REPORT

Emission Summary and Dispersion Modelling Report

Durham York Energy Centre

Version 1.0

Submitted to:

The Regional Municipality of Durham, The Regional Municipality of York, and Reworld Durham York Limited Partnership

Submitted by:

WSP Canada Inc.

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Distribution List

Electronic copy - The Regional Municipality of Durham, The Regional Municipality of York, and Reworld Durham York Limited Partnership.

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DOCUMENT VERSION CONTROL

This Emission Summary and Dispersion Modelling (ESDM) Report documents the operations at Durham York Energy Centre (DYEC) waste management facility located at 1835 Energy Drive in Clarington, Ontario (the Facility) and has been prepared in accordance with s.26 of Ontario Regulation 419/05 (O. Reg. 419/05) to document compliance with s. 20 of O. Reg. 419/05.

Version	Date	Revision Description	Prepared By	Reviewed By (Facility Contact)
1.0	June 2025	ESDM to support increase in thermal treatment of waste to 160,000 TPA	WSP Canada Inc.	Lipika Saha, Lyndsay Waller, Nicia Williams, Andrew Evans.

Ontario

Ministry of the Environment, Conservation and Parks

Emission Summary and Dispersion Modelling Report Checklist

Company Name

Reworld Durham York Limited Partnership

Company Address

Unit Number	Street Number	Street Name	PO Box
	605	Rossland Road East	

City/Town	Province	Postal Code
Whitby	Ontario	L1N 6A3

Location of Facility

1835 Energy Drive, Clarington, Ontario, L1E 2R2

The attached Emission Summary and Dispersion Modeling Report was prepared in accordance with s. 26 of O. Reg. 419/05 and the guidance in the MECP document "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2009 and "Air Dispersion Modelling Guideline for Ontario" dated March 2009 and the minimum required information identified in the check-list on the reverse of this sheet has been submitted.

Company Contact

☑ By checking this each of the undersigned acknowledge that in providing their name on the applicable line below in electronic form will constitute a signature for the purposes of the *Electronic Commerce Act, 2000*, S.O. 2000, c. 17.

Company Contact

Lipika Saha, P.Eng.

Company Contact Name

Last Name	First Name	Middle Initial
Saha	Lipika	

Title	Telephone Number
Manager, Waste Management	365-688-6042

Signature	Date (yyyy/mm/dd)
	2025/06/24

Technical Contact

☑ By checking this each of the undersigned acknowledge that in providing their name on the applicable line below in electronic form will constitute a signature for the purposes of the *Electronic Commerce Act, 2000*, S.O. 2000, c. 17.

Technical Contact

Technical Contact Name

Last Name	First Name	Middle Initial
Narayanan	Mano	

Representing	Telephone Number
WSP Canada Inc.	647-922-0261

Signature	Date (yyyy/mm/dd)
	2025/06/19

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* This checklist is taken from the document titled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2009.

Emission Summary and Dispersion Modelling Report Checklist

	Required Information	Submitted	Explanation/Reference
	Executive Summary and Emission Summary Table		
	1.1 Overview of ESDM Report	☑ Yes	Executive Summary
	1.2 Emission Summary Table	☑ Yes	Executive Summary
1.0	**Introduction and Facility Description**		
	1.1 Purpose and Scope of ESDM Report (when report only represents a portion of facility)	☑ Yes	Section 1.1
	1.2 Description of Processes and NAICS code(s)	☑ Yes	Section 1.2
	1.3 Description of Products and Raw Materials	☑ Yes	Section 1.2
	1.4 Process Flow Diagram	☑ Yes	Figure 2
	1.5 Operating Schedule	☑ Yes	Section 1.4
2.0	**Initial Identification of Sources and Contaminants**		
	2.1 Sources and Contaminants Identification Table	☑ Yes	Section 2
3.0	**Assessment of the Significance of Contaminants and Sources**		
	3.1 Identification of Negligible Contaminants and Sources	☑ Yes	Section 3
	3.2 Rationale for Assessment	☑ Yes	Section 3.2
4.0	**Operating Conditions, Emission Rate Estimating and Data Quality**		
	4.1 Description of operating conditions, for each significant contaminant that results in the maximum POI concentration for that contaminant	☑ Yes	Section 4.1
	4.2 Explanation of Method used to calculate the emission rate for each contaminant	☑ Yes	Section 4.2
	4.3 Sample calculation for each method	☑ Yes	Section 4.3
	4.4 Assessment of Data Quality for each emission rate	☑ Yes	Section 4.4
5.0	**Source Summary Table and Property Plan**		
	5.1 Source Summary Table	☑ Yes	Table 2
	5.2 Site Plan (scalable)	☑ Yes	Figure 4
6.0	**Dispersion Modelling**		
	6.1 Dispersion Modelling Input Summary Table	☑ Yes	Table 3
	6.2 Land Use Zoning Designation Plan	☑ Yes	Figure 5
	6.3 Dispersion Modelling Input and Output Files	☑ Yes	Provided electronically
7.0	**Emission Summary Table and Conclusions**		
	7.1 Emission Summary Table	☑ Yes	Table 5
	7.2 Assessment of Contaminants with no MECP POI Limits	☑ Yes	Section 7.1
	7.3 Conclusions	☑ Yes	Section 8
	Appendices (Provide supporting information or details such as…)		
	Tables	☑ Yes	
	Figures	☑ Yes	
	Calculations, Previous Stack Testing, Odour Data	☑ Yes	Appendix A, B, D

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EXECUTIVE SUMMARY

This Emission Summary and Dispersion Modelling (ESDM) Report update was prepared to support an ECA amendment application by The Regional Municipality of Durham and The Regional Municipality of York ("Durham-York") at an Energy from Waste (EfW) facility operated by Reworld Durham York Limited Partnership (Reworld, formerly Covanta Durham York Renewable Energy Limited Partnership) located in an industrial zoned area, on the west side of Osborne Road, south of Highway 401 and north of a CN Rail Corridor in the Municipality of Clarington, Ontario at 1835 Energy Drive in Clarington, Ontario (DYEC). Currently the facility and associated sources are covered under the Multi-Media Environmental Compliance Approval with Limited Operational Flexibility (ECALOF) Number 7306-8FDKNX, issued on June 28, 2011, and most recently amended on December 23, 2021, which permits the thermal treatment of up to 140,000 tonnes per annum (tpa) of waste (temporarily increased to 142,000 tpa until December 31, 2021) to generate nominally 17.5 megawatts of electrical power.

For this amendment application, DYEC is proposing a step change increase of 20,000 tonnes to allow for processing of up to 160,000 TPA of MSW (the Project). Under the 160,000 tpa limit, there will be fewer periods of shut down due to capacity limit or low waste supply, this will help stabilize and optimize operations throughout the year. In general, with the 160,000 tpa increase the plant will operate at the design steaming rate and throughput more often throughout the year. Emission rates for the stack were calculated using a combination of stack testing data, in-stack emission limits and emission factors. Emission rates from all other sources on-site were calculated using published emission factors. In addition, an updated Air Quality Impact Assessment (AQIA) submitted in 2021 assessed the 160,000 tpa scenario and the result indicated that the additional 20,000 tpa would not significantly impact local air quality. The Project will not introduce any new sources of emissions. The following ESDM Report supports this amendment application and documents compliance with O.Reg.419/05.

The contents of this ESDM Report satisfy the requirements of s.26 of O. Reg.419/05. In addition, guidance in the Ontario Ministry of the Environment, Conservation and Parks (Ministry) publication "*Guideline A-10: Procedure for Preparing an Emission Summary and Dispersion Modelling (ESDM) Report, Version 4.1*", dated March 2018 (ESDM Procedure Document) was followed, as appropriate.

Emissions from the Facility will be limited in accordance with Provincial standards with ambient impacts being compliant with ambient standards. The North American Industry Classification System (NAICS) code that best applies to the Facility is Waste Treatment and Disposal, which is part of NAICS code 5622 and is listed in Schedule 5 of O.Reg. 419/05.

In accordance with consultation with the MECP, and to be consistent with the Environmental Assessment, compliance was assessed using the CALPUFF dispersion model. A request for use of a specified dispersion model and use of site specific meteorological data has already been completed and was granted by the MECP (See Appendix E).

The maximum Point of Impingement (POI) concentrations were derived from six (6) potential operating scenarios (Scenarios A-F) including two trains operating, one train operating and start-up. In addition, the operation of a standby diesel generator was also assessed as well as the particulate emissions from the filling of four (4) on-site silos. The maximum emission rates for each significant contaminant emitted from the significant sources were calculated in accordance with s.11 of O. Reg. 419/05 and the data quality assessment follows the process outlined in the requirements of the ESDM Procedure Document. In accordance with s.8 of O.Reg.419/05, some of the sources and contaminants were considered negligible such as road dust from 1.5 km of paved roads and 98 m of unpaved roads, respectively. Similarly for fly ash and bottom ash which are quenched, conveyed in a covered conveyor system to the Residual Building and disposed of in covered trucks or containers.

A POI concentration for each significant contaminant emitted from the Facility was estimated in accordance with s.26 of O. Reg. 419/05 with the results presented Emission Summary Tables (Tables i and ii). Table i reflects the typical maximum operating conditions (e.g., Scenario A) while Table ii presents maximum number of sources operating concurrently (e.g., Scenario F). The POI is an estimated maximum value reflective of meteorological conditions and stack emissions at the maximum allowable discharge rate. The POI concentrations listed in the Emission Summary Table were compared against criteria listed in the Air Contaminants Benchmark (ACB) List published in April 2023.

All predicted impacts comply with applicable ambient standards. Under Scenarios A-F, which represents normal operations and start-up/shut-down emissions from the main stack, 1-hour averaged sulphur dioxide has the highest concentration relative to the MECP POI limit. Of these scenarios, Scenario A has the highest concentration of sulphur dioxide at 16% of the relevant limit. Scenario F represents a worst case operation and includes silo filling plus stand-by diesel generator operation in addition to normal operational emissions from the main stack. In this scenario, the concentration of nitrogen oxides assessed against the 1 hour standard is 64% of this limit. In all scenarios the maximum modelled concentration of Benzo(a)pyrene is less than 1% of the annual standard, indicating that it is not a contaminant of concern.

Under Scenario F, 24-hour averaged $PM_{2.5}$ has the highest concentration relative to the corresponding 24 hour CAAQS at 22% of the limit. However, in this scenario, all four of the silos have been modelled assuming 24/7 simultaneous filling. This is highly conservative as in reality; the silos will only be filled one at a time.

The remaining contaminants that do not have MECP POI Limits were assessed and determined to be below the *de minimus* limit.

Potential odour emissions from the facility were also assessed following the MECP *Technical Bulletin Methodology for Modelling Assessments of Contaminants with 10-minute Average Standards and Guidelines under O. Reg 419/05 (September 2016)*. The odour scenario assumed that both combustion units were off-line. The Induced Draft fans would continue to operate and draw air from the tipping floor through the system and release the odours from the top of the stack. The odour emission rate was determined from measurements taken at the DYEC facility as part of an Odour test report prepared by Zorix Environmental dated November 23, 2015. The maximum 10 min odour concentration was calculated to be 0.73 ou/m^3 at the most impacted sensitive receptor which is less than the guideline value of 1 ou/m^3.

This ESDM Report demonstrates that the predicted emissions from the Facility will comply with s.20 of O. Reg. 419/05.

Table (i) and Table 5 (Scenario A)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
1,1,1-Trichloroethane	71-55-6	8.89E-05	CALPUFF	1.04E-04	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	
1,1-Dichloroethene	75-35-4	8.89E-05	CALPUFF	1.04E-04	24-hour	10	Health	Sch. 3	Standard	B1	<1%	
1,2,3,4-tetrachlorobenzene	634-66-2	9.27E-08	CALPUFF	1.08E-07	24-hour	600	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	9.27E-08	CALPUFF	1.08E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3-trichlorobenzene	87-61-6	1.09E-07	CALPUFF	1.28E-07	24-hour	135	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,4-trichlorobenzene	120-82-1	1.35E-07	CALPUFF	1.57E-07	24-hour	400	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichlorobenzene	95-50-1	3.60E-07	CALPUFF	3.75E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichloroethane	107-06-2	8.89E-05	CALPUFF	1.04E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,2-Dichloroethane	107-06-2	8.89E-05	CALPUFF	1.04E-04	24-hour	200	—	Sch. 6	URT	—	Below URT	
1,2-Dichloropropane	78-87-5	8.89E-05	CALPUFF	1.04E-04	24-hour	2400	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
1,3,5-trichlorobenzene	108-70-3	9.27E-08	CALPUFF	1.08E-07	24-hour	3.6	Health	Sch. 3	SL-JSL	B2	Below B2	
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	5.04E-06	Annual	2	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	1.04E-04	24-hour	300	—	Sch. 6	URT	—	Below URT	
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	5.04E-06	Annual	20	—	—	AAV	—	0%	
1,3-Dichlorobenzene	541-73-1	5.52E-07	CALPUFF	6.45E-07	24-hour	50	Health	Sch. 3	SL-JSL	B2	Below B2	
1,4-Dichlorobenzene	106-46-7	4.28E-07	CALPUFF	5.00E-07	24-hour	95	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,4-Dichlorobenzene	106-46-7	4.28E-07	CALPUFF	5.00E-07	24-hour	950	—	Sch. 6	URT	—	Below URT	
1-Methylnaphthalene	90-12-0	4.91E-07	CALPUFF	5.74E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
1-Methylphenanthrene	832-69-9	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4,5-tetrachlorophenol	4901-51-3	7.59E-07	CALPUFF	8.87E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4-trichlorophenol	15950-66-0	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	1.38E-06	CALPUFF	1.62E-06	24-hour	0.75	Health	Sch. 3	SL-JSL	B2	Below B2	
2,3,5-trichlorophenol	933-78-8	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,6-trichlorophenol	933-75-5	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3-dichlorophenol	576-24-9	7.70E-06	CALPUFF	8.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,4 & 2,5-dichlorophenol	120-83-2	7.70E-06	CALPUFF	8.99E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,5-trichlorophenol	95-95-4	4.56E-07	CALPUFF	5.33E-07	24-hour	220	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,6-trichlorophenol	88-06-2	4.56E-07	CALPUFF	5.33E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,6-dichlorophenol	87-65-0	7.70E-06	CALPUFF	8.99E-06	24-hour	19	Health	Sch. 3	SL-JSL	B2	Below B2	
2-Butanone	78-93-3	8.89E-05	CALPUFF	1.04E-04	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
2-Butanone	78-93-3	8.89E-05	CALPUFF	1.04E-04	24-hour	10000	—	Sch. 6	URT	—	Below URT	
2-Chloronaphthalene	91-58-7	9.27E-08	CALPUFF	1.08E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
2-methylanthracene	613-12-7	1.56E-07	CALPUFF	1.83E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2-Methylnaphthalene	91-57-6	8.26E-07	CALPUFF	9.65E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2-monochlorophenol	95-57-8	7.69E-06	CALPUFF	8.98E-06	24-hour	18	Health	Sch. 3	SL-JSL	B2	Below B2	
3,4,5-trichlorophenol	609-19-8	8.56E-06	CALPUFF	9.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,4-dichlorophenol	95-77-2	2.70E-05	CALPUFF	3.16E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,5-dichlorophenol	591-35-5	7.70E-06	CALPUFF	8.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-Methylcholanthrene	56-49-5	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-monochlorophenol	108-43-0	7.69E-06	CALPUFF	8.98E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
4-monochlorophenol	106-48-9	7.69E-06	CALPUFF	8.98E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
7,12-Dimethylbenzo(a)anthracene	57-97-6	4.02E-07	CALPUFF	4.70E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9,10-dimethylanthracene	781-43-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9-Methylphenanthrene	883-20-5	4.69E-07	CALPUFF	5.48E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthene	83-32-9	1.43E-07	CALPUFF	1.67E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthylene	208-96-8	1.16E-07	CALPUFF	1.35E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acetone	67-64-1	1.81E-04	CALPUFF	2.11E-04	24-hour	11880	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Acetone	67-64-1	1.81E-04	CALPUFF	2.11E-04	24-hour	118800	—	Sch. 6	URT	—	Below URT	
Ammonia	7664-41-7	3.07E-02	CALPUFF	3.58E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Ammonia	7664-41-7	3.07E-02	CALPUFF	3.58E-02	24-hour	1000	—	Sch. 6	URT	—	Below URT	
Anthracene	120-12-7	1.18E-07	CALPUFF	1.38E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Antimony	7440-36-0	3.07E-06	CALPUFF	3.58E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	

Table (i) and Table 5 (Scenario A)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Arsenic	7440-38-2	2.04E-06	CALPUFF	2.39E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	
Barium	7440-39-3	5.16E-04	CALPUFF	6.02E-04	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Benzene	71-43-2	8.89E-05	CALPUFF	1.04E-04	24-hour	0.45	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Benzene	71-43-2	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Benzene	71-43-2	8.89E-05	CALPUFF	5.04E-06	Annual	4.5	—	—	AAV	—	0%	
Benzo(a)Anthracene	56-55-3	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)fluorene	238-84-6	1.12E-07	CALPUFF	1.30E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	5.25E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Notes 6, 7, Table 2, 3 URT - Note 8, Table 4
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	1.08E-07	24-hour	0.005	—	Sch. 6	URT	—	Below URT	
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	5.25E-09	Annual	0.0001	—	—	AAV	—	0%	
Benzo(b)Fluoranthene	205-99-2	2.49E-07	CALPUFF	2.91E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(b)fluorene	243-17-4	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(e)Pyrene	192-97-2	1.74E-07	CALPUFF	2.03E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(g,h,i)Perylene	191-24-2	2.61E-07	CALPUFF	3.05E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(k)Fluoranthene	207-08-9	1.50E-07	CALPUFF	1.75E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Beryllium	7440-41-7	2.04E-06	CALPUFF	2.39E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	
Biphenyl	92-52-4	3.08E-06	CALPUFF	3.21E-05	1-hour	60	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
Bromodichloromethane	75-27-4	8.89E-05	CALPUFF	1.04E-04	24-hour	350	Health	Sch. 3	SL-JSL	B2	Below B2	
Bromodichloromethane	75-27-4	8.89E-05	CALPUFF	1.04E-04	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Bromoform	75-25-2	8.89E-05	CALPUFF	1.04E-04	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	
Bromomethane	74-83-9	8.89E-05	CALPUFF	1.04E-04	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	
Cadmium	7440-43-9	3.11E-04	CALPUFF	3.63E-04	24-hour	0.025	Health	Sch. 3	Standard	B1	1%	URT - Note 8, Table 4
Cadmium	7440-43-9	3.11E-04	CALPUFF	3.63E-04	24-hour	0.25	—	Sch. 6	URT	—	Below URT	
Carbon Monoxide	630-08-0	1.78E+00	CALPUFF	2.49E+00	½-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 17
Carbon Tetrachloride	56-23-5	8.89E-05	CALPUFF	1.04E-04	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Carbon Tetrachloride	56-23-5	8.89E-05	CALPUFF	1.04E-04	24-hour	24	—	Sch. 6	URT	—	Below URT	
Chloroform	67-66-3	8.89E-05	CALPUFF	1.04E-04	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Chloroform	67-66-3	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Chromium	7440-47-3	4.58E-05	CALPUFF	5.35E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 22 URT - Note 8, Table 4
Chromium	7440-47-3	4.58E-05	CALPUFF	5.35E-05	24-hour	5	—	Sch. 6	URT	—	Below URT	
Chrysene/Triphenylene	218-01-9	1.21E-06	CALPUFF	1.41E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cobalt	7440-48-4	1.96E-06	CALPUFF	2.28E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	
Copper	7440-50-8	1.21E-04	CALPUFF	1.41E-04	24-hour	50	Health	Sch. 3	Standard	B1	<1%	
Coronene	191-07-1	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cumene (Isopropylbenzene)	98-82-8	8.89E-05	CALPUFF	1.04E-04	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Dibenzo(a,c)Anthracene	215-58-7	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,e)pyrene	192-65-4	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,h)Anthracene	53-70-3	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibromochloromethane	124-48-1	8.89E-05	CALPUFF	1.04E-04	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below B2	
Dichlorodifluoromethane	75-71-8	8.89E-05	CALPUFF	1.04E-04	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Dioxins, Furans and Dioxin-like PCBs	N/A	0.0027 µg TEQ/s	CALPUFF	0.0031 pg TEQ/m3	24-hour	0.1 pg TEQ/m3	Health	Sch. 3	Standard	B1	3%	
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.53E-03	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.04E-04	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.04E-04	24-hour	10000	—	Sch. 6	URT	—	Below URT	
Ethylene Dibromide	106-93-4	8.89E-05	CALPUFF	1.04E-04	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	
Fluoranthene	206-44-0	1.03E-06	CALPUFF	1.20E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Fluorene	86-73-7	4.02E-07	CALPUFF	4.70E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Hexachlorobenzene	118-74-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below B2	
Hexachlorobenzene	118-74-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	

Table (i) and Table 5 (Scenario A)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Hydrogen Chloride	7647-01-0	4.00E-01	CALPUFF	4.67E-01	24-hour	20	Health	Sch. 3	Standard	B1	2%	URT - Note 8, Table 4
Hydrogen Chloride	7647-01-0	4.00E-01	CALPUFF	4.67E-01	24-hour	200	—	Sch. 6	URT	—	Below URT	
Hydrogen Fluoride	7664-39-3	4.89E-03	CALPUFF	5.71E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Hydrogen Fluoride	7664-39-3	4.89E-03	CALPUFF	8.33E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Indeno(1,2,3-cd)Pyrene	193-39-5	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Lead	7439-92-1	2.22E-03	CALPUFF	2.60E-03	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	2.22E-03	CALPUFF	3.79E-04	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	2.22E-03	CALPUFF	2.60E-03	24-hour	2	—	Sch. 6	URT	—	Below URT	
M&P-Xylene	108-38-3	1.85E-04	CALPUFF	2.17E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Mercury	7439-97-6	6.67E-04	CALPUFF	7.79E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Mercury	7439-97-6	6.67E-04	CALPUFF	7.79E-04	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	CALPUFF	1.04E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	CALPUFF	1.04E-04	24-hour	2200	—	Sch. 6	URT	—	Below URT	
Methylene Chloride	75-09-2	1.99E-04	CALPUFF	2.32E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Methylene Chloride	75-09-2	1.99E-04	CALPUFF	2.32E-04	24-hour	22000	—	Sch. 6	URT	—	Below URT	
Molybdenum	7439-98-7	1.89E-04	CALPUFF	2.21E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	
Monochlorobenzene	108-90-7	4.99E-06	CALPUFF	5.20E-05	1-hour	3500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Monochlorobenzene	108-90-7	4.99E-06	CALPUFF	8.58E-05	10-minute	4,500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
m-terphenyl	92-06-8	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Naphthalene	91-20-3	2.08E-06	CALPUFF	2.43E-06	24-hour	22.5	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Naphthalene	91-20-3	2.08E-06	CALPUFF	3.57E-05	10-minute	50	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Nickel	7440-02-0	3.42E-05	CALPUFF	1.94E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Nickel	7440-02-0	3.42E-05	CALPUFF	4.00E-05	24-hour	2	—	Sch. 6	URT	—	Below URT	
Nickel	7440-02-0	3.42E-05	CALPUFF	1.94E-06	Annual	0.4	—	—	AAV	—	0%	
Nitrogen Oxides	10102-44-0	5.38E+00	CALPUFF	6.28E+00	24-hour	200	Health	Sch. 3	Standard	B1	3%	Notes 10, 28
Nitrogen Oxides	10102-44-0	5.38E+00	CALPUFF	5.60E+01	1-hour	400	Health	Sch. 3	Standard	B1	14%	Notes 10, 28
o-Terphenyl	84-15-1	1.18E-07	CALPUFF	1.38E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
O-Xylene	95-47-6	8.89E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pentachlorobenzene	608-93-5	9.27E-08	CALPUFF	1.08E-07	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below B2	
Pentachlorophenol	87-86-5	9.49E-06	CALPUFF	1.11E-05	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	
Perylene	198-55-0	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Phenanthrene	85-01-8	5.20E-06	CALPUFF	6.08E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Picene	213-46-7	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
p-terphenyl	92-94-4	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pyrene	129-00-0	1.03E-06	CALPUFF	1.20E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Selenium	7782-49-2	1.02E-05	CALPUFF	1.19E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Silver	7440-22-4	2.04E-06	CALPUFF	2.39E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	
Styrene	100-42-5	8.89E-05	CALPUFF	1.04E-04	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Sulphur Dioxide	7446-09-5	1.56E+00	CALPUFF	1.62E+01	1-hour	100	Health & Vegetation	Sch. 3	Standard	B1	16%	Note 10, URT - Note 8, Table 4
Sulphur Dioxide	7446-09-5	1.56E+00	CALPUFF	8.83E-02	Annual	10	Health & Vegetation	Sch. 3	Standard	B1	<1%	Note 10, URT - Note 8, Table 5
Tetrachloroethene	127-18-4	8.89E-05	CALPUFF	1.04E-04	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Tetrachloroethene	127-18-4	8.89E-05	CALPUFF	1.04E-04	24-hour	3600	—	Sch. 6	URT	—	Below URT	
Tetralin	119-64-2	5.90E-07	CALPUFF	6.89E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Thallium	7440-28-0	2.04E-06	CALPUFF	2.39E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below B2	

Table (i) and Table 5 (Scenario A)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Toluene	108-88-3	1.24E-02	CALPUFF	1.45E-02	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
trans,1,2-Dichloroethene	156-60-5	8.89E-05	CALPUFF	1.04E-04	24-hour	105	Health	Sch. 3	Guideline	B1	<1%	
Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	CALPUFF	1.04E-04	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	CALPUFF	1.04E-04	24-hour	1200	—	Sch. 6	URT	—	Below URT	
Trichlorofluoromethane	75-69-4	8.89E-05	CALPUFF	1.04E-04	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Trichlorotrifluoroethane	26523-64-8	8.89E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Vanadium	7440-62-2	1.02E-06	CALPUFF	1.19E-06	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Vinyl Chloride	75-01-4	8.89E-05	CALPUFF	1.04E-04	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Vinyl Chloride	75-01-4	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Xylenes	1330-20-7	2.74E-04	CALPUFF	4.72E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11, 19
Xylenes	1330-20-7	2.74E-04	CALPUFF	3.20E-04	24-hour	730	Health	Sch. 3	Standard	B1	<1%	Notes 10, 19 URT - Note 8, Table 4
Xylenes	1330-20-7	2.74E-04	CALPUFF	3.20E-04	24-hour	7300	—	Sch. 6	URT	—	Below URT	
Zinc	7440-66-6	6.35E-04	CALPUFF	7.42E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	
Polychlorinated Biphenyls (PCB)	1336-36-3	4.53E-07	CALPUFF	5.29E-07	24-hour	0.15	Health	Sch. 3	Guideline	B1	<1%	Note 21
Suspended particulate matter (< 44 µm diameter)	N/A -1	4.00E-01	CALPUFF	5.22E-01	24-hour	120	Visibility	Sch. 3	Guideline	B1	<1%	
Particulate matter (< 10 µm diameter)	N/A -3	2.91E-01	CALPUFF	3.95E-01	24-hour	50	Health	AAQC			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	2.88E-01	CALPUFF	3.91E-01	24-hour	27	Health	CAAQS			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	2.88E-01	CALPUFF	1.99E-02	Annual	8.8	Health	CAAQS			0%	

Table (ii) and Table 5 (Scenario F)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
1,1,1-Trichloroethane	71-55-6	8.89E-05	CALPUFF	1.04E-04	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	
1,1-Dichloroethene	75-35-4	8.89E-05	CALPUFF	1.04E-04	24-hour	10	Health	Sch. 3	Standard	B1	<1%	
1,2,3,4-tetrachlorobenzene	634-66-2	9.27E-08	CALPUFF	1.08E-07	24-hour	600	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	9.27E-08	CALPUFF	1.08E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3-trichlorobenzene	87-61-6	1.09E-07	CALPUFF	1.28E-07	24-hour	135	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,4-trichlorobenzene	120-82-1	1.35E-07	CALPUFF	1.57E-07	24-hour	400	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichlorobenzene	95-50-1	3.60E-07	CALPUFF	3.75E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichloroethane	107-06-2	8.89E-05	CALPUFF	1.04E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,2-Dichloroethane	107-06-2	8.89E-05	CALPUFF	1.04E-04	24-hour	200	—	Sch. 6	URT	—	Below URT	
1,2-Dichloropropane	78-87-5	8.89E-05	CALPUFF	1.04E-04	24-hour	2400	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
1,3,5-trichlorobenzene	108-70-3	9.27E-08	CALPUFF	1.08E-07	24-hour	3.6	Health	Sch. 3	SL-JSL	B2	Below B2	
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	5.04E-06	Annual	2	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	1.04E-04	24-hour	300	—	Sch. 6	URT	—	Below URT	
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	5.04E-06	Annual	20	—	—	AAV	—	0%	
1,3-Dichlorobenzene	541-73-1	5.52E-07	CALPUFF	6.45E-07	24-hour	50	Health	Sch. 3	SL-JSL	B2	Below B2	
1,4-Dichlorobenzene	106-46-7	4.28E-07	CALPUFF	5.00E-07	24-hour	95	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,4-Dichlorobenzene	106-46-7	4.28E-07	CALPUFF	5.00E-07	24-hour	950	—	Sch. 6	URT	—	Below URT	
1-Methylnaphthalene	90-12-0	4.91E-07	CALPUFF	5.74E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
1-Methylphenanthrene	832-69-9	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4,5-tetrachlorophenol	4901-51-3	7.59E-07	CALPUFF	8.87E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4-trichlorophenol	15950-66-0	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	1.38E-06	CALPUFF	1.62E-06	24-hour	0.75	Health	Sch. 3	SL-JSL	B2	Below B2	
2,3,5-trichlorophenol	933-78-8	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,6-trichlorophenol	933-75-5	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3-dichlorophenol	576-24-9	7.70E-06	CALPUFF	8.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,4 & 2,5-dichlorophenol	120-83-2	7.70E-06	CALPUFF	8.99E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,5-trichlorophenol	95-95-4	4.56E-07	CALPUFF	5.33E-07	24-hour	220	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,6-trichlorophenol	88-06-2	4.56E-07	CALPUFF	5.33E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,6-dichlorophenol	87-65-0	7.70E-06	CALPUFF	8.99E-06	24-hour	19	Health	Sch. 3	SL-JSL	B2	Below B2	
2-Butanone	78-93-3	8.89E-05	CALPUFF	1.04E-04	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
2-Butanone	78-93-3	8.89E-05	CALPUFF	1.04E-04	24-hour	10000	—	Sch. 6	URT	—	Below URT	
2-Chloronaphthalene	91-58-7	9.27E-08	CALPUFF	1.08E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
2-methylanthracene	613-12-7	1.56E-07	CALPUFF	1.83E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2-Methylnaphthalene	91-57-6	8.26E-07	CALPUFF	9.65E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2-monochlorophenol	95-57-8	7.69E-06	CALPUFF	8.98E-06	24-hour	18	Health	Sch. 3	SL-JSL	B2	Below B2	
3,4,5-trichlorophenol	609-19-8	8.56E-06	CALPUFF	9.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,4-dichlorophenol	95-77-2	2.70E-05	CALPUFF	3.16E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,5-dichlorophenol	591-35-5	7.70E-06	CALPUFF	8.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-Methylcholanthrene	56-49-5	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-monochlorophenol	108-43-0	7.69E-06	CALPUFF	8.98E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
4-monochlorophenol	106-48-9	7.69E-06	CALPUFF	8.98E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
7,12-Dimethylbenzo(a)anthracene	57-97-6	4.02E-07	CALPUFF	4.70E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9,10-dimethylanthracene	781-43-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9-Methylphenanthrene	883-20-5	4.69E-07	CALPUFF	5.48E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthene	83-32-9	1.43E-07	CALPUFF	1.67E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthylene	208-96-8	1.16E-07	CALPUFF	1.35E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acetone	67-64-1	1.81E-04	CALPUFF	2.11E-04	24-hour	11880	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Acetone	67-64-1	1.81E-04	CALPUFF	2.11E-04	24-hour	118800	—	Sch. 6	URT	—	Below URT	

