* (FOIPPA) and the *EBR*. If you do not claim confidentiality at the time of submitting the information, the Ministry of the Environment may make the information available to the public without further notice to you.

#### Instructions

This form should be used to notify the MOE of a measured or modeled air related exceedence as required under O. Reg. 419/05. Failure to notify the MOE as required by regulation constitutes an offence under the O. Reg. 419/05 and the EPA.

The generic term "limits" in the context of this form means any numerical Point of Impingement Concentration limit set by the MOE including standards in O. Reg. 419/05 and guidelines provided by the MOE (Ministry POI Limits). For a comprehensive list of MOE POI Limits please refer to the publication titled "Summary of O. Reg. 419/05 Standards, Point of Impingement Guidelines, and Ambient Air Quality Criteria (AAQC's)" available on the Ministry of the Environment Internet site at <a href="http://www.ene.gov.on.ca/envision/gp/2424e01.htm">http://www.ene.gov.on.ca/envision/gp/2424e01.htm</a>. Note that contaminants that have guidelines limits or recommended levels for chemicals with no standard or guideline may be considered "contaminants not listed in any of Schedules 1, 2 and 3 and discharges of the contaminant may cause an adverse effect" as this language appears in O. Reg. 419/05.

This form may be used for notification of exceedences of more than one contaminant; Table 1 (or equvalent) should be completed for each contaminant. If this notification is made pursuant to s. 30 in combination with ss. 25(9) or 28(1) then this form must be submitted immediately in accordance with s.30.

#### **Regulatory Authority**

- 28. (1) A person who discharges or causes or permits the discharge of a contaminant shall, as soon as practicable, notify a provincial officer in writing if,
  - (a) the person uses an approved dispersion model to predict concentrations of the contaminant that result from the discharges and,
    - (i) the use of the model indicates that discharges of the contaminant may result in a contravention of section 18, 19 or 20, or
       (ii) the contaminant is not listed in any of Schedules 1, 2 and 3 and the use of the model indicates that discharges of the contaminant may cause an adverse effect;
  - (b) measurements of air samples indicate that discharges of the contaminant may result in a contravention of section 18, 19 or 20; or
  - (c) the contaminant is not listed in any of Schedules 1, 2 and 3 and measurements of air samples indicate that discharges of the contaminant may cause an adverse effect.
- 25. (9) A person who is required under subsection (8) to complete the update of a report not later than March 31 in a year shall, as soon as practicable after that date, notify a provincial officer in writing if the person has started to use an approved dispersion model with respect to a contaminant for the purpose of completing the update but has not yet complied with section 12, and,
  - (a) the use of the model indicates that discharges of the contaminant may result in a contravention of section 18, 19 or 20; or
  - (b) the contaminant is not listed in any of Schedules 1, 2 and 3 and the use of the model indicates that discharges of the contaminant may cause an adverse effect.
- 30. (1) A person who discharges or causes or permits the discharge of a contaminant listed in Schedule 6 into the air shall comply with subsections (3) and (4) if there is reason to believe, based on any relevant information, that discharges of the contaminant may result in the concentration of the contaminant exceeding the half hour upper risk threshold or other time period upper risk threshold set out for that contaminant in Schedule 6 at a point of impingement.
  - (2) Without limiting the generality of subsection (1), the reference in that subsection to relevant information includes relevant information from predictions of a dispersion model, including,
    - (a) an approved dispersion model or other dispersion model; or
    - (b) a dispersion model that is not used in accordance with this Regulation.
  - (3) If subsection (1) applies to a discharge, the person who discharged or caused or permitted the discharge of the contaminant shall immediately notify the Director in writing.



## Notification of Exceedence – Regulation 419/05

C

Ministry of the Environment

1. Ministry of the Environment District Office Information	<u></u>							
Date Form Submitted (Faxed)	Date Exceedednce Determined January 10, 2020							
District Office York-Durham District Office	Fax Number (905) 427-5602							
Supporting information attached? Yes No								
If yes, number of pages: 2								
2. Site Information								
Name of Person Making the Notification	Business Name							
Lyndsay vvaller								
562210 Business Activity Descr Waste Treatment	siness endeavour, this may include products sold, services provided, equipment used, etc.) It and Disposal							
Site Name	MOE District Office							
Courtice AQ Station And Rundle AQ Station	York-Durham District Office							
Address Information: Site Address - Street information (address that has civic numbering and street information includes 1835 Energy Drive	s street number, name, type and direction) Unit Identifier (i.e. suite or apartment number)							
Survey Address (used for a rural location specified for a subdivided township, an unsubdivided township and Conc.: used to indicate location within a subdivided township and consists of a lot number and a concession number Lot Conc. Conc.	vided township or unsurveyed territory) used to indicate location within an unsubdivided township or unsurveyed territory, and id a reference plan number indicating the location within that plan. Attach copy of the plan Part Reference Plan							
Non Address Information (includes any additional information to clarify applicants' physica	al location)							
Municipality/Unorganized Township County/District	Postal Code							
Courtice York-Durham	L1E2R2							
Geo R Map Datum Zone Accuracy Estimate	Teference Geo Referencing Method UTM Easting UTM Northing							
Certificate of Approval Number (s) - attach a separate list if more space is required								
7306-8FDKNX								
3. Type of Notification: Limit Exceedence – Table 1 or Table 2 should be co.	mpleted and submitted with this notification of exceedence.							
This is a notification under Section 28(1) – Notice to Provincial Officer as a result o	of modelling or measurements relating to an exceedence of: (select all that apply)							
Schedule 1 Schedule 2 Schedule 3 POI	Guideline 🔀 Ambient Air Quality Criteria							
Other Limit (explain):								
This is a notification under Section 25 (9) – Notice to Provincial Officer as a result a	an update of an Emission Summary and Dispersion Modelling Report (select all that apply)							
Schedule 1 Schedule 2 Schedule 3 POI C	Guideline Ambient Air Quality Criteria							
Other Limit (explain):								
Date that Refinement is anticipated to be complete (dd/mm/www)								
This is a patification under Saction 20 (2). Mation to the Director on a result of an	evenedance of Linner Dials Threadaide (Ophedule O)							
Yes No	exceedence of upper Risk Thresholds (Schedule 6)							
4. Follow-Up Action								
Section 28 Notifications								
Will an Abatement Plan be submitted to the Ministry within 30 days of this notice as per s.29?								
Yes     Type of Previously Approved Abatement Plan     Date Approved under s.29 of O. Reg. 419/05 (dd/mm/yyyy)       No     If No, please provide the following:     Date Approved under s.29 of O. Reg. 419/05 (dd/mm/yyyy)								
Section 30 (3) Notifications for URT exceedence								
Has an Emission Summary and Dispersion Modelling (ESDM) Report been prepared in ac	ccordance with s.30(4) and submitted to the Ministry?							
No. If No. what is the anticipated submission data for the ESDM# (dd/are been	au 2							
I NO IT NO, What is the anticipated submission date for the ESDM <sup>*</sup> (dd/mm/yyy	¥10							

