

**Quarterly Ambient Air Quality
Monitoring Report for the Durham
York Energy Centre (Crago Road
Station) – October to December
2016**

Durham York Energy Centre



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Sign-off Sheet

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QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE (CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016

Executive Summary

The Regional Municipalities of Durham and York operate the Durham York Energy Centre (DYEC) which is an Energy from Waste (EFW) facility intended to provide a long-term, sustainable solution to manage municipal solid waste remaining after diversion from the Regions. The facility commenced commercial operation on February 1, 2016.

An Ambient Air Quality Monitoring Plan – Durham York Residual Waste Study (Ambient Monitoring Plan) was developed and included two monitoring stations referred to as the Courtice Water Pollution Control Plant (WPCP) Station and the Rundle Road Station (as well as a temporary Fence Line Station). The plan developed for these stations was based on the Regional Council's mandate to provide ambient air quality monitoring in the area of the DYEC for a three-year period.

Subsequently, the Region decided to add a third ambient air monitoring station located near the corner of Crago and Osborne Roads (referred to as the Crago Road Station), which was installed in October/November 2014. The Crago Road Station is not part of the Ambient Monitoring Plan; however, it is operated following the same protocols as the other two stations. Results from the Crago Road Station are reported separately from the Courtice WPCP and Rundle Road Stations.

The Crago Road Station is equipped to measure concentrations of several air contaminants either continuously or at scheduled intervals (non-continuously) as outlined below:

- Contaminants monitored continuously:
 - Sulphur Dioxide (SO₂)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns (PM_{2.5}).
- Contaminants monitored non-continuously:
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

Meteorological data is also measured at the station. The predominantly downwind Crago Road Station measures horizontal wind speed, wind direction, atmospheric temperature, relative humidity, and rainfall.

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The Regional Municipality of Durham requested that the dioxin/ furan sampling frequency at the Crago Road Station (as well as the Courtice WPCP and Rundle Road monitoring stations) be increased from once every 24 days to once every 12 days for a 3-month period starting on September 9, 2016 and ending on November 20, 2016. The additional sampling followed the same methodologies and protocols specified in the Ambient Monitoring Plan (Stantec, 2012) for the existing monitoring program. The results of this additional sampling have been included in this report.

Site personnel noted ongoing Highway 418 construction on the north and south sides of Highway 401 between Courtice and Crago Roads causing significant dust suspension from haul trucks, bulldozers, graders, and excavators. These construction activities may have contributed to elevated PM_{2.5} measurements during this quarter.

This quarterly report provides a summary of the ambient air quality data collected at the Crago Road Station for the period October to December 2016 (Calendar Quarter 4). All measured air quality parameters had acceptable data recovery rates during this quarter. Instrumentation recovery rates are presented in Section 3.2 of this report.

The following observations and conclusions were made from a review of the measured ambient air quality monitoring data:

1. Measured levels of NO₂, SO₂ and PM_{2.5} were below the applicable O. Reg. 419/05 Standards or human health risk assessment (HHRA) health-based criteria presented in **Table 2-1** of this report.
2. Since the Canadian Ambient Air Quality Standard (CAAQS) for PM_{2.5} is based on a 98th percentile level over three years, whereas the PM_{2.5} measurement period at the Crago Road Station for this quarterly report was three months, there was insufficient data collected to determine with any certainty if exceedances of the CAAQS would occur. Therefore, no comparison of the measured PM_{2.5} data during this quarter to the CAAQS was conducted for this report, as it would not be scientifically accurate or representative.
3. The maximum measured concentrations of TSP and all metals with Ministry of Environment and Climate Change (MOECC) air quality Standards were well below their applicable Standards (as presented in **Table 2-2** in this report).
4. The maximum measured concentrations of all PAHs with MOECC air quality Standards were well below their applicable criteria shown in **Table 2-3**, with the exception of the 24-hour benzo(a)pyrene concentration for one sample, which exceeded the applicable Ontario Ambient Air Quality Criteria (AAQC) by 38%. The measurement was however, well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based standard. The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario.

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5. The maximum measured toxic equivalent dioxin and furan concentration was below the applicable Standard presented in **Table 2-3**.

In summary, the measured concentrations of the air contaminants monitored were below their applicable MOECC Standards during the monitoring period between October and December 2016, with the exception of one (1) benzo(a)pyrene sample. All measured levels of the monitored contaminants were below their applicable HHRA health-based criteria.

QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE (CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016

Abbreviations

AAQC	Ambient Air Quality Criteria
CAAQS	Canadian Ambient Air Quality Standard
CAC	Criteria Air Contaminants
CDD	Chlorinated Dibenzo-p-dioxins
CDF	Chlorinated Dibenzo-p-furans
D/Fs	Dioxins and Furans
DYEC	Durham York Energy Centre
EFW	Energy from Waste
HHRA	Human Health Risk Assessment
MOECC	Ontario Ministry of the Environment and Climate Change
SO ₂	Sulphur Dioxide
NO _x	Nitrogen Oxides
O ₃	Ozone
PAH	Polycyclic Aromatic Hydrocarbons
Particulate	A particle of a solid or liquid that is suspended in air.
PCB	Polychlorinated Biphenyl
PCDD/PCDF	Polychlorinated Dibenzo-p-dioxins and Dibenzofurans
PM	Particulate Matter
PM _{2.5}	Particulate Matter smaller than 2.5 microns
Q1, Q2, Q3, Q4	Quarter 1 (January, February, and March); Quarter 2 (April, May, and June); Quarter 3 (July, August, and September); and Quarter 4 (October, November, and December)
TEQ	Toxic Equivalent Quotient
TEQs	Toxic Equivalents
TSP	Total Suspended Particulate
WPCP	Water Pollution Control Plant

Elements

Cd	Cadmium
Hg	Mercury
Pb	Lead
Al	Aluminum
As	Arsenic
Be	Beryllium
Cr	Chromium
Cu	Copper
Mn	Manganese

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Ni	Nickel
Ag	Silver
Tl	Thallium
Sn	Tin
V	Vanadium
Zn	Zinc

Miscellaneous

°C	Temperature in degrees Celsius
N/A	Not Available
%	Percent
ppm	Parts per million
ppb	Parts per billion
ppbv	Parts per billion by volume
ppt	Parts per trillion
min	Minimum
max	Maximum
mm	Millimetre
m	Metre
km/hr	Kilometre per hour
mg/m ³	Milligrams per cubic metre
µg/m ³	Micrograms per cubic metre
ng/m ³	Nanograms per cubic metre
pg/m ³	Picograms per cubic metre
pg TEQ/m ³	Picograms toxic exposure equivalents per cubic metre

QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE (CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016

Introduction
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1.0 INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

The Regional Municipalities of Durham and York operate the Durham York Energy Centre (DYEC) which is an Energy from Waste (EFW) facility intended to provide a long-term, sustainable solution to manage municipal solid waste remaining after diversion from the Regions. The location of the DYEC is shown in **Figure 1-1**. The facility commenced commercial operation on February 1, 2016.

An Ambient Air Quality Monitoring Plan – Durham York Residual Waste Study (Ambient Monitoring Plan) was developed and included two monitoring stations referred to as the Courtice Water Pollution Control Plant (WPCP) Station and the Rundle Road Station (as well as a temporary Fence Line Station). The plan developed for these stations was based on the Regional Council's mandate to provide ambient air quality monitoring in the area of the DYEC for a three-year period.

The purposes of the ambient air quality monitoring program are to:

1. Quantify any measureable 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 (Jacques Whitford, 2009);
2. Monitor concentration levels of EFW-related air contaminants in nearby residential areas; and,
3. Quantify background ambient levels of air contaminants in the area.

At the request of the Regional Municipality of Durham (the Region), a third ambient air monitoring station located near the corner of Crago and Osborne Roads was installed. This station, which is not part of the Ambient Monitoring Plan, is operated following the same protocols as the other two stations (Courtice WPCP and Rundle Road Stations) already in operation.

The Crago Road Station is equipped to measure concentrations of several air contaminants either continuously or at scheduled intervals (non-continuously) as outlined below:

- Contaminants monitored continuously:
 - Sulphur Dioxide (SO₂)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns (PM_{2.5}).

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- Contaminants monitored non-continuously:
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

At the request of the Regional Municipality of Durham, the dioxin/ furan sampling frequency at the Crago Road Station (as well as the Courtice WPCP and Rundle Road monitoring stations) was increased to once every 12 days from once every 24 days between September 9 and November 20, 2016. The additional sampling followed the same methodologies and protocols specified in the Ambient Monitoring Plan (Stantec, 2012) for the existing monitoring program. The results of this additional sampling have been included in this report.

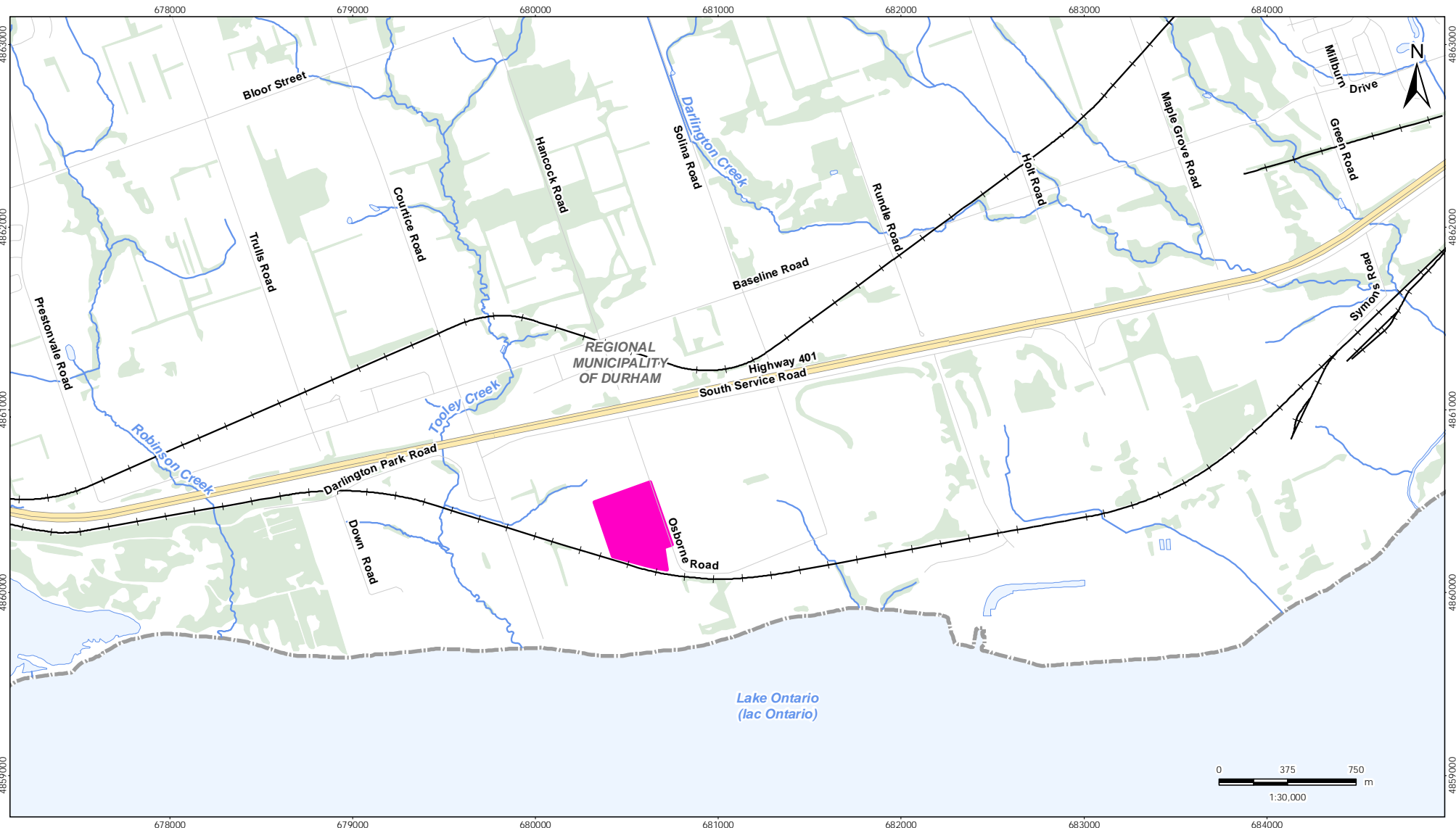
This quarterly report provides a summary of the ambient air quality data collected at this station for the period October to December 2016 (Q4).

1.2 LOCATION OF AMBIENT AIR QUALITY MONITORING STATION

The selection of the site for the monitoring station was accomplished in consultation with Regional Municipality of Durham representatives, with consideration of the location of the existing monitoring stations and general MOECC siting criteria. The final location of the monitoring station was influenced by the availability of electrical power, accessibility of each location, and security.

The Crago Road Station is sited east of the DYEC near the Darlington Hydro Upper and Lower Soccer Fields on the east side of Crago Road, north of Osborne Road. Its location is shown in **Figure 1-2** and **Figure 1-3**. The monitoring station measures all the air contaminants listed in Section 1.1 and meteorological data.

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Revised: 2013-10-28 By: searies



October 2013
160950528



- Legend
- Durham York Energy Centre Site
 - Railway
 - Road
 - Highway
 - Watercourse
 - Waterbody
 - Wooded Area

- Notes
- Coordinate System: NAD 1983 UTM Zone 17N
 - Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

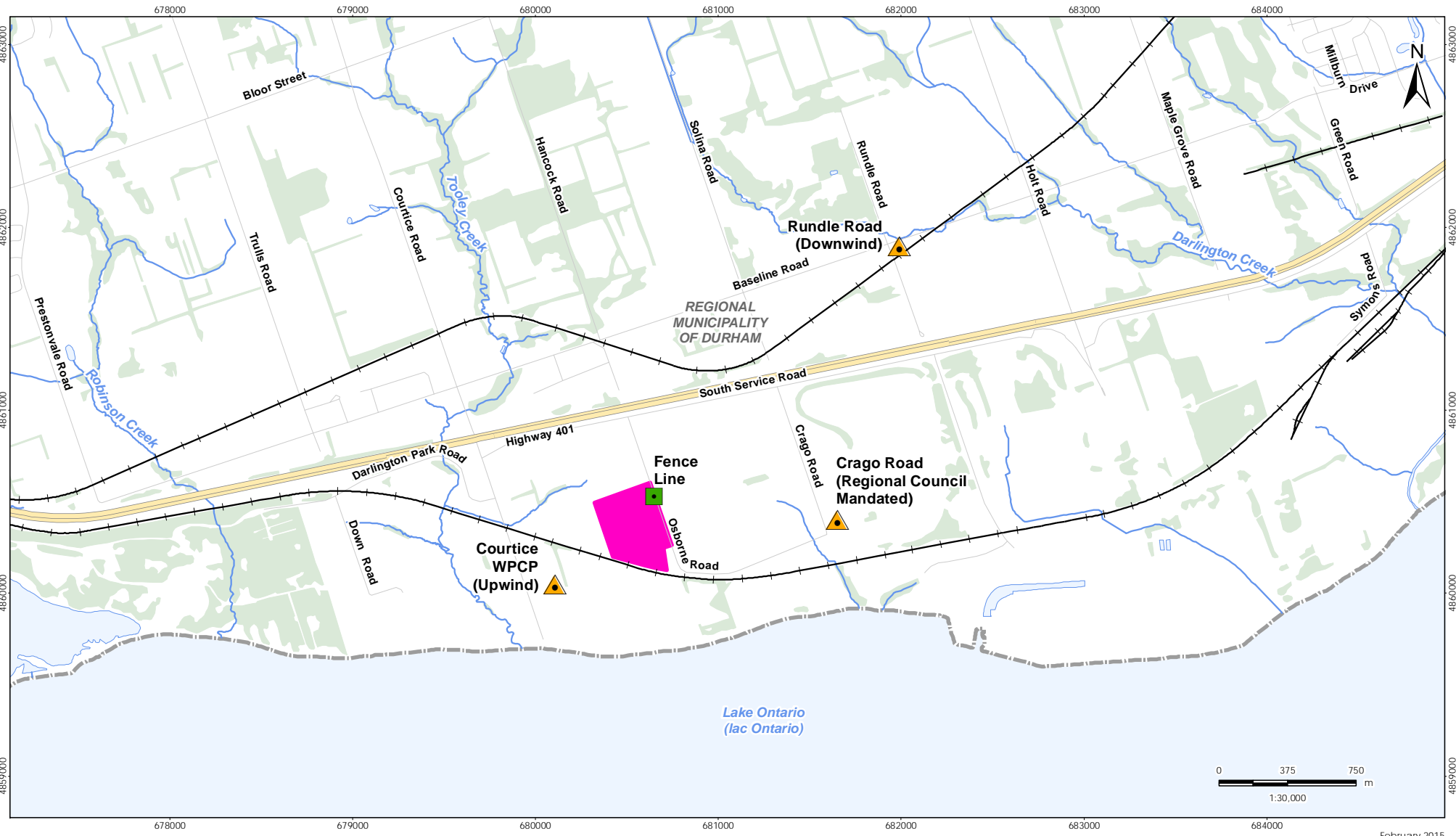


Client/Project
The Region of Durham
Durham York Energy Centre

Figure No.
1-1

Title
Site Location Plan

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Revised: 2015-02-27 By: searles



Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

- Legend
- Station Location
 - Fence Line Station Location (Monitoring to begin after DYEC commissioning period)
 - Durham York Energy Centre Site
 - Railway
 - Road
 - Highway
 - Watercourse
 - Waterbody
 - Wooded Area

Client/Project

The Region of Durham
Durham York Energy Centre

Figure No.

1-2

Title

Locations of Ambient
Monitoring Stations

February 2015
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Figure 1-3 View of Crago Road Ambient Air Quality Monitoring Station



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Key Components Assessed
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2.0 KEY COMPONENTS ASSESSED

2.1 METEOROLOGY

The following meteorological parameters are measured at the Crago Road monitoring station:

- Wind Speed and direction at a height of 10 m
- Ambient temperature at a height of 2 m
- Relative humidity, and
- Rainfall.

2.2 AIR QUALITY CONTAMINANTS OF CONCERN

The ambient air quality monitoring program for the Crago Road Station includes the following contaminants specified in the Ambient Monitoring Plan (Stantec, 2012):

- Continuously monitored criteria air contaminants (CACs)
 - Sulphur Dioxide (SO₂)
 - Nitrogen Oxides (NO_x), and
 - Particulate Matter smaller than 2.5 microns (PM_{2.5}).
- Non-continuously monitored
 - Metals in Total Suspended Particulate (TSP) matter
 - Polycyclic Aromatic Hydrocarbons (PAHs), and
 - Dioxins and Furans.

The following are lists of the specific metals, PAHs, and dioxins and furans being measured. Rationales for the choice of contaminants being monitored are provided in the Ambient Monitoring Plan (Stantec, 2012).

Metals:

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

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Polycyclic Aromatic Hydrocarbons:

- | | | |
|-----------------------|--------------------------|--------------------------|
| • 1-Methylnaphthalene | • Benzo(b)fluoranthene | • Indeno(1,2,3-cd)pyrene |
| • 2-Methylnaphthalene | • Benzo(e)pyrene | • Naphthalene |
| • Acenaphthene | • Benzo(g,h,i)perylene | • Perylene |
| • Acenaphthylene | • Benzo(k)fluoranthene | • Phenanthrene |
| • Anthracene | • Biphenol | • Pyrene |
| • Benzo(a)anthracene | • Chrysene | • Tetralin |
| • Benzo(a)fluorene | • Dibenzo(a,h)anthracene | • o-Terphenyl |
| • Benzo(a)pyrene | • Dibenzo(a,c)anthracene | • Total PAHs |
| • Benzo(b)fluorene | • Fluoranthene | |

Dioxins and Furans:

- | | | |
|---------------------------|---------------------------|-----------------------------------|
| • 2,3,7,8-Tetra CDD | • Total Hepta CDD | • Octa CDF |
| • 1,2,3,7,8-Penta CDD | • 2,3,7,8-Tetra CDF | • Total Tetra CDF |
| • 1,2,3,4,7,8-Hexa CDD | • 1,2,3,7,8-Penta CDF | • Total Penta CDF |
| • 1,2,3,6,7,8-Hexa CDD | • 2,3,4,7,8-Penta CDF | • Total Hexa CDF |
| • 1,2,3,7,8,9-Hexa CDD | • 1,2,3,4,7,8-Hexa CDF | • Total Hepta CDF |
| • 1,2,3,4,6,7,8-Hepta CDD | • 1,2,3,6,7,8-Hexa CDF | • Total toxic equivalency (I-TEQ) |
| • Octa CDD | • 2,3,4,6,7,8-Hexa CDF | |
| • Total Tetra CDD | • 1,2,3,7,8,9-Hexa CDF | |
| • Total Penta CDD | • 1,2,3,4,6,7,8-Hepta CDF | |
| • Total Hexa CDD | • 1,2,3,4,7,8,9-Hepta CDF | |

2.3 AIR QUALITY CRITERIA

Two sets of criteria were used for comparison to the air quality data as specified in the Ambient Monitoring Plan (Stantec, 2012). The first set of criteria was the Standards reported in O. Reg. 419/05 (Schedules 3 and 6). These are compliance based Standards used throughout the province of Ontario. However, not all chemicals have O. Reg. 419/05 Standards, or in some instances updated health-based criteria were used in the human health risk assessment (HHRA) conducted in support of the Environmental Assessment (July 31, 2009) - December 10, 2009). These health-based values, which were reported in Table 7-2 (Summary of Inhalation TRVs and Inhalation Benchmarks Selected for CACs) and Table 7-3 (Inhalation TRVs and Inhalation Benchmarks for Selected COPCs) of the HHRA (Stantec, 2009) were used as the second set of criteria.

The previously applicable 24-hour average Canada-Wide Standard (CWS) for PM_{2.5} of 30 µg/m³ (98th percentile averaged over 3 consecutive years), has been superseded by a new Canadian Ambient Air Quality Standard (CAAQS) of 28 µg/m³ (98th percentile averaged over three consecutive years) and an annual objective of 10 µg/m³ as noted in **Table 2-1**. The proposed CAAQS 24-hour objective for 2020 is 27 µg/m³.

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Summaries of the relevant air quality criteria for the contaminants monitored in Q4 2016 are presented in **Table 2-1** to **Table 2-3**.

Table 2-1 Summary of Air Quality Criteria for CACs

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria		
		1-Hour (µg/m³)	24-Hour (µg/m³)	Other time Period (µg/m³)	1-Hour (µg/m³)	24-Hour (µg/m³)	Annual (µg/m³)
Sulphur dioxide	7446095	690	275	-	690	275	29
Nitrogen oxides ^A	10102-44-0	400	200	-	400	200	60
Contaminant	CAS	Canadian Ambient Air Quality Standards (CAAQS)			HHRA Health-Based Criteria		
		1-Hour (µg/m³)	24-Hour (µg/m³)	Other time Period (µg/m³)	1-Hour (µg/m³)	24-Hour (µg/m³)	Other time Period (µg/m³)
PM _{2.5}	N/A	-	28 ^B	10 ^C	-	30 ^D	-

Notes:

- The Schedule 3 Standards for NO_x are based on health effects of NO₂, as NO₂ has adverse health effects at much lower concentrations than NO. Therefore, the standard was compared to NO₂ in this report. However, as per the current April 2012 version of O. Reg. 419/05 Summary of Standards and Guidelines, the standard was also compared to the monitored NO_x.
- Canadian Ambient Air Quality Standards (CAAQS) for Respirable Particulate Matter and Ozone, effective by 2015 (CCME, 2012). The Respirable Particulate Matter Objective is referenced to the 98th percentile daily average concentration averaged over 3 consecutive years.
- Annual Canadian Ambient Air Quality Standard for Respirable Particulate Matter, effective by 2015. The Respirable Particulate Matter Objective is referenced to the 3-year average of the annual average concentrations.
- HHRA Health-Based criterion for PM_{2.5} was selected referencing CCME (2006).