Table (ii) and Table 5 (Scenario F)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Ammonia	7664-41-7	3.07E-02	CALPUFF	3.58E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Ammonia	7664-41-7	3.07E-02	CALPUFF	3.58E-02	24-hour	1000	—	Sch. 6	URT	—	Below URT	
Anthracene	120-12-7	1.18E-07	CALPUFF	1.38E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Antimony	7440-36-0	3.07E-06	CALPUFF	3.58E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	
Arsenic	7440-38-2	2.04E-06	CALPUFF	2.39E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	
Barium	7440-39-3	5.16E-04	CALPUFF	6.02E-04	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Benzene	71-43-2	8.89E-05	CALPUFF	1.04E-04	24-hour	0.45	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Benzene	71-43-2	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Benzene	71-43-2	8.89E-05	CALPUFF	5.04E-06	Annual	4.5	—	—	AAV	—	0%	
Benzo(a)Anthracene	56-55-3	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)fluorene	238-84-6	1.12E-07	CALPUFF	1.30E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	5.25E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Notes 6, 7, Table 2, 3 URT - Note 8, Table 4
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	1.08E-07	24-hour	0.005	—	Sch. 6	URT	—	Below URT	
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	5.25E-09	Annual	0.0001	—	—	AAV	—	0%	
Benzo(b)Fluoranthene	205-99-2	2.49E-07	CALPUFF	2.91E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(b)fluorene	243-17-4	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(e)Pyrene	192-97-2	1.74E-07	CALPUFF	2.03E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(g,h,i)Perylene	191-24-2	2.61E-07	CALPUFF	3.05E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(k)Fluoranthene	207-08-9	1.50E-07	CALPUFF	1.75E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Beryllium	7440-41-7	2.04E-06	CALPUFF	2.39E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	
Biphenyl	92-52-4	3.08E-06	CALPUFF	3.21E-05	1-hour	60	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
Bromodichloromethane	75-27-4	8.89E-05	CALPUFF	1.04E-04	24-hour	350	Health	Sch. 3	SL-JSL	B2	Below B2	
Bromodichloromethane	75-27-4	8.89E-05	CALPUFF	1.04E-04	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Bromoform	75-25-2	8.89E-05	CALPUFF	1.04E-04	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	
Bromomethane	74-83-9	8.89E-05	CALPUFF	1.04E-04	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	
Cadmium	7440-43-9	3.11E-04	CALPUFF	3.63E-04	24-hour	0.025	Health	Sch. 3	Standard	B1	1%	URT - Note 8, Table 4
Cadmium	7440-43-9	3.11E-04	CALPUFF	3.63E-04	24-hour	0.25	—	Sch. 6	URT	—	Below URT	
Carbon Monoxide	630-08-0	1.78E+00	CALPUFF	2.49E+00	½-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 17
Carbon Tetrachloride	56-23-5	8.89E-05	CALPUFF	1.04E-04	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Carbon Tetrachloride	56-23-5	8.89E-05	CALPUFF	1.04E-04	24-hour	24	—	Sch. 6	URT	—	Below URT	
Chloroform	67-66-3	8.89E-05	CALPUFF	1.04E-04	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Chloroform	67-66-3	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Chromium	7440-47-3	4.58E-05	CALPUFF	5.35E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 22 URT - Note 8, Table 4
Chromium	7440-47-3	4.58E-05	CALPUFF	5.35E-05	24-hour	5	—	Sch. 6	URT	—	Below URT	
Chrysene/Triphenylene	218-01-9	1.21E-06	CALPUFF	1.41E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cobalt	7440-48-4	1.96E-06	CALPUFF	2.28E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	
Copper	7440-50-8	1.21E-04	CALPUFF	1.41E-04	24-hour	50	Health	Sch. 3	Standard	B1	<1%	
Coronene	191-07-1	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cumene (Isopropylbenzene)	98-82-8	8.89E-05	CALPUFF	1.04E-04	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Dibenzo(a,c)Anthracene	215-58-7	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,e)pyrene	192-65-4	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,h)Anthracene	53-70-3	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibromochloromethane	124-48-1	8.89E-05	CALPUFF	1.04E-04	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below B2	
Dichlorodifluoromethane	75-71-8	8.89E-05	CALPUFF	1.04E-04	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Dioxins, Furans and Dioxin-like PCBs	N/A	0.0027 µg TEQ/s	CALPUFF	0.0031 pg TEQ/m3	24-hour	0.1 pg TEQ/m3	Health	Sch. 3	Standard	B1	3%	
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.53E-03	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11

Table (ii) and Table 5 (Scenario F)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.04E-04	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.04E-04	24-hour	10000	—	Sch. 6	URT	—	Below URT	
Ethylene Dibromide	106-93-4	8.89E-05	CALPUFF	1.04E-04	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	
Fluoranthene	206-44-0	1.03E-06	CALPUFF	1.20E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Fluorene	86-73-7	4.02E-07	CALPUFF	4.70E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Hexachlorobenzene	118-74-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below B2	
Hexachlorobenzene	118-74-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Hydrogen Chloride	7647-01-0	4.00E-01	CALPUFF	4.67E-01	24-hour	20	Health	Sch. 3	Standard	B1	2%	URT - Note 8, Table 4
Hydrogen Chloride	7647-01-0	4.00E-01	CALPUFF	4.67E-01	24-hour	200	—	Sch. 6	URT	—	Below URT	
Hydrogen Fluoride	7664-39-3	4.89E-03	CALPUFF	5.71E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Hydrogen Fluoride	7664-39-3	4.89E-03	CALPUFF	8.33E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Indeno(1,2,3-cd)Pyrene	193-39-5	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Lead	7439-92-1	2.22E-03	CALPUFF	2.60E-03	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	2.22E-03	CALPUFF	3.79E-04	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	2.22E-03	CALPUFF	2.60E-03	24-hour	2	—	Sch. 6	URT	—	Below URT	
M&P-Xylene	108-38-3	1.85E-04	CALPUFF	2.17E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Mercury	7439-97-6	6.67E-04	CALPUFF	7.79E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Mercury	7439-97-6	6.67E-04	CALPUFF	7.79E-04	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	CALPUFF	1.04E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	CALPUFF	1.04E-04	24-hour	2200	—	Sch. 6	URT	—	Below URT	
Methylene Chloride	75-09-2	1.99E-04	CALPUFF	2.32E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Methylene Chloride	75-09-2	1.99E-04	CALPUFF	2.32E-04	24-hour	22000	—	Sch. 6	URT	—	Below URT	
Molybdenum	7439-98-7	1.89E-04	CALPUFF	2.21E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	
Monochlorobenzene	108-90-7	4.99E-06	CALPUFF	5.20E-05	1-hour	3500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Monochlorobenzene	108-90-7	4.99E-06	CALPUFF	8.58E-05	10-minute	4,500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
m-terphenyl	92-06-8	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Naphthalene	91-20-3	2.08E-06	CALPUFF	2.43E-06	24-hour	22.5	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Naphthalene	91-20-3	2.08E-06	CALPUFF	3.57E-05	10-minute	50	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Nickel	7440-02-0	3.42E-05	CALPUFF	1.94E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Nickel	7440-02-0	3.42E-05	CALPUFF	4.00E-05	24-hour	2	—	Sch. 6	URT	—	Below URT	
Nickel	7440-02-0	3.42E-05	CALPUFF	1.94E-06	Annual	0.4	—	—	AAV	—	0%	
Nitrogen Oxides	10102-44-0	6.49E+00	CALPUFF	1.04E+02	24-hour	200	Health	Sch. 3	Standard	B1	52%	Notes 10, 28
Nitrogen Oxides	10102-44-0	6.49E+00	CALPUFF	2.57E+02	1-hour	400	Health	Sch. 3	Standard	B1	64%	Notes 10, 28
o-Terphenyl	84-15-1	1.18E-07	CALPUFF	1.38E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
O-Xylene	95-47-6	8.89E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pentachlorobenzene	608-93-5	9.27E-08	CALPUFF	1.08E-07	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below B2	
Pentachlorophenol	87-86-5	9.49E-06	CALPUFF	1.11E-05	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	
Perylene	198-55-0	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	

Table (ii) and Table 5 (Scenario F)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Phenanthrene	85-01-8	5.20E-06	CALPUFF	6.08E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Picene	213-46-7	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
p-terphenyl	92-94-4	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pyrene	129-00-0	1.03E-06	CALPUFF	1.20E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Selenium	7782-49-2	1.02E-05	CALPUFF	1.19E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Silver	7440-22-4	2.04E-06	CALPUFF	2.39E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	
Styrene	100-42-5	8.89E-05	CALPUFF	1.04E-04	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Sulphur Dioxide	7446-09-5	1.56E+00	CALPUFF	1.62E+01	1-hour	100	Health & Vegetation	Sch. 3	Standard	B1	16%	Note 10, URT - Note 8, Table 4
Sulphur Dioxide	7446-09-5	1.56E+00	CALPUFF	8.83E-02	Annual	10	Health & Vegetation	Sch. 3	Standard	B1	<1%	Note 10, URT - Note 8, Table 5
Tetrachloroethene	127-18-4	8.89E-05	CALPUFF	1.04E-04	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Tetrachloroethene	127-18-4	8.89E-05	CALPUFF	1.04E-04	24-hour	3600	—	Sch. 6	URT	—	Below URT	
Tetralin	119-64-2	5.90E-07	CALPUFF	6.89E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Thallium	7440-28-0	2.04E-06	CALPUFF	2.39E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Toluene	108-88-3	1.24E-02	CALPUFF	1.45E-02	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
trans,1,2-Dichloroethene	156-60-5	8.89E-05	CALPUFF	1.04E-04	24-hour	105	Health	Sch. 3	Guideline	B1	<1%	
Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	CALPUFF	1.04E-04	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	CALPUFF	1.04E-04	24-hour	1200	—	Sch. 6	URT	—	Below URT	
Trichlorofluoromethane	75-69-4	8.89E-05	CALPUFF	1.04E-04	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Trichlorotrifluoroethane	26523-64-8	8.89E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Vanadium	7440-62-2	1.02E-06	CALPUFF	1.19E-06	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Vinyl Chloride	75-01-4	8.89E-05	CALPUFF	1.04E-04	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Vinyl Chloride	75-01-4	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Xylenes	1330-20-7	2.74E-04	CALPUFF	4.72E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11, 19
Xylenes	1330-20-7	2.74E-04	CALPUFF	3.20E-04	24-hour	730	Health	Sch. 3	Standard	B1	<1%	Notes 10, 19 URT - Note 8, Table 4
Xylenes	1330-20-7	2.74E-04	CALPUFF	3.20E-04	24-hour	7300	—	Sch. 6	URT	—	Below URT	
Zinc	7440-66-6	6.35E-04	CALPUFF	7.42E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	
Polychlorinated Biphenyls (PCB)	1336-36-3	4.53E-07	CALPUFF	5.29E-07	24-hour	0.15	Health	Sch. 3	Guideline	B1	<1%	Note 21
Suspended particulate matter (< 44 µm diameter)	N/A -1	3.34E-01	CALPUFF	6.64	24-hour	120	Visibility	Sch. 3	Guideline	B1	6%	
Particulate matter (< 10 µm diameter)	N/A -3	3.34E-01	CALPUFF	6.06	24-hour	50	Health	AAQC			12%	
Particulate matter (< 2.5 µm diameter)	N/A -4	3.31E-01	CALPUFF	6.06	24-hour	27	Health	CAAQS			22%	
Particulate matter (< 2.5 µm diameter)	N/A -4	3.31E-01	CALPUFF	9.63E-01	Annual	8.8	Health	CAAQS			11%	

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List of Abbreviations

A-7	MECP Guideline A-7 Air Pollution Control, Design and Operation Guidelines for Municipal Waste Thermal Treatment Facilities
A-9	MECP Guideline A-9: NO_X Emissions from Boilers and Heaters
AAQC	Ambient Air Quality Criteria
ADMGO	Guideline A-11: Air Dispersion Modelling Guideline for Ontario
Am^3/s	Flow rate at actual conditions in cubic metres per second
AP-42	USEPA Air Pollutant Emission Factors (http://www.epa.gov/ttnchie1/ap42/)
APC	Air Pollution Control
BPIP	Building Profile Input Program
°C	Degrees centigrade (temperature)
Cd	Cadmium
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CofA	Certificate of Approval
CWS	Canada Wide Standard
DCS	Distributed Control System
Durham-York	The Regional Municipality of Durham and The Regional Municipality of York
DYEC	Durham-York Energy Centre
EA	Environmental Assessment
EAA	Environmental Assessment Act
ESDM	Emission Summary and Dispersion Modelling
EfW	Energy from Waste
°F	Degrees Fahrenheit (temperature)
Facility	The proposed Durham-York Energy Centre
GJ	Gigajoule (energy)
HCl	Hydrogen chloride
HF	Hydrogen fluoride
HHV	Higher Heating Value
HNO3	Nitric acid
HP	Horsepower (power)
Hr	Hour
HVAC	Heating, Ventilating and Air conditioning
IC&I	Institutional, Commercial and Industrial
ID	Induced Draft
IGR	Internal Gas Recirculation
ISC	Industrial Source Complex
JSL	Jurisdictional Screening Level
Kg	Kilogram (mass)
Km	Kilometre (distance)
Kw	Kilowatt (energy)
M^3	Cubic metre (volume)

MCR	Maximum Continuous Rating
MECP	Ministry of Environment, Conservation and Parks
µg	Microgram (mass)
µg/Rm^3	Concentration at reference conditions in micrograms per cubic metre
µm	Micron (distance)
MJ	Mega joule (energy)
MSW	Municipal Solid Waste
MW	Megawatt (power)
NAD 83	North American Datum (1983)
NAICS	North American Industry Classification
NAPS	National Air Pollution Surveillance
NG	Natural Gas
NH_3	Ammonia
NO	Nitrogen Oxide
NO_2	Nitrogen dioxide
NO_3	Nitrate
NO_X	Nitrogen oxides
O_2	Oxygen
O.Reg	Ontario Regulation
Ou	Odour unit
Pb	Lead
PCDD	Polychlorinated Dibenzodioxins
PG/7	Environment Canada Publication “Protocol and Performance Specifications EPS1/PG/7”
PM_{10}	Particulate matter with diameter less than or equal to 10 µm
$PM_{2.5}$	Particulate matter with diameter less than or equal to 2.5 µm
POI	Point of Impingement
PPM	Parts per million
PRIME	Plume Rise Model Enhancements
Mg/Rm^3	Concentration at reference conditions in milligrams per cubic metre
SNCR	Selective Non Catalytic Reduction
SO_2	Sulphur dioxide
SO_4	Sulphate
SPM	Secondary Particulate Matter
THC	Total hydrocarbons
TIBL	Thermal Internal Boundary Layer
URT	Upper Risk Threshold
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
VLN	Reworld’s Very Low NO_X System

1 INTRODUCTION AND FACILITY DESCRIPTION

This section provides a description of the Durham York Energy Centre (DYEC), an Energy from Waste (EfW) Facility (Facility) as required by sub paragraph 1 of s.26(1) of Ontario Regulation (O. Reg.) 419/05.

1.1 Purpose and Scope of ESDM Report

This Emission Summary and Dispersion Modelling (ESDM) Report update was prepared to support an ECA amendment application by the Regional Municipalities of Durham and York ("Durham-York") at the Energy from Waste (EfW) Facility operated by Reworld Durham York Limited Partnership (Reworld, formerly Covanta Durham York Renewable Energy Limited Partnership Corporation)) located in an industrial zoned area, on the west side of Osborne Road, south of Highway 401 and north of a CN Rail Corridor in the Municipality of Clarington, Ontario at 1835 Energy Drive in Clarington, Ontario (DYEC). Currently the facility and associated sources are covered under the Multi-Media Environmental Compliance Approval (ECA) Number 7306-8FDKNX, issued on June 28, 2011 and most recently amended on December 23, 2021, which permits the thermal treatment of up to 140,000 tonnes per annum (TPA) of waste (temporarily increased to 142,000 tpa until December 31, 2021). For this amendment application, DYEC is proposing a step change increase of 20,000 tonnes to allow for processing of up to 160,000 tpa of MSW (the Project). Under the 160,000 tpa limit, there will be fewer periods of shut down due to reduced load, this will help stabilize and optimize operations throughout the year. In general, with the increase to 160,000 tpa the plant will operate closer to design steaming rate and throughput more often throughout the year. In addition, an updated Air Quality Impact Assessment (AQIA) submitted in 2021 assessed the 160,000 tpa scenario and the result indicated that the additional 20,000 tpa would not significantly impact local air quality. The Project will not introduce any new sources of emissions to DYEC.

This Emission Summary and Dispersion Modelling (ESDM) Report was prepared in accordance with s.26 of Ontario Regulation (O. Reg.) 419/05. In addition, guidance in the Ontario Ministry of the Environment, Conservation and Parks (Ministry) publication "Guideline A-10: Procedure for Preparing an Emission Summary and Dispersion Modelling (ESDM) Report, Version 4.1", dated March 2018 (ESDM Procedure Document) was followed, as appropriate.

The equipment at the Facility is subject to s.20 of O. Reg. 419/05. The Facility's assessment of compliance was performed using the CALPUFF dispersion model and its pre-processors, as approved by the MECP.

1.2 Description of Processes and NAICS Code(s) (including Products and Raw Materials)

The EfW Facility accepts Municipal Solid Waste (MSW) from the Regions of Durham and York. The sources of waste are post-diversion residual waste collected at curbside as well as any residual waste materials collected at public drop-off centers and transfers stations. The facility currently processes 140,000 tonnes/year of waste but is proposed to process up to 160,000 tonnes/year of waste, with MSW delivered to the facility six (6) days per week.

The Facility consists of two (2) identical combustion trains, with normal operations of 218 tonnes/day/train of MSW referenced at 13MJ/kg which is considered 100% of MCR heat input (118 GJ/hr). At times the facility may operate at a 110% of MCR heat input (130 GJ/hr). Each train has identical boilers/furnaces and air pollution control equipment such as carbon injection, dry scrubbers and fabric filters. The treated exhaust gases are vented to a common 87.6 m stack and released into the atmosphere.

Waste will continue to only be accepted from MECP approved haulers that have valid waste licences or municipal vehicles or other exempt vehicles as per Section 16(2) (a) of Regulation 347 *General – Waste Management*, made under the *Environmental Protection Act*, R.S.O. 1990.

All incoming waste vehicles must proceed to a weigh scale to allow the vehicle weight, waste type and source to be recorded by the scale operator. Radiation detection equipment is permanently mounted on the weigh scale to measure any potential radiation in incoming loads. Additionally, refuse trucks are evaluated periodically by visual examination of its contents for the presence of hazardous waste and unacceptable waste. The refuse storage pit is sized to allow for continuous operation of the system. Seven (7) days of storage at 436 Mg/day is provided.

The combustion air is drawn through the tipping hall by inlet ducts above the storage pit. This maintains a negative pressure in the tipping building and helps prevent the escape of dust and odour from the Facility. When the entrance/exit doors are closed during non-delivery hours, combustion air is admitted to the tipping area from outside the building through manually operable louvers in the tipping building walls.

The following is a summary of the combustion process and combustion equipment. A simplified process flow diagram is presented in Figure 2.

1.2.1 Waste Combustion Process

MSW delivered to the facility is deposited in the storage pit. Facility operators manage MSW by moving and mixing MSW within the storage pit with overhead grapple cranes. Operators use the grapples to transfer MSW from the bunker to the charging hoppers that are located at an elevation above the Martin® grate. The charging hopper is pyramidal in shape with the entrance being rectangular and the front edge overhanging the bunker. Grapple loads of MSW are loaded along the front edge to allow the MSW to slide down into the hopper and the chute that connects the hopper to the charging table. The residue from the combustion process that remains on the grate, referred to as bottom ash, is removed from the grate and quenched with water in an ash discharger. Bottom ash is removed from the ash discharger by a hydraulic ram that moves the bottom ash up an inclined surface that promotes dewatering of the bottom ash. The result is a cooled and moist residue with a nominal 20 to 25 % by weight water content that prevents generation of fugitive dust. The bottom ash is conveyed to the Residual Building by covered conveyers.

The combustion process is monitored by a distributed control system (DCS) that provides continuous automatic control of the combustion process and other facility processes. The combustion process includes three primary control routines that are integrated together to ensure continuous compliance with all operating requirements:

1) Fuel firing;

2) Combustion air; and

3) Auxiliary burner (intermittent operation only, see Section 1.3.1.5.1 for details).

Trained operators will provide a fourth routine by monitoring information provided by the distributed control system and through direct observation, making adjustments as necessary.

The general control logic begins with the fuel firing routine which receives input from the O_2 analyzer, steam load and furnace temperature and is used to adjust the fuel firing rate to maintain desired setpoints. The combustion air logic receives input from the O_2 analyzer, steam flow, and NO_X control system and is used to adjust the amount and distribution of combustion air introduced through the primary and secondary air systems. The natural-

gas-fired auxiliary burner will be available to maintain flue gas temperature in the furnace region during operating conditions and as required during start-up and shutdown conditions.

1.2.1.1 Fuel Firing Process

After being charged into the feed chute hopper, the refuse is metered onto the surface of the Martin® stoker from the bottom of the feed chute by hydraulic feed rams. The feed rams are designed to provide an even distribution of refuse over the entire width of the grate. The proprietary reverse reciprocating action of the Martin® stoker grate agitates the fuel bed in a manner which continually mixes the combusting refuse, resulting in thorough burnout of combustible matter.

The grate is inclined downward toward the discharge end. Burning refuse is pushed back underneath the freshly fed refuse to achieve continuous drying, volatilization, ignition and combustion. A series of plenum air chambers is provided along the length of each grate run to admit primary combustion air. There are five zones with air rates admitted to each being precisely controlled to suit the combustion conditions of each burning zone as the refuse moves from feed end to discharge. Dampers control the air rate. These dampers are designed to individually regulate the amount of air fed into the various zones of each grate run. Consistently low emissions of hydrocarbons, carbon monoxide and organic compounds are achieved through a combination of grate design and operation.

1.2.1.2 Combustion Air Process

Each boiler is equipped with the Martin® /Reworld Very Low NOX (VLN™) system, a type of staged combustion, referred to as $VLN_{Air/Gas}$. This technology is an integral component of all new Martin® Reworld stokers. VLN is a refinement of the standard combustion process offered in Martin® Reworld stokers that reduces the NO_x generated in the furnace as well as increases the overall boiler efficiency (Exhibit 1).

The secondary air system consists of two rows of closely spaced secondary air nozzles, one row in the front wall above the stoker feeder ram(s) and the second row in the rear wall above the rear arch. The $VLN_{Air/Gas}$ system recirculates gas drawn from the lower stoker area, or uses ambient air, for supply into the overhead nozzles. The secondary air and the $VLN_{Air/Gas}$ nozzle design is such that complete penetration of the gas stream above the stoker is achieved for flame shaping and thorough burnout of combustible material.

Drawing combustion air from above the refuse pit eliminates ambient odour problems. The inlet to the VLN fan is from above the stoker's clinker roller or from the boiler building. To ensure maximum burnout of refuse with low heating value and high moisture content, steam heated combustion air heaters are provided to pre-heat primary air (undergrate) to 95 to 150 °C.

This permits the maximum burnout of non aqueous condensable matter and eliminates odours. The temperature in the furnace ranges from 1100 to 1400°C in the lower furnace, and over 900°C at the chamber exit, which is sufficiently high to complete the combustion of all organic vapours. At the lower furnace throat, secondary air nozzles provide additional oxygen to combust unburned gases such as carbon monoxide and hydrocarbons and shape the flames. The ambient air or recirculated flue gas from above the clinker roll is directed into high velocity flue gas jets located near the boiler's nose on the furnace side walls, causing intense turbulence. This assures complete combustion of all organic material before the gases pass into the boiler convection section, superheater and economizer.

Following combustion in the furnace, the products of combustion (flue gases) pass through screen tubes at the outlet of the furnace and flow downward through the second boiler pass radiating heat to superheater platens and

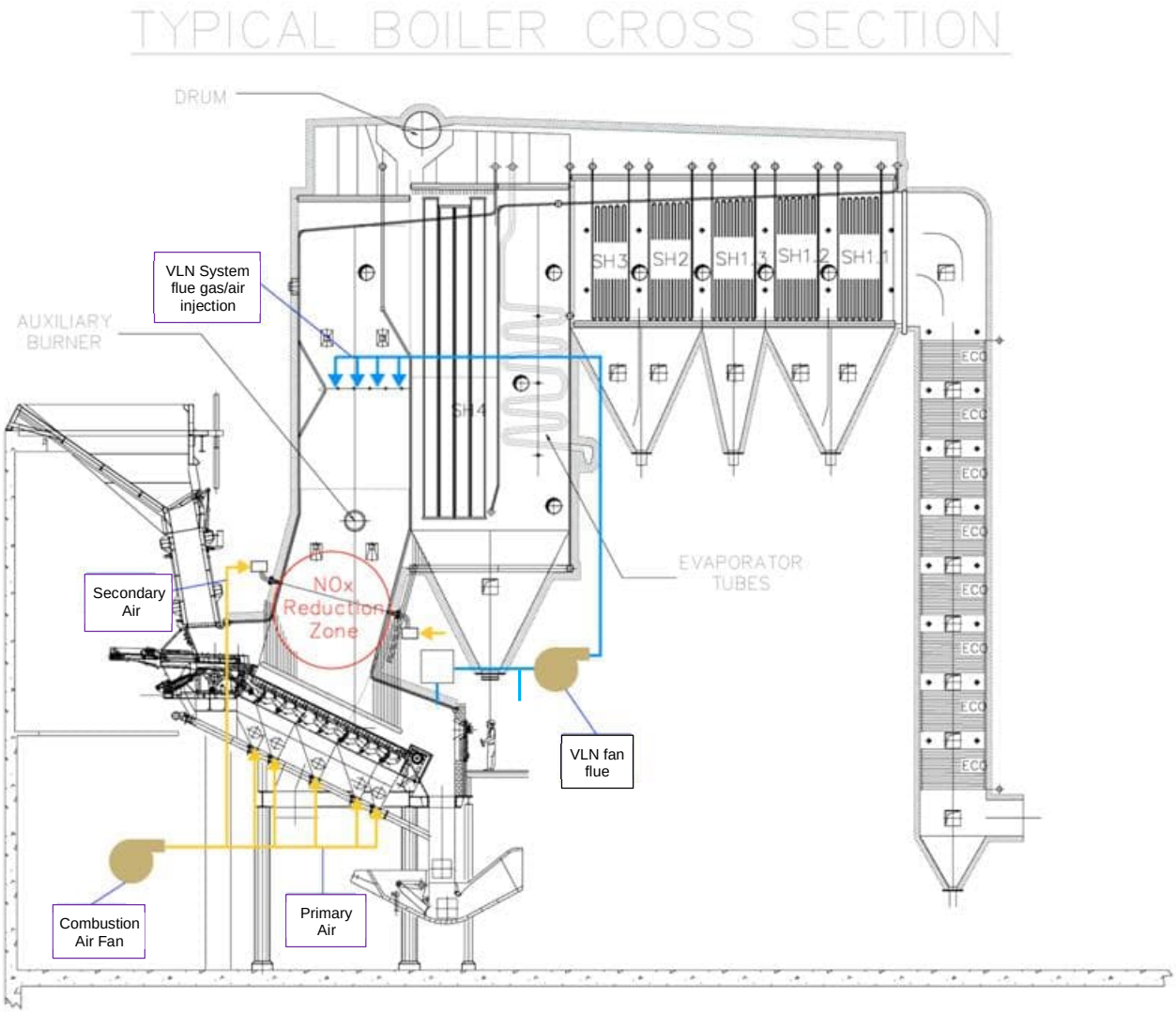
the membrane water wall enclosure, thereby lowering gas temperature. At the bottom of this pass, the flue gas is turned upward and flows through a third pass with convection heat transfer surface. The flue gas temperature is thus further reduced as it passes its heat to the water in these tubes.

The change in direction or flow reversal of the gases at the end of the second gas pass is provided to "throw out" the larger fly ash particles in the gas stream to reduce the particulate load on the downstream convective heat transfer surfaces. As the flue gas leaves the convection surface, it enters and flows across the superheaters. This transfer of heat continues to lower flue gas temperature. Finally, the flue gas passes across the boiler economizer tube surfaces to lower its temperature to the design temperature for entry to the air pollution control system.

