Quarterly Ambient Air Quality Monitoring Report for the Durham York Energy Centre (Crago Road Station) – July to September 2017

Durham York Energy Centre

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Sign-off Sheet

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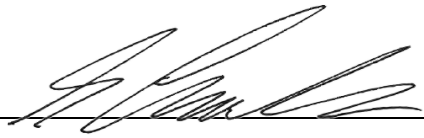
Reviewed by 

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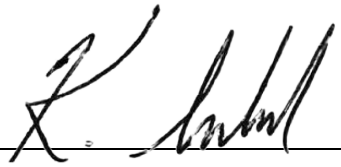
Reviewed by 

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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 the remaining municipal solid waste after waste 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 (SO_2)
  - 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.

This quarterly report provides a summary of the ambient air quality data collected at the Crago Road Station for the period July to September 2017 (Calendar Quarter 3). 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.

Site personnel noted ongoing Highway 418 construction on the north and south sides of Highway 401 between Courtice and Crago Roads during Quarter 3 2017.

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

1. Measured levels of NO_2, SO_2 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 3 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 below their applicable Standards (as presented in **Table 2-2** in this report).
4. The maximum measured concentrations of PAHs with MOECC air quality Standards were below their applicable criteria shown in **Table 2-3**, with the exception of the 24-hour benzo(a)pyrene (B(a)P) concentration in one (1) sample which exceeded the applicable Ontario Ambient Air Quality Criteria (AAQC) by 96%. The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario. The measurements were 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 criterion.
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 July and September 2017, 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.

Abbreviations

AAQC	Ambient Air Quality Criteria
ACB List	Air Contaminants Benchmarks List: Standards, Guidelines and Screening Levels for Assessing Point of Impingement Concentrations of Air Contaminants
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
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
$\mu g/m^3$	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

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 measurable ground level concentrations resulting from emissions from the DYEC cumulative to local air quality, including validating the predicted concentrations from the dispersion modelling conducted in the Environmental Assessment (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 (SO_2)
  - Nitrogen Oxides (NO_X), and
  - Particulate Matter smaller than 2.5 microns ($PM_{2.5}$).

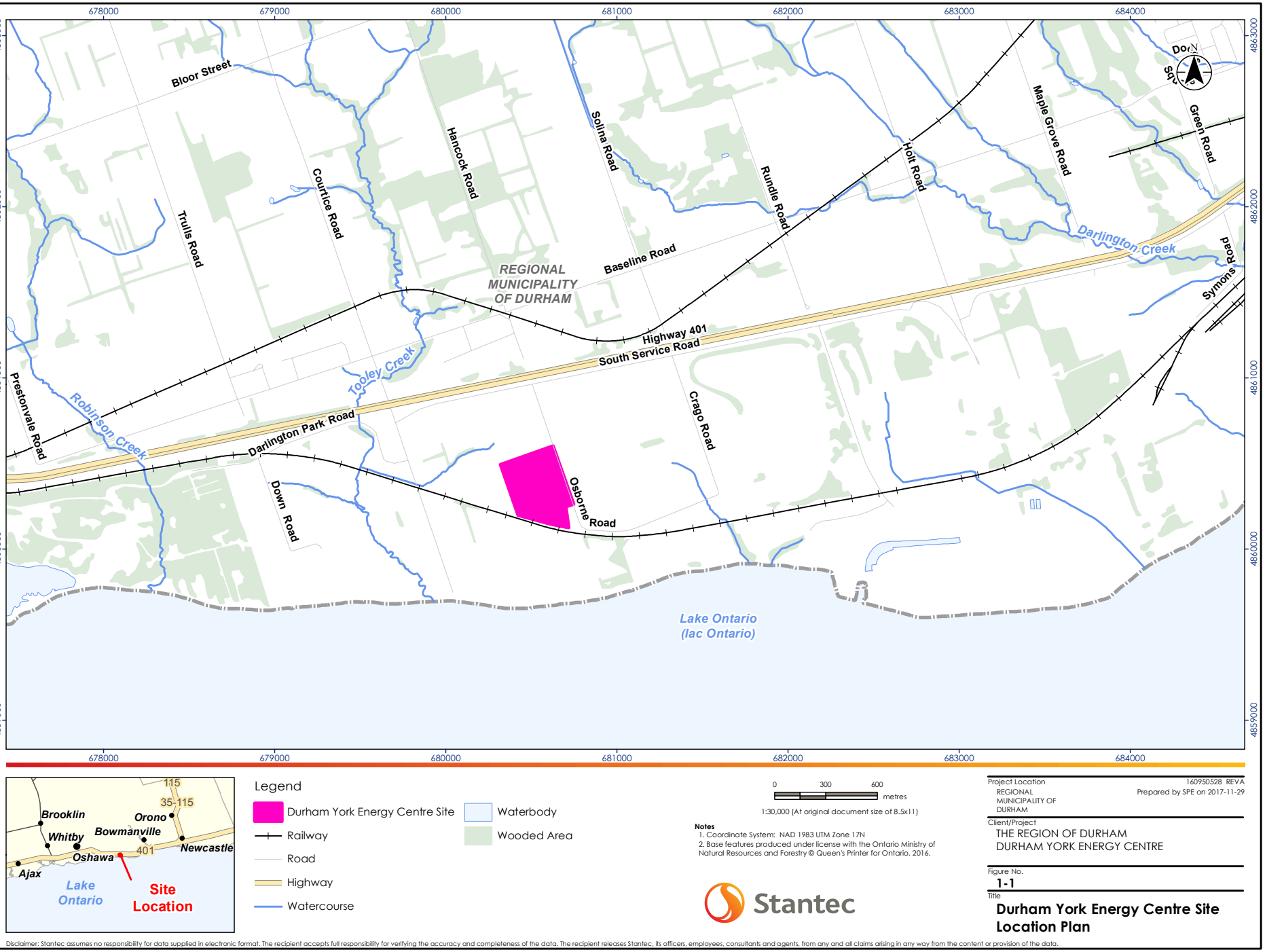
- Contaminants monitored non-continuously:
  - Metals in Total Suspended Particulate (TSP) matter
  - Polycyclic Aromatic Hydrocarbons (PAHs), and
  - Dioxins and Furans.

This quarterly report provides a summary of the ambient air quality data collected at this station for the period July to September 2017 (Q3).

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.



Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
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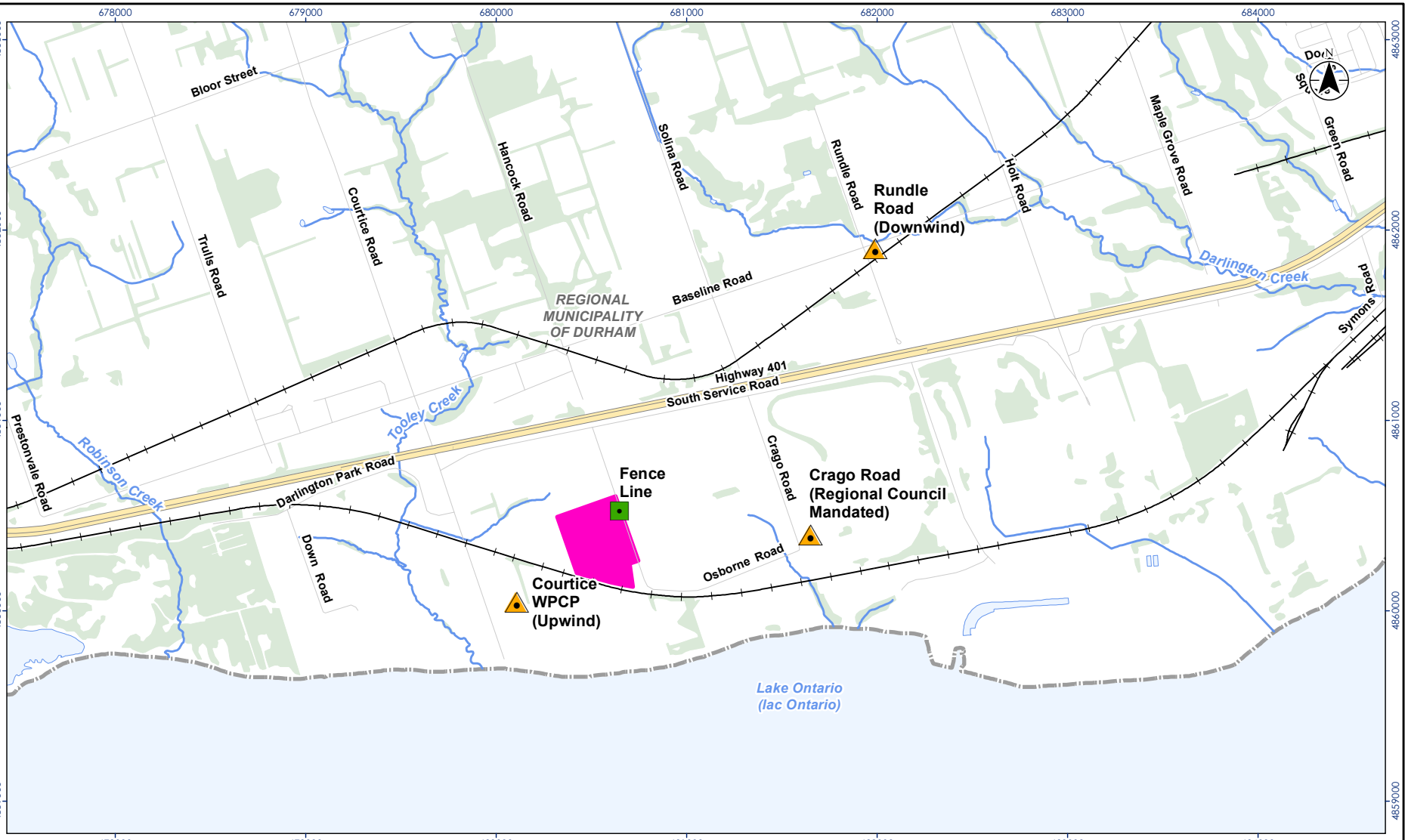
Project Location
REGIONAL MUNICIPALITY OF DURHAM

160950528 REVA
Prepared by SPE on 2017-11-29

Client/Project
THE REGION OF DURHAM
DURHAM YORK ENERGY CENTRE

Figure No.
1-1

Title
Durham York Energy Centre Site Location Plan



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

0 300 600 metres

1:30,000 (At original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
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Project Location
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THE REGION OF DURHAM
DURHAM YORK ENERGY CENTRE

Figure No.
1-2

Title
Location of Ambient Air Quality Monitoring Stations

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

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 (SO_2)
  - 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)
- Antimony (Sb)
- Arsenic (As)
- Barium (Ba)
- Beryllium (Be)
- Bismuth (Bi)
- Boron (B)
- Cadmium (Cd)
- Cobalt (Co)
- Copper (Cu)
- Chromium (Cr) (Total)
- Iron (Fe)
- Lead (Pb)
- Magnesium (Mg)
- Manganese (Mn)
- Mercury (Hg)
- Molybdenum (Mo)
- Nickel (Ni)
- Phosphorus (Ph)
- Selenium (Se)
- Silver (Ag)
- Strontium (Sr)
- Thallium (Tl)
- Tin (Sn)
- Titanium (Ti)
- Uranium (U)
- Vanadium (V)
- Zinc (Zn)
- Zirconium (Zr)

Polycyclic Aromatic Hydrocarbons:

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

Dioxins and Furans:

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

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 was the Ontario Ambient Air Quality Criteria (AAQC) developed by the MOECC (MOECC, 2012). The second 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. These criteria, along with O. Reg. 419/05 Guidelines and Jurisdictional Screening Levels are unchanged but were consolidated in December 2016 into a new format known as the "Air Contaminants Benchmarks List: Standards, Guidelines and Screening Levels for Assessing Point of Impingement Concentrations of Air Contaminants" (MOECC, 2016) (ACB List).

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/m^3 (98th percentile averaged over 3 consecutive years), has been superseded by a new Canadian Ambient Air Quality Standard (CAAQS) of 28 µg/m^3 (98th percentile averaged over three consecutive years) and an annual objective of 10 µg/m^3 as noted in **Table 2-1**. The proposed CAAQS 24-hour objective for 2020 is 27 µg/m^3.

Summaries of the relevant air quality criteria for the contaminants monitored 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 (ppb / µg/m^3)	24-Hour (ppb / µg/m^3)	Annual (ppb / µg/m^3)	1-Hour (ppb / µg/m^3)	24-Hour (ppb / µg/m^3)	Annual (ppb / µg/m^3)
Sulphur dioxide	7446095	250 /690	100 / 275	20 / 55	250 / 690	100 / 275	11 / 29
Nitrogen dioxide	10102-44-0	200 /400	100 / 200	-	200 / 400	100 / 200	30 / 60
Contaminant	**CAS**	**Canadian Ambient Air Quality Standards (CAAQS)**			**HHRA Health-Based Criteria**		
		1-Hour (µg/m^3)	**24-Hour (µg/m^3)**	**Other Time Period (µg/m^3)**	**1-Hour (µg/m^3)**	**24-Hour (µg/m^3)**	**Other Time Period (µg/m^3)**
$PM_{2.5}$	N/A	-	28 [A]	10 [B]	-	30 [C]	-

Notes:

A. 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.

B. 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.

C. HHRA Health-Based criterion for $PM_{2.5}$ was selected referencing CCME (2006).

Table 2-2 Summary of Air Quality Criteria for Metals

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards, Guidelines, and Screening Levels			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	-	-	-	-	-	6.4×10^7
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	-	-	-	-

Table 2-2 Summary of Air Quality Criteria for Metals

Contaminant	CAS	O. Reg. 419/05 – Schedule 3 Standards, Guidelines, and Screening Levels			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)
Vanadium	7440-62-2	-	2	-	0.5	1	1
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

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] $(ng/m^3)^{-1}$
Biphenyl	92-52-4	-	-	-	-	-	224,000	-
Chrysene	218-01-9	-						-
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 $(ng/m^3)^{-1}$.
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 WHO_{2005} toxic equivalency factors (i-TEFs).
F. Toxic Equivalency Factors (TEFs) are shown as benzo(a)pyrene equivalents.

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 (SO_2) 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	Teledyne 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 API 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

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. Sampling for these contaminants is conducted following the methodology and analyses described in the Ambient Monitoring Plan (Stantec, 2012), as presented in **Table 3-2.** 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.[A]

Note:
A. In Q3, one additional sample of Dioxins and Furans was collected and analyzed as discussed in Section 4.5.

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

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 summary of the operational issues for each measurement parameter during the monitoring period is presented in **Table 3-4**. The only item of note was the return of the Crago Sharp particulate monitor during the July calibration.

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

Parameter	Issues	Timeframe	Remedial Action
SO_2	None	-	-
NOx	None	-	-
$PM_{2.5}$	Crago Sharp re-installed in Crago Station. Courtice WPCP Sharp unit removed and re-installed at Courtice WPCP.	26-Jul-17 13:00	Sharp units returned to their original locations during the July calibration.
TSP/Metals Hi-Vol.	None	-	-
PAH/ D/F Hi-Vol	None	-	-
Other	None	-	-

3.3 INSTRUMENTATION RECOVERY RATES

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

Table 3-5 Summary of Data Recovery Rates for the Crago Road Station – July to September 2017

Parameter	Valid Measurement Hours	Data Recovery Rate (%)
SO_2	2198	99.5% [B]
NO_X	2201	99.7% [B]
$PM_{2.5}$	2195	97.4% [B]
Temperature	2208	100% [B]
Rainfall	2208	100% [B]
Relative Humidity	2208	100% [B]

Table 3-5 Summary of Data Recovery Rates for the Crago Road Station – July to September 2017

Parameter	Valid Measurement Hours	Data Recovery Rate (%)
Wind Speed/Direction	2208	100% [B]
TSP/Metals	15 [A]	100%
PAHs	8 [A]	100%
Dioxins and Furans	5 [A]	100%

Notes:
A. Number of filters/24-hour average samples.
B. Includes instrumentation issues summarized in Table 3-4 and monthly calibrations.

3.4 FIELD CONDITION OBSERVATIONS

During Q3 2017, 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 during field visits by Stantec personnel.

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. Throughout the quarter, excavator/dump truck crews were observed working 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 road, called Megawatt Drive, was opened in August 2017 and is located immediately south of the previous South Service Road. Megawatt Drive runs between Courtice Road and Crago Road where it becomes Energy Drive West and connects to Holt Road. A photograph of South Service Road realignment construction prior to the opening of Megawatt Drive is shown in **Figure 3-1**, a photograph of the newly surfaced Megawatt Drive is shown in **Figure 3-2**.

During Q3, there were some periods where waste feed to a boiler was halted, and times where the boilers were offline due to either planned or unexpected maintenance. Times when feed stops occurred and when either boiler was offline are summarized in **Table 3-6**.

Table 3-6 Summary of Boiler Operational Status in Q3 2017

Boiler	Date	Time	Status
Boiler 1	July 31 – August 1	17:08 – 05:20	Boiler Offline
	August 3 – August 5	09:07 – 16:56	Boiler Offline
	August 6	06:17 – 07:33	Feedstop
	August 6 – August 7	12:53 – 14:32	Boiler Offline
	August 13	05:32 – 08:34	Feedstop
	August 13 – August 20	15:59 – 23:34	Boiler Offline
	September 21	14:27 – 15:13	Feedstop
Boiler 2	July 31 – August 2	17:08 – 03:31	Boiler Offline
	August 20 – August 28	16:44 – 17:47	Boiler Offline
	September 21	08:27 – 11:34	Feedstop

Figure 3-1 Looking Southwest from Crago Road of the South Service Road Realignment Construction (July 4, 2017)

Figure 3-2 Looking West from Crago Road of the new Megawatt Drive Construction (July 28, 2017)

4.0 SUMMARY OF AMBIENT MEASUREMENTS

The following sections provide summaries of the validated data and the validation completed 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 July to September 2017 period are presented in **Table 4-1**.

Table 4-1 Summary of Hourly Meteorological Measurements – July to September 2017

Parameter		Crago Road Station (Predominately Downwind)	Units
Temperature	Maximum	28.8	C
	Minimum	4.2	C
	Mean (July)	19.3	C
	Mean (August)	18.0	C
	Mean (September)	16.3	C
	Mean (Period)	17.9	C
	Standard Deviation	4.1	C
Rainfall	Maximum	14.8	mm
	Minimum	0.0	mm
	Mean (July)	0.11	mm
	Mean (August)	0.08	mm
	Mean (September)	0.06	mm
	Mean (Period)	0.09	mm
	Standard Deviation	0.69	mm
Relative Humidity	Maximum	98.0	%
	Minimum	35.0	%
	Mean (July)	76.4	%
	Mean (August)	79.2	%
	Mean (September)	78.7	%
	Mean (Period)	78.1	%
	Standard Deviation	13.6	%

Table 4-1 Summary of Hourly Meteorological Measurements – July to September 2017

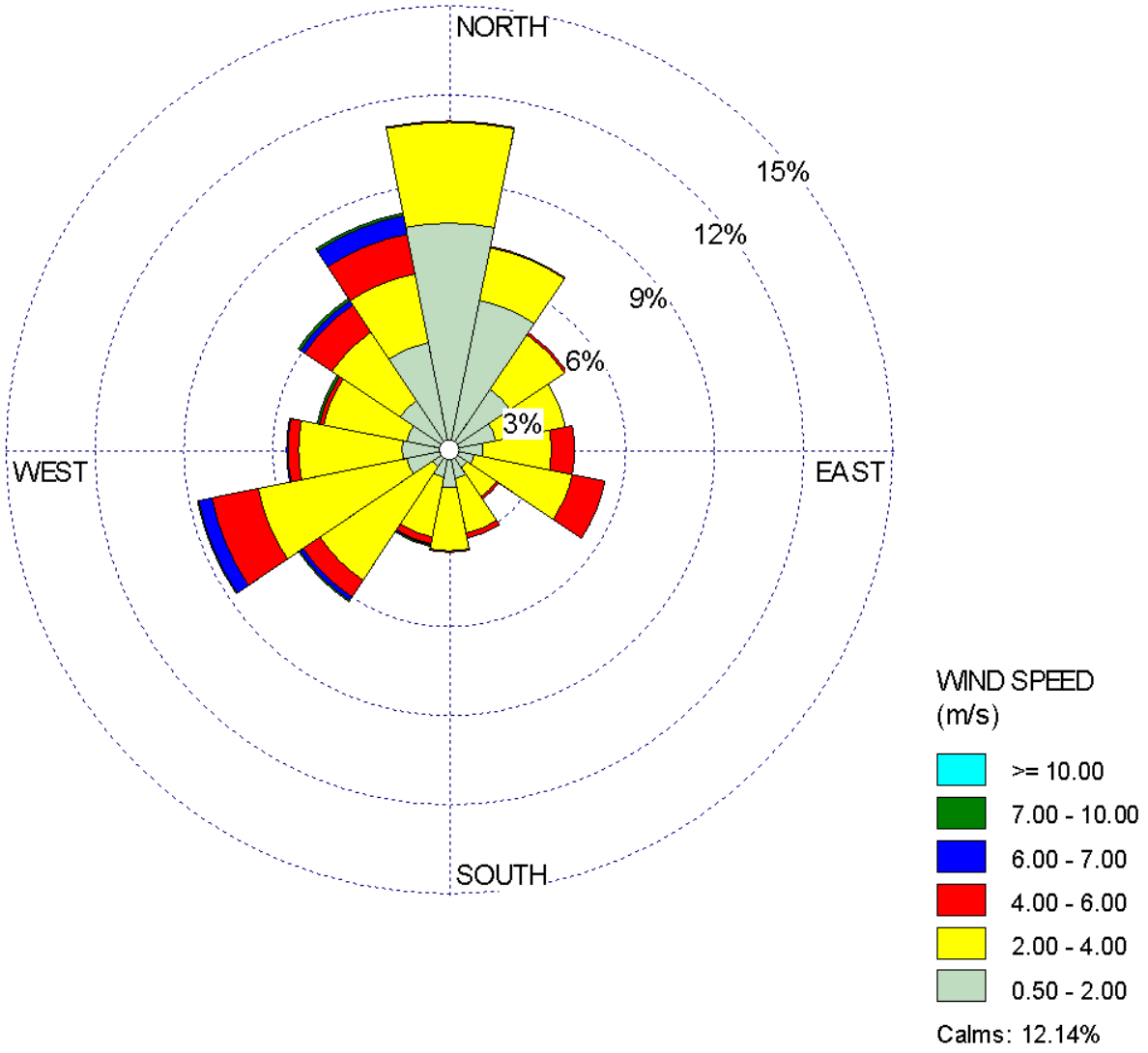
Parameter		Crago Road Station (Predominately Downwind)	Units
Wind Speed [A]	Maximum	30.7	km/hr
	Minimum	0.0	km/hr
	Mean (July)	8.0	km/hr
	Mean (August)	8.0	km/hr
	Mean (September)	7.1	km/hr
	Mean (Period)	7.7	km/hr
	Standard Deviation	5.1	km/hr

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 west-southwesterly and northerly directions. Wind contribution from the northeast and south was low. Higher wind speeds occurred from west south-westerly and north-northwesterly directions.

Figure 4-1 Wind Rose for July to September 2017



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 July to September 2017.

Nitric oxide (NO) has no regulatory criteria as discussed in Section 4.2.2 below. There are both hourly and daily AAQCs for NO_2 which are based on health effects of NO_2; therefore, the AAQC were compared to measured NO_2 concentrations in this report.

The maximum concentration levels measured at the Crago Road Station in this quarter are compared in **Figure 4-2** to their respective air quality criteria along with the levels measured at the Courtice WPCP and Rundle Road Stations (Stantec, 2017).

Table 4-2 Summary of Ambient CAC Monitoring Data – July to September 2017

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)
SO_2	1	250	690	Maximum	9.3	24.8
				Minimum	0.0	0.0
				Mean (July)	0.4	1.0
				Mean (August)	0.1	0.2
				Mean (September)	0.3	0.8
				Mean (Period)	0.3	0.7
				Standard Deviation	0.5	1.3
				# of Exceedances	0	0
	24	100	275	Maximum	1.5	3.9
				Minimum	0.0	0.0
				Mean (July)	0.4	1.0
				Mean (August)	0.1	0.2
				Mean (September)	0.3	0.8
				Mean (Period)	0.3	0.7
				Standard Deviation	0.3	0.8
				# of Exceedances	0	0

Table 4-2 Summary of Ambient CAC Monitoring Data – July to September 2017

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)
$PM_{2.5}$	24	N/A	28 [A]	Maximum	-	21.3
				Minimum	-	0.0
				Mean (July)	-	5.9
				Mean (August)	-	3.4
				Mean (September)	-	7.0
				Mean (Period)	-	5.4
				Standard Deviation	-	4.3
				# of Exceedances	-	N/A
NO_2	1	200	400	Maximum	38.6	75.2
				Minimum	0.0	0.0
				Mean (July)	2.1	4.1
				Mean (August)	2.1	4.1
				Mean (September)	6.9	13.3
				Mean (Period)	3.7	7.1
				Standard Deviation	4.6	8.9
				# of Exceedances	0	0
	24	100	200	Maximum	13.8	26.9
				Minimum	0.0	0.0
				Mean (July)	2.1	4.0
				Mean (August)	2.1	4.1
				Mean (September)	6.9	13.4

Table 4-2 Summary of Ambient CAC Monitoring Data – July to September 2017

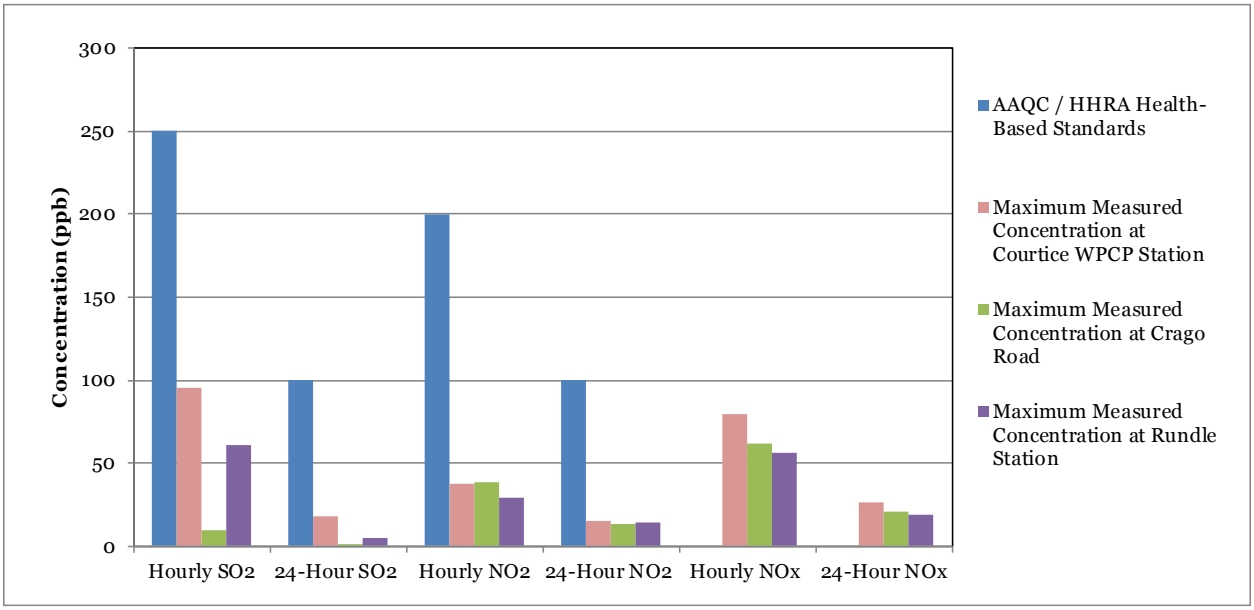
Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)
				Mean (Period)	3.7	7.1
				Standard Deviation	3.1	6.0
				# of Exceedances	0	0
NO [B]	1	N/A	N/A	Maximum	35.2	44.2
				Minimum	0.0	0.0
				Mean (July)	1.9	2.3
				Mean (August)	1.6	2.1
				Mean (September)	2.2	2.7
				Mean (Period)	1.9	2.4
				Standard Deviation	3.9	4.9
				# of Exceedances	N/A	N/A
	24	N/A	N/A	Maximum	9.9	12.7
				Minimum	0.0	0.0
				Mean (July)	1.8	2.3
				Mean (August)	1.7	2.1
				Mean (September)	2.2	2.7
				Mean (Period)	1.9	2.4
				Standard Deviation	1.9	2.4
				# of Exceedances	N/A	N/A

Table 4-2 Summary of Ambient CAC Monitoring Data – July to September 2017

Pollutant	Averaging Period	AAQC / Schedule 3 / HHRA Health-Based Criteria			Crago Road Station (Predominately Downwind)	
		ppb	µg/m³		Concentration (ppbv)	Concentration (µg/m³)
NO_X [B]	1	N/A	N/A	Maximum	61.5	118.5
				Minimum	0.0	0.0
				Mean (July)	3.9	7.5
				Mean (August)	3.6	6.9
				Mean (September)	8.8	17.1
				Mean (Period)	5.4	10.4
				Standard Deviation	7.3	14.1
				# of Exceedances	N/A	N/A
	24	N/A	N/A	Maximum	20.7	40.7
				Minimum	0.0	0.0
				Mean (July)	3.8	7.3
				Mean (August)	3.6	7.0
				Mean (September)	8.9	17.1
				Mean (Period)	5.4	10.4
				Standard Deviation	4.3	8.4
				# of Exceedances	N/A	N/A

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. NO and NOx have no Ambient Air Quality Criteria.