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Table 2-2 Summary of Air Quality Criteria for Metals

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria		
		1-Hour (µg/m³)	24-Hour (µg/m³)	Other time Period (µg/m³)	1-Hour (µg/m³)	24-Hour (µg/m³)	Annual (µg/m³)
Total Particulate	NA	-	120	-	-	120	60
Aluminum	7429-90-5	-	4.8	-	-	-	-
Antimony	7440-36-0	-	25	-	5	25	0.2
Arsenic	7440-38-2	-	0.3	-	0.2	0.3	0.015 ^A 0.0043 ^B
Barium	7440-39-3	-	10	-	5	10	1
Beryllium	7440-41-7	-	0.01	-	0.02	0.01	0.007 ^A 0.0024 ^B
Bismuth	7440-69-9	-					
Boron	7440-42-8	-	120	-	50	-	5
Cadmium	7440-43-9	-	0.025	0.005; annual	0.1	0.025	0.005 ^A 0.0098 ^B
Chromium (Total)	7440-47-3	-	0.5	-	1	-	60
Cobalt	7440-48-4	-	0.1	-	0.2	0.1	0.1
Copper	8440-50-8	-	50	-	-	-	-
Iron	15438-31-0	-	4	-	-	-	-
Lead	7439-92-1	-	0.5	0.2; 30-day	1.5	0.5	0.5
Magnesium	7439-95-4	-					
Manganese	7439-96-5	-	0.4	-	-	-	-
Mercury	7439-97-6	-	2	-	0.6	2	0.3
Molybdenum	7439-87-7	-	120	-	-	-	-
Nickel	7440-02-0	-	0.2	0.04; annual	6	-	0.05
Phosphorus	7723-14-0	-	-	-	-	-	6.4 x 10 ⁷
Selenium	7782-49-2	-	10	-	2	10	0.2
Silver	7440-22-4	-	1	-	0.1	1	0.01
Strontium	7440-24-6	-	120	-	-	-	-
Thallium	7440-28-0	-	-	-	1	-	0.1
Tin	7440-31-5	-	10	-	20	10	2
Titanium	7440-32-6	-	120	-	-	-	-
Vanadium	7440-62-2	-	2	-	0.5	1	1

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Table 2-2 Summary of Air Quality Criteria for Metals

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria		
		1-Hour (µg/m³)	24-Hour (µg/m³)	Other time Period (µg/m³)	1-Hour (µg/m³)	24-Hour (µg/m³)	Annual (µg/m³)
Uranium	7440-61-1	-	1.5	0.03; annual	-	-	-
Zinc	7440-66-6	-	120	-	50		5
Zirconium	7440-67-7	-	20	-	-	-	-

Notes:

A. Annual Average

B. Carcinogenic Annual Average

Table 2-3 Summary of Air Quality Criteria for PAHs and D/Fs

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria			
		1-Hour (ng/m³)	24-Hour (ng/m³)	Other time Period (ng/m³)	1-Hour (ng/m³)	24-Hour (ng/m³)	Annual (ng/m³)	Toxic Equivalency Factor Annual ^{A, F} (ng/m³) ⁻¹
1-Methylnaphthalene	90-12-0	-	12,000	-	-	-	3,000	-
2-Methylnaphthalene	91-57-6	-	10,000	-	-	-	3,000	-
Acenaphthene	83-32-9	-	-	-	1,000	-	-	1
Acenaphthylene	208-96-8	-	3,500	-	1,000	-	-	10
Anthracene	120-12-7	-	200	-	500	-	50	-
Benzo(a)anthracene	56-55-3	-	-	-	500	-	-	100
Benzo(b)fluoranthene	205-99-2	-	-	-	500	-	-	100
Benzo(k)fluoranthene	207 -08-9	-	-	-	500	-	-	100
Benzo(a)fluorene	238-84-6	-	-	-	500	-	50	-
Benzo(b)fluorene	243-17-4	-	-	-	500	-	50	-
Benzo (g,h,i) perylene	191-24-2	-	-	-	500	-	-	100
Benzo(a)pyrene	50-32-8	-	0.05 ^B 5 ^C 1.1 ^D	0.01; annual	-	1	87 ^A	-
Benzo(e)pyrene	192-97-2	-	-	-	500	-	-	10
Biphenyl	92-52-4	-	-	-	-	-	224,000	-
Chrysene	218-01-9	-						-

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Table 2-3 Summary of Air Quality Criteria for PAHs and D/Fs

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards			HHRA Health-Based Criteria			
		1-Hour (ng/m ³)	24-Hour (ng/m ³)	Other time Period (ng/m ³)	1-Hour (ng/m ³)	24-Hour (ng/m ³)	Annual (ng/m ³)	Toxic Equivalency Factor Annual ^{A, F} (ng/m ³) ⁻¹
Dibenzo(a,c)anthracene	215-58-7	-	-	-	-	-	-	100
Dibenzo(a,h)anthracene	53-70-3	-	-	-	500	-	-	1,000
Fluoranthene	206-44-0	-	-	-	500	-	-	1
Indeno(1,2,3-cd)pyrene	193-39-5	-	-	-	500	-	-	100
Naphthalene	91-20-3	-	22,500	-	-	22,500	3,000	-
o-Terphenyl	84-15-1	-	-	-	50,000	-	5,000	-
Perylene	198-55-0	-	-	-	500	-	-	1
Phenanthrene	85-01-8	-	-	-	500	-	-	1
Pyrene	129-00-0	-	-	-	500	-	-	1
Tetralin	119-64-2	-						-
Dioxins and Furans Total Toxic Equivalency ^E	NA	-	0.1 (pg TEQ/m ³) ^E 1 (pg TEQ/m ³) ^C	-	-	-	-	-

Notes:

- A. Carcinogenic Annual Average. Units in (ng/m³)⁻¹.
- B. Ontario Ambient Air Quality Criteria - The standard for benzo(a)pyrene (B(a)P) is for B(a)P as a surrogate for PAHs.
- C. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds.
- D. O. Reg. 419/05 24 Hour Guideline.
- E. Application of the air standard for dioxins, furans, and dioxin-like PCBs requires the calculation of the total toxicity equivalent (TEQ) concentration contributed by all dioxin-like compounds in the mixture. TEQ is calculated using the methodology as per the O. Reg. 419/05 Summary of Standards and Guidelines, and the corresponding WHO₂₀₀₅ toxic equivalency factors (TEFs).
- F. Toxic Equivalency Factors (TEFs) are shown as benzo(a)pyrene equivalents.

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3.0 INSTRUMENTATION SUMMARY AND FIELD CONDITIONS

3.1 INSTRUMENTATION

The measurement program at the monitoring site includes both continuous and non-continuous monitors to sample air contaminant concentrations.

Monitoring for respirable particulate matter (PM_{2.5}), nitrogen oxides (NO_x) and sulphur dioxide (SO₂) are conducted on a continuous basis. A summary of the continuous monitors and a brief description of their principle of operation are provided in **Table 3-1** below.

Table 3-1 Summary of Continuous Ambient Air Quality Monitors

Contaminant	Monitor	Principle of Operation	Range	Time Interval
PM _{2.5}	Thermo Sharp 5030 Synchronized Hybrid Ambient Real-time Particulate Monitor	Light Scattering Photometry / Beta Attenuation - Consists of a carbon14 source, detector, and light scattering Nephelometer in a rack-mountable enclosure. The Thermo Sharp utilizes a continuous (non-step wise) hybrid mass measurement and a combination of beta attenuation and light scattering technology. The unit's filter tape is automatically advanced based upon a user defined frequency or particulate loading.	0 - 10 mg/m ³	1 minute
NO, NO ₂ , NO _x	API Model 200E Chemiluminescence Analyzer	Chemiluminescence - Uses a chemiluminescence detection principle and microprocessor technology for ambient continuous emissions monitoring (CEM). Measurements are automatically compensated for temperature and pressure changes.	0 – 1000 ppb	1 second
SO ₂	Teledyne Monitor Labs Sulphur Dioxide Analyzer Model T100	Pulsed Florescence - SO ₂ levels are measured based on the principle that SO ₂ has a strong ultraviolet (UV) absorption at a wavelength between 200 and 240 nanometres (nm). The absorption of photons at these wavelengths results in the emission of fluorescence photons at a higher wavelength. The amount of fluorescence measured is directly proportional to the concentration of SO ₂ .	0 – 1000 ppb	1 second

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Two manually operated, hi-volume air samplers are installed at the Crago Road Station to collect metals in total suspended particulate (TSP), polycyclic aromatic hydrocarbons (PAHs), and dioxins and furans. The samples were submitted to Maxxam Analytics Inc., a Canadian Association for Laboratory Accreditation Inc. (CALA) / Standards Council of Canada (SCC) accredited laboratory, for analysis.

Table 3-2 Summary of Non-Continuous Ambient Air Quality Monitors

Contaminant	Sampler	Filter Media	Lab Analysis	Sampling Schedule
TSP and metals	Tisch Environmental TE-5170 mass-flow high volume sampler	Pre-weighed, conditioned Teflon coated glass fibre filters	Weighed for particulate loading and analysed using the Atomic Emission Spectroscopy / Inductively Coupled Plasma (AES/ICP) technique to determine metals content	24 hour sample taken every 6 days
PAHs	Tisch Environmental TE-1000 mass-flow high volume air sampler	Dual chambered sampling module with a Teflon-coated glass fibre filter and a Poly-Urethane Foam (PUF) cartridge	Gas Chromatography / Mass Spectrometry (GC/MS)	24 hour sample taken every 12 days
Dioxins and Furans				24 hour sample taken every 24 days. At the request of the Region this was increased to every 12 days from 9 September to 20 November 2016.

Horizontal wind speed, wind direction, atmospheric temperature, relative humidity, and rainfall are measured at the predominantly downwind Crago Road Station. The meteorological sensors at the Crago Road Station are mounted on an external 10 m aluminum tower and are logged using a digital data acquisition system (DAS). The meteorological equipment at the Crago Road Station is summarized in **Table 3-3**.

Table 3-3 Summary of Meteorological Equipment

Parameter	Equipment
Wind Speed/Wind Direction	Met One Instruments Inc. Model 034B
Temperature/Relative Humidity	Campbell Scientific Model HMP60
Rainfall	Texas Electronic TE525M

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A Campbell Scientific CRX1000 station data acquisition system is used to collect continuous instrument monitoring data and status codes from the ambient air quality monitors. Continuous station data is maintained in the data loggers, and data is viewed locally using a laptop and the relevant DAS software applications. Remote data transmission is accomplished by the periodic transmission of collected station air quality data via cellular phone.

3.2 INSTRUMENTATION ISSUES

A few instrumentation issues were encountered during this quarter including a station power outage and a data logger access failure requiring manufacturer repair. A summary of the operational issues for each measurement parameter during the monitoring period is presented in **Table 3-4**.

Table 3-4 Summary of Instrument Issues at the Crago Road Station

Parameter	Issues	Timeframe	Remedial Action
SO ₂	Power outage.	27-Nov-16 11:00 AM – 5:30 PM	Reviewed and invalidated 7 hours of data.
NO _x	Power outage.	27-Nov-16 11:00 AM – 5:30 PM	Reviewed and invalidated 7 hours of data.
PM _{2.5}	Power outage.	27-Nov-16 11:00 AM – 5:30 PM	Reviewed and invalidated 7 hours of data.
TSP/Metals Hi-Vol.	None	-	-
PAH/ D/F Hi-Vol	None	-	-
Other	Power outage. Unable to access data logger.	27-Nov-16 11:00 AM – 5:30 PM 15-Dec-16, 10:00 AM – 21-Dec-16, 2:00 PM	Reviewed and invalidated 7 hours of meteorological data. Data logger replaced with spare unit and sent to manufacturer for repair. Data in the logger memory could not be retrieved by the manufacturer. All continuous data during this timeframe were invalidated.

3.3 INSTRUMENTATION RECOVERY RATES

Data recovery rates for each monitor at the station during Q4 are presented in **Table 3-5**.

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Table 3-5 Summary of Data Recovery Rates for the Crago Road Station – October to December 2016

Parameter	Valid Measurement Hours	Data Recovery Rate (%)
SO ₂	2044 ^B	92.6% ^B
NO _x	2045	92.6% ^B
PM _{2.5}	2046	92.7% ^B
Temperature	2059	93.3% ^B
Rainfall	2059	93.3% ^B
Relative Humidity	2059	93.3% ^B
Wind Speed/Direction	2059	93.3% ^B
TSP/Metals	15 ^{A,C}	100%
PAHs	8 ^{A,C}	100%
Dioxins and Furans	6 ^{A,C}	100%

Notes:

- A. Number of filters/24-hour average samples.
- B. Includes instrumentation issues summarized in Table 3-4 and monthly calibrations.
- C. Includes additional dioxins and furans sampling requested by the Regional Municipality of Durham.

3.4 FIELD CONDITION OBSERVATIONS

During Q4 2016, activities in the vicinity of the Crago ambient air monitoring station were observed that had the potential to be affecting air quality levels. These observations were noted by Stantec and Valley Environmental Services personnel during field visits and by Regional Municipality of Durham personnel located at the DYEC.

Construction of Highway 418, which will connect with Highway 401 between Courtice Road and Crago Road was ongoing during this quarter. Highway 418 will provide a north-south link between Highway 401 and the Phase 2 expansion of Highway 407. The Highway 401/418 interchange will be located almost directly north of the DYEC. During October and November, the highway construction contractor worked in a large area immediately north of the DYEC between Energy Drive and Hwy 401 for the relocation/re-alignment of South Service Road. The new South Service Road will be located immediately south of the existing South Service Road and run between Courtice Road and Crago Road. A photograph of the South Service Road realignment is shown in **Figure 3-1**.

Other activities around the monitoring station that had the potential to affect local air quality included:

- Hydro crews working on the perimeter of the new South Service Road construction area in December 2016.
- A fire on the roof of the DYEC on December 11, 2016 lasting from approximately 10:00 – 12:00.

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Figure 3-1 **View of South Service Road Realignment Construction (Looking from the Existing South Service Road)**



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4.0 SUMMARY OF AMBIENT MEASUREMENTS

The following sections provide summaries of the validated data and the validation done on each parameter.

4.1 METEOROLOGICAL DATA

A summary of the maximum, minimum, arithmetic mean, and standard deviation of the hourly average meteorological parameters measured at the monitoring station for the October to December 2016 period are presented in **Table 4-1**.

Table 4-1 Summary of Hourly Meteorological Measurements – October to December 2016

Parameter		Crago Road Station (Predominately Downwind)	Units
Temperature	Maximum	20.8	°C
	Minimum	-13.1	°C
	Mean (October)	10.8	°C
	Mean (November)	5.4	°C
	Mean (December)	-0.5	°C
	Mean (Period)	5.7	°C
	Standard Deviation	6.6	°C
Rainfall	Maximum	4.5	mm
	Minimum	0.0	mm
	Mean (October)	0.05	mm
	Mean (November)	0.05	mm
	Mean (December)	0.08	mm
	Mean (Period)	0.06	mm
	Standard Deviation	0.32	mm
Relative Humidity	Maximum	97.7	%
	Minimum	36.7	%
	Mean (October)	76.0	%
	Mean (November)	78.2	%
	Mean (December)	74.2	%
	Mean (Period)	76.2	%
	Standard Deviation	13.3	%

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Table 4-1 Summary of Hourly Meteorological Measurements – October to December 2016

Parameter		Crago Road Station (Predominately Downwind)	Units
Wind Speed ^A	Maximum	41.6	km/hr
	Minimum	0.0	km/hr
	Mean (October)	11.3	km/hr
	Mean (November)	12.2	km/hr
	Mean (December)	16.5	km/hr
	Mean (Period)	13.1	km/hr
	Standard Deviation	7.5	km/hr

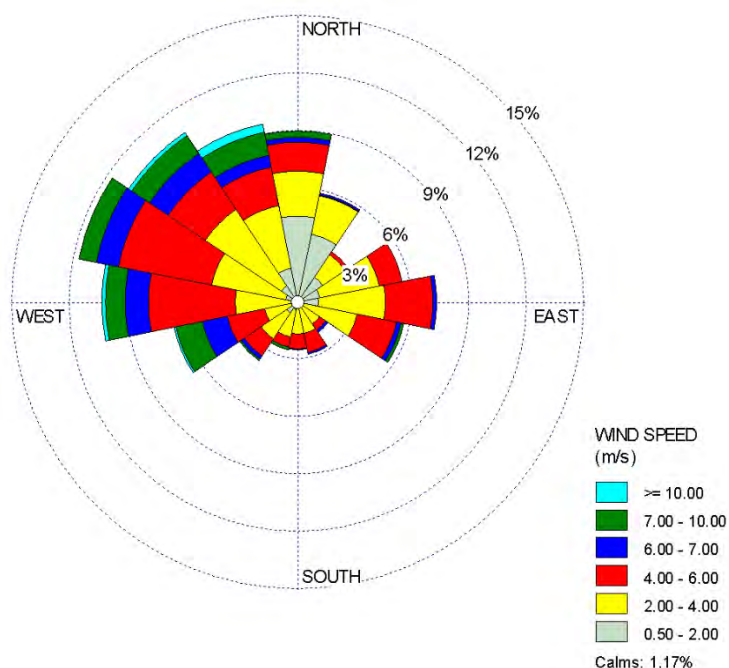
Note:

A. Wind speed is measured at 10 m.

A wind rose showing directionality and speed is presented in **Figure 4-1**. The length of the radial barbs gives the total percent frequency of winds from the indicated direction, while portions of the barbs of different widths indicate the frequency associated with each wind speed category.

Winds over the three-month period occurred predominantly from northwesterly directions. Wind contribution from the south was low. Higher wind speeds occurred from northwesterly directions.

Figure 4-1 Wind Rose for October to December 2016



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4.2 CAC AMBIENT AIR QUALITY MEASUREMENTS

A summary of the maximum, minimum, arithmetic mean, and standard deviation of the measured CAC pollutant concentrations are presented in **Table 4-2**. Also presented in this table are the number of exceedances (if any occurred) of the relevant O. Reg. 419/05 Schedule 3 Standards, Ontario Ambient Air Quality Criteria (AAQC) or health-based criteria for each contaminant. All monitored contaminants were below their applicable criteria during the period between October to December, 2016.

Nitric oxide (NO) has no regulatory criteria as discussed in Section 4.2.2 below. There are both hourly and daily AAQCs as well as O. Reg. 419/05 Schedule 3 Standards for NO_x which are based on health effects of NO₂. As specified in the MOECC's listing of AAQCs (MOECC, 2012a) the AAQC were compared to measured NO₂ concentrations in this report. However, as per the current April 2012 version of O. Reg. 419/05 Summary of Standards and Guidelines, the Schedule 3 Standards for NO_x (MOECC, 2012b) was compared to the monitored NO_x levels.

The maximum concentration levels measured at the Crago Road Station in this quarter are compared in **Figure 4-2** to their respective AAQC along with the levels measured at the Courtice WPCP and Rundle Road Stations (Stantec, 2016).

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Table 4-2 Summary of Ambient CAC Monitoring Data – October to December 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)
SO ₂	1	250	690	Maximum	16.3	45.3
				Minimum	0.0	0.0
				Mean (October)	0.5	1.4
				Mean (November)	0.5	1.4
				Mean (December)	0.5	1.4
				Mean (Period)	0.5	1.4
				Standard Deviation	0.8	2.4
				# of Exceedances	0	0
	24	100	275	Maximum	2.9	8.1
				Minimum	0.0	0.0
				Mean (October)	0.6	1.5
				Mean (November)	0.5	1.4
				Mean (December)	0.5	1.4
				Mean (Period)	0.5	1.4
				Standard Deviation	0.4	1.2
				# of Exceedances	0	0

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Table 4-2 Summary of Ambient CAC Monitoring Data – October to December 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)
PM _{2.5}	24	N/A	28 ^A	Maximum	-	96.0
				Minimum	-	0.4
				Mean (October)	-	3.6
				Mean (November)	-	7.8
				Mean (December)	-	11.3
				Mean (Period)	-	7.3
				Standard Deviation	-	10.3
				# of Exceedances	-	N/A
NO ₂	1	200	400	Maximum	31.4	63.8
				Minimum	0.0	0.0
				Mean (October)	3.2	6.4
				Mean (November)	8.2	16.6
				Mean (December)	3.9	8.1
				Mean (Period)	5.2	10.4
				Standard Deviation	5.9	11.9
				# of Exceedances	0	0
	24	100	200	Maximum	18.5	36.9
				Minimum	0.0	0.0
				Mean (October)	3.2	6.3
				Mean (November)	8.3	16.7
				Mean (December)	4.1	8.1

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Table 4-2 Summary of Ambient CAC Monitoring Data – October to December 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)
NO ^c	1	NA	NA	Mean (Period)	5.2	10.4
				Standard Deviation	4.0	8.1
				# of Exceedances	0	0
				Maximum	46.6	60.5
				Minimum	0.0	0.0
				Mean (October)	1.2	1.5
				Mean (November)	3.3	4.3
				Mean (December)	2.2	3.0
				Mean (Period)	2.2	2.9
				Standard Deviation	4.6	6.0
				# of Exceedances	N/A	N/A
	24	NA	NA	Maximum	16.9	21.9
				Minimum	0.0	0.0
				Mean (October)	1.1	1.5
				Mean (November)	3.3	4.3
				Mean (December)	2.1	2.8
				Mean (Period)	2.2	2.8
				Standard Deviation	2.5	3.3
				# of Exceedances	N/A	N/A

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Table 4-2 Summary of Ambient CAC Monitoring Data – October to December 2016

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m ³		Concentration (ppbv)	Concentration (µg/m ³)
NO _x	1	200 ^B	400 ^B	Maximum	68.2	135.8
				Minimum	0.0	0.0
				Mean (October)	4.3	8.5
				Mean (November)	11.4	23.0
				Mean (December)	5.8	11.8
				Mean (Period)	7.2	14.5
				Standard Deviation	9.4	19.1
				# of Exceedances	0	0
	24	100 ^C	200 ^C	Maximum	35.7	71.3
				Minimum	0.0	0.0
				Mean (October)	4.2	8.4
				Mean (November)	11.4	23.0
				Mean (December)	5.9	11.5
				Mean (Period)	7.2	14.4
				Standard Deviation	6.1	12.4
				# of Exceedances	0	0

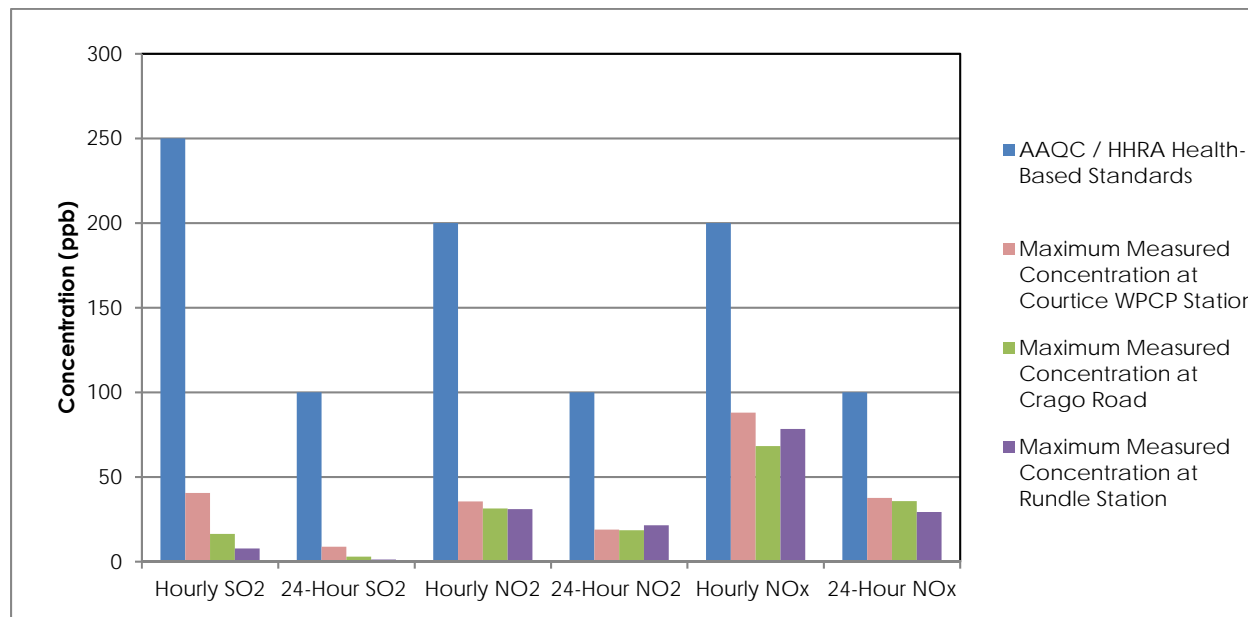
Notes:

- A. Canadian Ambient Air Quality Standards (CAAQS) for Respirable Particulate Matter (CCME, 2012). The Respirable Particulate Matter Objective is referenced to the 98th percentile over 3 consecutive years.
- B. As per current version (April 2012) of O. Reg. 419/05 Summary of Standards and Guidelines, the air standard for NO_x is compared to a monitored NO_x concentration, although the O. Reg. 419/05 Schedule 3 Standard for NO_x is based on health effects of NO₂.
- C. NO has no regulatory criteria.