The furnace is designed and operated to minimize the concentration of combustion-related pollutants such as carbon monoxide and hydrocarbons. The boiler design incorporates state of the art features including combustion air distribution and control, location and sizing of heating surfaces, and appropriate cleaning methods during operations.

Strategically located and automatically sequenced rotary and retractable type soot blowers are installed to enable gas side cleaning of the boiler, primary superheater and economizer tubes. Retractable soot blowers constructed of suitable alloy material are used in the high temperature zones.

Exhibit 1: Typical Boiler Cross-Section



1.2.2 Air Pollution Control Processes

Information on post combustion air pollution control processes is organized into two groups;

- NO_X Control System; and
- Other Post combustion processes.

Control of NO_X is integral to the combustion process and is separate from other processes downstream of the economizer.

The Facility design does not include any mechanical or structural equipment for flue gas bypass. All flue gas is processed during all phases of operation. Additionally, major systems and equipment are conservatively designed and include spare equipment to enable on-line transfer from one component to another should there be a need to do so.

All air pollution control processes are integrated with the Facility's distributed control system (DCS). The DCS includes annunciation to inform control room operators if a system is not achieving a specific setpoint.

1.2.2.1 NO_X Reduction System

The NO_X reduction process consists of two processes that are integrated together through the distributed control system and process control logic, namely;

- VLN™ system; and
- Selective Non Catalytic Reduction (SNCR) System.

1.2.2.2 VLN™ System

The VLN™ process employs a unique combustion air design featuring a system that can use an ambient air or internal gas recirculation (IGR) to supply an injection system located in the upper furnace (Exhibit 1). The internal gas stream is drawn from the rear of the combustor, above the burnout zone of the grate. This flue gas most often contains elevated levels of oxygen because very little combustion occurs in the burnout zone and the gas is not well mixed with other combustion gases near the NO_X reduction zone of Exhibit 1. The ambient air is drawn directly from the boiler building. A single fan supplies the primary and secondary air streams, while a separate and dedicated fan is provided for the VLN system.

Similar to a conventional energy from waste process, the quantity of primary air in the Reworld VLN™ process is adjusted to minimize excess air during the combustion of the waste on the grate; however, secondary air flow in the VLN™ process is significantly less than that of a conventional energy from waste facility. The distribution of flows between the primary air, secondary air and VLN streams is controlled to yield the optimal combustion gas composition and temperature profile to minimize NO_X and control combustion. The control methodology takes into account the heating value of the waste and the fouling condition of the furnace. The flow of VLN flue gas or air is set to achieve complete coverage of the furnace cross-section to ensure good mixing with the combustion gases. The VLN system ensures high combustion efficiency and yields uniform flue gas temperature and velocity profiles, which improves the performance and reliability of downstream boiler equipment. The VLN nozzles are located on the side waterwalls of the upper furnace; their positioning in the furnace is critical to the VLN™ process performance.

1.2.2.3 Selective Non-Catalytic Reduction System

A Selective Non-Catalytic Reduction (SNCR) system is provided with each of the two units. The system is designed to maintain continuous compliance with NO_X emission limits by adjusting the injection rate and location of aqueous ammonia. Multiple levels are available, and nozzles can be manually moved to accommodate different conditions of flue gas temperatures during varying conditions. The stack NO_X analyzer provides information to the DCS to assure continuous compliance.

Aqueous ammonia in a water solution of approximately 19% ammonia by weight is delivered and stored at the Facility. The system consists of an aqueous ammonia storage tank, aqueous ammonia feed pumps, carrier water supply from the boiler make-up water system, a nozzle purge air system, aqueous ammonia injection nozzles and an automatic control system.

1.2.3 Post Combustion Air Pollution Control Systems

The post combustion air pollution control systems include several major components:

- An Evaporative Cooling Tower, or ECT for reducing flue gas temperature,
- A dry reactor vessel for the mixing of flue gas with lime, carbon and recirculated residue
- A baghouse (fabric filter) that provides abatement for solid and gas phase emissions
- A continuous emission monitoring system that monitors stack emissions with certain output being used in the process control system

Each combustion unit is provided with a dedicated dry recirculation system that is operated independently from the other unit. The two units are located inside the facility enclosure and share a common reagent system for storage of lime and carbon. The storage silo(s) for lime are located inside the Facility enclosure. The carbon silo is located adjacent to the APC building.

1.2.3.1 Dry Recirculation Reactor - Scrubber

Each dry recirculation scrubber includes two main components:

1) A vessel that reduces flue gas temperature through the evaporation of water and a vessel for mixing flue gas with fresh lime, carbon, and recirculated residue from the baghouse residue storage silo, and
2) A vessel and mechanical equipment that provides for the management and injection of recirculated flyash, carbon and lime into the flue gas.

The ECT is a cylindrical vessel that was designed for the effective mixing of flue gas with atomized water. The ECT is fabricated of carbon steel with stiffeners and supports as required and is insulated and lagged to avoid cold spots where condensation and corrosion could occur. Atomization of water is by two-fluid nozzles where compressed air is used to atomize water. One lance, with multiple nozzles per lance, is used to mix atomized water with flue gas. The lance and nozzle assemblies can be serviced by one person. The amount of atomized water is managed by a process control loop that uses temperature measurements at the tower outlet. The amount of water atomized is modulated by control valves to maintain a desired setpoint. The evaporative tower is followed by a reactor where flue gas is mixed with reagents including fresh lime, carbon and recirculated residue.

The dry reactor vessel is a custom section of ductwork fabricated of carbon steel. It is insulated and lagged to prevent temperature loss and cold spots where condensation and corrosion could occur. It is designed to promote

effective mixing between flue gas and three reagents; fresh lime hydrate, fresh carbon and recirculated residue that includes unreacted lime and carbon. The reagents are typically of consistent size and easily mixed in the flue gas. Effective reduction of acid gases (HCl, SO_2, HF, SO_3, etc.), mercury, dioxins and other pollutants is facilitated through the large contact area provided by many small particles.

The injection rate of fresh lime is adjusted to maintain a preset stack concentration for acid gases (SO_2 and HCl) with carbon being injected at a constant rate. The recirculation rate of residue is also adjusted to minimize usage of fresh lime while maximizing the effectiveness of recirculated residue. The DYEC system humidifies the recirculated residue to maximize its reactivity with pollutants when mixed in the reactor.

The mechanical lime feed equipment is sized to deliver excess amounts of reagent based on design margins on both the inlet acid gas concentrations as well as the flue gas flow rate.

The carbon injection rate is based primarily on operating experience instead of direct chemical relationships. Experience indicates that a carbon injection rate between 0.25 and 0.75 kg/tonne of MSW is required. The DYEC typically operates with a carbon injection rate of 5.1-5.2 kg/hr which corresponds of a carbon injection rate of 0.6 kg/tonne of MSW. This rate has been demonstrated to provide the control necessary for the removal of Dioxins and Mercury.

1.2.3.2 Fabric Filters (Baghouse)

The treated and cooled flue gas then flows to the high efficiency baghouse where the solid phase materials (fly ash, scrubber reaction products and unreacted lime and carbon) are collected and removed from the gas. These solids form a filter cake, on the surface of each bag, allowing additional reaction between flue gas and reagents for further reduction of acid gases, mercury dioxin and other pollutants.

The baghouse design includes multiple modules with each module having its own filter bags and filter bag cleaning system. The baghouse has enough filter bags and associated filtration area such that the flue gas velocity through the bags will average approximately 1 meter per minute. The cleaning frequency is determined by a pre-set pressure drop set point coupled with actual operating conditions including filtration speed, recirculation rate of residue and injection rate of reagents.

The baghouse uses a pulse jet cleaning system to maintain a preset pressure drop range across the entire baghouse. This approach creates steady-state operating conditions and a stable filter cake that provides reliable performance. The filter bags are cleaned with a pulse of compressed air that dislodges filter cake from the bags surface along the entire length and circumference of the bag. The normal operating temperature is between approximately 135°C and 145°C.

The filter cake dislodged from the bags and collected in the hopper of the baghouse will be removed by a residue conveying system. A fraction of the residue will be recirculated to the dry recirculation reactor to improve the reduction of air emissions while also improving reagent utilization.

1.2.3.3 Reagent Management System

One common reagent management system is provided for both dry recirculation systems and includes storage and process control for the two reagents used in the dry recirculation system; hydrated lime, and carbon. Dedicated silos are provided for hydrated lime and carbon to enable direct unloading of reagent from bulk carriers to the silos. Each silo is equipped with a bin vent or equal to control fugitive emissions during the loading process.

A dedicated carbon transport system is provided to enable delivery of carbon to each dry recirculation scrubber and may use either a mechanical or pneumatic system. Each transport system includes a gravimetric feeder, piping, wiring, process controls and other accessories needed for a complete, operational system.

A dedicated lime transport system is provided to enable delivery of lime to each dry recirculation scrubber. The system may be either a mechanical, pneumatic or combination of equipment and will include all required conveying equipment, a process control system including a method to weigh lime usage and to make adjustments according to the process control system.

1.2.4 Ash Handling

Covered conveyors are used to transport residue from each unit to the residue building. Only a single train of bottom ash equipment is provided. The bottom ash is transported via front end loader if a system component must be taken out of service. The system proposed separately collects air pollution control residue (fly ash and spent salts of reaction) and boiler fly ash. The fly ash is mixed with Portland cement, pozzolan and water for micro encapsulation (chelation) prior to truck loading and subsequent transportation.

All residue mixing and/or handling areas are fully enclosed and sufficiently protected from extreme weather conditions (e.g. freezing conditions, etc.). In addition, all conveyors handling residue that are located outside are fully enclosed.

To minimize any dust escaping to the environment during the conveying, separating, and truck loading process, the residue building is totally enclosed and has a filtered ventilation system complete with a filtration unit. The ventilation system also draws air from the grizzly area along the enclosed conveyor gallery.

1.2.5 Continuous Emission Monitoring and Operations Reporting System

1.2.5.1 Continuous Emission Monitoring

A continuous emission monitoring system (CEMS) for each of the two combustion units provides continuous monitoring of the following parameters, as per the existing ECA:

- Baghouse outlet: opacity, moisture, O_2, NO_X, SO_2, HCl, HF, NH_3 & THC (as methane); and
- Economizer outlet: O_2, SO_2, CO.

The dedicated CEMS is based upon separate flue gas sample and transport systems for the economizer and ID fan inlet or outlet sample points, each of which will transport the sample to a free-standing CEMS enclosure. The CEMS is configured to provide all necessary reports that document emissions from the Facility. The system installation and calibration follows the requirements of *EPS 1/PG/7 - Protocols And Performance Specifications For Continuous Monitoring Of Gaseous Emissions From Thermal Power Generation (December 2005).* The monitoring and reporting of the CEMS will continue to meet the requirements of the existing ECA.

1.2.5.2 Continuous Operations Reporting System

As part of the Facility operations, the following operational monitoring equipment provides as feedback on the combustion units' operations;

- Temperature measurements of combustion zone or a surrogate;
- Long-term Integrated continuous dioxins sampling device;
- Flue gas stack exit temperature;

- Temperature and pressure of the steam for each boiler; and
- Mass flow rate of steam for each boiler.

1.2.5.3 Ancillary Equipment/Process

1.2.5.4 Natural Gas Fired Auxiliary Burners

Natural gas is used for one (1) auxiliary burner in each furnace during start-up conditions to raise the temperature in the furnace to above 1000°C. This process (Phase 1 – Start-up) takes about 6 hours prior to MSW being fed into the system. Each burner has a maximum thermal input rating of 56 MMBtu/hr and meets the NO_X limits of MECP *A-9 Guideline - NO_X Emissions from Boilers and Heaters* of 49.6 ppmv @ 3% O_2 for natural gas fired heaters above 10 MMBTU/hr. Similarly, during shut down conditions, the natural gas burners will be used to maintain elevated temperatures in the furnace to consume the waste. The burners are also used to maintain elevated temperatures and to control CO emissions during other transient periods (malfunction periods).

1.2.5.5 Stand-by Diesel Generator and Fire Pumps

The Facility utilizes one (1) 250 kW diesel generator for stand-by power and two (2) 300 HP (224 kW) diesel fire pumps. Based on guidance provided in the ESDM Procedure Document (Table B-3), the fire pumps would be exempt from assessment. For the purposes of this assessment, the emissions of NO_X from the stand-by diesel generator have been included in the inventory and modelling.

1.2.5.6 Silos and Tanks

As discussed above, dry reagents are used to reduce emissions of various contaminants. These dry reagents are stored in silos while ammonia is stored in an outdoor tank. The Facility includes silos for storage of dry material and tanks for storage of ammonia as shown below.

- Indoor Silos – dry materials;
  - Lime;
- Outdoor Silos – dry materials;
  - Carbon, cement, pozzolan;
- Outdoor Tanks – solutions;
  - Aqueous ammonia.

The silos are equipped with filter vents to capture particulate emissions during the filling processes while ammonia vapour displaced from the receiving tank will vent back to the delivery truck to prevent the release of ammonia vapour during the loading process.

1.2.5.7 Steam Turbine

The Facility consists of two (2) waste steam generators and one (1) steam turbine generator with a maximum gross output of approximately 20 MW. The turbine generator set will be designed to accept 72,000 kg/hr of steam.

The turbine will exhaust to the direct air cooled condenser package including a condenser complete with duct from turbine, isolation valves, blanking plate, steam jet air ejectors, relief valves and other required accessories. The condenser is designed to accept full turbine bypass flow and must be isolatable from the turbine under this mode of operation.

1.3 Description of NAICS Code(s)

The North American Industry Classification System (NAICS) code that best applies to the Facility is waste treatment and disposal, which is part of NAICS code 5622 and is listed in Schedule 5 of O.Reg. 419/05.

1.4 Operating Schedule

The Facility's operating schedule is on a continuous basis; 24 hours/day, 7 days/week.

1.5 Facility Production Limit

The facility will process up to 160,000 tonnes/year of MSW. The design condition for Maximum Continuous Rating (MCR) is nominally 218 tonnes/day per unit of MSW with a calorific value of 13 MJ/kg.

2 INITIAL IDENTIFICATION OF SOURCES AND CONTAMINANTS

This section provides an identification of all of the sources and contaminants emitted at the Facility, as required by subparagraphs 2 to 4 of s.26(1) of O. Reg. 419/05. General ventilation that does not discharge process emissions is considered to be negligible and is not identified as a significant source of contamination from the Facility.

2.1 Sources and Contaminants Identification Table

Table 1 – Sources and Contaminants Identification Table tabulates all the emission sources at the Facility; for example, the Main Stack is identified as a source.

The expected contaminants emitted from each source are also identified in Table 1; for example, the expected contaminants emitted from the Main Stack are identified as products of combustion. Each of the identified sources has been assigned a source reference number; for example, the Main Stack has been designated S-1.

2.2 Description and Mitigation of Processes with Potential Odour Emissions

All waste handling activities take place in enclosed buildings. The refuse storage pit is segregated from the tipping hall by a wall open to the tipping hall only through the tipping bays.

Under normal operating conditions both trains are online. The tipping hall and refuse storage pit will continue to be maintained under negative pressure by drawing primary combustion air from these areas. This potentially malodorous air will be drawn into the furnace and destroyed. The primary air is introduced into the furnaces thereby subjecting these pollutants to direct flame and high temperature oxidation.

In addition, the louvers on the outside wall are closed during truck deliveries. The truck entrance and exit doors remain closed when trucks are not delivering MSW. This effectively creates an enclosed area from which to draw combustion air. All MSW trucks are enclosed which reduces the potential for off-site odour.

A potential odour emission scenario could occur if both units are off-line for an extend period of time and the pit contains MSW. This would be an outage condition, but all doors and louvers would be closed. Under this scenario, the induced draft fans could still be in operation, drawing odourous air through the combustion system and releasing the uncombusted odourous air into the atmosphere from the 87.6 m stack. The internal tipping and refuse storage building odour levels are not expected to fluctuate as Durham-York have significant and aggressive organic separation and diversion programs which will reduce the quantity of odour generating waste.

The odour emission rate was determined from measurements taken at the DYEC facility as part of an Odour test report prepared by Zorix Environmental dated November 23, 2015. Odour data can be found in Appendix D including measurement procedures and laboratory results. The Odour Management and Mitigation Plan is also provided in Appendix D.

3 ASSESSMENT OF THE SIGNIFICANCE OF CONTAMINANTS AND SOURCES

This section provides an explanation for each source and contaminant identified as negligible (i.e., not significant) in Table 1 – Sources and Contaminants Identification Table, as required by sub paragraph 5 of s.26(1) of O. Reg. 419/05.

In accordance with s.8 of O.Reg 419/05 emission rate calculations and dispersion modelling does not have to be performed for emissions from negligible sources or for the emission of negligible contaminants from significant sources.

3.1 Identification of Negligible Contaminants and Sources

Of the 5 sources listed in Table 1 – Sources and Contaminants Identification Table, three (3) sources; residual ash building exhaust fans, stand-by fire pumps and HVAC equipment, have been identified as negligible accordance with Ontario Regulation 524/98 (Certificate of Approval Exemptions - Air). The remaining sources are significant and are included in the dispersion modelling for the Facility.

3.1.1 Products of Combustion

As specified in Section 7.1.1 of the Procedure for Preparing an ESDM Report, Version 4.1, the only contaminants of significance from the combustion of natural gas are nitrogen oxides. All other contaminants are emitted in negligible amounts.

3.2 Rationale for Assessment

For each source that has been deemed negligible, the technical information required to substantiate the argument that each of the identified sources is negligible is presented in Table 1.

For each contaminant that has been deemed negligible, the technical information required to substantiate this conclusion is presented in Table 1.

In accordance with s.8 of O Reg. 419/05, emission rate calculations and dispersion modelling does not have to be performed for emissions from negligible sources. The emissions of negligible contaminants are included in the emission rate calculations; however, are excluded from the dispersion modelling assessment.

4 OPERATING CONDITIONS, EMISSION ESTIMATING AND DATA QUALITY

This section provides a description of operating conditions used in the calculation of the emission estimates and an assessment of the data quality of the emission estimates for each significant contaminant from the facility as required by sub paragraphs 6 and 7 of s.26(1) of O.Reg 419/05. In accordance with s.8 of O.Reg 419/05, emission rate calculations and dispersion modelling does not have to be performed on emissions from negligible sources or for the emission of negligible contaminants from significant sources.

4.1 Description of Operating Conditions

Section 10 of O.Reg.419/05 states that an acceptable operating condition is a scenario in which operating conditions for the Facility would result, for the relevant contaminant, in the highest concentration of the contaminant possible at the point of impingement (POI). The operating conditions described in this ESDM Report meets this requirement.

Exhibit 2 identifies the six different Facility operational scenarios evaluated with dispersion modeling and primary variables considered in each:

The grate is designed for a specific heat input and mass loading of refuse. The design heat input of a thermal treatment unit is the product of a specific flow of refuse with a specific energy content or heating value. These conditions set the Maximum Continuous Rating of a unit. The Facility's thermal treatment units are designed to process a nominal 218 tonnes/day/train with a nominal HHV of 13MJ/kg which amounts to a total heat release of approximately 118 GJ/hr. Since the refuse will have continuously varying characteristics, the grate's control system adjusts throughput to maintain the heat release necessary to attain a target steam production rate. The mass and heat input range of the grate is represented in the Solid Waste Refuse Firing Diagram below (Exhibit 3)

The thermal treatment unit is designed for solid waste with higher heating values ranging from 8.4 MJ/kg to 15 MJ/kg as represented in the firing diagram. The "envelope" (Area 4-5-6-8-2'-3-4) is the rated continuous operating range of a thermal treatment unit. 100% of the MCR heat input is represented by any operating condition with heat input of 118 GJ/hr (e.g. points 2, 1 and 7); 110% of the MCR heat input is represented by any operating condition with heat input of 130 GJ/hr (e.g. points 2', 1' and 8); and 60% of the MCR heat input is represented by any operating condition with heat input of 71 GJ/hr (e.g. points 4 and 5).

Each combustion unit is capable of continuous operation at 110 % MCR. The normal operating condition for the two combustion units is 100% MCR @ 13 MJ/kg (HHV) (Reference Point 1 on Exhibit 3). DYEC has been in operation since early 2016 and based on historical operating data (which can be provided upon request) the average measured HHV for the refuse is 12.87 MJ/kg. Therefore, the DYEC facility typically operates within the 100% of the MCR heat input scenario when considering the heat content of the refuse. In addition, DYEC has carried out compliance and voluntary stack testing since 2016, the historical operating parameters since 2018 indicate that refuse throughput is between 180-220 tonnes/day per train during the stack testing. Which also falls within the 100% or lower of the MCR heat input operation, for refuse throughput (as per Exhibit 3).

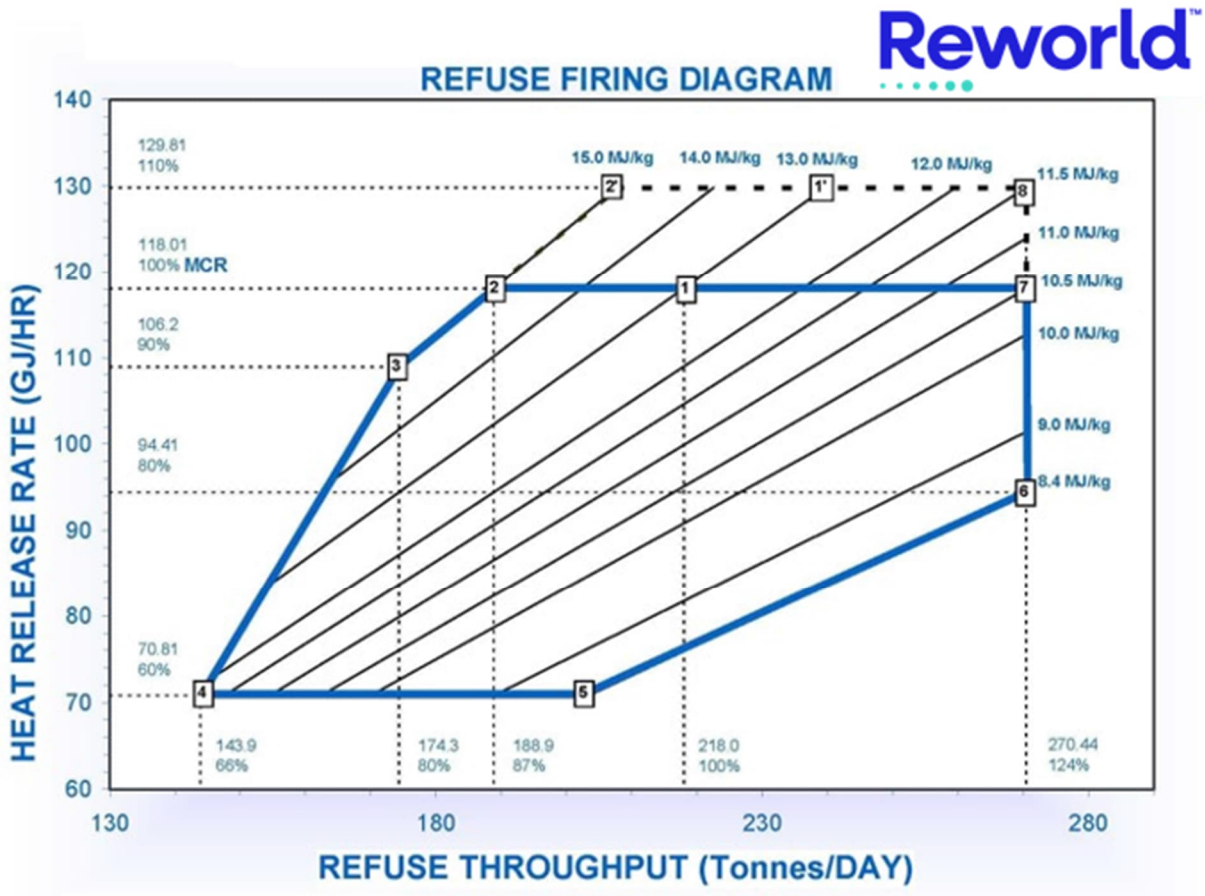
To process the additional 20,000 tonnes/yr of waste, DYEC is not proposing to increase the daily refuse throughput, but there will be fewer periods of shut down due to low waste supply, this will help stabilize and optimize operations throughout the year. In general, the plant will be operated at the typical steam generation rate and refuse throughput more consistently throughout the year to process 160,000 tpa of waste. Based on historical data, it has been established that the facility generally operates at 100% of the MCR heat input production rate

with an average HHV of approximately 13 MJ/kg. Historical data has also indicated that the daily refuse fluctuates, and the facility can operate at greater than 100% MCR according to Exhibit 3 below. To assess a potential worst-case operating scenario, the assumption is that the facility will occasionally operate at 110% of the MCR at close to 13 MJ/kg HHV to potentially process more refuse during the day (24 hours). Again, this is because historically the facility average HHV is 12.87 MJ/kg since the start of operations. Emissions from the DYEC facility are based on a combination of stack testing data, in-stack emission limits and emission factors calculated using the maximum reference flow rate from the system based on stack testing data. To assess this worst-case scenario the historical stack testing data was analysed to determine what was the highest reference flow rate measured. The highest dry reference flow rate (0% Moisture, 25 °C, and 11% O_2) measured was 20.2 m^3/s in the spring of 2022 stack testing. The assumption that this flow rate was measured at 100% of MCR operating scenario. Under the 110% of the MCR heat input scenario, it was assumed that the flow rate would also increase by 10%, therefore the highest measured flow rate of 20.2 m^3/s was increased by 10% to 22.22 m^3/s (per train). Emission rates for all representative compounds were calculated based on this updated flow rate representing the 110% MCR scenario multiplied by the concentration from stack testing data, in-stack emission limits and emission factors. Long term operation of the Facility at these reference operating points (shown in Exhibit 3) is possible according to Facility design, however, the maximum annual processing would not exceed the facility production limit specified in Section 1.5 of the ESDM.

Exhibit 2: Durham York Energy Centre Emission Scenarios

Emission Scenario	Unit 1	Unit 2	Silo	Standby Diesel Generator	Comments
A	110% MCR	110% MCR	Not Filling	Off-line	This represents the future worst-case operating scenario of 110% MCR based on historical operations at 13 MJ/kg HHV
B	Off-line	110% MCR	Not Filling	Off-line	One unit operating on-line operating at 110% MCR, and one unit offline
C	Phase 2 – Start-up	Phase 2 – Start-up	Not Filling	Off-line	60% MSW/40% NG Extreme Case
D	Phase 2 – Start-up	Off-line	Not Filling	Off-line	60% MSW/40% NG Most Likely Start-up condition
E	ID Fans on	ID Fans on	N/A	Off-line	Used for Odour modeling only
F	110% MCR	110% MCR	Filling	Testing	Maximum Emissions for the 110% MCR at 13 MJ/kg HHV representing an Extreme Case.

Exhibit 3: Base Facility Theoretical Refuse Firing Diagram



Start-up was considered according to two different phases. Phase 1 only includes emissions from the firing of natural gas during furnace warm up operations. Furnace warm up is required to ensure combustion zone temperature to spontaneously combust MSW when it is fed on the grate. Phase 2 is the transition period when MSW (60% of heat input) is initially charged to the grate and auxiliary burners (40% of heat input) are in operation until stable steady state combustion is achieved.

Other operations include the coincident filling of the lime, carbon, cement and pozzolan silos and firing of the standby diesel generator. While this is not a likely scenario, it is considered to be a conservative approach.

In addition, TSP emissions from the baghouses on the combustion train are assumed to be equivalent to PM_{10} emissions which are greater than $PM_{2.5}$ emission.

The averaging periods for the maximum rates provided in the above table were selected based on the averaging periods in the Air Contaminants Benchmarks (ACB) List of the significant contaminants emitted from each source. The use of the above maximum rates to estimate emission rates of contaminants for each significant emission source results in an operating condition which satisfies section 10 of O. Reg. 419/05. The averaging time for the operating condition is dependent on the averaging time for the MECP POI Limit. The operating condition used for

source results in an operating condition which satisfies section 10 of O. Reg. 419/05. The averaging time for the operating condition is dependent on the averaging time for the MECP POI Limit. The operating condition used for this Facility that results in the maximum concentration at a POI is the scenario where all significant sources are operating simultaneously at their individual maximum rates of production for the relevant averaging times, as described in Appendix A of this ESDM Report. The individual maximum rates of production for each significant source of emissions correspond to the maximum emission rate for the averaging time.

The MECP has established standards and guidelines for over 300 contaminants, as documented in the Air Contaminants Benchmark (ACB) list dated April 2023 (MECP POI Limit[s]).

4.2 Explanation of the Methods Used to Calculate Emission Rates

The maximum emission rates for each significant contaminant emitted from the significant sources were estimated in accordance with requirements of s.11 of O.Reg.419/05 and the ESDM Procedure Document. The emission rate for each significant contaminant emitted from a significant source was estimated and the methodology for the calculation is clearly documented in Table 2 – Source Summary Table.

4.3 Sample Calculations

The technical rationale, including sample calculations, required to substantiate the emission rates presented in Table 2 - Source Summary Table is documented in Appendix A – Emission Rate Calculations. All emission rates were calculated using source testing data, manufacturer specifications or alternatively from the USEPA AP-42 documentation (Natural gas auxiliary burners and diesel generator). All of the emission factor data used for the emission rate calculations is provided in Appendix A.

4.4 Assessment of Data Quality

This section provides a description of the assessment of the data quality of the emission estimates for each significant contaminant from the Facility, in accordance with the requirements of sub paragraph 7iii of s 26(1) of the O. Reg. 419/05.

For each contaminant, the emission rate was estimated, and the data quality of the estimate is documented in Table 2 – Source Summary Table. The assessment of data quality for each source listed in Table 2 is documented in Appendix A – Emission Rate Calculations.

4.5 Conservative Assumptions in Emission Estimates and Operating Condition

The following assumptions were included in the development of the emission estimates and operating condition for the Facility:

- The highest emission rate that each source is capable of (i.e., maximum usage rates or throughputs) was used to characterize the emissions.
- All sources are assumed to be operating simultaneously at the corresponding maximum emission rate for the averaging period.
- All fuel-fired combustion equipment (i.e., auxiliary burners and stand-by power) emission rates were determined using the highest emission factor, combined with the maximum thermal heat input or engine rating for each piece of equipment.