Figure 4-2 Comparison of NO_2, NO_X and SO_2 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 (SO_2)

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 SO_2 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 SO_2 concentrations at the station were well below the Ontario AAQCs.

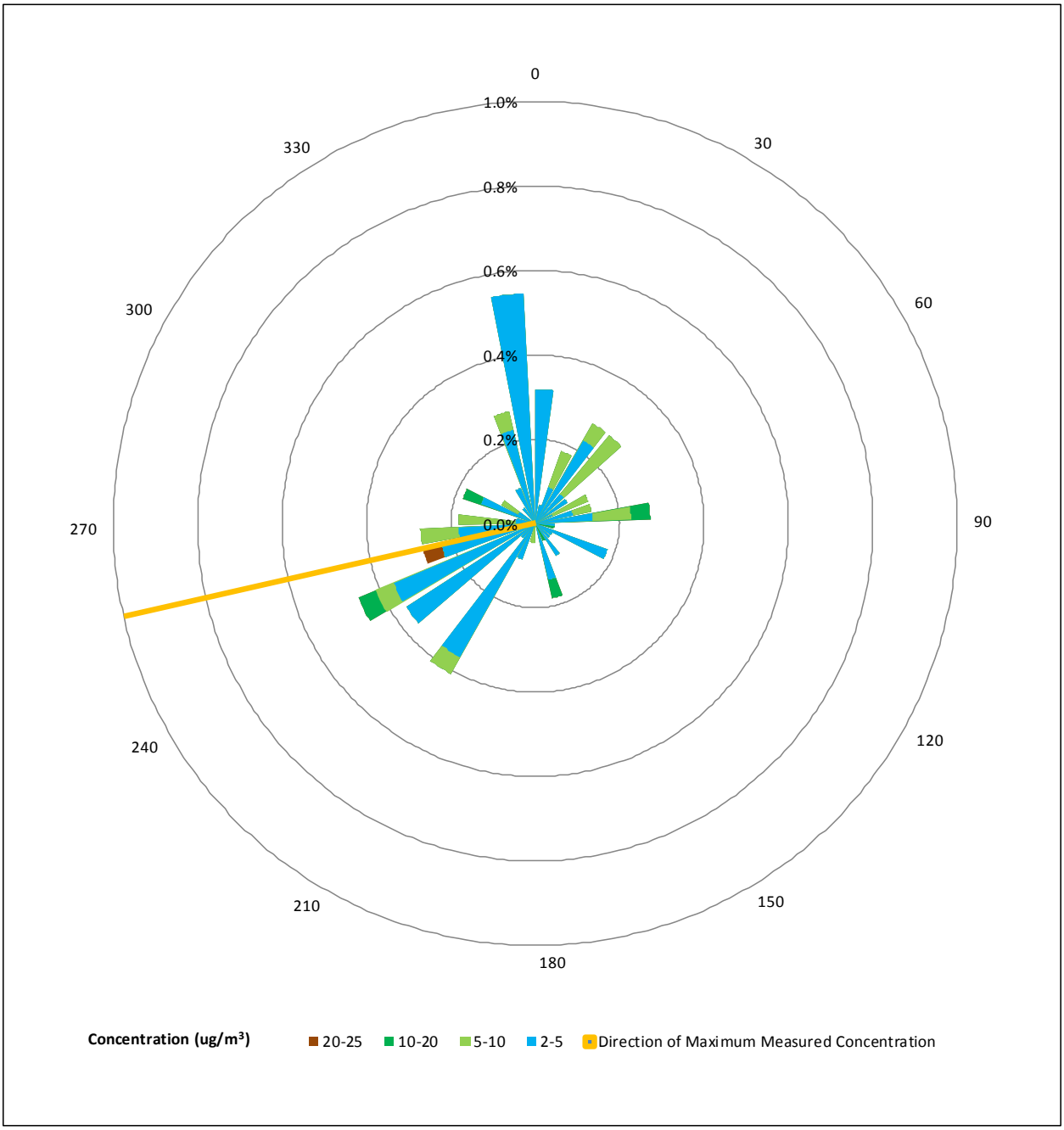
The maximum hourly and 24-hour average SO_2 concentrations measured at the Crago Road Station during July to September 2017 were 9.3 and 1.5 ppb (24.8 and 3.9 µg/m³) respectively, which are 4% and 1% of the applicable 1-hour and 24-hour Ontario AAQCs.

A pollution rose of hourly average SO_2 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 2 µg/m³, which account for 92% 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 westerly directions.

The maximum hourly average concentration of SO_2 occurred on August 9, 2017 at 8:00, with winds blowing from the west (the direction of the DYEC). The maximum 24-hour average SO_2

concentration occurred for winds blowing from the direction of St. Mary's Cement on September 17, 2017.

Figure 4-3 Pollution Rose of Measured Hourly Average SO_2 Concentrations – July to September 2017



4.2.2 Nitrogen Dioxide (NO_2)

Nitrogen oxides (NO_X) are almost entirely made up of nitric oxide (NO) and nitrogen dioxide (NO_2). Together, they are often referred to as NO_X. Most NO_2 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 NO_2 can result in adverse health effects to an exposed population. NO_2 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 NO_2, as health effects are seen at much lower concentrations of NO_2 than NO. In this report, because NO_2 is the regulated form of NO_X, the AAQC were compared to measured NO_2 concentrations. However, as per the current (December 2016) version of the ACB List, the Schedule 3 NO_X criteria were also compared to the monitored NO_X concentrations (see Section 4.2.3 below).

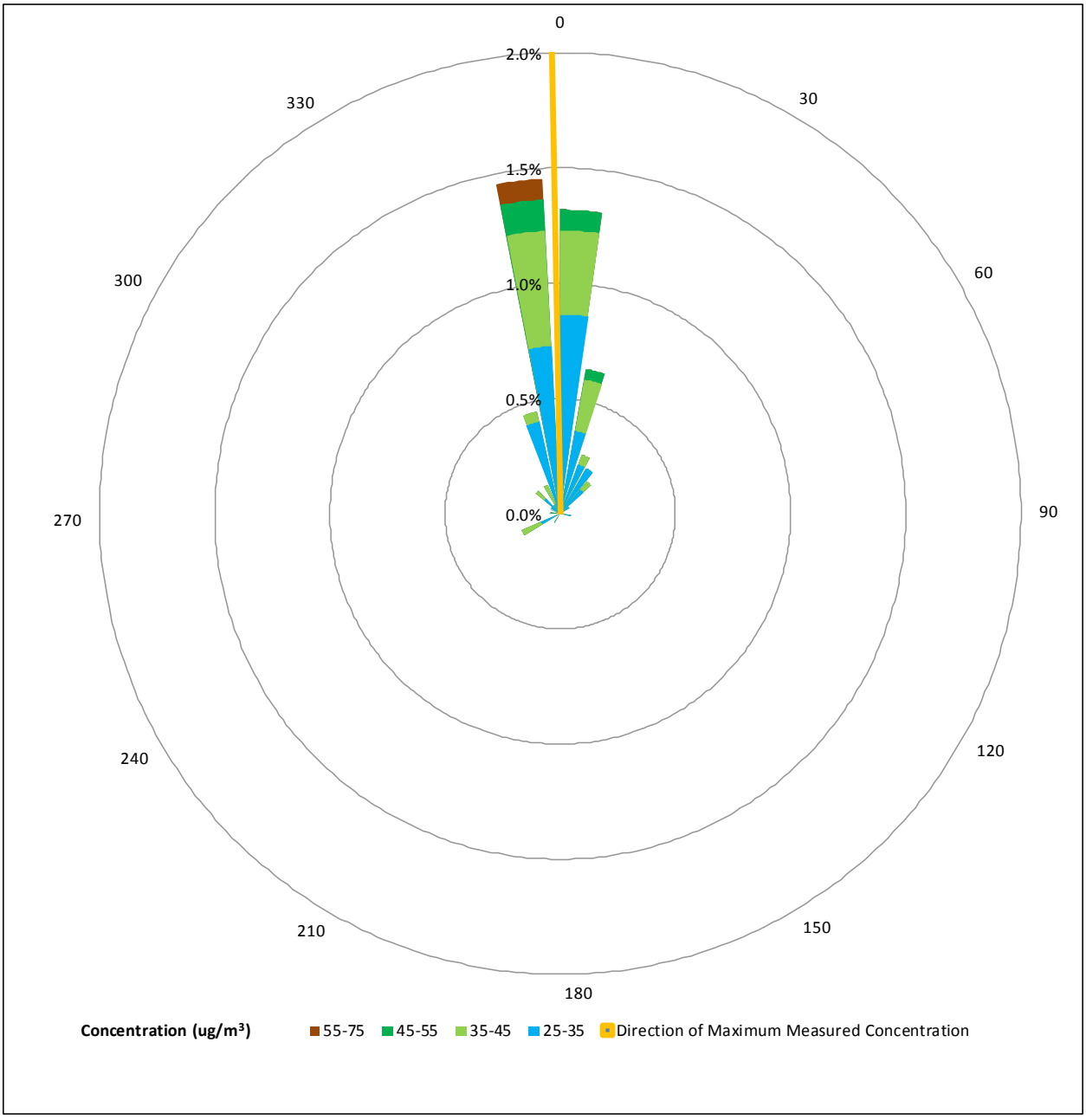
Data summaries are presented in **Appendix B** for nitrogen dioxide for the station for each month as well as time history plots of the hourly and 24-hour average NO_2 concentrations. For the hourly and 24-hour averages, the Ontario AAQCs of 200 ppb and 100 ppb (400 µg/m^3 and 200 µg/m^3) are shown with blue lines on the respective plot. As shown in these figures, measured ambient NO_2 concentrations were well below the Ontario AAQCs.

The maximum measured hourly and 24-hour average concentrations were 38.6 and 13.8 ppb (75.2 and 26.9 µg/m^3), which are 19% and 14% respectively, of the applicable 1-hour and 24-hour Ontario AAQCs.

A pollution rose of measured hourly average NO_2 concentrations is presented in **Figure 4-4**. Concentrations less than 25 µg/m^3, which account for 93% 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 NO_2 concentration occurred on September 12, 2017 at 20:00. During this hour winds were blowing from the north for which Highway 401 and Highway 418 construction activities were upwind. The highest 24-hour average concentration occurred when winds were blowing from the east on September 13, 2017, for which St. Mary's Cement and a CN Railway were upwind.

Figure 4-4 Pollution Rose of Measured Hourly Average NO_2 – July to September 2017



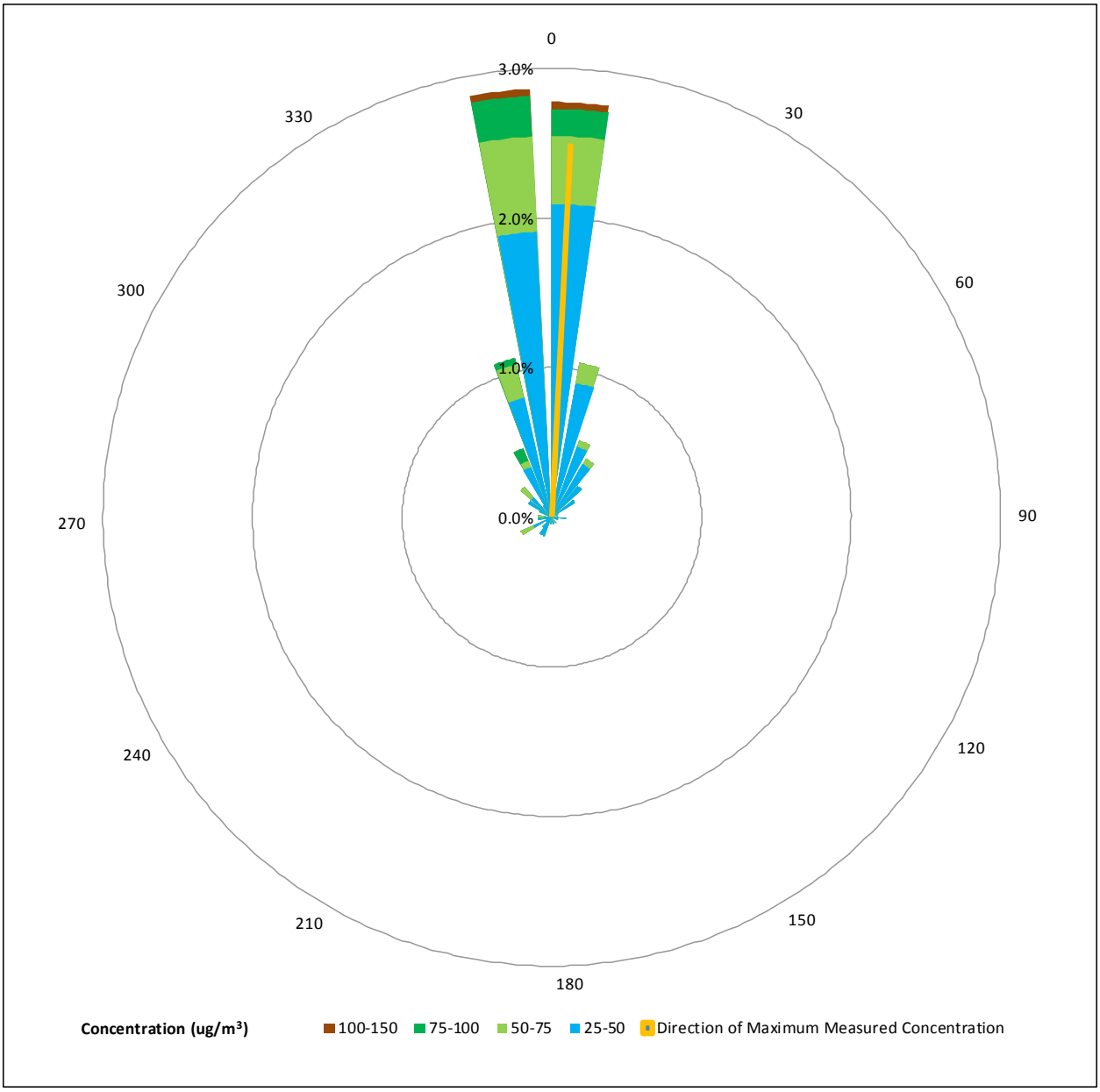
4.2.3 Nitrogen Oxides (NO_X)

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. The maximum hourly NO_X concentration measured at the Crago Road Station was 61.5 ppb (118.5 µg/m^3), and the maximum measured 24-hour average NO_X concentration was 20.7 ppb (40.7 µg/m^3). See **Table 4-2** for detailed results.

A pollution rose of measured hourly average NO_X concentrations is presented in **Figure 4-5**. Concentrations less than 25 µg/m^3, which account for 86% 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 NOx 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 and Highway 418 construction activities) on September 25, 2017 at 6:00. The maximum 24-hour average NO_x concentration was measured on September 12, 2017 when winds were blowing from northerly directions for which Highway 401 and Highway 418 construction activities are upwind.

Figure 4-5 Pollution Rose of Measured Hourly Average NO_X Concentrations – July to September 2017



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

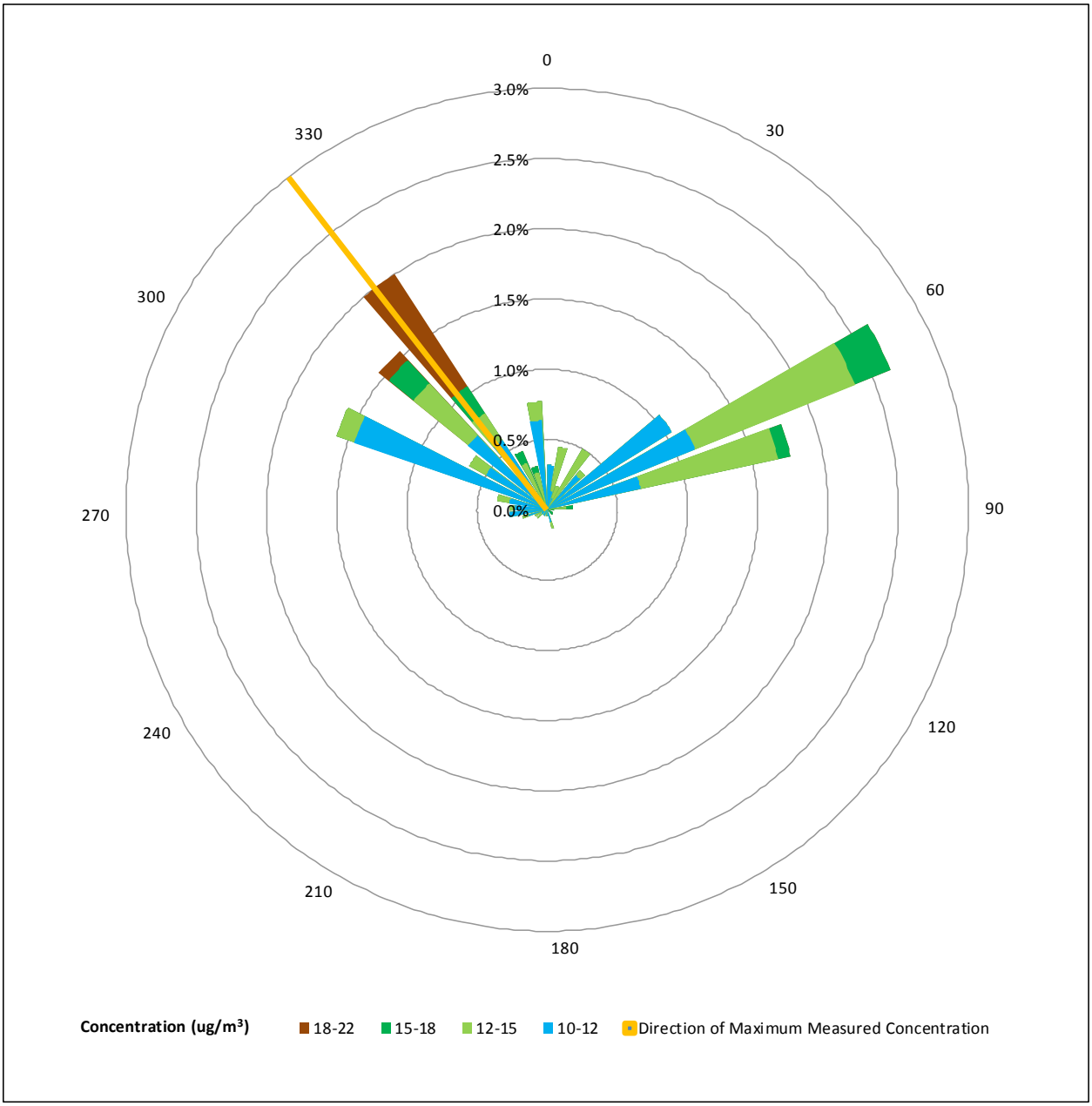
Data summaries and time history plots of measured 24-hour average concentrations are presented in **Appendix D** for $PM_{2.5}$.

The maximum measured 24-hour average $PM_{2.5}$ concentration was 21.3 µg/m^3 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/m^3 whereas the $PM_{2.5}$ measurements in this report consisted of 3 months of data, there is insufficient data to determine with any certainty if exceedances of the CAAQS would occur. Discussion of $PM_{2.5}$ measurements with respect to the CAAQS will be provided in the 2017 annual report, at which time sufficient data will have been collected to make 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/m^3, which account for 84% 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 northwesterly directions.

The highest measured 24-hour average $PM_{2.5}$ concentration occurred on September 24, 2017 with winds originating from the northwest. For this wind direction, agricultural fields, Highway 401 traffic and Highway 418 construction activities were upwind of the Crago Road Station.

Figure 4-6 Pollution Rose of Measured 24-Hour Average $PM_{2.5}$ Concentrations – July to September 2017



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/m³	120	120	59	13	0
Total Mercury (Hg)	µg/m³	2	2	3.75E-05	6.14E-06 [A]	0
Aluminum (Al)	µg/m³	4.8	-	4.42E-01	4.19E-02	0
Antimony (Sb)	µg/m³	25	25	3.36E-03 [A]	3.07E-03 [A]	0
Arsenic (As)	µg/m³	0.3	0.3	2.02E-03 [A]	1.84E-03 [A]	0
Barium (Ba)	µg/m³	10	10	2.44E-02	3.04E-03	0
Beryllium (Be)	µg/m³	0.01	0.01	3.36E-04 [A]	3.07E-04 [A]	0
Bismuth (Bi)	µg/m³	-	-	2.02E-03 [A]	1.84E-03 [A]	-
Boron (B)	µg/m³	120	-	4.82E-03	1.84E-03 [A]	0
Cadmium (Cd)	µg/m³	0.025	0.025	6.72E-04 [A]	6.14E-04 [A]	0
Chromium (Cr)	µg/m³	0.5	-	1.50E-02	1.55E-03 [A]	0
Cobalt (Co)	µg/m³	0.1	0.1	6.72E-04 [A]	6.14E-04 [A]	0
Copper (Cu)	µg/m³	50	-	1.22E-01	2.17E-02	0
Iron (Fe)	µg/m³	4	-	9.23E-01	1.26E-01	0
Lead (Pb)	µg/m³	0.5	0.5	4.76E-03	9.31E-04 [A]	0
Magnesium (Mg)	µg/m³	-	-	4.78E-01	6.41E-02	-
Manganese (Mn)	µg/m³	0.4	-	2.86E-02	4.53E-03	0
Molybdenum (Mo)	µg/m³	120	-	1.01E-03 [A]	9.21E-04 [A]	0
Nickel (Ni)	µg/m³	0.2	-	1.90E-03	9.21E-04 [A]	0
Phosphorus (P)	µg/m³	-	-	7.17E-02	8.18E-03 [A]	-
Selenium (Se)	µg/m³	10	10	3.36E-03 [A]	3.07E-03 [A]	0
Silver (Ag)	µg/m³	1	1	1.68E-03 [A]	1.54E-03 [A]	0
Strontium (Sr)	µg/m³	120	-	1.36E-02	1.24E-03	0
Thallium (Tl)	µg/m³	-	-	3.36E-03 [A]	3.07E-03 [A]	-
Tin (Sn)	µg/m³	10	10	3.36E-03 [A]	3.07E-03 [A]	0

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/m³	120	-	2.73E-02	3.07E-03 A	0
Vanadium (V)	µg/m³	2	1	1.68E-03 A	1.54E-03 A	0
Zinc (Zn)	µg/m³	120	-	5.72E-02	1.05E-02	0
Zirconium (Zr)	µg/m³	20	-	1.68E-03 A	1.54E-03 A	0
Total Uranium (U)	µg/m³	1.5	-	1.51E-04 A	1.38E-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 below their applicable 24-hour criteria, with the exception of the benzo(a)pyrene (B(a)P) measurement collected on September 16, 2017 which exceeded the Ontario AAQC by 96%. However, the sample was 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. Winds were blowing from the north during this day and the following were upwind: agricultural areas, Highway 418 construction activities and Highway 401 traffic.

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.

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/m³	0.05 [A]	1	9.81E-02	1.15E-02	1
		5 [B]				0
		1.1 [C]				0
1-Methylnaphthalene	ng/m³	12,000	-	9.42E+00	2.94E+00	0
2-Methylnaphthalene	ng/m³	10,000	-	1.48E+01	5.32E+00	0
Acenaphthene	ng/m³	-	-	9.41E+00	1.70E+00	-
Acenaphthylene	ng/m³	3500	-	3.47E-01	7.02E-02 [F]	0
Anthracene	ng/m³	200	-	4.72E-01	7.41E-02 [F]	0
Benzo(a)anthracene	ng/m³	-	-	1.10E-01 [F]	7.02E-02 [F]	-
Benzo(a)fluorene	ng/m³	-	-	2.20E-01 [F]	1.40E-01 [F]	-
Benzo(b)fluoranthene	ng/m³	-	-	1.10E-01 [F]	7.02E-02 [F]	-
Benzo(b)fluorene	ng/m³	-	-	2.20E-01 [F]	1.40E-01 [F]	-
Benzo(e)pyrene	ng/m³	-	-	2.20E-01 [F]	1.40E-01 [F]	-
Benzo(g,h,i)perylene	ng/m³	-	-	1.10E-01 [F]	7.02E-02 [F]	-
Benzo(k)fluoranthene	ng/m³	-	-	1.10E-01 [F]	7.02E-02 [F]	-
Biphenyl	ng/m³	-	-	5.16E+00	9.33E-01	-
Chrysene	ng/m³	-	-	1.10E-01 [F]	7.02E-02 [F]	-
Dibenz(a,h)anthracene [D]	ng/m³	-	-	1.10E-01 [F]	7.02E-02 [F]	-
Dibenzo(a,c)anthracene + Picene	ng/m³	-	-	2.20E-01 [F]	1.38E-01 [F]	-
Fluoranthene	ng/m³	-	-	3.00E+00	2.69E-01	-
Indeno (1,2,3-cd)pyrene	ng/m³	-	-	1.10E-01 [F]	7.02E-02 [F]	-
Naphthalene	ng/m³	22,500	22,500	5.13E+01	1.02E+01	0
o-Terphenyl	ng/m³	-	-	2.20E-01 [F]	1.40E-01 [F]	-
Perylene	ng/m³	-	-	2.20E-01 [F]	1.40E-01 [F]	-
Phenanthrene	ng/m³	-	-	1.31E+01	1.41E+00	-

Table 4-4 Summary of Measured Ambient PAH Concentrations

Contaminant	Units	MOECC Standard	HHRA Health Based Criteria	Results		
				Maximum	Minimum	No. of Exceedances
Pyrene	ng/m³	-	-	1.15E+00	1.06E-01 [F]	-
Tetralin	ng/m³	-	-	3.31E+00	1.24E+00	-
Total PAH [E]	ng/m³	-	-	1.01E+02	2.62E+01	-

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/m³	-	-	7.97E-03	3.99E-03 [A]	N/A
1,2,3,7,8-Penta CDD	pg/m³			1.76E-02	4.27E-03 [A]	
1,2,3,4,7,8-Hexa CDD	pg/m³			3.85E-02	4.52E-03 [A]	
1,2,3,6,7,8-Hexa CDD	pg/m³			1.19E-01	4.38E-03 [A]	
1,2,3,7,8,9-Hexa CDD	pg/m³			1.97E-01	3.96E-03 [A]	
1,2,3,4,6,7,8-Hepta CDD	pg/m³			2.37E+00	1.07E-02	
Octa CDD	pg/m³			7.67E+00	3.87E-02	
Total Tetra CDD	pg/m³			1.25E-01	4.27E-03 [A]	

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
Total Penta CDD	pg/m³			1.53E-01	4.27E-03 A	
Total Hexa CDD	pg/m³			1.15E+00	5.10E-03 A	
Total Hepta CDD	pg/m³			4.41E+00	2.06E-02	
2,3,7,8-Tetra CDF **	pg/m³			9.68E-03	4.10E-03 A	
1,2,3,7,8-Penta CDF	pg/m³			9.57E-03	3.39E-03 A	
2,3,4,7,8-Penta CDF	pg/m³			8.90E-03	3.39E-03 A	
1,2,3,4,7,8-Hexa CDF	pg/m³			4.85E-03	3.72E-03 A	
1,2,3,6,7,8-Hexa CDF	pg/m³			4.85E-03	3.58E-03 A	
2,3,4,6,7,8-Hexa CDF	pg/m³			7.57E-03	3.86E-03 A	
1,2,3,7,8,9-Hexa CDF	pg/m³			5.31E-03	4.13E-03 A	
1,2,3,4,6,7,8-Hepta CDF	pg/m³			6.62E-02	3.58E-03 A	
1,2,3,4,7,8,9-Hepta CDF	pg/m³			7.90E-03	4.69E-03 A	
Octa CDF	pg/m³			1.18E-01	4.10E-03 A	
Total Tetra CDF	pg/m³			1.45E-02	4.10E-03 A	
Total Penta CDF	pg/m³			1.59E-02	3.39E-03 A	
Total Hexa CDF	pg/m³			5.05E-02	3.86E-03 A	
Total Hepta CDF	pg/m³			1.26E-01	4.13E-03 A	
TOTAL TOXIC EQUIVALENCY B	pg TEQ/m³	0.1 1 C	-	9.39E-02	1.33E-02	0 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 WHO_{2005} 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

The maximum ambient dioxins and furans concentration in Q3 at the Crago Road Station was measured on July 18, 2017 and was 0.094 pg TEQ/m³, which is 94% of the MOECC criteria. Dioxins and furans TEQ concentrations at the Courtice WPCP and Rundle Road Stations (0.052 and 0.065 pg TEQ/m³, respectively) were also elevated relative to recent measurements (Stantec, 2017). All dioxins and furans TEQ values were below the MOECC's Upper Risk Threshold (URT) of 1.0 pg TEQ/m³.