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Figure 4-2 Comparison of NO₂, NO_x and SO₂ Ambient Air Quality Monitoring Data to Applicable Criteria at the Stations



Detailed discussion for each measured contaminant is presented in the following sections.

4.2.1 Sulphur Dioxide (SO₂)

Data summaries are presented in **Appendix A** for sulphur dioxide for each month as well as time history plots of hourly and 24-hour average SO₂ concentrations. For hourly and 24-hour averages, the Ontario AAQCs of 250 ppb and 100 ppb (690 µg/m³ and 275 µg/m³) are shown with blue lines on the respective plot. As shown in these figures, measured ambient SO₂ concentrations at the station were well below the Ontario AAQCs.

The maximum hourly and 24-hour average SO₂ concentrations measured at the Crago Road Station during October to December 2016 were 16.3 and 2.9 ppb (45.3 and 8.1 µg/m³) respectively, which are 7% and 3% of the applicable 1-hour and 24-hour Ontario AAQCs.

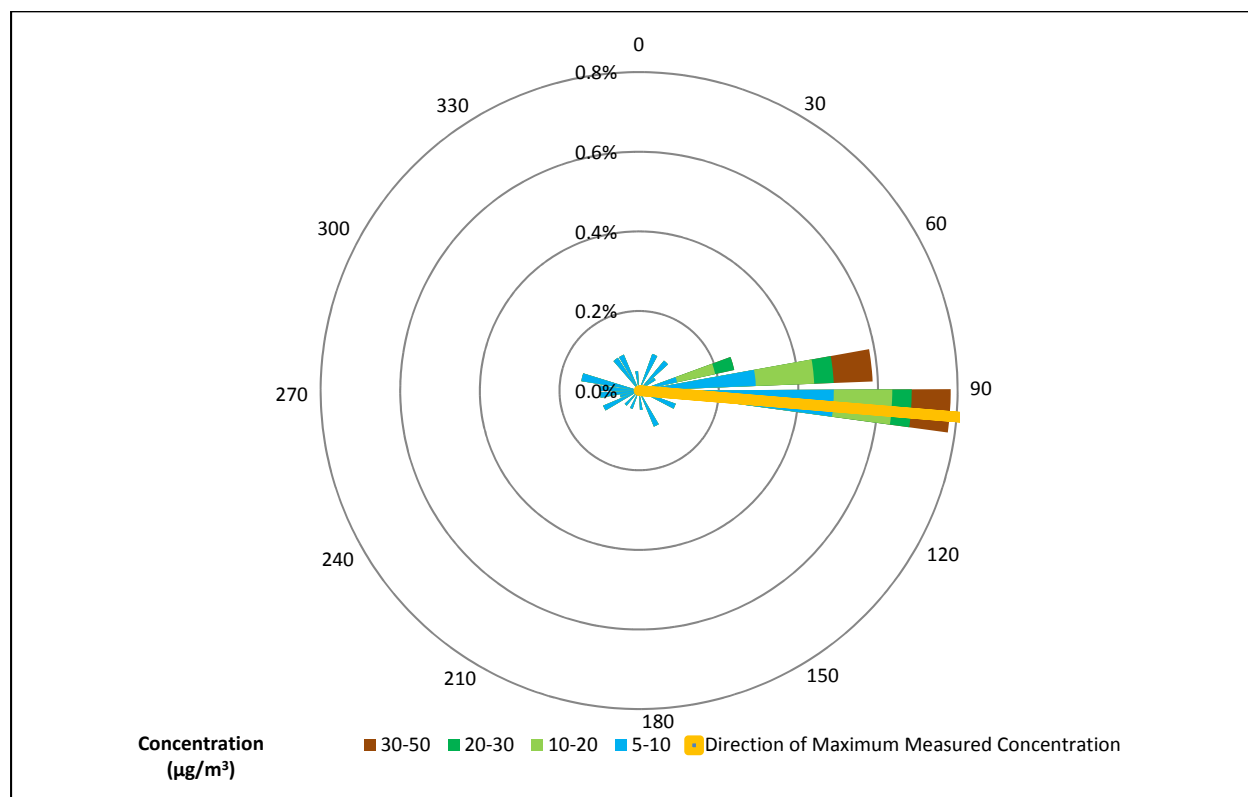
A pollution rose of hourly average SO₂ concentrations measured at the Crago Road Station is presented in **Figure 4-3**. The pollution rose plot presents measured hourly average contaminant concentrations versus measured wind direction (over 10° wind sectors). Concentrations less than 5 µg/m³, which account for 97% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown in the figure. In this period, the Crago Road Station generally measured higher hourly concentrations for winds blowing from easterly directions.

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The maximum hourly average concentration of SO₂ occurred on November 28, 2016 at 19:00, with winds blowing from the east (the direction of the St. Mary's Cement facility). The maximum 24-hour average SO₂ concentration also occurred for winds blowing from the direction of St. Mary's Cement on November 20, 2016.

Figure 4-3 Pollution Rose of Measured Hourly Average SO₂ Concentrations – October to December 2016



4.2.2 Nitrogen Dioxide (NO₂)

Nitrogen oxides (NO_x) are almost entirely made up of nitric oxide (NO) and nitrogen dioxide (NO₂). Together, they are often referred to as NO_x. Most NO₂ in the atmosphere is formed by the oxidation of NO, which is emitted directly by combustion processes, particularly those at high temperature and pressure. Exposure to both NO and NO₂ can result in adverse health effects to an exposed population. NO₂ is the regulated form of NO_x. Similar to other jurisdictions (e.g., Alberta Environment, World Health Organization), the O. Reg. 419/05 Schedule 3 Standards for NO_x are based on health effects of NO₂, as health effects are seen at much lower concentrations of NO₂ than NO. In this report, because NO₂ is the regulated form of NO_x, the AAQC were compared to measured NO₂ concentrations (as per MOECC, 2012a). However, as per the April 2012 version of O. Reg. 419/05 Summary of Standards and Guidelines, the

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Schedule 3 NO_x Standards were also compared to the monitored NO_x concentrations (see Section 4.2.3 below).

Data summaries are presented in **Appendix B** for nitrogen dioxide for the station for each month as well as time history plots of the hourly and 24-hour average NO₂ concentrations. For the hourly and 24-hour averages, the Ontario AAQCs of 200 ppb and 100 ppb (400 µg/m³ and 200 µg/m³) are shown with blue lines on the respective plot. As shown in these figures, measured ambient NO₂ concentrations were well below the Ontario AAQCs.

The maximum measured hourly and 24-hour average concentrations were 31.4 and 18.5 ppb (63.8 and 36.9 µg/m³), which are 16% and 18% respectively, of the applicable 1-hour and 24-hour Ontario AAQCs.

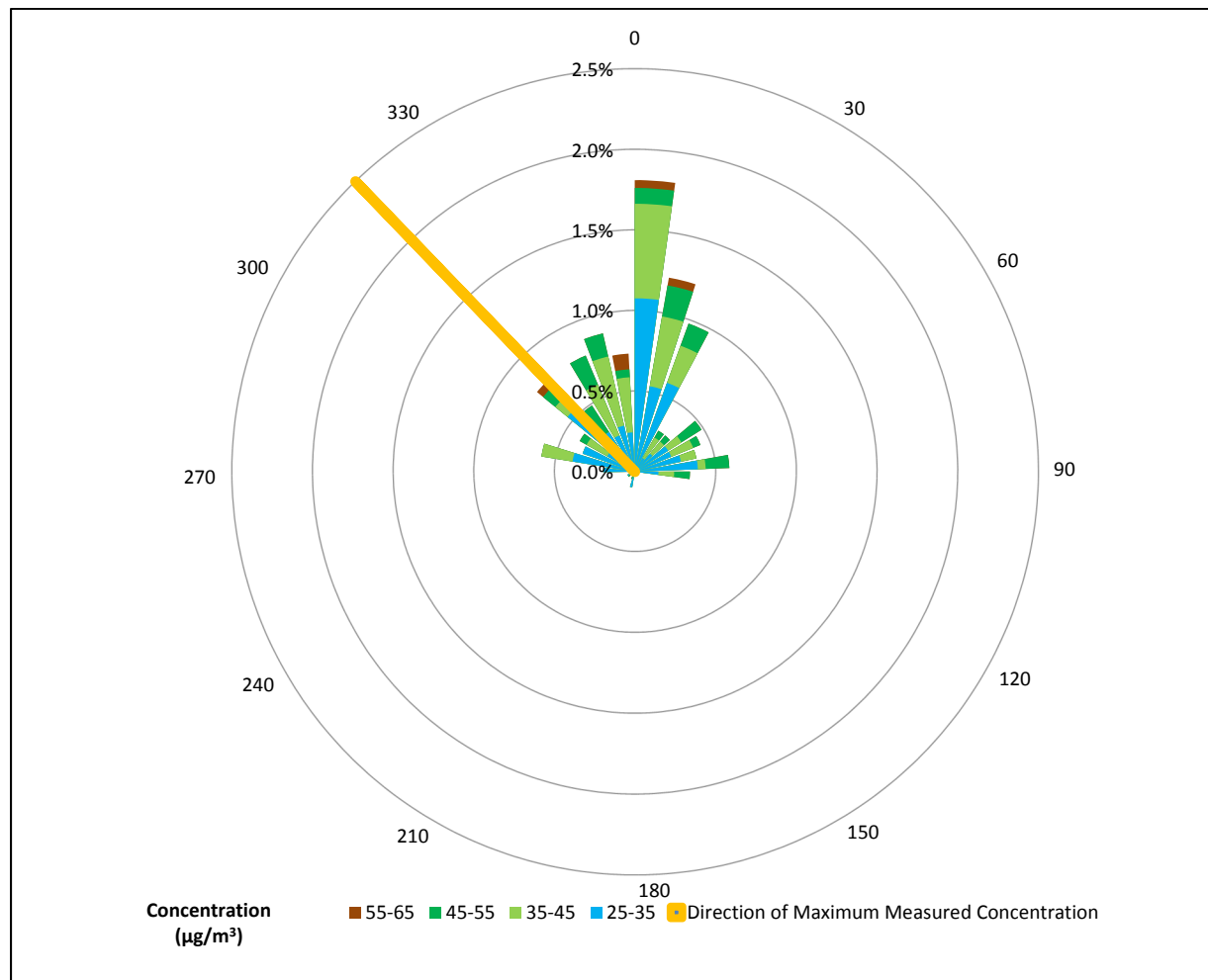
A pollution rose of measured hourly average NO₂ concentrations is presented in **Figure 4-4**. Concentrations less than 25 µg/m³, which account for 87% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown in the figure. Higher measured hourly average concentrations generally occurred from the north.

The highest measured hourly average NO₂ concentration occurred on December 5, 2016 at 21:00. During this hour winds were blowing from the northwest for which Highway 401 was upwind. The highest 24-hour average concentration occurred when winds were blowing from the north on November 16, 2016, for which Highway 401 and Highway 418 construction activities were upwind.

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Figure 4-4 Pollution Rose of Measured Hourly Average NO₂ – October to December 2016



4.2.3 Nitrogen Oxides (NO_x)

Data summaries are presented in **Appendix C** for nitrogen oxides for each month as well as time history plots of the hourly and 24-hour average NO_x concentrations. For the hourly and 24-hour averages, the O. Reg. 419/05 Schedule 3 Standards of 200 ppb and 100 ppb (400 µg/m³ and 200 µg/m³) are shown with blue lines on the respective plot.

The maximum hourly NO_x concentration measured at the Crago Road Station was 68.2 ppb (135.8 µg/m³), which is 34% of the 1-hour Ontario AAQCs. The maximum 24-hour average NO_x concentration measured at this station was 35.7 ppb (71.3 µg/m³), which is 36% of the applicable 24-hour Ontario AAQCs. See **Table 4-2** for detailed results.

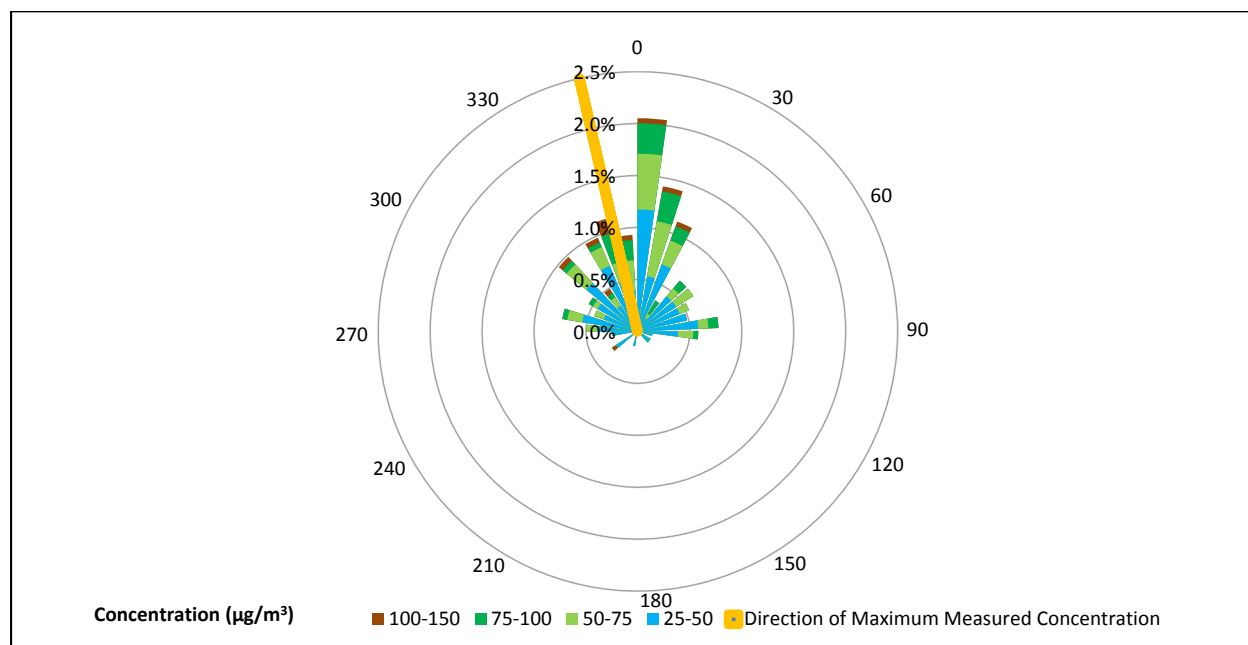
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A pollution rose of measured hourly average NO_x concentrations is presented in **Figure 4-5**. Concentrations less than 25 µg/m³, which account for 83% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown. In **Figure 4-5**, higher measured hourly average NO_x concentrations typically occurred for winds blowing from the north.

The highest measured hourly average NO_x concentration occurred for a wind blowing from the north (from the direction of Highway 401) on November 16, 2016 at 7:00. The maximum 24-hour average NO_x concentration was also measured on November 16, 2016 when winds were blowing from the north for which Highway 401 and Highway 418 construction activities were upwind.

Figure 4-5 Pollution Rose of Measured Hourly Average NO_x Concentrations – October to December 2016



4.2.4 Particulate Matter Smaller than 2.5 Microns (PM_{2.5})

Data summaries and time history plots of measured 24-hour average concentrations are presented in **Appendix D** for PM_{2.5}.

The maximum measured 24-hour average PM_{2.5} concentration was 96.0 µg/m³ during this quarter. It should be noted that since an exceedance of the 24-hour CAAQS for PM_{2.5} requires the average of the 98th percentile levels in each of three consecutive calendar years to be greater than 28 µg/m³ whereas the PM_{2.5} measurements in this report consisted of three months of data, there is insufficient data to determine with any certainty if exceedances of the CAAQS

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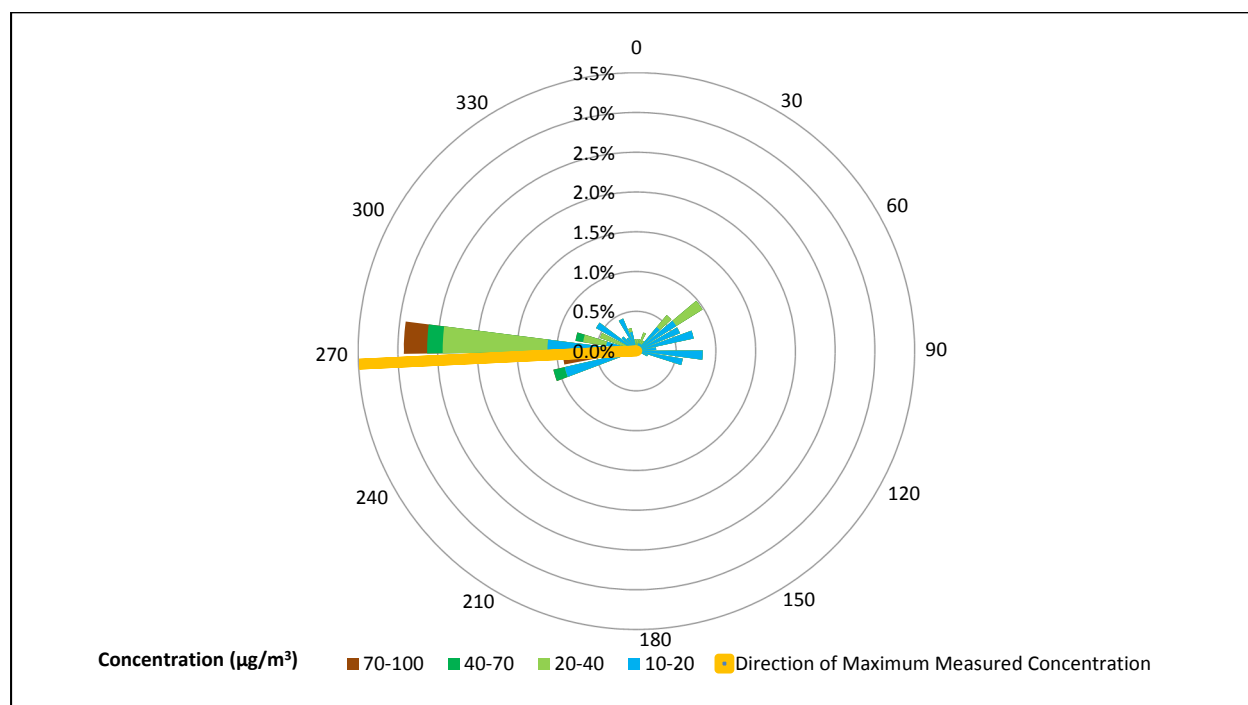
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would occur. Discussion of PM_{2.5} measurements with respect to the CAAQS will be provided in the 2016 annual report, at which time sufficient data will have been collected to make preliminary comparisons.

A pollution rose showing the measured 24-hour average ambient PM_{2.5} concentrations versus direction is shown in **Figure 4-6**. Concentrations less than 10 µg/m³, which account for 85% of the measurements, have been removed from the plot to allow the distribution of maximum levels to be more clearly shown in the figure. Higher measured concentrations typically occurred from westerly directions.

The highest measured 24-hour average PM_{2.5} concentration occurred on December 8, 2016 with winds originating from the west with moderate wind speeds. For this wind direction the Courtice WPCP Station, the DYEC, agricultural fields and local roads were upwind of the Crago Road Station. Continuous emissions monitoring for opacity at the DYEC during this period were 0% for both boilers.

Figure 4-6 Pollution Rose of Measured 24-Hour Average PM_{2.5} Concentrations – October to December 2016



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4.3 AMBIENT TSP / METALS CONCENTRATIONS

A summary of the maximum and minimum ambient TSP and metals concentrations (for a daily averaging period) are presented in **Table 4-3**. A detailed summary of the concentrations measured for each sample is presented in **Appendix F**.

The maximum measured concentrations of TSP and all metals with MOECC AAQCs were below their applicable 24-hour criteria (shown in **Table 4-3** below).