Based on the conservative assumptions summarized above and detailed in Appendix A – Emission Rate Calculations, the emission rates listed in Table 2 are likely to be an overestimate of the actual emission rates.

4.6 Performance Requirements

As per Section 6 and Schedule C of the current ECA, DYEC is required to meet performance requirements and in-stack limits. These limits are based on Guideline A-7 Air Pollution Control, Design and Operation Guidelines for Municipal Waste Thermal Treatment Facilities. A summary of the performance and the in-stack ECA limits are indicated below. Since the commencement of the DYEC operations, the compliance stack testing has consistently shown that the in-stack emissions are well below the limits indicated in Exhibit 4 below. The most recent stack testing report has been included in Appendix B. The DYEC facility will continue to operate under the performance limits established in the existing ECA (contained in Appendix C and indicated in Exhibit 4 below) under the proposed 160 tpa scenario.

Exhibit 4: Schedule C Performance Requirements

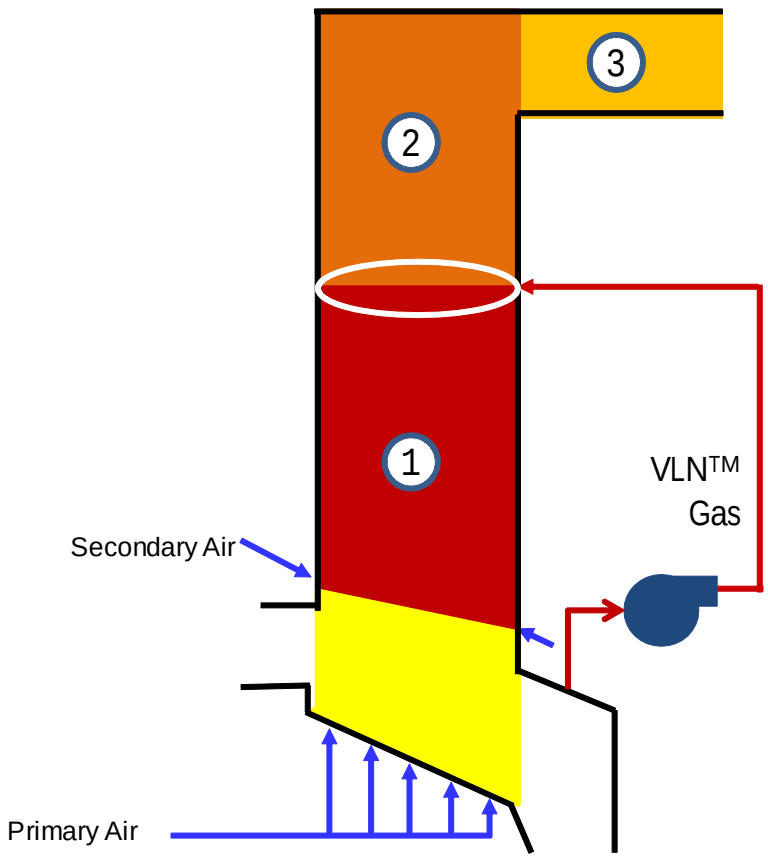
Pollutant	In-Stack Emission Limit (1)	Verification of Compliance
Organic Matter as CH_4	33 mg/Rm^3	Results from compliance stack testing.
CO	40 mg/Rm^3	4-hr rolling average CEM
		System that provides data at least once every fifteen minutes, in accordance with condition 6 (2) (c)
O_2	≥6%	6 % O_2, dry gas basis
		4-hr rolling average CEM
Opacity	10%	6 min rolling, CEM
	5%	2 hour rolling, CEM
HCl	9 mg/Rm^3	24-hr CEM
HF	None	Compliance stack testing
SO_2	35 mg/Rm^3	24-hr CEM
NO_X as NO_2	121 mg/Rm^3	24-hr CEM
Total Suspended Particulate Matter (filterable particulate measured in accordance with the Ontario Source Testing Code)	9 mg/Rm^3	Results from compliance stack testing.
Cd	7 µg/Rm^3	Results from compliance stack testing.
Pb	50 µg/Rm^3	Results from compliance stack testing.
Hg	15 µg/Rm^3	Results from compliance stack testing.
Dioxins & Furans	60 pg/Rm^3	Results from compliance stack Testing; results expressed as I-TEQ

1. All emission limits are stated at reference conditions of 298.15K, 1.013 bar, 11% oxygen and 0% moisture.

4.6.1.1 Demonstration of Flue Gas Time, Temperature and Oxygen Content

Exhibit *5* illustrates the general location of primary air injection, secondary air injection and injection of air/re-circulated flue gas and the zones used to determine flue gas temperature and residence time. Exhibit 8 provides results from field measurements at a full scale facility with the resulting heat and mass balance demonstrating that the proposed design meets or exceeds the A-7 Guidelines for residence time and temperature. Zone 1 is where volatile gases are combusted at very high temperatures. Flue gas operating conditions for the Design case will average about 1,200°C for 2 to 3 seconds in this zone. The VLN nozzles provide a turbulent mixing zone and additional oxygen. The flue gas operating condition in Zone 2 is a typically two seconds above 850 °C. When Zone 1 and 2 are considered together, flue gas will be exposed to temperatures above 850°C for 4 to 5 seconds after secondary air injection. This analysis demonstrates that facility design conforms to Guideline A-7 recommendations of combustion temperature, combustion gas residence time, and oxygen availability. Based on the historical stack testing reports, and CEMs data the average combustion zone temperature consistently exceeds 1200 °C with oxygen availability greater than six (6) percent.

Exhibit 5: Combustion Zones



4.6.1.2 Flue Gas Time and Temperature Monitoring

Continuous and reliable measurement of flue gas temperature in the combustion zone of the furnace is not practical due to the aggressive environment where flue gas temperatures are well above 1000 °C however a reliable correlation can be developed between actual flue gas temperature at the one second residence point in the furnace combustion zone (measured from the secondary air injection elevation) and the furnace gas temperature measured by a downstream device. This approach has been used in the EfW industry and is used as the method for demonstrating compliance with the A-7 Guideline of maintaining flue gas at a minimum of 1000 °C for one second.

4.6.2 Compliance with Guideline A-7 Combustion Related Parameters

4.6.2.1 A-7 Continuous Emission Monitoring

As per the existing ECA, the following compliance standards for parameters are direct indicators of combustion efficiency including organic matter and carbon monoxide;

The specific emission limits and reporting periods for each are summarized below in **Exhibit *6***.

Exhibit 6: References for Organic Matter and Carbon Monoxide

Pollutant	Parameter	Limit	Compliance Verification
CO	Limit	40 mg/Rm^3	Calculated as the rolling arithmetic average of four (4) hours of data at the outlet of the piece of equipment where combustion of the gas stream resulting from thermal treatment of waste is completed but before dilution with any other gaseous stream, measured by a continuous emission monitoring system that provides data at least once every fifteen minutes.
Organic Matter	Limit	33 mg/Rm^3	Results from compliance stack testing

All emission limits are stated at reference conditions of 298.15K, 1.013 bar, 11% oxygen and 0% moisture.

Exhibit 4 and **Exhibit 6** indicate that the stack limit of 33 mg/Rm^3 at 11 % O_2 for organic matter in the current ECA and A-7 are appropriate with compliance being demonstrated by an annual stack test per A-7. DYEC also provides continuous emission monitor for total hydrocarbons (THCs) for the purpose of monitoring and reporting THCs as a 10-minute rolling average. This operating information has been historically provided as an independent indication of good combustion beyond information provided by the CO CEM.

Exhibit 4 and **Exhibit 6** indicate that the stack limit of 40 mg/Rm^3 at 11 % O_2 for carbon monoxide (CO) in the ECA and A-7 is appropriate with compliance being demonstrated by a continuous emission monitor and a 4-hour rolling average per A-7.

5 SOURCE SUMMARY TABLE AND SITE PLAN

This section provides the information required by sub paragraph 8 and the site plan as required by sub paragraph 9 of s.26 of O.Reg 419/05.

5.1 Source Summary Table

The emission rates for each source of significant contaminants are documented in Table 2 – Source Summary Table in accordance with requirements of sub paragraph 8 of s.26(1) of O. Reg. 419/05.

5.2 Site Plan

The locations of the emission sources listed in Table 2 – Source Summary Table are presented in Figure 3 – Dispersion modelling plan; the location of each of the sources is specified with the source reference number. The location of the property line is also indicated on Figure 3. UTM coordinates (NAD 83) are provided for each source in Table 2 – Source Summary Table.

6 DISPERSION MODELLING

This section provides a description of how the dispersion modelling was conducted for the Facility to calculate the maximum concentration at a point of impingement (POI), as required by sub paragraphs 10 to 13 of s.26(1) of O. Reg. 419/05.

The Facility is subject to s.20 of O. Reg. 419/05, consequently it would typically be assessed using the US EPA AERMOD model. However a request was submitted to the MECP to allow the use of an alternative model and approved in August 2010. In 2021, an updated request was submitted to the MECP under sections 7 and 13 of O.reg. 419/05 for the use of more up-to-date model versions and accompanying meteorological data. These were approved in December 2021 and a copy of the approval is provided in Appendix E. The assessment of compliance with Schedule 3 standards was, therefore, carried out with the aid of the U.S. EPA CALPUFF atmospheric dispersion model (CALPUFF).

CALPUFF modelling system is made up of three main components: CALMET meteorological model (which generates hourly wind and temperature fields on a three dimensional gridded modelling domain), CALPUFF transport and dispersion model (which advects “puffs” of material emitted from sources to calculate hourly concentration/fluxes at receptors of interest), and CALPOST post processor (used to extract the data of interest from CALPUFF binary output files).

The following models and pre- and post-processors were used in the assessment:

- CALMET diagnostic meteorological model (v. 6.5.0, level 150223);
- CALPUFF dispersion model (v. 7.2.1, level 150618);
- CALPOST post processor (v. 7.1.0, Level 141010);
- BPIP building downwash pre processor (v. 04274);
- POSTUTIL post processor (v.7.0.0, Level 150207).

The dispersion modelling was conducted in accordance with the MECP *publication “Guideline A-11: Air Dispersion Modelling Guideline for Ontario, Version, 3.0”*, dated February 2017 (ADMGO) PIBS 5165e03.

The emission rates used in the dispersion model meet the requirements of s.11(1)1 of O. Reg. 419/05, which states that “for the relevant averaging period the emission rate is at least as high as the maximum emission rate that the source of contaminant is reasonably capable of for the relevant contaminant”. Emission rates are further described in Appendix A – Emission Rate Calculations.

6.1 Dispersion Modelling Input Summary Table

A description of the way in which the approved dispersion model was performed is included as Table 3 – Dispersion Modelling Input Summary Table. This table meets both the requirements of s.26(1)11 and sections 8-17 of O. Reg. 419/05 and follows the format provided in the ESDM Procedure Document. Furthermore, the dispersion modelling input parameters are summarized in Table 4 – Dispersion Modelling Source Summary Table. Although not required by s.26 of O. Reg. 419/05, this table simplifies the data presentation.

All sources have been modelled as point sources. The location of each source is shown on Figure 3.

6.2 Coordinate System

The Universal Transverse Mercator (UTM) coordinate system, as per Section 5.2.2 of the ADMGO, was used to specify model object sources, buildings and receptors. All coordinates were defined in the North American Datum of 1983 (NAD83).

6.3 Model Domain

The CALPUFF Model domain used in this assessment is the same as the domain used in the Environmental Assessment. It extends 40 km by 40 km and covers 25 km to the west, north and east of DYEC and 15 km to the south (which is dominated by Lake Ontario). This domain covers more than the air quality study area but will ensure that plumes are tracked beyond the furthest receptor locations to ensure the worst case ground level concentrations are considered at all receptors.

6.4 Meteorology, Land Use and Terrain Data

Sub paragraph 10 of s.26(1) of O. Reg. 419/05 requires a description of the local land use conditions if meteorological data, as described in paragraph 2 of s.13(l) of O. Reg. 419/05, was used. The land use surrounding the Facility is characterized as industrial, as illustrated in Figure 4 - Land Use Zoning Designation/ Area Location plan and Figure 5 – 3 Kilometre Boundary Buffer.

To use the full capabilities of CALPUFF described above, CALMET diagnostic meteorological model is required. CALMET produces three-dimensional wind and temperature fields and two-dimensional fields of mixing heights and other meteorological variables. Such meteorological data set is site-specific and it is obtained by a computation method that is at least as accurate as data obtained by local or site specific meteorological monitoring.

Development of CALMET meteorological data set, which considers effects such as slope flow and terrain channelling of winds, requires the use of both meteorological and geophysical type of input data. The following sections describe the meteorological inputs to the CALMET model. The CALMET model was executed using observation data from surface stations and large-scale mesoscale meteorological data from the Weather Research and Forecasting (WRF) model between 2014 – 2018, inclusive. The surface stations utilized as data input are outlined in Exhibit 7. Where gaps in the data exist, the WRF data was used to complete the dataset.

The 1 km horizontal grid spacing WRF data for the model years 2014-2018 was processed and provided by Meteosim (Meteosim, 2021). A copy of the WRF Validation Report summarizing the inputs and verification is provided in Appendix F. This data was reviewed and approved by the MECP for use before the completion of the CALMET modelling (a copy of this correspondence is provided in Appendix F).

6.4.1 Meteorological Stations

Meteorology parameters are measured at a number of federally maintained meteorological stations close to the site. In addition to the federal stations, the two ambient air quality monitoring stations that were initiated in response to condition 7(4) of the ECA for the DYEC (Courtice and Rundle) both contain meteorological stations. As previously mentioned in Section 2, the Courtice and Rundle Stations are maintained by the Region of Durham and are inspected regularly by the MECP. A copy of the Monitoring Plans and MECP approval of the plan for these stations is provided in Appendix F along with copies of the calibration records.

CALMET was executed using surface station, buoy and WRF data; upper air soundings were not used.

A summary of the meteorological stations that were be considered in the CALMET modelling are provided in Exhibit 7, below.

Exhibit 7 Meteorological Stations used in CALMET

Station name	ID	Type	CALMET Pathway	Parameters Measured
Courtice	N/A	Region of Durham	Surface	Temperature, relative humidity, Wind Speed and direction, atmospheric pressure and precipitation
Rundle	N/A	Region of Durham	Surface	Temperature, relative humidity, Wind Speed and direction, and precipitation
Buttonville	71639	ECCC/Navigation Canada (NAVCAN)	Surface	Temperature, relative humidity, Wind Speed and direction.
Cobourg	71431	ECCC	Surface	Temperature, relative humidity, Wind Speed and direction.
Oshawa	71697	ECCC	Surface	Temperature, relative humidity, Wind Speed and direction.
Toronto International Airport	71624	ECCC/NAVCAN	Surface	Temperature, relative humidity, Wind Speed and direction.
Toronto City Centre (Island Airport)	71265	ECCC	Surface	Temperature, relative humidity, Wind Speed and direction.
Trenton Airport	71621	Department of National Defence (DND)	Surface	Temperature, relative humidity, Wind Speed and direction.
Ajax	45159	National Buoy Data centre	Buoy	Temperature, Wind Speed and Direction, Air – Lake temperature difference

A meteorological data review of the Courtice and Rundle Stations was completed by WSP, prior to inclusion in the air dispersion modelling. A copy of the review and data analysis including a comparison to ECCC data from the Oshawa Station is provided in Appendix F.

6.4.2 Geophysical Data Input

To initialize the CALMET model, terrain elevation and land use data depicting the geophysical conditions in the modelling domain are required. In addition to terrain data, CALMET uses surface parameters such as surface roughness length, albedo, bowen ratio, leaf area index, soil heat flux and anthropogenic heat flux to estimate meteorological parameters. The model's pre-processor, MAKEGEO, values are assigned for each surface parameter based on land use categories. Some geophysical data parameters change throughout the year (e.g. snow cover may impact some parameters). As a result, geophysical data files were created for each of the four Ontario seasons.

6.4.2.1 Land Use

Each meteorological grid cell was assigned one (or more, in the case of mixed land use cells) land use categories defined by CALMET. For this assessment, a data file of land uses for each grid cell was provided by MECP for review and inclusion.

6.4.2.2 Terrain

Terrain is the vertical dimension of land surface. DYEC is located in relatively flat terrain but approximately 500m from the Lake Ontario shoreline.

Terrain data was downloaded from the MECP's database of regional terrain data for modelling (MECP, 2017b) and processed using the CALPUFF pre-processor, TERREL.

6.4.2.3 Roughness Length

Roughness length (zo) is a measure of the aerodynamic roughness of a surface and is related to the height, shape and density of the surface as well as the wind speed. Different land uses are assigned different roughness lengths within the MAKEGEO pre-processor (part of the CALMET package). A roughness length was provided for each land use, for each season in the land use data set provided by MECP.

6.4.2.4 Albedo

The albedo is a measure of the reflectivity of the Earth's surface. This is a very important parameter in meteorological dispersion modelling because it provides a measure of the amount of incident solar radiation that is absorbed by the Earth's atmosphere. Absorbed solar radiation is one of the driving forces for local, regional, and global atmospheric dynamics. Albedo is defined as the ratio of reflected solar radiation to the total incoming solar radiation received at the surface. Different land uses are assigned different albedos within the MAKEGEO pre-processor (part of the CALMET package). Albedo was provided for each land use, for each season in the land use data set provided by MECP.

6.4.2.5 Bowen Ratio

Bowen ratio is the ratio of the vertical flux of sensible heat to latent heat, where sensible heat is the transfer of heat from the surface to the atmosphere via convection and latent heat is the transfer of heat required to evaporate liquid water from the surface to the atmosphere. The Bowen ratio gives a measure of the surface heat flux and how much moisture is injected into the atmosphere. The Bowen ratio is defined as the ratio of sensible heat flux to latent heat flux. Different land uses are assigned different Bowen Ratios within the MAKEGEO pre-processor (part of the CALMET package). Bowen Ratio was provided for each land use, for each season in the land use data set provided by MECP.

6.4.2.6 Soil Heat Flux

The soil heat flux constant is a function of the surface properties and is used to compute the flux of heat into the soil. Anthropogenic heat flux is a function of population density and energy usage. Different land uses are assigned different soil heat fluxes within the MAKEGEO pre-processor (part of the CALMET package). Soil heat flux was provided for each land use, for each season in the land use data set provided by MECP.

6.4.2.7 Leaf Area Index

Leaf area index (LAI) is defined as the ratio of leaf area to soil surface area. Different land uses are assigned different leaf area indices within the MAKEGEO pre-processor (part of the CALMET package). Leaf Area Index was provided for each land use, for each season in the land use data set provided by MECP.

6.4.3 Meteorological Data Processing

Five full years of 3-D dispersion meteorology data (2014-2018 data period) were developed using the WRF data. A sample CALMET input file is provided in Appendix F. All CALMET input and output files were reviewed and approved for use in this AQIA prior to the commencement of CALPUFF modelling.

6.5 Receptors

Receptors were chosen based on recommendations provided in Section 7.1 of the ADMGO, which is in accordance with s.14 of O.Reg.419/05. Specifically, a nested receptor grid, centered around the outer edges of all the sources, was placed as follows:

a) 20 m spacing, within an area of 200 m by 200 m;

b) 50 m spacing, within an area surrounding the area described in (a) with a boundary at 300 m by 300 m outside the boundary of the area described in (a);

c) 100 m spacing, within an area surrounding the area described in (b) with a boundary at 800 m by 800 m outside the boundary of the area described in (a);

d) 200 m spacing, within an area surrounding the area described in (c) with a boundary at 1,800 m by 1,800 m outside the boundary of the area described in (a);

e) 500 m spacing, within an area surrounding the area described in (d) with a boundary at 4,800 m by 4,800 m outside the boundary of the area described in (a); and

f) 1,000 m spacing beyond the area described in (e) out to 20,000 m to the North, West and East and 10, 000 m to the South.

In addition to using the nested receptor grid, receptors were also placed every 10 m along the property line. The area of modeling coverage is illustrated on Figure 7 – Dispersion Modelling Gridded Receptors.

Discrete Receptors were also placed at approximately 6400 locations to represent locations of interest. They include hospitals, nursing homes, schools, daycares, Senior citizen centres and the nearest residential receptors. Where relevant, flagpole heights were used to represent the locations of elevated air intakes on mid and high-rise residential buildings. These receptors are illustrated in Figure 8 – Dispersion Modelling Sensitive Receptors.

6.6 Building Downwash

Building wake effects were considered in this assessment using the U.S. EPA's Building Profile Input Program (BPIP-ISC). The inputs into this pre-processor include the coordinates and heights of the buildings and stacks. The output data from BPIP is used in the building wake effect calculations.

CALPUFF has an option to model building wake effect using PRIME or ISC algorithm. In most cases the newer PRIME model is considered to more accurately predict concentrations within the building wake zone since it takes into account the effect of vertical wind shear and the variation in wind speed deficit with downwind distance. For this assessment, the PRIME algorithm was used.

The building obstacles as used in the BPIP program are shown in Figure 9.

6.7 Deposition

CALPUFF has the capability to account for wet and dry deposition of substances that would reduce ground level concentrations at POIs. However, the deposition algorithm has not been implemented for conservatism and to maintain consistency with the EA Assessment for maximum POI predictions.

6.8 Chemical Transformation

For the purposes of assessing project contributions to Secondary particulate Matter (SPM) formation, chemical transformation was considered in the CALPUFF modelling. To model the chemical transformation of emitted NO, NO_2 and SO_2 into HNO_3, NO_3 and SO_4, CALPUFFs RIVAD/ARM[3] mechanism was used.

6.9 Thermal Internal Boundary layer

CALPUFF contains an option to account for sub-grid coastal influences on plume dispersion such as the development of a thermal internal boundary layer (TIBL). Given the proximity of the proposed Facility to Lake Ontario (approximately 500m) and the grid size (250m), variations in coastline location within the grid cells near the proposed facility were accounted for in the dispersion modelling. To achieve this, a digitized sub-grid coastline, extending to the boundaries of the air quality study area was included as an additional input.

6.10 Averaging Times and Conversions

CALPUFF can predict 1-hour average values. Many of the relevant Schedule 3 standards are based on a 24-hour averaging time, which is easily provided by CALPUFF. Several of the modelled contaminants have averaging periods less than 1 hour. For these contaminants, the 1 hour average concentration was converted using the conversion factors listed in table 4-1 of ADMGO. For example, for odour, the hourly odour concentration was converted to a 10-min average by multiplying the hour value by 1.65.

6.11 Dispersion Modelling Options

The options used in the CALPUFF dispersion model are summarized in the table below and were agreed in pre-consultation with the MECP.

Exhibit 8 CALPUFF Options and Flags

Flag	Default	Values to be Used in this Study	Comments
MGAUSS	1	1	Vertical distribution used in the near field
MCTADJ	3	3	Terrain adjustment method (3 used for partial plume path adjustment)
MCTSG	0	0	Subgrid-Scale complex terrain flag
MSLUG	0	0	Near-field puffs modelled as elongated
MTRANS	1	1	Transitional Plume Rise modelled
MTIP	1	1	Stack-tip downwash
MBDW	1	2	PRIME method selected for building downwash
MSHEAR	0	0	Vertical wind shear modelled above stack top
MSPLIT	0	0	Puff splitting allowed 0 = NO; 1 = Yes
MCHEM	1	3	Chemical Transformation rates to be computed internally (RIVAD/ARM[3] scheme)
MAQCHEM	0	0	Aqueous phase transformation flag (only used if MCHEM =1 or 3)

MWET	1	0	No wet removal modelled for conservatism
MDRY	1	0	No dry deposition modelled for conservatism
MTILT	0	0	Gravitational settling (plume tilt) modelled
MDISP	3	2	Methods used to compute dispersion coefficients from internally calculated sigma v, sigma w using CALMET micrometeorological variables (u*, w*, L, etc.)
MTURBVW	3	3	Sigma measurements used (Used only if MDISP = 1or 5)
MDISP2	3	3	Back-up method used to compute dispersion when measured turbulence data are missing (Used only if MDISP=1 or 5)
MTAULY	0	0	[DIAGNOSTIC FEATURE] Method used for Lagrangian timescale for Sigma-y (used only if MDISP=1,2 or MSIDP2=1,2)

6.12 Dispersion Modelling Input and Output Files

The dispersion model source input data are summarized in the Dispersion Modelling Input Summary Table (Table 3).

This Section provides the table required by sub paragraph 14 of s.26 (1) of O.Reg 419/05. It also provides an interpretation of results as required by the ESDM procedure document. Dispersion modelling files are provided electronically.

7 EMISSION SUMMARY TABLE

A POI concentration for each significant contaminant emitted from the Facility was calculated based on the emission rates listed in Table 2 – Source Summary Table and the output from the approved dispersion model. The results are presented in Table 5 – Emission Summary Table. This table follows the format provided in the ESDM Procedure Document.

All predicted impacts comply with applicable ambient standards.

The remaining contaminants that do not have MOE POI Limits were assessed and determined to be below the *de minimus* limit.

The POI concentrations listed in Table 5 were compared against the MECP POI Limits, or in the case of $PM_{2.5}$ and PM_{10}, the MECP AAQC. Under Scenarios A-F, which represents normal operations and start-up/shut-down emissions from the main stack, 1-hour averaged sulphur dioxide has the highest concentration relative to the MECP POI limit. Of these scenarios, Scenario A has the highest concentration of sulphur dioxide at 16% of the relevant limit. Scenario F represents a worst case operation and includes silo filling plus stand-by diesel generator operation in addition to normal operational emissions from the main stack. In this scenario, the concentration of nitrogen oxides assessed against the 1 hour standard is 64% of this limit.

Under Scenario F, 24-hour averaged $PM_{2.5}$ has the highest concentration relative to the corresponding 24 hour CAAQS at 22% of the limit. However, in this scenario, all four of the silos have been modelled assuming 24/7 simultaneous filling. This is highly conservative as in reality; the silos will only be filled one at a time.

In all scenarios the maximum modelled concentration of Benzo(a)pyrene is less than 1% of the annual standard, indicating that it is not a contaminant of concern.

In addition, during the review of the Air Quality Impact Assessment (AQIA), the Town of Clarington identified that there are proposed plans for the Major Transit Station Area (MTSA) around a proposed Courtice GO station which allows for tall developments in the surrounding area that should be included in the assessment. To address this comment, DYEC engaged WSP to prepare a modelling screening assessment to evaluate whether the proposed secondary plans and allowance of taller developments near DYEC, may cause land use compatibility issues. The technical memo to support this screening assessment is contained in Appendix H.

Note that under start-up conditions, a worst-case assumption was made that the one or two units would be operating under these conditions for 24 hrs per day. Similarly, silo filling and diesel generator operation would also be occurring 24/7.

7.1 Assessment of Contaminants with no MECP POI Limits

Sub paragraph 14 subsection viii of s.26(1) O. Reg. 419/05 requires an indication of the likelihood, nature and location of any adverse effect if the contaminant is not listed in any of Schedules 1, 2 and 3.

Contaminants at the Facility that do not have MECP POI Limits were screened against the Air Contaminants Benchmark (ACB) list, April 2023. These are represented as Benchmark 2 (B2) limits.

For those contaminants that are not on the ACB list, the *de minimis* limit was used for the assessment.

7.2 Odour Concentrations

Odour modelling was completed following the MECP *Technical Bulletin Methodology for Modelling Assessments of Contaminants with 10-minute Average Standards and Guidelines under O. Reg 419/05 (September 2016).*

Potential odour emissions from the facility were also assessed following the MOE *Technical Bulletin Methodology for Modelling Assessments of Contaminants with 10-minute Average Standards and Guidelines under O. Reg 419/05 (September 2016)*. The odour scenario assumed that both combustion units were off-line. The Induced Draft fans would continue to operate and draw air from the tipping floor through the system and release the odours from the top of the stack. The odour emission rate was determined from measurements taken at the DYEC facility as part of an Odour test report prepared by Zorix Environmental dated November 23, 2015. The maximum 10 min odour concentration was calculated to be 0.73 ou/m^3 at the most impacted sensitive receptor which is less than the guideline value of 1 ou/m^3.

8 CONCLUSIONS

This ESDM Report was prepared in accordance with s.26 of O. Reg. 419/05. In addition, guidance in the ESDM Procedure Document was followed, as appropriate.

The Facility is subject to s. 20 of O. Reg. 419/05, and contaminant emissions are assessed using the CALPUFF modelling software.

All the emission rates listed in Table 2 correspond to the operating scenario where all significant sources are operating simultaneously at their individual maximum rates of production. Therefore, the emission rates listed in Table 2 are likely to overestimate of the actual emission rates.

A POI concentration for each significant contaminant emitted from the Facility was calculated based on the calculated emission rates and the output from the CALPUFF model. The results are presented in Table 5 - Emission Summary Table and were compared against the respective MECP POI Limits.

Contaminants that do not have MECP POI Limits were screened against the JSL and *de minimis* limits. The concentrations of these contaminants were all below their relevant limits. Of the remaining contaminants assessed with MECP POI Limits; all the predicted POI concentrations are below the corresponding limits. Under Scenarios A-F, which represent normal and start-up emissions from the main stack, 1-hour averaged sulphur dioxide has the highest concentration relative to the MECP POI limit. Of these scenarios, Scenario A has the highest concentration of sulphur dioxide at 16% of the relevant limit. Scenario F represents a worst case operation and includes silo filling plus stand-by diesel generator operation in addition to normal operational emissions from the main stack. In this scenario, the concentration of nitrogen oxides assessed against the 1 hour standard is 64% of this limit. In all scenarios the maximum modelled concentration of Benzo(a)pyrene is less than 1% of the annual standard, indicating that it is not a contaminant of concern.

Under Scenario F, 24-hour averaged $PM_{2.5}$ has the highest concentration relative to the corresponding 24 hour CAAQS at 22% of the limit. However, in this scenario, all four of the silos have been modelled assuming 24/7 simultaneous filling. This is highly conservative as in reality; the silos will only be filled one at a time.

Odour was modelled during potential outage situation when all combustion equipment is off-line and the tipping floor air would be vented out the stack. The maximum 10 min odour concentration was calculated to be 0.73 ou/m^3 at the most impacted sensitive receptor which is less than the guideline value of 1 ou/m^3.

The conservative emission rates, when combined with the conservative operating conditions and conservative dispersion modelling assumptions, are likely to overestimate the concentrations at a POI. This assessment demonstrates that the Facility can operate in compliance with s.20 of O. Reg. 419/05.