At the request of the Region, additional dioxin and furan samples were collected at all stations on August 23, 2017. The results of the additional dioxins and furans sampling at the Crago Road Station are presented in Appendix H and included in the analysis and data summary in **Table 4-5.**

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 July to September 2017.

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

1. Measured levels of NO_2, SO_2 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 3 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 below their applicable Standards (as presented in **Table 2-2** in this report).
4. The maximum measured concentrations of PAHs with MOECC air quality Standards were below their applicable criteria shown in **Table 2-3**, with the exception of the 24-hour benzo(a)pyrene (B(a)P) concentration in one (1) sample which exceeded the applicable Ontario Ambient Air Quality Criteria (AAQC) by 96%. The current Ontario 24-hour B(a)P AAQC was introduced in 2011 and levels above this AAQC are commonly measured throughout Ontario. The measurements were 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 criterion.
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 July and September 2017, 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.

6.0 REFERENCES

Canadian Council of Ministers of the Environment (CCME), (2007). Guidance Document on Achievement Determination. Canada-Wide Standards for Particulate Matter and Ozone. Revised (PN1391)(978-1-896997-74-2 PDF).

Canadian Council of Ministers of the Environment (CCME), (2012). Guidance Document on Achievement Determination. Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone (PN 1483)(978-1 896997-91-9 PDF).

Jacques Whitford, (2009). Final Environmental Assessment, December 4, 2009.

Ontario Minister of the Environment (MOECC), (2010). Environmental Assessment Act, Section 9. Notice of Approval to Proceed with the Undertaking. Re: The Amended Environmental Assessment for Durham and York Residual Waste Study (EA File No: 04-EA-02-08).

Ontario Ministry of the Environment (MOECC), (2012a). Standards Development Branch, Ontario's Ambient Air Quality Criteria, April 2012. (PIBs 6570e01).

Ontario Ministry of the Environment and Climate Change (MOECC), (2016). Air Contaminants Benchmarks List: Standards, Guidelines and Screening Levels for Assessing Point of Impingement Concentrations of Air Contaminants (ACB List), December 2016.

Stantec Consulting Limited, (2009). Final Environmental Assessment, Appendix C12: Site Specific Human Health and Ecological Risk Assessment Technical Study Report, December 4, 2009.

Stantec Consulting Limited, (2012). Ambient Air Quality Monitoring Plan – Durham York Residual Waste Study, May 8, 2012.

Stantec Consulting Limited, (2017). Quarterly Ambient Air Quality Monitoring Report for the Durham York Energy Centre – July to September 2017. November 14, 2017.

APPENDIX A SO_2 DATA SUMMARIES AND TIME HISTORY PLOTS

SO2 - Crago Road
July 2017
ppb

Day	Hour 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	0.2	0.7	0.6	0.4	0.3	0.4	0.4	0.4	0.3	0.0	0.1	0.1	0.2	0.4	0.3	0.4	0.5	0.3	0.3	0.2	0.4	0.3	0.4	0.3	24	0.7	0.0	0.3	0	0
2	0.2	0.3	1.3	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.3	0.3	0.4	0.4	0.3	0.2	0.4	0.1	24	1.3	0.1	0.3	0	0
3	0.4	0.3	0.2	0.8	0.4	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.3	0.2	0.2	0.3	0.1	0.4	24	0.8	0.1	0.3	0	0
4	0.2	0.2	0.2	0.1	0.7	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.1	0.2	0.3	0.2	0.3	0.2	0.3	0.5	0.6	0.3	24	0.7	0.1	0.3	0	0
5	0.4	0.3	0.2	0.3	0.2	1.1	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.4	0.4	0.4	24	1.1	0.2	0.3	0	0
6	0.4	0.4	0.3	0.4	0.4	0.4	0.9	0.4	0.5	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.5	24	0.9	0.3	0.4	0	0
7	0.4	0.3	0.3	0.3	0.5	0.5	0.4	1.0	0.5	0.4	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.4	0.5	0.3	0.5	0.5	0.5	24	1.0	0.3	0.4	0	0
8	0.5	0.5	0.4	0.4	0.5	0.5	0.3	0.3	0.6	0.5	0.4	0.4	0.3	0.0	0.3	0.4	0.5	0.4	0.3	0.3	0.4	0.3	0.4	0.3	24	0.6	0.0	0.4	0	0
9	0.2	0.3	0.2	0.4	0.2	0.3	0.3	0.3	0.4	0.9	0.6	0.4	0.4	0.4	0.3	0.4	0.3	0.2	0.3	0.4	0.3	0.3	0.3	0.2	24	0.9	0.2	0.3	0	0
10	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.3	0.2	0.4	0.8	0.5	0.5	0.3	0.3	0.3	0.4	0.5	0.3	0.3	0.5	0.4	0.3	0.3	24	0.8	0.2	0.4	0	0
11	0.3	0.3	0.4	0.3	0.3	0.2	0.3	0.4	0.0	0.2	0.2	0.9	0.5	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.3	0.3	24	0.9	0.0	0.4	0	0
12	0.3	0.4	0.4	0.4	0.3	0.3	0.4	0.0	0.1	0.2	0.3	0.3	0.8	0.5	0.5	0.5	0.6	0.5	0.3	0.5	0.5	0.3	0.4	0.5	24	0.8	0.0	0.4	0	0
13	0.4	0.3	0.2	0.2	0.2	0.4	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.6	0.4	0.5	0.4	0.3	0.4	0.5	0.4	0.4	0.3	0.2	24	0.6	0.2	0.3	0	0
14	0.2	0.1	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.2	0.2	0.3	0.5	0.5	1.0	0.7	0.5	0.4	0.2	0.3	0.4	0.4	0.4	0.4	24	1.0	0.1	0.4	0	0
15	0.4	0.3	0.3	0.4	0.3	0.2	0.3	0.2	0.3	0.1	0.1	0.3	0.4	0.3	0.4	1.5	0.5	0.4	0.5	0.5	0.5	0.3	0.4	0.4	24	1.5	0.1	0.4	0	0
16	0.3	0.4	0.3	0.2	0.4	0.4	0.3	0.2	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	1.2	0.6	0.6	0.6	0.4	0.5	0.4	0.3	24	1.2	0.2	0.4	0	0
17	0.5	0.4	0.3	0.5	0.3	0.3	0.4	0.2	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.4	1.1	0.6	0.4	0.6	0.4	0.4	0.4	24	1.1	0.2	0.4	0	0
18	0.3	0.4	0.3	0.4	0.5	0.3	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.4	1.2	0.6	0.6	0.5	0.5	0.4	24	1.2	0.2	0.4	0	0
19	0.4	0.4	0.5	0.4	0.5	0.4	0.2	0.3	0.4	0.2	0.4	0.3	0.4	0.5	0.4	0.3	0.3	0.3	0.4	1.0	0.7	0.7	0.4	0.5	24	1.0	0.2	0.4	0	0
20	0.6	0.3	0.6	0.3	0.5	0.3	0.6	0.4	0.3	0.5	0.5	0.5	0.4	0.2	0.2	0.3	0.3	0.4	0.4	0.5	1.3	0.7	0.5	0.5	24	1.3	0.2	0.5	0	0
21	0.6	0.7	0.4	0.3	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	1.0	0.6	0.5	24	1.0	0.3	0.5	0	0
22	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.2	0.3	0.4	0.6	0.5	0.5	0.4	0.6	1.0	0.8	24	1.0	0.2	0.5	0	0
23	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.3	0.3	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5	1.4	24	1.4	0.3	0.5	0	0
24	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.3	0.5	0.6	0.5	0.5	0.4	0.4	0.5	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4	24	0.6	0.3	0.4	0	0
25	0.9	0.6	0.5	0.4	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.3	0.2	0.5	0.4	24	0.9	0.2	0.3	0	0
26	0.5	1.0	0.7	0.7	0.7	0.8	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.3	24	1.0	0.3	0.5	0	0
27	0.3	0.5	1.1	0.7	0.5	0.6	0.7	0.7	0.6	0.6	0.7	0.7	0.5	0.5	NA	NA	0.6	0.7	0.9	1.1	1.4	1.6	1.7	2.0	22	2.0	0.3	0.8	0	0
28	2.1	2.2	2.3	2.2	2.1	C	C	0.6	0.5	0.5	0.4	0.3	0.4	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.0	0.1	0.0	22	2.3	0.0	0.7	0	0
29	0.1	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	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
30	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	24	0.0	0.0	0.0	0	0
31	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	2.4	0.0	0.0	0.0	0.0	0.0	24	2.4	0.0	0.1	0	0
Count	31	31	31	31	31	30	30	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	740					
Maximum	2.1	2.2	2.3	2.2	2.1	1.1	0.9	1.0	0.6	0.9	0.8	0.9	0.8	0.6	1.0	1.5	1.2	1.1	2.4	1.1	1.4	1.6	1.7	2.0	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	22					
Average	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	24					

Percentiles	10	20	30	40	50	60	70	80	90	95	99	100
Data	0.1	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.7	1.7	2.4

	Maximum
Maximum Hourly	2.4
Maximum Daily	0.8
Monthly Average	0.4

Notes C - Calibration / Span Cycle NA - No Data Available T - Test A- MOE Audit M - Equipment Malfunction / Down R - Rate of Change

SO2 - Crago Road
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ppb

Day	Hour 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	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	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	24	0.2	0.0	0.0	0	0
2	0.1	0.3	0.2	0.1	0.1	0.2	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	0.0	0.1	0.0	24	0.6	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	0.8	0.1	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	0.8	0.0	0.0	0	0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.5	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	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.5	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	0.4	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
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	0.0	0.4	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
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	0.4	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
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	6.0	3.1	1.4	0.9	0.5	0.4	0.6	0.3	0.1	0.2	0.0	0.0	0.0	0.1	0.0	24	9.3	0.0	1.0	0	0
10	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	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.2	0.0	0.0	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	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	24	0.6	0.0	0.0	0	0
12	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	0.5	0.0	0.0	0.0	0.0	0.0	24	0.5	0.0	0.0	0	0
13	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	0.7	0.0	0.0	0.0	0.0	24	0.7	0.0	0.0	0	0
14	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	0.7	0.1	0.0	0.0	24	0.7	0.0	0.0	0	0
15	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	0.3	0.0	0.0	24	0.3	0.0	0.0	0	0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24	0.3	0.0	0.0	0	0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.4	0.3	0.1	0.0	0.2	1.6	2.9	3.9	2.4	2.4	1.5	3.3	1.2	1.1	24	3.9	0.0	1.0	0	0
18	0.3	0.1	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	24	0.3	0.0	0.0	0	0
19	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	0.0	0.0	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
20	0.0	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	0.0	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
21	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	24	0.2	0.0	0.0	0	0
22	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	24	0.2	0.0	0.0	0	0
23	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.3	0.0	0.0	0	0
24	0.0	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	0.0	0.0	0.0	0.0	0.0	24	0.5	0.0	0.0	0	0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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	0.1	0.0	0.0	0	0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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	0.1	0.0	0.0	0	0
27	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	0.0	0.0	24	0.1	0.0	0.0	0	0
28	0.0	0.0	0.0	0.0	0.8	0.2	0.1	0.0	0.0	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	24	0.8	0.0	0.1	0	0
29	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	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	24	0.1	0.0	0.0	0	0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	0.3	0.0	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	21	0.3	0.0	0.0	0	0
31	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.2	0.0	0.0	0	0
Count	31	31	31	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	741					
Maximum	0.5	0.4	0.2	0.2	0.8	0.5	0.1	0.1	9.3	6.0	3.1	1.4	0.9	0.5	0.4	1.6	2.9	3.9	2.4	2.4	1.5	3.3	1.2	1.1	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	21					
Average	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	24					

Percentiles	10	20	30	40	50	60	70	80	90	95	99	100
Data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	2.1	9.3

	Maximum
Maximum Hourly	9.3
Maximum Daily	1.0
Monthly Average	0.1

Notes C - Calibration / Span Cycle NA - No Data Available T - Test A- MOE Audit M - Equipment Malfunction / Down R - Rate of Change

SO_2 - Crago Road

September 2017

ppb

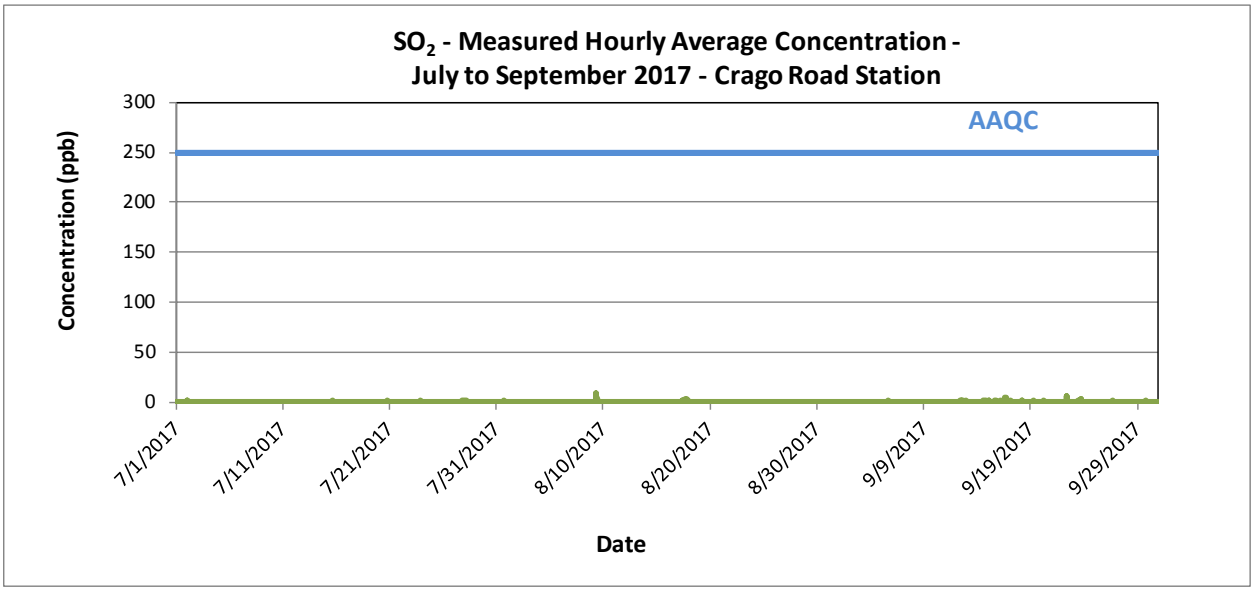
Day	Hour 0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>250	Days>100
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	24	0.2	0.0	0.0	0	0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.3	0.0	0.0	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	0.0	0.0	0.0	0.0	0.6	0.2	0.2	0.1	0.1	0.0	0.0	0.1	0.0	24	0.6	0.0	0.1	0	0
4	0.0	0.2	0.1	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.3	0.1	0.2	0.1	0.0	0.2	24	1.0	0.0	0.2	0	0
5	0.2	0.0	0.3	0.1	0.3	0.4	0.4	0.4	0.2	0.1	0.1	0.3	0.2	0.3	0.3	0.2	0.1	1.3	0.6	0.2	0.2	0.3	0.0	0.2	24	1.3	0.0	0.3	0	0
6	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.0	0.4	0.3	0.1	0.2	0.2	24	1.0	0.0	0.1	0	0
7	0.0	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.4	0.4	0.1	0.1	0.0	0.0	0.0	0.6	0.3	0.2	0.3	0.4	24	0.6	0.0	0.2	0	0
8	0.1	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	0.6	0.2	0.1	0.1	24	0.6	0.0	0.1	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	0.5	0.1	0.0	24	0.5	0.0	0.0	0	0
10	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	0.5	0.1	24	0.5	0.0	0.0	0	0
11	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.9	24	0.9	0.0	0.1	0	0
12	0.3	0.3	0.0	0.2	0.3	0.5	0.5	0.3	0.1	0.3	1.0	1.8	1.2	1.1	1.2	1.4	1.2	0.7	0.7	0.5	0.6	0.6	0.5	0.4	24	1.8	0.0	0.7	0	0
13	1.2	0.6	0.5	0.5	0.4	0.5	0.7	0.7	0.6	0.5	0.6	0.6	0.5	0.9	0.8	0.6	0.5	0.7	0.9	0.6	0.5	0.5	0.5	0.5	24	1.2	0.4	0.6	0	0
14	0.4	1.1	0.7	0.4	0.7	0.6	0.6	0.9	0.8	0.7	0.8	0.9	1.2	1.0	1.6	2.0	2.1	2.3	1.9	2.3	1.6	0.9	1.0	0.8	24	2.3	0.4	1.1	0	0
15	0.5	0.4	1.2	0.7	0.4	0.4	0.7	0.8	0.6	0.4	0.4	0.5	0.6	0.7	0.8	1.1	1.1	1.2	1.4	1.2	0.9	0.8	0.6	0.6	24	1.4	0.4	0.8	0	0
16	0.5	0.6	0.4	1.2	0.7	0.4	0.4	0.7	0.6	0.6	0.6	0.6	0.7	2.0	3.1	5.0	4.7	3.3	2.3	1.8	1.2	1.0	0.8	0.7	24	5.0	0.4	1.4	0	0
17	0.6	0.5	0.6	0.6	1.3	0.7	0.6	0.9	0.7	0.8	0.7	0.7	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.7	0.3	0.5	0.5	0.4	24	1.3	0.3	0.6	0	0
18	0.4	0.4	0.4	0.4	0.4	1.3	0.7	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.4	0.6	0.3	0.5	0.4	0.3	24	1.3	0.3	0.4	0	0
19	0.6	0.4	0.7	0.4	0.7	0.5	1.3	0.8	0.6	0.8	0.5	0.4	0.5	0.5	0.6	0.5	0.5	0.6	1.0	0.5	0.8	0.3	0.6	0.5	24	1.3	0.3	0.6	0	0
20	0.4	0.5	0.3	0.5	0.5	0.5	0.4	1.5	0.6	0.5	0.3	0.5	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20	1.5	0.0	0.3	0	0
21	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	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
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	6.7	0.0	0.3	0	0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	1.3	1.2	0.8	0.3	1.8	2.4	2.5	3.8	1.7	0.8	0.2	0.0	0.0	0.0	24	3.8	0.0	0.7	0	0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	0.2	0.0	0.0	0	0
25	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	24	0.0	0.0	0.0	0	0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	0.0	0.3	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.4	0.0	0.1	0	0
27	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4	1.0	1.0	0.5	1.1	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.1	0.0	0.2	0	0
28	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	24	0.0	0.0	0.0	0	0
29	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	1.9	0.0	0.0	0.0	0.0	0.0	24	1.9	0.0	0.1	0	0
30	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	24	0.0	0.0	0.0	0	0
31																													0	0
Count	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	29	30	30	30	30	30	30	30	30	716					
Maximum	1.2	1.1	1.2	1.2	1.3	1.3	1.3	1.5	0.8	6.7	1.3	1.8	1.2	2.0	3.1	5.0	4.7	3.8	2.3	2.3	1.6	1.0	1.0	0.9	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	20					
Average	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.4	0.3	0.3	0.3	0.3	0.4	0.6	0.5	0.5	0.5	0.4	0.3	0.2	0.2	0.2	24					

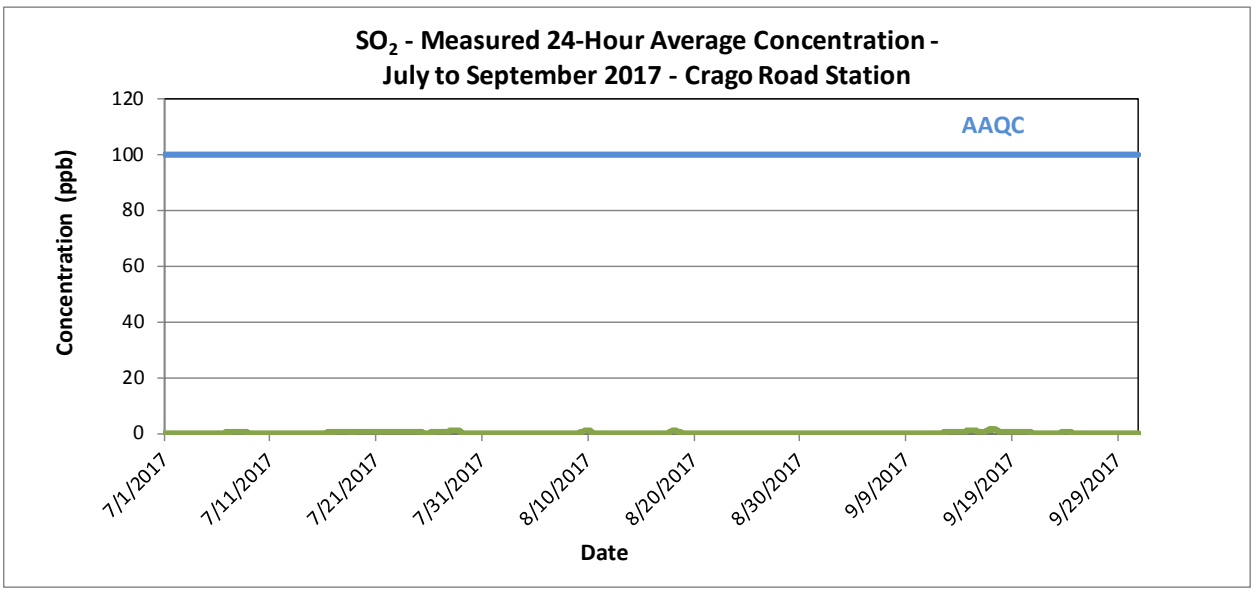
Percentiles	10	20	30	40	50	60	70	80	90	95	99	100
Data	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.5	0.8	1.2	2.3	6.7

	Maximum
Maximum Hourly	6.7
Maximum Daily	1.4
Monthly Average	0.3

Notes C - Calibration / Span Cycle NA - No Data Available T - Test A- MOE Audit M - Equipment Malfunction / Down R - Rate of Change

Figure A-1 Time History Plots of Measured Hourly Average and 24-Hour Average SO_2 Concentrations– Crago Road Station





APPENDIX B NO_2 DATA SUMMARIES AND TIME HISTORY PLOTS

NO_2 - Crago Road
July 2017
ppb

Day	Hour 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	0.8	0.8	0.5	1.5	1.5	3.0	1.3	2.6	2.1	1.0	0.7	0.3	2.1	1.7	2.2	1.3	1.2	1.1	1.1	2.3	2.4	0.7	0.7	1.4	24	3.0	0.3	1.4	0	0
2	3.1	2.0	2.1	2.3	3.8	1.7	1.7	0.1	0.5	0.9	0.0	0.0	1.6	0.5	0.0	0.9	1.2	1.6	2.0	0.5	0.0	1.0	2.1	1.6	24	3.8	0.0	1.3	0	0
3	1.5	0.9	1.9	1.7	1.4	2.5	0.9	0.4	0.0	0.2	0.2	1.0	0.6	0.0	0.2	0.3	0.1	0.0	0.2	2.5	6.4	8.9	2.3	2.2	24	8.9	0.0	1.5	0	0
4	2.4	2.0	1.7	0.2	0.6	1.0	0.2	0.4	0.8	0.3	0.0	0.0	0.2	0.0	0.0	0.5	0.6	0.2	1.4	2.1	8.3	8.8	8.8	7.3	24	8.8	0.0	2.0	0	0
5	8.2	6.6	4.0	2.9	2.8	6.4	6.2	4.5	2.3	1.5	0.3	0.0	0.4	0.0	1.8	0.2	0.5	0.2	0.5	0.4	0.0	8.2	13.3	11.8	24	13.3	0.0	3.5	0	0
6	8.3	7.5	7.3	7.7	10.1	10.6	13.2	9.4	6.5	5.1	4.6	3.9	2.5	1.6	1.2	2.0	2.0	1.5	1.5	1.9	1.3	1.5	8.6	4.3	24	13.2	1.2	5.2	0	0
7	3.0	1.8	1.6	3.9	5.1	4.5	3.2	2.9	3.2	5.3	5.8	4.6	3.7	4.4	2.8	2.0	3.3	2.7	1.7	0.8	2.9	8.3	3.9	3.9	24	8.3	0.8	3.6	0	0
8	8.0	7.2	3.6	1.1	0.3	0.8	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	1.5	1.5	2.3	2.2	24	8.0	0.0	1.2	0	0
9	2.3	1.8	3.2	6.1	7.2	6.1	1.5	1.0	0.6	0.9	0.8	1.4	1.2	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.1	0.1	1.7	24	7.2	0.0	1.5	0	0
10	1.7	1.4	2.1	1.4	1.2	3.2	3.0	2.3	1.5	1.7	1.6	1.9	2.0	1.6	1.3	1.0	1.2	0.6	2.0	2.3	2.2	1.3	1.7	2.1	24	3.2	0.6	1.8	0	0
11	3.0	2.5	1.3	0.8	1.3	3.1	2.7	5.8	5.7	1.8	2.1	2.1	2.0	1.8	1.1	0.8	2.0	1.1	1.5	1.5	1.6	5.4	10.1	8.0	24	10.1	0.8	2.9	0	0
12	5.8	4.4	3.9	2.3	3.2	8.8	3.2	6.2	3.2	3.1	1.4	0.2	2.2	3.3	3.1	1.5	3.9	0.5	0.5	1.1	0.3	1.1	2.9	3.4	24	8.8	0.2	2.9	0	0
13	1.7	1.3	1.1	1.3	1.7	2.0	1.1	0.7	3.8	3.1	1.5	1.3	1.0	0.8	1.2	0.0	0.0	1.2	2.0	0.2	0.0	3.1	3.7	1.3	24	3.8	0.0	1.5	0	0
14	1.6	1.5	1.4	1.3	2.4	2.2	1.3	1.3	1.7	3.1	0.6	1.0	0.9	1.6	2.2	1.5	2.0	2.8	1.5	1.7	2.1	2.1	3.7	3.3	24	3.7	0.6	1.9	0	0
15	0.7	0.4	0.0	0.0	0.0	0.0	0.6	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	0.4	0.0	0.6	0.3	24	0.7	0.0	0.2	0	0
16	0.5	2.5	1.8	1.6	2.3	1.8	0.6	0.6	0.7	0.4	1.8	0.2	0.5	0.8	0.3	0.0	0.0	3.4	0.9	1.2	1.8	3.5	2.2	3.2	24	3.5	0.0	1.4	0	0
17	3.9	2.3	2.7	6.0	6.0	4.0	3.0	4.8	6.5	8.2	2.0	1.1	1.3	0.7	0.6	0.8	0.5	0.6	0.0	0.1	5.9	8.1	9.0	9.1	24	9.1	0.0	3.6	0	0
18	9.2	6.2	3.9	6.4	5.8	8.1	5.1	0.9	0.7	1.8	1.7	1.1	0.5	2.1	2.5	2.8	2.0	2.6	1.2	0.0	2.2	2.2	2.7	1.0	24	9.2	0.0	3.0	0	0
19	1.0	4.3	8.2	5.9	2.7	1.6	1.3	1.8	2.1	3.1	3.7	3.1	3.7	1.3	1.3	0.6	1.1	8.1	1.4	3.7	3.1	2.4	2.5	4.0	24	8.2	0.6	3.0	0	0
20	5.1	6.9	7.2	4.0	4.9	5.8	7.5	8.0	4.4	3.8	6.7	9.8	5.4	1.8	0.3	0.0	0.3	3.2	0.5	0.0	0.2	0.3	3.5	6.7	24	9.8	0.0	4.0	0	0
21	7.3	5.2	6.5	3.3	3.5	9.2	11.8	7.8	3.9	3.5	3.6	0.7	0.6	0.1	0.8	1.2	0.0	0.2	0.5	1.4	2.5	2.6	2.6	5.3	24	11.8	0.0	3.5	0	0
22	5.8	3.7	2.4	2.7	3.5	2.5	3.7	4.1	6.7	4.7	2.3	1.8	1.7	0.9	1.2	2.6	2.7	1.4	1.4	0.2	0.2	0.9	1.8	2.0	24	6.7	0.2	2.5	0	0
23	1.0	0.7	0.6	0.6	0.5	0.9	1.3	2.2	4.6	1.0	2.5	0.9	0.3	0.5	0.3	0.6	0.8	1.2	3.7	1.0	1.0	1.7	0.8	0.8	24	4.6	0.3	1.2	0	0
24	0.2	0.8	1.1	1.0	1.2	3.2	2.8	1.2	0.9	0.9	1.0	1.0	0.0	0.2	0.6	0.5	0.0	0.0	0.0	0.1	0.3	0.7	0.8	0.2	24	3.2	0.0	0.8	0	0
25	0.1	0.3	0.1	0.2	0.3	1.0	1.2	0.8	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	6.1	7.3	7.0	24	7.3	0.0	1.0	0	0
26	4.6	5.0	5.1	3.3	3.7	4.6	5.0	3.5	1.5	0.2	0.0	0.2	0.3	0.1	4.0	4.9	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	5.1	0.0	2.0	0	0
27	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	NA	NA	1.8	4.4	3.8	3.4	6.9	3.8	2.0	0.9	22	6.9	0.0	1.2	0	0
28	0.7	0.5	0.2	0.8	0.5	0.9	C	C	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	1.7	6.0	3.6	2.9	0.5	22	6.0	0.0	0.8	0	0
29	0.7	0.4	0.1	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	0.4	0.4	24	0.7	0.0	0.1	0	0
30	0.1	0.6	0.7	0.7	0.7	0.9	0.5	0.0	0.0	0.0	0.8	1.6	1.6	0.1	0.0	0.0	0.0	0.1	1.3	3.0	2.9	5.2	3.7	5.1	24	5.2	0.0	1.2	0	0
31	4.4	5.3	4.9	4.5	5.4	3.6	5.9	5.9	3.5	5.2	6.0	5.7	4.2	3.8	2.9	2.9	0.0	0.0	0.4	5.3	4.1	2.0	3.2	6.0	24	6.0	0.0	4.0	0	0
Count	31	31	31	31	31	31	30	30	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	740					
Maximum	9.2	7.5	8.2	7.7	10.1	10.6	13.2	9.4	6.7	8.2	6.7	9.8	5.4	4.4	4.0	4.9	3.9	8.1	3.8	5.3	8.3	8.9	13.3	11.8	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	22					
Average	3.1	2.8	2.6	2.4	2.7	3.4	3.0	2.7	2.2	2.0	1.7	1.4	1.3	1.0	1.1	1.0	1.0	1.3	1.0	1.2	2.1	3.1	3.5	3.5	24					