\* Note: The ESDM must be submitted within three months of the discharge

5. Model Based Assessment – please complete this section if notifying of a modelled exceedence (complete Table 1)									
Was an ESDM Report prepared in accordance with s.26 O. Reg. 419/05?									
Yes No									
If yes, was the ESDM Report prepared to fulfill (select all that apply):									
s.22 of O. Reg. 419/05 - Application for Certificate of Approval under section 9 of the Environmental Protection Act									
s.23 of O. Reg. 419/05 - Requirement for Schedule 4 or 5 sector facilities									
s.24 of O. Reg. 419/05 - Notice issued by Director									
s.25 of O. Reg. 419/05 - Requirement for updating ESDM Report									
s.30(4) of O. Reg 419/05 – Required as result of URT exceedence									
s.32(13) of O. Reg. 419/05 – Required as part of a Request for Alternative Standard									
Other (please specify):									
Was the approved dispersion model refined as required by \$12.0. Reg. 419/05 (i.e. operating conditions, emission rates)?									
Have you modelled for additional receptor locations other than the maximum POI? (please include figure showing maximum POI location)									
Yes No									
If Yes, specify additional locations (i.e., land use) at which the exceedence may occur (select all that apply – please include figure showing additional modelled locations):									
Health Care Seniors Residence / Long Term Care Facility Child Care Facility Educational Facility Dwelling Unknown									
Location Specified by The Director (explain):									

## 6. Measurement Based Assessment – please complete this section if notifying of a measured exceedence (Complete Table 2 or equivalent)

Type of Monitor / Measurement Type			Date	Date of Exceedence (dd/mm/yyyy)			Duration of Exceedence		
PS-1 A	ir Sampler		23/1	23/12/2019			2 Events (24 hours)		
Is the monitoring approved by the Ministry of the Environment?									
X Ye	es Ifyes, please de	scribe the approval:	7306-8FDKNX						
No No									
Monitoring	Reference Number: (if	available)							
Specify the	e location (i.e., land use	) at which the exceedence	did occ	ur (select all that apply)	i.				
He:	alth Care 🔲 So	eniors Residence / ong Term Care Facility		Child Care Facility		Educational Facility	Dwe	elling	Unknown
	cation Specified by e Director (explain):				X	Other Location (explain)	Courtic	e and Rur	ndle AQ Stations

#### 7. Statement of Company Official

3	I, th	ne undersigned hereby declare that, to the best of my knowledge:
	•	The information contained herein and the information submitted is complete and accurate in every way and I am aware of the penalties against providing false information as per s 184(2) of the Environmental Protection Act

authorized to act on behalf of the company identified in this form for the purpose of providing this notification of exceedence under O.Reg 419/05 to the Ministry of ment
r

•	I have used the most recent notification form (as obtained from the Ministry of the Environment Internet site at http://www.ene.gov.on.ca/envision/gp/index.htm#PartAir or from
	my local Ministry District Office and I have included all necessary information required by O. Reg. 419/05 and identified on this form.

Name of Signing Authority (please print)		Title						
Lyndsay Waller		Operations Tech	hnician					
Civic Address (address that has civic num	pering and street information ind	cludes street number, name, type and d	<i>irection</i> ) Unit lo	lentifier (i.e. suite or apartment number)				
1835 Energy Dr								
Delivery Designator: If signing authority mailing address is a Rural Route, Suburban Service, Mobile Route or General Delivery ( <i>i.e., RR#3</i> )								
Municipality	Postal Station	Province/State	Country	Postal Code				
Courtice		Ontario	Canada	L1E 2R2				
Telephone Number (including area code &	extension) Fax Numl	ber (including area code)	E-mail Address					
905-404-0888 x 4107			lyndsay.walle	er@durham.ca				
Signature		Date ( <i>dd/mmlyyyy)</i>	·					

Location of Maximum POI Concentration (e.g. UTM, street address, etc.)							Land Use at Maxim	um Point of Impingem	ent (if known)
	Contaminant <sup>(a)</sup>	CAS <sup>(b)</sup> Number	Type of Assessment (Air Dispersion Model Used)	Maximum POI <sup>(e)</sup> Concentration (µg/m³)	Averaging Period (hours)	Current MOE AAQC or POI Limit (µg/m³)	Limiting Effect	Schedule (1, 2 or 3)	Percentage of MOE AAQC or POILimit
1									
2									
3									
4									
5					-				
6									
7							0		
8									
9									
10									
11		4.							-
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22							1		

## Table 1 - Information About Modelled Air Limit Exceedence – Contaminant Information

Notes:

(a) Proper Chemical Name should be given (Abbreviations, acronyms, numeric codes, trade names and mixtures NOT ACCEPTABLE).

(b) CAS Number : Chemical Abstracts Services Number (UNIQUE Identifier for a chemical)

(c) POI Concentration : Point of Impingement Concentration

PIBS: 5354e

Last Revised: November 24, 2005

Page 4 of 5

Location of Monitor (Describe)			Date (dd/mm/yyyy)		Time Sampling Period		Land Use at Monitor			
Co	ourtice Station (1) and Rundle	e Station (2)	23/12/2019		N/A 2	N/A 24-Hours		On-site at waste water facility		
	Contaminant <sup>(a)</sup>	CAS <sup>(b)</sup> Number	Type of Assessment (Measurement Method)	Maximum POI <sup>®</sup> Concentration (µg/m³)	Averaging Peri (hours)	od Current MOE AAQC POI Limi (µg/m³)	Limiting Effect	Schedule (1, 2 or 3)	Percentage of MOE AAQC POI Limit	
1	Benzo(a)Pyrene	50-32-8	PUF	0.000098	24	0.00005	Health	AAQS	196%	
2	Benzo(a)Pyrene	50-32-8	PUF	0.000111	24	0.00005	Health	AAQS	222%	
3									26 12	
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16							2			
17										
18										
19										
20										
21										

## Table 2 - Information About Measured Air Limit Exceedence – Contaminant Information

\* For additional measurement locations / sampling times, please included additional tables \*\* If you are reporting more than one exceedence, include the time of the exceedence in the contaminant column

Notes: (a) Proper Chemical Name should be given (Abbreviations, acronyms, numeric codes, trade names and mixtures NOT ACCEPTABLE).

(b) CAS Number : Chemical Abstracts Services Number (UNIQUE Identifier for a chemical)

(c) POI Concentration : Point of Impingement Concentration

PIBS: 5354e

Last Revised: November 24, 2005

Page 5 of 5



# MEMO





600 Southgate Drive Guelph ON Canada N1G 4P6 Tel: +1.519.823.1311 Fax: +1.519.823.1316 E-mail: solutions@rwdi.com

## MEMORANDUM

DATE:	2020-01-14	RWDI Reference No.: 1803743
TO:	Lyndsay Waller	EMAIL: Lyndsay.Waller@Durham.ca
CC:	Andrew Evans	EMAIL: <u>Andrew.Evans@Durham.ca</u>
CC:	Gioseph Anello	EMAIL: <u>Gioseph.Anello@Durham.ca</u>
FROM:	John DeYoe	EMAIL:jd@rwdi.com
RE:	Exceedance Report – Benzo(a)Pyrene December 23, 2019 Region of Durham, DYEC	

On January 9, 2020 the results from ALS Environmental were received regarding the PAH results from the December 23, 2019 sampling event. On January 10, 2019, the results were entered and assessed, and it was found that there were measured Benzo(a)Pyrene concentrations in excess of the 24-hour AAQC on the December 23 sampling date. Attached is the Exceedance Form PIBS 5354e for your reference. Below is a summary of the event.