9 LIMITATIONS OF REPORT

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Tables

Table 1
Sources and Contaminants Identification Table

Source Information			Expected Contaminants	Significant (Yes or No)?	Modelled (Yes or No)?	Rationale
Source ID	Source Description or Title	General Location				
1A	Main Stack - Normal Operation - Two Trains	Main Plant	Products of combustion, particulate matter and metals	Yes	Yes (Scenarios A and F)	N/A
1B	Main Stack - Normal Operation - One Train Only	Main Plant	Products of combustion, particulate matter and metals	Yes	Yes (Scenario B)	N/A
1C	Main Stack - Start Up - Phase 2 - Two Trains	Main Plant	Products of combustion, particulate matter and metals	Yes	Yes (Scenario C)	For Natural Gas combustion in this scenario, only NOx emissions were considered as per Section 7.1.1 of the ESDM Procedure Document
1D	Main Stack - Start Up - Phase 2 - One Train Only	Main Plant	Products of combustion, particulate matter and metals	Yes	Yes (Scenario D)	For Natural Gas combustion in this scenario, only NOx emissions were considered as per Section 7.1.1 of the ESDM Procedure Document
1E	Main Stack - fans only	Main Plant	Odour	Yes	Yes (Scenario E)	N/A
1F	Main Stack - Normal Operation - Two Trains; Silo Filling; and Stand-by generator	Main Plant	Products of combustion, particulate matter and metals	Yes	Yes (Scenario F)	For Natural Gas combustion in this scenario, only NOx emissions were considered as per Section 7.1.1 of the ESDM Procedure Document
2	Silo Filling	Main Plant	Particulate matter	Yes	Yes (Scenario F)	N/A
3	Stand-by generator	Main Plant	Products of combustion	Yes	Yes (Scenario F)	N/A
4	Residual Ash Building Exhaust Fans	Main Plant	Particulate matter	No	No	Emissions from the exhaust fans represent less than 5% fo the total site-wide emissions of particulate matter and have therefore been considered negligible as per section 7.2.2 of the ESDM Procedure Document.
5	HVAC	Main Plant	Products of combustion	No	No	Contaminants emitted in negligible amounts as per section 7.2.1 of the ESDM Procedure Document.
6	Emergency Fire Pumps	Main Plant	Products of combustion	Yes	No	The use of the emergency fire pumps and generator will be limited to emergencies and scheduled maintenance testing, with the testing of each piece of equipment occuring on different days. The stand-by generator has the greatest capacity of these pieces of equipment, consequently only emissions from the emergency generator have been assessed.

Table 2
Source Summary Table

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
1A	Main Stack - Normal Operation - Two Trains	54.56	138	1.7	87.6	(680538, 4860346)	Nitrogen Oxides	10102-44-0	5.38E+00	24, 1	ST	Average	100%
							Carbon Monoxide	630-08-0	1.78E+00	½	ST	Above-Average	100%
							Sulphur Dioxide	7446-09-5	1.56E+00	1, Annual	ST	Above-Average	100%
							Filterable TSP	N/A -2	4.00E-01	24	ST	Above-Average	100%
							Lead	7439-92-1	2.22E-03	24, 30 days	ST	Above-Average	100%
							Cadmium	7440-43-9	3.11E-04	24	ST	Above-Average	100%
							Mercury	7439-97-6	6.67E-04	24	ST	Above-Average	100%
							Dioxins, Furans and Dioxin-like PCBs	N/A -6	0.0027 µg TEQ/s	24	ST	Above-Average	100%
							Hydrogen Chloride	7647-01-0	4.00E-01	24	ST	Above-Average	100%
							PM10	N/A -3	2.91E-01	24	ST	Above-Average	100%
							PM2.5	N/A -4	2.88E-01	24	ST	Above-Average	100%
							Total Suspended Particulate	N/A -1	2.91E-01	24	ST	Above-Average	100%
							Hydrogen Fluoride	7664-39-3	4.89E-03	24, 30 days	ST	Above-Average	100%
							Ammonia	7664-41-7	3.07E-02	24	ST	Above-Average	100%
							Antimony	7440-36-0	3.07E-06	24	ST	Above-Average	100%
							Arsenic	7440-38-2	2.04E-06	24	ST	Above-Average	100%
							Barium	7440-39-3	5.16E-04	24	ST	Above-Average	100%
							Beryllium	7440-41-7	2.04E-06	24	ST	Above-Average	100%
							Chromium	7440-47-3	4.58E-05	24	ST	Above-Average	100%
							Cobalt	7440-48-4	1.96E-06	24	ST	Above-Average	100%
							Copper	7440-50-8	1.21E-04	24	ST	Above-Average	100%
							Molybdenum	7439-98-7	1.89E-04	24	ST	Above-Average	100%
							Nickel	7440-02-0	3.42E-05	24, Annual	ST	Above-Average	100%
							Selenium	7782-49-2	1.02E-05	24	ST	Above-Average	100%
							Silver	7440-22-4	2.04E-06	24	ST	Above-Average	100%
							Thallium	7440-28-0	2.04E-06	24	ST	Above-Average	100%
							Vanadium	7440-62-2	1.02E-06	24	ST	Above-Average	100%
							Zinc	7440-66-6	6.35E-04	24	ST	Above-Average	100%
							Polychlorinated Biphenyls (PCB)	1336-36-3	4.53E-07	24	ST	Above-Average	100%
							Monochlorobenzene	108-90-7	4.99E-06	1, 10-minute	ST	Above-Average	100%
							1,3-Dichlorobenzene	541-73-1	5.52E-07	24	ST	Above-Average	100%
							1,4-Dichlorobenzene	106-46-7	4.28E-07	24	ST	Above-Average	100%
							1,2-Dichlorobenzene	95-50-1	3.60E-07	1	ST	Above-Average	100%
							1,3,5-trichlorobenzene	108-70-3	9.27E-08	24	ST	Above-Average	100%
							1,2,4-trichlorobenzene	120-82-1	1.35E-07	24	ST	Above-Average	100%
							1,2,3-trichlorobenzene	87-61-6	1.09E-07	24	ST	Above-Average	100%
							1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	9.27E-08	24	ST	Above-Average	100%
							1,2,3,4-tetrachlorobenzene	634-66-2	9.27E-08	24	ST	Above-Average	100%
							Pentachlorobenzene	608-93-5	9.27E-08	24	ST	Above-Average	100%
							Hexachlorobenzene	118-74-1	9.27E-08	24	ST	Above-Average	100%
							2-monochlorophenol	95-57-8	7.69E-06	24	ST	Above-Average	100%
							3-monochlorophenol	108-43-0	7.69E-06	24	ST	Above-Average	100%
							4-monochlorophenol	106-48-9	7.69E-06	24	ST	Above-Average	100%
							2,6-dichlorophenol	87-65-0	7.70E-06	24	ST	Above-Average	100%

Table 2
Source Summary Table

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							2,4 & 2,5-dichlorophenol	120-83-2	7.70E-06	24	ST	Above-Average	100%
							3,5-dichlorophenol	591-35-5	7.70E-06	24	ST	Above-Average	100%
							2,3-dichlorophenol	576-24-9	7.70E-06	24	ST	Above-Average	100%
							3,4-dichlorophenol	95-77-2	2.70E-05	24	ST	Above-Average	100%
							2,4,6-trichlorophenol	88-06-2	4.56E-07	24	ST	Above-Average	100%
							2,3,6-trichlorophenol	933-75-5	4.56E-07	24	ST	Above-Average	100%
							2,3,5-trichlorophenol	933-78-8	4.56E-07	24	ST	Above-Average	100%
							2,4,5-trichlorophenol	95-95-4	4.56E-07	24	ST	Above-Average	100%
							2,3,4-trichlorophenol	15950-66-0	4.56E-07	24	ST	Above-Average	100%
							3,4,5-trichlorophenol	609-19-8	8.56E-06	24	ST	Above-Average	100%
							2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	1.38E-06	24	ST	Above-Average	100%
							2,3,4,5-tetrachlorophenol	4901-51-3	7.59E-07	24	ST	Above-Average	100%
							Pentachlorophenol	87-86-5	9.49E-06	24	ST	Above-Average	100%
							Acenaphthene	83-32-9	1.43E-07	24	ST	Above-Average	100%
							Acenaphthylene	208-96-8	1.16E-07	24	ST	Above-Average	100%
							Anthracene	120-12-7	1.18E-07	24	ST	Above-Average	100%
							Benzo(a)Anthracene	56-55-3	9.27E-08	24	ST	Above-Average	100%
							Benzo(b)Fluoranthene	205-99-2	2.49E-07	24	ST	Above-Average	100%
							Benzo(k)Fluoranthene	207-08-9	1.50E-07	24	ST	Above-Average	100%
							Benzo(a)fluorene	238-84-6	1.12E-07	24	ST	Above-Average	100%
							Benzo(b)fluorene	243-17-4	9.27E-08	24	ST	Above-Average	100%
							Benzo(g,h,i)Perylene	191-24-2	2.61E-07	24	ST	Above-Average	100%
							Benzo(a)Pyrene	50-32-8	9.27E-08	24, Annual	ST	Above-Average	100%
							Benzo(e)Pyrene	192-97-2	1.74E-07	24	ST	Above-Average	100%
							Biphenyl	92-52-4	3.08E-06	1	ST	Above-Average	100%
							2-Chloronaphthalene	91-58-7	9.27E-08	24	ST	Above-Average	100%
							Chrysene/Triphenylene	218-01-9	1.21E-06	24	ST	Above-Average	100%
							Coronene	191-07-1	4.56E-07	24	ST	Above-Average	100%
							Dibenzo(a,c)Anthracene	215-58-7	9.27E-08	24	ST	Above-Average	100%
							Dibenzo(a,h)Anthracene	53-70-3	9.27E-08	24	ST	Above-Average	100%
							Dibenzo(a,e)pyrene	192-65-4	4.56E-07	24	ST	Above-Average	100%
							9,10-dimethylanthracene	781-43-1	9.27E-08	24	ST	Above-Average	100%
							7,12-Dimethylbenzo(a)anthracene	57-97-6	4.02E-07	24	ST	Above-Average	100%
							Fluoranthene	206-44-0	1.03E-06	24	ST	Above-Average	100%
							Fluorene	86-73-7	4.02E-07	24	ST	Above-Average	100%
							Indeno(1,2,3-cd)Pyrene	193-39-5	9.27E-08	24	ST	Above-Average	100%
							2-methylanthracene	613-12-7	1.56E-07	24	ST	Above-Average	100%
							3-Methylcholanthrene	56-49-5	4.56E-07	24	ST	Above-Average	100%
							1-Methylnaphthalene	90-12-0	4.91E-07	24	ST	Above-Average	100%
							2-Methylnaphthalene	91-57-6	8.26E-07	24	ST	Above-Average	100%
							1-Methylphenanthrene	832-69-9	9.27E-08	24	ST	Above-Average	100%
							9-Methylphenanthrene	883-20-5	4.69E-07	24	ST	Above-Average	100%
							Naphthalene	91-20-3	2.08E-06	24, 10-minute	ST	Above-Average	100%
							Perylene	198-55-0	9.27E-08	24	ST	Above-Average	100%
							Phenanthrene	85-01-8	5.20E-06	24	ST	Above-Average	100%
							Picene	213-46-7	4.56E-07	24	ST	Above-Average	100%
							Pyrene	129-00-0	1.03E-06	24	ST	Above-Average	100%
							Tetralin	119-64-2	5.90E-07	24	ST	Above-Average	100%

Table 2
Source Summary Table

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							m-terphenyl	92-06-8	9.27E-08	24	ST	Above-Average	100%
							o-Terphenyl	84-15-1	1.18E-07	24	ST	Above-Average	100%
							p-terphenyl	92-94-4	9.27E-08	24	ST	Above-Average	100%
							Acetone	67-64-1	1.81E-04	24	ST	Above-Average	100%
							Benzene	71-43-2	8.89E-05	24, Annual	ST	Above-Average	100%
							Bromodichloromethane	75-27-4	8.89E-05	24, 24	ST	Above-Average	100%
							Bromoform	75-25-2	8.89E-05	24	ST	Above-Average	100%
							Bromomethane	74-83-9	8.89E-05	24	ST	Above-Average	100%
							1,3-Butadiene	106-99-0	8.89E-05	24, Annual	ST	Above-Average	100%
							2-Butanone	78-93-3	8.89E-05	24	ST	Above-Average	100%
							Carbon Tetrachloride	56-23-5	8.89E-05	24	ST	Above-Average	100%
							Chloroform	67-66-3	8.89E-05	24	ST	Above-Average	100%
							Cumene (Isopropylbenzene)	98-82-8	8.89E-05	24	ST	Above-Average	100%
							Dibromochloromethane	124-48-1	8.89E-05	24	ST	Above-Average	100%
							Dichlorodifluoromethane	75-71-8	8.89E-05	24	ST	Above-Average	100%
							1,2-Dichloroethane	107-06-2	8.89E-05	24	ST	Above-Average	100%
							trans,1,2-Dichloroethene	156-60-5	8.89E-05	24	ST	Above-Average	100%
							1,1-Dichloroethene	75-35-4	8.89E-05	24	ST	Above-Average	100%
							1,2-Dichloropropane	78-87-5	8.89E-05	24	ST	Above-Average	100%
							Ethylbenzene	100-41-4	8.89E-05	10-minute, 24	ST	Above-Average	100%
							Ethylene Dibromide	106-93-4	8.89E-05	24	ST	Above-Average	100%
							Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	24	ST	Above-Average	100%
							Methylene Chloride	75-09-2	1.99E-04	24	ST	Above-Average	100%
							Styrene	100-42-5	8.89E-05	24	ST	Above-Average	100%
							Tetrachloroethene	127-18-4	8.89E-05	24	ST	Above-Average	100%
							Toluene	108-88-3	1.24E-02	24	ST	Above-Average	100%
							1,1,1-Trichloroethane	71-55-6	8.89E-05	24	ST	Above-Average	100%
							Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	24	ST	Above-Average	100%
							Trichlorotrifluoroethane	26523-64-8	8.89E-05	24	ST	Above-Average	100%
							Trichlorofluoromethane	75-69-4	8.89E-05	24	ST	Above-Average	100%
							M&P-Xylene	108-38-3	1.85E-04	24	ST	Above-Average	100%
							O-Xylene	95-47-6	8.89E-05	24	ST	Above-Average	100%
							Xylenes	1330-20-7	2.74E-04	10-minute, 24	ST	Above-Average	100%
							Vinyl Chloride	75-01-4	8.89E-05	24	ST	Above-Average	100%
1B	Main Stack - Normal Operation - One Train Only	27.28	138.0	1.7	87.6	(680538, 4860346)	Nitrogen Oxides	10102-44-0	2.69E+00	24, 1	ST	Average	100%
							Carbon Monoxide	630-08-0	8.89E-01	½	ST	Above-Average	100%
							Sulphur Dioxide	7446-09-5	7.79E-01	1, Annual	ST	Above-Average	100%
							Filterable TSP	N/A -2	2.00E-01	24	ST	Above-Average	100%
							Lead	7439-92-1	1.11E-03	24, 30 days	ST	Above-Average	100%
							Cadmium	7440-43-9	1.56E-04	24	ST	Above-Average	100%
							Mercury	7439-97-6	3.33E-04	24	ST	Above-Average	100%
							Dioxins, Furans and Dioxin-like PCBs	N/A -6	0.0013 µg TEQ/s	24	ST	Above-Average	100%
							Hydrogen Chloride	7647-01-0	2.00E-01	24	ST	Above-Average	100%
							PM10	N/A -3	1.46E-01	24	ST	Above-Average	100%
							PM2.5	N/A -4	1.44E-01	24	ST	Above-Average	100%

Table 2
Source Summary Table

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							Total Suspended Particulate	N/A -1	1.46E-01	24	ST	Above-Average	100%
							Hydrogen Fluoride	7664-39-3	2.44E-03	24, 30 days	ST	Above-Average	100%
							Ammonia	7664-41-7	1.53E-02	24	ST	Above-Average	100%
							Antimony	7440-36-0	1.53E-06	24	ST	Above-Average	100%
							Arsenic	7440-38-2	1.02E-06	24	ST	Above-Average	100%
							Barium	7440-39-3	2.58E-04	24	ST	Above-Average	100%
							Beryllium	7440-41-7	1.02E-06	24	ST	Above-Average	100%
							Chromium	7440-47-3	2.29E-05	24	ST	Above-Average	100%
							Cobalt	7440-48-4	9.78E-07	24	ST	Above-Average	100%
							Copper	7440-50-8	6.04E-05	24	ST	Above-Average	100%
							Molybdenum	7439-98-7	9.44E-05	24	ST	Above-Average	100%
							Nickel	7440-02-0	1.71E-05	24, Annual	ST	Above-Average	100%
							Selenium	7782-49-2	5.11E-06	24	ST	Above-Average	100%
							Silver	7440-22-4	1.02E-06	24	ST	Above-Average	100%
							Thallium	7440-28-0	1.02E-06	24	ST	Above-Average	100%
							Vanadium	7440-62-2	5.11E-07	24	ST	Above-Average	100%
							Zinc	7440-66-6	3.18E-04	24	ST	Above-Average	100%
							Polychlorinated Biphenyls (PCB)	1336-36-3	2.27E-07	24	ST	Above-Average	100%
							Monochlorobenzene	108-90-7	2.50E-06	1, 10-minute	ST	Above-Average	100%
							1,3-Dichlorobenzene	541-73-1	2.76E-07	24	ST	Above-Average	100%
							1,4-Dichlorobenzene	106-46-7	2.14E-07	24	ST	Above-Average	100%
							1,2-Dichlorobenzene	95-50-1	1.80E-07	1	ST	Above-Average	100%
							1,3,5-trichlorobenzene	108-70-3	4.63E-08	24	ST	Above-Average	100%
							1,2,4-trichlorobenzene	120-82-1	6.73E-08	24	ST	Above-Average	100%
							1,2,3-trichlorobenzene	87-61-6	5.47E-08	24	ST	Above-Average	100%
							1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	4.63E-08	24	ST	Above-Average	100%
							1,2,3,4-tetrachlorobenzene	634-66-2	4.63E-08	24	ST	Above-Average	100%
							Pentachlorobenzene	608-93-5	4.63E-08	24	ST	Above-Average	100%
							Hexachlorobenzene	118-74-1	4.63E-08	24	ST	Above-Average	100%
							2-monochlorophenol	95-57-8	3.84E-06	24	ST	Above-Average	100%
							3-monochlorophenol	108-43-0	3.84E-06	24	ST	Above-Average	100%
							4-monochlorophenol	106-48-9	3.84E-06	24	ST	Above-Average	100%
							2,6-dichlorophenol	87-65-0	3.85E-06	24	ST	Above-Average	100%
							2,4 & 2,5-dichlorophenol	120-83-2	3.85E-06	24	ST	Above-Average	100%
							3,5-dichlorophenol	591-35-5	3.85E-06	24	ST	Above-Average	100%
							2,3-dichlorophenol	576-24-9	3.85E-06	24	ST	Above-Average	100%
							3,4-dichlorophenol	95-77-2	1.35E-05	24	ST	Above-Average	100%
							2,4,6-trichlorophenol	88-06-2	2.28E-07	24	ST	Above-Average	100%
							2,3,6-trichlorophenol	933-75-5	2.28E-07	24	ST	Above-Average	100%
							2,3,5-trichlorophenol	933-78-8	2.28E-07	24	ST	Above-Average	100%
							2,4,5-trichlorophenol	95-95-4	2.28E-07	24	ST	Above-Average	100%
							2,3,4-trichlorophenol	15950-66-0	2.28E-07	24	ST	Above-Average	100%
							3,4,5-trichlorophenol	609-19-8	4.28E-06	24	ST	Above-Average	100%
							2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	6.92E-07	24	ST	Above-Average	100%
							2,3,4,5-tetrachlorophenol	4901-51-3	3.80E-07	24	ST	Above-Average	100%
							Pentachlorophenol	87-86-5	4.75E-06	24	ST	Above-Average	100%

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							Acenaphthene	83-32-9	7.15E-08	24	ST	Above-Average	100%
							Acenaphthylene	208-96-8	5.78E-08	24	ST	Above-Average	100%
							Anthracene	120-12-7	5.92E-08	24	ST	Above-Average	100%
							Benzo(a)Anthracene	56-55-3	4.63E-08	24	ST	Above-Average	100%
							Benzo(b)Fluoranthene	205-99-2	1.25E-07	24	ST	Above-Average	100%
							Benzo(k)Fluoranthene	207-08-9	7.48E-08	24	ST	Above-Average	100%
							Benzo(a)fluorene	238-84-6	5.58E-08	24	ST	Above-Average	100%
							Benzo(b)fluorene	243-17-4	4.63E-08	24	ST	Above-Average	100%
							Benzo(g,h,i)Perylene	191-24-2	1.31E-07	24	ST	Above-Average	100%
							Benzo(a)Pyrene	50-32-8	4.63E-08	24, Annual	ST	Above-Average	100%
							Benzo(e)Pyrene	192-97-2	8.71E-08	24	ST	Above-Average	100%
							Biphenyl	92-52-4	1.54E-06	1	ST	Above-Average	100%
							2-Chloronaphthalene	91-58-7	4.63E-08	24	ST	Above-Average	100%
							Chrysene/Triphenylene	218-01-9	6.03E-07	24	ST	Above-Average	100%
							Coronene	191-07-1	2.28E-07	24	ST	Above-Average	100%
							Dibenzo(a,c)Anthracene	215-58-7	4.63E-08	24	ST	Above-Average	100%
							Dibenzo(a,h)Anthracene	53-70-3	4.63E-08	24	ST	Above-Average	100%
							Dibenzo(a,e)pyrene	192-65-4	2.28E-07	24	ST	Above-Average	100%
							9,10-dimethylanthracene	781-43-1	4.63E-08	24	ST	Above-Average	100%
							7,12-Dimethylbenzo(a)anthracene	57-97-6	2.01E-07	24	ST	Above-Average	100%
							Fluoranthene	206-44-0	5.14E-07	24	ST	Above-Average	100%
							Fluorene	86-73-7	2.01E-07	24	ST	Above-Average	100%
							Indeno(1,2,3-cd)Pyrene	193-39-5	4.63E-08	24	ST	Above-Average	100%
							2-methylanthracene	613-12-7	7.82E-08	24	ST	Above-Average	100%
							3-Methylcholanthrene	56-49-5	2.28E-07	24	ST	Above-Average	100%
							1-Methylnaphthalene	90-12-0	2.46E-07	24	ST	Above-Average	100%
							2-Methylnaphthalene	91-57-6	4.13E-07	24	ST	Above-Average	100%
							1-Methylphenanthrene	832-69-9	4.63E-08	24	ST	Above-Average	100%
							9-Methylphenanthrene	883-20-5	2.34E-07	24	ST	Above-Average	100%
							Naphthalene	91-20-3	1.04E-06	24, 10-minute	ST	Above-Average	100%
							Perylene	198-55-0	4.63E-08	24	ST	Above-Average	100%
							Phenanthrene	85-01-8	2.60E-06	24	ST	Above-Average	100%
							Picene	213-46-7	2.28E-07	24	ST	Above-Average	100%
							Pyrene	129-00-0	5.14E-07	24	ST	Above-Average	100%
							Tetralin	119-64-2	2.95E-07	24	ST	Above-Average	100%
							m-terphenyl	92-06-8	4.63E-08	24	ST	Above-Average	100%
							o-Terphenyl	84-15-1	5.92E-08	24	ST	Above-Average	100%
							p-terphenyl	92-94-4	4.63E-08	24	ST	Above-Average	100%
							Acetone	67-64-1	9.03E-05	24	ST	Above-Average	100%
							Benzene	71-43-2	4.44E-05	24, Annual	ST	Above-Average	100%
							Bromodichloromethane	75-27-4	4.44E-05	24, 24	ST	Above-Average	100%
							Bromoform	75-25-2	4.44E-05	24	ST	Above-Average	100%
							Bromomethane	74-83-9	4.44E-05	24	ST	Above-Average	100%
							1,3-Butadiene	106-99-0	4.44E-05	24, Annual	ST	Above-Average	100%
							2-Butanone	78-93-3	4.44E-05	24	ST	Above-Average	100%
							Carbon Tetrachloride	56-23-5	4.44E-05	24	ST	Above-Average	100%
							Chloroform	67-66-3	4.44E-05	24	ST	Above-Average	100%
							Cumene (Isopropylbenzene)	98-82-8	4.44E-05	24	ST	Above-Average	100%

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							Dibromochloromethane	124-48-1	4.44E-05	24	ST	Above-Average	100%
							Dichlorodifluoromethane	75-71-8	4.44E-05	24	ST	Above-Average	100%
							1,2-Dichloroethane	107-06-2	4.44E-05	24	ST	Above-Average	100%
							trans,1,2-Dichloroethene	156-60-5	4.44E-05	24	ST	Above-Average	100%
							1,1-Dichloroethene	75-35-4	4.44E-05	24	ST	Above-Average	100%
							1,2-Dichloropropane	78-87-5	4.44E-05	24	ST	Above-Average	100%
							Ethylbenzene	100-41-4	4.44E-05	10-minute, 24	ST	Above-Average	100%
							Ethylene Dibromide	106-93-4	4.44E-05	24	ST	Above-Average	100%
							Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	4.44E-05	24	ST	Above-Average	100%
							Methylene Chloride	75-09-2	9.94E-05	24	ST	Above-Average	100%
							Styrene	100-42-5	4.44E-05	24	ST	Above-Average	100%
							Tetrachloroethene	127-18-4	4.44E-05	24	ST	Above-Average	100%
							Toluene	108-88-3	6.19E-03	24	ST	Above-Average	100%
							1,1,1-Trichloroethane	71-55-6	4.44E-05	24	ST	Above-Average	100%
							Trichloroethene/1,1,2-Trichloroethane	79-01-6	4.44E-05	24	ST	Above-Average	100%
							Trichlorotrifluoroethane	26523-64-8	4.44E-05	24	ST	Above-Average	100%
							Trichlorofluoromethane	75-69-4	4.44E-05	24	ST	Above-Average	100%
							M&P-Xylene	108-38-3	9.27E-05	24	ST	Above-Average	100%
							O-Xylene	95-47-6	4.44E-05	24	ST	Above-Average	100%
							Xylenes	1330-20-7	1.37E-04	10-minute, 24	ST	Above-Average	100%
							Vinyl Chloride	75-01-4	4.44E-05	24	ST	Above-Average	100%
1C	Main Stack - Start Up - Phase 2 - Two Trains	39.08	132	1.7	87.6	(680538, 4860346)	Nitrogen Oxides	10102-44-0	3.35E+00	24, 1	EF, ST	Average	100%
							Carbon Monoxide	630-08-0	9.70E-01	½	ST	Above-Average	100%
							Sulphur Dioxide	7446-09-5	8.48E-01	1, Annual	ST	Above-Average	100%
							Filterable TSP	N/A -2	2.18E-01	24	ST	Above-Average	100%
							Lead	7439-92-1	1.21E-03	24, 30 days	ST	Above-Average	100%
							Cadmium	7440-43-9	1.70E-04	24	ST	Above-Average	100%
							Mercury	7439-97-6	3.64E-04	24	ST	Above-Average	100%
							Dioxins, Furans and Dioxin-like PCBs	N/A -6	0.0015 µg TEQ/s	24	ST	Above-Average	100%
							Hydrogen Chloride	7647-01-0	2.18E-01	24	ST	Above-Average	100%
							PM10	N/A -3	1.59E-01	24	ST	Above-Average	100%
							PM2.5	N/A -4	1.57E-01	24	ST	Above-Average	100%
							Total Suspended Particulate	N/A -1	2.18E-01	24	ST	Above-Average	100%
							Hydrogen Fluoride	7664-39-3	2.67E-03	24, 30 days	ST	Above-Average	100%
							Ammonia	7664-41-7	1.67E-02	24	ST	Above-Average	100%
							Antimony	7440-36-0	1.67E-06	24	ST	Above-Average	100%
							Arsenic	7440-38-2	1.12E-06	24	ST	Above-Average	100%
							Barium	7440-39-3	2.81E-04	24	ST	Above-Average	100%
							Beryllium	7440-41-7	1.12E-06	24	ST	Above-Average	100%
							Chromium	7440-47-3	2.50E-05	24	ST	Above-Average	100%
							Cobalt	7440-48-4	1.07E-06	24	ST	Above-Average	100%
							Copper	7440-50-8	6.59E-05	24	ST	Above-Average	100%
							Molybdenum	7439-98-7	1.03E-04	24	ST	Above-Average	100%
							Nickel	7440-02-0	1.87E-05	24, Annual	ST	Above-Average	100%
							Selenium	7782-49-2	5.58E-06	24	ST	Above-Average	100%