Percentiles	10	20	30	40	50	60	70	80	90	95	99	100		Maximum
													Maximum Hourly	13.3
													Maximum Daily	5.2
Data	0.0	0.1	0.5	0.9	1.4	1.8	2.5	3.7	5.8	7.3	9.6	13.3	Monthly Average	2.1

Notes C - Calibration / Span Cycle NA - No Data Available T - Test A- MOE Audit M - Equipment Malfunction / Down R - Rate of Change

NO_2 - Crago Road
August 2017
ppb

Day	Hour 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	6.5	5.3	2.6	1.9	2.6	3.5	4.3	5.0	2.5	1.8	1.2	1.6	2.1	2.5	3.1	2.9	2.1	2.4	4.3	5.1	4.7	3.8	3.3	3.2	24	6.5	1.2	3.3	0	0
2	3.1	3.3	3.8	4.3	3.4	3.1	1.4	2.3	2.2	0.7	0.0	0.0	0.7	0.5	0.6	1.2	5.5	9.8	5.6	4.1	3.3	7.4	7.4	6.0	24	9.8	0.0	3.3	0	0
3	4.3	5.0	4.4	5.1	4.6	6.5	7.4	5.9	4.0	3.9	3.0	2.4	2.9	3.6	2.2	2.6	2.7	1.8	2.6	1.6	1.1	1.9	2.6	3.2	24	7.4	1.1	3.6	0	0
4	2.4	1.8	0.7	1.2	1.3	1.1	1.5	1.2	1.5	1.0	1.7	1.9	1.6	0.9	2.0	1.7	1.1	1.4	1.3	0.9	1.1	1.1	0.7	1.5	24	2.4	0.7	1.4	0	0
5	1.1	0.5	0.8	0.8	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	0.3	24	1.1	0.0	0.2	0	0
6	4.7	4.8	2.5	0.3	0.0	0.1	2.0	1.4	2.0	1.7	1.5	1.5	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.5	0.4	0.5	2.8	2.6	24	4.8	0.0	1.2	0	0
7	3.2	0.1	0.8	0.0	0.0	1.2	1.5	0.7	2.0	2.0	1.0	0.8	1.2	1.5	0.3	2.6	6.3	2.8	1.0	0.0	0.0	0.1	3.6	1.1	24	6.3	0.0	1.4	0	0
8	1.7	1.0	0.3	0.2	0.0	0.0	1.4	1.8	0.0	1.5	0.7	0.4	4.7	4.5	0.7	0.8	0.9	0.3	0.0	0.1	0.0	0.0	0.4	3.4	24	4.7	0.0	1.0	0	0
9	3.2	8.2	5.3	7.2	6.5	4.6	4.2	3.9	4.3	5.9	4.3	2.7	2.4	2.3	3.0	2.2	4.9	3.1	9.4	6.9	5.1	4.1	4.2	5.0	24	9.4	2.2	4.7	0	0
10	4.6	5.3	3.6	4.1	3.9	3.9	3.4	8.7	6.0	3.1	3.1	2.4	2.3	2.0	2.7	1.7	2.0	1.9	1.0	1.0	3.5	4.0	4.2	4.5	24	8.7	1.0	3.4	0	0
11	8.3	6.2	4.7	4.7	2.7	0.2	1.2	4.6	2.1	2.5	1.7	2.2	2.1	2.1	2.3	2.4	2.0	4.2	4.0	2.7	1.1	3.1	4.2	3.6	24	8.3	0.2	3.1	0	0
12	3.8	3.9	1.7	2.3	4.8	3.1	6.4	7.4	4.1	2.5	1.5	1.7	1.0	0.3	1.6	1.4	0.2	0.0	0.0	0.0	0.9	1.0	2.2	0.5	24	7.4	0.0	2.2	0	0
13	0.6	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.7	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	2.7	1.2	1.2	24	2.7	0.0	0.3	0	0
14	3.3	1.9	1.6	4.6	3.5	2.8	3.2	2.8	3.1	4.4	1.9	1.2	0.7	1.7	0.1	0.4	0.0	0.3	0.0	0.7	3.7	9.7	9.8	6.4	24	9.8	0.0	2.8	0	0
15	5.3	4.0	2.7	4.4	5.4	8.5	7.2	7.0	7.7	6.6	5.2	2.4	1.1	0.7	3.1	5.3	3.5	3.5	3.9	4.9	5.9	3.7	2.0	2.5	24	8.5	0.7	4.4	0	0
16	3.2	1.9	1.7	1.7	1.3	3.5	1.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	6.7	17.4	12.3	11.6	24	17.4	0.0	2.7	0	0
17	10.4	5.9	3.0	4.0	6.7	8.5	4.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	9.4	12.3	10.8	5.9	7.0	11.3	7.7	2.6	24	12.3	0.0	4.9	0	0
18	5.6	0.5	1.4	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	0.3	0.6	0.7	1.5	1.8	1.2	24	5.6	0.0	0.6	0	0
19	2.0	0.7	0.0	2.6	0.0	0.0	0.0	0.6	1.1	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	0.7	2.2	24	2.6	0.0	0.4	0	0
20	3.5	3.5	0.1	0.3	1.2	3.6	3.4	0.5	0.3	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	24	3.6	0.0	0.7	0	0
21	0.5	0.0	0.0	4.2	7.7	11.8	9.5	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.3	0.2	0.0	0.0	8.3	1.5	24	11.8	0.0	2.1	0	0
22	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	1.2	0.4	0.0	0.0	0.0	0.0	1.5	2.6	24	2.6	0.0	0.2	0	0
23	1.2	0.1	0.0	0.4	1.2	0.9	1.6	2.5	2.4	2.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	3.0	2.8	1.9	3.2	24	3.2	0.0	1.1	0	0
24	2.8	9.5	7.9	7.1	5.9	7.7	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.6	3.1	6.1	3.0	2.2	0.7	24	9.5	0.0	2.7	0	0
25	0.0	1.0	1.7	1.0	1.3	3.0	1.4	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	7.4	22.0	15.7	8.0	24	22.0	0.0	2.6	0	0
26	0.0	0.0	0.0	0.0	0.6	0.5	0.2	0.6	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	4.6	3.1	0.9	0.6	24	4.6	0.0	0.6	0	0
27	0.0	0.0	0.0	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	0.0	2.7	3.2	1.9	0.4	0.6	24	3.2	0.0	0.4	0	0
28	0.4	0.0	0.0	1.1	7.3	6.4	4.8	3.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	24	7.3	0.0	1.0	0	0
29	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	2.3	6.1	8.9	4.6	3.2	5.3	24	8.9	0.0	1.3	0	0
30	10.1	5.4	7.7	6.0	6.6	5.5	2.5	1.2	0.9	0.0	C	C	C	3.2	1.4	1.3	2.1	4.3	2.6	6.2	7.2	22.3	11.4	11.5	21	22.3	0.0	5.7	0	0
31	6.4	2.9	2.9	2.7	2.8	3.3	3.3	2.1	1.4	1.5	1.2	1.2	1.2	1.1	1.1	1.2	1.2	1.6	2.5	5.6	6.6	6.9	9.8	8.8	24	9.8	1.1	3.3	0	0
Count	31	31	31	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	741					
Maximum	10.4	9.5	7.9	7.2	7.7	11.8	9.5	8.7	7.7	6.6	5.2	2.7	4.7	4.5	3.1	5.3	9.4	12.3	10.8	6.9	8.9	22.3	15.7	11.6	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	21					
Average	3.3	2.7	2.0	2.4	2.6	3.0	2.7	2.4	1.6	1.4	1.0	0.8	0.8	0.9	0.8	1.0	1.5	1.7	1.8	2.0	3.0	4.5	4.1	3.4	24					

Percentiles	10	20	30	40	50	60	70	80	90	95	99	100
Data	0.0	0.0	0.0	0.5	1.2	1.9	2.7	3.9	5.9	7.4	11.5	22.3

	Maximum
Maximum Hourly	22.3
Maximum Daily	5.7
Monthly Average	2.2

Notes C - Calibration / Span Cycle; NA - No Data Available; T - Test; A- MOE Audit; M - Equipment Malfunction / Down; R - Rate of Change

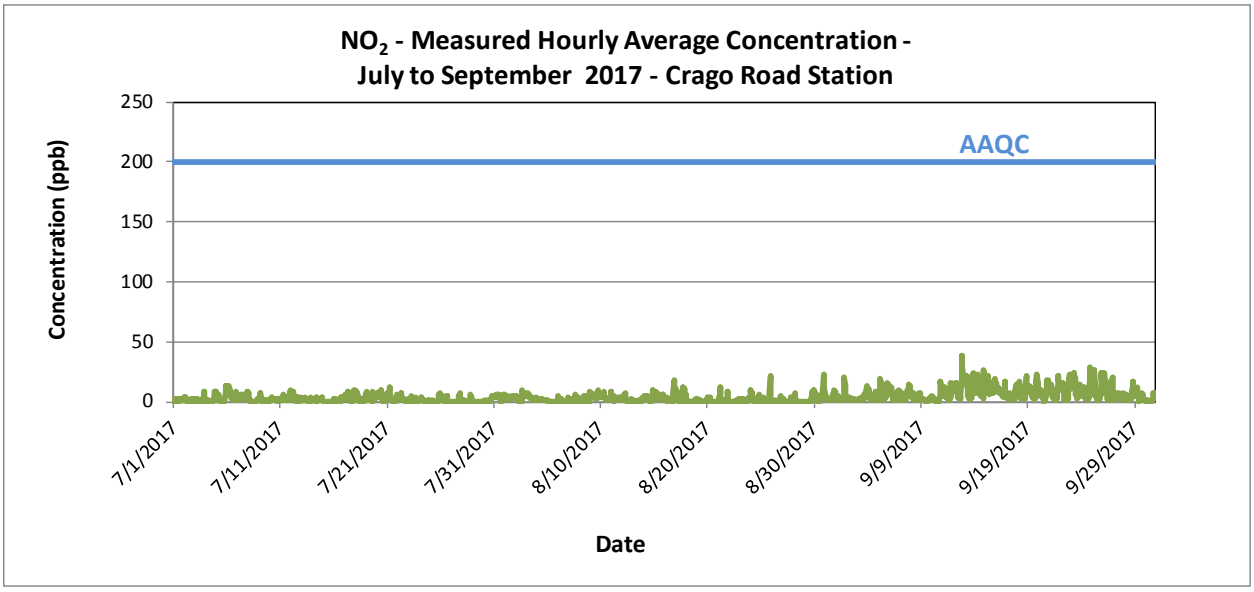
NO_2 - Crago Road
September 2017
ppb

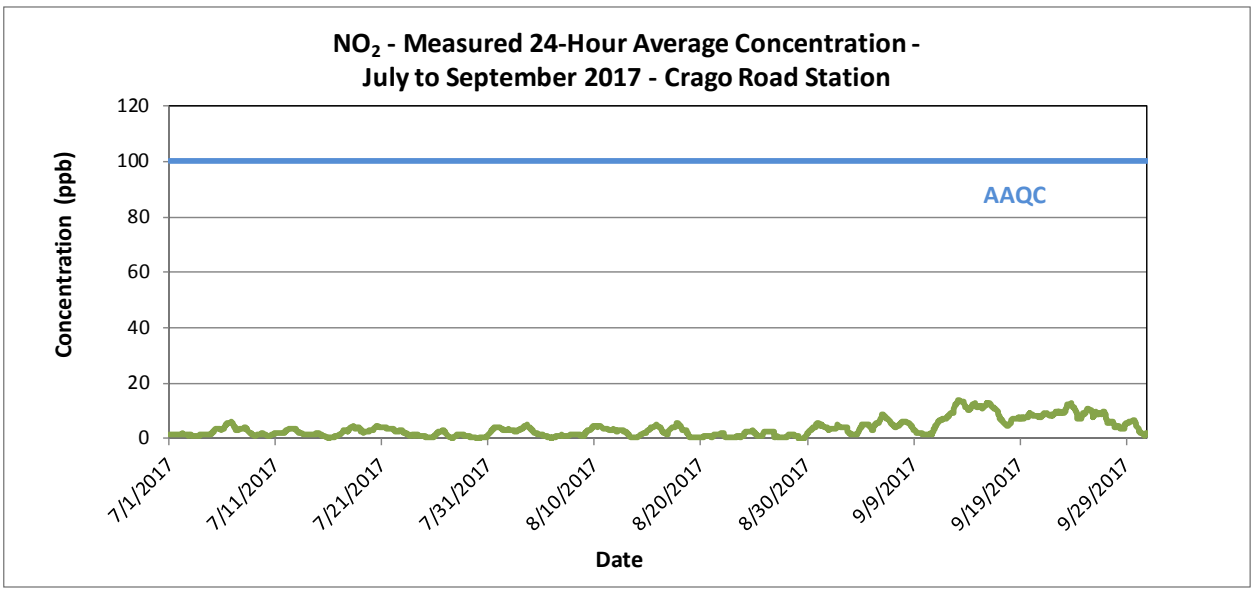
Day	Hour 0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>200	Days>100
1	5.8	4.8	4.1	2.7	5.4	5.4	3.9	2.7	1.6	1.1	1.0	0.8	0.8	0.9	1.3	0.9	1.2	1.7	4.4	15.4	20.7	13.0	4.5	2.7	24	20.7	0.8	4.5	0	0
2	2.7	3.0	2.6	2.9	4.0	3.2	3.6	3.6	2.6	1.1	1.3	0.9	0.8	0.8	0.7	0.7	2.0	2.1	1.5	0.8	1.6	1.4	1.0	1.0	24	4.0	0.7	1.9	0	0
3	1.3	1.6	1.2	1.0	1.0	2.4	1.6	1.8	2.4	3.4	2.0	1.1	1.2	1.0	1.1	3.6	2.5	5.2	5.6	7.6	6.5	7.0	13.6	6.1	24	13.6	1.0	3.4	0	0
4	6.7	10.7	7.2	10.9	6.6	5.9	5.6	2.1	2.6	2.0	1.5	1.3	1.5	1.1	1.3	1.1	2.4	3.6	6.3	8.3	2.2	2.3	3.6	1.3	24	10.9	1.1	4.1	0	0
5	1.7	1.3	3.7	4.6	7.5	19.5	15.5	15.4	9.7	6.4	5.9	3.6	1.7	1.6	3.9	3.2	6.7	3.6	8.9	12.2	10.2	15.9	14.1	12.5	24	19.5	1.3	7.9	0	0
6	7.9	6.8	6.4	6.4	8.8	11.7	10.6	9.8	5.9	1.4	1.4	1.1	0.8	0.9	1.6	3.0	1.5	2.9	8.2	2.2	3.1	1.5	5.7	9.6	24	11.7	0.8	5.0	0	0
7	6.2	8.5	4.7	6.9	6.5	7.0	6.9	4.8	2.4	3.3	4.4	2.8	1.7	1.8	2.5	5.9	6.2	7.1	8.0	9.9	5.9	9.1	14.2	13.3	24	14.2	1.7	6.3	0	0
8	8.5	6.2	4.0	5.0	5.1	6.4	6.9	5.2	1.9	1.6	1.4	1.4	1.3	1.2	1.1	1.1	1.1	1.6	2.7	4.7	7.8	7.2	2.6	2.6	24	8.5	1.1	3.7	0	0
9	2.1	1.7	1.2	1.5	2.1	1.9	1.7	1.0	0.7	0.7	0.4	0.5	0.5	0.5	0.4	0.4	1.1	1.6	2.6	2.7	3.4	2.6	1.4	1.3	24	3.4	0.4	1.4	0	0
10	1.6	3.1	4.4	3.5	2.0	1.7	2.3	1.8	0.9	0.5	0.7	0.7	0.3	0.9	0.6	0.5	2.0	0.8	1.7	6.3	16.5	15.5	12.3	10.3	24	16.5	0.3	3.8	0	0
11	8.6	9.8	5.9	5.2	9.5	12.5	12.2	9.8	6.6	3.6	4.0	3.9	2.5	2.3	1.2	1.2	2.6	2.6	5.8	3.7	15.1	15.7	14.3	12.2	24	15.7	1.2	7.1	0	0
12	11.6	11.1	9.0	11.1	12.4	14.5	14.4	15.1	10.4	10.9	9.6	6.3	4.1	2.8	2.5	2.2	3.8	2.2	6.3	20.6	38.6	31.6	21.8	19.3	24	38.6	2.2	12.2	0	0
13	17.7	18.2	14.1	16.4	15.4	17.1	21.7	16.3	12.6	4.5	4.5	3.3	2.1	2.9	2.9	2.4	4.2	2.9	3.8	8.8	21.5	23.8	21.2	19.3	24	23.8	2.1	11.6	0	0
14	15.0	12.5	7.8	7.0	14.0	15.9	18.7	22.9	11.0	12.9	9.6	10.2	13.4	10.2	6.5	4.7	4.3	4.7	8.1	10.5	2.9	5.9	26.8	19.1	24	26.8	2.9	11.4	0	0
15	8.2	10.8	13.1	15.5	8.2	15.9	21.5	19.0	17.0	9.9	7.8	5.9	8.1	9.6	11.0	10.1	7.9	6.8	7.5	15.0	17.0	18.8	16.4	16.3	24	21.5	5.9	12.4	0	0
16	17.1	16.2	15.7	11.0	12.3	11.3	8.9	10.9	6.9	7.4	6.9	7.1	6.8	6.8	6.1	5.2	5.3	4.2	4.4	8.1	12.8	17.2	8.3	7.8	24	17.2	4.2	9.4	0	0
17	5.8	5.2	5.4	3.6	2.3	3.8	6.7	5.2	3.0	2.8	2.4	1.9	2.5	2.3	2.0	2.1	1.8	7.5	4.4	2.4	8.1	9.7	14.3	14.3	24	14.3	1.8	5.0	0	0
18	9.3	8.8	5.8	10.6	16.9	10.3	14.8	9.2	7.9	3.2	2.7	2.6	2.4	2.1	2.2	2.4	2.2	2.3	2.6	1.9	8.9	21.4	13.4	14.0	24	21.4	1.9	7.4	0	0
19	11.1	8.6	7.9	9.6	12.7	13.4	10.3	11.9	6.8	4.0	3.3	4.1	3.1	2.8	2.3	2.3	2.1	5.6	6.4	19.8	15.8	23.0	15.9	12.6	24	23.0	2.1	9.0	0	0
20	10.7	5.9	4.6	7.8	9.9	8.0	9.2	8.5	5.8	4.7	4.2	1.6	1.3	C	2.4	1.5	1.6	2.6	5.6	18.5	18.3	18.3	13.6	12.8	23	18.5	1.3	7.7	0	0
21	12.1	12.1	11.5	10.3	11.6	12.6	14.0	10.0	5.5	3.4	1.9	4.1	3.0	2.6	1.4	2.6	1.9	4.9	2.3	5.4	15.7	22.1	17.5	15.3	24	22.1	1.4	8.5	0	0
22	13.0	9.7	14.6	10.6	14.0	11.8	14.7	15.2	11.0	14.2	2.6	1.7	2.0	3.8	2.3	1.5	1.3	6.3	2.2	4.2	15.4	22.9	15.4	15.8	24	22.9	1.3	9.4	0	0
23	15.7	10.8	10.9	10.4	14.0	16.1	14.6	21.2	23.9	22.4	18.8	13.7	7.7	6.3	5.1	3.9	2.6	3.5	4.6	10.5	13.9	11.3	7.1	6.8	24	23.9	2.6	11.5	0	0
24	9.0	11.0	11.0	8.8	4.7	5.7	11.4	11.7	4.5	4.8	3.0	5.8	5.9	5.5	3.1	2.9	3.4	2.2	3.6	17.5	27.6	29.0	17.2	11.2	24	29.0	2.2	9.2	0	0
25	11.7	7.1	8.0	5.8	10.5	7.5	26.6	23.7	10.8	6.1	4.7	2.6	2.1	1.8	1.7	3.2	3.6	2.7	2.6	3.1	6.8	6.1	24.3	20.1	24	26.6	1.7	8.5	0	0
26	12.3	9.5	9.4	11.1	19.2	24.1	10.9	16.2	6.9	7.4	7.9	2.9	2.9	2.7	1.6	2.1	2.1	5.4	4.6	1.9	9.6	18.0	20.0	14.7	24	24.1	1.6	9.3	0	0
27	6.7	1.7	2.4	1.7	3.5	3.3	3.9	2.2	3.4	6.4	7.3	6.7	7.2	5.9	3.2	2.6	2.5	2.8	2.4	2.8	3.7	6.9	6.4	1.8	24	7.3	1.7	4.1	0	0
28	2.4	4.1	5.2	5.8	5.7	4.4	6.2	4.0	1.9	1.9	2.1	1.7	1.9	2.1	2.5	2.8	2.5	3.4	3.1	7.7	13.2	17.3	13.5	9.4	24	17.3	1.7	5.2	0	0
29	6.3	5.2	4.6	5.6	8.6	11.6	11.4	8.3	5.5	3.2	0.8	0.6	1.9	2.5	4.5	4.5	4.9	7.6	6.2	3.0	1.9	1.4	1.0	1.1	24	11.6	0.6	4.7	0	0
30	0.7	1.1	0.9	0.5	0.8	0.9	1.0	1.4	0.7	0.6	0.5	0.3	0.1	0.3	0.2	0.4	0.5	2.1	5.7	7.5	4.6	6.9	4.0	2.0	24	7.5	0.1	1.8	0	0
31																													0	0
Count	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	719					
Maximum	17.7	18.2	15.7	16.4	19.2	24.1	26.6	23.7	23.9	22.4	18.8	13.7	13.4	10.2	11.0	10.1	7.9	7.6	8.9	20.6	38.6	31.6	26.8	20.1	24					
Minimum	0.7	1.1	0.9	0.5	0.8	0.9	1.0	1.0	0.7	0.5	0.4	0.3	0.1	0.3	0.2	0.4	0.5	0.8	1.5	0.8	1.6	1.4	1.0	1.0	23					
Average	8.3	7.6	6.9	7.1	8.5	9.5	10.4	9.7	6.4	5.2	4.2	3.4	3.0	3.0	2.6	2.7	2.9	3.7	4.7	8.1	11.6	13.4	12.2	10.2	24					

Percentiles	10	20	30	40	50	60	70	80	90	95	99	100		Maximum
													Maximum Hourly	38.6
													Maximum Daily	12.4
Data	1.2	1.9	2.6	3.6	5.2	6.7	8.8	11.6	15.5	18.7	24.1	38.6	Monthly Average	6.9

Notes C - Calibration / Span Cycle; NA - No Data Available; T - Test; 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 NO_2 Concentrations – Crago Road Station





APPENDIX C NO_X DATA SUMMARIES AND TIME HISTORY PLOTS

NOx Crago Road
July 2017
(µg/m³)