### December 23, 2019

On Monday, December 23, 2019, there were two exceedances of the Benzo(a)Pyrene 24-hour AAQC, which occurred at both the Courtice Station and Rundle 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 station with regards to the Durham York Energy Centre.

The following summarizes the BaP concentrations and onsite conditions during the December 23<sup>rd</sup> sampling date:

 The guideline concentration for BaP is 0.00005 ug/m<sup>3</sup>. The measured concentration at the Courtice Station sampler was 0.000098 ug/m<sup>3</sup> and the Rundle Station sampler was 0.000111 ug/m<sup>3</sup>. During the sampling day the wind was recorded predominantly from the West to WSW as recorded at the Rundle Meteorological Tower. Wind speeds ranged from 3.6 kph to 28.5 kph.



rwdi.com

This document is intended for the sole use of the party to whom it is addressed and may contain information that is privileged and/or confictential. If you have received this in error, please notify us immediately. Accessible document format available upon request. <sup>©</sup> RWDI name and logo are registered trademarks in Canada and the United States of America.



Lyndsay Waller Durham York Energy Centre RWDI#1803743 JANUARY 14. 2020

2. According to the Rundle meteorological data, the Courtice Station was located upwind of the Energy Centre. The Rundle Station was not upwind or downwind of the Energy Centre during the sampling period. Since the higher exceedance was detected at Rundle Station, it is likely that the measured BaP exceedances may be attributed to sources other that the Energy Centre operations.

At the Courtice Station, the NO<sub>2</sub> and SO<sub>2</sub> values were less than 5% of the 24-hour criteria for the same period. The  $PM_{2.5}$  24-hour average value was 14.5 micrograms per metre cubed or 52% of the criterion.

At the Rundle Station, the  $NO_2$  and  $SO_2$  values were less than 5% of the criteria for the same period. The  $PM_{2.5}$  24-hour average value was 1.4 micrograms per metre cubed or 5% of the of the criterion.

The results from both stations must be due to some extremely localized temporary source or more probably, some unidentified error related to handling or analysis.

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

Respectfully submitted by:

**RWDI AIR Inc.** 

John DeYoe, B.A. Senior Consultant / Principal

JD/VML

Attach.



# FIGURE







# SUPPORTING DATA




Certificate of Analysis											
ALS Project Contact:	Claire Kocharakkal	Client Name:	RWDI Air Inc.								
ALS Project ID:	23601	Client Address:	600 Southgate Drive								
ALS WO#:	L2400442		Guelph, ON N1G 4P6								
Date of Report	9-Jan-20		Canada								
Date of Sample Receipt	27-Dec-19	Client Contact:	John DeYoe								
		Client Project ID:	DYEC								
OMMENTS:	PAH by CARB method 429 (LR option)- Iso	tope dilution									
	್ಷದ ನಿರ್ದಾರಣ	Sensa	6								
	Certified b	Steve Kennedy	e.								
		Technical Supervisor	<								

This report shall not be reproduced, except in full, without the written permission of ALS Canada Ltd.

				ALS	S Life Science	es				
			Samp	le Ai	nalysis Summary	Rep	port			
Sample Name	Method Blank		Method Blank		COURTICE- DX/PAH-DEC23		RUNDLE-DX/PAH DEC23		Laboratory Control Sample	
ALS Sample ID	WG3250121-1		WG3250121-4		L2400442-1		L2400442-2		WG3250121-2	
Sample Size	1		1		1		1		1	
Sample units	sample		sample		sample		sample		n/a	
Moisture Content	n/a		n/a		n/a		n/a		n/a	
Matrix	MEDIA		REAGENT		Puf		Puf		QC	
Sampling Date	n/a 20.0cc 10		n/a 20 Doc 10		23-Dec-19		23-Dec-19		n/a 20 Dec 10	
Exclaction bate	30-DBC-19		30-Dec-19		30-DBC-19		20-060-19		30-Dec-19	
Target Analytes	ng/sample		ng/sample		ng/sample		ng/sample		%Rec	
Naphthalene	25.0	М	12.5	110.00	14900		13700		127	м
2-Methylnaphthalene	15.7	199	2.41	м	1220		1290		100	
1-Methylnaphthalene	4.91	M	1.42		881		890		97.9	
Acenaphichylene	0./10	к	0.210	R	55.3	M	36.9	M	89.U	
Fluorene	9.20		1.90	P	128		243		1.60	
Phenanthrene	202		2.30	IN.	508		400		02.U 98.0	
Anthracene	1.84	M	0.650	R	13.8	M	19.9	м	86.0	
Fluoranthene	1.21	Needin.	0,630	(2)2)	215	100	243	1711	85.2	
Pyrene	1.17		0.780	R	110		126		90.2	
Benzo(a)Anthracene	0.270	R	0.220	R	29.0		30.8		105	
Chrysene	0.240		< 0.20	υ	72.1		73.9		92.8	
Benzo(b)Fluoranthene	<0.20	U	0.230	R	44.0	М	51.2		74.6	
Benzo(k)Fluoranthene	<0.20	U	< 0.20	U	44.5	м	48.5	м	83.0	м
Benzo(e)Pyrene	0.600	R	0.580	R	35.5		38.5		79.8	
Benzo(a)Pyrene	<0.20	U	< 0.20	U	32.8		36.6	М	80.0	
Perylene	0.210	R	0.270	R	7.66		7.91		105	
indeno( 1,2,3-cd)Pyrene	<0.20	U	0.280	R	40.3		44.7	м	79.5	
Dibenzo(a,h)Anthracene	<0.20	U	< 0.20	U	5.38		5.43	М	86.5	
Benzo(g,h,ı)Perylene	<0.20	U	0.200	R	40.5		43.8		94.3	
Additional Analytes	12111	122					12207			
Tetralin	7.61	M	1.08		563		732		NS	
Siphenyl. Tarebanul	4.65	20.1	1.31	100	606		596 E 20		NS	
anzo(a)fluorene	<0.20	0	< 0.20		0.02 26.1	M	5.20	14	NG	
Senzo(b)fluorene	<0.20	Ŭ	< 0.20	Ŭ	20.9	1.1	21.7		NS	
ield Sampling Standards	% Rec		% Rec		% Rec		% Rec		% Rec	
-Methylnaphthalene-D10	NS		NS		65		80.4		NS	
Fluorene D10	NS		NS		63.6		90.2		NS	
Terphenyl D14(Surr.)	NS		NS		114.3		117.4		NS	
Extraction Standards	% Rec		% Rec		% Rec		% Rec		% Rec	
Naphthalene D8	60.8	М	63.3	М	48.9	М	66.2	м	55.9	м
2-Methylnaphthalene-D10	79.6		70		86.4		110.9		72.6	
Acenaphthylene D8	76.8		68.9		62.4		73.5		73	
-nenanthrene D10	89.3		88.1		80.2		84.8		75.6	
-nurracene-010 Fluoranthene D10	85.1		80.4 106.4		/b.b 107.4		115.2		/3.5	
Benz(a)Anthracene-D12	100		105.8		117.5		137.7		93.2 104.8	
Chrysene D12	94.8		108.5		105.2		117.3		111.5	
enzo(b)Fluoranthene-D12	101.5	м	126.1	м	132.5	м	129.2	м	117.7	м
enzo(k)Fluoranthene-D12	87.8	м	90.9	м	109.7	м	121.8	м	103.2	м
enzo(a)Pyrene D12	103.8	R	97.9		90.8		99		96.4	м
erylene D12	65.1		72.5		72.1		79.9		70.3	
ndeno( 1,2,3,cd)Pyrene-D 12	98.3		120.4		123.2		127.6		108.8	
)ibenz(a.h)Anthracene-D14	73.5		95.9		91.5		95.6		89.7	
	74.0		05.2		00.4		026		85.3	