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		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							Silver	7440-22-4	1.12E-06	24	ST	Above-Average	100%
							Thallium	7440-28-0	1.12E-06	24	ST	Above-Average	100%
							Vanadium	7440-62-2	5.58E-07	24	ST	Above-Average	100%
							Zinc	7440-66-6	3.47E-04	24	ST	Above-Average	100%
							Polychlorinated Biphenyls (PCB)	1336-36-3	2.47E-07	24	ST	Above-Average	100%
							Monochlorobenzene	108-90-7	2.72E-06	1, 10-minute	ST	Above-Average	100%
							1,3-Dichlorobenzene	541-73-1	3.01E-07	24	ST	Above-Average	100%
							1,4-Dichlorobenzene	106-46-7	2.33E-07	24	ST	Above-Average	100%
							1,2-Dichlorobenzene	95-50-1	1.97E-07	1	ST	Above-Average	100%
							1,3,5-trichlorobenzene	108-70-3	5.06E-08	24	ST	Above-Average	100%
							1,2,4-trichlorobenzene	120-82-1	7.34E-08	24	ST	Above-Average	100%
							1,2,3-trichlorobenzene	87-61-6	5.97E-08	24	ST	Above-Average	100%
							1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	5.06E-08	24	ST	Above-Average	100%
							1,2,3,4-tetrachlorobenzene	634-66-2	5.06E-08	24	ST	Above-Average	100%
							Pentachlorobenzene	608-93-5	5.06E-08	24	ST	Above-Average	100%
							Hexachlorobenzene	118-74-1	5.06E-08	24	ST	Above-Average	100%
							2-monochlorophenol	95-57-8	4.19E-06	24	ST	Above-Average	100%
							3-monochlorophenol	108-43-0	4.19E-06	24	ST	Above-Average	100%
							4-monochlorophenol	106-48-9	4.19E-06	24	ST	Above-Average	100%
							2,6-dichlorophenol	87-65-0	4.20E-06	24	ST	Above-Average	100%
							2,4 & 2,5-dichlorophenol	120-83-2	4.20E-06	24	ST	Above-Average	100%
							3,5-dichlorophenol	591-35-5	4.20E-06	24	ST	Above-Average	100%
							2,3-dichlorophenol	576-24-9	4.20E-06	24	ST	Above-Average	100%
							3,4-dichlorophenol	95-77-2	1.47E-05	24	ST	Above-Average	100%
							2,4,6-trichlorophenol	88-06-2	2.49E-07	24	ST	Above-Average	100%
							2,3,6-trichlorophenol	933-75-5	2.49E-07	24	ST	Above-Average	100%
							2,3,5-trichlorophenol	933-78-8	2.49E-07	24	ST	Above-Average	100%
							2,4,5-trichlorophenol	95-95-4	2.49E-07	24	ST	Above-Average	100%
							2,3,4-trichlorophenol	15950-66-0	2.49E-07	24	ST	Above-Average	100%
							3,4,5-trichlorophenol	609-19-8	4.67E-06	24	ST	Above-Average	100%
							2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	7.55E-07	24	ST	Above-Average	100%
							2,3,4,5-tetrachlorophenol	4901-51-3	4.14E-07	24	ST	Above-Average	100%
							Pentachlorophenol	87-86-5	5.18E-06	24	ST	Above-Average	100%
							Acenaphthene	83-32-9	7.80E-08	24	ST	Above-Average	100%
							Acenaphthylene	208-96-8	6.31E-08	24	ST	Above-Average	100%
							Anthracene	120-12-7	6.46E-08	24	ST	Above-Average	100%
							Benzo(a)Anthracene	56-55-3	5.06E-08	24	ST	Above-Average	100%
							Benzo(b)Fluoranthene	205-99-2	1.36E-07	24	ST	Above-Average	100%
							Benzo(k)Fluoranthene	207-08-9	8.16E-08	24	ST	Above-Average	100%
							Benzo(a)fluorene	238-84-6	6.09E-08	24	ST	Above-Average	100%
							Benzo(b)fluorene	243-17-4	5.06E-08	24	ST	Above-Average	100%
							Benzo(g,h,i)Perylene	191-24-2	1.43E-07	24	ST	Above-Average	100%
							Benzo(a)Pyrene	50-32-8	5.06E-08	24, Annual	ST	Above-Average	100%
							Benzo(e)Pyrene	192-97-2	9.50E-08	24	ST	Above-Average	100%
							Biphenyl	92-52-4	1.68E-06	1	ST	Above-Average	100%
							2-Chloronaphthalene	91-58-7	5.06E-08	24	ST	Above-Average	100%
							Chrysene/Triphenylene	218-01-9	6.58E-07	24	ST	Above-Average	100%

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							Coronene	191-07-1	2.49E-07	24	ST	Above-Average	100%
							Dibenzo(a,c)Anthracene	215-58-7	5.06E-08	24	ST	Above-Average	100%
							Dibenzo(a,h)Anthracene	53-70-3	5.06E-08	24	ST	Above-Average	100%
							Dibenzo(a,e)pyrene	192-65-4	2.49E-07	24	ST	Above-Average	100%
							9,10-dimethylanthracene	781-43-1	5.06E-08	24	ST	Above-Average	100%
							7,12-Dimethylbenzo(a)anthracene	57-97-6	2.19E-07	24	ST	Above-Average	100%
							Fluoranthene	206-44-0	5.60E-07	24	ST	Above-Average	100%
							Fluorene	86-73-7	2.19E-07	24	ST	Above-Average	100%
							Indeno(1,2,3-cd)Pyrene	193-39-5	5.06E-08	24	ST	Above-Average	100%
							2-methylanthracene	613-12-7	8.53E-08	24	ST	Above-Average	100%
							3-Methylcholanthrene	56-49-5	2.49E-07	24	ST	Above-Average	100%
							1-Methylnaphthalene	90-12-0	2.68E-07	24	ST	Above-Average	100%
							2-Methylnaphthalene	91-57-6	4.51E-07	24	ST	Above-Average	100%
							1-Methylphenanthrene	832-69-9	5.06E-08	24	ST	Above-Average	100%
							9-Methylphenanthrene	883-20-5	2.56E-07	24	ST	Above-Average	100%
							Naphthalene	91-20-3	1.13E-06	24, 10-minute	ST	Above-Average	100%
							Perylene	198-55-0	5.06E-08	24	ST	Above-Average	100%
							Phenanthrene	85-01-8	2.84E-06	24	ST	Above-Average	100%
							Picene	213-46-7	2.49E-07	24	ST	Above-Average	100%
							Pyrene	129-00-0	5.60E-07	24	ST	Above-Average	100%
							Tetralin	119-64-2	3.22E-07	24	ST	Above-Average	100%
							m-terphenyl	92-06-8	5.06E-08	24	ST	Above-Average	100%
							o-Terphenyl	84-15-1	6.46E-08	24	ST	Above-Average	100%
							p-terphenyl	92-94-4	5.06E-08	24	ST	Above-Average	100%
							Acetone	67-64-1	9.85E-05	24	ST	Above-Average	100%
							Benzene	71-43-2	4.85E-05	24, Annual	ST	Above-Average	100%
							Bromodichloromethane	75-27-4	4.85E-05	24, 24	ST	Above-Average	100%
							Bromoform	75-25-2	4.85E-05	24	ST	Above-Average	100%
							Bromomethane	74-83-9	4.85E-05	24	ST	Above-Average	100%
							1,3-Butadiene	106-99-0	4.85E-05	24, Annual	ST	Above-Average	100%
							2-Butanone	78-93-3	4.85E-05	24	ST	Above-Average	100%
							Carbon Tetrachloride	56-23-5	4.85E-05	24	ST	Above-Average	100%
							Chloroform	67-66-3	4.85E-05	24	ST	Above-Average	100%
							Cumene (Isopropylbenzene)	98-82-8	4.85E-05	24	ST	Above-Average	100%
							Dibromochloromethane	124-48-1	4.85E-05	24	ST	Above-Average	100%
							Dichlorodifluoromethane	75-71-8	4.85E-05	24	ST	Above-Average	100%
							1,2-Dichloroethane	107-06-2	4.85E-05	24	ST	Above-Average	100%
							trans,1,2-Dichloroethene	156-60-5	4.85E-05	24	ST	Above-Average	100%
							1,1-Dichloroethene	75-35-4	4.85E-05	24	ST	Above-Average	100%
							1,2-Dichloropropane	78-87-5	4.85E-05	24	ST	Above-Average	100%
							Ethylbenzene	100-41-4	4.85E-05	10-minute, 24	ST	Above-Average	100%
							Ethylene Dibromide	106-93-4	4.85E-05	24	ST	Above-Average	100%
							Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	4.85E-05	24	ST	Above-Average	100%
							Methylene Chloride	75-09-2	1.08E-04	24	ST	Above-Average	100%
							Styrene	100-42-5	4.85E-05	24	ST	Above-Average	100%
							Tetrachloroethene	127-18-4	4.85E-05	24	ST	Above-Average	100%
							Toluene	108-88-3	6.75E-03	24	ST	Above-Average	100%

Table 2
Source Summary Table

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							1,1,1-Trichloroethane	71-55-6	4.85E-05	24	ST	Above-Average	100%
							Trichloroethene/1,1,2-Trichloroethane	79-01-6	4.85E-05	24	ST	Above-Average	100%
							Trichlorotrifluoroethane	26523-64-8	4.85E-05	24	ST	Above-Average	100%
							Trichlorofluoromethane	75-69-4	4.85E-05	24	ST	Above-Average	100%
							M&P-Xylene	108-38-3	1.01E-04	24	ST	Above-Average	100%
							O-Xylene	95-47-6	4.85E-05	24	ST	Above-Average	100%
							Xylenes	1330-20-7	1.50E-04	10-minute, 24	ST	Above-Average	100%
							Vinyl Chloride	75-01-4	4.85E-05	24	ST	Above-Average	100%
1D	Main Stack - Start Up - Phase 2 - One Train Only	19.54	132	1.7	87.6	(680538, 4860346)	Nitrogen Oxides	10102-44-0	1.68E+00	24, 1	EF, ST	Average	100%
							Carbon Monoxide	630-08-0	4.85E-01	½	ST	Above-Average	100%
							Sulphur Dioxide	7446-09-5	4.24E-01	1, Annual	ST	Above-Average	100%
							Filterable TSP	N/A -2	1.09E-01	24	ST	Above-Average	100%
							Lead	7439-92-1	6.06E-04	24, 30 days	ST	Above-Average	100%
							Cadmium	7440-43-9	8.48E-05	24	ST	Above-Average	100%
							Mercury	7439-97-6	1.82E-04	24	ST	Above-Average	100%
							Dioxins, Furans and Dioxin-like PCBs	N/A -6	0.0007 µg TEQ/s	24	ST	Above-Average	100%
							Hydrogen Chloride	7647-01-0	1.09E-01	24	ST	Above-Average	100%
							PM10	N/A -3	7.94E-02	24	ST	Above-Average	100%
							PM2.5	N/A -4	7.85E-02	24	ST	Above-Average	100%
							Total Suspended Particulate	N/A -1	1.09E-01	24	ST	Above-Average	100%
							Hydrogen Fluoride	7664-39-3	1.33E-03	24, 30 days	ST	Above-Average	100%
							Ammonia	7664-41-7	8.36E-03	24	ST	Above-Average	100%
							Antimony	7440-36-0	8.36E-07	24	ST	Above-Average	100%
							Arsenic	7440-38-2	5.58E-07	24	ST	Above-Average	100%
							Barium	7440-39-3	1.41E-04	24	ST	Above-Average	100%
							Beryllium	7440-41-7	5.58E-07	24	ST	Above-Average	100%
							Chromium	7440-47-3	1.25E-05	24	ST	Above-Average	100%
							Cobalt	7440-48-4	5.33E-07	24	ST	Above-Average	100%
							Copper	7440-50-8	3.30E-05	24	ST	Above-Average	100%
							Molybdenum	7439-98-7	5.15E-05	24	ST	Above-Average	100%
							Nickel	7440-02-0	9.33E-06	24, Annual	ST	Above-Average	100%
							Selenium	7782-49-2	2.79E-06	24	ST	Above-Average	100%
							Silver	7440-22-4	5.58E-07	24	ST	Above-Average	100%
							Thallium	7440-28-0	5.58E-07	24	ST	Above-Average	100%
							Vanadium	7440-62-2	2.79E-07	24	ST	Above-Average	100%
							Zinc	7440-66-6	1.73E-04	24	ST	Above-Average	100%
							Polychlorinated Biphenyls (PCB)	1336-36-3	1.24E-07	24	ST	Above-Average	100%
							Monochlorobenzene	108-90-7	1.36E-06	1, 10-minute	ST	Above-Average	100%
							1,3-Dichlorobenzene	541-73-1	1.51E-07	24	ST	Above-Average	100%
							1,4-Dichlorobenzene	106-46-7	1.17E-07	24	ST	Above-Average	100%
							1,2-Dichlorobenzene	95-50-1	9.83E-08	1	ST	Above-Average	100%
							1,3,5-trichlorobenzene	108-70-3	2.53E-08	24	ST	Above-Average	100%
							1,2,4-trichlorobenzene	120-82-1	3.67E-08	24	ST	Above-Average	100%
							1,2,3-trichlorobenzene	87-61-6	2.98E-08	24	ST	Above-Average	100%

Table 2
Source Summary Table

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	2.53E-08	24	ST	Above-Average	100%
							1,2,3,4-tetrachlorobenzene	634-66-2	2.53E-08	24	ST	Above-Average	100%
							Pentachlorobenzene	608-93-5	2.53E-08	24	ST	Above-Average	100%
							Hexachlorobenzene	118-74-1	2.53E-08	24	ST	Above-Average	100%
							2-monochlorophenol	95-57-8	2.10E-06	24	ST	Above-Average	100%
							3-monochlorophenol	108-43-0	2.10E-06	24	ST	Above-Average	100%
							4-monochlorophenol	106-48-9	2.10E-06	24	ST	Above-Average	100%
							2,6-dichlorophenol	87-65-0	2.10E-06	24	ST	Above-Average	100%
							2,4 & 2,5-dichlorophenol	120-83-2	2.10E-06	24	ST	Above-Average	100%
							3,5-dichlorophenol	591-35-5	2.10E-06	24	ST	Above-Average	100%
							2,3-dichlorophenol	576-24-9	2.10E-06	24	ST	Above-Average	100%
							3,4-dichlorophenol	95-77-2	7.37E-06	24	ST	Above-Average	100%
							2,4,6-trichlorophenol	88-06-2	1.24E-07	24	ST	Above-Average	100%
							2,3,6-trichlorophenol	933-75-5	1.24E-07	24	ST	Above-Average	100%
							2,3,5-trichlorophenol	933-78-8	1.24E-07	24	ST	Above-Average	100%
							2,4,5-trichlorophenol	95-95-4	1.24E-07	24	ST	Above-Average	100%
							2,3,4-trichlorophenol	15950-66-0	1.24E-07	24	ST	Above-Average	100%
							3,4,5-trichlorophenol	609-19-8	2.33E-06	24	ST	Above-Average	100%
							2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	3.78E-07	24	ST	Above-Average	100%
							2,3,4,5-tetrachlorophenol	4901-51-3	2.07E-07	24	ST	Above-Average	100%
							Pentachlorophenol	87-86-5	2.59E-06	24	ST	Above-Average	100%
							Acenaphthene	83-32-9	3.90E-08	24	ST	Above-Average	100%
							Acenaphthylene	208-96-8	3.15E-08	24	ST	Above-Average	100%
							Anthracene	120-12-7	3.23E-08	24	ST	Above-Average	100%
							Benzo(a)Anthracene	56-55-3	2.53E-08	24	ST	Above-Average	100%
							Benzo(b)Fluoranthene	205-99-2	6.80E-08	24	ST	Above-Average	100%
							Benzo(k)Fluoranthene	207-08-9	4.08E-08	24	ST	Above-Average	100%
							Benzo(a)fluorene	238-84-6	3.05E-08	24	ST	Above-Average	100%
							Benzo(b)fluorene	243-17-4	2.53E-08	24	ST	Above-Average	100%
							Benzo(g,h,i)Perylene	191-24-2	7.13E-08	24	ST	Above-Average	100%
							Benzo(a)Pyrene	50-32-8	2.53E-08	24, Annual	ST	Above-Average	100%
							Benzo(e)Pyrene	192-97-2	4.75E-08	24	ST	Above-Average	100%
							Biphenyl	92-52-4	8.40E-07	1	ST	Above-Average	100%
							2-Chloronaphthalene	91-58-7	2.53E-08	24	ST	Above-Average	100%
							Chrysene/Triphenylene	218-01-9	3.29E-07	24	ST	Above-Average	100%
							Coronene	191-07-1	1.24E-07	24	ST	Above-Average	100%
							Dibenzo(a,c)Anthracene	215-58-7	2.53E-08	24	ST	Above-Average	100%
							Dibenzo(a,h)Anthracene	53-70-3	2.53E-08	24	ST	Above-Average	100%
							Dibenzo(a,e)pyrene	192-65-4	1.24E-07	24	ST	Above-Average	100%
							9,10-dimethylanthracene	781-43-1	2.53E-08	24	ST	Above-Average	100%
							7,12-Dimethylbenzo(a)anthracene	57-97-6	1.10E-07	24	ST	Above-Average	100%
							Fluoranthene	206-44-0	2.80E-07	24	ST	Above-Average	100%
							Fluorene	86-73-7	1.10E-07	24	ST	Above-Average	100%
							Indeno(1,2,3-cd)Pyrene	193-39-5	2.53E-08	24	ST	Above-Average	100%
							2-methylanthracene	613-12-7	4.26E-08	24	ST	Above-Average	100%
							3-Methylcholanthrene	56-49-5	1.24E-07	24	ST	Above-Average	100%

Table 2
Source Summary Table

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							1-Methylnaphthalene	90-12-0	1.34E-07	24	ST	Above-Average	100%
							2-Methylnaphthalene	91-57-6	2.25E-07	24	ST	Above-Average	100%
							1-Methylphenanthrene	832-69-9	2.53E-08	24	ST	Above-Average	100%
							9-Methylphenanthrene	883-20-5	1.28E-07	24	ST	Above-Average	100%
							Naphthalene	91-20-3	5.66E-07	24, 10-minute	ST	Above-Average	100%
							Perylene	198-55-0	2.53E-08	24	ST	Above-Average	100%
							Phenanthrene	85-01-8	1.42E-06	24	ST	Above-Average	100%
							Picene	213-46-7	1.24E-07	24	ST	Above-Average	100%
							Pyrene	129-00-0	2.80E-07	24	ST	Above-Average	100%
							Tetralin	119-64-2	1.61E-07	24	ST	Above-Average	100%
							m-terphenyl	92-06-8	2.53E-08	24	ST	Above-Average	100%
							o-Terphenyl	84-15-1	3.23E-08	24	ST	Above-Average	100%
							p-terphenyl	92-94-4	2.53E-08	24	ST	Above-Average	100%
							Acetone	67-64-1	4.93E-05	24	ST	Above-Average	100%
							Benzene	71-43-2	2.42E-05	24, Annual	ST	Above-Average	100%
							Bromodichloromethane	75-27-4	2.42E-05	24, 24	ST	Above-Average	100%
							Bromoform	75-25-2	2.42E-05	24	ST	Above-Average	100%
							Bromomethane	74-83-9	2.42E-05	24	ST	Above-Average	100%
							1,3-Butadiene	106-99-0	2.42E-05	24, Annual	ST	Above-Average	100%
							2-Butanone	78-93-3	2.42E-05	24	ST	Above-Average	100%
							Carbon Tetrachloride	56-23-5	2.42E-05	24	ST	Above-Average	100%
							Chloroform	67-66-3	2.42E-05	24	ST	Above-Average	100%
							Cumene (Isopropylbenzene)	98-82-8	2.42E-05	24	ST	Above-Average	100%
							Dibromochloromethane	124-48-1	2.42E-05	24	ST	Above-Average	100%
							Dichlorodifluoromethane	75-71-8	2.42E-05	24	ST	Above-Average	100%
							1,2-Dichloroethane	107-06-2	2.42E-05	24	ST	Above-Average	100%
							trans,1,2-Dichloroethene	156-60-5	2.42E-05	24	ST	Above-Average	100%
							1,1-Dichloroethene	75-35-4	2.42E-05	24	ST	Above-Average	100%
							1,2-Dichloropropane	78-87-5	2.42E-05	24	ST	Above-Average	100%
							Ethylbenzene	100-41-4	2.42E-05	10-minute, 24	ST	Above-Average	100%
							Ethylene Dibromide	106-93-4	2.42E-05	24	ST	Above-Average	100%
							Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	2.42E-05	24	ST	Above-Average	100%
							Methylene Chloride	75-09-2	5.42E-05	24	ST	Above-Average	100%
							Styrene	100-42-5	2.42E-05	24	ST	Above-Average	100%
							Tetrachloroethene	127-18-4	2.42E-05	24	ST	Above-Average	100%
							Toluene	108-88-3	3.38E-03	24	ST	Above-Average	100%
							1,1,1-Trichloroethane	71-55-6	2.42E-05	24	ST	Above-Average	100%
							Trichloroethene/1,1,2-Trichloroethane	79-01-6	2.42E-05	24	ST	Above-Average	100%
							Trichlorotrifluoroethane	26523-64-8	2.42E-05	24	ST	Above-Average	100%
							Trichlorofluoromethane	75-69-4	2.42E-05	24	ST	Above-Average	100%
							M&P-Xylene	108-38-3	5.06E-05	24	ST	Above-Average	100%
							O-Xylene	95-47-6	2.42E-05	24	ST	Above-Average	100%
							Xylenes	1330-20-7	7.48E-05	10-minute, 24	ST	Above-Average	100%
							Vinyl Chloride	75-01-4	2.42E-05	24	ST	Above-Average	100%
1E	Main Stack - fans only	54.56	138	1.7	87.6	(680538, 4860346)	Odour	N/A	2.15E+04	10-min	ST	Above-Average	100%
2	Silo Filling	0.31	Ambient	0.10	5.4864	(680551,4860359)	Total Particulate Matter	N/A -1	1.07E-02	24	EC	Above-Average	<1%
							PM10	N/A -3	1.07E-02	24	EC	Above-Average	1%

Table 2
Source Summary Table

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							PM2.5	N/A -4	1.07E-02	24	EC	Above-Average	2%
		0.31	Ambient	0.10	4.8768	(680513,4860332)	Total Particulate Matter	N/A -1	1.07E-02	24	EC	Above-Average	25%
							PM10	N/A -3	1.07E-02	24	EC	Above-Average	1%
							PM2.5	N/A -4	1.07E-02	24	EC	Above-Average	2%
		0.31	Ambient	0.10	3.9624	(680517,4860333)	Total Particulate Matter	N/A -1	1.07E-02	24	EC	Above-Average	25%
							PM10	N/A -3	1.07E-02	24	EC	Above-Average	1%
							PM2.5	N/A -4	1.07E-02	24	EC	Above-Average	2%
		0.31	Ambient	0.10	12.4	(680537,4860391)	Total Particulate Matter	N/A -1	1.07E-02	24	EC	Above-Average	25%
							PM10	N/A -3	1.07E-02	24	EC	Above-Average	1%
							PM2.5	N/A -4	1.07E-02	24	EC	Above-Average	2%
3	Stand-by generator	1.16	265.85	0.2	3	(680475,4860419)	Nitrogen Oxides	10102-44-0	1.12E+00	1, 24	EF	Marginal	100%

Notes:

"V-ST" - Validated Source Test, "ST" - Source Test, "EF" - Emission Factor, "MB" Mass Balance, "EC" - Engineering Calculation
Data Quality Categories: "Highest"; "Above-Average"; "Average"; and "Marginal"

Table 3
Dispersion Modelling Input Summary Table

Relevant Section of the Regulation	Section Title	Summary of How the Approved Dispersion Model Was Used	Location of Supporting Documentation in ESDM Report
Section 8	Negligible Sources of Contaminants	Sources and contaminants that were considered negligible were explicitly identified, and therefore were not modelled in accordance with s.8 of O.Reg.419/05.	Section 3.0, Table 1
Section 9	Same Structure Contamination	Not applicable as the Facility is the only tenant occupying the building, and does not have a child care facility, health care facility, senior's residence, long-term care facility or an education facility located on-site.	N/A
Section 10	Operating Conditions	All equipment was assumed to be operating at the maximum production rates, simultaneously.	Section 4.0, Table 4
Section 11	Source of Contaminant Emission Rates	The emission rate for each significant contaminant emitted from a significant source was estimated, the methodology for the calculation is documented in Table 2 - Source Summary Table.	Section 4.0, Table 2
Section 12	Combined Effect of Assumptions for Operating Conditions and Emission Rates	The operating conditions were estimated in accordance with s.10(1) 1 and s.11(1) 1 of O.Reg.419/05 and are therefore considered to result in the highest POI concentration that the Facility is capable of for each contaminant emitted.	Section 4.0
Section 13	Meteorological Conditions	Meteorological data used in this assessment was taken from the WRF model 2014-2018 inclusive.	Section 6.0
Section 14	Area of Modelling Coverage (receptor locations)	The area of modelling coverage was selected to match the EA.	Section 6.0, Figure 7
Section 15	Stack Height for Certain New Sources of Contaminant	The stack height meets the GEP stack height.	N/A
Section 16	Terrain Data	Terrain data was obtained from the MECP database	Section 6.0, Figure 6
Section 17	Averaging Periods	1 hour, 24 hour and 30 day averaging periods were modelled. 10-minute and 1/2 hour averaging periods were calculated using table 4-1 of the ADMGO document.	Table 5

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
Stack 1 (Scenario A and F)	Main Stack - Normal Operation - Two Trains	Point	87.6	24.04	138.0	1.7	(680538, 4860346)	Nitrogen Oxides	10102-44-0	5.38E+00	24, 1
								Carbon Monoxide	630-08-0	1.78E+00	½
								Sulphur Dioxide	7446-09-5	1.56E+00	1, Ann
								Filterable TSP	N/A -2	4.00E-01	24
								Lead	7439-92-1	2.22E-03	24, 30 days
								Cadmium	7440-43-9	3.11E-04	24
								Mercury	7439-97-6	6.67E-04	24
								Dioxins, Furans and Dioxin- like PCBs	N/A -6	0.0027 µg TEQ/s	24
								Hydrogen Chloride	7647-01-0	4.00E-01	24
								PM10	N/A -3	2.91E-01	24
								PM2.5	N/A -4	2.88E-01	24
								Total Suspended Particulate	N/A -1	2.91E-01	24
								Hydrogen Fluoride	7664-39-3	4.89E-03	24, 30 days
								Ammonia	7664-41-7	3.07E-02	24
								Antimony	7440-36-0	3.07E-06	24
								Arsenic	7440-38-2	2.04E-06	24
								Barium	7440-39-3	5.16E-04	24
								Beryllium	7440-41-7	2.04E-06	24
								Chromium	7440-47-3	4.58E-05	24
								Cobalt	7440-48-4	1.96E-06	24
								Copper	7440-50-8	1.21E-04	24
								Molybdenum	7439-98-7	1.89E-04	24
								Nickel	7440-02-0	3.42E-05	24, Annual
								Selenium	7782-49-2	1.02E-05	24
								Silver	7440-22-4	2.04E-06	24
								Thallium	7440-28-0	2.04E-06	24
								Vanadium	7440-62-2	1.02E-06	24
								Zinc	7440-66-6	6.35E-04	24
								Polychlorinated Biphenyls (PCB)	1336-36-3	4.53E-07	24
								Monochlorobenzene	108-90-7	4.99E-06	1, 10-minute
								1,3-Dichlorobenzene	541-73-1	5.52E-07	24
								1,4-Dichlorobenzene	106-46-7	4.28E-07	24
								1,2-Dichlorobenzene	95-50-1	3.60E-07	1
								1,3,5-trichlorobenzene	108-70-3	9.27E-08	24
								1,2,4-trichlorobenzene	120-82-1	1.35E-07	24
								1,2,3-trichlorobenzene	87-61-6	1.09E-07	24
								1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	9.27E-08	24
								1,2,3,4-tetrachlorobenzene	634-66-2	9.27E-08	24
								Pentachlorobenzene	608-93-5	9.27E-08	24
								Hexachlorobenzene	118-74-1	9.27E-08	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
								2-monochlorophenol	95-57-8	7.69E-06	24
								3-monochlorophenol	108-43-0	7.69E-06	24
								4-monochlorophenol	106-48-9	7.69E-06	24
								2,6-dichlorophenol	87-65-0	7.70E-06	24
								2,4 & 2,5-dichlorophenol	120-83-2	7.70E-06	24
								3,5-dichlorophenol	591-35-5	7.70E-06	24
								2,3-dichlorophenol	576-24-9	7.70E-06	24
								3,4-dichlorophenol	95-77-2	2.70E-05	24
								2,4,6-trichlorophenol	88-06-2	4.56E-07	24
								2,3,6-trichlorophenol	933-75-5	4.56E-07	24
								2,3,5-trichlorophenol	933-78-8	4.56E-07	24
								2,4,5-trichlorophenol	95-95-4	4.56E-07	24
								2,3,4-trichlorophenol	15950-66-0	4.56E-07	24
								3,4,5-trichlorophenol	609-19-8	8.56E-06	24
								2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	1.38E-06	24
								2,3,4,5-tetrachlorophenol	4901-51-3	7.59E-07	24
								Pentachlorophenol	87-86-5	9.49E-06	24
								Acenaphthene	83-32-9	1.43E-07	24
								Acenaphthylene	208-96-8	1.16E-07	24
								Anthracene	120-12-7	1.18E-07	24
								Benzo(a)Anthracene	56-55-3	9.27E-08	24
								Benzo(b)Fluoranthene	205-99-2	2.49E-07	24
								Benzo(k)Fluoranthene	207-08-9	1.50E-07	24
								Benzo(a)fluorene	238-84-6	1.12E-07	24
								Benzo(b)fluorene	243-17-4	9.27E-08	24
								Benzo(g,h,i)Perylene	191-24-2	2.61E-07	24
								Benzo(a)Pyrene	50-32-8	9.27E-08	24, Annual
								Benzo(e)Pyrene	192-97-2	1.74E-07	24
								Biphenyl	92-52-4	3.08E-06	1
								2-Chloronaphthalene	91-58-7	9.27E-08	24
								Chrysene/Triphenylene	218-01-9	1.21E-06	24
								Coronene	191-07-1	4.56E-07	24
								Dibenzo(a,c)Anthracene	215-58-7	9.27E-08	24
								Dibenzo(a,h)Anthracene	53-70-3	9.27E-08	24
								Dibenzo(a,e)pyrene	192-65-4	4.56E-07	24
								9,10-dimethylanthracene	781-43-1	9.27E-08	24
								7,12-Dimethylbenzo(a)anthracene	57-97-6	4.02E-07	24
								Fluoranthene	206-44-0	1.03E-06	24
								Fluorene	86-73-7	4.02E-07	24
								Indeno(1,2,3-cd)Pyrene	193-39-5	9.27E-08	24
								2-methylanthracene	613-12-7	1.56E-07	24
								3-Methylcholanthrene	56-49-5	4.56E-07	24
								1-Methylnaphthalene	90-12-0	4.91E-07	24
								2-Methylnaphthalene	91-57-6	8.26E-07	24
								1-Methylphenanthrene	832-69-9	9.27E-08	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
								9-Methylphenanthrene	883-20-5	4.69E-07	24
								Naphthalene	91-20-3	2.08E-06	24, 10-minute
								Perylene	198-55-0	9.27E-08	24
								Phenanthrene	85-01-8	5.20E-06	24
								Picene	213-46-7	4.56E-07	24
								Pyrene	129-00-0	1.03E-06	24
								Tetralin	119-64-2	5.90E-07	24
								m-terphenyl	92-06-8	9.27E-08	24
								o-Terphenyl	84-15-1	1.18E-07	24
								p-terphenyl	92-94-4	9.27E-08	24
								Acetone	67-64-1	1.81E-04	24
								Benzene	71-43-2	8.89E-05	24, Annual
								Bromodichloromethane	75-27-4	8.89E-05	24, 24
								Bromoform	75-25-2	8.89E-05	24
								Bromomethane	74-83-9	8.89E-05	24
								1,3-Butadiene	106-99-0	8.89E-05	24, Annual
								2-Butanone	78-93-3	8.89E-05	24
								Carbon Tetrachloride	56-23-5	8.89E-05	24
								Chloroform	67-66-3	8.89E-05	24
								Cumene (Isopropylbenzene)	98-82-8	8.89E-05	24
								Dibromochloromethane	124-48-1	8.89E-05	24
								Dichlorodifluoromethane	75-71-8	8.89E-05	24
								1,2-Dichloroethane	107-06-2	8.89E-05	24
								trans,1,2-Dichloroethene	156-60-5	8.89E-05	24
								1,1-Dichloroethene	75-35-4	8.89E-05	24
								1,2-Dichloropropane	78-87-5	8.89E-05	24
								Ethylbenzene	100-41-4	8.89E-05	10-minute, 24
								Ethylene Dibromide	106-93-4	8.89E-05	24
								Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	24
								Methylene Chloride	75-09-2	1.99E-04	24
								Styrene	100-42-5	8.89E-05	24
								Tetrachloroethene	127-18-4	8.89E-05	24
								Toluene	108-88-3	1.24E-02	24
								1,1,1-Trichloroethane	71-55-6	8.89E-05	24
								Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	24
								Trichlorotrifluoroethane	26523-64-8	8.89E-05	24
								Trichlorofluoromethane	75-69-4	8.89E-05	24
								M&P-Xylene	108-38-3	1.85E-04	24
								O-Xylene	95-47-6	8.89E-05	24
								Xylenes	1330-20-7	2.74E-04	10-minute, 24
								Vinyl Chloride	75-01-4	8.89E-05	24