Day	Hour 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	1.1	1.0	1.0	1.9	2.4	4.4	2.0	3.9	3.5	2.0	1.8	1.5	3.3	2.6	3.5	2.1	1.9	1.6	1.5	2.7	2.8	1.2	1.2	1.9	24	4.4	1.0	2.2	0	0
2	3.8	2.4	2.9	3.1	6.2	2.6	3.1	1.2	1.9	2.5	0.2	0.9	3.1	0.8	0.6	1.8	2.4	2.4	2.7	1.0	0.0	1.2	2.7	1.9	24	6.2	0.0	2.1	0	0
3	2.2	1.9	2.7	2.4	1.9	4.2	1.9	1.6	0.2	1.7	1.3	2.5	1.7	0.3	1.0	1.2	0.7	0.6	0.5	2.9	6.8	10.0	3.6	3.6	24	10.0	0.2	2.4	0	0
4	4.2	3.8	3.6	1.1	1.4	2.1	1.3	1.9	3.9	2.1	1.2	1.0	1.3	0.9	0.9	1.7	1.8	1.5	2.9	3.0	13.6	25.3	32.9	16.0	24	32.9	0.9	5.4	0	0
5	15.8	11.7	6.0	4.1	9.3	31.3	16.6	9.9	4.8	3.1	1.3	0.7	1.4	0.4	3.2	0.8	1.3	0.8	1.0	0.8	0.0	12.9	26.2	21.4	24	31.3	0.0	7.7	0	0
6	14.5	16.0	10.7	15.3	20.2	22.3	26.9	19.1	13.2	8.4	6.7	5.2	3.5	2.1	1.3	2.5	2.3	2.0	2.0	2.1	1.5	2.0	10.1	6.1	24	26.9	1.3	9.0	0	0
7	4.3	2.8	2.5	5.0	7.8	8.4	6.1	4.7	5.0	7.9	7.5	6.1	4.7	5.5	3.4	2.4	3.9	3.0	1.8	0.9	3.3	8.9	4.5	4.6	24	8.9	0.9	4.8	0	0
8	8.8	8.2	4.5	1.9	1.3	1.8	1.4	0.4	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.2	1.9	1.9	2.7	2.9	24	8.8	0.0	1.6	0	0
9	2.7	2.0	3.4	6.6	8.7	7.2	2.5	1.9	1.6	2.2	2.1	2.9	2.2	0.0	0.3	0.0	1.2	0.0	0.0	0.0	0.0	0.1	0.3	2.0	24	8.7	0.0	2.1	0	0
10	2.0	1.8	2.6	1.9	1.7	5.1	4.4	3.6	2.3	2.9	2.6	3.2	3.0	2.2	1.9	1.8	2.0	1.0	2.5	2.5	2.9	1.5	2.1	2.7	24	5.1	1.0	2.5	0	0
11	3.6	3.0	1.7	1.2	1.7	4.1	4.6	8.9	9.9	3.5	3.5	2.9	2.8	2.4	1.6	1.4	2.7	1.5	1.9	1.8	2.0	6.4	12.4	10.7	24	12.4	1.2	4.0	0	0
12	7.2	5.9	5.4	4.0	4.8	16.1	5.7	9.1	5.0	4.5	2.3	0.9	3.0	4.4	3.8	1.9	4.7	1.0	1.2	1.9	1.5	2.3	5.4	6.2	24	16.1	0.9	4.5	0	0
13	3.8	3.3	3.2	3.4	3.4	3.8	3.0	2.8	7.4	5.4	2.7	3.0	2.4	2.0	2.3	0.8	0.0	2.0	3.1	1.0	0.2	4.0	4.7	2.0	24	7.4	0.0	2.9	0	0
14	2.3	1.9	2.0	2.2	3.4	3.4	2.4	2.8	4.3	7.9	3.4	4.3	3.3	6.1	4.0	3.0	3.2	3.9	2.2	2.4	3.0	3.9	5.8	6.0	24	7.9	1.9	3.6	0	0
15	1.8	1.2	0.6	0.2	0.4	0.8	1.8	2.6	1.5	0.0	0.1	0.0	0.0	0.2	1.0	0.5	0.3	0.3	0.3	0.2	1.1	0.3	0.9	0.8	24	2.6	0.0	0.7	0	0
16	1.1	3.2	2.7	3.0	5.5	3.6	1.4	1.6	2.0	1.4	3.4	0.7	0.9	1.8	0.6	0.1	0.3	4.0	2.0	2.4	2.9	5.3	3.8	5.1	24	5.5	0.1	2.5	0	0
17	6.4	4.6	5.0	8.6	9.2	6.8	5.2	8.4	10.9	13.8	3.5	2.0	2.1	1.5	1.7	1.5	1.5	1.1	0.3	0.3	6.8	9.7	16.2	18.4	24	18.4	0.3	6.1	0	0
18	13.8	8.9	5.5	15.3	13.9	19.5	9.2	2.2	1.7	3.2	3.5	2.5	1.5	2.6	3.4	3.2	2.5	3.0	1.3	0.2	2.9	2.7	3.4	1.4	24	19.5	0.2	5.3	0	0
19	1.3	5.7	18.5	9.5	5.2	3.9	2.2	2.8	3.0	4.9	5.4	4.5	5.0	1.8	1.7	1.1	1.6	8.3	1.9	4.0	3.3	3.1	3.2	5.2	24	18.5	1.1	4.5	0	0
20	6.8	16.5	15.8	9.3	11.3	11.2	21.1	17.9	9.3	5.9	10.1	18.4	12.9	3.5	0.8	0.7	1.3	4.2	1.0	0.5	0.7	0.6	4.2	8.1	24	21.1	0.5	8.0	0	0
21	11.1	10.9	14.4	6.0	5.7	18.3	24.4	14.8	6.5	6.0	4.5	1.6	1.6	0.8	1.4	1.7	0.8	0.7	0.9	1.5	2.8	3.1	3.3	7.7	24	24.4	0.7	6.3	0	0
22	11.1	5.2	3.7	4.3	4.8	5.7	13.7	13.9	13.5	7.2	3.3	2.8	3.2	2.0	2.1	3.6	3.9	2.0	2.0	1.1	0.8	1.7	3.4	3.9	24	13.9	0.8	5.0	0	0
23	2.9	3.2	2.7	2.6	2.8	3.5	4.1	5.6	10.9	2.7	4.7	2.2	1.5	1.4	1.1	1.5	1.7	2.2	5.3	1.7	1.8	2.6	1.5	1.4	24	10.9	1.1	3.0	0	0
24	0.8	1.0	1.7	1.6	1.8	4.0	4.2	2.3	2.2	2.0	2.4	2.9	0.6	0.7	1.5	1.6	0.6	0.1	0.5	0.8	1.1	1.3	1.8	1.0	24	4.2	0.1	1.6	0	0
25	0.8	0.8	0.7	0.8	0.8	1.1	1.6	1.5	1.1	1.1	0.7	0.3	0.6	0.5	0.1	0.0	0.1	0.0	0.0	0.0	0.2	7.4	9.6	22.8	24	22.8	0.0	2.2	0	0
26	12.4	10.3	17.1	15.5	26.7	33.7	18.6	9.0	4.0	1.2	0.6	0.9	1.2	1.0	4.7	20.6	24.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	24	33.7	0.0	8.4	0	0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.8	NA	NA	0.8	4.8	4.1	4.4	10.7	5.4	3.0	1.7	22	10.7	0.0	1.7	0	0
28	1.4	1.4	0.7	1.4	1.1	1.3	C	C	0.2	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	1.2	6.0	3.4	2.6	0.0	22	6.0	0.0	1.0	0	0
29	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	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.1	24	1.1	0.0	0.1	0	0
30	1.3	2.1	2.5	2.6	2.8	3.4	2.5	1.1	0.0	0.1	1.6	2.7	2.3	0.4	0.0	0.0	0.0	0.0	1.1	3.5	3.4	5.3	3.7	5.6	24	5.6	0.0	2.0	0	0
31	6.6	10.3	8.5	9.9	13.4	7.5	10.1	10.0	5.2	7.6	8.4	7.6	4.7	3.7	2.5	2.5	0.0	0.0	14.1	5.9	6.7	4.0	6.6	16.9	24	16.9	0.0	7.2	0	0
Count	31	31	31	31	31	31	30	30	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	740					
Maximum	15.8	16.5	18.5	15.5	26.7	33.7	26.9	19.1	13.5	13.8	10.1	18.4	12.9	6.1	4.7	20.6	24.2	8.3	14.1	5.9	13.6	25.3	32.9	22.8	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	22					
Average	5.0	4.9	4.9	4.7	5.8	7.8	6.7	5.5	4.4	3.6	2.9	2.7	2.4	1.7	1.7	2.0	2.2	1.7	1.9	1.6	2.9	4.4	5.9	6.1	24					

Percentiles	10	20	30	40	50	60	70	80	90	95	99	100
Data	0.0	0.8	1.3	1.8	2.3	3.0	3.8	5.4	9.7	14.5	24.3	33.7

	Maximum
Maximum Hourly	33.7
Maximum Daily	9.0
Monthly Average	3.9

Notes C - Calibration / Span Cycle NA - No Data Available T - Test A- MOE Audit M - Equipment Malfunction / Down R - Rate of Change

NOx Crago Road
August 2017
ppb

Day	Hour 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	24.5	27.8	21.0	15.5	21.1	24.7	22.6	15.3	10.6	5.4	2.6	2.4	2.1	2.6	3.0	2.5	1.7	2.1	4.2	7.2	8.4	9.2	10.5	14.9	24	27.8	1.7	10.9	0	0
2	16.3	21.2	19.5	16.6	15.4	24.6	17.8	7.5	2.3	0.4	0.0	0.0	0.5	0.0	0.0	0.8	4.8	9.2	5.6	4.7	4.6	10.4	13.4	13.3	24	24.6	0.0	8.7	0	0
3	13.7	13.3	11.1	10.1	11.4	12.4	12.8	9.8	5.9	5.0	3.4	2.4	2.6	3.2	1.6	2.4	2.3	1.2	2.2	1.2	0.5	1.6	2.3	3.9	24	13.7	0.5	5.7	0	0
4	2.5	1.7	0.4	1.1	1.2	0.9	1.5	1.2	1.6	1.1	1.8	2.0	1.4	0.9	2.1	1.7	1.0	1.4	1.3	0.6	0.9	1.2	0.7	1.4	24	2.5	0.4	1.3	0	0
5	1.0	0.7	0.5	0.7	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	1.0	0.0	0.1	0	0
6	6.5	8.9	2.7	0.0	0.0	0.5	3.7	4.0	6.1	3.2	2.2	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.6	4.2	24	8.9	0.0	2.0	0	0
7	12.4	5.0	7.7	5.7	6.0	9.7	7.6	6.3	10.5	5.1	3.3	1.6	1.5	2.2	1.2	6.4	14.9	4.5	1.9	1.3	2.2	5.6	31.2	10.4	24	31.2	1.2	6.8	0	0
8	12.4	8.6	7.0	13.2	9.0	4.6	9.2	4.7	0.8	3.9	2.0	0.6	7.0	6.1	0.4	0.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	24	13.2	0.0	4.0	0	0
9	2.9	13.0	9.2	11.4	25.1	12.9	6.9	6.2	6.6	8.4	5.6	3.0	2.4	1.8	2.4	1.7	5.3	3.0	10.5	8.6	9.4	12.3	22.1	18.9	24	25.1	1.7	8.7	0	0
10	14.4	13.9	8.4	10.4	13.2	19.8	20.7	22.9	11.2	4.2	3.8	2.5	2.0	1.5	2.3	1.1	1.3	1.2	0.1	0.3	3.1	3.8	4.2	4.6	24	22.9	0.1	7.1	0	0
11	9.9	9.0	8.0	8.0	6.6	4.0	5.9	8.4	3.3	3.3	2.0	2.6	2.0	1.9	2.2	2.3	1.5	4.2	4.0	2.5	0.6	3.2	5.9	5.1	24	9.9	0.6	4.4	0	0
12	6.3	5.9	2.6	1.9	4.9	5.3	8.7	9.6	6.0	3.5	1.7	1.9	0.8	0.0	1.2	1.2	0.0	0.0	0.0	0.0	0.5	1.0	2.2	0.5	24	9.6	0.0	2.7	0	0
13	0.3	0.0	1.3	0.8	0.0	0.0	0.0	0.0	0.0	1.3	1.2	0.3	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	4.7	3.1	2.2	24	4.7	0.0	0.7	0	0
14	5.5	3.8	3.8	8.7	9.8	14.7	12.8	7.5	6.9	8.5	2.9	1.5	0.5	1.6	0.0	0.2	0.0	0.0	0.0	0.2	3.7	21.4	19.2	12.3	24	21.4	0.0	6.1	0	0
15	13.4	9.3	7.0	13.9	10.7	21.5	20.6	14.0	11.0	8.9	5.7	2.3	0.3	0.4	2.5	4.9	3.0	3.0	3.4	5.4	7.1	3.8	1.9	2.3	24	21.5	0.3	7.4	0	0
16	3.2	1.9	1.8	2.1	3.5	8.7	8.6	2.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	37.2	18.2	15.7	24	37.2	0.0	4.7	0	0
17	14.2	6.0	2.1	2.9	8.6	11.6	4.2	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	10.5	14.1	11.4	5.3	7.8	13.0	9.2	1.4	24	14.2	0.0	5.5	0	0
18	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.1	24	4.6	0.0	0.2	0	0
19	0.9	0.0	0.0	1.7	0.0	0.0	0.0	0.2	2.1	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	1.1	24	2.1	0.0	0.3	0	0
20	3.5	2.8	0.0	0.0	0.3	4.4	6.2	1.5	1.5	0.8	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	6.2	0.0	0.9	0	0
21	0.0	0.0	0.0	6.8	11.2	15.4	29.7	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.3	24	29.7	0.0	3.4	0	0
22	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	0.7	0.0	0.0	0.0	0.0	0.0	0.3	1.4	24	1.4	0.0	0.1	0	0
23	0.0	0.0	0.0	0.0	0.0	0.0	1.2	4.2	5.0	4.6	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.7	1.5	0.7	2.4	24	5.0	0.0	1.0	0	0
24	1.6	13.9	8.0	7.1	7.1	12.8	9.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.0	2.6	5.6	2.5	2.0	0.2	24	13.9	0.0	3.3	0	0
25	0.0	0.1	0.6	0.5	1.6	4.1	2.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	36.7	17.2	7.4	24	36.7	0.0	3.2	0	0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	5.6	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.5	2.0	0.0	0.0	24	5.6	0.0	0.8	0	0
27	0.0	0.0	0.0	1.1	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	1.5	1.9	0.6	0.0	0.0	24	1.9	0.0	0.2	0	0
28	0.0	0.0	0.0	0.0	6.5	5.4	4.5	4.4	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	24	6.5	0.0	0.9	0	0
29	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	1.1	4.8	7.9	3.4	1.9	4.2	24	7.9	0.0	1.0	0	0
30	9.7	4.5	7.9	5.7	7.2	6.4	4.1	2.8	2.3	0.0	C	C	C	3.7	1.3	1.2	2.1	4.7	2.2	5.8	6.8	22.4	11.2	11.2	21	22.4	0.0	5.9	0	0
31	6.0	2.4	2.7	2.3	2.5	3.2	3.4	2.3	1.6	1.7	1.4	1.6	1.5	1.2	1.3	1.4	1.1	1.7	2.5	5.7	6.7	7.7	11.0	9.1	24	11.0	1.1	3.4	0	0
Count	31	31	31	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	741					
Maximum	24.5	27.8	21.0	16.6	25.1	24.7	29.7	22.9	11.2	8.9	5.7	3.0	7.0	6.1	3.0	6.4	14.9	14.1	11.4	8.6	9.4	37.2	31.2	18.9	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	21					
Average	6.0	5.6	4.3	4.8	5.9	7.3	7.2	5.1	3.3	2.4	1.4	0.9	0.8	0.9	0.7	1.0	1.7	1.7	1.7	1.9	3.2	6.6	6.5	4.9	24					

																										Maximum
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100		Maximum Hourly	37.2
																										Maximum Daily	10.9
Data		0.0		0.0		0.0		0.3		1.3		2.2		3.8		6.4		10.6		14.4		24.6		37.2		Monthly Average	3.6

Notes C - Calibration / Span Cycle NA - No Data Available T - Test A- MOE Audit M - Equipment Malfunction / Down R - Rate of Change

NOx Crago Road

September 2017

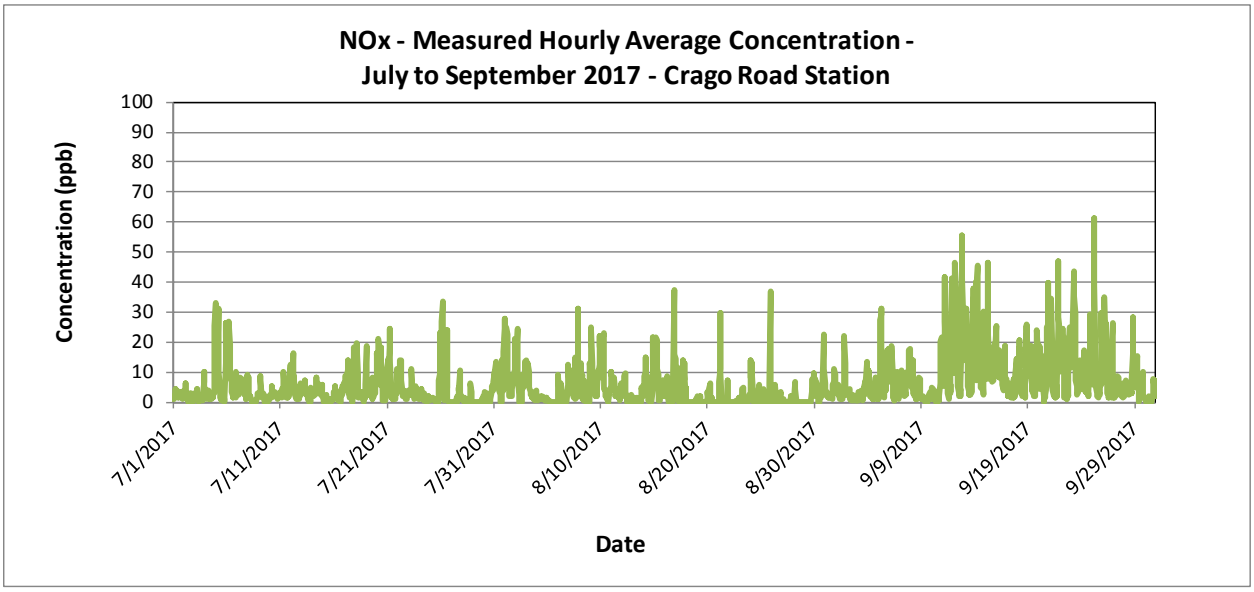
ppb

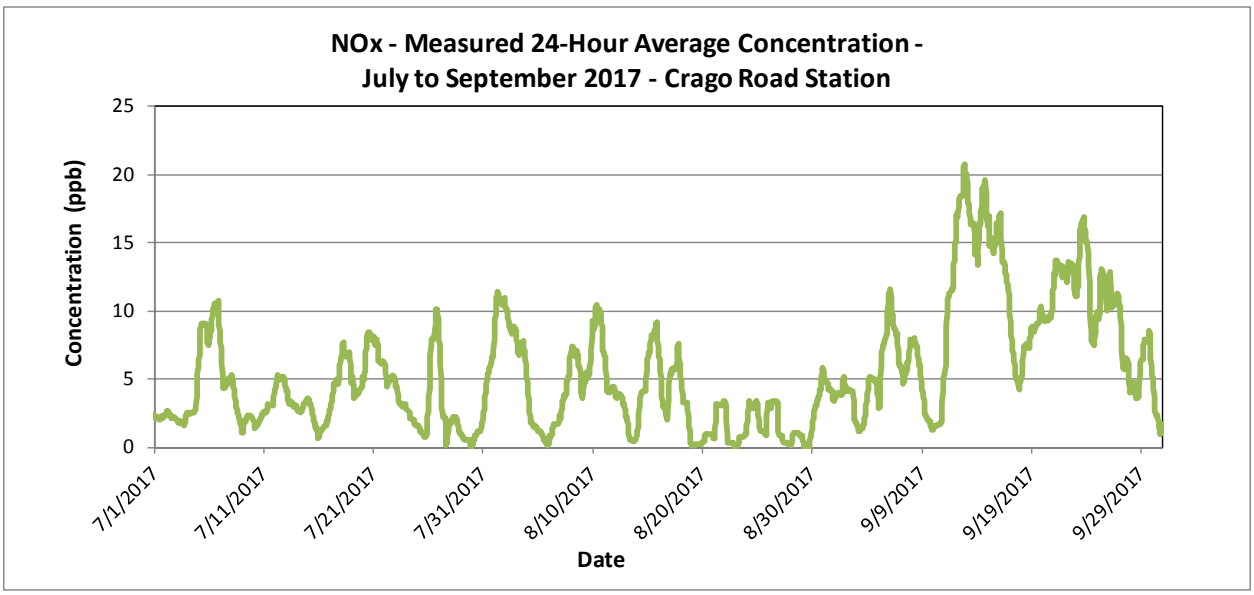
Day	Hour 0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Count	Maximum	Minimum	Average	Hrs>200	Days>100
1	5.8	4.7	4.2	2.7	5.8	5.9	4.8	4.1	2.4	1.2	1.2	0.8	0.8	1.0	1.5	0.8	0.9	1.4	4.3	15.3	22.2	13.0	4.4	2.5	24	22.2	0.8	4.7	0	0
2	2.3	2.7	2.4	2.6	3.9	2.9	3.8	4.5	4.1	1.2	1.5	0.4	0.6	0.5	0.5	0.4	2.3	2.0	1.2	0.3	1.6	1.3	0.5	0.4	24	4.5	0.3	1.8	0	0
3	1.1	1.3	0.6	0.6	0.3	3.2	1.5	2.0	3.0	3.7	2.5	1.0	1.1	0.7	0.6	4.6	2.4	5.3	5.4	7.2	6.3	6.7	13.4	5.8	24	13.4	0.3	3.3	0	0
4	6.4	10.5	6.8	10.7	6.4	5.4	6.3	1.9	2.9	2.3	1.3	0.9	1.4	1.0	1.0	0.8	2.7	3.2	6.1	8.0	2.1	1.9	3.2	1.0	24	10.7	0.8	3.9	0	0
5	1.2	0.9	3.3	4.4	7.4	27.5	29.4	31.4	16.5	10.6	9.9	5.3	1.9	1.6	4.2	3.4	8.1	3.8	8.9	12.6	10.0	17.4	17.4	17.7	24	31.4	0.9	10.6	0	0
6	9.4	7.8	6.6	6.9	9.5	13.7	17.2	18.9	9.5	1.4	1.5	1.0	0.5	0.5	1.6	3.8	1.2	3.3	10.0	2.3	3.5	1.2	5.3	9.6	24	18.9	0.5	6.1	0	0
7	6.0	8.5	4.4	7.4	6.7	8.3	10.8	8.5	4.2	6.4	8.9	5.2	2.0	2.8	2.5	7.9	7.6	9.2	8.7	9.9	5.9	9.3	17.2	17.7	24	17.7	2.0	7.7	0	0
8	9.2	7.7	4.6	5.2	6.5	9.4	14.1	11.1	3.1	2.5	2.2	1.8	2.1	1.2	1.5	1.1	1.0	1.7	2.5	4.6	8.4	7.8	2.5	2.6	24	14.1	1.0	4.8	0	0
9	1.9	1.6	1.0	1.6	2.1	1.6	1.5	1.2	0.6	0.8	0.1	0.5	0.2	0.1	0.4	0.0	1.3	1.3	2.6	2.3	3.5	2.5	1.0	0.8	24	3.5	0.0	1.3	0	0
10	1.3	2.8	4.7	4.2	1.8	1.5	2.3	2.3	1.0	0.2	0.5	0.7	0.0	1.2	0.3	0.8	3.9	0.6	1.4	6.0	19.5	20.3	21.3	14.3	24	21.3	0.0	4.7	0	0
11	10.1	10.1	7.1	5.3	15.1	30.8	41.8	26.8	11.9	5.8	6.4	5.8	3.3	2.9	1.2	1.3	4.3	2.7	5.6	3.5	23.5	39.9	41.3	22.3	24	41.8	1.2	13.7	0	0
12	25.2	25.1	9.4	23.5	29.8	46.3	37.8	26.9	17.3	21.0	15.6	9.2	5.4	2.9	2.5	2.1	4.2	2.0	6.0	23.1	55.7	43.1	28.1	20.4	24	55.7	2.0	20.1	0	0
13	23.2	20.7	13.9	21.8	16.6	18.0	31.3	23.7	17.6	5.3	5.1	3.6	2.3	3.2	3.5	2.4	4.5	2.7	3.5	8.3	24.8	35.5	37.8	25.1	24	37.8	2.3	14.8	0	0
14	19.7	13.1	7.5	7.4	40.4	39.6	37.4	45.5	14.5	19.3	13.7	14.3	20.1	14.5	7.6	4.8	4.5	4.6	7.8	10.4	2.5	5.5	30.2	19.5	24	45.5	2.5	16.8	0	0
15	8.1	11.1	13.5	18.4	7.7	20.0	46.5	40.1	25.1	13.5	10.6	7.5	10.1	12.6	14.1	11.8	8.2	6.5	7.0	14.6	17.9	19.6	16.3	17.9	24	46.5	6.5	15.8	0	0
16	17.2	25.6	19.7	14.8	14.9	12.1	11.8	17.4	8.2	9.9	9.2	9.0	8.6	8.3	7.3	5.6	5.5	4.0	3.8	7.8	12.9	18.8	8.1	7.6	24	25.6	3.8	11.2	0	0
17	5.6	4.8	5.1	3.3	1.9	3.4	6.4	5.7	3.0	2.7	2.1	1.5	2.6	2.0	1.6	1.9	1.4	7.5	4.0	1.9	7.6	9.3	14.1	14.4	24	14.4	1.4	4.8	0	0
18	8.5	8.4	5.4	10.4	18.4	11.6	20.4	10.3	9.8	3.5	2.9	2.8	2.4	2.1	1.9	2.1	1.9	1.8	2.2	1.6	9.0	25.5	17.1	26.0	24	26.0	1.6	8.6	0	0
19	12.2	9.2	8.6	9.7	13.5	14.7	13.0	18.8	8.4	4.7	3.8	5.4	3.4	2.5	2.0	2.2	1.7	5.1	6.0	19.1	15.4	24.1	16.2	12.4	24	24.1	1.7	9.7	0	0
20	10.7	5.6	4.3	9.5	18.7	12.5	14.1	15.6	9.4	7.0	6.2	1.8	1.2	C	3.0	1.5	1.7	2.5	5.4	20.5	24.9	25.8	39.6	22.6	23	39.6	1.2	11.5	0	0
21	16.8	16.9	16.9	12.3	13.7	14.8	34.4	16.1	7.0	3.7	1.9	5.7	3.7	3.3	1.4	3.1	1.8	5.5	2.0	5.4	24.6	46.7	28.3	23.9	24	46.7	1.4	12.9	0	0
22	19.3	10.1	15.7	11.0	17.0	12.4	21.0	24.6	15.5	21.8	3.1	1.6	2.1	4.7	2.6	1.4	1.0	7.2	1.9	3.9	15.9	24.8	16.7	16.0	24	24.8	1.0	11.3	0	0
23	17.2	11.6	11.8	11.3	21.9	19.1	26.2	43.8	36.4	35.6	29.6	19.5	10.1	7.0	5.5	4.1	2.4	3.3	4.2	10.4	13.7	11.1	6.8	6.5	24	43.8	2.4	15.4	0	0
24	8.9	11.5	12.1	8.7	4.5	5.7	17.1	16.9	5.1	5.9	3.2	6.3	6.3	5.7	3.0	2.8	3.1	2.1	3.4	17.2	28.9	29.0	16.9	10.9	24	29.0	2.1	9.8	0	0
25	11.5	6.9	7.7	5.6	10.1	8.9	61.5	38.9	13.6	7.2	5.3	2.8	2.0	1.7	1.6	3.7	3.9	2.5	2.3	2.7	6.7	5.9	29.7	21.8	24	61.5	1.6	11.0	0	0
26	12.2	9.3	9.4	11.3	19.3	34.8	16.6	26.2	8.0	9.1	10.1	3.0	3.0	2.9	1.3	2.0	1.8	5.1	4.2	1.6	9.6	18.2	26.6	15.7	24	34.8	1.3	10.9	0	0
27	6.6	1.3	2.1	1.4	3.2	3.1	4.2	2.0	3.3	7.4	8.6	8.0	8.3	6.5	3.7	3.3	3.1	2.7	2.0	2.2	3.3	6.5	6.1	1.6	24	8.6	1.3	4.2	0	0
28	1.9	3.5	4.7	5.5	5.5	4.0	7.1	5.2	2.7	2.8	2.7	2.5	2.4	2.8	3.1	3.1	2.9	3.6	2.9	7.6	17.0	28.2	16.5	10.6	24	28.2	1.9	6.2	0	0
29	6.7	5.1	4.6	5.7	10.4	15.5	15.1	11.3	6.8	3.9	0.5	0.2	2.4	2.3	5.0	6.2	5.2	7.8	10.1	2.9	1.9	1.3	0.8	0.8	24	15.5	0.2	5.5	0	0
30	0.8	0.9	0.6	0.1	0.6	0.7	0.8	1.7	0.9	0.6	0.5	0.1	0.0	0.0	0.2	0.3	0.5	1.9	5.4	7.8	4.4	7.2	4.2	1.9	24	7.8	0.0	1.8	0	0
31																													0	0
Count	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	719					
Maximum	25.2	25.6	19.7	23.5	40.4	46.3	61.5	45.5	36.4	35.6	29.6	19.5	20.1	14.5	14.1	11.8	8.2	9.2	10.1	23.1	55.7	46.7	41.3	26.0	24					
Minimum	0.8	0.9	0.6	0.1	0.3	0.7	0.8	1.2	0.6	0.2	0.1	0.1	0.0	0.0	0.2	0.0	0.5	0.6	1.2	0.3	1.6	1.2	0.5	0.4	23					
Average	9.6	8.6	7.3	8.1	11.1	13.6	18.5	16.8	9.1	7.4	5.7	4.3	3.7	3.4	2.9	3.0	3.2	3.8	4.7	8.0	13.4	16.9	16.3	12.3	24					

																										Maximum
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100		Maximum Hourly	61.5
																									Maximum Daily	20.1
Data		1.1		1.9		2.7		3.9		5.5		7.5		10.0		14.8		21.0		28.1		42.9		61.5		Monthly Average	8.8

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





APPENDIX D $PM_{2.5}$ DATA SUMMARIES AND TIME HISTORY PLOTS

$PM_{2.5}$ - Crago Road
July 2017
(µg/m³)