ALS Life Sciences								
			Lab	orator	y Method Blank Analys	sis Report		
<b>Sample Name</b> ALS Sample ID Analysis Method Analysis Type	<b>Method Blank</b> WG3250121-1 PAH by CARB 42 blank	9			Sampling Date Extraction Date	n/a 30-Dec-19		
Sample Matrix Sample Size Percent Moisture Split Ratio	MEDIA 1 san n/a 1	nple			Workgroup	WG3250121	Approved: <i>Santheep Mathew</i> e-signature 09-Jan-2020	
Run Information		Run 1						
Filename Run Date Final Volume Dilution Factor Analysis Units Instrument Column		200107 1/7/202 0.1 1 ng/sam MSD-5 HP-5MS	06.D 20 9:49 mL ple 6 UST530312H					
Target Analytes		Ret. Time	Concentration ng/sample	Flags				
Naphthalene 2-Methylnaphthalene 1-Methylnaphthalene Acenaphthylene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)Anthracene Chrysene Benzo(a)Pyrene Benzo(a)Pyrene Benzo(a)Pyrene Perylene Indeno(1,2,3-cd)Pyre Dibenzo(a,h)Anthrac Benzo(g,h,i)Perylene Additional Analytes Tetralin Biphenyl o-Terphenyl Benzo(a)fluorene	e e ene ene s	2.74 3.34 3.44 4.45 5.65 7.86 7.91 11.15 11.75 15.77 15.77 15.77 18.99 19.00 19.66 19.80 20.312 23.14 24.06 2.61 3.83 9.00 12.95	4 25.0 M   4 25.0 M   4 15.7 G   5 4.91 M   5 9.25 G   5 7.00 G   5 9.25 G   5 7.00 G   22.3 G 1.84 M   5 1.21 G   3 1.17 G   1 0.270 G   3 0.240 G   9 <0.20 G					
Benzo(b)fluorene	.d.o	13.13	3 <0.20	U	Limite			
Naphthalene D8 2-Methylnaphthalene Acenaphthylene D8 Phenanthrene D10 Anthracene-D10 Fluoranthene D10 Benz(a)Anthracene-D Chrysene D12 Benzo(b)Fluoranthen Benzo(k)Fluoranthen Benzo(a)Pyrene D12 Perylene D12 Indeno(1,2,3,cd)Pyre Dibenz(a,h)Anthracei Benzo(g,h,i)Perylene	e-D12 e-D12 e-D12 e-D12 e-D12 ne-D14 e-D14 e-D12	50 2.72   50 3.36   50 4.44   50 7.75   50 7.83   50 15.66   11.10 50   50 15.67   50 15.67   50 19.80   50 19.80   50 20.03   50 23.19   50 23.33   50 23.35   50 24.03	va KEC   2 60.8 №   0 79.6   4 76.8   5 89.3   7 85.1   0 105.0   0 100.0   1 94.8   2 101.5 №   0 87.8 №   0 103.8   3 65.1   9 98.3   5 73.5   7 74.2	R	50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150			
M U R	1 Ind J Ind R Ind	icates that icates that icates that	a peak has been this compound w the ion abundanc	manually as not de e ratio fo	integrated. tected above the MDL. or this compound did not meet	the acceptance criterion.		

					A	LS Life Scienc	es		
					3	Sample Analysis Repo	rt		
Sample Name ALS Sample ID Analysis Method Analysis Type	<b>Method Bl</b> WG325012 PAH by CAF sample	<b>ank</b> 1-4 RB 429				Sampling Date Extraction Date	n/a 30-Dec-19	-	
Sample Matrix Sample Size Percent Moisture Split Ratio	REAGENT 1 n/a 1	sample	9			Workgroup	WG3250121		Approved: <i>Santheep Mathew</i> e-signature 09-Jan-2020
Run Information	A1800	}	Run 1				Assertion to a minimum included opposi-		
Filename Run Date Final Volume Dilution Factor Analysis Units Instrument Column			200107( 1/7/202 0.1 1 ng/samp MSD-5 HP-5MS	07.D 10:25 mL ble UST530312H					
Target Analytes			Ret. Time	Concentration ng/sample	Flags				
Naphthalene			2.75	12.5					
2-Methylnaphthalene	i i		3.34	2.41 M	1				
1-Methylnaphthalene	E		3.45	1.42	D				
Acenaphthene			4.40	0.210	R				
Fluorene			5.65	1.30	R				
Phenanthrene			7.80	2.24					
Anthracene			7.91	0.650	R				
Fluoranthene			11.15	0.630	D				
Pyrene Benzo(a)Anthracene			11.78	0.780	R				
Chrysene			15.77	< 0.20	U				
, Benzo(b)Fluoranthen	e		18.99	0.230	R				
Benzo(k)Fluoranthen	e		18.99	<0.20	U				
Benzo(e)Pyrene			19.66	0.580	R				
Benzo(a)Pyrene			19.80	< 0.20	U				
Indeno(1, 2, 3-cd)Dyre	ano		20.03	0.270	R				
Dibenzo(a,h)Anthrace	ene		23.46	< 0.20	U				
Benzo(g,h,i)Perylene			24.07	0.200	R				
Additional Analytes	s								
Tetralin			2.62	1.08					
Biphenyl			3.87	1.31					
o-Terphenyl			9.07	<0.20	U				
Benzo(a)fluorene			12.95	<0.20	U				
Benzo(b)fluorene			13.16	<0.20	U				
Extraction Standar	ds			% Rec		Limits			
Naphthalene D8		50	2.73	63.3 M	I	50-150			
2-Methylnaphthalene	-D10	50	3.31	70.0		50-150			
Acenaphthylene D8		50	4.44	68.9		50-150			
Anthracene-D10		50	7.75	88.1		50-150 50-150			
Fluoranthene D10		50	11.10	106.4		50-150			
Benz(a)Anthracene-D	012	50	15.60	105.8		50-150			
Chrysene D12		50	15.71	108.5		50-150			
Benzo(b)Fluoranthen	e-D12	50	18.92	126.1 M	1	50-150			
Benzo(k)Fluoranthen	e-D12	50	19.01	90.9 N	1	50-150			
Perviene D12		50	20.03	72.5		50-150			
Indeno(1,2,3,cd)Pyre	ene-D12	50	23.19	120.4		50-150			
Dibenz(a,h)Anthracer	ne-D14	50	23.35	95.9		50-150			
Benzo(g,h,i)Perylene	D12	50	24.07	95.2		50-150			
MU		Indica Indica	es that tes that	a peak has been this compound w	manuall as not d	y integrated. etected above the MDL.	the acceptories with the		
R	~	TUDICA	.es that	une ion abundano	e ratio f	or this compound did not meet	, une acceptance criterion.		