Table 4-3 Summary of Measured Ambient TSP/Metals Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Particulate	µg/m ³	120	120	49.26	10.51	0
Total Mercury (Hg)	µg/m ³	2	2	1.3E-05	6.0E-06 ^A	0
Aluminum (Al)	µg/m ³	4.8	-	2.7E-01	4.0E-02	0
Antimony (Sb)	µg/m ³	25	25	3.5E-03 ^A	3.0E-03 ^A	0
Arsenic (As)	µg/m ³	0.3	0.3	2.1E-03 ^A	1.8E-03 ^A	0
Barium (Ba)	µg/m ³	10	10	1.9E-02	2.8E-03	0
Beryllium (Be)	µg/m ³	0.01	0.01	3.5E-04 ^A	3.0E-04 ^A	0
Bismuth (Bi)	µg/m ³	-	-	2.1E-03 ^A	1.8E-03 ^A	-
Boron (B)	µg/m ³	120	-	2.1E-03 ^A	1.8E-03 ^A	0
Cadmium (Cd)	µg/m ³	0.025	0.025	7.0E-04 ^A	6.0E-04 ^A	0
Chromium (Cr)	µg/m ³	0.5	-	5.1E-03	1.5E-03 ^A	0
Cobalt (Co)	µg/m ³	0.1	0.1	7.0E-04	6.0E-04	0
Copper (Cu)	µg/m ³	50	-	4.7E-02	1.5E-02	0
Iron (Fe)	µg/m ³	4	-	7.6E-01	1.1E-01	0
Lead (Pb)	µg/m ³	0.5	0.5	6.2E-03	9.0E-04 ^A	0
Magnesium (Mg)	µg/m ³	-	-	5.2E-01	5.9E-02	-
Manganese (Mn)	µg/m ³	0.4	-	2.9E-02	3.9E-03	0
Molybdenum (Mo)	µg/m ³	120	-	1.1E-03 ^A	9.0E-04 ^A	0
Nickel (Ni)	µg/m ³	0.2	-	2.6E-03 ^A	9.0E-04 ^A	0
Phosphorus (P)	µg/m ³	-	-	6.5E-02	8.1E-03 ^A	-
Selenium (Se)	µg/m ³	10	10	3.5E-03 ^A	3.0E-03 ^A	0
Silver (Ag)	µg/m ³	1	1	1.8E-03 ^A	1.5E-03 ^A	0
Strontium (Sr)	µg/m ³	120	-	9.6E-03	1.4E-03	0
Thallium (Tl)	µg/m ³	-	-	3.5E-03 ^A	3.0E-03 ^A	-
Tin (Sn)	µg/m ³	10	10	3.5E-03 ^A	3.0E-03 ^A	0

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Table 4-3 Summary of Measured Ambient TSP/Metals Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Titanium (Ti)	µg/m ³	120	-	1.5E-02	3.0E-03 ^A	0
Vanadium (V)	µg/m ³	2	1	1.8E-03 ^A	1.5E-03 ^A	0
Zinc (Zn)	µg/m ³	120	-	6.7E-02	8.0E-03	0
Zirconium (Zr)	µg/m ³	20	-	1.8E-03 ^A	1.5E-03 ^A	0
Total Uranium (U)	µg/m ³	1.5	-	1.6E-04 ^A	1.4E-04 ^A	0

Note:

A. Measured concentration was less than the laboratory method detection limit.

4.4 AMBIENT PAH CONCENTRATIONS

A summary of the maximum and minimum ambient PAH concentrations (for a daily averaging period) are presented in **Table 4-4**. In this summary, both individual PAHs as well as a total PAH concentration are reported. A detailed summary of the concentrations measured for each sample is presented in **Appendix G**.

The maximum measured concentrations of the PAHs with MOECC AAQCs were well below their applicable 24-hour criteria, with the exception of one (1) measurement of benzo(a)pyrene (B(a)P) on November 8, 2016.

B(a)P is a byproduct of a wide variety of natural and man-made combustion processes (including motor vehicles, natural gas, wood, refuse, oil, forest fires, etc.) and is widely present in the environment (including being present in soil and water).

The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario. B(a)P measurement data available from the National Air Pollutant Surveillance (NAPS) network for Ontario in 2013 (for Simcoe, Toronto, and Hamilton), all had maximum levels above the AAQC (varying between 136% -6,220% of the criteria). Available NAPS data for Ontario in 2012 (for Windsor, Toronto, and Hamilton) showed maximum B(a)P levels at these stations that varied between 716% -2,920% of the criteria. In 2011, NAPS data available for seven Ontario stations (Windsor, Toronto, Etobicoke, Hamilton, Simcoe, Pt. Petrie, and Burnt Island) showed exceedances at six of the seven stations, with only the remote Burnt Island Ontario station reporting a maximum level below the MOECC AAQC. In 2010, all of these stations, including the Burnt Island station, measured B(a)P levels above the AAQC.

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The B(a)P the sample collected on November 8, 2016, exceeded the Ontario AAQC by 38%. The sample was however, well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based criteria. Northerly winds were occurring at the time of sampling. Contributors to the measurement may have included agricultural activity, a CN rail, and Highway 418 construction activities, all of which are located to the north of the Crago Road Station. The samples at the Courtice WPCP and the Rundle Road Stations on the same day also exceeded the B(a)P AAQC by 107% and 250%, respectively.

Based on the air quality assessments completed during the Environmental Assessment Study and the Environmental Compliance Approval application for the DYEC, the facility will not be a significant contributor of B(a)P. Therefore, ambient B(a)P levels are not expected to be substantially impacted by the operation of the DYEC.

Table 4-4 Summary of Measured Ambient PAH Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Benzo(a)pyrene	ng/m ³	0.05 ^A	1	6.91E-02	1.02E-03	1
		5 ^B				0
		1.1 ^C				0
1-Methylnaphthalene	ng/m ³	12,000	-	9.98E+00	1.32E+00	0
2-Methylnaphthalene	ng/m ³	10,000	-	1.47E+01	2.01E+00	0
Acenaphthene	ng/m ³	-	-	2.78E+00	2.73E-01	-
Acenaphthylene	ng/m ³	3500	-	4.07E-01 ^F	6.75E-02 ^F	0
Anthracene	ng/m ³	200	-	8.92E-01	6.75E-02 ^F	0
Benzo(a)anthracene	ng/m ³	-	-	2.41E-01 ^F	6.75E-02 ^F	-
Benzo(a)fluorene	ng/m ³	-	-	2.07E-01 ^F	1.35E-01 ^F	-
Benzo(b)fluoranthene	ng/m ³	-	-	5.89E-01 ^F	6.75E-02 ^F	-
Benzo(b)fluorene	ng/m ³	-	-	2.07E-01 ^F	1.35E-01 ^F	-
Benzo(e)pyrene	ng/m ³	-	-	2.07E-01 ^F	1.35E-01 ^F	-
Benzo(g,h,i)perylene	ng/m ³	-	-	1.04E-01 ^F	6.75E-02 ^F	-
Benzo(k)fluoranthene	ng/m ³	-	-	1.04E-01 ^F	6.75E-02 ^F	-
Biphenyl	ng/m ³	-	-	5.03E+00	7.14E-01	-
Chrysene	ng/m ³	-	-	4.56E-01 ^F	6.75E-02 ^F	-
Dibenz(a,h)anthracene ^D	ng/m ³	-	-	1.04E-01 ^F	6.75E-02 ^F	-
Dibenzo(a,c)anthracene + Picene	ng/m ³	-	-	2.04E-01 ^F	1.35E-01 ^F	-
Fluoranthene	ng/m ³	-	-	1.76E+00	9.92E-02 ^F	-

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Table 4-4 Summary of Measured Ambient PAH Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Indeno (1,2,3-cd)pyrene	ng/m ³	-	-	1.04E-01 ^F	6.75E-02 ^F	-
Naphthalene	ng/m ³	22,500	22,500	6.72E+01	6.98E+00	0
o-Terphenyl	ng/m ³	-	-	2.07E-01 ^F	1.35E-01 ^F	-
Perylene	ng/m ³	-	-	2.07E-01 ^F	1.35E-01 ^F	-
Phenanthrene	ng/m ³	-	-	7.48E+00	7.30E-01	-
Pyrene	ng/m ³	-	-	1.15E+00	9.77E-02 ^F	-
Tetralin	ng/m ³	-	-	4.95E+00	7.90E-01	-
Total PAH ^E	ng/m ³	-	-	116	15.8	-

Notes:

- A. Ontario Ambient Air Quality Criteria. The standard for benzo(a)pyrene (B(a)P) is for B(a)P as a surrogate for PAHs.
- B. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds.
- C. O. Reg. 419/05 24 Hour Guideline.
- D. Based on laboratory analyses, dibenzo(a,c)anthracene co-elutes with dibenz(a,h)anthracene. Picene elutes after dibenz(a,h)anthracene.
- E. The reported total PAH is the sum of all analyzed PAH species.
- F. Measured concentration was less than the laboratory method detection limit.

4.5 AMBIENT DIOXINS AND FURANS CONCENTRATIONS

A summary of the maximum and minimum ambient dioxins and furans concentrations (for a daily averaging period) are presented in **Table 4-5**. In this summary, both individual dioxin and furan concentrations (pg/m³) as well as the total toxic equivalency concentration (TEQ) are reported. A detailed summary of the concentrations measured for each sample is presented in **Appendix H**.

The maximum measured toxic equivalent dioxin and furan concentration was below the applicable 24-hour Ontario AAQC of 0.1 pg TEQ/m³ (as shown in **Table 4-5**).

Table 4-5 Summary of Measured Ambient Dioxins and Furans Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
2,3,7,8-Tetra CDD *	pg/m ³	-	-	4.76E-03 ^A	3.34E-03 ^A	N/A
1,2,3,7,8-Penta CDD	pg/m ³			5.04E-03 ^A	3.88E-03 ^A	
1,2,3,4,7,8-Hexa CDD	pg/m ³			6.08E-03 ^A	4.15E-03 ^A	
1,2,3,6,7,8-Hexa CDD	pg/m ³			6.21E-03 ^A	4.15E-03 ^A	

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Table 4-5 Summary of Measured Ambient Dioxins and Furans Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
1,2,3,7,8,9-Hexa CDD	pg/m ³			9.13E-03 ^A	4.01E-03 ^A	
1,2,3,4,6,7,8-Hepta CDD	pg/m ³			1.21E-01	1.12E-02 ^A	
Octa CDD	pg/m ³			4.62E-01	4.79E-02	
Total Tetra CDD	pg/m ³			1.56E-02 ^A	3.34E-03 ^A	
Total Penta CDD	pg/m ³			1.35E-02 ^A	3.88E-03 ^A	
Total Hexa CDD	pg/m ³			6.91E-02	1.26E-02 ^A	
Total Hepta CDD	pg/m ³			2.85E-01	2.38E-02	
2,3,7,8-Tetra CDF **	pg/m ³			7.61E-03 ^A	4.14E-03 ^A	
1,2,3,7,8-Penta CDF	pg/m ³			5.45E-03 ^A	3.61E-03 ^A	
2,3,4,7,8-Penta CDF	pg/m ³			5.45E-03 ^A	3.65E-03 ^A	
1,2,3,4,7,8-Hexa CDF	pg/m ³			1.49E-02	3.27E-03 ^A	
1,2,3,6,7,8-Hexa CDF	pg/m ³			8.82E-03	3.13E-03 ^A	
2,3,4,6,7,8-Hexa CDF	pg/m ³			4.84E-03 ^A	3.41E-03 ^A	
1,2,3,7,8,9-Hexa CDF	pg/m ³			4.98E-03 ^A	3.54E-03 ^A	
1,2,3,4,6,7,8-Hepta CDF	pg/m ³			4.04E-02	3.97E-03 ^A	
1,2,3,4,7,8,9-Hepta CDF	pg/m ³			6.40E-03 ^A	3.48E-03 ^A	
Octa CDF	pg/m ³			1.42E-02	4.23E-03 ^A	
Total Tetra CDF	pg/m ³			7.61E-03	4.14E-03 ^A	
Total Penta CDF	pg/m ³			1.68E-02	3.65E-03 ^A	
Total Hexa CDF	pg/m ³			3.98E-02	3.27E-03 ^A	
Total Hepta CDF	pg/m ³			4.04E-02	4.23E-03 ^A	
TOTAL TOXIC EQUIVALENCY ^B	pg TEQ/m ³	0.1	-	0.018	0.014	0
		1 ^C				0

Notes:

- A. Measured concentration was less than the laboratory method detection limit.
- B. Total Toxicity Equivalent (TEQ) concentration contributed by all dioxins, furans and dioxin-like PCBs calculated as per O. Reg. 419/05 methodology using corresponding WHO₂₀₀₅ toxic equivalency factors (TEFs) and a value of half the minimum detection limit (MDL) substituted for concentrations less than the MDL.
- C. O. Reg. 419/05 Schedule 6 Upper Risk Thresholds.

* CDD - Chloro Dibenzo-p-Dioxin, ** CDF - Chloro Dibenzo-p-Furan

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5.0 CONCLUSIONS

This quarterly report provides a summary of the ambient air quality data collected at the Crago Road monitoring station for the period October to December 2016.

The following observations and conclusions were made from a review of the measured ambient air quality monitoring data:

1. Measured levels of NO₂, SO₂ and PM_{2.5} were below the applicable O. Reg. 419/05 Standards or human health risk assessment (HHRA) health-based criteria presented in **Table 2-1** of this report.
2. Since the Canadian Ambient Air Quality Standard (CAAQS) for PM_{2.5} is based on a 98th percentile level over three years, whereas the PM_{2.5} measurement period at the Crago Road Station for this quarterly report was three months, there was insufficient data collected to determine with any certainty if exceedances of the CAAQS would occur. Therefore, no comparison of the measured PM_{2.5} data during this quarter to the CAAQS was conducted for this report, as it would not be scientifically accurate or representative.
3. The maximum measured concentrations of TSP and all metals with Ministry of Environment and Climate Change (MOECC) air quality Standards were well below their applicable Standards (as presented in **Table 2-2** in this report).
4. The maximum measured concentrations of all PAHs with MOECC air quality Standards were well below their applicable Standards shown in **Table 2-3**, with the exception of the 24-hour benzo(a)pyrene concentration for one sample, which exceeded the applicable Ontario AAQC by 38%. The measurement was however, well below the MOECC Schedule 6 Upper Risk Threshold, the MOECC O. Reg. 419/05 24-hour average guideline, and the HHRA health based standard. The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario.
5. The maximum measured toxic equivalent dioxin and furan concentration was below the applicable Standards presented in **Table 2-3**.

In summary, the measured concentrations of the air contaminants monitored were below their applicable MOECC Standards during the monitoring period between October and December 2016, with the exception of one (1) benzo(a)pyrene sample. All measured levels of the monitored contaminants were below their applicable HHRA health-based criteria.

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**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016**

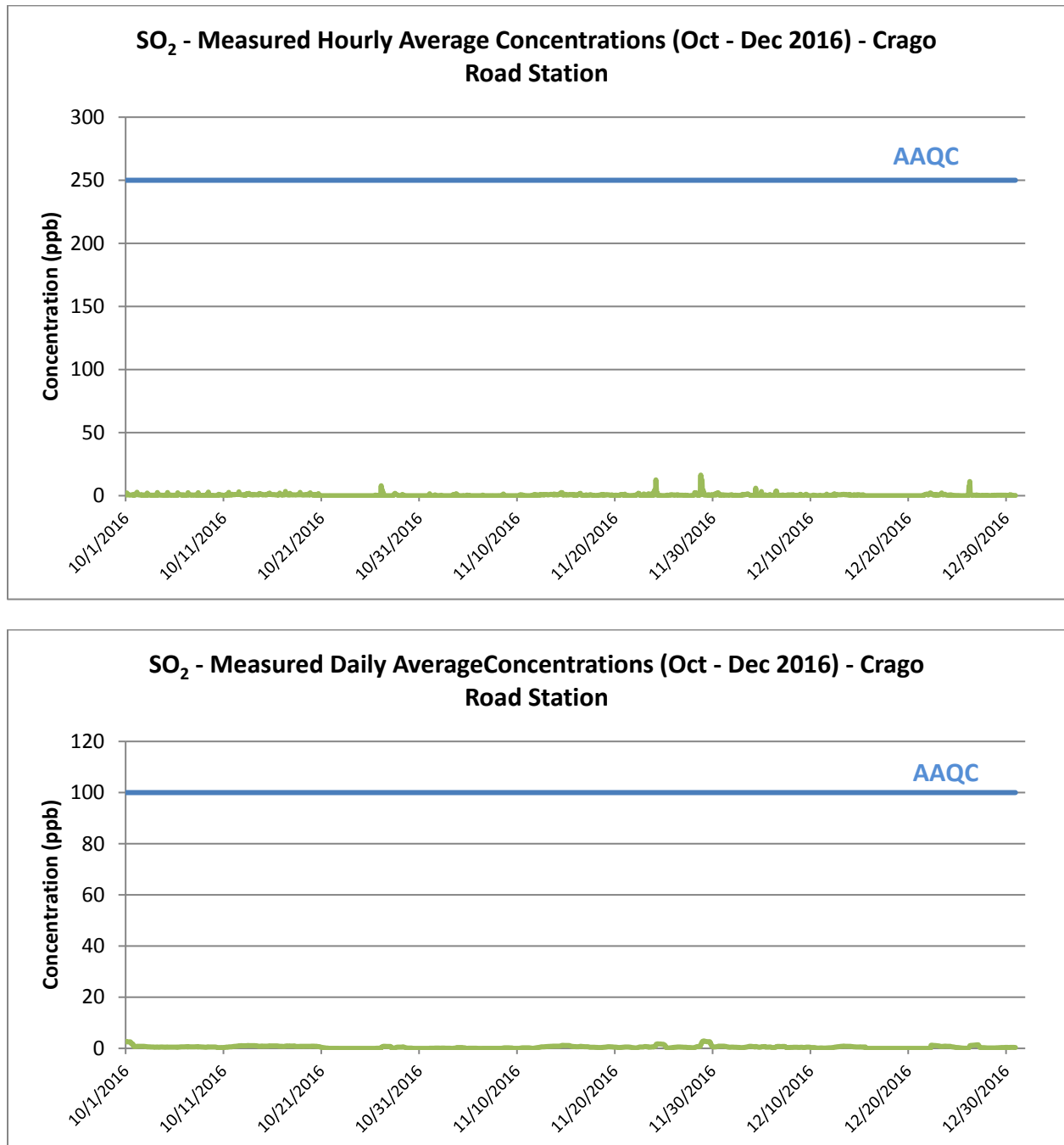
Appendix A SO₂ Data Summaries and Time History Plots
February 9, 2017

Appendix A SO₂ DATA SUMMARIES AND TIME HISTORY PLOTS

SO ₂ - Crago Road																															
November 2016																															
ppb																															
Hour																															
Day		0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>250	Days>100
1	1	0.0	0.0	1.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.6	0.0	0.1	0	0
	2	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.4	0.0	0.1	0	0
	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.0	0.1	0.0	0.3	0.2	1.1	1.3	1.2	1.4	0.0	0.0	0.0	24	1.4	0.0	0.3	0	0
	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24	0.5	0.0	0.0	0	0
	5	0.0	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.4	0.0	0.0	0	0
	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.5	0.0	0.0	0	0
	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.1	0.0	0.0	0	0
	8	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.5	0.6	1.0	1.3	0.4	0.2	0.1	0.0	0.0	0.0	0.0	24	1.3	0.0	0.2	0	0
	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	24	0.1	0.0	0.0	0	0
10	10	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.7	0.7	0.4	0.5	0.6	0.6	0.7	0.5	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	24	0.7	0.0	0.2	0	0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	C	C	C	0.8	0.6	0.7	0.4	0.6	0.4	0.5	21	0.8	0.0	0.2	0	0
	12	0.8	0.7	0.4	0.4	0.5	0.4	0.4	0.5	0.7	1.0	0.5	0.8	0.8	0.9	0.7	0.7	0.6	0.5	0.6	1.0	0.7	1.0	0.9	0.8	24	1.0	0.4	0.7	0	0
	13	0.9	0.9	1.0	0.6	0.6	0.6	0.8	0.8	0.9	0.9	0.9	0.9	1.1	1.0	0.9	1.0	0.9	0.6	0.7	1.3	1.0	0.6	0.9	1.1	24	1.3	0.6	0.9	0	0
	14	0.9	0.9	0.6	0.5	0.6	0.7	0.7	1.2	1.0	1.3	1.3	2.1	2.3	2.5	2.0	2.5	1.2	0.5	0.6	0.6	0.7	0.9	1.0	1.1	24	2.5	0.5	1.2	0	0
	15	0.6	0.5	0.6	0.5	0.6	0.8	0.8	0.9	0.8	0.6	0.7	0.7	0.8	0.9	0.9	0.9	0.6	0.7	0.6	0.4	0.7	0.9	0.5	0.6	24	0.9	0.4	0.7	0	0
	16	0.5	0.4	0.5	0.6	0.3	0.5	0.6	1.1	0.9	1.1	1.7	1.6	1.8	0.6	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.4	24	1.8	0.2	0.6	0	0
	17	0.3	0.5	0.7	0.4	0.4	0.2	0.4	0.4	0.4	0.3	0.6	0.7	0.8	0.8	0.7	0.6	0.4	0.2	0.3	0.3	0.2	0.2	0.2	0.1	24	0.8	0.1	0.4	0	0
	18	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.6	0.6	0.7	0.6	0.7	0.6	0.9	0.6	0.8	1.0	0.7	0.3	0.3	24	1.0	0.1	0.5	0	0
	19	0.5	0.6	0.6	0.7	0.9	0.8	0.7	0.7	0.6	0.7	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.7	0.5	0.4	0.2	0.2	0.3	0.3	24	0.9	0.2	0.5	0	0
	20	20	0.2	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.6	0.9	0.7	0.8	1.0	0.9	0.8	0.6	0.7	0.4	0.5	24	1.0	0.1	0.5	0
21		0.8	1.2	0.7	0.3	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	24	1.2	0.1	0.2	0	0
22		0.1	0.4	0.3	0.1	0.5	0.7	1.0	0.7	0.8	1.1	1.9	1.3	1.6	1.1	0.3	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.8	1.4	24	1.9	0.0	0.6	0	0
23		1.3	1.1	1.0	0.5	0.2	0.1	0.1	0.2	0.4	0.5	1.2	1.5	0.1	0.1	0.4	0.3	0.2	0.2	1.4	0.8	0.4	0.3	0.1	0.1	24	1.5	0.1	0.5	0	0
24		1.4	4.1	2.2	1.0	2.8	12.6	6.6	0.5	2.4	1.7	1.2	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	24	12.6	0.0	1.6	0	0
25		0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.5	0.3	0.4	0.3	0.3	0.5	0.5	0.6	0.7	0.8	0.6	0.6	0.4	0.5	0.6	24	0.8	0.0	0.3	0	0
26		0.7	0.6	0.4	0.4	0.5	0.4	0.4	0.4	0.6	0.6	0.8	0.6	0.6	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	24	0.8	0.3	0.5	0	0
27		0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.0	M	M	M	M	M	M	0.0	0.1	0.2	0.3	0.2	0.2	0.1	18	0.4	0.0	0.2	0	0
28		0.1	0.3	0.4	0.4	2.4	1.3	1.0	2.4	1.1	0.8	1.2	0.9	0.2	0.6	0.5	0.5	1.0	0.5	5.0	16.3	2.4	9.0	12.4	2.9	24	16.3	0.1	2.7	0	0
29		1.3	4.0	1.3	0.6	0.5	0.4	0.5	0.5	0.5	0.6	0.6	0.4	0.5	0.7	0.5	0.4	0.4	0.6	0.6	0.6	0.6	0.4	0.6	0.4	24	4.0	0.4	0.7	0	0
30		0.7	0.6	0.4	0.4	0.6	0.9	1.4	1.0	0.6	0.5	1.4	2.1	1.0	1.6	2.3	0.7	0.8	0.5	0.5	0.4	0.6	0.5	0.6	0.5	24	2.3	0.4	0.9	0	0
31																									0	0.0	0.0		0	0	
Count		30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	28	30	30	30	30	30	30	30	711					
Maximum		1.4	4.1	2.2	1.0	2.8	12.6	6.6	2.4	2.4	1.7	1.9	2.1	2.3	2.5	2.3	2.5	1.2	1.1	5.0	16.3	2.4	9.0	12.4	2.9	24					
Minimum		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0					
Average		0.4	0.6	0.5	0.3	0.4	0.7	0.6	0.4	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.5	0.9	0.4	0.6	0.7	0.4						
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100		Maximum Hourly		Maximum			
Data		0.0		0.0		0.1		0.2		0.3		0.4		0.6		0.7		1.0		1.4		3.9		16.3		Maximum Daily		16.3			
																										2.7		0.5			
Notes		C - Calibration / Span Cycle			NA - No Data Available			T - Test/Startup period			A- MOE Audit			M - Equipment Malfunction / Down			R - Rate of Change														