Day	Hour 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	7.0	7.8	7.1	7.2	6.2	8.3	6.3	5.1	4.3	3.4	4.2	4.0	3.0	1.5	1.8	5.2	6.0	3.7	5.5	6.5	8.4	6.9	8.7	14.2	24	14.2	1.5	5.9
2	13.3	8.4	7.8	5.7	4.0	4.6	4.4	4.2	4.3	3.2	1.7	1.7	2.2	2.5	3.0	3.2	4.0	4.7	5.5	5.1	4.8	7.8	18.7	11.8	24	18.7	1.7	5.7
3	16.3	14.8	9.6	7.5	6.1	4.7	4.0	3.0	2.3	2.9	3.5	5.4	3.2	2.5	2.0	1.8	1.5	1.1	1.3	1.8	3.2	6.3	9.2	12.1	24	16.3	1.1	5.3
4	8.8	7.0	5.8	4.2	4.0	3.6	2.4	1.6	1.9	2.8	3.2	3.5	7.1	7.6	7.8	7.2	6.0	5.0	4.5	5.2	6.2	10.2	10.2	10.7	24	10.7	1.6	5.7
5	8.5	9.3	8.1	7.3	7.3	6.9	5.2	5.2	3.4	3.3	2.6	3.3	2.9	2.5	3.3	3.0	3.5	3.9	4.0	4.9	5.7	6.4	7.3	6.9	24	9.3	2.5	5.2
6	7.2	8.2	8.8	8.1	8.1	8.3	7.1	5.5	6.2	6.6	6.1	5.7	5.9	6.8	7.6	7.1	7.4	7.1	7.6	8.5	10.2	10.6	11.8	12.2	24	12.2	5.5	7.9
7	7.2	7.0	9.6	13.3	17.6	16.5	12.4	11.3	11.4	15.5	14.5	13.4	12.8	11.6	10.9	10.8	10.7	10.4	11.1	9.8	3.9	5.6	4.4	3.4	24	17.6	3.4	10.6
8	5.3	6.0	9.2	8.6	6.6	6.5	5.6	3.4	4.4	5.5	5.0	4.0	3.2	2.5	2.1	2.0	2.5	1.4	1.6	1.8	2.7	4.2	4.7	5.3	24	9.2	1.4	4.3
9	6.3	6.1	6.1	7.0	5.5	5.6	3.8	3.7	5.1	6.5	7.5	8.3	7.3	5.3	4.4	4.7	5.1	5.3	5.8	6.2	6.0	6.3	6.9	8.3	24	8.3	3.7	6.0
10	6.5	4.7	4.8	6.1	6.6	6.4	4.9	4.0	4.5	5.3	5.0	4.6	4.8	5.3	5.4	5.9	6.7	5.6	6.5	6.3	7.1	7.6	8.1	8.2	24	8.2	4.0	5.9
11	11.7	12.6	2.6	3.0	3.7	3.4	5.0	14.9	10.6	10.5	10.1	15.7	11.2	4.7	3.4	2.7	2.8	2.9	3.5	4.3	5.0	6.1	7.1	7.2	24	15.7	2.6	6.9
12	7.1	7.4	7.9	6.9	9.8	9.7	7.0	6.3	5.7	6.0	9.2	12.0	11.3	9.2	8.8	9.8	10.8	7.6	6.4	4.7	4.7	5.4	5.6	4.4	24	12.0	4.4	7.7
13	3.3	2.8	3.4	3.4	3.5	3.9	3.9	3.5	3.4	2.9	T	2.4	2.8	3.1	3.2	3.8	2.7	2.7	2.5	2.0	2.2	3.2	2.7	1.4	23	3.9	1.4	3.0
14	1.3	1.5	1.7	2.2	2.7	3.1	4.8	6.1	8.9	12.5	10.1	15.6	17.4	11.8	11.8	10.2	10.0	6.3	7.8	3.6	0.3	0.6	0.9	0.9	24	17.4	0.3	6.3
15	0.9	0.8	0.8	1.3	4.3	4.8	4.5	4.1	3.0	2.0	1.9	2.0	4.0	7.0	4.9	3.1	3.0	3.7	5.5	8.0	3.7	3.8	5.3	6.2	24	8.0	0.8	3.7
16	6.5	7.8	7.8	8.5	8.9	12.7	6.4	4.3	3.9	3.7	4.4	4.1	7.9	5.5	4.6	5.5	5.7	4.7	3.2	5.2	6.0	5.2	5.8	5.7	24	12.7	3.2	6.0
17	5.7	5.6	6.1	6.0	5.6	5.4	5.4	5.6	5.5	6.3	5.2	5.4	4.9	4.0	3.5	3.1	2.2	2.1	3.3	8.0	8.8	9.4	11.3	11.8	24	11.8	2.1	5.8
18	12.5	14.2	12.7	11.9	12.0	13.3	8.5	3.8	3.6	5.5	7.0	7.8	9.2	15.7	10.7	9.3	7.1	4.8	5.1	6.0	7.6	7.3	9.1	9.3	24	15.7	3.6	8.9
19	11.7	14.1	17.0	17.7	20.5	13.8	8.0	7.8	7.6	7.5	7.5	8.7	10.3	9.2	7.9	7.7	6.5	7.1	3.3	3.3	4.8	9.7	13.2	14.1	24	20.5	3.3	10.0
20	15.0	16.3	15.4	15.7	15.9	14.3	13.0	11.5	11.0	12.0	12.7	14.6	9.3	7.8	9.5	10.0	11.6	10.8	10.3	11.3	11.8	9.3	9.7	9.4	24	16.3	7.8	12.0
21	11.1	11.2	13.5	18.3	23.2	16.6	10.5	8.0	6.4	6.7	6.9	7.2	7.0	7.0	9.6	8.8	6.6	6.8	6.8	6.8	8.1	9.0	9.9	14.0	24	23.2	6.4	10.0
22	11.7	11.7	11.6	11.3	11.8	10.2	10.3	10.1	8.7	7.6	7.0	7.7	8.6	7.7	7.2	7.3	7.5	7.3	7.6	7.7	7.7	8.8	11.0	12.1	24	12.1	7.0	9.2
23	12.2	13.4	12.0	11.2	11.8	11.4	10.2	8.2	7.1	6.1	7.0	8.2	8.6	7.3	6.0	5.3	4.0	4.0	4.8	3.6	3.4	3.5	3.1	3.0	24	13.4	3.0	7.3
24	3.3	3.9	4.8	5.4	5.1	5.0	4.8	5.0	6.1	5.6	5.5	5.7	5.0	3.9	2.7	3.2	4.7	2.8	2.6	2.2	1.9	1.7	1.7	1.5	24	6.1	1.5	3.9
25	1.7	1.6	1.6	1.5	1.6	1.5	1.6	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.3	1.2	1.4	2.0	2.8	2.8	4.5	5.8	5.7	8.0	24	8.0	1.2	2.3
26	6.5	4.4	5.2	4.8	5.5	5.6	3.3	1.4	1.0	0.8	1.1	1.0	0.9	1.2	1.5	1.5	3.5	5.1	2.9	2.1	1.8	1.8	1.7	2.9	24	6.5	0.8	2.8
27	4.1	5.4	7.1	6.6	10.7	14.0	4.6	T	T	T	T	3.2	4.3	5.4	NA	NA	1.8	3.5	3.9	12.6	9.4	12.5	4.9	1.8	18	14.0	1.8	6.4
28	0.2	0.0	0.0	0.8	1.3	0.8	C	C	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.8	1.8	0.1	0.9	22	1.8	0.0	0.4
29	0.3	0.1	0.0	0.0	0.0	0.3	0.6	2.5	2.1	1.8	2.4	2.5	2.4	3.0	3.1	3.5	2.7	2.8	0.7	0.0	1.4	2.1	2.5	2.3	24	3.5	0.0	1.6
30	1.1	0.4	0.3	0.6	0.3	0.4	0.1	0.9	2.2	3.2	2.8	2.3	3.0	1.2	1.7	3.5	4.0	3.1	2.8	3.2	4.3	8.9	6.2	5.7	24	8.9	0.1	2.6
31	4.6	4.4	4.7	5.1	5.3	4.9	3.9	2.4	0.9	0.2	0.3	0.9	3.3	5.1	5.6	7.3	2.7	0.0	2.2	1.2	2.2	3.1	5.0	5.7	24	7.3	0.0	3.4
Count	31	31	31	31	31	31	30	29	30	30	29	31	31	31	30	30	31	31	31	31	31	31	31	31	735			
Maximum	16.3	16.3	17.0	18.3	23.2	16.6	13.0	14.9	11.4	15.5	14.5	15.7	17.4	15.7	11.8	10.8	11.6	10.8	11.1	12.6	11.8	12.5	18.7	14.2	24			
Minimum	0.2	0.0	0.0	0.0	0.0	0.3	0.1	0.9	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.3	0.6	0.1	0.9	18			
Average	7.1	7.1	6.9	7.0	7.6	7.3	5.7	5.3	4.9	5.2	5.4	5.9	6.0	5.5	5.2	5.3	5.0	4.5	4.6	5.0	5.1	6.1	6.9	7.1	24			

Percentiles	10	20	30	40	50	60	70	80	90	95	99	100
Data	1.4	2.6	3.4	4.4	5.3	6.2	7.3	8.8	11.5	13.3	16.8	23.2

	Maximum
Maximum Hourly	23.2
Maximum Daily	12.0
Monthly Average	5.9

Notes C - Calibration / Span Cycle; NA - No Data Available; T - Test; A- MOE Audit; M - Equipment Malfunction / Down; R - Rate of Change

$PM_{2.5}$ - Crago Road
August 2017
(µg/m³)

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	5.8	6.3	9.5	9.1	10.1	11.6	11.0	11.1	8.7	7.7	8.1	11.2	13.4	12.3	11.5	12.0	10.4	6.6	5.0	5.4	8.0	7.8	9.6	9.3	24	13.4	5.0	9.2
2	7.2	5.4	6.3	6.0	7.1	6.7	6.2	4.3	4.7	2.8	2.9	3.8	5.6	8.5	7.5	6.8	5.4	6.9	6.2	6.0	6.2	6.9	8.4	8.6	24	8.6	2.8	6.1
3	7.9	6.8	7.5	5.6	5.6	4.9	4.1	4.7	4.7	4.5	6.6	11.2	10.6	8.4	6.7	6.2	5.5	5.5	5.9	5.9	5.3	5.4	3.6	2.7	24	11.2	2.7	6.1
4	0.3	3.4	0.4	1.7	1.6	1.7	2.7	3.5	3.7	2.2	2.9	4.3	3.3	3.2	3.1	2.0	1.7	1.8	3.8	1.3	0.7	0.0	0.0	0.2	24	4.3	0.0	2.1
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	24	1.0	0.0	0.1
6	5.5	2.2	0.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.3	0.1	0.9	1.3	1.1	2.2	2.8	2.7	24	5.5	0.0	0.9
7	3.6	4.3	4.0	3.0	1.9	1.7	1.3	1.4	1.9	1.2	0.6	0.6	0.7	1.3	1.2	2.8	4.9	5.4	6.2	6.8	5.7	4.0	7.9	6.3	24	7.9	0.6	3.3
8	5.6	2.7	2.4	1.7	1.0	0.7	0.4	0.1	0.0	0.2	0.9	0.7	2.2	1.1	0.7	0.8	0.6	0.9	2.5	5.4	6.2	2.8	3.7	6.0	24	6.2	0.0	2.1
9	12.1	9.6	10.2	11.7	11.2	11.4	8.0	6.5	T	22.6	23.6	21.1	18.1	20.6	16.9	7.5	6.2	6.4	7.7	12.6	10.5	8.7	10.1	9.5	23	23.6	6.2	12.3
10	9.3	9.4	10.2	10.8	10.9	11.1	9.5	9.7	9.9	9.3	7.3	9.7	11.4	10.2	11.0	9.8	9.2	9.2	9.3	9.4	11.2	11.7	11.8	10.8	24	11.8	7.3	10.1
11	10.0	8.4	7.9	6.8	5.3	2.8	2.1	3.1	2.0	1.8	2.1	2.7	3.6	4.0	4.1	4.7	4.7	5.8	5.9	4.0	1.0	1.3	1.4	1.6	24	10.0	1.0	4.0
12	1.6	3.1	1.8	1.0	2.6	3.6	5.5	5.2	4.5	5.0	6.9	6.5	5.0	3.1	0.5	0.5	0.2	0.4	1.0	1.8	0.6	1.4	1.9	1.2	24	6.9	0.2	2.7
13	0.2	0.0	0.0	0.0	0.1	0.7	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.3	0.9	1.7	1.7	2.8	24	2.8	0.0	0.4
14	5.6	3.6	2.3	1.9	1.9	2.0	1.4	1.9	0.8	0.9	2.4	3.5	3.6	4.2	2.3	2.5	1.9	2.0	2.4	2.6	2.6	4.2	6.6	6.3	24	6.6	0.8	2.9
15	4.2	3.6	3.5	5.9	4.1	7.0	7.4	5.0	4.2	4.5	4.4	2.7	2.3	3.0	5.2	7.8	5.9	5.7	5.6	2.4	3.3	2.0	2.1	2.4	24	7.8	2.0	4.3
16	3.1	3.2	3.1	3.3	4.2	4.4	4.0	2.6	2.3	2.0	1.5	0.5	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	24	4.4	0.0	1.4
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.1	0.1	0.3	0.5	0.3	0.3	24	0.5	0.0	0.1
18	1.0	2.0	2.7	4.5	5.6	7.6	6.2	3.7	1.2	1.0	0.8	1.1	1.3	1.5	0.2	0.8	1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	24	7.6	0.0	1.8
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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	24	0.1	0.0	0.0
20	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.6	0.5	1.2	2.3	4.2	4.8	6.9	9.2	11.0	9.3	8.7	8.5	7.9	6.3	6.5	6.8	7.1	24	11.0	0.0	4.3
21	7.4	6.8	6.8	8.1	10.4	11.8	10.5	8.6	5.4	4.6	5.4	5.7	6.6	8.1	8.4	7.3	7.7	8.9	9.1	9.5	9.2	8.7	9.3	9.0	24	11.8	4.6	8.1
22	8.4	8.4	9.4	9.3	8.6	8.4	8.3	7.9	8.1	8.8	9.1	8.8	8.4	6.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	24	9.4	0.0	5.0
23	0.7	0.1	0.3	0.6	1.0	1.1	1.5	1.9	0.8	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.3	1.1	0.1	0.1	0.0	0.2	24	1.9	0.0	0.5
24	0.1	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	0.3	0.1	0.0	0.1	24	1.0	0.0	0.1
25	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	0.2	1.6	3.2	4.5	3.1	1.1	24	4.5	0.0	0.6
26	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	0.0	68.2	4.5	0.8	0.3	0.9	24	68.2	0.0	3.1
27	0.4	0.2	0.7	0.7	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.6	3.9	4.6	3.2	3.2	2.6	2.3	3.3	24	4.6	0.0	1.1
28	4.2	4.3	4.3	4.1	4.3	4.2	3.9	3.7	2.2	2.7	3.9	4.5	5.1	6.2	6.0	5.4	7.2	7.0	6.8	6.5	6.5	6.1	5.5	4.6	24	7.2	2.2	5.0
29	5.6	5.5	5.4	5.6	5.4	5.1	4.8	4.4	3.9	3.2	2.6	1.5	1.4	1.4	1.6	1.7	1.4	1.0	1.5	2.5	3.0	2.6	2.4	2.2	24	5.6	1.0	3.1
30	1.1	0.0	0.2	0.4	0.6	0.8	0.6	0.2	0.0	0.0	C	C	C	0.0	0.0	0.6	1.3	1.9	2.8	4.2	5.8	9.0	9.4	8.6	21	9.4	0.0	2.3
31	8.1	5.8	3.9	3.4	3.3	4.1	4.6	4.3	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	24	8.1	0.0	1.7
Count	31	31	31	31	31	31	31	31	30	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	740			
Maximum	12.1	9.6	10.2	11.7	11.2	11.8	11.0	11.1	9.9	22.6	23.6	21.1	18.1	20.6	16.9	12.0	10.4	9.2	9.3	68.2	11.2	11.7	11.8	10.8	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	0.1	21			
Average	3.8	3.4	3.3	3.4	3.5	3.7	3.4	3.1	2.4	2.8	3.2	3.5	3.6	3.6	3.1	3.0	2.8	2.9	3.1	5.5	3.4	3.3	3.6	3.5	24			

Percentiles	10	20	30	40	50	60	70	80	90	95	99	100
Data	0.0	0.0	0.1	0.8	1.9	3.2	4.8	6.5	8.9	10.3	13.1	68.2

	Maximum
Maximum Hourly	68.2
Maximum Daily	12.3
Monthly Average	3.4

Notes C - Calibration / Span Cycle; NA - No Data Available; T - Test; A- MOE Audit; M - Equipment Malfunction / Down; R - Rate of Change

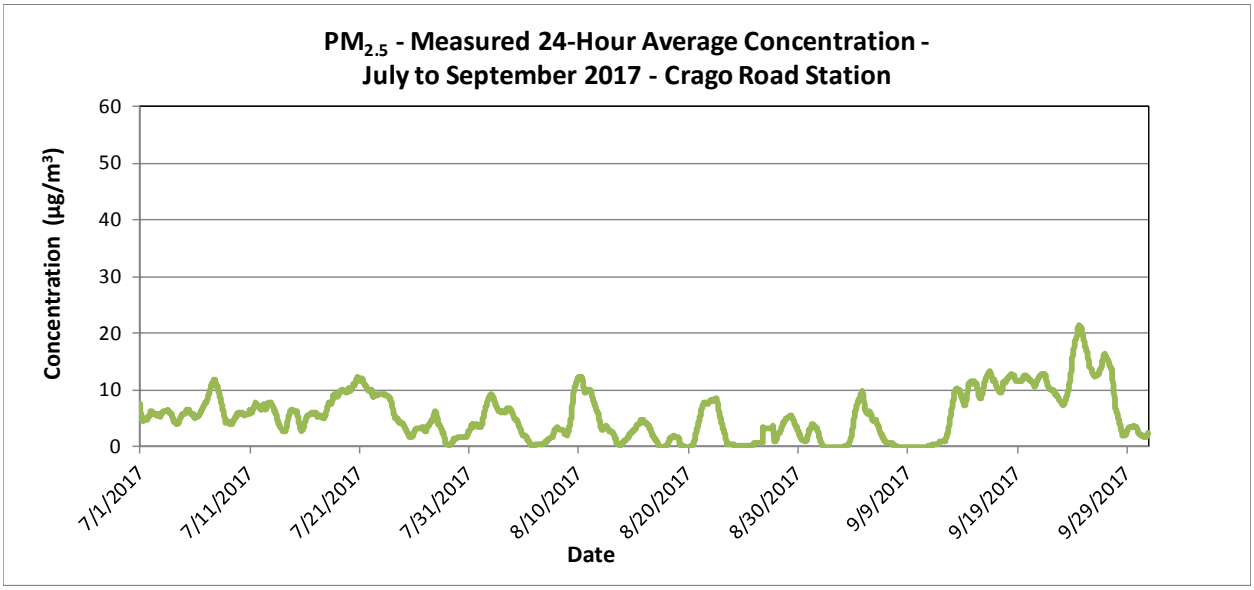
$PM_{2.5}$ - Crago Road
September 2017
(µg/m³)

Day	Hour 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	0.1	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	0.1	24	0.1	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	24	0.5	0.0	0.0
3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.2	0.0	0.0	0.0	0.2	0.9	2.2	5.1	4.0	4.0	7.4	5.7	5.0	11.0	11.0	11.2	24	11.2	0.0	2.9
4	14.2	16.4	15.5	13.8	10.7	9.5	8.0	7.3	7.0	4.5	4.9	5.2	5.8	6.0	8.0	8.9	9.4	10.0	11.3	13.1	10.4	8.0	3.1	0.2	24	16.4	0.2	8.8
5	0.4	2.1	2.3	2.3	3.5	4.8	4.8	6.5	4.6	4.1	7.1	7.0	8.1	7.5	3.8	4.0	6.0	4.8	5.0	4.7	6.7	3.8	2.8	3.2	24	8.1	0.4	4.6
6	3.5	2.8	1.4	0.4	0.1	0.0	0.2	0.2	0.0	0.0	0.1	0.3	0.3	0.8	1.4	2.7	2.0	1.1	1.2	0.6	0.5	0.1	0.6	2.4	24	3.5	0.0	1.0
7	0.9	0.1	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	0.0	0.0	0.0	0.0	0.0	0.1	24	0.9	0.0	0.1
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	24	0.3	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	24	0.2	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.2	1.1	0.8	0.2	24	1.1	0.0	0.1
11	1.0	1.4	0.2	0.0	0.1	0.2	1.1	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.7	0.0	0.3	0.1	1.5	4.4	4.1	4.0	24	4.4	0.0	0.9
12	1.1	0.1	0.0	0.0	0.6	1.2	1.4	0.2	0.1	0.1	1.6	2.4	6.4	7.3	8.2	8.4	8.3	8.0	9.8	14.9	17.4	16.6	14.6	14.1	24	17.4	0.0	6.0
13	13.2	11.0	11.8	13.1	10.8	10.7	11.1	6.6	6.5	5.4	5.9	5.4	4.9	4.5	7.4	7.4	7.5	7.7	7.8	9.3	9.8	9.9	9.8	9.3	24	13.2	4.5	8.6
14	7.1	5.6	5.2	5.6	7.7	8.6	9.4	13.6	11.6	16.7	14.8	21.3	25.7	22.1	15.1	11.2	8.6	8.3	9.1	10.0	9.2	5.5	7.3	9.2	24	25.7	5.2	11.2
15	8.8	7.6	7.3	6.7	5.5	6.5	8.9	6.7	6.6	6.6	7.3	7.1	14.9	12.3	11.7	12.4	9.6	21.5	11.3	12.7	14.0	16.9	21.8	14.8	24	21.8	5.5	10.8
16	14.0	13.2	14.0	13.1	13.6	11.4	11.1	9.6	9.0	10.8	11.3	14.6	12.7	8.9	6.7	6.9	5.4	5.6	6.9	9.3	17.0	20.2	15.4	14.0	24	20.2	5.4	11.5
17	9.1	8.4	9.2	7.6	7.2	7.6	8.4	7.4	6.6	6.9	10.3	12.6	13.2	13.3	11.0	11.6	12.8	14.5	16.6	17.2	17.8	16.1	14.9	14.7	24	17.8	6.6	11.5
18	13.3	12.1	11.2	10.4	10.9	10.3	10.8	10.5	9.8	8.5	12.0	11.8	11.6	11.8	12.2	11.3	12.4	11.0	11.1	11.4	12.8	14.1	14.1	14.0	24	14.1	8.5	11.6
19	13.0	12.1	11.4	10.8	10.1	10.1	9.7	10.8	10.4	10.7	11.0	13.8	16.9	20.9	13.9	15.6	14.3	11.5	11.1	10.3	10.8	11.2	10.9	11.2	24	20.9	9.7	12.2
20	9.6	8.7	8.9	9.1	9.2	9.4	9.4	9.5	8.9	8.3	10.2	10.7	11.5	C	9.5	19.0	19.3	17.9	16.2	15.1	14.3	13.8	17.3	15.4	23	19.3	8.3	12.2
21	13.7	12.3	11.4	8.9	8.0	9.8	11.2	10.6	10.3	10.0	11.1	10.6	10.0	9.3	7.9	8.6	7.6	7.5	7.5	12.8	10.2	12.2	11.8	10.2	24	13.7	7.5	10.1
22	11.5	11.5	10.9	10.1	9.8	9.5	8.8	8.1	7.6	7.4	5.8	7.1	6.9	6.8	6.4	6.2	5.4	4.7	5.4	6.0	6.4	10.2	11.3	9.1	24	11.5	4.7	8.1
23	7.2	6.3	7.1	8.5	9.0	9.4	9.0	11.8	11.6	14.6	14.2	13.1	12.4	12.5	12.3	14.1	13.6	16.4	17.0	18.6	23.2	26.3	24.9	23.8	24	26.3	6.3	14.0
24	26.1	24.1	22.5	21.1	19.7	20.8	23.8	21.3	16.5	17.2	19.4	25.8	27.6	26.8	19.3	16.0	13.4	13.8	14.6	15.6	18.9	18.1	18.8	18.6	24	27.6	13.4	20.0
25	17.2	14.7	13.0	11.3	11.1	13.2	13.3	12.1	12.2	12.2	12.7	11.7	11.6	11.9	12.0	12.1	11.2	11.3	11.9	12.1	12.3	13.1	15.5	15.1	24	17.2	11.1	12.7
26	13.6	13.0	12.0	11.5	12.2	12.7	13.4	14.4	14.4	15.3	16.2	17.4	16.0	15.3	14.5	18.6	17.4	18.6	19.0	19.4	22.1	23.9	22.5	20.9	24	23.9	11.5	16.4
27	10.1	7.5	7.8	7.6	8.6	8.9	8.8	8.8	8.8	9.4	10.5	11.8	12.9	14.7	7.6	4.3	2.9	2.6	2.0	1.9	1.7	1.6	1.5	1.3	24	14.7	1.3	6.8
28	1.3	1.1	0.9	1.1	0.7	1.0	1.9	1.8	1.2	1.5	1.9	2.8	2.9	2.5	2.4	3.8	3.9	3.2	1.5	1.8	2.7	3.8	6.0	7.7	24	7.7	0.7	2.5
29	8.8	7.4	4.7	3.1	2.6	2.1	1.9	1.9	2.5	2.4	2.9	2.2	3.2	3.4	3.3	2.3	3.0	3.7	2.0	1.9	1.9	1.5	1.4	2.0	24	8.8	1.4	3.0
30	1.3	0.7	0.8	1.3	1.5	1.6	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.9	1.9	2.0	2.0	2.4	4.2	6.7	4.4	6.8	4.8	3.4	24	6.8	0.7	2.5
31																												
Count	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	719			
Maximum	26.1	24.1	22.5	21.1	19.7	20.8	23.8	21.3	16.5	17.2	19.4	25.8	27.6	26.8	19.3	19.0	19.3	21.5	19.0	19.4	23.2	26.3	24.9	23.8	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	0.1	23			
Average	7.3	6.7	6.3	5.9	5.8	6.0	6.3	6.1	5.6	5.8	6.4	7.2	7.9	7.6	6.6	7.2	6.7	7.0	7.0	7.7	8.4	9.0	8.9	8.4	24			

																											Maximum
Percentiles		10		20		30		40		50		60		70		80		90		95		99		100			Maximum Hourly	27.6
																											Maximum Daily	20.0
Data		0.0		0.1		1.4		3.4		6.8		8.9		10.8		12.3		15.1		18.6		24.1		27.6			Monthly Average	7.0

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



APPENDIX E CONTINUOUS PARAMETER EDIT LOG

EDIT LOG TABLE

Project Name	**Durham York Energy Centre Ambient Air Monitoring Program**						
Contact	**Greg Crooks / Connie Lim / Toni Zbie**		**Phone:**	**905-944-7777**	**E-mail:**	**greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@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**		**Serial Number:**	**1228**
Data edit period	**Start date:**	**1-Jul-17**	**End date:**	**30-Sep-17**	**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)**	
15	8-Aug-17	BB	Invalidate	27-Jul-17	15:00	27-Jul-17	15:00	One hour of missing data
16	8-Aug-17	BB	Invalidate	28-Jul-17	06:00	28-Jul-17	07:00	Monthly Calibration
17	3-Oct-17	TZ	Invalidate	30-Aug-17	10:00	30-Aug-17	12:00	Monthly Calibration
18	3-Oct-17	TZ	Data Review	9-Aug-17	08:00	9-Aug-17	10:00	An elevated SO2 concentration was noted. Winds were blowing from the southwest. Possible source could be emissions from St. Mary's Cement or CN rail traffic. Data determined to be valid.
19	16-Oct-17	TZ	Invalidate	20-Sep-17	12:00	20-Sep-17	15:00	Monthly Calibration
20	20-Nov-17	TZ	Invalidate	27-Jul-17	14:00	27-Jul-17	15:00	Two hours of missing data as the original logger was re-installed at the site after being repaired. Date recovery in each hour was <75% and therefore hourly averages cannot be calculated. This is a revision to edit # 15.

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 / Toni Zbie**		**Phone:**	**905-944-7777**	**E-mail:**	**greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@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-Jul-17**	**End date:**	**30-Sep-17**		**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)	
20	8-Aug-17	BB	Invalidate	27-Jul-17	15:00	27-Jul-17	15:00	One hour of missing data
21	8-Aug-17	BB	Invalidate	28-Jul-17	06:00	28-Jul-17	07:00	Monthly Calibration
22	3-Oct-17	TZ	Invalidate	30-Aug-17	10:00	30-Aug-17	12:00	Monthly Calibration
23	3-Oct-17	TZ	Data Review	16-Aug-17	21:00	16-Aug-17	21:00	An elevated NOX concentration of 37 ppb was noted on 16-Aug-17 at 21:00. Elevated NOX was also measured at the Courtice WPCP During this time. Winds were blowing from the north. Concentrations of NO were similar to concentrations of NO_2, indicating an intermediate distance combustion source. A possible source could be emissions from CN rail traffic or earthworks. Data determined to be valid.
24	16-Oct-17	TZ	Invalidate	20-Sep-17	13:00	20-Sep-17	13:00	Monthly Calibration
25	20-Nov-17	TZ	Invalidate	27-Jul-17	14:00	27-Jul-17	15:00	Two hours of missing data as the original logger was re-installed at the site after being repaired. Date recovery in each hour was <75% and therefore hourly averages cannot be calculated. This is a revision to edit # 20.