					AL	S Lif	e So	ie	nces		
					s	ample A	nalysi	s Re	eport		
Sample Name ALS Sample ID Analysis Method Analysis Type	COURTIC L2400442- PAH by CA sample	E-DX/P# -1 RB 429	AH-DEC	23		one me	Samplir Extracti	ig Da on D	ate :	23-Dec-19 00:00 30-Dec-19	
Sample Matrix Sample Size Percent Moisture	Puf 1 n/a	sample	2				or 1				Approved: Santheep Mathew e-signature
Split Ratio	1						Workgr	oup		WG3250121	09-Jan-2020
Run Information			Run 1	10.0			Run 2	00 0			
Run Date Final Volume Dilution Factor Analysis Units Instrument Column		90 D. 20 D.	1/7/202 0.1 1 ng/sam MSD-5 HP-5MS	10.12:12 mL ble UST530312H			1/7/202 1 10 ng/sam MSD-5 HP-5MS	20 11 mL ple	::00 -530312H		
Target Analytes			Ret. Time	Concentration ng/sample	Flags		Ret. Time.	Coi ng,	ncentration /sample	i Flags	
Naphthalene 2-Methylnaphthalene 1-Methylnaphthalene Acenaphthylene			4.46	5 55.3 N	1		2.76 3.35 3.46	5	14900 1220 881		
Acenaphthene Fluorene Rhenenthrene			4.75	5 128			5.6	5	366		
Anthracene			7.91	. 13.8 N	1		7.80		306		
Fluoranthene Pvrene			11.78	3 110			11.1	5	215		
Benzo(a)Anthracene			15.67	29.0							
Chrysene Benzo(b)Fluoranthene	e		15.78 18.99	3 72.1 9 44.0 №	1						
Benzo(k)Fluoranthene	e		19.04	44.5 N	1						
Benzo(e)Pyrene Benzo(a)Pyrene			19.73 19.86	35.5 32.8							
Perylene			20.09	7.66							
Indeno(1,2,3-cd)Pyre Dibenzo(a,h)Anthrace	ene ene		23.26 23.45	5 40.3 5 5.38							
Benzo(g,h,i)Perylene			24.16	40.5							
Additional Analytes	5										
Tetralin Binhenvl							2.6	4 2	563 606		
o-Terphenyl			9.07	5.52			0.0		000		
Benzo(b)fluorene Benzo(b)anthracene			13.16	5 20.9 63.8							
Eield Sampling Star	ndards	na spi	ked	% Rec							
1-Methylnaphthalene	-D 10	300	3 41	65							
Fluorene D 10	2.55.55. 	300	5.60	63.6							
Terphenyl D14(Surr.)	)	300	12.60	) 114.3							
Extraction Standard	ds			% Rec		Limits			% Rec		
Naphthalene D8 2-Methylnaphthalene	-D 10	50 50				50-150 50-150	2.75	2	48.91 86.4	M	
Acenaphthylene D8		50	4.44	62.4		50-150					
Phenanthrene D10		50	7.75	5 80.2 76.6		50-150					
Fluoranthene D10		50	11.10	) 107.4		50-150					
Benz(a)Anthracene-D	012	50	15.60	117.5		50-150					
Chrysene D12	o D 10	50	15.71	. 105.2	4	50-150					
Benzo(k)Eluoranthene	e-D12 e-D12	50	19.93	1097 N	1	50-150 50-150					
Benzo(a)Pyrene D12		50	19.80	90.8	5	50-150					
Perylene D12		50	20.03	3 72.1		50-150					
Indeno(1,2,3,cd)Pyre	ne-D12	50	23.19	123.2		50-150					
Dibenz(a,h)Anthracer Benzo(a,h,i)Pervlene	ne-D14 D12	50 50	23.35 24.07	91.5 89.4		50-150 50-150					
, or yrollo	4			a pool bes here		otopret-J					
M	q	Indical	es that.	a peak has been i	nanually ir	itegrated					

					AL	S Life	e Sc	ier	nces		
-					Sa	ample A	nalysi	s Rej	oort		
<b>Sample Name</b> ALS Sample ID Analysis Method Analysis Type	RUNDLE-E L2400442- PAH by CAI sample	<b>DX/PAH</b> - 2 RB 429	DEC23				Samplin Extracti	ig Dati on Dat	e te	23-Dec-19 00:00 30-Dec-19	
Sample Matrix Sample Size Percent Moisture Split Ratio	Puf 1 n/a 1	sample					Workard	สมจ		WG3250121	Approved: Santheep Mathew e-signature 09-Jan-2020
Bun Information	1.		Run 1				Run 2	Jup			0000012020
Filename Final Volume Dilution Factor Analysis Units Instrument Column		2 ; ; ; ; ; ; ; ; ; ; ; ; ;	200107 1/7/202 D.1 1 ng/samp MSD-5 HP-5MS	11.D 0 12:47 mL ble UST530312H			200107/ 1/7/202 1 10 ng/sam MSD-5 HP-5MS	09.D 20 11:: mL ple UST5	36 30312H		
Target Analytes		F	Ret. Time	Concentration ng/sample	Flags		Ret. Time.	Cone ng/s	centratior sample	n Flags	
Naphthalene 2-Methylnaphthalene 1-Methylnaphthalene Acenaphthylene Acenaphthylene Acenaphthene Fluorene Fluorene Fluoranthene Pyrene Benzo(a)Anthracene Chrysene Benzo(b)Fluoranthene Benzo(b)Fluoranthene Benzo(c)Fyrene Benzo(a)Pyrene Perylene Indeno(1,2,3-cd)Pyre Dibenzo(a,h)Anthrace Benzo(g,h,i)Perylene <b>Additional Analytes</b> Tetralin Biphenyl o-Terphenyl Benzo(b)fluorene Benzo(b)fluorene	e e ene ene		4.46 7.91 11.76 15.67 19.04 19.73 19.86 20.05 23.26 23.45 24.16 9.06 13.16 15.76	36.9 M 19.9 M 126 30.8 73.9 51.2 48.5 M 38.5 36.6 M 7.91 44.7 N 5.43 M 43.8 5.20 21.7 69.8			2.77 3.33 3.46 4.75 5.65 7.80 11.15 2.65 3.86	, 55 55 50 53	13700 1290 890 243 455 667 243 743 732 596		
Field Sampling Star	ndards	ng spil	ked	% Rec					% Rec		
I-IVIETRYINAPhthalene Fluorene D10 Terphenyl D14(Surr.)	-D1U )	300 300 300	3.41 5.60 12.60	90.2 117.4							
Extraction Standar	ds			% Rec		Limits			% Rec		
Naphthalene D8 2-Methylnaphthalene Acenaphthylene D8 Phenanthrene D10 Anthracene-D10 Fluoranthene D10 Benz(a)Anthracene-D Chrysene D12 Benzo(b)Fluoranthene Benzo(c)Purene D12 Perylene D12 Indeno(1,2,3,cd)Pyre Dibenz(a,h)Anthracen Benzo(g,h,i)Perylene	-D10 012 e-D12 e-D12 one-D12 ne-D14 D12	50 50 50 50 50 50 50 50 50 50 50 50 50 5	7.75 7.87 11.10 15.60 15.71 18.93 19.01 19.80 20.03 23.19 23.35 24.07 es that	84.8 85.0 115.2 137.7 117.3 129.2 № 99.0 79.9 127.6 95.6 93.6 a peak has been f	1 1 manually in	50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150 50-150	2.76 3.32 4.44	4	66.2 110.9 73.5	M	
IX		marcau	undt.	a peak nas been f	nanadiry III	agrateu					