[illegible]

Figure A-1 Time History Plots of Measured Hourly Average and 24-Hour Average SO₂ Concentrations– Crago Road Station



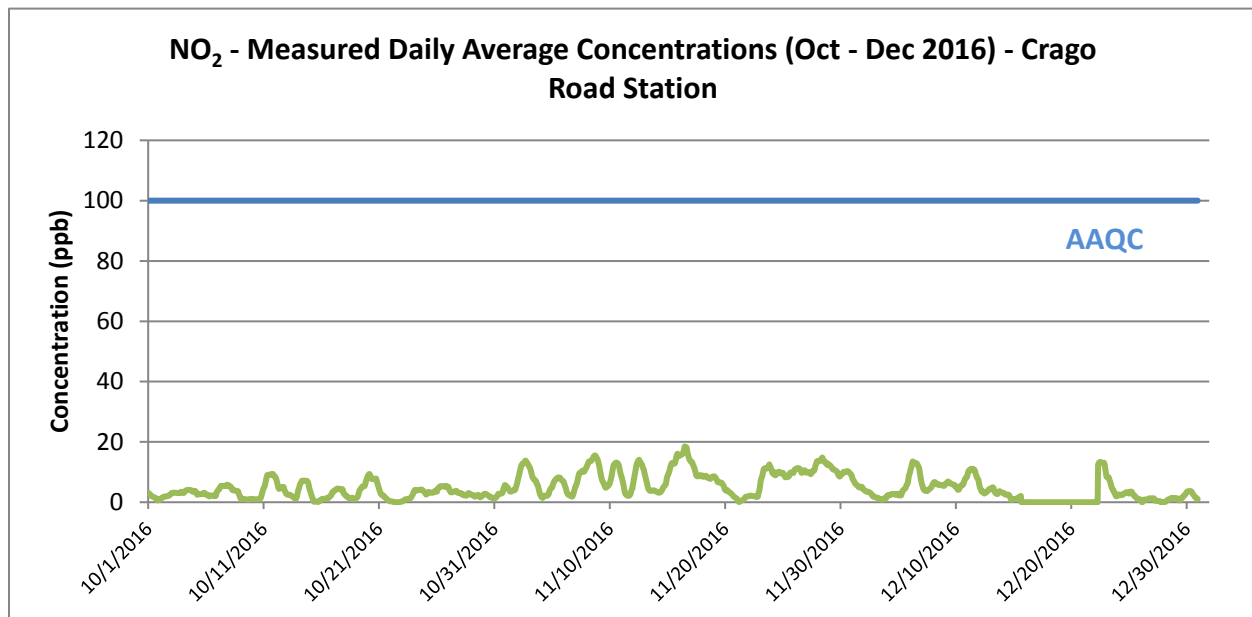
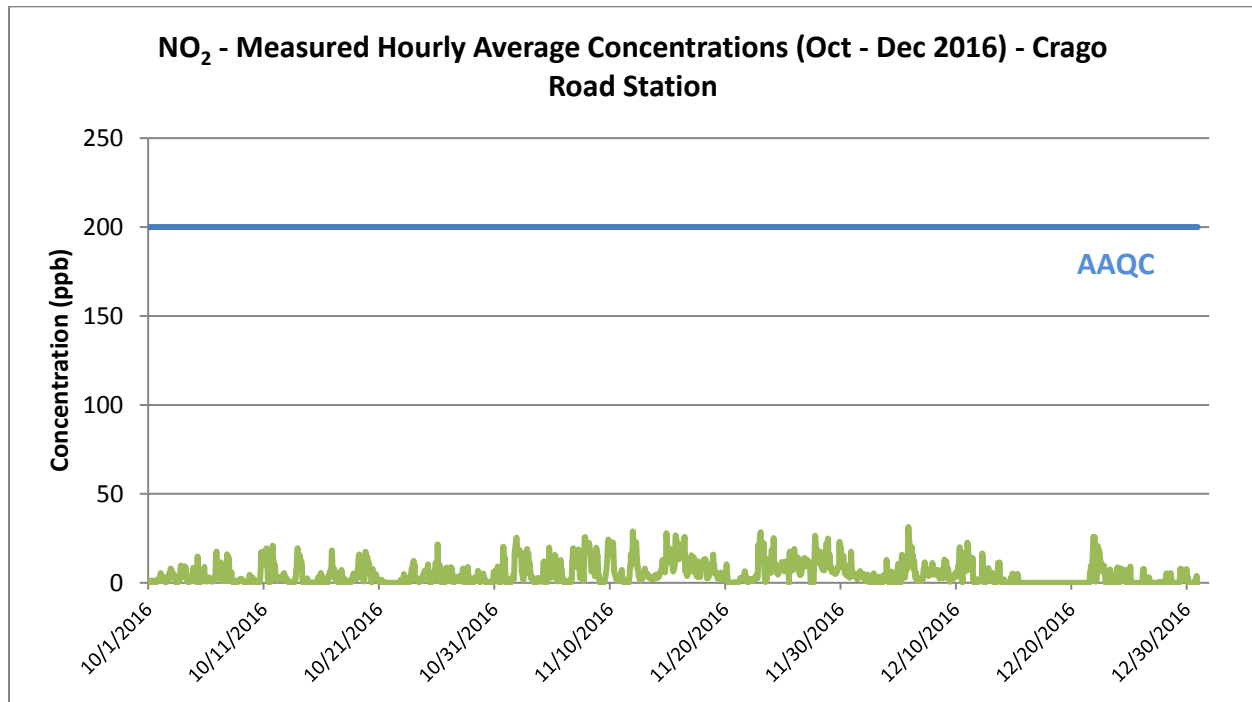
**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016**

Appendix B NO₂ Data Summaries and Time History Plots
February 9, 2017

Appendix B NO₂ DATA SUMMARIES AND TIME HISTORY PLOTS

NO ₂ - Crago Road																														
November 2016																														
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Hour																														
Day	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>200	Days>100
1	0.1	0.0	0.7	2.5	0.0	0.0	0.6	0.0	0.2	0.1	0.1	1.5	1.7	1.8	2.5	4.3	1.7	4.0	16.2	19.1	21.2	23.7	25.4	20.6	24	25.4	0.0	6.2	0	0
2	17.3	16.7	16.4	15.7	17.1	18.3	17.1	16.4	13.7	5.8	8.8	3.0	1.4	2.7	5.9	7.4	16.8	5.3	9.5	11.7	19.0	16.3	16.3	16.3	24	19.0	1.4	12.3	0	0
3	8.0	11.5	7.7	6.3	2.9	2.8	1.9	3.4	3.0	1.7	1.1	0.0	0.1	0.4	0.2	0.4	1.0	1.4	2.1	2.8	1.7	0.7	1.2	2.2	24	11.5	0.0	2.7	0	0
4	2.0	1.0	0.6	1.1	1.8	2.8	11.3	12.1	3.3	0.5	0.5	0.0	0.0	0.2	0.7	2.7	7.5	4.9	19.9	13.8	10.7	6.9	6.8	2.8	24	19.9	0.0	4.7	0	0
5	5.3	12.2	13.6	12.4	8.3	13.4	15.7	15.1	6.4	6.1	6.0	0.8	1.6	3.1	1.7	2.2	2.6	5.5	12.8	8.6	7.9	3.9	0.7	1.7	24	15.7	0.7	7.0	0	0
6	2.2	1.5	0.0	0.0	0.0	0.0	0.4	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.6	1.7	12.6	13.8	19.4	16.6	14.6	15.8	24	19.4	0.0	4.3	0	0
7	15.2	9.2	9.0	10.1	11.9	16.6	18.5	18.7	15.4	8.6	2.9	2.5	3.7	3.4	3.0	4.4	2.6	4.0	1.2	16.3	25.6	25.8	22.9	21.1	24	25.8	1.2	11.4	0	0
8	21.4	20.9	17.2	19.9	21.2	22.4	21.2	17.7	15.6	11.1	6.4	6.6	9.9	11.2	10.9	11.8	7.6	3.6	4.2	10.4	19.7	18.9	15.2	15.8	24	22.4	3.6	14.2	0	0
9	6.4	3.1	4.0	0.5	0.0	0.1	0.6	0.6	0.8	0.1	0.2	0.5	0.6	0.4	1.7	2.6	4.5	6.8	9.6	13.2	20.2	24.3	21.3	20.4	24	24.3	0.0	5.9	0	0
10	17.4	15.5	18.5	16.2	18.5	22.6	22.8	22.4	14.6	5.9	5.1	4.2	3.9	2.2	1.7	1.1	2.8	2.9	3.1	2.7	2.5	2.8	4.4	5.6	24	22.8	1.1	9.1	0	0
11	4.6	7.2	0.6	0.8	0.9	2.3	0.5	1.4	1.1	0.3	0.3	1.5	0.0	0.3	C	C	1.5	3.5	8.9	8.3	16.2	15.9	13.9	10.3	22	16.2	0.0	4.6	0	0
12	28.9	23.0	23.9	18.5	21.3	18.9	21.9	22.8	16.0	12.4	7.4	8.6	4.1	3.3	2.1	1.8	1.5	2.3	2.2	2.0	3.1	4.5	5.4	3.6	24	28.9	1.5	10.8	0	0
13	5.6	8.0	5.5	4.3	5.8	4.9	4.5	4.8	3.9	2.9	3.2	3.3	2.6	2.6	2.1	2.5	3.0	2.8	2.1	3.3	3.8	2.3	2.6	3.0	24	8.0	2.1	3.7	0	0
14	3.6	4.7	3.1	2.6	4.0	3.4	3.2	5.0	4.7	5.6	6.2	7.5	8.0	8.8	12.9	8.9	8.0	7.5	8.4	5.9	8.6	12.3	27.9	23.4	24	27.9	2.6	8.1	0	0
15	16.8	11.9	14.4	12.4	14.6	19.2	17.9	18.3	16.5	12.0	10.5	8.6	6.3	8.1	7.9	10.0	11.1	26.7	26.4	23.0	20.1	22.4	17.4	16.9	24	26.7	6.3	15.4	0	0
16	13.1	17.1	15.3	17.1	15.2	19.3	20.0	21.2	20.7	20.1	24.0	24.7	25.9	6.8	6.1	8.8	6.8	3.8	4.7	8.2	8.3	8.1	7.8	8.6	24	25.9	3.8	13.8	0	0
17	10.3	11.4	15.5	12.9	9.9	6.2	9.9	14.3	10.9	8.4	9.6	9.9	5.4	3.6	3.4	7.3	12.1	8.2	4.8	5.6	3.1	10.9	10.8	10.5	24	15.5	3.1	9.0	0	0
18	8.8	9.4	8.6	10.1	13.0	9.0	12.0	13.3	12.7	7.2	2.5	3.5	2.6	4.7	3.4	7.6	5.0	5.9	10.3	9.6	8.5	9.4	12.2	15.9	24	15.9	2.5	8.6	0	0
19	9.5	10.3	5.9	5.0	5.8	5.5	5.2	5.7	2.4	2.5	4.3	2.4	2.3	2.9	3.0	4.8	5.8	4.9	3.5	4.9	1.8	2.3	1.9	2.7	24	10.3	1.8	4.4	0	0
20	3.3	4.4	5.0	10.4	5.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.2	0.0	0.0	24	10.4	0.0	1.4	0	0
21	0.0	0.0	0.0	0.0	0.2	0.9	1.5	2.3	2.8	2.9	2.1	1.8	1.8	2.0	1.9	2.8	5.1	6.5	4.8	2.5	3.3	0.7	0.8	0.5	24	6.5	0.0	2.0	0	0
22	0.5	0.5	0.5	1.4	1.5	2.1	1.3	1.9	1.7	1.4	1.5	1.5	1.1	1.6	1.8	3.4	3.5	3.5	4.8	2.4	4.3	21.3	14.5	12.9	24	21.3	0.5	3.8	0	0
23	23.6	26.9	28.4	17.3	12.3	12.0	18.8	16.5	22.3	11.0	4.2	2.7	0.4	0.8	1.0	2.5	7.5	5.4	11.8	13.6	12.8	9.9	8.4	5.6	24	28.4	0.4	11.5	0	0
24	9.3	18.4	12.5	8.3	15.3	25.1	13.3	6.3	8.9	10.6	9.0	7.1	6.8	5.3	4.6	5.1	6.3	7.7	8.8	8.1	9.0	8.1	11.7	9.8	24	25.1	4.6	9.8	0	0
25	8.8	7.9	11.3	6.4	9.2	9.6	12.0	9.6	10.4	10.2	8.2	7.2	7.7	C	17.2	17.6	9.4	8.2	9.6	7.0	7.1	7.0	10.9	18.1	23	18.1	6.4	10.0	0	0
26	19.0	17.2	12.1	10.0	9.5	12.0	10.8	10.3	14.2	10.2	6.0	5.2	4.4	4.4	4.9	5.9	9.1	11.2	11.5	9.7	13.1	14.0	10.9	9.2	24	19.0	4.4	10.2	0	0
27	12.6	13.3	12.9	11.7	12.3	12.1	10.4	10.0	9.7	5.4	0.0	M	M	M	M	M	M	9.8	16.1	26.5	23.3	20.2	19.2	18.8	18	26.5	0.0	13.6	0	0
28	13.9	12.5	12.3	12.3	16.2	10.8	10.5	17.4	10.0	8.7	8.5	7.3	7.1	8.8	6.9	8.5	10.9	9.0	16.4	22.2	9.8	22.6	24.9	11.5	24	24.9	6.9	12.5	0	0
29	8.6	15.9	8.9	8.9	9.6	7.5	6.1	7.5	7.2	7.2	6.4	5.3	6.2	5.8	5.0	5.5	6.8	6.8	8.8	8.5	8.3	9.3	23.0	12.9	24	23.0	5.0	8.6	0	0
30	19.7	20.0	12.3	10.2	9.2	12.8	15.2	9.3	7.8	5.3	6.4	8.0	4.1	7.6	9.6	5.0	5.4	3.7	4.2	2.8	4.6	5.3	17.5	9.6	24	20.0	2.8	9.0	0	0
31																									0	0.0	0.0		0	0
Count	30	30	30	30	30	30	30	30	30	30	30	29	29	28	28	28	29	30	30	30	30	30	30	30	711					
Maximum	28.9	26.9	28.4	19.9	21.3	25.1	22.8	22.8	22.3	20.1	24.0	24.7	25.9	11.2	17.2	17.6	16.8	26.7	26.4	26.5	25.6	25.8	27.9	23.4	24					
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.2	0.0	0.0	0					
Average	10.5	11.1	9.9	8.8	9.1	9.8	10.2	10.2	8.6	6.1	5.0	4.7	4.1	3.7	4.4	5.2	5.8	5.9	8.6	9.5	10.6	11.5	12.3	10.9						
Percentiles	10		20		30		40		50		60		70		80		90		95		99		100				Maximum Hourly		Maximum	
Data	0.5		2.1		3.1		5.0		6.9		8.8		10.8		13.9		18.5		21.3		25.9		28.9				Maximum Daily		15.4	
																											Monthly Average		8.3	
Notes	C - Calibration / Span Cycle			NA - No Data Available			T - Test/Startup period			A- MOE Audit			M - Equipment Malfunction / Down			R - Rate of Change														

Figure B-1 Time History Plots of Measured Hourly Average and 24-Hour Average NO₂ Concentrations – Crago Road Station



**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016**

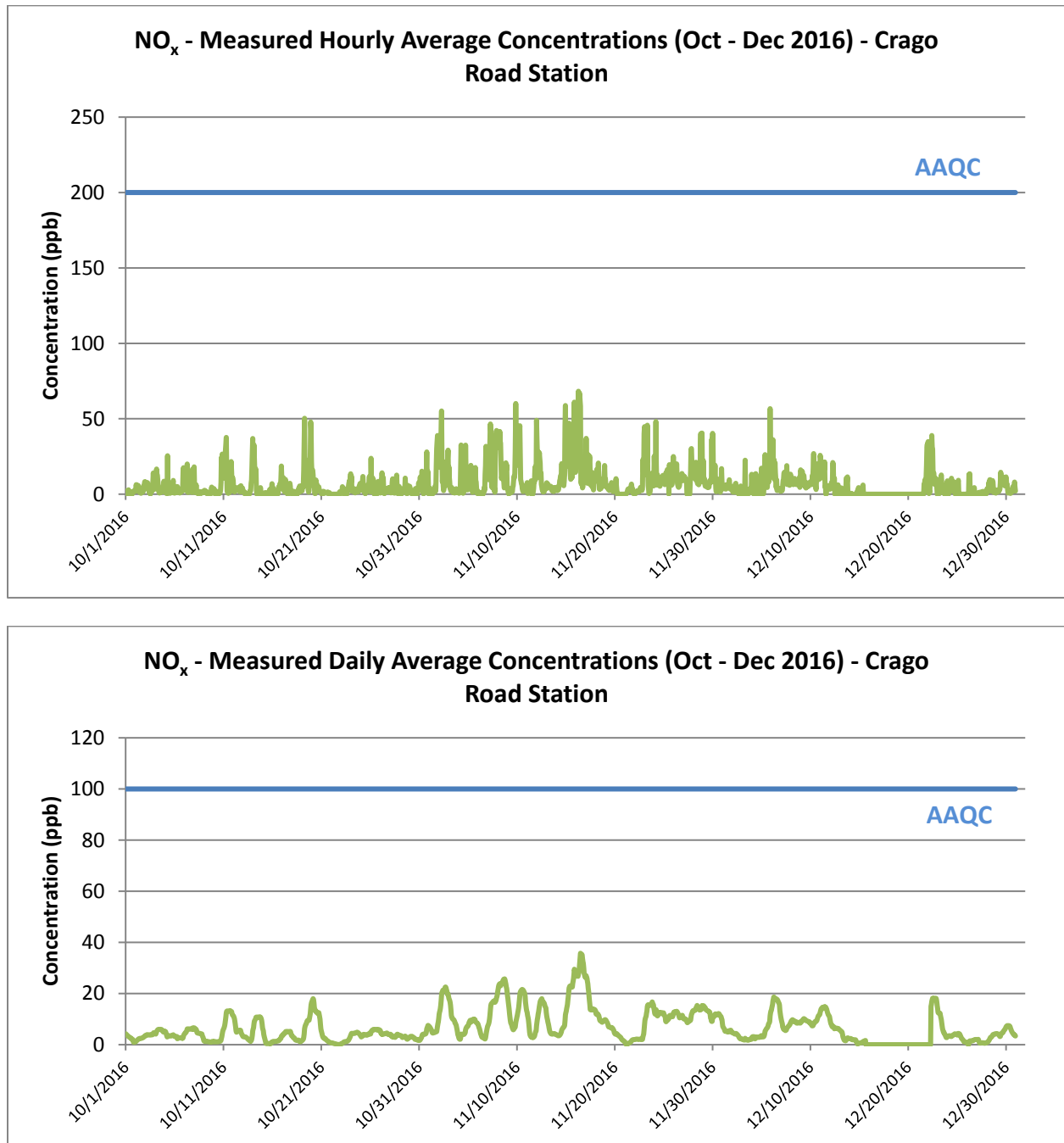
Appendix C NO_x Data Summaries and Time History Plots
February 9, 2017