Examples of Acceptable Edit Actions:

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

EDIT LOG TABLE

Project Name	**Durham York Energy Centre Ambient Air Monitoring Program**						
Contact	**Greg Crooks / Connie Lim / Toni Zbie**		**Phone:**	**905-944-7777**	**E-mail:**	**greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@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**	**Serial Number:**	**CM 0269**	
Data edit period	**Start date:**	**1-Jul-17**	**End date:**	**30-Sep-17**		**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)**	
18	8-Aug-17	BB	Invalidate	27-Jul-17	15:00	27-Jul-17	15:00	One hour of missing data
19	8-Aug-17	BB	Invalidate	28-Jul-17	06:00	28-Jul-17	07:00	Monthly Calibration
20	3-Oct-17	TZ	Invalidate	30-Aug-17	10:00	30-Aug-17	12:00	Monthly Calibration
21	3-Oct-17	TZ	Data Review	26-Aug-17	19:00	26-Aug-17	19:00	An elevated PM2.5 concentration of 68 µg/m^3 was measured at the site, winds were from the northwest in the direction from the Courtice Waste Management facility which had a fire on August 26, 2017. This data is determined to be valid.
22	3-Oct-17	TZ	Invalidate minute data	1-Aug-17	11:22	1-Aug-17	11:30	Weekly zero check. Invalidated minute data.
23	3-Oct-17	TZ	Invalidate	9-Aug-17	08:00	9-Aug-17	08:00	Weekly zero check. Zero check was longer than 15 min, therefore entire hour invalidated.
24	3-Oct-17	TZ	Invalidate minute data	14-Aug-17	09:18	14-Aug-17	09:28	Weekly zero check. Invalidated minute data.
25	3-Oct-17	TZ	Invalidate minute data	21-Aug-17	13:01	21-Aug-17	13:10	Weekly zero check. Invalidated minute data.
26	3-Oct-17	TZ	Invalidate minute data	24-Aug-17	13:08	24-Aug-17	13:15	Weekly zero check. Invalidated minute data.
27	3-Oct-17	TZ	Invalidate minute data	4-Jul-17	11:54	4-Jul-17	11:59	Weekly zero check. Invalidated minute data.
28	3-Oct-17	TZ	Invalidate	13-Jul-17	10:00	13-Jul-17	10:00	Weekly zero check. Zero check was longer than 15 min, therefore entire hour invalidated.
29	3-Oct-17	TZ	Invalidate minute data	20-Jul-17	13:39	20-Jul-17	13:49	Weekly zero check. Invalidated minute data.
30	3-Oct-17	TZ	Invalidate minute data	26-Jul-17	13:51	26-Jul-17	13:59	SHARP unit off and switched back to original unit which was temporarily placed at Courtice.
31	3-Oct-17	TZ	Invalidate	27-Jul-17	07:00	27-Jul-17	10:00	Repairs to SHARP noted in log book, replace tape.
32	16-Oct-17	TZ	Invalidate	20-Sep-17	13:00	20-Sep-17	13:00	Monthly Calibration
33	16-Oct-17	TZ	Invalidate minute data	5-Sep-17	09:27	5-Sep-17	9:36	Weekly zero check. Invalidated minute data.
34	16-Oct-17	TZ	Invalidate minute data	14-Sep-17	13:54	14-Sep-17	14:03	Weekly zero check. Invalidated minute data.
35	16-Oct-17	TZ	Invalidate minute data	18-Sep-17	09:29	18-Sep-17	09:39	Weekly zero check. Invalidated minute data.
36	16-Oct-17	TZ	Invalidate minute data	26-Sep-17	14:47	26-Sep-17	14:58	Weekly zero check. Invalidated minute data.
37	16-Oct-17	TZ	Invalidate minute data	29-Sep-17	07:32	29-Sep-17	7:40	Weekly zero check. Invalidated minute data.
38	20-Nov-17	TZ	Invalidate	27-Jul-17	14:00	27-Jul-17	15:00	Two hours of missing data as the original logger was re-installed at the site after being repaired. Date recovery in each hour was <75% and therefore hourly averages cannot be calculated. This is a revision to edit # 18.

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
Test

EDIT LOG TABLE

Project Name	**Durham York Energy Centre Ambient Air Monitoring Program**							
Contact	**Greg Crooks / Connie Lim / Toni Zbie**		**Phone:**	**905-944-7777**	**E-mail:**	**greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@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-Jul-17**	**End date:**	**30-Sep-17**		**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)**	

EDIT LOG TABLE

Project Name	**Durham York Energy Centre Ambient Air Monitoring Program**							
Contact	**Greg Crooks / Connie Lim / Toni Zbie**		**Phone:**	**905-944-7777**	**E-mail:**	**greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@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 TE525M**				
Data edit period	**Start date:**	**1-Jul-17**	**End date:**	**30-Sep-17**		**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)**	

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 / Toni Zbier**		**Phone:**	**905-944-7777**	**E-mail:**	**greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@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-Jul-17**	**End date:**	**30-Sep-17**		**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)**	

EDIT LOG TABLE

Project Name	**Durham York Energy Centre Ambient Air Monitoring Program**							
Contact	**Greg Crooks / Connie Lim / Toni Zbier**		**Phone:**	**905-944-7777**	**E-mail:**	**greg.crooks@stantec.com, connie.lim@stantec.com, toni.zbieranowski@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-Jul-17**	**End date:**	**30-Sep-17**		**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)**	

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

APPENDIX F METALS DATA SUMMARY

Metals and Total Particulates	Crago Road Station																											
Location		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago	
Date	dd/mm/yyyy	06/07/2017		12/07/2017		18/07/2017		24/07/2017		30/07/2017		05/08/2017		11/08/2017		17/08/2017		23/08/2017		29/08/2017		04/09/2017		10/09/2017		16/09/2017		22/09/2017		28/09/2017	
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	
Sample Duration	Hours	23.32		23.77		23.5		23.28		23.59		23.52		24.3		23.33		23.62		23.38		23.42		23.18		23.36		23.83		23.92	
Technician		TH		TH		TH		TH		TH		TH		TH		TZ		TZ		TZ		TZ		TZ		TZ		TZ		TZ	
Filter Number		17061512		17061549		17061923		17061927		17071309		17071313		17071958		17071962		17080138		17080143		17081480		17081481		17083145		17083146		17091561	
Analytical Report #		B7E4496		B7E9406		B7F6113		B7G5154		B7G5138		B7H1996		B7H5265		B7I2514		B7I4152		B7J1051		B7J2452		B7K2190		B7K3561		B7L2571		B7L5380	
Total Volumetric Flow	Am^3/sample	1538.73		1600.84		1574.85		1572.38		1598.22		1611.01		1628.62		1561.00		1578.63		1488.49		1558.40		1528.39		1555.84		1597.61		1575.29	
Analytical Results	**Units**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**	**Value**	**RDL**
Particulate	mg	63.7	5.0	55.8	5.0	72.0	5.0	48.4	5.0	46.7	5.0	26.0	5.0	39.7	5.0	46.7	5.0	32.4	5.0	33.4	5.0	39.7	5.0	19.8	5.0	48.1	5.0	50.9	5.0	92.2	5.0
Total Mercury (Hg)	µg	0.03	0.02	0.06	0.02	0.03	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	0.02	<0.02	0.02	0.03	0.02	<0.02	0.02	<0.02	0.02
Aluminum (Al)	µg	580	50	199	50	250	50	187	50	199	50	69	50	137	50	205	50	103	50	160	50	100	50	64	50	186	50	301	50	696	50
Antimony (Sb)	µg	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<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	<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	37.6	1.0	15.0	1.0	22.8	1.0	10.1	1.0	5.4	1.0	4.9	1.0	10.4	1.0	10.0	1.0	11.4	1.0	9.8	1.0	8.3	1.0	8.7	1.0	15.9	1.0	24.4	1.0	17.5	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	<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	<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	6.1	6.0	<6.0	6.0	<6.0	6.0	6.2	6.0	<6.0	6.0	<6.0	6.0	7.7	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	<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	6.3	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	24.5	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	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	<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	187	5.0	96.1	5.0	103	5.0	106	5.0	66.7	5.0	35.0	5.0	147	5.0	67.3	5.0	52.3	5.0	48.4	5.0	40.5	5.0	49.0	5.0	135	5.0	71.9	5.0	53.3	5.0
Iron (Fe)	µg	1420	50	725	50	945	50	478	50	453	50	203	50	647	50	639	50	417	50	415	50	329	50	326	50	655	50	754	50	1360	50
Lead (Pb)	µg	6.0	3.0	5.3	3.0	5.8	3.0	<3.0	3.0	<3.0	3.0	<3.0	3.0	5.0	3.0	<3.0	3.0	3.0	3.0	3.6	3.0	4.2	3.0	<3.0	3.0	7.4	3.0	5.1	3.0	<3.0	3.0
Magnesium (Mg)	µg	736	50	313	50	516	50	270	50	214	50	120	50	220	50	238	50	234	50	222	50	185	50	98	50	301	50	311	50	658	50
Manganese (Mn)	µg	43.1	1.0	19.5	1.0	31.1	1.0	17.4	1.0	14.5	1.0	7.3	1.0	17.4	1.0	14.5	1.0	17.3	1.0	11.0	1.0	11.4	1.0	8.1	1.0	19.0	1.0	20.9	1.0	45.0	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	<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	<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	98	25	83	25	87	25	46	25	36	25	31	25	48	25	88	25	37	25	30	25	62	25	<25	25	55	25	85	25	113	25
Selenium (Se)	µg	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<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	<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	20.9	1.0	8.8	1.0	12.8	1.0	9.1	1.0	6.2	1.0	2.0	1.0	4.9	1.0	9.9	1.0	4.4	1.0	5.4	1.0	3.0	1.0	2.8	1.0	6.8	1.0	10.0	1.0	19.1	1.0
Thallium (Tl)	µg	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<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	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10
Titanium (Ti)	µg	35	10	11	10	19	10	14	10	12	10	<10	10	<10	10	12	10	<10	10	<10	10	<10	10	<10	10	12	10	20	10	43	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	<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	83.6	5.0	91.5	5.0	66.2	5.0	22.3	5.0	16.8	5.0	27.4	5.0	34.7	5.0	21.5	5.0	57.5	5.0	28.9	5.0	34.8	5.0	24.0	5.0	73.9	5.0	45.2	5.0	24.7	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	<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	<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 3			Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago	Crago
				32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	
	Units	Maximum	Minimum	06/07/2017	12/07/2017	18/07/2017	24/07/2017	30/07/2017	05/08/2017	11/08/2017	17/08/2017	23/08/2017	29/08/2017	04/09/2017	10/09/2017	16/09/2017	22/09/2017	28/09/2017	
Particulate	µg/m^3	58.53	12.95	54.53	34.86	45.72	30.78	29.22	16.14	24.38	29.92	20.52	22.44	25.47	12.95	30.92	31.86	58.53	
Total Mercury (Hg)	µg/m^3	3.75E-05	6.14E-06	1.95E-05	3.75E-05	1.90E-05	6.36E-06	6.26E-06	6.21E-06	6.14E-06	6.41E-06	6.33E-06	6.72E-06	1.28E-05	6.54E-06	1.93E-05	6.26E-06	6.35E-06	
Aluminum (Al)	µg/m^3	4.42E-01	4.19E-02	3.77E-01	1.24E-01	1.59E-01	1.19E-01	1.25E-01	4.28E-02	8.41E-02	1.31E-01	6.52E-02	1.07E-01	6.42E-02	4.19E-02	1.20E-01	1.88E-01	4.42E-01	
Antimony (Sb)	µg/m^3	3.36E-03	3.07E-03	3.25E-03	3.12E-03	3.17E-03	3.18E-03	3.13E-03	3.10E-03	3.07E-03	3.20E-03	3.17E-03	3.36E-03	3.21E-03	3.27E-03	3.21E-03	3.13E-03	3.17E-03	
Arsenic (As)	µg/m^3	2.02E-03	1.84E-03	1.95E-03	1.87E-03	1.90E-03	1.91E-03	1.88E-03	1.86E-03	1.84E-03	1.92E-03	1.90E-03	2.02E-03	1.93E-03	1.96E-03	1.93E-03	1.88E-03	1.90E-03	
Barium (Ba)	µg/m^3	2.44E-02	3.04E-03	2.44E-02	9.37E-03	1.45E-02	6.42E-03	3.38E-03	3.04E-03	6.39E-03	6.41E-03	7.22E-03	6.58E-03	5.33E-03	5.69E-03	1.02E-02	1.53E-02	1.11E-02	
Beryllium (Be)	µg/m^3	3.36E-04	3.07E-04	3.25E-04	3.12E-04	3.17E-04	3.18E-04	3.13E-04	3.10E-04	3.07E-04	3.20E-04	3.17E-04	3.36E-04	3.21E-04	3.27E-04	3.21E-04	3.13E-04	3.17E-04	
Bismuth (Bi)	µg/m^3	2.02E-03	1.84E-03	1.95E-03	1.87E-03	1.90E-03	1.91E-03	1.88E-03	1.86E-03	1.84E-03	1.92E-03	1.90E-03	2.02E-03	1.93E-03	1.96E-03	1.93E-03	1.88E-03	1.90E-03	
Boron (B)	µg/m^3	4.82E-03	1.84E-03	1.95E-03	1.87E-03	1.90E-03	1.91E-03	1.88E-03	1.86E-03	1.84E-03	3.91E-03	1.90E-03	2.02E-03	3.98E-03	1.96E-03	1.93E-03	4.82E-03	1.90E-03	
Cadmium (Cd)	µg/m^3	6.72E-04	6.14E-04	6.50E-04	6.25E-04	6.35E-04	6.36E-04	6.26E-04	6.21E-04	6.14E-04	6.41E-04	6.33E-04	6.72E-04	6.42E-04	6.54E-04	6.43E-04	6.26E-04	6.35E-04	
Chromium (Cr)	µg/m^3	1.50E-02	1.55E-03	4.09E-03	1.56E-03	1.59E-03	1.59E-03	1.56E-03	1.55E-03	1.50E-02	1.60E-03	1.58E-03	1.68E-03	1.60E-03	1.64E-03	1.61E-03	1.56E-03	1.59E-03	
Cobalt (Co)	µg/m^3	6.72E-04	6.14E-04	6.50E-04	6.25E-04	6.35E-04	6.36E-04	6.26E-04	6.21E-04	6.14E-04	6.41E-04	6.33E-04	6.72E-04	6.42E-04	6.54E-04	6.43E-04	6.26E-04	6.35E-04	
Copper (Cu)	µg/m^3	1.22E-01	2.17E-02	1.22E-01	6.00E-02	6.54E-02	6.74E-02	4.17E-02	2.17E-02	9.03E-02	4.31E-02	3.31E-02	3.25E-02	2.60E-02	3.21E-02	8.68E-02	4.50E-02	3.38E-02	
Iron (Fe)	µg/m^3	9.23E-01	1.26E-01	9.23E-01	4.53E-01	6.00E-01	3.04E-01	2.83E-01	1.26E-01	3.97E-01	4.09E-01	2.64E-01	2.79E-01	2.11E-01	2.13E-01	4.21E-01	4.72E-01	8.63E-01	
Lead (Pb)	µg/m^3	4.76E-03	9.31E-04	3.90E-03	3.31E-03	3.68E-03	9.54E-04	9.39E-04	9.31E-04	3.07E-03	9.61E-04	1.90E-03	2.42E-03	2.70E-03	9.81E-04	4.76E-03	3.19E-03	9.52E-04	
Magnesium (Mg)	µg/m^3	4.78E-01	6.41E-02	4.78E-01	1.96E-01	3.28E-01	1.72E-01	1.34E-01	7.45E-02	1.35E-01	1.52E-01	1.48E-01	1.49E-01	1.19E-01	6.41E-02	1.93E-01	1.95E-01	4.18E-01	
Manganese (Mn)	µg/m^3	2.86E-02	4.53E-03	2.80E-02	1.22E-02	1.97E-02	1.11E-02	9.07E-03	4.53E-03	1.07E-02	9.29E-03	1.10E-02	7.39E-03	7.32E-03	5.30E-03	1.22E-02	1.31E-02	2.86E-02	
Molybdenum (Mo)	µg/m^3	1.01E-03	9.21E-04	9.75E-04	9.37E-04	9.52E-04	9.54E-04	9.39E-04	9.31E-04	9.21E-04	9.61E-04	9.50E-04	1.01E-03	9.63E-04	9.81E-04	9.64E-04	9.39E-04	9.52E-04	
Nickel (Ni)	µg/m^3	1.90E-03	9.21E-04	9.75E-04	9.37E-04	1.90E-03	9.54E-04	9.39E-04	9.31E-04	9.21E-04	9.61E-04	9.50E-04	1.01E-03	9.63E-04	9.81E-04	9.64E-04	9.39E-04	9.52E-04	
Phosphorus (P)	µg/m^3	7.17E-02	8.18E-03	6.37E-02	5.18E-02	5.52E-02	2.93E-02	2.25E-02	1.92E-02	2.95E-02	5.64E-02	2.34E-02	2.02E-02	3.98E-02	8.18E-03	3.54E-02	5.32E-02	7.17E-02	
Selenium (Se)	µg/m^3	3.36E-03	3.07E-03	3.25E-03	3.12E-03	3.17E-03	3.18E-03	3.13E-03	3.10E-03	3.07E-03	3.20E-03	3.17E-03	3.36E-03	3.21E-03	3.27E-03	3.21E-03	3.13E-03	3.17E-03	
Silver (Ag)	µg/m^3	1.68E-03	1.54E-03	1.62E-03	1.56E-03	1.59E-03	1.59E-03	1.56E-03	1.55E-03	1.54E-03	1.60E-03	1.58E-03	1.68E-03	1.60E-03	1.64E-03	1.61E-03	1.56E-03	1.59E-03	
Strontium (Sr)	µg/m^3	1.36E-02	1.24E-03	1.36E-02	5.50E-03	8.13E-03	5.79E-03	3.88E-03	1.24E-03	3.01E-03	6.34E-03	2.79E-03	3.63E-03	1.93E-03	1.83E-03	4.37E-03	6.26E-03	1.21E-02	
Thallium (Tl)	µg/m^3	3.36E-03	3.07E-03	3.25E-03	3.12E-03	3.17E-03	3.18E-03	3.13E-03	3.10E-03	3.07E-03	3.20E-03	3.17E-03	3.36E-03	3.21E-03	3.27E-03	3.21E-03	3.13E-03	3.17E-03	
Tin (Sn)	µg/m^3	3.36E-03	3.07E-03	3.25E-03	3.12E-03	3.17E-03	3.18E-03	3.13E-03	3.10E-03	3.07E-03	3.20E-03	3.17E-03	3.36E-03	3.21E-03	3.27E-03	3.21E-03	3.13E-03	3.17E-03	
Titanium (Ti)	µg/m^3	2.73E-02	3.07E-03	2.27E-02	6.87E-03	1.21E-02	8.90E-03	7.51E-03	3.10E-03	3.07E-03	7.69E-03	3.17E-03	3.36E-03	3.21E-03	3.27E-03	7.71E-03	1.25E-02	2.73E-02	
Vanadium (V)	µg/m^3	1.68E-03	1.54E-03	1.62E-03	1.56E-03	1.59E-03	1.59E-03	1.56E-03	1.55E-03	1.54E-03	1.60E-03	1.58E-03	1.68E-03	1.60E-03	1.64E-03	1.61E-03	1.56E-03	1.59E-03	
Zinc (Zn)	µg/m^3	5.72E-02	1.05E-02	5.43E-02	5.72E-02	4.20E-02	1.42E-02	1.05E-02	1.70E-02	2.13E-02	1.38E-02	3.64E-02	1.94E-02	2.23E-02	1.57E-02	4.75E-02	2.83E-02	1.57E-02	
Zirconium (Zr)	µg/m^3	1.68E-03	1.54E-03	1.62E-03	1.56E-03	1.59E-03	1.59E-03	1.56E-03	1.55E-03	1.54E-03	1.60E-03	1.58E-03	1.68E-03	1.60E-03	1.64E-03	1.61E-03	1.56E-03	1.59E-03	
Total Uranium (U)	µg/m^3	1.51E-04	1.38E-04	1.46E-04	1.41E-04	1.43E-04	1.43E-04	1.41E-04	1.40E-04	1.38E-04	1.44E-04	1.43E-04	1.51E-04	1.44E-04	1.47E-04	1.45E-04	1.41E-04	1.43E-04	

APPENDIX G PAHS DATA SUMMARY

Polycyclic Aromatic Hydrocarbons	Crago Station																	
Location			Crago		Crago		Crago		Crago		Crago		Crago		Crago		Crago	
Date	dd/mm/yyyy		6/07/2017		18/07/2017		30/07/2017		11/08/2017		23/08/2017		4/09/2017		16/09/2017		28/09/2017	
Start Time	hh:mm		0:00		0:00		0:00		0:00		0:00		0:00		0:00		0:00	
Sample Duration	hours		23.17		23.7		23.54		24.08		24.09		23.38		23.77		24.07	
Technician			TH		TH		TH		TH		TZ		TZ		TZ		TZ	
Filter Number			EJC531-01		ELE943-01		EPI569-01		EPJ223-01		EUE067-01		EUE080-01		EXJ841.01		EXJ984-01	
Maxaam ID			ESE975		EUM591		EWF312		EYE002		EZU069		FBK153		FDM725		FFS187	
Maxxam Job #			B7E4479		B7F6552		B7G5100		B7H5223		B7I3980		B7J2438		B7K3602		B7L5374	
Total Volumetric Flow	Am^3/sample		356.09		376.34		346.93		351.44		363.00		341.07		337.41		353.66	
Analytical Results	Units		Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL	Value	RDL
Benzo(a)pyrene	µg		0.0041	0.020	0.0063	0.030	0.0071	0.0016	0.0100	0.0031	0.0085	0.0033	0.0049	0.0022	0.0331	0.00075	<0.012	0.012
1-Methylnaphthalene	µg		2.58	0.10	2.56	0.15	1.66	0.10	2.68	0.15	1.35	0.15	1.46	0.15	3.18	0.10	1.04	0.15
2-Methylnaphthalene	µg		4.50	0.10	4.38	0.15	2.64	0.10	4.39	0.15	2.36	0.15	2.52	0.15	4.98	0.10	1.88	0.15
Acenaphthene	µg		3.18	0.050	3.54	0.075	1.49	0.050	2.59	0.075	0.988	0.075	1.12	0.075	1.86	0.050	0.600	0.075
Acenaphthylene	µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	0.117	0.050	<0.075	0.075
Anthracene	µg		0.168	0.050	<0.075	0.075	0.092	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075
Benzo(a)anthracene	µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075
Benzo(a)fluorene	µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15
Benzo(b)fluoranthene	µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075
Benzo(b)fluorene	µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15
Benzo(e)pyrene	µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15
Benzo(g,h,i)perylene	µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075
Benzo(k)fluoranthene	µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075
Biphenyl	µg		1.34	0.10	1.32	0.15	0.82	0.10	1.38	0.15	0.75	0.15	0.89	0.15	1.74	0.10	0.33	0.15
Chrysene	µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075
Dibenz(a,h)anthracene	µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075
Dibenzo(a,c) anthracene + Picene [1]	µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.10	0.10
Fluoranthene	µg		1.07	0.050	0.858	0.075	0.634	0.050	0.657	0.075	0.299	0.075	0.458	0.075	0.593	0.050	0.095	0.075
Indeno(1,2,3-cd)pyrene	µg		<0.050	0.050	<0.075	0.075	<0.050	0.050	<0.075	0.075	<0.075	0.075	<0.075	0.075	<0.050	0.050	<0.075	0.075
Naphthalene	µg		8.99	0.072	10.2	0.11	4.43	0.072	12.5	0.11	6.01	0.11	7.52	0.11	17.3	0.072	3.59	0.11
o-Terphenyl	µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15
Perylene	µg		<0.10	0.10	<0.15	0.15	<0.10	0.10	<0.15	0.15	<0.15	0.15	<0.15	0.15	<0.10	0.10	<0.15	0.15
Phenanthrene	µg		4.66	0.050	3.89	0.075	2.63	0.050	3.24	0.075	1.26	0.075	1.68	0.075	2.63	0.050	0.500	0.075
Pyrene	µg		0.410	0.050	0.333	0.075	0.252	0.050	0.243	0.075	0.134	0.075	0.198	0.075	0.291	0.050	<0.075	0.075
Tetralin	µg		0.61	0.10	0.76	0.15	1.15	0.10	0.83	0.15	1.02	0.15	0.44	0.15	0.92	0.10	0.44	0.15

Calculated Concentrations	Quarter 3			Crago 16	Crago 17	Crago 18	Crago 19	Crago 20	Crago 21	Crago 22	Crago 23
	Units	Maximum	Minimum	6/07/2017	18/07/2017	30/07/2017	11/08/2017	23/08/2017	4/09/2017	16/09/2017	28/09/2017
Benzo(a)pyrene	ng/m^3	9.81E-02	1.15E-02	1.15E-02	1.67E-02	2.05E-02	2.85E-02	2.34E-02	1.44E-02	9.81E-02	1.70E-02
1-Methylnaphthalene	ng/m^3	9.42	2.94	7.25E+00	6.80E+00	4.78E+00	7.63E+00	3.72E+00	4.28E+00	9.42E+00	2.94E+00
2-Methylnaphthalene	ng/m^3	14.76	5.32	1.26E+01	1.16E+01	7.61E+00	1.25E+01	6.50E+00	7.39E+00	1.48E+01	5.32E+00
Acenaphthene	ng/m^3	9.41E+00	1.70E+00	8.93E+00	9.41E+00	4.29E+00	7.37E+00	2.72E+00	3.28E+00	5.51E+00	1.70E+00
Acenaphthylene	ng/m^3	0.35	0.07	7.02E-02	9.96E-02	7.21E-02	1.07E-01	1.03E-01	1.10E-01	3.47E-01	1.06E-01
Anthracene	ng/m^3	0.47	0.07	4.72E-01	9.96E-02	2.65E-01	1.07E-01	1.03E-01	1.10E-01	7.41E-02	1.06E-01
Benzo(a)anthracene	ng/m^3	1.10E-01	7.02E-02	7.02E-02	9.96E-02	7.21E-02	1.07E-01	1.03E-01	1.10E-01	7.41E-02	1.06E-01
Benzo(a)fluorene	ng/m^3	2.20E-01	1.40E-01	1.40E-01	1.99E-01	1.44E-01	2.13E-01	2.07E-01	2.20E-01	1.48E-01	2.12E-01
Benzo(b)fluoranthene	ng/m^3	1.10E-01	7.02E-02	7.02E-02	9.96E-02	7.21E-02	1.07E-01	1.03E-01	1.10E-01	7.41E-02	1.06E-01
Benzo(b)fluorene	ng/m^3	2.20E-01	1.40E-01	1.40E-01	1.99E-01	1.44E-01	2.13E-01	2.07E-01	2.20E-01	1.48E-01	2.12E-01
Benzo(e)pyrene	ng/m^3	2.20E-01	1.40E-01	1.40E-01	1.99E-01	1.44E-01	2.13E-01	2.07E-01	2.20E-01	1.48E-01	2.12E-01
Benzo(g,h,i)perylene	ng/m^3	1.10E-01	7.02E-02	7.02E-02	9.96E-02	7.21E-02	1.07E-01	1.03E-01	1.10E-01	7.41E-02	1.06E-01
Benzo(k)fluoranthene	ng/m^3	1.10E-01	7.02E-02	7.02E-02	9.96E-02	7.21E-02	1.07E-01	1.03E-01	1.10E-01	7.41E-02	1.06E-01
Biphenyl	ng/m^3	5.16E+00	9.33E-01	3.76E+00	3.51E+00	2.36E+00	3.93E+00	2.07E+00	2.61E+00	5.16E+00	9.33E-01
Chrysene	ng/m^3	1.10E-01	7.02E-02	7.02E-02	9.96E-02	7.21E-02	1.07E-01	1.03E-01	1.10E-01	7.41E-02	1.06E-01
Dibenz(a,h)anthracene	ng/m^3	1.10E-01	7.02E-02	7.02E-02	9.96E-02	7.21E-02	1.07E-01	1.03E-01	1.10E-01	7.41E-02	1.06E-01
Dibenzo(a,c) anthracene + Picene	ng/m^3	2.20E-01	1.38E-01	1.40E-01	1.99E-01	1.44E-01	2.13E-01	1.38E-01	2.20E-01	1.48E-01	1.41E-01
Fluoranthene	ng/m^3	3.00E+00	2.69E-01	3.00E+00	2.28E+00	1.83E+00	1.87E+00	8.24E-01	1.34E+00	1.76E+00	2.69E-01
Indeno(1,2,3-cd)pyrene	ng/m^3	1.10E-01	7.02E-02	7.02E-02	9.96E-02	7.21E-02	1.07E-01	1.03E-01	1.10E-01	7.41E-02	1.06E-01
Naphthalene	ng/m^3	51.3	10.15	2.52E+01	2.71E+01	1.28E+01	3.56E+01	1.66E+01	2.20E+01	5.13E+01	1.02E+01
o-Terphenyl	ng/m^3	2.20E-01	1.40E-01	1.40E-01	1.99E-01	1.44E-01	2.13E-01	2.07E-01	2.20E-01	1.48E-01	2.12E-01
Perylene	ng/m^3	2.20E-01	1.40E-01	1.40E-01	1.99E-01	1.44E-01	2.13E-01	2.07E-01	2.20E-01	1.48E-01	2.12E-01
Phenanthrene	ng/m^3	1.31E+01	1.41E+00	1.31E+01	1.03E+01	7.58E+00	9.22E+00	3.47E+00	4.93E+00	7.79E+00	1.41E+00
Pyrene	ng/m^3	1.15E+00	1.06E-01	1.15E+00	8.85E-01	7.26E-01	6.91E-01	3.69E-01	5.81E-01	8.62E-01	1.06E-01
Tetralin	ng/m^3	3.31E+00	1.24E+00	1.71E+00	2.02E+00	3.31E+00	2.36E+00	2.81E+00	1.29E+00	2.73E+00	1.24E+00
Total PAH	ng/m^3	1.01E+02	2.62E+01	7.87E+01	7.61E+01	4.70E+01	8.34E+01	4.12E+01	5.01E+01	1.01E+02	2.62E+01

Note:
RDL = Reportable Detection Limit

1. These parameters have not been subjected to Maxxam's standard validation process nor has it been accredited for the submitted matrix.