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Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
Stack 1 (Scenario B)	Main Stack - Normal Operation - One Train Only	Point	87.6	12.02	138.00	1.7	(680538, 4860346)	Nitrogen Oxides	10102-44-0	2.69E+00	24, 1
								Carbon Monoxide	630-08-0	8.89E-01	½
								Sulphur Dioxide	7446-09-5	7.79E-01	1, Ann
								Filterable TSP	N/A -2	2.00E-01	24
								Lead	7439-92-1	1.11E-03	24, 30 days
								Cadmium	7440-43-9	1.56E-04	24
								Mercury	7439-97-6	3.33E-04	24
								Dioxins, Furans and Dioxin- like PCBs	N/A -6	0.0013 µg TEQ/s	24
								Hydrogen Chloride	7647-01-0	2.00E-01	24
								PM10	N/A -3	1.46E-01	24
								PM2.5	N/A -4	1.44E-01	24
								Total Suspended Particulate	N/A -1	1.46E-01	24
								Hydrogen Fluoride	7664-39-3	2.44E-03	24, 30 days
								Ammonia	7664-41-7	1.53E-02	24
								Antimony	7440-36-0	1.53E-06	24
								Arsenic	7440-38-2	1.02E-06	24
								Barium	7440-39-3	2.58E-04	24
								Beryllium	7440-41-7	1.02E-06	24
								Chromium	7440-47-3	2.29E-05	24
								Cobalt	7440-48-4	9.78E-07	24
								Copper	7440-50-8	6.04E-05	24
								Molybdenum	7439-98-7	9.44E-05	24
								Nickel	7440-02-0	1.71E-05	24, Annual
								Selenium	7782-49-2	5.11E-06	24
								Silver	7440-22-4	1.02E-06	24
								Thallium	7440-28-0	1.02E-06	24
								Vanadium	7440-62-2	5.11E-07	24
								Zinc	7440-66-6	3.18E-04	24
								Polychlorinated Biphenyls (PCB)	1336-36-3	2.27E-07	24
								Monochlorobenzene	108-90-7	2.50E-06	1, 10-minute
								1,3-Dichlorobenzene	541-73-1	2.76E-07	24
								1,4-Dichlorobenzene	106-46-7	2.14E-07	24
								1,2-Dichlorobenzene	95-50-1	1.80E-07	1
								1,3,5-trichlorobenzene	108-70-3	4.63E-08	24
								1,2,4-trichlorobenzene	120-82-1	6.73E-08	24
								1,2,3-trichlorobenzene	87-61-6	5.47E-08	24
								1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	4.63E-08	24
								1,2,3,4-tetrachlorobenzene	634-66-2	4.63E-08	24
								Pentachlorobenzene	608-93-5	4.63E-08	24
								Hexachlorobenzene	118-74-1	4.63E-08	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
								2-monochlorophenol	95-57-8	3.84E-06	24
								3-monochlorophenol	108-43-0	3.84E-06	24
								4-monochlorophenol	106-48-9	3.84E-06	24
								2,6-dichlorophenol	87-65-0	3.85E-06	24
								2,4 & 2,5-dichlorophenol	120-83-2	3.85E-06	24
								3,5-dichlorophenol	591-35-5	3.85E-06	24
								2,3-dichlorophenol	576-24-9	3.85E-06	24
								3,4-dichlorophenol	95-77-2	1.35E-05	24
								2,4,6-trichlorophenol	88-06-2	2.28E-07	24
								2,3,6-trichlorophenol	933-75-5	2.28E-07	24
								2,3,5-trichlorophenol	933-78-8	2.28E-07	24
								2,4,5-trichlorophenol	95-95-4	2.28E-07	24
								2,3,4-trichlorophenol	15950-66-0	2.28E-07	24
								3,4,5-trichlorophenol	609-19-8	4.28E-06	24
								2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	6.92E-07	24
								2,3,4,5-tetrachlorophenol	4901-51-3	3.80E-07	24
								Pentachlorophenol	87-86-5	4.75E-06	24
								Acenaphthene	83-32-9	7.15E-08	24
								Acenaphthylene	208-96-8	5.78E-08	24
								Anthracene	120-12-7	5.92E-08	24
								Benzo(a)Anthracene	56-55-3	4.63E-08	24
								Benzo(b)Fluoranthene	205-99-2	1.25E-07	24
								Benzo(k)Fluoranthene	207-08-9	7.48E-08	24
								Benzo(a)fluorene	238-84-6	5.58E-08	24
								Benzo(b)fluorene	243-17-4	4.63E-08	24
								Benzo(g,h,i)Perylene	191-24-2	1.31E-07	24
								Benzo(a)Pyrene	50-32-8	4.63E-08	24, Annual
								Benzo(e)Pyrene	192-97-2	8.71E-08	24
								Biphenyl	92-52-4	1.54E-06	1
								2-Chloronaphthalene	91-58-7	4.63E-08	24
								Chrysene/Triphenylene	218-01-9	6.03E-07	24
								Coronene	191-07-1	2.28E-07	24
								Dibenzo(a,c)Anthracene	215-58-7	4.63E-08	24
								Dibenzo(a,h)Anthracene	53-70-3	4.63E-08	24
								Dibenzo(a,e)pyrene	192-65-4	2.28E-07	24
								9,10-dimethylanthracene	781-43-1	4.63E-08	24
								7,12-Dimethylbenzo(a)anthracene	57-97-6	2.01E-07	24
								Fluoranthene	206-44-0	5.14E-07	24
								Fluorene	86-73-7	2.01E-07	24
								Indeno(1,2,3-cd)Pyrene	193-39-5	4.63E-08	24
								2-methylanthracene	613-12-7	7.82E-08	24
								3-Methylcholanthrene	56-49-5	2.28E-07	24
								1-Methylnaphthalene	90-12-0	2.46E-07	24
								2-Methylnaphthalene	91-57-6	4.13E-07	24
								1-Methylphenanthrene	832-69-9	4.63E-08	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
								9-Methylphenanthrene	883-20-5	2.34E-07	24
								Naphthalene	91-20-3	1.04E-06	24, 10-minute
								Perylene	198-55-0	4.63E-08	24
								Phenanthrene	85-01-8	2.60E-06	24
								Picene	213-46-7	2.28E-07	24
								Pyrene	129-00-0	5.14E-07	24
								Tetralin	119-64-2	2.95E-07	24
								m-terphenyl	92-06-8	4.63E-08	24
								o-Terphenyl	84-15-1	5.92E-08	24
								p-terphenyl	92-94-4	4.63E-08	24
								Acetone	67-64-1	9.03E-05	24
								Benzene	71-43-2	4.44E-05	24, Annual
								Bromodichloromethane	75-27-4	4.44E-05	24, 24
								Bromoform	75-25-2	4.44E-05	24
								Bromomethane	74-83-9	4.44E-05	24
								1,3-Butadiene	106-99-0	4.44E-05	24, Annual
								2-Butanone	78-93-3	4.44E-05	24
								Carbon Tetrachloride	56-23-5	4.44E-05	24
								Chloroform	67-66-3	4.44E-05	24
								Cumene (Isopropylbenzene)	98-82-8	4.44E-05	24
								Dibromochloromethane	124-48-1	4.44E-05	24
								Dichlorodifluoromethane	75-71-8	4.44E-05	24
								1,2-Dichloroethane	107-06-2	4.44E-05	24
								trans,1,2-Dichloroethene	156-60-5	4.44E-05	24
								1,1-Dichloroethene	75-35-4	4.44E-05	24
								1,2-Dichloropropane	78-87-5	4.44E-05	24
								Ethylbenzene	100-41-4	4.44E-05	10-minute, 24
								Ethylene Dibromide	106-93-4	4.44E-05	24
								Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	4.44E-05	24
								Methylene Chloride	75-09-2	9.94E-05	24
								Styrene	100-42-5	4.44E-05	24
								Tetrachloroethene	127-18-4	4.44E-05	24
								Toluene	108-88-3	6.19E-03	24
								1,1,1-Trichloroethane	71-55-6	4.44E-05	24
								Trichloroethene/1,1,2-Trichloroethane	79-01-6	4.44E-05	24
								Trichlorotrifluoroethane	26523-64-8	4.44E-05	24
								Trichlorofluoromethane	75-69-4	4.44E-05	24
								M&P-Xylene	108-38-3	9.27E-05	24
								O-Xylene	95-47-6	4.44E-05	24
								Xylenes	1330-20-7	1.37E-04	10-minute, 24
								Vinyl Chloride	75-01-4	4.44E-05	24

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Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
Stack 1 (Scenario C)	Main Stack - Start Up - Phase 2 - Two Trains	Point	87.6	17.22	132	1.7	(680538, 4860346)	Nitrogen Oxides	10102-44-0	3.35E+00	24, 1
								Carbon Monoxide	630-08-0	9.70E-01	½
								Sulphur Dioxide	7446-09-5	8.49E-01	1, Ann
								Filterable TSP	N/A -2	2.18E-01	24
								Lead	7439-92-1	1.21E-03	24, 30 days
								Cadmium	7440-43-9	1.70E-04	24
								Mercury	7439-97-6	3.64E-04	24
								Dioxins, Furans and Dioxin- like PCBs	N/A -6	0.0015 µg TEQ/s	24
								Hydrogen Chloride	7647-01-0	2.18E-01	24
								PM10	N/A -3	1.59E-01	24
								PM2.5	N/A -4	1.57E-01	24
								Total Suspended Particulate	N/A -1	2.18E-01	24
								Hydrogen Fluoride	7664-39-3	2.67E-03	24, 30 days
								Ammonia	7664-41-7	1.67E-02	24
								Antimony	7440-36-0	1.67E-06	24
								Arsenic	7440-38-2	1.12E-06	24
								Barium	7440-39-3	2.81E-04	24
								Beryllium	7440-41-7	1.12E-06	24
								Chromium	7440-47-3	2.50E-05	24
								Cobalt	7440-48-4	1.07E-06	24
								Copper	7440-50-8	6.59E-05	24
								Molybdenum	7439-98-7	1.03E-04	24
								Nickel	7440-02-0	1.87E-05	24, Annual
								Selenium	7782-49-2	5.58E-06	24
								Silver	7440-22-4	1.12E-06	24
								Thallium	7440-28-0	1.12E-06	24
								Vanadium	7440-62-2	5.58E-07	24
								Zinc	7440-66-6	3.47E-04	24
								Polychlorinated Biphenyls (PCB)	1336-36-3	2.47E-07	24
								Monochlorobenzene	108-90-7	2.72E-06	1, 10-minute
								1,3-Dichlorobenzene	541-73-1	3.01E-07	24
								1,4-Dichlorobenzene	106-46-7	2.33E-07	24
								1,2-Dichlorobenzene	95-50-1	1.97E-07	1
								1,3,5-trichlorobenzene	108-70-3	5.06E-08	24
								1,2,4-trichlorobenzene	120-82-1	7.34E-08	24
								1,2,3-trichlorobenzene	87-61-6	5.97E-08	24
								1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	5.06E-08	24
								1,2,3,4-tetrachlorobenzene	634-66-2	5.06E-08	24
								Pentachlorobenzene	608-93-5	5.06E-08	24
								Hexachlorobenzene	118-74-1	5.06E-08	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
								2-monochlorophenol	95-57-8	4.19E-06	24
								3-monochlorophenol	108-43-0	4.19E-06	24
								4-monochlorophenol	106-48-9	4.19E-06	24
								2,6-dichlorophenol	87-65-0	4.20E-06	24
								2,4 & 2,5-dichlorophenol	120-83-2	4.20E-06	24
								3,5-dichlorophenol	591-35-5	4.20E-06	24
								2,3-dichlorophenol	576-24-9	4.20E-06	24
								3,4-dichlorophenol	95-77-2	1.47E-05	24
								2,4,6-trichlorophenol	88-06-2	2.49E-07	24
								2,3,6-trichlorophenol	933-75-5	2.49E-07	24
								2,3,5-trichlorophenol	933-78-8	2.49E-07	24
								2,4,5-trichlorophenol	95-95-4	2.49E-07	24
								2,3,4-trichlorophenol	15950-66-0	2.49E-07	24
								3,4,5-trichlorophenol	609-19-8	4.67E-06	24
								2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	7.55E-07	24
								2,3,4,5-tetrachlorophenol	4901-51-3	4.14E-07	24
								Pentachlorophenol	87-86-5	5.18E-06	24
								Acenaphthene	83-32-9	7.80E-08	24
								Acenaphthylene	208-96-8	6.31E-08	24
								Anthracene	120-12-7	6.46E-08	24
								Benzo(a)Anthracene	56-55-3	5.06E-08	24
								Benzo(b)Fluoranthene	205-99-2	1.36E-07	24
								Benzo(k)Fluoranthene	207-08-9	8.16E-08	24
								Benzo(a)fluorene	238-84-6	6.09E-08	24
								Benzo(b)fluorene	243-17-4	5.06E-08	24
								Benzo(g,h,i)Perylene	191-24-2	1.43E-07	24
								Benzo(a)Pyrene	50-32-8	5.06E-08	24, Annual
								Benzo(e)Pyrene	192-97-2	9.50E-08	24
								Biphenyl	92-52-4	1.68E-06	1
								2-Chloronaphthalene	91-58-7	5.06E-08	24
								Chrysene/Triphenylene	218-01-9	6.58E-07	24
								Coronene	191-07-1	2.49E-07	24
								Dibenzo(a,c)Anthracene	215-58-7	5.06E-08	24
								Dibenzo(a,h)Anthracene	53-70-3	5.06E-08	24
								Dibenzo(a,e)pyrene	192-65-4	2.49E-07	24
								9,10-dimethylanthracene	781-43-1	5.06E-08	24
								7,12-Dimethylbenzo(a)anthracene	57-97-6	2.19E-07	24
								Fluoranthene	206-44-0	5.60E-07	24
								Fluorene	86-73-7	2.19E-07	24
								Indeno(1,2,3-cd)Pyrene	193-39-5	5.06E-08	24
								2-methylanthracene	613-12-7	8.53E-08	24
								3-Methylcholanthrene	56-49-5	2.49E-07	24
								1-Methylnaphthalene	90-12-0	2.68E-07	24
								2-Methylnaphthalene	91-57-6	4.51E-07	24
								1-Methylphenanthrene	832-69-9	5.06E-08	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
								9-Methylphenanthrene	883-20-5	2.56E-07	24
								Naphthalene	91-20-3	1.13E-06	24, 10-minute
								Perylene	198-55-0	5.06E-08	24
								Phenanthrene	85-01-8	2.84E-06	24
								Picene	213-46-7	2.49E-07	24
								Pyrene	129-00-0	5.60E-07	24
								Tetralin	119-64-2	3.22E-07	24
								m-terphenyl	92-06-8	5.06E-08	24
								o-Terphenyl	84-15-1	6.46E-08	24
								p-terphenyl	92-94-4	5.06E-08	24
								Acetone	67-64-1	9.85E-05	24
								Benzene	71-43-2	4.85E-05	24, Annual
								Bromodichloromethane	75-27-4	4.85E-05	24, 24
								Bromoform	75-25-2	4.85E-05	24
								Bromomethane	74-83-9	4.85E-05	24
								1,3-Butadiene	106-99-0	4.85E-05	24, Annual
								2-Butanone	78-93-3	4.85E-05	24
								Carbon Tetrachloride	56-23-5	4.85E-05	24
								Chloroform	67-66-3	4.85E-05	24
								Cumene (Isopropylbenzene)	98-82-8	4.85E-05	24
								Dibromochloromethane	124-48-1	4.85E-05	24
								Dichlorodifluoromethane	75-71-8	4.85E-05	24
								1,2-Dichloroethane	107-06-2	4.85E-05	24
								trans,1,2-Dichloroethene	156-60-5	4.85E-05	24
								1,1-Dichloroethene	75-35-4	4.85E-05	24
								1,2-Dichloropropane	78-87-5	4.85E-05	24
								Ethylbenzene	100-41-4	4.85E-05	10-minute, 24
								Ethylene Dibromide	106-93-4	4.85E-05	24
								Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	4.85E-05	24
								Methylene Chloride	75-09-2	1.08E-04	24
								Styrene	100-42-5	4.85E-05	24
								Tetrachloroethene	127-18-4	4.85E-05	24
								Toluene	108-88-3	6.75E-03	24
								1,1,1-Trichloroethane	71-55-6	4.85E-05	24
								Trichloroethene/1,1,2-Trichloroethane	79-01-6	4.85E-05	24
								Trichlorotrifluoroethane	26523-64-8	4.85E-05	24
								Trichlorofluoromethane	75-69-4	4.85E-05	24
								M&P-Xylene	108-38-3	1.01E-04	24
								O-Xylene	95-47-6	4.85E-05	24
								Xylenes	1330-20-7	1.50E-04	10-minute, 24
								Vinyl Chloride	75-01-4	4.85E-05	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
Stack 1 (Scenario D)	Main Stack - Start Up - Phase 2 - One Train Only	Point	87.6	8.61	132	1.7	(680538, 4860346)	Nitrogen Oxides	10102-44-0	1.68E+00	24, 1
								Carbon Monoxide	630-08-0	4.85E-01	½
								Sulphur Dioxide	7446-09-5	4.25E-01	1, Ann
								Filterable TSP	N/A -2	1.09E-01	24
								Lead	7439-92-1	6.06E-04	24, 30 days
								Cadmium	7440-43-9	8.48E-05	24
								Mercury	7439-97-6	1.82E-04	24
								Dioxins, Furans and Dioxin- like PCBs	N/A -6	0.0007 µg TEQ/s	24
								Hydrogen Chloride	7647-01-0	1.09E-01	24
								PM10	N/A -3	7.94E-02	24
								PM2.5	N/A -4	7.85E-02	24
								Total Suspended Particulate	N/A -1	1.09E-01	24
								Hydrogen Fluoride	7664-39-3	1.33E-03	24, 30 days
								Ammonia	7664-41-7	8.36E-03	24
								Antimony	7440-36-0	8.36E-07	24
								Arsenic	7440-38-2	5.58E-07	24
								Barium	7440-39-3	1.41E-04	24
								Beryllium	7440-41-7	5.58E-07	24
								Chromium	7440-47-3	1.25E-05	24
								Cobalt	7440-48-4	5.33E-07	24
								Copper	7440-50-8	3.30E-05	24
								Molybdenum	7439-98-7	5.15E-05	24
								Nickel	7440-02-0	9.33E-06	24, Annual
								Selenium	7782-49-2	2.79E-06	24
								Silver	7440-22-4	5.58E-07	24
								Thallium	7440-28-0	5.58E-07	24
								Vanadium	7440-62-2	2.79E-07	24
								Zinc	7440-66-6	1.73E-04	24
								Polychlorinated Biphenyls (PCB)	1336-36-3	1.24E-07	24
								Monochlorobenzene	108-90-7	1.36E-06	1, 10-minute
								1,3-Dichlorobenzene	541-73-1	1.51E-07	24
								1,4-Dichlorobenzene	106-46-7	1.17E-07	24
								1,2-Dichlorobenzene	95-50-1	9.83E-08	1
								1,3,5-trichlorobenzene	108-70-3	2.53E-08	24
								1,2,4-trichlorobenzene	120-82-1	3.67E-08	24
								1,2,3-trichlorobenzene	87-61-6	2.98E-08	24
								1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	2.53E-08	24
								1,2,3,4-tetrachlorobenzene	634-66-2	2.53E-08	24
								Pentachlorobenzene	608-93-5	2.53E-08	24
								Hexachlorobenzene	118-74-1	2.53E-08	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
								2-monochlorophenol	95-57-8	2.10E-06	24
								3-monochlorophenol	108-43-0	2.10E-06	24
								4-monochlorophenol	106-48-9	2.10E-06	24
								2,6-dichlorophenol	87-65-0	2.10E-06	24
								2,4 & 2,5-dichlorophenol	120-83-2	2.10E-06	24
								3,5-dichlorophenol	591-35-5	2.10E-06	24
								2,3-dichlorophenol	576-24-9	2.10E-06	24
								3,4-dichlorophenol	95-77-2	7.37E-06	24
								2,4,6-trichlorophenol	88-06-2	1.24E-07	24
								2,3,6-trichlorophenol	933-75-5	1.24E-07	24
								2,3,5-trichlorophenol	933-78-8	1.24E-07	24
								2,4,5-trichlorophenol	95-95-4	1.24E-07	24
								2,3,4-trichlorophenol	15950-66-0	1.24E-07	24
								3,4,5-trichlorophenol	609-19-8	2.33E-06	24
								2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	3.78E-07	24
								2,3,4,5-tetrachlorophenol	4901-51-3	2.07E-07	24
								Pentachlorophenol	87-86-5	2.59E-06	24
								Acenaphthene	83-32-9	3.90E-08	24
								Acenaphthylene	208-96-8	3.15E-08	24
								Anthracene	120-12-7	3.23E-08	24
								Benzo(a)Anthracene	56-55-3	2.53E-08	24
								Benzo(b)Fluoranthene	205-99-2	6.80E-08	24
								Benzo(k)Fluoranthene	207-08-9	4.08E-08	24
								Benzo(a)fluorene	238-84-6	3.05E-08	24
								Benzo(b)fluorene	243-17-4	2.53E-08	24
								Benzo(g,h,i)Perylene	191-24-2	7.13E-08	24
								Benzo(a)Pyrene	50-32-8	2.53E-08	24, Annual
								Benzo(e)Pyrene	192-97-2	4.75E-08	24
								Biphenyl	92-52-4	8.40E-07	1
								2-Chloronaphthalene	91-58-7	2.53E-08	24
								Chrysene/Triphenylene	218-01-9	3.29E-07	24
								Coronene	191-07-1	1.24E-07	24
								Dibenzo(a,c)Anthracene	215-58-7	2.53E-08	24
								Dibenzo(a,h)Anthracene	53-70-3	2.53E-08	24
								Dibenzo(a,e)pyrene	192-65-4	1.24E-07	24
								9,10-dimethylanthracene	781-43-1	2.53E-08	24
								7,12-Dimethylbenzo(a)anthracene	57-97-6	1.10E-07	24
								Fluoranthene	206-44-0	2.80E-07	24
								Fluorene	86-73-7	1.10E-07	24
								Indeno(1,2,3-cd)Pyrene	193-39-5	2.53E-08	24
								2-methylanthracene	613-12-7	4.26E-08	24
								3-Methylcholanthrene	56-49-5	1.24E-07	24
								1-Methylnaphthalene	90-12-0	1.34E-07	24
								2-Methylnaphthalene	91-57-6	2.25E-07	24
								1-Methylphenanthrene	832-69-9	2.53E-08	24

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
								9-Methylphenanthrene	883-20-5	1.28E-07	24
								Naphthalene	91-20-3	5.66E-07	24, 10-minute
								Perylene	198-55-0	2.53E-08	24
								Phenanthrene	85-01-8	1.42E-06	24
								Picene	213-46-7	1.24E-07	24
								Pyrene	129-00-0	2.80E-07	24
								Tetralin	119-64-2	1.61E-07	24
								m-terphenyl	92-06-8	2.53E-08	24
								o-Terphenyl	84-15-1	3.23E-08	24
								p-terphenyl	92-94-4	2.53E-08	24
								Acetone	67-64-1	4.93E-05	24
								Benzene	71-43-2	2.42E-05	24, Annual
								Bromodichloromethane	75-27-4	2.42E-05	24, 24
								Bromoform	75-25-2	2.42E-05	24
								Bromomethane	74-83-9	2.42E-05	24
								1,3-Butadiene	106-99-0	2.42E-05	24, Annual
								2-Butanone	78-93-3	2.42E-05	24
								Carbon Tetrachloride	56-23-5	2.42E-05	24
								Chloroform	67-66-3	2.42E-05	24
								Cumene (Isopropylbenzene)	98-82-8	2.42E-05	24
								Dibromochloromethane	124-48-1	2.42E-05	24
								Dichlorodifluoromethane	75-71-8	2.42E-05	24
								1,2-Dichloroethane	107-06-2	2.42E-05	24
								trans,1,2-Dichloroethene	156-60-5	2.42E-05	24
								1,1-Dichloroethene	75-35-4	2.42E-05	24
								1,2-Dichloropropane	78-87-5	2.42E-05	24
								Ethylbenzene	100-41-4	2.42E-05	10-minute, 24
								Ethylene Dibromide	106-93-4	2.42E-05	24
								Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	2.42E-05	24
								Methylene Chloride	75-09-2	5.42E-05	24
								Styrene	100-42-5	2.42E-05	24
								Tetrachloroethene	127-18-4	2.42E-05	24
								Toluene	108-88-3	3.38E-03	24
								1,1,1-Trichloroethane	71-55-6	2.42E-05	24
								Trichloroethene/1,1,2-Trichloroethane	79-01-6	2.42E-05	24
								Trichlorotrifluoroethane	26523-64-8	2.42E-05	24
								Trichlorofluoromethane	75-69-4	2.42E-05	24
								M&P-Xylene	108-38-3	5.06E-05	24
								O-Xylene	95-47-6	2.42E-05	24
								Xylenes	1330-20-7	7.48E-05	10-minute, 24
								Vinyl Chloride	75-01-4	2.42E-05	24
Stack 1 (Scenario E)	Main Stack - fans only	Point	87.6	10.40	20	1.7	(680538, 4860346)	Odour	N/A	2.15E+04	10-min

Table 4
Dispersion Modelling Source Summary Table

Modelling ID	Source ID(s)	Source Type	Stack Height Above Grade [m]	Stack Gas Exit Velocity [m/s]	Stack Gas Exit Temperature [°C]	Stack Inner Diameter	Source Coordinates (x,y) [m]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]
Stack 2A	Carbon silo filling	Point	5.4864	38.42	Ambient	0.10	(680551,4860359)	Total Particulate Matter	N/A -1	1.07E-02	24
								PM10	N/A -3	1.07E-02	24
								PM2.5	N/A -4	1.07E-02	24
Stack 2B	Pozzolan silo filling	Point	4.8768	38.42	Ambient	0.10	(680513,4860332)	Total Particulate Matter	N/A -1	1.07E-02	24
								PM10	N/A -3	1.07E-02	24
								PM2.5	N/A -4	1.07E-02	24
Stack 2C	Portland Cement silo filling	Point	3.9624	38.42	Ambient	0.10	(680517,4860333)	Total Particulate Matter	N/A -1	1.07E-02	24
								PM10	N/A -3	1.07E-02	24
								PM2.5	N/A -4	1.07E-02	24
Stack 2D	Pebble Lime silo filling	Point	12.4	38.42	Ambient	0.10	(680537,4860391)	Total Particulate Matter	N/A -1	1.07E-02	24
								PM10	N/A -3	1.07E-02	24
								PM2.5	N/A -4	1.07E-02	24
Stack 3	Stand-by generator	Point	3	36.92	265.85	0.2	(680475,4860419)	Nitrogen Oxides	10102-44-0	1.12E+00	1, 24