Appendix C NO_x DATA SUMMARIES AND TIME HISTORY PLOTS

NOx Crago Road																															
November 2016																															
ppb																															
Hour																															
Day	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>200	Days>100	
1	0.0	0.0	0.6	3.9	0.0	0.2	1.2	0.0	1.3	0.5	0.3	2.4	2.4	2.5	3.7	5.4	1.8	4.0	18.9	30.0	34.7	38.9	38.2	24.2	24	38.9	0.0	9.0	0	0	
2	29.8	38.8	21.6	17.7	20.0	31.0	44.8	55.1	23.9	8.1	12.2	5.5	2.4	4.2	8.7	8.0	19.3	5.5	9.8	14.0	22.0	18.5	24.2	29.2	24	55.1	2.4	19.8	0	0	
3	9.6	18.1	11.3	8.1	3.6	3.1	2.0	3.7	4.5	3.5	2.8	1.1	1.2	1.4	1.1	0.8	2.2	1.7	2.7	3.7	2.5	1.0	1.7	2.8	24	18.1	0.8	3.9	0	0	
4	2.1	1.0	0.6	1.5	2.4	3.2	18.8	32.6	6.8	2.3	2.0	0.9	0.6	1.0	1.8	3.7	9.6	5.2	32.5	16.1	10.7	6.9	6.8	2.9	24	32.6	0.6	7.2	0	0	
5	5.4	12.1	13.8	13.4	8.2	13.7	16.7	19.1	9.3	12.3	10.3	1.2	2.4	5.6	2.5	3.1	3.0	7.5	17.7	8.9	8.1	3.8	0.5	1.7	24	19.1	0.5	8.3	0	0	
6	2.1	1.5	0.0	0.0	0.0	0.0	0.4	1.1	0.9	0.0	0.0	1.3	0.4	0.0	0.8	1.6	4.6	2.5	13.2	18.8	31.7	28.6	21.6	22.1	24	31.7	0.0	6.4	0	0	
7	20.1	9.7	9.7	11.3	17.1	26.9	36.8	46.6	41.3	15.9	5.0	4.4	6.0	5.4	4.4	5.9	2.6	4.0	1.3	22.8	38.7	39.4	42.2	33.3	24	46.6	1.3	18.8	0	0	
8	39.6	38.5	31.0	35.5	32.9	33.6	41.6	35.2	33.8	21.6	10.4	11.2	15.7	17.2	13.8	13.3	8.0	4.2	4.6	10.6	20.2	20.8	16.0	19.4	24	41.6	4.2	22.0	0	0	
9	6.4	3.2	4.5	0.9	0.1	0.7	1.2	0.8	1.3	0.8	1.3	1.5	2.3	1.7	4.6	5.5	9.1	11.9	10.9	13.8	28.2	60.2	38.1	34.5	24	60.2	0.1	10.1	0	0	
10	25.6	19.3	27.3	20.1	22.9	38.3	41.3	45.3	26.7	9.6	8.4	6.9	6.3	3.6	2.4	1.7	3.4	3.3	3.4	2.8	2.7	3.0	4.7	5.7	24	45.3	1.7	14.0	0	0	
11	4.8	7.7	0.5	1.1	1.4	2.9	0.9	2.2	2.1	1.1	1.1	8.8	0.0	0.4	C	C	1.8	3.9	9.1	7.9	16.5	18.4	13.7	10.3	22	18.4	0.0	5.3	0	0	
12	49.0	37.1	27.2	20.5	28.2	20.5	23.8	27.5	23.6	20.6	10.9	14.0	6.5	4.9	2.9	2.6	1.5	2.6	2.5	1.7	2.8	4.8	5.3	3.7	24	49.0	1.5	14.4	0	0	
13	5.5	7.6	5.3	4.0	6.7	4.9	4.5	4.6	4.9	4.1	5.0	5.3	3.6	3.7	2.3	2.7	3.5	2.8	1.7	3.1	4.5	2.4	2.5	2.8	24	7.6	1.7	4.1	0	0	
14	3.7	4.5	2.9	2.4	3.9	3.3	3.0	5.5	5.6	8.9	9.7	12.2	12.6	12.7	20.3	10.7	9.6	7.4	9.8	5.6	8.4	12.7	45.2	58.8	24	58.8	2.4	11.6	0	0	
15	24.0	18.2	27.5	21.2	24.7	42.2	37.9	43.4	47.1	20.1	17.9	13.9	9.8	11.9	10.7	12.1	11.3	40.9	31.7	28.9	47.6	61.0	25.6	29.0	24	61.0	9.8	27.4	0	0	
16	14.5	20.3	19.6	34.7	19.6	35.6	34.5	68.2	51.2	61.2	66.9	62.2	58.4	8.6	6.8	10.0	7.2	4.2	5.0	9.4	8.9	8.8	9.8	11.0	24	68.2	4.2	26.5	0	0	
17	14.0	14.3	37.0	17.5	12.6	7.2	12.9	26.2	20.8	17.6	24.8	25.0	10.3	6.1	5.7	9.4	14.5	8.5	4.3	5.5	2.8	10.8	10.8	10.4	24	37.0	2.8	13.7	0	0	
18	8.5	9.7	9.1	11.2	16.4	8.8	12.6	15.9	20.6	11.0	3.3	5.0	3.4	6.4	3.8	8.7	4.9	5.6	10.0	9.3	8.1	9.1	12.9	19.0	24	20.6	3.3	9.7	0	0	
19	9.3	10.1	5.6	4.7	5.4	5.2	4.7	5.6	3.1	3.0	4.7	2.5	2.6	3.5	2.8	5.4	7.7	6.5	3.9	5.5	1.7	2.3	2.2	2.8	24	10.1	1.7	4.6	0	0	
20	3.6	5.0	5.0	10.3	5.6	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	10.3	0.0	1.3	0	0	
21	0.0	0.0	0.0	0.0	0.0	0.6	1.1	2.1	3.1	3.5	2.4	2.0	2.1	2.2	1.9	3.0	5.3	6.7	4.6	2.4	3.3	0.5	0.7	0.3	24	6.7	0.0	2.0	0	0	
22	0.2	0.2	0.0	1.2	1.5	1.8	1.3	2.1	1.9	2.1	2.5	2.5	1.6	2.8	2.8	4.4	3.9	3.3	4.8	2.5	4.6	22.8	15.5	13.4	24	22.8	0.0	4.2	0	0	
23	40.2	44.7	42.9	19.6	13.1	13.9	27.2	21.2	45.8	15.6	5.8	3.4	0.5	1.1	0.8	2.2	7.3	5.0	12.0	13.9	12.7	9.8	8.1	5.4	24	45.8	0.5	15.5	0	0	
24	10.6	25.2	16.5	9.7	22.2	48.2	19.8	6.1	10.4	12.8	11.1	8.2	8.1	6.3	5.5	5.3	6.5	8.2	9.5	8.5	10.0	8.8	12.4	9.7	24	48.2	5.3	12.5	0	0	
25	8.7	7.8	11.6	6.3	9.5	10.3	14.3	11.0	14.4	16.3	13.6	13.3	13.4	C	19.5	18.4	8.7	6.5	8.5	5.9	6.1	6.8	10.9	21.2	23	21.2	5.9	11.4	0	0	
26	24.9	20.1	12.2	9.6	9.9	12.9	11.5	10.7	20.0	12.8	7.0	5.7	4.8	4.5	5.0	5.7	8.7	10.7	11.0	9.2	12.7	13.7	10.5	8.9	24	24.9	4.5	11.0	0	0	
27	11.9	11.9	12.0	10.6	11.1	10.6	9.3	8.9	8.5	0.0	0.0	M	M	M	M	M	M	8.1	15.3	29.9	30.3	21.3	19.1	18.4	18	30.3	0.0	13.2	0	0	
28	13.2	11.6	11.6	11.7	17.2	10.0	9.8	21.2	10.3	9.2	8.4	6.9	6.9	10.0	6.2	8.1	10.6	8.5	30.0	40.2	10.1	36.1	40.5	12.4	24	40.5	6.2	15.0	0	0	
29	8.2	22.3	9.0	8.4	10.4	6.7	5.3	6.5	6.4	6.8	6.2	4.5	5.8	5.4	4.4	4.6	6.6	9.1	8.4	7.7	7.8	8.5	36.4	14.2	24	36.4	4.4	9.1	0	0	
30	40.3	34.4	11.7	9.6	8.3	12.8	19.2	10.3	3.8	1.7	5.8	9.1	3.2	8.7	9.9	3.8	4.3	2.2	2.9	1.3	3.2	4.3	17.0	8.7	24	40.3	1.3	9.9	0	0	
31																									0	0.0	0.0		0	0	
Count	30	30	30	30	30	30	30	30	30	30	30	29	29	28	28	28	29	30	30	30	30	30	30	30	711						
Maximum	49.0	44.7	42.9	35.5	32.9	48.2	44.8	68.2	51.2	61.2	66.9	62.2	58.4	17.2	20.3	18.4	19.3	40.9	32.5	40.2	47.6	61.0	45.2	58.8	24						
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0						
Average	14.5	15.2	12.9	10.9	11.2	13.7	15.3	18.0	15.1	10.1	8.7	8.3	6.7	5.1	5.5	5.9	6.5	6.7	10.0	11.3	13.4	16.2	16.4	14.5							

NOx Crago Road December 2016 ppb																															
Hour																															
Day		0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>200	Days>100
1	2	5.1	4.8	3.9	3.8	3.6	4.1	5.3	4.6	5.9	3.4	3.8	5.2	6.5	5.1	5.8	5.4	5.8	9.6	5.9	4.5	3.3	3.3	3.8	3.6	24	9.6	3.3	4.8	0	0
2	3	5.1	2.0	1.3	1.5	2.1	1.7	1.3	5.1	6.8	7.3	3.0	1.9	1.7	2.4	1.0	0.7	0.0	0.0	0.0	0.0	0.0	5.4	3.5	2.9	24	7.3	0.0	2.4	0	0
3	4	0.0	0.0	0.0	0.0	0.0	1.8	1.6	3.6	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	3.4	2.4	2.4	1.3	3.2	3.9	3.4	24	22.6	0.0	2.1	0	0
4	5	13.1	7.9	3.3	1.2	0.4	1.4	0.5	3.7	2.9	1.6	13.6	1.4	0.0	0.0	0.0	0.0	0.0	1.0	0.7	4.3	6.1	4.4	3.3	10.5	24	13.6	0.0	3.4	0	0
5	6	17.2	0.3	0.0	0.9	0.9	0.2	3.2	13.8	19.7	26.2	19.3	8.1	7.5	5.9	4.4	8.3	10.0	16.7	8.2	10.2	18.2	56.7	30.8	28.6	24	56.7	0.0	13.1	0	0
6	7	23.1	21.8	18.1	17.0	36.1	15.5	23.2	12.0	9.7	21.0	14.2	10.2	4.3	9.5	2.5	2.4	3.8	2.5	3.8	2.7	3.0	3.8	2.3	1.9	24	36.1	1.9	11.0	0	0
7	8	3.7	2.2	2.9	2.5	5.7	9.0	9.8	13.9	14.5	7.6	9.6	8.7	8.8	10.5	18.9	6.5	8.8	8.1	7.6	6.8	8.4	5.9	10.9	13.3	24	18.9	2.2	8.5	0	0
8	9	11.9	10.5	8.5	7.0	8.3	6.8	6.3	7.3	8.8	10.5	8.4	8.4	9.5	8.2	6.3	8.3	8.7	6.7	8.0	8.3	10.0	11.2	4.5	10.2	24	11.9	4.5	8.4	0	0
9	10	16.1	15.0	11.2	13.0	15.1	12.2	10.9	11.3	12.3	8.4	5.5	5.7	4.5	4.1	5.5	4.7	7.5	5.2	6.3	5.2	7.2	7.3	7.5	7.7	24	16.1	4.1	8.7	0	0
10	11	6.9	8.5	7.9	6.3	7.5	12.5	10.9	18.3	27.0	11.6	12.2	11.7	9.8	5.4	3.1	9.8	11.8	20.1	18.7	15.7	15.6	9.8	10.3	11.5	24	27.0	3.1	11.8	0	0
11	12	25.8	24.0	21.4	14.6	10.8	18.0	14.3	17.0	17.4	15.5	16.3	21.3	4.7	5.5	0.0	0.0	3.7	4.0	4.3	5.7	4.3	5.2	4.3	3.5	24	25.8	0.0	10.9	0	0
12	13	3.3	3.7	3.8	4.0	7.8	3.9	7.2	21.0	20.1	10.5	8.6	10.6	C	C	2.0	1.9	2.9	1.6	2.1	5.8	6.1	2.6	0.3	0.0	22	21.0	0.0	5.9	0	0
13	14	1.3	0.0	0.3	0.0	4.1	3.6	0.1	3.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.8	10.5	10.1	8.0	11.5	1.6	1.1	1.2	0.0	24	11.5	0.0	2.5	0	0
14	15	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.1	0.6	3.3	4.4	2.0	24	4.4	0.0	0.6	0	0
15	16	0.6	0.0	0.0	1.9	1.5	0.0	0.0	1.0	5.3	6.0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	10	6.0	0.0	0.0	0	0
16	17	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0	0.0	0	0
17	18	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0	0.0	0	0
18	19	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0	0.0	0	0
19	20	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0	0.0	0	0
20	21	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0	0.0	0	0
21	22	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	6.5	6.7	9.2	9.8	6.9	11.2	18.9	30.8	33.2	9	33.2	6.5		0	0
22	23	26.3	34.8	6.7	0.4	2.4	0.9	8.9	27.8	27.8	30.0	38.9	31.3	29.9	14.9	13.5	14.0	6.6	8.3	9.3	9.2	10.3	8.0	4.5	0.0	24	38.9	0.0	15.2	0	0
23	24	0.0	0.0	0.0	0.0	1.5	2.8	5.4	4.7	10.6	12.7	8.5	2.9	2.2	1.3	0.9	2.7	6.0	0.0	0.0	0.9	0.6	0.0	2.6	2.7	24	12.7	0.0	2.9	0	0
24	25	8.8	3.2	1.8	0.0	1.1	3.3	1.7	8.3	7.9	8.8	10.6	8.6	2.0	3.0	5.1	6.9	8.1	1.8	3.8	0.1	0.8	0.0	0.0	0.9	24	10.6	0.0	4.0	0	0
25	26	2.6	3.1	8.4	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	9.2	0.0	1.0	0	0
26	27	0.0	0.0	0.0	0.0	0.0	13.1	8.8	13.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	3.2	1.7	1.5	4.3	0.8	0.8	0.0	0.0	0.0	24	13.5	0.0	2.0	0	0
27	28	0.0	0.0	0.7	0.0	0.4	0.1	0.0	1.2	0.0	0.5	0.4	1.4	0.0	0.9	0.8	1.8	1.3	1.8	1.1	1.3	0.0	1.0	1.4	0.0	24	1.8	0.0	0.7	0	0
28	29	1.9	3.4	1.4	2.2	4.2	5.1	8.0	4.3	9.6	9.6	6.3	2.0	2.4	5.1	5.7	9.0	8.1	3.6	1.1	1.7	3.0	2.7	2.2	0.6	24	9.6	0.6	4.3	0	0
29	30	2.5	1.5	2.4	2.9	1.8	1.6	1.6	2.8	2.8	3.3	7.6	14.5	10.1	12.3	9.8	9.1	10.0	9.7	11.3	6.5	8.7	5.5	8.9	9.2	24	14.5	1.5	6.5	0	0
30	31	11.5	8.6	5.3	6.3	2.8	0.7	1.5	2.0	1.3	1.3	1.3	0.5	0.7	1.0	1.5	2.9	2.3	4.9	4.0	4.4	2.4	8.0	4.9	2.1	24	11.5	0.5	3.4	0	0
31		3.5	3.7	1.9	1.8	1.7	1.6	1.7	2.6	0.8	3.0	2.8	4.0	2.0	2.2	1.9	2.3	2.3	2.7	1.9	2.4	1.9	3.6	3.7	3.8	24	4.0	0.8	2.5	0	0
Count		25	25	25	25	25	25	25	25	25	25	24	24	23	23	24	25	25	25	25	25	25	25	25	25	593					
Maximum		26.3	34.8	21.4	17.0	36.1	18.0	23.2	27.8	27.8	30.0	38.9	31.3	29.9	14.9	18.9	14.0	11.8	20.1	18.7	15.7	18.2	56.7	30.8	33.2	24					
Minimum		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0					
Average		7.6	6.4	4.5	3.9	4.8	4.8	5.3	8.1	9.3	8.0	8.0	6.6	4.6	4.2	3.7	4.3	5.1	5.3	5.0	4.8	5.0	6.8	6.0	6.1						
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100			Maximum Hourly		Maximum Daily	Maximum	
Data		0.0		0.3		1.5		2.4		3.6		5.1		7.5		9.6		13.6		19.1		30.9		56.7				Maximum Hourly		Maximum Daily	Maximum
Notes		C - Calibration / Span Cycle				NA - No Data Available				T - Test				A- MOE Audit				M - Equipment Malfunction / Down				R - Rate of Change									

Figure C-1 Time History Plots of Measured Hourly Average and 24-Hour Average NO_x Concentrations – Crago Road Station



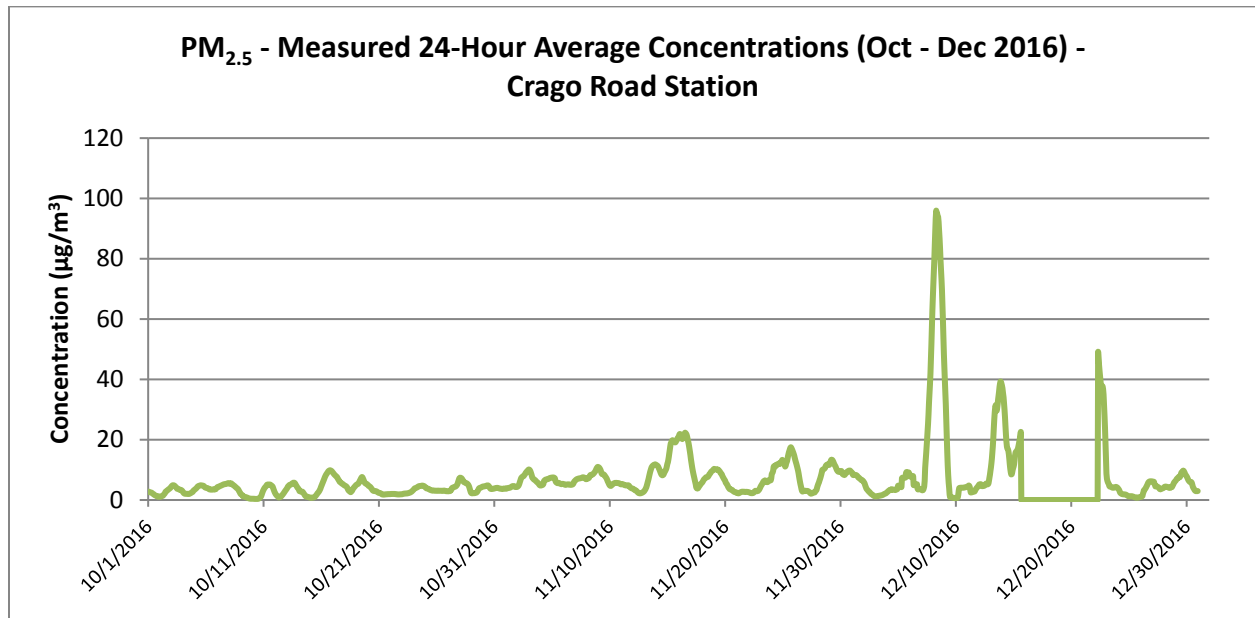
**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016**

Appendix D PM_{2.5} Data Summaries and Time History Plots
February 9, 2017

Appendix D PM_{2.5} DATA SUMMARIES AND TIME HISTORY PLOTS

PM _{2.5} - Crago Road December 2016 (µg/m³)																															
Hour																															
Day	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average			
1	8.5	7.4	8.5	12.5	11.7	11.8	10.9	6.4	4.5	6.3	6.1	4.6	3.4	4.9	6.6	5.2	4.5	3.8	3.3	3.1	4.8	4.7	3.9	3.8	24	12.5	3.1	6.3			
2	2.9	2.0	1.4	1.0	0.9	0.9	0.9	1.2	1.1	1.2	1.2	0.9	1.1	1.0	1.0	1.1	0.9	0.8	1.0	1.1	1.2	1.7	1.8	1.7	24	2.9	0.8	1.2			
3	1.9	1.9	1.6	1.3	1.6	1.8	1.9	2.0	1.8	1.4	1.8	2.1	1.7	1.9	2.4	2.2	2.3	3.0	3.0	3.5	2.7	2.8	3.4	4.6	24	4.6	1.3	2.3			
4	5.6	5.8	4.7	4.6	5.3	4.9	4.7	3.3	1.8	1.2	8.4	1.2	1.1	1.0	1.2	1.6	1.9	2.0	2.0	5.0	4.5	3.7	4.5	20.6	24	20.6	1.0	4.2			
5	19.3	1.9	2.8	3.1	3.0	3.3	2.8	5.0	73.5	4.2	3.5	2.8	2.6	2.1	1.7	2.1	36.7	12.0	2.2	2.5	3.3	4.0	4.0	3.9	24	73.5	1.7	8.4			
6	3.8	3.8	3.7	4.1	4.4	3.3	2.4	2.9	2.4	3.6	6.1	3.3	2.1	6.1	2.4	2.8	3.3	3.1	4.3	5.2	4.2	3.0	1.9	1.8	24	6.1	1.8	3.5			
7	1.9	1.0	2.4	4.1	7.5	14.8	17.6	46.0	106.6	59.3	57.7	61.7	60.7	70.1	63.0	79.8	96.2	77.6	75.4	89.0	121.8	119.8	135.3	134.6	24	135.3	1.0	62.7			
8	108.7	102.1	98.3	97.5	127.4	128.4	123.4	109.0	79.5	60.8	41.6	54.2	21.0	0.8	0.6	0.7	1.2	1.9	1.7	1.6	1.6	1.5	0.8	0.8	24	128.4	0.6	48.6			
9	1.0	1.0	0.8	0.8	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.7	0.7	0.6	0.6	1.1	24	1.1	0.5	0.7			
10	0.9	1.0	0.9	0.7	6.5	20.8	34.1	20.5	1.7	1.1	0.9	0.7	0.6	0.5	0.4	0.7	0.9	1.6	1.5	1.5	1.9	1.8	2.0	2.2	24	34.1	0.4	4.4			
11	2.9	3.4	3.4	3.7	3.7	10.5	10.6	2.0	1.9	1.9	1.9	2.2	1.7	1.8	1.0	1.5	9.0	8.2	8.5	6.8	6.4	6.4	6.7	7.8	24	10.6	1.0	4.7			
12	8.3	9.1	3.4	4.2	4.7	3.4	1.2	2.1	2.5	2.6	2.6	3.0	C	C	6.7	6.9	6.5	6.5	6.7	7.5	13.5	26.5	28.4	29.3	22	29.3	1.2	8.4			
13	34.7	33.3	34.3	39.1	49.4	49.5	61.3	73.0	68.0	55.1	38.3	17.8	4.6	13.0	27.6	37.9	45.1	37.4	38.6	45.3	39.3	43.3	24.2	15.9	24	73.0	4.6	38.6			
14	19.4	12.6	0.4	0.3	0.4	0.5	0.5	0.5	0.3	0.4	0.3	0.5	0.6	0.5	0.5	0.6	0.7	2.9	11.7	27.6	39.5	58.7	44.8	30.0	24	58.7	0.3	10.6			
15	31.5	31.5	33.0	37.3	23.6	6.3	4.5	5.3	8.1	9.8	M	M	M	M	M	M	M	M	M	M	M	M	M	M	10	37.3	4.5				
16	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0				
17	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0				
18	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0				
19	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0				
20	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0.0	0.0				
21	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	3.0	3.2	4.7	22.5	45.7	84.6	87.0	102.0	121.5	9	121.5	3.0				
22	124.7	132.3	47.4	22.4	20.1	19.5	17.4	16.9	9.8	4.1	4.7	4.8	4.8	3.9	3.4	2.6	1.4	1.4	1.4	0.7	0.6	3.3	4.6	3.8	24	132.3	0.6	19.0			
23	5.4	5.6	6.2	6.2	8.5	11.5	9.6	3.9	3.9	4.0	3.5	3.2	2.6	1.9	1.9	1.9	1.7	2.4	2.4	2.8	3.2	3.5	3.0	1.6	24	11.5	1.6	4.2			
24	2.0	1.5	1.4	0.5	0.7	0.8	1.1	1.6	1.7	1.7	2.0	2.2	1.8	1.6	1.5	1.9	1.6	1.0	0.8	0.6	0.5	0.5	0.6	0.8	24	2.2	0.5	1.3			
25	1.2	1.6	1.7	1.6	0.6	0.4	0.4	0.4	0.6	0.7	0.5	0.4	0.4	0.5	0.6	0.8	1.1	1.4	1.3	1.4	1.5	1.5	1.9	1.7	24	1.9	0.4	1.0			
26	2.1	2.1	2.3	4.4	2.9	19.0	11.9	15.9	4.2	5.2	6.1	6.3	7.5	8.5	8.4	9.9	9.3	7.1	4.9	3.2	2.2	1.7	1.4	1.7	24	19.0	1.4	6.2			
27	1.6	1.6	1.6	2.4	2.8	3.3	3.6	4.0	4.3	4.7	5.5	5.5	5.0	5.5	4.8	4.5	4.4	4.7	5.1	5.3	4.7	3.3	2.8	2.6	24	5.5	1.6	3.9			
28	4.8	5.4	5.4	4.5	3.3	2.9	2.6	2.1	4.4	4.3	3.1	2.1	3.8	6.0	6.2	7.3	5.2	4.6	10.5	13.1	12.3	12.1	10.7	7.3	24	13.1	2.1	6.0			
29	9.5	9.8	10.3	10.2	9.4	6.2	5.9	7.0	4.7	1.8	5.3	10.7	17.8	18.2	11.8	9.7	10.2	9.6	7.6	5.1	4.7	2.5	4.0	2.4	24	18.2	1.8	8.1			
30	3.1	2.8	2.1	1.4	0.9	1.6	1.8	2.3	3.4	4.1	4.1	3.6	3.5	3.3	3.3	4.0	2.8	3.3	3.0	3.3	3.0	4.5	3.2	2.3	24	4.5	0.9	2.9			
31	2.3	2.0	1.9	3.8	6.1	7.2	5.3	7.1	6.2	5.2	4.0	2.8	2.4	2.5	2.6	3.0	5.1	6.3	7.9	7.6	6.5	11.8	12.4	10.2	24	12.4	1.9	5.5			
Count	25	25	25	25	25	25	25	25	25	25	24	24	23	23	24	25	25	25	25	25	25	25	25	25	593						
Maximum	124.7	132.3	98.3	97.5	127.4	128.4	123.4	109.0	106.6	60.8	57.7	61.7	60.7	70.1	63.0	79.8	96.2	77.6	75.4	89.0	121.8	119.8	135.3	134.6	24						
Minimum	0.9	1.0	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.5	0.4	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.8	0						
Average	16.3	15.3	11.2	10.9	12.2	13.3	13.5	13.6	15.9	9.8	8.7	8.2	6.6	6.8	6.7	7.7	10.2	8.3	9.1	11.6	14.8	16.4	16.3	16.6							
Percentiles	10		20		30		40		50		60		70		80		90		95		99		100							Maximum	
Data	0.7		1.4		1.9		2.6		3.4		4.5		6.1		10.1		34.2		62.2		123.5		135.3							Maximum Hourly	
																															Maximum Daily
																															Monthly Average
Notes	C - Calibration / Span Cycle		NA - No Data Available				T - Test			A- MOE Audit			M - Equipment Malfunction / Down				R - Rate of Change														