ALS Life Sciences											
Sample Analysis Report											
Sample Name ALS Sample ID Analysis Method Analysis Type	<b>Laborato</b> WG32501 PAH by C sample	<b>ory Cont</b> 121-2 ARB 429	rol Sam	ple			Sampling Date Extraction Date		n/a 30-Dec-19		
Sample Matrix Sample Size	QC 1	n/a									Approved:
Percent Moisture	n/a	nya					111 - F		W22050404		e-signature
Split Ratio	1.		1000 12				Workgroup		WG3250121		09-Jan-2020
Run Information			Run 1								
Filename Pun Date			200107	03.D							
Final Volume			0.1	mL							
Dilution Factor			1								
Analysis Units			%Rec MSD-5								
Column			HP-5MS	UST530312H							
			Ret.	Concentration							
Target Analytes			Time	%Rec	Flags						
Naphthalene			2.74	↓ 127 M							
2-Methylnaphthalene	2		3.34	100							
1-Methyinaphthalene	2		3.45 4.46	5 97.9 5 89.0							
Acenaphthene			4.75	5 85.1							
Fluorene			5.65	5 82.0							
Phenanthrene			7.80	98.0							
Anthracene			7.91	86.0 85.2							
Pyrene			11.78	3 90.2							
Benzo(a)Anthracene			15.67	105							
Chrysene			15.79	92.8							
Benzo(b)Fluoranthen	ie 		18.99	) 74.6							
Benzo(e)Pyrene	ie:		19.00	3 83.0 M 3 79.8							
Benzo(a)Pyrene			19.86	5 80.0							
Perylene			20.09	0 105							
Indeno(1,2,3-cd)Pyre	ene		23.26	5 79.5							
Benzo(g,h,i)Pervlene	ene e		23.4.	5 80.3 5 94.3							
Extraction Standar	ds			% Rec		Limits					
Naphthalene D8		50	) 2.73	з 55.9 M		50-150					
2-Methylnaphthalene	e-D10	50	3.30	) 72.6		50-150					
Acenaphthylene D8		50	) 4.44	73.0		50-150					
Phenanthrene D10		50	) 7.74	4 75.6 73.6		50-150					
Fluoranthene D10		50	) 11.10	) 95.2		50-150					
Benz(a)Anthracene-E	D12	50	15.60	) 104.8		50-150					
Chrysene D12	<b>D</b> 10	50	) 15.71	111.5		50-150					
Benzo(b)Fluoranthen	ie-D12	50	) 18.93	3 117.7 M		50-150					
Benzo(a)Pyrene D12		50	) 19.80	) 96.4 M		50-150					
Perylene D12		50	20.03	3 70.3		50-150					
Indeno(1,2,3,cd)Pyre	ene-D12	50	23.18	108.8		50-150					
Dibenz(a,h)Anthrace	ne-D14	50	23.34	k 89.7		50-150					
benzo(g,n,r)r er yiene		50	24.07	05.5		50 150					
М	1	Indica	ates that	a peak has been	manuall	y integrated	le -				



L2400442-COFC

L2400444-COFC

_	Canada Toll Erea: 1 800 668 9878

Chain of Custody (COC) / Analytical Request Form

Report To	Contact and company name below will app	pear on the final report		Report Format / Distribution						Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)									
Company:	RWDI		Select Report Fo	mat:	Ø PDF	EXCEL 6 EDG	(DIGITAL)	Standa	ard TAT	is 15	busines	days. I	TOX and	iysis	standard	TAT is 5	business d	ays	
Contact:	Matt Lantz		Quality Control (	QC) Report with Rep	ort	C YES	D NO	-	15 d	ay [R	- Regu	iar] i	MC V	5	Busines	s day -	DTOX [R	- Regu	ilar]
Phone:	519 823 1311		Compare Results	to Criteria on Report - pro	ovide details below if box	checked		THORE	10 da	y P-	50%]	3	EROE	3	Businer	ss day -	DTOX [E	- 100%	1
	Company address below will appear on the fir	nal report	Select Distribution	on:	EMAIL		AX		5 day	[E-10	0%]	9							
Street:	600 Southgate Drive		Email 1 or Fax		Matt Lantz@rwdi.	com			Date an	d Time	Requir	ed for al	E&P TA	Ts:			dd-mmm	⊢yy hh:	mm
City/Province:	Guelph, Ontario		Email 2					For tee	or tests that can not be performed according to the service level selected, you will be contacted.										
Postal Code:	N1G 4P6		Email 3						Analysis Request										
Invoice To	Same as Report To 🛛 🖸 Yes	D NO	1. A	in .	voice Distribution			S		Indicate	e Filtered	(F), Pre	served (F	P) or F	iltered and	Preserve	ed (F/P) belo	*	
	Copy of Invoice with Report O YES	NO	Select Invoice D	istribution:	g em		FAX	l K									k - 1		0
Company:			Email 1 or Fax					]z						- 1					7
Contact:			Email 2	mail 2									-1						₽
	Project Information			15		8 J													
ALS Account #	/ Quote #:		AFE/Cost Canter. PO#										-1	1					Z
Job #:	DYEC		Major/Minor Code:	Aajor/Minor Code: Routing Code:									1			1			0
PO / AFE:	1803743 Phase 1000		Requisitioner:					15	Filte		1 1		- 1						S
LSD:		2000 A2-0	Location:					Ĩ	ION.		1			1					щ
ALS Lab Wor	rk Order # (lab use only):		ALS Contact:			Sampler:	Martin Town	BEI	h no H				1			1			MP
ALS Sample # (lab use only)	Sample Identificatio (This description will	n and/or Coordinates appear on the report)		Sample Air Volume (m3)	Date (dd-mmm-yy)	Sample Period	Sample Type	NN	TSP, ICI	PAH	ă								SAI
1	12394633-7	~ (oust:	ce	336	13. Dec - 19	24hr	Air	1		X	X	-							
1	740128			1665	17-1-10	24hr	Air	1				-		+	+			+	
.7	720094		-	1665	13 Dect	24hr	Air		$\diamond$	-		-	-		+			+	<u> </u>
2	12201122 7	- 0	1.	1005	27 24 16	24hr	Air	-			K	-	-	+	+	-	+	+	<u> </u>
2	625-2	- Kuna	ic	320	23. Pact	2411	~!!	-	1	X	X	-		+		-	_	+	<u></u>
3	740227			1660	IT-Dec'	24hr	Air	-	X	K-				-					<u> 6</u>
4	739993			1660	13-000-19	24hr	Air		X						+-				-
						24hr	Air												
						24hr	Air												
						24hr	Air								-				<u> </u>
					-	24hr	Air	<u> </u>		-		-	-	-	+-				
						24hr	Air		t	-		-		+				+	<u> </u>
						2464		-	-	-	$\left  \right $		-+	+	+	-		+	<u> </u>
	· · · · · · · · · · · · · · · · · · ·				<u> </u>	2411	AIF	-			CAL		TICHO		AS DEC	ENED	/leb use i		
Drinking	Water (DW) Samples <sup>1</sup> (client use)	Special Instructions / :	Specify Criteria to a	add on report by cilcle	ing on the drop-dow	m list below (elect	ronic COC only)	From		-	SAN	FLEC	SIE	Oh	AS REC	EIVED	Yes		
Are samples tak	en from a Regulated DW System?							Ice P	acks ing Ini	itiated	Ice Ci	ibes		stody	y seal int	lact	Yes	Ø	
Are samples for	human consumption/ use?	Samples are 10 day TA	Т		- 2 <u> 2</u>				I	INTIAL	COOLE	TEMP	RATUR	ES C		F	INAL GOOL	ER TEMP	ERATUR
	IS 17 NO							2.8	Ċ	K.	1°C								
<u> </u>	SHIPMENT RELEASE (client use	D)		INITIAL	HIPMENT RECEPT	TION (lab use on	ly)					FI	NAL SH	IIPM	ENT RE	CEPTIC	ON (lab ut	e only)	
Released by:	Unter Date: 27-D	ec - 19 Time: 12:20	Received by:	BETON		Date: 27-Dec-	-2019	Time 12 :	:20	Rece	eived b	y:			Dat	e:			Time:
REFER TO BACK	PAGE FOR ALS LOCATIONS AND SAMPLIN	IG INFORMATION			WH	ITE - LABORATOR	Y COPY YEL	LOW -	CLIEN	TCOP	γ								ŝ