APPENDIX H DIOXINS AND FURANS DATA SUMMARY

Dioxins and Furans	Crago Station									
Location		Crago			Crago			Crago		
Date	dd/mm/yyyy	18/07/2017			18/07/2017			18/07/2017		
Start Time	hh:mm	0:00			0:00			0:00		
Sample Duration	hours	23.7			23.7			23.7		
Technician		TH			TH			TH		
Filter Number		ELE943-01			ELE943-01			ELE943-01		
Maxaam ID		EUM591 (Original analysis)			EUM591 (Re-analysis)			EUM591 (Note a)		
Maxxam Job #		B7F6552 (QC Batch 5097268)			B7F6552 (QC Batch 5123996)			B7F6552 (Note a)		
Total Volumetric Flow	Am^3/sample	376.34			376.34			376.34		
Analytical Results	Units	Value	EDL	WHO_{2005} TEF	Value	EDL	WHO_{2005} TEF	Value	EDL	WHO_{2005} TEF
2,3,7,8-Tetra CDD *	pg	<3.3	3.3	1	<8.7	8.7	1	-	-	1
1,2,3,7,8-Penta CDD *	pg	8.8	3.3	1	<8.9	8.9	1	-	-	1
1,2,3,4,7,8-Hexa CDD *	pg	20.0	3.3	0.1	<18	18	0.1	-	-	0.1
1,2,3,6,7,8-Hexa CDD *	pg	47.9	3.6	0.1	42	12	0.1	-	-	0.1
1,2,3,7,8,9-Hexa CDD *	pg	82.4	3.1	0.1	66	10	0.1	-	-	0.1
1,2,3,4,6,7,8-Hepta CDD *	pg	949	3.1	0.01	838	3.4	0.01	-	-	0.01
Octa CDD *	pg	2910	3.4	0.0003	2860	13	0.0003	-	-	0.0003
Total Tetra CDD *	pg	9.2	3.3		<8.7	8.7		-	-	
Total Penta CDD *	pg	82.1	3.3		33.1	8.9		-	-	
Total Hexa CDD *	pg	469	3.3		398	11		-	-	
Total Hepta CDD *	pg	1760	3.1		1560	3.4		-	-	
2,3,7,8-Tetra CDF **	pg	<3.5	3.5	0.1	<8.1	8.1	0.1	-	-	0.1
1,2,3,7,8-Penta CDF **	pg	<3.4	3.4	0.03	<11	11	0.03	-	-	0.03
2,3,4,7,8-Penta CDF **	pg	<3.4	3.4	0.3	<10	10	0.3	-	-	0.3
1,2,3,4,7,8-Hexa CDF **	pg	<3.1	3.1	0.1	<4.2	4.2	0.1	-	-	0.1
1,2,3,6,7,8-Hexa CDF **	pg	<3.1	3.1	0.1	<4.2	4.2	0.1	-	-	0.1
2,3,4,6,7,8-Hexa CDF **	pg	3.4	3.2	0.1	<4.6	4.6	0.1	-	-	0.1
1,2,3,7,8,9-Hexa CDF **	pg	<3.3	3.3	0.1	<4.7	4.7	0.1	-	-	0.1
1,2,3,4,6,7,8-Hepta CDF **	pg	26.2	3.0	0.01	23.6	3.3	0.01	-	-	0.01
1,2,3,4,7,8,9-Hepta CDF **	pg	3.9	3.5	0.01	<4.1	4.1	0.01	-	-	0.01
Octa CDF **	pg	45.5	3.3	0.0003	43.6	4.6	0.0003	-	-	0.0003
Total Tetra CDF **	pg	4.9	3.3		<8.1	8.1		-	-	
Total Penta CDF **	pg	4.6	3.4		<10	10		-	-	
Total Hexa CDF **	pg	21.9	3.2		16.1	4.4		-	-	
Total Hepta CDF **	pg	71.5	3.3		23.6	3.7		-	-	
Toxic Equivalency	pg									

Notes:
* CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan

Calculated Concentrations	Quarter 3			Crago	Crago	Crago
				9 (Original analysis)	9 (Re-analysis)	9 (note a)
	Units	Maximum	Minimum	18/07/2017	18/07/2017	18/07/2017
2,3,7,8-Tetra CDD *	pg/m^3	7.97E-03	3.99E-03	0.004	0.012	0.008
1,2,3,7,8-Penta CDD *	pg/m^3	1.76E-02	4.27E-03	0.023	0.012	0.018
1,2,3,4,7,8-Hexa CDD *	pg/m^3	3.85E-02	4.52E-03	0.053	0.024	0.039
1,2,3,6,7,8-Hexa CDD *	pg/m^3	1.19E-01	4.38E-03	0.127	0.112	0.119
1,2,3,7,8,9-Hexa CDD *	pg/m^3	1.97E-01	3.96E-03	0.219	0.175	0.197
1,2,3,4,6,7,8-Hepta CDD *	pg/m^3	2.37E+00	1.07E-02	2.522	2.227	2.374
Octa CDD *	pg/m^3	7.67E+00	3.87E-02	7.732	7.599	7.666
Total Tetra CDD *	pg/m^3	1.25E-01	4.27E-03	0.024	0.012	0.018
Total Penta CDD *	pg/m^3	1.53E-01	4.27E-03	0.218	0.088	0.153
Total Hexa CDD *	pg/m^3	1.15E+00	5.10E-03	1.246	1.058	1.152
Total Hepta CDD *	pg/m^3	4.41E+00	2.06E-02	4.677	4.145	4.411
2,3,7,8-Tetra CDF **	pg/m^3	9.68E-03	4.10E-03	0.005	0.011	0.008
1,2,3,7,8-Penta CDF **	pg/m^3	9.57E-03	3.39E-03	0.005	0.015	0.010
2,3,4,7,8-Penta CDF **	pg/m^3	8.90E-03	3.39E-03	0.005	0.013	0.009
1,2,3,4,7,8-Hexa CDF **	pg/m^3	4.85E-03	3.72E-03	0.004	0.006	0.005
1,2,3,6,7,8-Hexa CDF **	pg/m^3	4.85E-03	3.58E-03	0.004	0.006	0.005
2,3,4,6,7,8-Hexa CDF **	pg/m^3	7.57E-03	3.86E-03	0.009	0.006	0.008
1,2,3,7,8,9-Hexa CDF **	pg/m^3	5.31E-03	4.13E-03	0.004	0.006	0.005
1,2,3,4,6,7,8-Hepta CDF **	pg/m^3	6.62E-02	3.58E-03	0.070	0.063	0.066
1,2,3,4,7,8,9-Hepta CDF **	pg/m^3	7.90E-03	4.69E-03	0.010	0.005	0.008
Octa CDF **	pg/m^3	1.18E-01	4.10E-03	0.121	0.116	0.118
Total Tetra CDF **	pg/m^3	1.45E-02	4.10E-03	0.013	0.011	0.012
Total Penta CDF **	pg/m^3	1.59E-02	3.39E-03	0.012	0.013	0.013
Total Hexa CDF **	pg/m^3	5.05E-02	3.86E-03	0.058	0.043	0.050
Total Hepta CDF **	pg/m^3	1.26E-01	4.13E-03	0.190	0.063	0.126
Toxic Equivalency	pg/m^3					
TOTAL TOXIC EQUIVALENCY	pg TEQ/m^3	9.39E-02	1.33E-02	0.100	0.088	0.094
Calculated TEQ Concentrations	**Units**			**Crago**	**Crago**	**Crago**
				18/07/2017	**18/07/2017**	**18/07/2017**
2,3,7,8-Tetra CDD *	pg TEQ/m^3			0.004	0.012	0.008
1,2,3,7,8-Penta CDD	pg TEQ/m^3			0.023	0.012	0.018
1,2,3,4,7,8-Hexa CDD	pg TEQ/m^3			0.0053	0.0024	0.0039
1,2,3,6,7,8-Hexa CDD	pg TEQ/m^3			0.0127	0.0112	0.0119
1,2,3,7,8,9-Hexa CDD	pg TEQ/m^3			0.0219	0.0175	0.0197
1,2,3,4,6,7,8-Hepta CDD	pg TEQ/m^3			0.0252	0.0223	0.0237
Octa CDD	pg TEQ/m^3			0.00232	0.00228	0.00230
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	0.0011	0.0008
1,2,3,7,8-Penta CDF	pg TEQ/m^3			0.0001	0.0004	0.0003
2,3,4,7,8-Penta CDF	pg TEQ/m^3			0.001	0.004	0.003
1,2,3,4,7,8-Hexa CDF	pg TEQ/m^3			0.0004	0.0006	0.0005
1,2,3,6,7,8-Hexa CDF	pg TEQ/m^3			0.0004	0.0006	0.0005
2,3,4,6,7,8-Hexa CDF	pg TEQ/m^3			0.0009	0.0006	0.0008
1,2,3,7,8,9-Hexa CDF	pg TEQ/m^3			0.0004	0.0006	0.0005
1,2,3,4,6,7,8-Hepta CDF	pg TEQ/m^3			0.00070	0.00063	0.00066
1,2,3,4,7,8,9-Hepta CDF	pg TEQ/m^3			0.00010	0.00005	0.00008
Octa CDF	pg TEQ/m^3			0.000036	0.000035	0.000036
Total Tetra CDF	pg TEQ/m^3					
Total Penta CDF	pg TEQ/m^3					
Total Hexa CDF	pg TEQ/m^3					
Total Hepta CDF	pg TEQ/m^3					
TOTAL TOXIC EQUIVALENCY	pg TEQ/m^3			0.100	0.088	0.094

Notes:
EDL = Estimated Detection Limit
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
(a) The sample from July 18, 2017 was re-analyzed by the laboratory as the intial laboratory result was equal to the MOECC Dioxin and Furan Criteria of 0.1 pg TEQ/m^3. Following standard prctice, the average of the two analyses results was used in data analysis.

Dioxins and Furans	Crago Station						
Location		Crago			Crago		
Date	dd/mm/yyyy	11/08/2017			23/08/2017		
Start Time	hh:mm	0:00			0:00		
Sample Duration	hours	24.08			24.09		
Technician		TH			TZ		
Filter Number		EYE002			EUE067-01		
Maxxam ID		EPJ223-01			EZU069		
Maxxam Job #		B7H5223			B7I3980		
Total Volumetric Flow	Am^3/sample	351.44			363.00		
Analytical Results	Units	Value	EDL	WHO_{2005} TEF	Value	EDL	WHO_{2005} TEF
2,3,7,8-Tetra CDD *	pg	<3.3	3.3	1	<2.9	2.9	1
1,2,3,7,8-Penta CDD *	pg	<3.1	3.1	1	<3.1	3.1	1
1,2,3,4,7,8-Hexa CDD *	pg	<3.3	3.3	0.1	<3.6	3.6	0.1
1,2,3,6,7,8-Hexa CDD *	pg	<3.6	3.6	0.1	<3.5	3.5	0.1
1,2,3,7,8,9-Hexa CDD *	pg	<3.3	3.3	0.1	<3.2	3.2	0.1
1,2,3,4,6,7,8-Hepta CDD *	pg	9.9	3.5	0.01	4.7	2.9	0.01
Octa CDD *	pg	47.7	3.3	0.0003	14.6	3.3	0.0003
Total Tetra CDD *	pg	44.1	3.3		<3.1 (1)	3.1	
Total Penta CDD *	pg	30.8	3.1		<3.1	3.1	
Total Hexa CDD *	pg	9.0	3.4		<3.7 (1)	3.7	
Total Hepta CDD *	pg	28.3	3.5		9.5	2.9	
2,3,7,8-Tetra CDF **	pg	<5.1 (1)	5.1	0.1	<3.0	3.0	0.1
1,2,3,7,8-Penta CDF **	pg	<3.3	3.3	0.03	<3.1	3.1	0.03
2,3,4,7,8-Penta CDF **	pg	<3.3	3.3	0.3	<3.1	3.1	0.3
1,2,3,4,7,8-Hexa CDF **	pg	<3.0	3.0	0.1	<2.7	2.7	0.1
1,2,3,6,7,8-Hexa CDF **	pg	<3.0	3.0	0.1	<2.6	2.6	0.1
2,3,4,6,7,8-Hexa CDF **	pg	<3.2	3.2	0.1	<2.8	2.8	0.1
1,2,3,7,8,9-Hexa CDF **	pg	<3.6	3.6	0.1	<3.0	3.0	0.1
1,2,3,4,6,7,8-Hepta CDF **	pg	3.4	2.8	0.01	<2.6	2.6	0.01
1,2,3,4,7,8,9-Hepta CDF **	pg	<3.8	3.8	0.01	<3.6	3.6	0.01
Octa CDF **	pg	6.7	3.4	0.0003	3.7	3.1	0.0003
Total Tetra CDF **	pg	5.1	3.5		<3.0	3.0	
Total Penta CDF **	pg	5.6	3.3		<3.1	3.1	
Total Hexa CDF **	pg	4.0	3.2		<2.8	2.8	
Total Hepta CDF **	pg	3.4	3.2		<3.0	3.0	
Toxic Equivalency	pg						

Notes:
* CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan

Calculated Concentrations	Quarter 3			Crago	Crago
				10	11
	Units	Maximum	Minimum	11/08/2017	23/08/2017
2,3,7,8-Tetra CDD *	pg/m^3	7.97E-03	3.99E-03	0.005	0.004
1,2,3,7,8-Penta CDD *	pg/m^3	1.76E-02	4.27E-03	0.004	0.004
1,2,3,4,7,8-Hexa CDD *	pg/m^3	3.85E-02	4.52E-03	0.005	0.005
1,2,3,6,7,8-Hexa CDD *	pg/m^3	1.19E-01	4.38E-03	0.005	0.005
1,2,3,7,8,9-Hexa CDD *	pg/m^3	1.97E-01	3.96E-03	0.005	0.004
1,2,3,4,6,7,8-Hepta CDD *	pg/m^3	2.37E+00	1.07E-02	0.028	0.013
Octa CDD *	pg/m^3	7.67E+00	3.87E-02	0.136	0.040
Total Tetra CDD *	pg/m^3	1.25E-01	4.27E-03	0.125	0.004
Total Penta CDD *	pg/m^3	1.53E-01	4.27E-03	0.088	0.004
Total Hexa CDD *	pg/m^3	1.15E+00	5.10E-03	0.026	0.005
Total Hepta CDD *	pg/m^3	4.41E+00	2.06E-02	0.081	0.026
2,3,7,8-Tetra CDF **	pg/m^3	9.68E-03	4.10E-03	0.007	0.004
1,2,3,7,8-Penta CDF **	pg/m^3	9.57E-03	3.39E-03	0.005	0.004
2,3,4,7,8-Penta CDF **	pg/m^3	8.90E-03	3.39E-03	0.005	0.004
1,2,3,4,7,8-Hexa CDF **	pg/m^3	4.85E-03	3.72E-03	0.004	0.004
1,2,3,6,7,8-Hexa CDF **	pg/m^3	4.85E-03	3.58E-03	0.004	0.004
2,3,4,6,7,8-Hexa CDF **	pg/m^3	7.57E-03	3.86E-03	0.005	0.004
1,2,3,7,8,9-Hexa CDF **	pg/m^3	5.31E-03	4.13E-03	0.005	0.004
1,2,3,4,6,7,8-Hepta CDF **	pg/m^3	6.62E-02	3.58E-03	0.010	0.004
1,2,3,4,7,8,9-Hepta CDF **	pg/m^3	7.90E-03	4.69E-03	0.005	0.005
Octa CDF **	pg/m^3	1.18E-01	4.10E-03	0.019	0.010
Total Tetra CDF **	pg/m^3	1.45E-02	4.10E-03	0.015	0.004
Total Penta CDF **	pg/m^3	1.59E-02	3.39E-03	0.016	0.004
Total Hexa CDF **	pg/m^3	5.05E-02	3.86E-03	0.011	0.004
Total Hepta CDF **	pg/m^3	1.26E-01	4.13E-03	0.010	0.004
Toxic Equivalency	pg/m^3				
TOTAL TOXIC EQUIVALENCY	pg TEQ/m^3	9.39E-02	1.33E-02	0.015	0.013
Calculated TEQ Concentrations	**Units**			**Crago**	**Crago**
				11/08/2017	**23/08/2017**
2,3,7,8-Tetra CDD *	pg TEQ/m^3			0.005	0.004
1,2,3,7,8-Penta CDD	pg TEQ/m^3			0.004	0.004
1,2,3,4,7,8-Hexa CDD	pg TEQ/m^3			0.0005	0.0005
1,2,3,6,7,8-Hexa CDD	pg TEQ/m^3			0.0005	0.0005
1,2,3,7,8,9-Hexa CDD	pg TEQ/m^3			0.0005	0.0004
1,2,3,4,6,7,8-Hepta CDD	pg TEQ/m^3			0.0003	0.0001
Octa CDD	pg TEQ/m^3			0.00004	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			0.0007	0.0004
1,2,3,7,8-Penta CDF	pg TEQ/m^3			0.0001	0.0001
2,3,4,7,8-Penta CDF	pg TEQ/m^3			0.001	0.001
1,2,3,4,7,8-Hexa CDF	pg TEQ/m^3			0.0004	0.0004
1,2,3,6,7,8-Hexa CDF	pg TEQ/m^3			0.0004	0.0004
2,3,4,6,7,8-Hexa CDF	pg TEQ/m^3			0.0005	0.0004
1,2,3,7,8,9-Hexa CDF	pg TEQ/m^3			0.0005	0.0004
1,2,3,4,6,7,8-Hepta CDF	pg TEQ/m^3			0.00010	0.00004
1,2,3,4,7,8,9-Hepta CDF	pg TEQ/m^3			0.00005	0.00005
Octa CDF	pg TEQ/m^3			0.000006	0.000003
Total Tetra CDF	pg TEQ/m^3				
Total Penta CDF	pg TEQ/m^3				
Total Hexa CDF	pg TEQ/m^3				
Total Hepta CDF	pg TEQ/m^3				
TOTAL TOXIC EQUIVALENCY	pg TEQ/m^3			0.015	0.013

Notes:
EDL = Estimated Detection Limit
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
(a) The sample from July 18, 2017 was re-analyzed by the laboratory as the intial laboratory result was equal to the MOECC Dioxin and Furan Criteria of 0.1 pg TEQ/m^3. Following standard prctice, the average of the two analyses results was used in data analysis.

Dioxins and Furans	Crago Station						
Location		Crago			Crago		
Date	dd/mm/yyyy	4/09/2017			28/09/2017		
Start Time	hh:mm	0:00			0:00		
Sample Duration	hours	23.38			24.07		
Technician		TZ			TZ		
Filter Number		EUE080-01			EXJ984-01		
Maxxam ID		FBK153			FFS187		
Maxxam Job #		B7J2438			B7L5374		
Total Volumetric Flow	Am^3/sample	341.07			353.66		
Analytical Results	Units	Value	EDL	WHO_{2005} TEF	Value	EDL	WHO_{2005} TEF
2,3,7,8-Tetra CDD *	pg	<3.2	3.2	1	<2.9	2.9	1
1,2,3,7,8-Penta CDD *	pg	<3.1	3.1	1	<3.1	3.1	1
1,2,3,4,7,8-Hexa CDD *	pg	<3.3	3.3	0.1	<3.2	3.2	0.1
1,2,3,6,7,8-Hexa CDD *	pg	<3.2	3.2	0.1	<3.1	3.1	0.1
1,2,3,7,8,9-Hexa CDD *	pg	3.1	2.9	0.1	<2.8	2.8	0.1
1,2,3,4,6,7,8-Hepta CDD *	pg	22.0	2.4	0.01	3.8	3.0	0.01
Octa CDD *	pg	93.1	2.9	0.0003	13.7	2.5	0.0003
Total Tetra CDD *	pg	3.5	3.2		<11 (1)	11	
Total Penta CDD *	pg	<3.1	3.1		<8.2 (1)	8.2	
Total Hexa CDD *	pg	8.0	3.1		<19 (1)	19	
Total Hepta CDD *	pg	47.5	2.4		7.3	3.0	
2,3,7,8-Tetra CDF **	pg	3.3	2.9	0.1	<2.9	2.9	0.1
1,2,3,7,8-Penta CDF **	pg	<3.1	3.1	0.03	<2.4	2.4	0.03
2,3,4,7,8-Penta CDF **	pg	<3.1	3.1	0.3	<2.4	2.4	0.3
1,2,3,4,7,8-Hexa CDF **	pg	<3.0	3.0	0.1	<3.3	3.3	0.1
1,2,3,6,7,8-Hexa CDF **	pg	<2.9	2.9	0.1	<3.1	3.1	0.1
2,3,4,6,7,8-Hexa CDF **	pg	<3.1	3.1	0.1	<3.3	3.3	0.1
1,2,3,7,8,9-Hexa CDF **	pg	<3.3	3.3	0.1	<3.6	3.6	0.1
1,2,3,4,6,7,8-Hepta CDF **	pg	3.8	2.3	0.01	<2.6	2.6	0.01
1,2,3,4,7,8,9-Hepta CDF **	pg	<3.2	3.2	0.01	<3.5	3.5	0.01
Octa CDF **	pg	6.4	3.3	0.0003	<2.9	2.9	0.0003
Total Tetra CDF **	pg	3.3	2.9		<2.9	2.9	
Total Penta CDF **	pg	3.9	3.1		<2.4	2.4	
Total Hexa CDF **	pg	<3.1	3.1		<3.3	3.3	
Total Hepta CDF **	pg	3.8	2.7		<3.0	3.0	
Toxic Equivalency	pg						

Notes:
* CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan

Calculated Concentrations	Quarter 3			Crago 11	Crago 12
	Units	Maximum	Minimum	4/09/2017	28/09/2017
2,3,7,8-Tetra CDD *	pg/m^3	7.97E-03	3.99E-03	0.005	0.004
1,2,3,7,8-Penta CDD *	pg/m^3	1.76E-02	4.27E-03	0.005	0.004
1,2,3,4,7,8-Hexa CDD *	pg/m^3	3.85E-02	4.52E-03	0.005	0.005
1,2,3,6,7,8-Hexa CDD *	pg/m^3	1.19E-01	4.38E-03	0.005	0.004
1,2,3,7,8,9-Hexa CDD *	pg/m^3	1.97E-01	3.96E-03	0.009	0.004
1,2,3,4,6,7,8-Hepta CDD *	pg/m^3	2.37E+00	1.07E-02	0.065	0.011
Octa CDD *	pg/m^3	7.67E+00	3.87E-02	0.273	0.039
Total Tetra CDD *	pg/m^3	1.25E-01	4.27E-03	0.010	0.016
Total Penta CDD *	pg/m^3	1.53E-01	4.27E-03	0.005	0.012
Total Hexa CDD *	pg/m^3	1.15E+00	5.10E-03	0.023	0.027
Total Hepta CDD *	pg/m^3	4.41E+00	2.06E-02	0.139	0.021
2,3,7,8-Tetra CDF **	pg/m^3	9.68E-03	4.10E-03	0.010	0.004
1,2,3,7,8-Penta CDF **	pg/m^3	9.57E-03	3.39E-03	0.005	0.003
2,3,4,7,8-Penta CDF **	pg/m^3	8.90E-03	3.39E-03	0.005	0.003
1,2,3,4,7,8-Hexa CDF **	pg/m^3	4.85E-03	3.72E-03	0.004	0.005
1,2,3,6,7,8-Hexa CDF **	pg/m^3	4.85E-03	3.58E-03	0.004	0.004
2,3,4,6,7,8-Hexa CDF **	pg/m^3	7.57E-03	3.86E-03	0.005	0.005
1,2,3,7,8,9-Hexa CDF **	pg/m^3	5.31E-03	4.13E-03	0.005	0.005
1,2,3,4,6,7,8-Hepta CDF **	pg/m^3	6.62E-02	3.58E-03	0.011	0.004
1,2,3,4,7,8,9-Hepta CDF **	pg/m^3	7.90E-03	4.69E-03	0.005	0.005
Octa CDF **	pg/m^3	1.18E-01	4.10E-03	0.019	0.004
Total Tetra CDF **	pg/m^3	1.45E-02	4.10E-03	0.010	0.004
Total Penta CDF **	pg/m^3	1.59E-02	3.39E-03	0.011	0.003
Total Hexa CDF **	pg/m^3	5.05E-02	3.86E-03	0.005	0.005
Total Hepta CDF **	pg/m^3	1.26E-01	4.13E-03	0.011	0.004
Toxic Equivalency	pg/m^3				
TOTAL TOXIC EQUIVALENCY	pg TEQ/m^3	9.39E-02	1.33E-02	0.016	0.013
Calculated TEQ Concentrations	**Units**			**Crago**	**Crago**
				04/09/2017	**28/09/2017**
2,3,7,8-Tetra CDD *	pg TEQ/m^3			0.005	0.004
1,2,3,7,8-Penta CDD	pg TEQ/m^3			0.005	0.004
1,2,3,4,7,8-Hexa CDD	pg TEQ/m^3			0.0005	0.0005
1,2,3,6,7,8-Hexa CDD	pg TEQ/m^3			0.0005	0.0004
1,2,3,7,8,9-Hexa CDD	pg TEQ/m^3			0.0009	0.0004
1,2,3,4,6,7,8-Hepta CDD	pg TEQ/m^3			0.0006	0.0001
Octa CDD	pg TEQ/m^3			0.00008	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			0.0010	0.0004
1,2,3,7,8-Penta CDF	pg TEQ/m^3			0.0001	0.0001
2,3,4,7,8-Penta CDF	pg TEQ/m^3			0.001	0.001
1,2,3,4,7,8-Hexa CDF	pg TEQ/m^3			0.0004	0.0005
1,2,3,6,7,8-Hexa CDF	pg TEQ/m^3			0.0004	0.0004
2,3,4,6,7,8-Hexa CDF	pg TEQ/m^3			0.0005	0.0005
1,2,3,7,8,9-Hexa CDF	pg TEQ/m^3			0.0005	0.0005
1,2,3,4,6,7,8-Hepta CDF	pg TEQ/m^3			0.00011	0.00004
1,2,3,4,7,8,9-Hepta CDF	pg TEQ/m^3			0.00005	0.00005
Octa CDF	pg TEQ/m^3			0.000006	0.000001
Total Tetra CDF	pg TEQ/m^3				
Total Penta CDF	pg TEQ/m^3				
Total Hexa CDF	pg TEQ/m^3				
Total Hepta CDF	pg TEQ/m^3				
TOTAL TOXIC EQUIVALENCY	pg TEQ/m^3			0.016	0.013

Notes:
EDL = Estimated Detection Limit
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
(a) The sample from July 18, 2017 was re-analyzed by the laboratory as the intial laboratory result was equal to the MOECC Dioxin and Furan Criteria of 0.1 pg TEQ/m^3. Following standard prctice, the average of the two analyses results was used in data analysis.