Figure D-1 Time History Plot of Measured 24-Hour Average PM_{2.5} Concentrations – Crago Road Station



**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016**

Appendix E Continuous Parameter Edit Log
February 9, 2017

Appendix E CONTINUOUS PARAMETER EDIT LOG

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program						
Contact		Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com	
Station number:		N/A		Station Name:		Crago Road		
Station address:		Crago Road		Emitter Address:		The Region of Durham, 605 Rossland Rd, Whitby, ON		
Pollutant or parameter:		SO2	Instrument make & model:		Teledyne Monitor Labs Sulphur Dioxide Analyzer		Serial Number:	1228
Data edit period		Start date: 1-Oct-16		End date: 31-Dec-16		Time Zone : EST		
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	23-Nov-16	BB	Invalidate	13-Oct-16	04:00	13-Oct-16	06:00	Monthly calibration
2	20-Dec-16	BB	Invalidate	11-Nov-16	14:00	11-Nov-16	16:00	Monthly calibration
3	20-Dec-16	BB	Invalidate	27-Nov-16	11:00	27-Nov-16	16:00	Invalidate due to power outage
4	11-Jan-16	BB	Data Review	27-Oct-16	02:00	27-Oct-16	09:00	SO2 concentrations elevated during October 27 between 2:00 and 9:00. Concentrations were consistent with Courtice measurements and winds were from the east, for which potential SO2 emissions sources include Ontario Hydro and St. Mary's cement. Data deemed valid.
5	11-Jan-16	BB	Data Review	24-Nov-16	00:00	24-Nov-16	08:00	SO2 concentrations elevated during November 24. Concentrations were consistent with Courtice measurements and winds were from the east, for which potential SO2 emissions sources include St. Mary's cement. Data deemed valid.
6	11-Jan-16	BB	Data Review	26-Dec-16	05:00	26-Dec-16	08:00	SO2 concentrations elevated during December 26. Concentrations were consistent with Courtice measurements and winds were from the east, for which potential SO2 emissions sources include Ontario Hydro and St. Mary's cement. Data deemed valid.
7	11-Jan-16	BB	Invalidate	15-Dec-16	10:00	21-Dec-16	14:00	Data Logger malfunction - manufacturer was unable to retrieve data. Data invalidated.
8	11-Jan-16	BB	Invalidate	12-Dec-16	12:00	12-Dec-16	14:00	Monthly calibration

Examples of Acceptable Edit Actions:

Add offset of

Delete hours

Zero Correction

Slope Correction

Manual data entry for missing, but collected data

Invalidating span & zero check data

Invalidating data due to equipment malfunctions and power failures.

Invalidating data when instrumentation off-line

Marking data as out-of-range

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program						
Contact		Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com	
Station number:		N/A		Station Name:		Crago Road		
Station address:		Crago Road		Emitter Address:		The Region of Durham, 605 Rossland Rd, Whitby, ON		
Pollutant or parameter:		NOx	Instrument make & model:		API Model 200E Chemiluminescence Analyzer		Serial Number:	1424
Data edit period		Start date: 1-Oct-16		End date: 31-Dec-16		Time Zone : EST		
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
1	23-Nov-16	BB	Invalidate	13-Oct-16	04:00	13-Oct-16	06:00	Monthly calibration
2	20-Dec-16	BB	Invalidate	11-Nov-16	14:00	11-Nov-16	16:00	Monthly calibration
3	20-Dec-16	BB	Invalidate	27-Nov-16	11:00	27-Nov-16	16:00	Invalidate due to power outage
4	20-Dec-16	BB	Invalidate	25-Nov-16	13:00	25-Nov-16	13:00	Calibration for new Nox analyzer
5	20-Dec-16	BB	Zero Correction	25-Nov-16	14:00	3-Dec-16	08:00	Zero drift correction applied during stabilization period between November 25 at 14:00 and December 3 at 15:00 for a replacement NO _x analyzer while the regular unit was removed for routine overhaul. A NO _x offset of 0 ppb on November 25 at 14:00 which varied linearly to 30.5 ppb on December 3 at 8:00 was applied. For NO, a polynomial zero correction was applied based on an analysis of the measured zero values. NO ₂ was calculated based on the difference between the zero adjusted values for NO and NO _x .
6	11-Jan-16	BB	Data Review	19-Oct-16	06:00	19-Oct-16	23:00	NO ₂ and NO concentrations were elevated during October 19 between 6:00 and 23:00. Concentrations were consistent with Courtice and Rundle measurements and winds were from the north. Potential emissions sources include Highway 401 and the CN railway. Data deemed valid.
7	11-Jan-16	BB	Data Review	24-Nov-16	00:00	24-Nov-16	08:00	NO _x concentrations were elevated during November 24. Concentrations were consistent with Courtice measurements and winds were from the east, for which potential emissions sources include St. Mary's cement. Data deemed valid.
8	11-Jan-16	BB	Data Review	9-Nov-16	21:00	10-Nov-16	08:00	NO _x concentrations elevated during November 9-10. Concentrations were consistent with Courtice measurements and winds were from the north, for which potential emissions sources include Highway 401 and a CN railway. Data deemed valid.
9	11-Jan-16	BB	Data Review	5-Dec-16	20:00	6-Dec-16	05:00	NO _x concentrations elevated during December 5-6. Concentrations were consistent with Courtice WPCP Station measurements and winds were from the west, indicating that the emissions source originated to the west of the Courtice WPCP Station. Data deemed valid.
10	11-Jan-16	BB	Invalidate	15-Dec-16	10:00	21-Dec-16	14:00	Data Logger malfunction - manufacturer was unable to retrieve data. Data invalidated.
11	11-Jan-16	BB	Invalidate	12-Dec-16	12:00	12-Dec-16	13:00	Monthly calibration

Examples of Acceptable Edit Actions:

Add offset of
 Delete hours
 Zero Correction
 Slope Correction
 Manual data entry for missing, but collected data

Invalidating span & zero check data
 Invalidating data due to equipment malfunctions and power failures.
 Invalidating data when instrumentation off-line
 Marking data as out-of-range

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program							
Contact		Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:		N/A		Station Name:		Crago Road			
Station address:		Crago Road		Emitter Address:		The Region of Durham, 605 Rossland Rd, Whitby, ON			
Pollutant or parameter:		PM2.5	Instrument make & model:		Thermo Sharp 5030 Synchronized Hybrid Ambient Real-time		Serial Number:	CM 0269	
Data edit period		Start date:	1-Oct-16	End date:	31-Dec-16	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason	
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)		
1	23-Nov-16	BB	Invalidate	13-Oct-16	04:00	13-Oct-16	06:00	Monthly calibration	
2	20-Dec-16	BB	Invalidate	11-Nov-16	14:00	11-Nov-16	16:00	Monthly calibration	
3	20-Dec-16	BB	Invalidate	27-Nov-16	11:00	27-Nov-16	16:00	Invalidate due to power outage	
4	11-Jan-16	BB	Data Review	27-Oct-16	12:00	28-Oct-16	00:00	PM2.5 concentrations elevated during October 27 between 12:00 and midnight on October 28. Concentrations were consistent with Rundle measurements and winds were from the north, for which potential emissions sources could be Highway 401 or Hwy 418 construction. Data deemed valid.	
5	11-Jan-16	BB	Data Review	24-Nov-16	00:00	24-Nov-16	08:00	PM2.5 concentrations elevated during November 24. Concentrations were consistent with Courtice measurements and winds were from the east, for which potential emissions sources include agricultural areas and St. Mary's cement. Data deemed valid.	
6	11-Jan-16	BB	Data Review	7-Dec-16	08:00	8-Dec-16	12:00	PM2.5 concentrations elevated during December 7-8. Winds were moderate (~20 km/h) and from the west, in the direction of DYEC. NOx/NO2 measurements at both the Courtice WPCP and Crago Road Stations had very similar trends and magnitudes over this period, indicating that the source(s) of NOx/NO2 measured at the Crago Road Station originated upwind of the Courtice WPCP Station. Measured PM2.5 concentrations at the Courtice WPCP Station were much lower than those at the Crago Road Station, indicating that the elevated PM2.5 levels measured at the Crago Road Station originated from a non-combustion emissions source located between the two monitoring stations. Possible sources for the PM2.5 measurements could be wind erosion off roads and an agricultural field to the west of the Crago Road Station.	
7	11-Jan-16	BB	Data Review	21-Dec-16	20:00	22-Dec-16	03:00	PM2.5 concentrations elevated during December 21-22. Winds were from the north, for which potential emissions sources could be Highway 401 or Hwy 418 construction. Hydro workers noted on December 21 towards the north. Data deemed valid.	
8	11-Jan-16	BB	Invalidate	15-Dec-16	10:00	21-Dec-16	14:00	Data Logger malfunction - manufacturer was unable to retrieve data. Data invalidated.	
9	11-Jan-16	BB	Invalidate	12-Dec-16	12:00	12-Dec-16	13:00	Monthly calibration	
10	20-Jan-16	BB	Data Review	5-Dec-16	08:00	5-Dec-16	09:00	PM2.5 concentrations elevated during December 5 at 8 AM. Winds were from the west for which potential emissions sources could be Highway 401 or Hwy 418 construction or activity in agricultural field to the west. Review of minute data showed a gradual increase and decrease in concentration. Data deemed valid.	

Examples of Acceptable Edit Actions:

Add offset of
 Delete hours
 Zero Correction
 Slope Correction
 Manual data entry for missing, but collected data
 Invalidating span & zero check data
 Invalidating data due to equipment malfunctions and power failures.
 Marking data as out-of-range

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program						
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A		Station Name:	Crago Road				
Station address:	Crago Road		Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON				
Pollutant or parameter:	Temperature	Instrument make & model:		Campbell Scientific Model HMP60				
Data edit period	Start date:	1-Oct-16	End date:	31-Dec-16	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	20-Dec-16	BB	Invalidate	27-Nov-16	11:00	27-Nov-16	16:00	Invalidate due to power outage
2	11-Jan-16	BB	Invalidate	15-Dec-16	10:00	21-Dec-16	14:00	Data Logger malfunction - manufacturer was unable to retrieve data. Data invalidated.

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program						
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A		Station Name:	Crago Road				
Station address:	Crago Road		Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON				
Pollutant or parameter:	Rainfall	Instrument make & model:		Texas Electronic TES25M				
Data edit period	Start date:	1-Oct-16	End date:	31-Dec-16		Time Zone : EST		
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	20-Dec-16	BB	Invalidate	27-Nov-16	11:00	27-Nov-16	16:00	Invalidate due to power outage
2	11-Jan-16	BB	Invalidate	15-Dec-16	10:00	21-Dec-16	14:00	Data Logger malfunction - manufacturer was unable to retrieve data. Data invalidated.

Examples of Acceptable Edit Actions:

Add offset of
Delete hours
Zero Correction
Slope Correction
Manual data entry for missing, but collected data
Invalidating span & zero check data
Invalidating data due to equipment malfunctions and power failures.
Invalidating data when instrumentation off-line

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program						
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A		Station Name:	Crago Road				
Station address:	Crago Road		Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON				
Pollutant or parameter:	Relative Humidity	Instrument make & model:		Campbell Scientific Model HMP60				
Data edit period	Start date:	1-Oct-16	End date:	31-Dec-16		Time Zone : EST		
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	20-Dec-16	BB	Invalidate	27-Nov-16	11:00	27-Nov-16	16:00	Invalidate due to power outage
2	11-Jan-16	BB	Invalidate	15-Dec-16	10:00	21-Dec-16	14:00	Data Logger malfunction - manufacturer was unable to retrieve data. Data invalidated.

EDIT LOG TABLE

Project Name		Durham York Energy Centre Ambient Air Monitoring Program						
Contact	Greg Crooks / Connie Lim / Tim Hung		Phone:	905-944-7777	E-mail:	greg.crooks@stantec.com, connie.lim@stantec.com, tim.hung@stantec.com		
Station number:	N/A		Station Name:	Crago Road				
Station address:	Crago Road		Emitter Address:	The Region of Durham, 605 Rossland Rd, Whitby, ON				
Pollutant or parameter:	Wind Speed/Wind Direction	Instrument make & model:		Met One Instruments Inc. Model 034B				
Data edit period	Start date:	1-Oct-16	End date:	31-Dec-16	Time Zone : EST			
Edit #	Edit date	Editor's Name	Edit Action	Starting		Ending		Reason
				Date (dd/mm/yyyy)	Hour (xx:xx)	Date (dd/mm/yyyy)	Hour (xx:xx)	
1	20-Dec-16	BB	Invalidate	27-Nov-16	11:00	27-Nov-16	16:00	Invalidate due to power outage
2	11-Jan-16	BB	Invalidate	15-Dec-16	10:00	21-Dec-16	14:00	Data Logger malfunction - manufacturer was unable to retrieve data. Data invalidated.

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016**

Appendix F Metals Data Summary
February 9, 2017

Appendix F METALS DATA SUMMARY

Metals and Total Particulates				Crago Station															
Location Date	dd/mm/yyyy			Crago 03/10/2016	Crago 09/10/2016	Crago 15/10/2016	Crago 21/10/2016	Crago 27/10/2016	Crago 02/11/2016	Crago 08/11/2016	Crago 14/11/2016	Crago 20/11/2016	Crago 26/11/2016	Crago 02/12/2016	Crago 08/12/2016	Crago 14/12/2016	Crago 20/12/2016	Crago 26/12/2016	
Start Time	hh:mm			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	
Sample Duration	Hours			23.16	23.43	22.91	24.29	23.25	23.64	23.87	23.3	23.53	22.71	24.24	23.17	23.11	23.7	23.76	
Technician	TH			TH	TH	TH	TH	TH	TH	KM	TH	TH	TH	TH	TH	TH	TH	0	
Filter Number				16090714	16090718	16090688	16090692	16091953	16091957	16092078	16092085	16092089	16092093	16111067	16111071	16112979	16112983	16120598	
Analytical Report #				B6L4663	B6M0586	B6M4161	B6N2118	B6N5701	B6O1408	B6O4935	B6P2340	B6P4192	B6P9733	B6Q5542	B6R1170	B6R5528	B6R8495	B6S0285	
Total Volumetric Flow	Am ³ /sample			1465.56	1503.36	1502.35	1658.22	1465.95	1509.71	1478.38	1504.15	1518.96	1447.83	1547.65	1534.64	1418.89	1459.89	1489.24	
Analytical Results	Units			Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL
Particulate	mg			28.4	5.0	15.8	5.0	23.2	5.0	20.9	5.0	41.4	5.0	62.9	5.0	57.0	5.0	74.1	5.0
Total Mercury (Hg)	µg			<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02
Aluminum (Al)	µg			126	50	60	50	116	50	78	50	257	50	253	50	239	50	406	50
Antimony (Sb)	µg			<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10
Arsenic (As)	µg			<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0
Barium (Ba)	µg			12.1	1.0	6.6	1.0	7.2	1.0	4.7	1.0	6.4	1.0	28.7	1.0	21.1	1.0	20.1	1.0
Beryllium (Be)	µg			<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0
Bismuth (Bi)	µg			<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0
Boron (B)	µg			<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0	<6.0	6.0
Cadmium (Cd)	µg			<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0
Chromium (Cr)	µg			<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0
Cobalt (Co)	µg			<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0	<2.0	2.0
Copper (Cu)	µg			68.5	5.0	40.1	5.0	57.4	5.0	40.0	5.0	26.0	5.0	61.6	5.0	58.2	5.0	50.1	5.0
Iron (Fe)	µg			395	50	228	50	321	50	186	50	495	50	930	50	752	50	1150	50
Lead (Pb)	µg			<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	5.6	3.0	9.1	3.0	8.1	3.0	<3.0	3.0
Magnesium (Mg)	µg			172	50	88	50	149	50	111	50	269	50	429	50	454	50	776	50
Manganese (Mn)	µg			8.8	1.0	5.9	1.0	8.8	1.0	7.1	1.0	15.8	1.0	30.9	1.0	27.9	1.0	43.7	1.0
Molybdenum (Mo)	µg			<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0
Nickel (Ni)	µg			<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0
Phosphorus (P)	µg			95	25	44	25	30	25	58	25	48	25	60	25	52	25	62	25
Selenium (Se)	µg			<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10
Silver (Ag)	µg			<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0
Strontium (Sr)	µg			6.2	1.0	2.1	1.0	4.0	1.0	2.3	1.0	13.5	1.0	11.1	1.0	11.3	1.0	14.5	1.0
Thallium (Tl)	µg			<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10
Tin (Sn)	µg			<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10
Titanium (Ti)	µg			<10	10	<10	10	<10	10	<10	10	11	10	20	10	18	10	23	10
Vanadium (V)	µg			<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0
Zinc (Zn)	µg			21.7	5.0	12.7	5.0	18.5	5.0	13.2	5.0	17.4	5.0	67.9	5.0	69.3	5.0	73.6	5.0
Zirconium (Zr)	µg			<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0
Total Uranium (U)	µg			<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45	<0.45	0.45
Calculated Concentrations	Quarter 4 2016			Crago 41	Crago 42	Crago 43	Crago 44	Crago 45	Crago 46	Crago 47	Crago 48	Crago 49	Crago 50	Crago 51	Crago 52	Crago 53	Crago 54	Crago 55	
	Units	Maximum	Minimum																
				03/10/2016	09/10/2016	15/10/2016	21/10/2016	27/10/2016	02/11/2016	08/11/2016	14/11/2016	20/11/2016	26/11/2016	02/12/2016	08/12/2016	14/12/2016	20/12/2016	26/12/2016	
Particulate	µg/m3	49.26	10.51	19.38	10.51	15.44	12.60	28.24	41.66	38.56	49.26	15.93	14.23	15.44	33.56	38.34	24.25	12.49	
Total Mercury (Hg)	µg/m3	1.3E-05	6.0E-06	6.82E-06	6.65E-06	6.66E-06	6.03E-06	6.82E-06	1.32E-05	6.76E-06	1.33E-05	6.58E-06	6.91E-06	6.46E-06	1.30E-05	7.05E-06	6.85E-06	6.71E-06	
Aluminum (Al)	µg/m3	2.7E-01	4.0E-02	8.60E-02	3.99E-02	7.72E-02	1.68E-01	1.75E-01	1.68E-01	1.62E-01	2.70E-01	1.68E-02	1.78E-01	7.82E-02	9.71E-02	1.22E-01	5.34E-02	6.65E-02	
Antimony (Sb)	µg/m3	3.5E-03	3.0E-03	3.41E-03	3.33E-03	3.33E-03	3.02E-03	3.41E-03	3.31E-03	3.38E-03	3.32E-03	3.29E-03	3.45E-03	3.23E-03	3.26E-03	3.52E-03	3.42E-03	3.36E-03	
Arsenic (As)	µg/m3	2.1E-03	1.8E-03	2.05E-03	2.00E-03	2.00E-03	1.81E-03	2.05E-03	1.99E-03	2.03E-03	1.99E-03	1.98E-03	2.07E-03	1.94E-03	1.95E-03	2.11E-03	2.05E-03	2.01E-03	
Barium (Ba)	µg/m3	1.9E-02	2.8E-03	8.26E-03	4.39E-03	4.79E-03	2.83E-03	4.37E-03	1.90E-02	1.43E-02	1.34E-02	4.41E-03	7.67E-03	7.37E-03	6.39E-03	6.06E-03	5.07E-03	4.36E-03	
Beryllium (Be)	µg/m3	3.5E-04	3.0E-04	3.41E-04	3.33E-04	3.33E-04	3.02E-04	3.41E-04	3.31E-04	3.38E-04	3.32E-04	3.29E-04	3.45E-04	3.23E-04	3.26E-04	3.52E-04	3.42E-04	3.36E-04	
Bismuth (Bi)	µg/m3	2.1E-03	1.8E-03	2.05E-03	2.00E-03	2.00E-03	1.81E-03	2.05E-03	1.99E-03	2.03E-03	1.99E-03	1.98E-03	2.07E-03	1.94E-03	1.95E-03	2.11E-03	2.05E-03	2.01E-03	
Boron (B)	µg/m3	2.1E-03	1.8E-03	2.05E-03	2.00E-03	2.00E-03	1.81E-03	2.05E-03	1.99E-03	2.03E-03	1.99E-03	1.98E-03	2.07E-03	1.94E-03	1.95E-03	2.11E-03	2.05E-03	2.01E-03	
Cadmium (Cd)	µg/m3	7.0E-04	6.0E-04	6.82E-04	6.66E-04	6.66E-04	6.03E-04	6.82E-04	6.62E-04	6.76E-04	6.65E-04	6.58E-04	6.91E-04	6.46E-04	6.52E-04	7.05E-04	6.85E-04	6.71E-04	
Chromium (Cr)	µg/m3	5.1E-03	1.5E-03	1.71E-03	1.66E-03	1.66E-03	1.51E-03	1.71E-03	1.66E-03	1.69E-03	1.66E-03	1.65E-03	1.73E-03	1.62E-03	3.32E-03	5.07E-03	1.71E-03	1.68E-03	
Cobalt (Co)	µg/m3	7.0E-04	6.0E-04	6.82E-04	6.65E-04	6.66E-04	6.03E-04	6.82E-04	6.62E-04	6.76E-04	6.65E-04	6.58E-04	6.91E-04	6.46E-04	6.52E-04	7.05E-04	6.85E-04	6.71E-04	
Copper (Cu)	µg/m3	4.7E-02	1.5E-02	4.67E-02	2.67E-02	3.82E-02	2.41E-02	1.77E-02	4.08E-02	3.94E-02	3.33E-02	2.14E-02	2.24E-02						