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

12 2

## Station: RofD Courtice Daily: 23/12/2019 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM2.5	NO	NO2	NOX	SO2	Batt Min	emperature - Ambie	Rain	Tr_Temp	RH AVG	Pressure	Rain total
	ug/m3	ppb	ppb	ppb	ppb	Volts	C°	mm	C°	%	in HG	mm
23/12/2019 00:00	24.7	0.1	7.3	7.5	0.715	13.2	2.899	0	20.2	80.1	29.76	0
23/12/2019 01:00	19.7	0	7	7	0.966	13.2	3.077	0	20.1	79.6	29.75	0
23/12/2019 02:00	13.3	0	4.5	4.6	1.833	13.2	3.421	0	20.2	78.9	29.74	0
23/12/2019 03:00	11.2	0	4.7	4.8	1.964	13.2	3.31	0	20.1	79.7	29.72	0
23/12/2019 04:00	14.2	0	3.4	3.4	1.364	13.2	3.316	0	20	82.8	29.71	0
23/12/2019 05:00	16.5	0	3.3	3.3	1.046	13.2	3.308	0	20	83.2	29.7	0
23/12/2019 06:00	17.2	0	3.9	4	1.5	13.2	3.482	0	20	80.5	29.7	0
23/12/2019 07:00	17.8	0	4.3	4.4	1.626	13.2	3.437	0	20.1	80.9	29.7	0
23/12/2019 08:00	17.5	0.2	.4.3	4.7	1.562	13.2	4.086	0	19.9	77.7	29.69	0
23/12/2019 09:00	19.2	0.8	4.7	5.7	1.53	13.2	4.303	0	19.5	78.9	29.69	0
23/12/2019 10:00	18	1.2	4	5.4	1.495	13.2	4.52	0	21.3	80.2	29.68	0
23/12/2019 11:00	15.1	0.7	3.1	4	1.142	13.2	5.006	0	19.9	79.6	29.66	0
23/12/2019 12:00	15.1	0.8	3.1	4.1	1.004	13.2	5.287	0	19.9	78.8	29.64	0
23/12/2019 13:00	15.7	0.8	3.5	4.6	0.957	13.2	5.296	0	19.9	79.2	29.62	0
23/12/2019 14:00	15.3	1	4.2	5.5	1.079	13.2	5.702	0	20.4	77.2	29.61	0
23/12/2019 15:00	14.3	0.7	6	6.9	0.924	13.2	5.321	0	20.5	76.6	29.64	0
23/12/2019 16:00	11.3	0.7	8.1	9.1	0.918	13.2	7.28	0	20.4	58.4	29.65	0
23/12/2019 17:00	13.1	1	7.1	8.3	0.542	13.2	5.425	0	20.4	66.2	29.68	0
23/12/2019 18:00	15.1	0.5	6.3	7	0.357	13.2	4.704	0	20.4	70.2	29.73	0
23/12/2019 19:00	12.6	0.3	4.9	5.4	0.312	13.2	5.12	0	20.5	67.9	29.76	0
23/12/2019 20:00	9.3	0.4	4.3	4.9	0.296	13.2	4.397	0	20.6	66.1	29.78	0
23/12/2019 21:00	8.6	2	13.4	15.7	0.287	13.2	3.311	0	20.6	69	29.81	0
23/12/2019 22:00	8.4	2.6	17.5	20.4	0.275	13.2	2.408	0	20.5	72.2	29.82	0
23/12/2019 23:00	5.9	2.3	17.1	19.7	0.204	13.2	1.323	0	20.5	73.7	29.84	0
Minimum	5.9	0	3.1	3.3	0.204	13.2	1.323	0	19.5	58.4	29.61	0
MinDate	23:00	01:00	11:00	05:00	23:00	00:00	23:00	00:00	09:00	16:00	14:00	00:00
Maximum	.24.7	2.6	17.5	20.4	1.964	13.2	7.28	0	21.3	83.2	29.84	0
MaxDate	00:00	22:00	22:00	22:00	03:00	00:00	16:00	00:00	10:00	05:00	23:00	00:00
Avg	14.5	0.7	6.3	7.1	0.996	13.2	4.156	0	20.2	75.7	29.71	0
Num	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
STD	4.1	0.7	4	4.6	0.5	No Data	1.3	0	0.4	6.2	0.1	0