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016**

Appendix G PAHs Data Summary
February 9, 2017

Appendix G PAHS DATA SUMMARY

Polycyclic Aromatic Hydrocarbons	Crago Road Station																		
Location Date	dd/mm/yyyy			Crago 03/10/2016		Crago 15/10/2016		Crago 27/10/2016		Crago 08/11/2016		Crago 20/11/2016		Crago 02/12/2016		Crago 14/12/2016		Crago 26/12/2016	
Start Time	hh:mm			0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00	
Sample Duration	Hours			24.06		23.62		23.25		23.68		23.96		23.67		23.96		23.53	
Technician	TH			TH		TH		TH		KM		TH		TH		TH		TH	
Filter Number				CXB830-01		DAQ812-01		CAR655-01		DAR744-01		DGG898-01		DGH086-01		DGH054-01		DGH108-01	
Maxaam ID				DER865		DGO853		DIZ341		DKT738		DMN706		DOT074		DQP480		DRM514	
Analytical Report #				B6L4670		B6M4139		B6N5707		B6O4945		B6P4176		B6Q5560		B6R5540		B6S0271	
Total Volumetric Flow	Am ³ /sample			370.15		366.97		383.65		361.57		377.98		336.69		374.02		370.14	
Analytical Results	Units			Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL
Benzo(a)pyrene	µg			0.0176	0.030	0.0086	0.030	0.0108	0.030	0.025	0.030	<0.0038	0.030	0.00348	0.020	0.0093	0.030	0.0173	0.020
1-Methylnaphthalene	µg			1.17	0.15	1.03	0.15	1.16	0.15	3.61	0.15	0.50	0.15	1.00	0.10	0.99	0.15	1.24	0.10
2-Methylnaphthalene	µg			1.89	0.15	1.61	0.15	1.59	0.15	5.30	0.15	0.76	0.15	1.55	0.10	1.40	0.15	1.73	0.10
Acenaphthene	µg			0.942	0.075	1.02	0.075	0.261	0.075	0.651	0.075	0.210	0.075	0.234	0.050	0.102	0.075	0.272	0.050
Acenaphthylene	µg			<0.075	0.075	<0.075	0.075	<0.075	0.075	0.147	0.075	<0.075	0.075	0.074	0.050	<0.075	0.075	<0.050	0.050
Anthracene	µg			0.330	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Benzo(a)anthracene	µg			<0.075	0.075	<0.075	0.075	<0.075	0.075	0.087	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Benzo(a)fluorene	µg			<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Benzo(b)fluoranthene	µg			<0.075	0.075	<0.075	0.075	<0.075	0.075	0.213	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Benzo(b)fluorene	µg			<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Benzo(e)pyrene	µg			<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Benzo(g,h,i)perylene	µg			<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Benzo(k)fluoranthene	µg			<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Biphenyl	µg			0.62	0.15	0.58	0.15	0.55	0.15	1.82	0.15	0.27	0.15	0.43	0.10	0.61	0.15	0.70	0.10
Chrysene	µg			<0.075	0.075	<0.075	0.075	<0.075	0.075	0.165	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Dibenz(a,h)anthracene	µg			<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Dibenzo(a,c) anthracene + Picene	µg			<0.10	0.10	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15
Fluoranthene	µg			0.477	0.075	0.300	0.075	0.123	0.075	0.636	0.075	<0.075	0.075	0.114	0.050	0.123	0.075	0.230	0.050
Indeno(1,2,3-cd)pyrene	µg			<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.050	0.050
Naphthalene	µg			4.87	0.11	5.33	0.11	5.27	0.11	24.3	0.11	2.64	0.11	4.88	0.072	6.33	0.11	7.26	0.072
o-Terphenyl	µg			<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Perylene	µg			<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10
Phenanthrene	µg			2.77	0.075	1.52	0.075	0.510	0.075	2.10	0.075	0.276	0.075	0.516	0.050	0.399	0.075	0.762	0.050
Pyrene	µg			0.258	0.075	0.123	0.075	<0.075	0.075	0.417	0.075	<0.075	0.075	0.078	0.050	<0.075	0.075	0.122	0.050
Tetralin	µg			0.44	0.15	0.29	0.15	0.52	0.15	1.79	0.15	0.45	0.15	0.66	0.10	0.77	0.15	0.59	0.10
Calculated Concentrations	Quarter 4 2016			Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago	
				24		25		26		27		28		29		30		31	
	Units	Maximum	Minimum	03/10/2016	15/10/2016	27/10/2016	08/11/2016	20/11/2016	02/12/2016	14/12/2016	26/12/2016								
Benzo(a)pyrene	ng/m ³	6.91E-02	1.03E-02	4.75E-02	2.34E-02	2.82E-02	6.91E-02	3.97E-02	1.03E-02	2.49E-02	4.67E-02								
1-Methylnaphthalene	ng/m ³	9.98E+00	1.32E+00	3.16E+00	2.81E+00	3.02E+00	9.98E+00	1.32E+00	2.97E+00	2.65E+00	3.35E+00								
2-Methylnaphthalene	ng/m ³	1.47E+01	2.01E+00	5.11E+00	4.39E+00	4.14E+00	1.47E+01	2.01E+00	4.60E+00	3.74E+00	4.67E+00								
Acenaphthene	ng/m ³	2.78E+00	2.73E-01	2.54E+00	2.78E+00	6.80E-01	1.80E+00	5.56E-01	6.95E-01	2.73E-01	7.35E-01								
Acenaphthylene	ng/m ³	4.07E-01	6.75E-02	1.01E-01	1.02E-01	9.77E-02	4.07E-01	9.92E-02	2.20E-01	1.00E-01	6.75E-02								
Anthracene	ng/m ³	8.92E-01	6.75E-02	8.92E-01	1.02E-01	9.77E-02	1.04E-01	9.92E-02	7.43E-02	1.00E-01	6.75E-02								
Benzo(a)anthracene	ng/m ³	2.41E-01	6.75E-02	1.01E-01	1.02E-01	9.77E-02	2.41E-01	9.92E-02	7.43E-02	1.00E-01	6.75E-02								
Benzo(a)fluorene	ng/m ³	2.07E-01	1.35E-01	2.03E-01	2.04E-01	1.95E-01	2.07E-01	1.98E-01	1.49E-01	2.01E-01	1.35E-01								
Benzo(b)fluoranthene	ng/m ³	5.89E-01	6.75E-02	1.01E-01	1.02E-01	9.77E-02	5.89E-01	9.92E-02	7.43E-02	1.00E-01	6.75E-02								
Benzo(b)fluorene	ng/m ³	2.07E-01	1.35E-01	2.03E-01	2.04E-01	1.95E-01	2.07E-01	1.98E-01	1.49E-01	2.01E-01	1.35E-01								
Benzo(e)pyrene	ng/m ³	2.07E-01	1.35E-01	2.03E-01	2.04E-01	1.95E-01	2.07E-01	1.98E-01	1.49E-01	2.01E-01	1.35E-01								
Benzo(g,h,i)perylene	ng/m ³	1.04E-01	6.75E-02	1.01E-01	1.02E-01	9.77E-02	1.04E-01	9.92E-02	7.43E-02	1.00E-01	6.75E-02								
Benzo(k)fluoranthene	ng/m ³	1.04E-01	6.75E-02	1.01E-01	1.02E-01	9.77E-02	1.04E-01	9.92E-02	7.43E-02	1.00E-01	6.75E-02								
Biphenyl	ng/m ³	5.03E+00	7.14E-01	1.68E+00	1.58E+00	1.43E+00	5.03E+00	7.14E-01	1.28E+00	1.63E+00	1.89E+00								
Chrysene	ng/m ³	4.56E-01	6.75E-02	1.01E-01	1.02E-01	9.77E-02	4.56E-01	9.92E-02	7.43E-02	1.00E-01	6.75E-02								
Dibenz(a,h)anthracene	ng/m ³	1.04E-01	6.75E-02	1.01E-01	1.02E-01	9.77E-02	1.04E-01	9.92E-02	7.43E-02	1.00E-01	6.75E-02								
Dibenzo(a,c) anthracene + Picene	ng/m ³	2.04E-01	1.35E-01	1.35E-01	2.04E-01	1.95E-01	1.38E-01	1.98E-01	1.49E-01	2.01E-01	2.03E-01								
Fluoranthene	ng/m ³	1.76E+00	9.92E-02	1.29E+00	8.18E-01	3.21E-01	1.76E+00	9.92E-02	3.39E-01	3.29E-01	6.21E-01								
Indeno(1,2,3-cd)pyrene	ng/m ³	1.04E-01	6.75E-02	1.01E-01	1.02E-01	9.77E-02	1.04E-01	9.92E-02	7.43E-02	1.00E-01	6.75E-02								
Naphthalene	ng/m ³	6.72E+01	6.98E+00	1.32E+01	1.45E+01	1.37E+01	6.72E+01	6.98E+00	1.45E+01	1.69E+01	1.96E+01								
o-Terphenyl	ng/m ³	2.07E-01	1.35E-01	2.03E-01	2.04E-01	1.95E-01	2.07E-01	1.98E-01	1.49E-01	2.01E-01	1.35E-01								
Perylene	ng/m ³	2.07E-01	1.35E-01	2.03E-01	2.04E-01	1.95E-01	2.07E-01	1.98E-01	1.49E-01	2.01E-01	1.35E-01								
Phenanthrene	ng/m ³	7.48E+00	7.30E-01	7.48E+00	4.14E+00	1.33E+00	5.81E+00	7.30E-01	1.53E+00	1.07E+00	2.06E+00								
Pyrene	ng/m ³	1.15E+00	9.77E-02	6.97E-01	3.35E-01	9.77E-02	1.15E+00	9.92E-02	2.32E-01	1.00E-01	3.30E-01								
Tetralin	ng/m ³	4.95E+00	7.90E-01	1.19E+00	7.90E-01	1.36E+00	4.95E+00	1.19											

**QUARTERLY AMBIENT AIR QUALITY MONITORING REPORT FOR THE DURHAM YORK ENERGY CENTRE
(CRAGO ROAD STATION) – OCTOBER TO DECEMBER 2016**

Appendix H Dioxins and Furans Data Summary
February 9, 2017

Appendix H DIOXINS AND FURANS DATA SUMMARY

Dioxins and Furans	Crago Road Station																		
Location		Crago			Crago			Crago			Crago			Crago			Crago		
Date	dd/mm/yyyy	03/10/2016			15/10/2016			27/10/2016			08/11/2016			20/11/2016			14/12/2016		
Start Time	hh:mm	0:00			0:00			0:00			0:00			0:00			0:00		
Sample Duration	Hours	24.06			23.62			23.25			23.68			23.96			23.96		
Technician		TH			TH			TH			KM			TH			TH		
Filter Number		CX8830-01			DAQ812-01			CAR655-01			DAR744-01			DGG898-01			DGH054-01		
Maxaam ID		DER865			DGO853			DIZ341			DKT738			DMN706			DQP480		
Maxxam Job #		B6L4670			B6M4139			B6N5707			B6O4945			B6P4176			B6R5540		
Total Volumetric Flow	Am ³ /sample	370.15			366.97			383.65			361.57			377.98			374.02		
Analytical Results	Units	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF	Value	EDL	WHO ₂₀₀₅ TEF
2,3,7,8-Tetra CDD *	pg	<2.8	2.8	1	<2.7	2.7	1	<3.5	3.5	1	<3.1	3.1	1	<3.6	3.6	1	<2.5	2.5	1
1,2,3,7,8-Penta CDD *	pg	<3.6	3.6	1	<3.7	3.7	1	<3.3	3.3	1	<3.5	3.5	1	<3.5	3.5	1	<2.9	2.9	1
1,2,3,4,7,8-Hexa CDD *	pg	<4.5	4.5	0.1	<4.0	4.0	0.1	<3.6	3.6	0.1	<3.0	3.0	0.1	<3.6	3.6	0.1	<3.2	3.2	0.1
1,2,3,6,7,8-Hexa CDD *	pg	<4.6	4.6	0.1	<4.0	4.0	0.1	<3.7	3.7	0.1	<3.0	3.0	0.1	<3.6	3.6	0.1	<3.4	3.4	0.1
1,2,3,7,8,9-Hexa CDD *	pg	<4.2	4.2	0.1	<3.7	3.7	0.1	<3.4	3.4	0.1	<6.6 (1)	6.6	0.1	<3.3	3.3	0.1	<3.0	3.0	0.1
1,2,3,4,6,7,8-Hepta CDD *	pg	9.8	3.3	0.01	14.4	2.6	0.01	11.8	3.2	0.01	43.7	3.2	0.01	<8.5 (1)	8.5	0.01	7.3	3.4	0.01
Octa CDD *	pg	57.0	3.7	0.0003	92.9	3.9	0.0003	52.1	3.2	0.0003	167	3.2	0.0003	34.3	3.5	0.0003	17.9	2.2	0.0003
Total Tetra CDD *	pg	<7.1 (1)	7.1		<7.0 (1)	7.0		<12 (1)	12		<3.1	3.1		<4.6 (1)	4.6		<2.5	2.5	
Total Penta CDD *	pg	<10 (1)	10		<5.3 (1)	5.3		<6.1 (1)	6.1		<6.3 (2)	6.3		<3.5	3.5		<2.9	2.9	
Total Hexa CDD *	pg	<9.3 (1)	9.3		6.0	3.9		<16 (1)	16		25.0	2.9		<12 (1)	12		5.9	3.2	
Total Hepta CDD *	pg	17.7	3.3		31.9	2.6		11.8	3.2		103	3.2		9.0	3.5		13.6	3.4	
2,3,7,8-Tetra CDF **	pg	<3.9	3.9	0.1	<3.4	3.4	0.1	<3.3	3.3	0.1	<5.5 (3)	5.5	0.1	<3.4	3.4	0.1	<3.1	3.1	0.1
1,2,3,7,8-Penta CDF **	pg	<2.7	2.7	0.03	<4.0	4.0	0.03	<3.7	3.7	0.03	<3.2	3.2	0.03	<3.3	3.3	0.03	<2.7	2.7	0.03
2,3,4,7,8-Penta CDF **	pg	<2.7	2.7	0.3	<4.0	4.0	0.3	<3.7	3.7	0.3	<3.2	3.2	0.3	<3.3	3.3	0.3	<2.8	2.8	0.3
1,2,3,4,7,8-Hexa CDF **	pg	<3.3	3.3	0.1	<2.4	2.4	0.1	3.6	3.3	0.1	5.4	3.3	0.1	<3.2	3.2	0.1	4.8	2.9	0.1
1,2,3,6,7,8-Hexa CDF **	pg	<3.1	3.1	0.1	<2.3	2.3	0.1	<3.2	3.2	0.1	<3.2	3.2	0.1	<3.1	3.1	0.1	3.3	2.9	0.1
2,3,4,6,7,8-Hexa CDF **	pg	<3.5	3.5	0.1	<2.5	2.5	0.1	<3.5	3.5	0.1	<3.5	3.5	0.1	<3.4	3.4	0.1	<3.1	3.1	0.1
1,2,3,7,8,9-Hexa CDF **	pg	<3.6	3.6	0.1	<2.6	2.6	0.1	<3.7	3.7	0.1	<3.6	3.6	0.1	<3.5	3.5	0.1	<3.3	3.3	0.1
1,2,3,4,6,7,8-Hepta CDF **	pg	<3.3 (1)	3.3	0.01	<4.0	4.0	0.01	<3.3 (1)	3.3	0.01	9.6	2.9	0.01	<3.0	3.0	0.01	15.1	2.0	0.01
1,2,3,4,7,8,9-Hepta CDF **	pg	<3.4	3.4	0.01	<4.7	4.7	0.01	<3.8	3.8	0.01	<3.4	3.4	0.01	<3.5	3.5	0.01	<2.6	2.6	0.01
Octa CDF **	pg	4.3	3.8	0.0003	5.2	3.4	0.0003	4.5	3.1	0.0003	<8.0 (3)	8.0	0.0003	<3.2	3.2	0.0003	3.5	3.0	0.0003
Total Tetra CDF **	pg	<3.9	3.9		<3.4	3.4		<3.3	3.3		<5.5 (3)	5.5		<3.4	3.4		<3.1	3.1	
Total Penta CDF **	pg	<2.7 (1)	2.7		<4.0	4.0		<3.7	3.7		<3.4 (3)	3.4		<3.3	3.3		6.3	2.8	
Total Hexa CDF **	pg	<3.4	3.4		<2.4	2.4		3.6	3.4		12.2	3.4		<3.3	3.3		14.9	3.0	
Total Hepta CDF **	pg	<3.3 (1)	3.3		<4.3	4.3		<3.6 (1)	3.6		13.7	3.1		<3.2	3.2		15.1	2.3	
TOTAL TOXIC EQUIVALENCY	pg																		

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.
(2) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.
(3) EMPC / Merged Peak
(4) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.
(5) Additional dioxin/ furan ambient sampling requested by the Regional Municipality of Durham
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Calculated Concentrations	Quarter 4 2016			Crago	Crago	Crago	Crago	Crago	Crago
				15	16	17	18	19	20
	Units	Maximum	Minimum	03/10/2016	15/10/2016	27/10/2016	08/11/2016	20/11/2016	14/12/2016
2,3,7,8-Tetra CDD *	pg/m3	4.76E-03	3.34E-03	0.004	0.004	0.005	0.004	0.005	0.003
1,2,3,7,8-Penta CDD	pg/m3	5.04E-03	3.88E-03	0.005	0.005	0.004	0.005	0.005	0.004
1,2,3,4,7,8-Hexa CDD	pg/m3	6.08E-03	4.15E-03	0.006	0.005	0.005	0.004	0.005	0.004
1,2,3,6,7,8-Hexa CDD	pg/m3	6.21E-03	4.15E-03	0.006	0.005	0.005	0.004	0.005	0.005
1,2,3,7,8,9-Hexa CDD	pg/m3	9.13E-03	4.01E-03	0.006	0.005	0.004	0.009	0.004	0.004
1,2,3,4,6,7,8-Hepta CDD	pg/m3	1.21E-01	1.12E-02	0.026	0.039	0.031	0.121	0.011	0.020
Octa CDD	pg/m3	4.62E-01	4.79E-02	0.154	0.253	0.136	0.462	0.091	0.048
Total Tetra CDD	pg/m3	1.56E-02	3.34E-03	0.010	0.010	0.016	0.004	0.006	0.003
Total Penta CDD	pg/m3	1.35E-02	3.88E-03	0.014	0.007	0.008	0.009	0.005	0.004
Total Hexa CDD	pg/m3	6.91E-02	1.26E-02	0.013	0.016	0.021	0.069	0.016	0.016
Total Hepta CDD	pg/m3	2.85E-01	2.38E-02	0.048	0.087	0.031	0.285	0.024	0.036
2,3,7,8-Tetra CDF **	pg/m3	7.61E-03	4.14E-03	0.005	0.005	0.004	0.008	0.004	0.004
1,2,3,7,8-Penta CDF	pg/m3	5.45E-03	3.61E-03	0.004	0.005	0.005	0.004	0.004	0.004
2,3,4,7,8-Penta CDF	pg/m3	5.45E-03	3.65E-03	0.004	0.005	0.005	0.004	0.004	0.004
1,2,3,4,7,8-Hexa CDF	pg/m3	1.49E-02	3.27E-03	0.004	0.003	0.009	0.015	0.004	0.013
1,2,3,6,7,8-Hexa CDF	pg/m3	8.82E-03	3.13E-03	0.004	0.003	0.004	0.004	0.004	0.009
2,3,4,6,7,8-Hexa CDF	pg/m3	4.84E-03	3.41E-03	0.005	0.003	0.005	0.005	0.004	0.004
1,2,3,7,8,9-Hexa CDF	pg/m3	4.98E-03	3.54E-03	0.005	0.004	0.005	0.005	0.005	0.004
1,2,3,4,6,7,8-Hepta CDF	pg/m3	4.04E-02	3.97E-03	0.004	0.004	0.004	0.027	0.004	0.040
1,2,3,4,7,8,9-Hepta CDF	pg/m3	6.40E-03	3.48E-03	0.005	0.006	0.005	0.005	0.005	0.003
Octa CDF	pg/m3	1.42E-02	4.23E-03	0.012	0.014	0.012	0.011	0.004	0.009
Total Tetra CDF	pg/m3	7.61E-03	4.14E-03	0.005	0.005	0.004	0.008	0.004	0.004
Total Penta CDF	pg/m3	1.68E-02	3.65E-03	0.004	0.005	0.005	0.005	0.004	0.017
Total Hexa CDF	pg/m3	3.98E-02	3.27E-03	0.005	0.003	0.009	0.034	0.004	0.040
Total Hepta CDF	pg/m3	4.04E-02	4.23E-03	0.004	0.006	0.005	0.038	0.004	0.040
Toxic Equivalency	pg/m3								
TOTAL TOXIC EQUIVALENCY	pg TEQ/m ³	0.018	0.014	0.014	0.015	0.015	0.018	0.015	0.014
Calculated TEQ Concentrations	Units			Crago	Crago	Crago	Crago	Crago	Crago
				03/10/2016	15/10/2016	27/10/2016	08/11/2016	20/11/2016	14/12/2016
2,3,7,8-Tetra CDD *	pg TEQ/m ³			0.004	0.004	0.005	0.004	0.005	0.003
1,2,3,7,8-Penta CDD	pg TEQ/m ³			0.005	0.005	0.004	0.005	0.005	0.004
1,2,3,4,7,8-Hexa CDD	pg TEQ/m ³			0.0006	0.0005	0.0005	0.0004	0.0005	0.0004
1,2,3,6,7,8-Hexa CDD	pg TEQ/m ³			0.0006	0.0005	0.0005	0.0004	0.0005	0.0005
1,2,3,7,8,9-Hexa CDD	pg TEQ/m ³			0.0006	0.0005	0.0004	0.0009	0.0004	0.0004
1,2,3,4,6,7,8-Hepta CDD	pg TEQ/m ³			0.0003	0.0004	0.0003	0.0012	0.0001	0.0002
Octa CDD	pg TEQ/m ³			0.00005	0.00008	0.00004	0.00014	0.00003	0.00001
Total Tetra CDD	pg TEQ/m ³								
Total Penta CDD	pg TEQ/m ³								
Total Hexa CDD	pg TEQ/m ³								
Total Hepta CDD	pg TEQ/m ³								
2,3,7,8-Tetra CDF **	pg TEQ/m ³			0.0005	0.0005	0.0004	0.0008	0.0004	0.0004
1,2,3,7,8-Penta CDF	pg TEQ/m ³			0.0001	0.0002	0.0001	0.0001	0.0001	0.0001
2,3,4,7,8-Penta CDF	pg TEQ/m ³			0.001	0.002	0.001	0.001	0.001	0.001
1,2,3,4,7,8-Hexa CDF	pg TEQ/m ³			0.0004	0.0003	0.0009	0.0015	0.0004	0.0013
1,2,3,6,7,8-Hexa CDF	pg TEQ/m ³			0.0004	0.0003	0.0004	0.0004	0.0004	0.0009</