## Station: RofD Rundle Daily: 23/12/2019 Type: AVG 1 Hr. [5 Mins.]

Date & Time	PM 2.5	NO	NO2	NOX	SO2	Batt Min	emperature - Ambie	Rain	Tr_Temp	RH AV G	Rain total	WS km/hr	WD
	ug/m3	ppb	ppb	ppb	ppb	Volts	C°	mm	C°	%	mm	km/hr	Deg
23/12/2019 00:00	24.89	0.4	14.6	15	0.655	13.2	2.2	0	20.8	84.1	0	9.9	267.76
23/12/2019 01:00	19.04	0.8	10.3	11.1	0.932	13.2	3.1	0	20.7	79.1	0	16.28	260.57
23/12/2019 02:00	13.13	0.5	6.9	7.4	1.677	13.2	3.3	0	20.4	79.3	0	17.83	262.73
23/12/2019 03:00	11.2	0.3	6.4	6.7	1.894	13.2	3.3	0	20.6	79.1	0	18.23	260.68
23/12/2019 04:00	14.47	0.3	6.2	6.5	1.449	13.2	3.4	0	20.5	82.2	0	16.03	263.93
23/12/2019 05:00	16.98	0.5	7	7.5	1.176	13.2	3.2	0	20.5	84.1	0	16.9	260.69
23/12/2019 06:00	17.5	1.5	8.3	9.9	1.526	13.2	3.4	0	21.6	81.9	0	19.62	260.25
23/12/2019 07:00	17.39	3.4	11.1	14.4	1.657	13.2	3.3	0	21.9	82.2	0	20.77	260.49
23/12/2019 08:00	16.65	2.4	8	10.4	1.483	13.2	3.9	0	21.8	79.4	0	24.1	255.71
23/12/2019 09:00	17.86	3.5	8.5	12.1	1.558	13.2	4.3	0	21.9	79.2	0	24.68	256.16
23/12/2019 10:00	17.92	3.6	7.2	10.8	1.578	13.2	4.7	0	21.8	79.9	0	26.55	256.96
23/12/2019 11:00	16.22	2.4	5.5	7.9	1.244	13.2	5.3	0	21.6	79.1	0	28.46	258.36
23/12/2019 12:00	16.41	2.4	5.6	8	1.054	13.2	5.5	0	21.8	78.9	0	23.71	259.94
23/12/2019 13:00	16.82	2.8	7.5	10.3	1.043	13.2	5.7	0	21.4	78.2	0	20.12	263.06
23/12/2019 14:00	15.91	4.1	9.5	13.5	1.206	13.2	6.3	0	22	75	0	17.62	262.66
23/12/2019 15:00	14.48	2.8	13.1	15.9	1.026	13.2	6.3	0	22.6	72.8	0	10.98	256.16
23/12/2019 16:00	11.42	0.9	6.3	7.2	0.706	13.2	7.2	0	22.3	59.6	0	6.94	329.89
23/12/2019 17:00	14.17	0.1	2.8	2.9	0.464	13.2	5.1	0	21.8	69.5	0	7.07	332.66
23/12/2019 18:00	15.89	0.1	2.7	2.8	0.392	13.2	4.4	0	21.9	73.9	0	7.79	314.47
23/12/2019 19:00	12.19	0.2	2.1	2.2	0.382	13.2	4.8	0	21.8	71	0	8.76	333.51
23/12/2019 20:00	9.06	0.1	1.7	1.8	0.321	13.2	4	0	21.9	69.8	0	4.63	329
23/12/2019 21:00	7.06	0.1	1.4	1.4	0.356	13.2	3.1	0	21.8	70.6	0	4.43	329.4
23/12/2019 22:00	6.07	0.1	1.2	1.4	0.281	13.2	2.5	0	22	72.3	0	4.93	333.89
23/12/2019 23:00	4.89	0.1	1	1.1	0.242	13.2	0.4	0	22.1	78.4	0	3.63	312.67
Minimum	4.89	0.1	1	1,1	0.242	13.2	0.4	0	20.4	59.6	. 0	3.63	255.71
MinDate	23:00	17:00	23:00	23:00	23:00	00:00	23:00	00:00	02:00	16:00	00:00	23:00	08:00
Maximum	24.89	4.1	14.6	15.9	1.894	13.2	7.2	0	22.6	84.1	0	28.46	333.89
MaxDate	00:00	14:00	00:00	15:00	03:00	00:00	16:00	00:00	15:00	00:00	00:00	11:00	22:00
Avg	14.48	1.4	6.5	7.8	1.013	13.2	4.1	0	21.6	76.7	0	15	282.57
Num	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
STD	4.4	1.4	3.7	4.5	0.5	No Data	1.5	0	0.6	5.6	0	7.6	31.8

	РАН							
	Courtice	Rundle						
Sample Date	23-Dec-19	23-Dec-19						
Sample ID	L2394633-2	L2394633-3						
Delta P ("H20) On:	45.0	52.0						
Delta P ("H20) Off:	46.0	54.0						
Pbar On ("Hg):	30.0	30.0						
Pbar On (kPa):	101.7	101.7						
Pbar Off ("Hg):	29.6	29.6						
Pbar Off (kPa):	100.3	100.3						
Temp. On (°C):	-5.7	-5.7						
Temp. On (K):	267.5	267.5						
Temp. Off (°C):	0.4	0.4						
Temp. Off (K):	273.6	273.6						
Flow On (cfm):	8.19	8.12						
Flow Off (cfm):	8.14	8.12						
Average Flow (cfm):	8.17	8.12						
Time On:	3981.4	3763.5						
Time Off:	4005.4	3787.6						
Duration (min):	1440	1441						
Sample Volume (ft3):	11758	11694						
Sample Volume (m3):	): 333 331							

December 23 Volume Calculations for Courtice and Rundle

Inputted values

## December 23 Courtice and Rundle Station Monitoring Results for PAHs

				Courtice	Rundle
Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	23-Dec-19	23-Dec-19
1-Methylnaphthalene	ng/m <sup>3</sup>	12000	-	2.65E+00	2.69E+00
2-Methylnaphthalene	ng/m <sup>3</sup>	10000	-	3.66E+00	3.90E+00
10/12/2019	ng/m <sup>3</sup>	-	-	3.84E-01	7.34E-01
Acenaphthylene	ng/m <sup>3</sup>	3500	-	1.66E-01	1.11E-01
Anthracene	ng/m <sup>3</sup>	200	-	4.14E-02	6.01E-02
Benzo(a)Anthracene	ng/m <sup>3</sup>	-	-	8.71E-02	9.31E-02
Benzo(a)fluorene	ng/m <sup>3</sup>	-	-	7.84E-02	8.28E-02
Benzo(a)Pyrene (Historically High)	ng/m <sup>3</sup>	0.05 <sup>[1]</sup> 5 <sup>[2]</sup> 1.1 <sup>[3]</sup>	1	9.85E-02	1.11E-01
Benzo(b)Fluoranthene	ng/m <sup>3</sup>		e	1.32E-01	1.55E-01
Benzo(b)fluorene	ng/m <sup>3</sup>	8 <b>.</b>	-	6.28E-02	6.56E-02
Benzo(e)Pyrene	ng/m <sup>3</sup>	0 <b>.</b>	-	1.07E-01	1.16E-01
Benzo(g,h,i)Perylene	ng/m <sup>3</sup>	8	ŀ	1.22E-01	1.32E-01
Benzo(k)Fluoranthene	ng/m <sup>3</sup>		ŀ	1.34E-01	1.47E-01
Biphenyl	ng/m <sup>3</sup>		ŀ	1.82E+00	1.80E+00
Chrysene	ng/m <sup>3</sup>	-	-	2.17E-01	2.23E-01
Dibenzo(a,h)Anthracene	ng/m <sup>3</sup>		-	1.62E-02	1.64E-02
Fluoranthene	ng/m <sup>3</sup>		-	6.46E-01	7.34E-01
Indeno(1,2,3-cd)Pyrene	ng/m <sup>3</sup>		-	1.21E-01	1.35E-01
Naphthalene	ng/m <sup>3</sup>	22500	22500	4.47E+01	4.14E+01
o-Terphenyl	ng/m <sup>3</sup>	-	-	1.66E-02	1.57E-02
Perylene	ng/m <sup>3</sup>	-	-	2.30E-02	2.39E-02
Phenanthrene	ng/m <sup>3</sup>	-	-	1.53E+00	2.02E+00
Pyrene	ng/m <sup>3</sup>	1-	-	3.30E-01	3.81E-01
Tetralin	ng/m <sup>3</sup>	8-	-	1.69E+00	2.21E+00
Fluorene	ng/m <sup>3</sup>	00	-	N/A	N/A
Total PAH <sup>[4]</sup>	ng/m <sup>3</sup>	-		5.89E+01	5.73E+01

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

Indicates an exceedance

[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