Table (i) and Table 5 (Scenario A)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
1,1,1-Trichloroethane	71-55-6	8.89E-05	CALPUFF	1.04E-04	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	
1,1-Dichloroethene	75-35-4	8.89E-05	CALPUFF	1.04E-04	24-hour	10	Health	Sch. 3	Standard	B1	<1%	
1,2,3,4-tetrachlorobenzene	634-66-2	9.27E-08	CALPUFF	1.08E-07	24-hour	600	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	9.27E-08	CALPUFF	1.08E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3-trichlorobenzene	87-61-6	1.09E-07	CALPUFF	1.28E-07	24-hour	135	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,4-trichlorobenzene	120-82-1	1.35E-07	CALPUFF	1.57E-07	24-hour	400	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichlorobenzene	95-50-1	3.60E-07	CALPUFF	3.75E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichloroethane	107-06-2	8.89E-05	CALPUFF	1.04E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,2-Dichloroethane	107-06-2	8.89E-05	CALPUFF	1.04E-04	24-hour	200	—	Sch. 6	URT	—	Below URT	
1,2-Dichloropropane	78-87-5	8.89E-05	CALPUFF	1.04E-04	24-hour	2400	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
1,3,5-trichlorobenzene	108-70-3	9.27E-08	CALPUFF	1.08E-07	24-hour	3.6	Health	Sch. 3	SL-JSL	B2	Below B2	
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	5.04E-06	Annual	2	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	1.04E-04	24-hour	300	—	Sch. 6	URT	—	Below URT	
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	5.04E-06	Annual	20	—	—	AAV	—	0%	
1,3-Dichlorobenzene	541-73-1	5.52E-07	CALPUFF	6.45E-07	24-hour	50	Health	Sch. 3	SL-JSL	B2	Below B2	
1,4-Dichlorobenzene	106-46-7	4.28E-07	CALPUFF	5.00E-07	24-hour	95	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,4-Dichlorobenzene	106-46-7	4.28E-07	CALPUFF	5.00E-07	24-hour	950	—	Sch. 6	URT	—	Below URT	
1-Methylnaphthalene	90-12-0	4.91E-07	CALPUFF	5.74E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
1-Methylphenanthrene	832-69-9	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4,5-tetrachlorophenol	4901-51-3	7.59E-07	CALPUFF	8.87E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4-trichlorophenol	15950-66-0	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	1.38E-06	CALPUFF	1.62E-06	24-hour	0.75	Health	Sch. 3	SL-JSL	B2	Below B2	
2,3,5-trichlorophenol	933-78-8	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,6-trichlorophenol	933-75-5	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3-dichlorophenol	576-24-9	7.70E-06	CALPUFF	8.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,4 & 2,5-dichlorophenol	120-83-2	7.70E-06	CALPUFF	8.99E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,5-trichlorophenol	95-95-4	4.56E-07	CALPUFF	5.33E-07	24-hour	220	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,6-trichlorophenol	88-06-2	4.56E-07	CALPUFF	5.33E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,6-dichlorophenol	87-65-0	7.70E-06	CALPUFF	8.99E-06	24-hour	19	Health	Sch. 3	SL-JSL	B2	Below B2	
2-Butanone	78-93-3	8.89E-05	CALPUFF	1.04E-04	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
2-Butanone	78-93-3	8.89E-05	CALPUFF	1.04E-04	24-hour	10000	—	Sch. 6	URT	—	Below URT	
2-Chloronaphthalene	91-58-7	9.27E-08	CALPUFF	1.08E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
2-methylanthracene	613-12-7	1.56E-07	CALPUFF	1.83E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2-Methylnaphthalene	91-57-6	8.26E-07	CALPUFF	9.65E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2-monochlorophenol	95-57-8	7.69E-06	CALPUFF	8.98E-06	24-hour	18	Health	Sch. 3	SL-JSL	B2	Below B2	
3,4,5-trichlorophenol	609-19-8	8.56E-06	CALPUFF	9.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,4-dichlorophenol	95-77-2	2.70E-05	CALPUFF	3.16E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,5-dichlorophenol	591-35-5	7.70E-06	CALPUFF	8.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-Methylcholanthrene	56-49-5	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-monochlorophenol	108-43-0	7.69E-06	CALPUFF	8.98E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
4-monochlorophenol	106-48-9	7.69E-06	CALPUFF	8.98E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
7,12-Dimethylbenzo(a)anthracene	57-97-6	4.02E-07	CALPUFF	4.70E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9,10-dimethylanthracene	781-43-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9-Methylphenanthrene	883-20-5	4.69E-07	CALPUFF	5.48E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthene	83-32-9	1.43E-07	CALPUFF	1.67E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthylene	208-96-8	1.16E-07	CALPUFF	1.35E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acetone	67-64-1	1.81E-04	CALPUFF	2.11E-04	24-hour	11880	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Acetone	67-64-1	1.81E-04	CALPUFF	2.11E-04	24-hour	118800	—	Sch. 6	URT	—	Below URT	
Ammonia	7664-41-7	3.07E-02	CALPUFF	3.58E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Ammonia	7664-41-7	3.07E-02	CALPUFF	3.58E-02	24-hour	1000	—	Sch. 6	URT	—	Below URT	
Anthracene	120-12-7	1.18E-07	CALPUFF	1.38E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Antimony	7440-36-0	3.07E-06	CALPUFF	3.58E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	

Table (i) and Table 5 (Scenario A)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Arsenic	7440-38-2	2.04E-06	CALPUFF	2.39E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	
Barium	7440-39-3	5.16E-04	CALPUFF	6.02E-04	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Benzene	71-43-2	8.89E-05	CALPUFF	1.04E-04	24-hour	0.45	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Benzene	71-43-2	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Benzene	71-43-2	8.89E-05	CALPUFF	5.04E-06	Annual	4.5	—	—	AAV	—	0%	
Benzo(a)Anthracene	56-55-3	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)fluorene	238-84-6	1.12E-07	CALPUFF	1.30E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	5.25E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Notes 6, 7, Table 2, 3 URT - Note 8, Table 4
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	1.08E-07	24-hour	0.005	—	Sch. 6	URT	—	Below URT	
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	5.25E-09	Annual	0.0001	—	—	AAV	—	0%	
Benzo(b)Fluoranthene	205-99-2	2.49E-07	CALPUFF	2.91E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(b)fluorene	243-17-4	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(e)Pyrene	192-97-2	1.74E-07	CALPUFF	2.03E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(g,h,i)Perylene	191-24-2	2.61E-07	CALPUFF	3.05E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(k)Fluoranthene	207-08-9	1.50E-07	CALPUFF	1.75E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Beryllium	7440-41-7	2.04E-06	CALPUFF	2.39E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	
Biphenyl	92-52-4	3.08E-06	CALPUFF	3.21E-05	1-hour	60	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
Bromodichloromethane	75-27-4	8.89E-05	CALPUFF	1.04E-04	24-hour	350	Health	Sch. 3	SL-JSL	B2	Below B2	
Bromodichloromethane	75-27-4	8.89E-05	CALPUFF	1.04E-04	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Bromoform	75-25-2	8.89E-05	CALPUFF	1.04E-04	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	
Bromomethane	74-83-9	8.89E-05	CALPUFF	1.04E-04	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	
Cadmium	7440-43-9	3.11E-04	CALPUFF	3.63E-04	24-hour	0.025	Health	Sch. 3	Standard	B1	1%	URT - Note 8, Table 4
Cadmium	7440-43-9	3.11E-04	CALPUFF	3.63E-04	24-hour	0.25	—	Sch. 6	URT	—	Below URT	
Carbon Monoxide	630-08-0	1.78E+00	CALPUFF	2.49E+00	½-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 17
Carbon Tetrachloride	56-23-5	8.89E-05	CALPUFF	1.04E-04	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Carbon Tetrachloride	56-23-5	8.89E-05	CALPUFF	1.04E-04	24-hour	24	—	Sch. 6	URT	—	Below URT	
Chloroform	67-66-3	8.89E-05	CALPUFF	1.04E-04	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Chloroform	67-66-3	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Chromium	7440-47-3	4.58E-05	CALPUFF	5.35E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 22 URT - Note 8, Table 4
Chromium	7440-47-3	4.58E-05	CALPUFF	5.35E-05	24-hour	5	—	Sch. 6	URT	—	Below URT	
Chrysene/Triphenylene	218-01-9	1.21E-06	CALPUFF	1.41E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cobalt	7440-48-4	1.96E-06	CALPUFF	2.28E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	
Copper	7440-50-8	1.21E-04	CALPUFF	1.41E-04	24-hour	50	Health	Sch. 3	Standard	B1	<1%	
Coronene	191-07-1	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cumene (Isopropylbenzene)	98-82-8	8.89E-05	CALPUFF	1.04E-04	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Dibenzo(a,c)Anthracene	215-58-7	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,e)pyrene	192-65-4	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,h)Anthracene	53-70-3	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibromochloromethane	124-48-1	8.89E-05	CALPUFF	1.04E-04	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below B2	
Dichlorodifluoromethane	75-71-8	8.89E-05	CALPUFF	1.04E-04	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Dioxins, Furans and Dioxin-like PCBs	N/A	0.0027 µg TEQ/s	CALPUFF	0.0031 pg TEQ/m3	24-hour	0.1 pg TEQ/m3	Health	Sch. 3	Standard	B1	3%	
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.53E-03	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.04E-04	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.04E-04	24-hour	10000	—	Sch. 6	URT	—	Below URT	
Ethylene Dibromide	106-93-4	8.89E-05	CALPUFF	1.04E-04	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	
Fluoranthene	206-44-0	1.03E-06	CALPUFF	1.20E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Fluorene	86-73-7	4.02E-07	CALPUFF	4.70E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Hexachlorobenzene	118-74-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below B2	
Hexachlorobenzene	118-74-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	

Table (i) and Table 5 (Scenario A)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Hydrogen Chloride	7647-01-0	4.00E-01	CALPUFF	4.67E-01	24-hour	20	Health	Sch. 3	Standard	B1	2%	URT - Note 8, Table 4
Hydrogen Chloride	7647-01-0	4.00E-01	CALPUFF	4.67E-01	24-hour	200	—	Sch. 6	URT	—	Below URT	
Hydrogen Fluoride	7664-39-3	4.89E-03	CALPUFF	5.71E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Hydrogen Fluoride	7664-39-3	4.89E-03	CALPUFF	8.33E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Indeno(1,2,3-cd)Pyrene	193-39-5	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Lead	7439-92-1	2.22E-03	CALPUFF	2.60E-03	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	2.22E-03	CALPUFF	3.79E-04	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	2.22E-03	CALPUFF	2.60E-03	24-hour	2	—	Sch. 6	URT	—	Below URT	
M&P-Xylene	108-38-3	1.85E-04	CALPUFF	2.17E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Mercury	7439-97-6	6.67E-04	CALPUFF	7.79E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Mercury	7439-97-6	6.67E-04	CALPUFF	7.79E-04	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	CALPUFF	1.04E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	CALPUFF	1.04E-04	24-hour	2200	—	Sch. 6	URT	—	Below URT	
Methylene Chloride	75-09-2	1.99E-04	CALPUFF	2.32E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Methylene Chloride	75-09-2	1.99E-04	CALPUFF	2.32E-04	24-hour	22000	—	Sch. 6	URT	—	Below URT	
Molybdenum	7439-98-7	1.89E-04	CALPUFF	2.21E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	
Monochlorobenzene	108-90-7	4.99E-06	CALPUFF	5.20E-05	1-hour	3500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Monochlorobenzene	108-90-7	4.99E-06	CALPUFF	8.58E-05	10-minute	4,500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
m-terphenyl	92-06-8	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Naphthalene	91-20-3	2.08E-06	CALPUFF	2.43E-06	24-hour	22.5	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Naphthalene	91-20-3	2.08E-06	CALPUFF	3.57E-05	10-minute	50	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Nickel	7440-02-0	3.42E-05	CALPUFF	1.94E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Nickel	7440-02-0	3.42E-05	CALPUFF	4.00E-05	24-hour	2	—	Sch. 6	URT	—	Below URT	
Nickel	7440-02-0	3.42E-05	CALPUFF	1.94E-06	Annual	0.4	—	—	AAV	—	0%	
Nitrogen Oxides	10102-44-0	5.38E+00	CALPUFF	6.28E+00	24-hour	200	Health	Sch. 3	Standard	B1	3%	Notes 10, 28
Nitrogen Oxides	10102-44-0	5.38E+00	CALPUFF	5.60E+01	1-hour	400	Health	Sch. 3	Standard	B1	14%	Notes 10, 28
o-Terphenyl	84-15-1	1.18E-07	CALPUFF	1.38E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
O-Xylene	95-47-6	8.89E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pentachlorobenzene	608-93-5	9.27E-08	CALPUFF	1.08E-07	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below B2	
Pentachlorophenol	87-86-5	9.49E-06	CALPUFF	1.11E-05	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	
Perylene	198-55-0	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Phenanthrene	85-01-8	5.20E-06	CALPUFF	6.08E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Picene	213-46-7	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
p-terphenyl	92-94-4	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pyrene	129-00-0	1.03E-06	CALPUFF	1.20E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Selenium	7782-49-2	1.02E-05	CALPUFF	1.19E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Silver	7440-22-4	2.04E-06	CALPUFF	2.39E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	
Styrene	100-42-5	8.89E-05	CALPUFF	1.04E-04	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Sulphur Dioxide	7446-09-5	1.56E+00	CALPUFF	1.62E+01	1-hour	100	Health & Vegetation	Sch. 3	Standard	B1	16%	Note 10, URT - Note 8, Table 4
Sulphur Dioxide	7446-09-5	1.56E+00	CALPUFF	8.83E-02	Annual	10	Health & Vegetation	Sch. 3	Standard	B1	<1%	Note 10, URT - Note 8, Table 5
Tetrachloroethene	127-18-4	8.89E-05	CALPUFF	1.04E-04	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Tetrachloroethene	127-18-4	8.89E-05	CALPUFF	1.04E-04	24-hour	3600	—	Sch. 6	URT	—	Below URT	
Tetralin	119-64-2	5.90E-07	CALPUFF	6.89E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Thallium	7440-28-0	2.04E-06	CALPUFF	2.39E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below B2	

Table (i) and Table 5 (Scenario A)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Toluene	108-88-3	1.24E-02	CALPUFF	1.45E-02	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
trans,1,2-Dichloroethene	156-60-5	8.89E-05	CALPUFF	1.04E-04	24-hour	105	Health	Sch. 3	Guideline	B1	<1%	
Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	CALPUFF	1.04E-04	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	CALPUFF	1.04E-04	24-hour	1200	—	Sch. 6	URT	—	Below URT	
Trichlorofluoromethane	75-69-4	8.89E-05	CALPUFF	1.04E-04	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Trichlorotrifluoroethane	26523-64-8	8.89E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Vanadium	7440-62-2	1.02E-06	CALPUFF	1.19E-06	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Vinyl Chloride	75-01-4	8.89E-05	CALPUFF	1.04E-04	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Vinyl Chloride	75-01-4	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Xylenes	1330-20-7	2.74E-04	CALPUFF	4.72E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11, 19
Xylenes	1330-20-7	2.74E-04	CALPUFF	3.20E-04	24-hour	730	Health	Sch. 3	Standard	B1	<1%	Notes 10, 19 URT - Note 8, Table 4
Xylenes	1330-20-7	2.74E-04	CALPUFF	3.20E-04	24-hour	7300	—	Sch. 6	URT	—	Below URT	
Zinc	7440-66-6	6.35E-04	CALPUFF	7.42E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	
Polychlorinated Biphenyls (PCB)	1336-36-3	4.53E-07	CALPUFF	5.29E-07	24-hour	0.15	Health	Sch. 3	Guideline	B1	<1%	Note 21
Suspended particulate matter (< 44 µm diameter)	N/A -1	4.00E-01	CALPUFF	5.22E-01	24-hour	120	Visibility	Sch. 3	Guideline	B1	<1%	
Particulate matter (< 10 µm diameter)	N/A -3	2.91E-01	CALPUFF	3.95E-01	24-hour	50	Health	AAQC			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	2.88E-01	CALPUFF	3.91E-01	24-hour	27	Health	CAAQS			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	2.88E-01	CALPUFF	1.99E-02	Annual	8.8	Health	CAAQS			0%	

Table 5 (Scenario B)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
1,1,1-Trichloroethane	71-55-6	4.44E-05	CALPUFF	8.04E-05	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	
1,1-Dichloroethene	75-35-4	4.44E-05	CALPUFF	8.04E-05	24-hour	10	Health	Sch. 3	Standard	B1	<1%	
1,2,3,4-tetrachlorobenzene	634-66-2	4.63E-08	CALPUFF	8.38E-08	24-hour	600	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	4.63E-08	CALPUFF	8.38E-08	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3-trichlorobenzene	87-61-6	5.47E-08	CALPUFF	9.90E-08	24-hour	135	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,4-trichlorobenzene	120-82-1	6.73E-08	CALPUFF	1.22E-07	24-hour	400	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichlorobenzene	95-50-1	1.80E-07	CALPUFF	2.16E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichloroethane	107-06-2	4.44E-05	CALPUFF	8.04E-05	24-hour	2	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,2-Dichloroethane	107-06-2	4.44E-05	CALPUFF	8.04E-05	24-hour	200	—	Sch. 6	URT	—	Below URT	
1,2-Dichloropropane	78-87-5	4.44E-05	CALPUFF	8.04E-05	24-hour	2400	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
1,3,5-trichlorobenzene	108-70-3	4.63E-08	CALPUFF	8.38E-08	24-hour	3.6	Health	Sch. 3	SL-JSL	B2	Below B2	
1,3-Butadiene	106-99-0	4.44E-05	CALPUFF	5.13E-06	Annual	2	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
1,3-Butadiene	106-99-0	4.44E-05	CALPUFF	8.04E-05	24-hour	300	—	Sch. 6	URT	—	Below URT	
1,3-Butadiene	106-99-0	4.44E-05	CALPUFF	5.13E-06	Annual	20	—	—	AAV	—	0%	
1,3-Dichlorobenzene	541-73-1	2.76E-07	CALPUFF	5.00E-07	24-hour	50	Health	Sch. 3	SL-JSL	B2	Below B2	
1,4-Dichlorobenzene	106-46-7	2.14E-07	CALPUFF	3.87E-07	24-hour	95	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,4-Dichlorobenzene	106-46-7	2.14E-07	CALPUFF	3.87E-07	24-hour	950	—	Sch. 6	URT	—	Below URT	
1-Methylnaphthalene	90-12-0	2.46E-07	CALPUFF	4.44E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
1-Methylphenanthrene	832-69-9	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4,5-tetrachlorophenol	4901-51-3	3.80E-07	CALPUFF	6.87E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4-trichlorophenol	15950-66-0	2.28E-07	CALPUFF	4.13E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	6.92E-07	CALPUFF	1.25E-06	24-hour	0.75	Health	Sch. 3	SL-JSL	B2	Below B2	
2,3,5-trichlorophenol	933-78-8	2.28E-07	CALPUFF	4.13E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,6-trichlorophenol	933-75-5	2.28E-07	CALPUFF	4.13E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3-dichlorophenol	576-24-9	3.85E-06	CALPUFF	6.96E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,4 & 2,5-dichlorophenol	120-83-2	3.85E-06	CALPUFF	6.96E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,5-trichlorophenol	95-95-4	2.28E-07	CALPUFF	4.13E-07	24-hour	220	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,6-trichlorophenol	88-06-2	2.28E-07	CALPUFF	4.13E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,6-dichlorophenol	87-65-0	3.85E-06	CALPUFF	6.96E-06	24-hour	19	Health	Sch. 3	SL-JSL	B2	Below B2	
2-Butanone	78-93-3	4.44E-05	CALPUFF	8.04E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
2-Butanone	78-93-3	4.44E-05	CALPUFF	8.04E-05	24-hour	10000	—	Sch. 6	URT	—	Below URT	
2-Chloronaphthalene	91-58-7	4.63E-08	CALPUFF	8.38E-08	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
2-methylanthracene	613-12-7	7.82E-08	CALPUFF	1.41E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2-Methylnaphthalene	91-57-6	4.13E-07	CALPUFF	7.47E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2-monochlorophenol	95-57-8	3.84E-06	CALPUFF	6.95E-06	24-hour	18	Health	Sch. 3	SL-JSL	B2	Below B2	
3,4,5-trichlorophenol	609-19-8	4.28E-06	CALPUFF	7.74E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,4-dichlorophenol	95-77-2	1.35E-05	CALPUFF	2.44E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,5-dichlorophenol	591-35-5	3.85E-06	CALPUFF	6.96E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-Methylcholanthrene	56-49-5	2.28E-07	CALPUFF	4.13E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-monochlorophenol	108-43-0	3.84E-06	CALPUFF	6.95E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
4-monochlorophenol	106-48-9	3.84E-06	CALPUFF	6.95E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
7,12-Dimethylbenzo(a)anthracene	57-97-6	2.01E-07	CALPUFF	3.64E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9,10-dimethylanthracene	781-43-1	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9-Methylphenanthrene	883-20-5	2.34E-07	CALPUFF	4.24E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthene	83-32-9	7.15E-08	CALPUFF	1.29E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthylene	208-96-8	5.78E-08	CALPUFF	1.05E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acetone	67-64-1	9.03E-05	CALPUFF	1.63E-04	24-hour	11880	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4

Table 5 (Scenario B)
Emission Summary Table

Acetone	67-64-1	9.03E-05	CALPUFF	1.63E-04	24-hour	118800	—	Sch. 6	URT	—	Below URT	
Ammonia	7664-41-7	1.53E-02	CALPUFF	2.77E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Ammonia	7664-41-7	1.53E-02	CALPUFF	2.77E-02	24-hour	1000	—	Sch. 6	URT	—	Below URT	
Anthracene	120-12-7	5.92E-08	CALPUFF	1.07E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Antimony	7440-36-0	1.53E-06	CALPUFF	2.77E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	
Arsenic	7440-38-2	1.02E-06	CALPUFF	1.85E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	
Barium	7440-39-3	2.58E-04	CALPUFF	4.66E-04	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Benzene	71-43-2	4.44E-05	CALPUFF	8.04E-05	24-hour	0.45	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Benzene	71-43-2	4.44E-05	CALPUFF	8.04E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Benzene	71-43-2	4.44E-05	CALPUFF	5.13E-06	Annual	4.5	—	—	AAV	—	0%	
Benzo(a)Anthracene	56-55-3	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)fluorene	238-84-6	5.58E-08	CALPUFF	1.01E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)Pyrene	50-32-8	4.63E-08	CALPUFF	5.35E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Notes 6, 7, Table 2, 3 URT - Note 8, Table 4
Benzo(a)Pyrene	50-32-8	4.63E-08	CALPUFF	8.38E-08	24-hour	0.005	—	Sch. 6	URT	—	Below URT	
Benzo(a)Pyrene	50-32-8	4.63E-08	CALPUFF	5.35E-09	Annual	0.0001	—	—	AAV	—	0%	
Benzo(b)Fluoranthene	205-99-2	1.25E-07	CALPUFF	2.26E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(b)fluorene	243-17-4	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(e)Pyrene	192-97-2	8.71E-08	CALPUFF	1.58E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(g,h,i)Perylene	191-24-2	1.31E-07	CALPUFF	2.36E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(k)Fluoranthene	207-08-9	7.48E-08	CALPUFF	1.35E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Beryllium	7440-41-7	1.02E-06	CALPUFF	1.85E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	
Biphenyl	92-52-4	1.54E-06	CALPUFF	1.85E-05	1-hour	60	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
Bromodichloromethane	75-27-4	4.44E-05	CALPUFF	8.04E-05	24-hour	350	Health	Sch. 3	SL-JSL	B2	Below B2	
Bromodichloromethane	75-27-4	4.44E-05	CALPUFF	8.04E-05	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Bromoform	75-25-2	4.44E-05	CALPUFF	8.04E-05	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	
Bromomethane	74-83-9	4.44E-05	CALPUFF	8.04E-05	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	
Cadmium	7440-43-9	1.56E-04	CALPUFF	2.81E-04	24-hour	0.025	Health	Sch. 3	Standard	B1	1%	URT - Note 8, Table 4
Cadmium	7440-43-9	1.56E-04	CALPUFF	2.81E-04	24-hour	0.25	—	Sch. 6	URT	—	Below URT	
Carbon Monoxide	630-08-0	8.89E-01	CALPUFF	1.93E+00	½-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 17
Carbon Tetrachloride	56-23-5	4.44E-05	CALPUFF	8.04E-05	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Carbon Tetrachloride	56-23-5	4.44E-05	CALPUFF	8.04E-05	24-hour	24	—	Sch. 6	URT	—	Below URT	
Chloroform	67-66-3	4.44E-05	CALPUFF	8.04E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Chloroform	67-66-3	4.44E-05	CALPUFF	8.04E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Chromium	7440-47-3	2.29E-05	CALPUFF	4.14E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 22 URT - Note 8, Table 4
Chromium	7440-47-3	2.29E-05	CALPUFF	4.14E-05	24-hour	5	—	Sch. 6	URT	—	Below URT	
Chrysene/Triphenylene	218-01-9	6.03E-07	CALPUFF	1.09E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cobalt	7440-48-4	9.78E-07	CALPUFF	1.77E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	
Copper	7440-50-8	6.04E-05	CALPUFF	1.09E-04	24-hour	50	Health	Sch. 3	Standard	B1	<1%	
Coronene	191-07-1	2.28E-07	CALPUFF	4.13E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cumene (Isopropylbenzene)	98-82-8	4.44E-05	CALPUFF	8.04E-05	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Dibenzo(a,c)Anthracene	215-58-7	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,e)pyrene	192-65-4	2.28E-07	CALPUFF	4.13E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,h)Anthracene	53-70-3	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibromochloromethane	124-48-1	4.44E-05	CALPUFF	8.04E-05	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below B2	
Dichlorodifluoromethane	75-71-8	4.44E-05	CALPUFF	8.04E-05	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Dioxins, Furans and Dioxin-like PCBs	N/A	0.0013 µg TEQ/s	CALPUFF	0.0016 pg TEQ/m3	24-hour	0.1 pg TEQ/m3	Health	Sch. 3	Standard	B1	2%	
Ethylbenzene	100-41-4	4.44E-05	CALPUFF	8.81E-04	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Ethylbenzene	100-41-4	4.44E-05	CALPUFF	8.04E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Ethylbenzene	100-41-4	4.44E-05	CALPUFF	8.04E-05	24-hour	10000	—	Sch. 6	URT	—	Below URT	
Ethylene Dibromide	106-93-4	4.44E-05	CALPUFF	8.04E-05	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	

Table 5 (Scenario B)
Emission Summary Table

Fluoranthene	206-44-0	5.14E-07	CALPUFF	9.29E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Fluorene	86-73-7	2.01E-07	CALPUFF	3.64E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Hexachlorobenzene	118-74-1	4.63E-08	CALPUFF	8.38E-08	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below B2	
Hexachlorobenzene	118-74-1	4.63E-08	CALPUFF	8.38E-08	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Hydrogen Chloride	7647-01-0	2.00E-01	CALPUFF	3.62E-01	24-hour	20	Health	Sch. 3	Standard	B1	2%	URT - Note 8, Table 4
Hydrogen Chloride	7647-01-0	2.00E-01	CALPUFF	3.62E-01	24-hour	200	—	Sch. 6	URT	—	Below URT	
Hydrogen Fluoride	7664-39-3	2.44E-03	CALPUFF	4.42E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Hydrogen Fluoride	7664-39-3	2.44E-03	CALPUFF	9.08E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Indeno(1,2,3-cd)Pyrene	193-39-5	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Lead	7439-92-1	1.11E-03	CALPUFF	2.01E-03	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	1.11E-03	CALPUFF	4.13E-04	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	1.11E-03	CALPUFF	2.01E-03	24-hour	2	—	Sch. 6	URT	—	Below URT	
M&P-Xylene	108-38-3	9.27E-05	CALPUFF	1.68E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Mercury	7439-97-6	3.33E-04	CALPUFF	6.03E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Mercury	7439-97-6	3.33E-04	CALPUFF	6.03E-04	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	4.44E-05	CALPUFF	8.04E-05	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	4.44E-05	CALPUFF	8.04E-05	24-hour	2200	—	Sch. 6	URT	—	Below URT	
Methylene Chloride	75-09-2	9.94E-05	CALPUFF	1.80E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Methylene Chloride	75-09-2	9.94E-05	CALPUFF	1.80E-04	24-hour	22000	—	Sch. 6	URT	—	Below URT	
Molybdenum	7439-98-7	9.44E-05	CALPUFF	1.71E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	
Monochlorobenzene	108-90-7	2.50E-06	CALPUFF	3.00E-05	1-hour	3500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Monochlorobenzene	108-90-7	2.50E-06	CALPUFF	4.95E-05	10-minute	4,500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
m-terphenyl	92-06-8	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Naphthalene	91-20-3	1.04E-06	CALPUFF	1.88E-06	24-hour	22.5	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Naphthalene	91-20-3	1.04E-06	CALPUFF	2.06E-05	10-minute	50	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Nickel	7440-02-0	1.71E-05	CALPUFF	1.97E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Nickel	7440-02-0	1.71E-05	CALPUFF	3.10E-05	24-hour	2	—	Sch. 6	URT	—	Below URT	
Nickel	7440-02-0	1.71E-05	CALPUFF	1.97E-06	Annual	0.4	—	—	AAV	—	0%	
Nitrogen Oxides	10102-44-0	2.69E+00	CALPUFF	4.86E+00	24-hour	200	Health	Sch. 3	Standard	B1	2%	Notes 10, 28
Nitrogen Oxides	10102-44-0	2.69E+00	CALPUFF	3.23E+01	1-hour	400	Health	Sch. 3	Standard	B1	8%	Notes 10, 28
o-Terphenyl	84-15-1	5.92E-08	CALPUFF	1.07E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
O-Xylene	95-47-6	4.44E-05	CALPUFF	8.04E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pentachlorobenzene	608-93-5	4.63E-08	CALPUFF	8.38E-08	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below B2	
Pentachlorophenol	87-86-5	4.75E-06	CALPUFF	8.58E-06	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	
Perylene	198-55-0	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Phenanthrene	85-01-8	2.60E-06	CALPUFF	4.71E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Picene	213-46-7	2.28E-07	CALPUFF	4.13E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
p-terphenyl	92-94-4	4.63E-08	CALPUFF	8.38E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pyrene	129-00-0	5.14E-07	CALPUFF	9.29E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Selenium	7782-49-2	5.11E-06	CALPUFF	9.25E-06	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Silver	7440-22-4	1.02E-06	CALPUFF	1.85E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	
Styrene	100-42-5	4.44E-05	CALPUFF	8.04E-05	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Sulphur Dioxide	7446-09-5	7.79E-01	CALPUFF	9.35E+00	1-hour	100	ealth & Vegetati	Sch. 3	Standard	B1	9%	Note 10, URT - Note 8, Table 4

Table 5 (Scenario B)
Emission Summary Table

Sulphur Dioxide	7446-09-5	7.79E-01	CALPUFF	8.99E-02	Annual	10	ealth & Vegetati	Sch. 3	Standard	B1	<1%	Note 10, URT - Note 8, Table 5
Tetrachloroethene	127-18-4	4.44E-05	CALPUFF	8.04E-05	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Tetrachloroethene	127-18-4	4.44E-05	CALPUFF	8.04E-05	24-hour	3600	—	Sch. 6	URT	—	Below URT	
Tetralin	119-64-2	2.95E-07	CALPUFF	5.33E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Thallium	7440-28-0	1.02E-06	CALPUFF	1.85E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Toluene	108-88-3	6.19E-03	CALPUFF	1.12E-02	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
trans,1,2-Dichloroethene	156-60-5	4.44E-05	CALPUFF	8.04E-05	24-hour	105	Health	Sch. 3	Guideline	B1	<1%	
Trichloroethene/1,1,2-Trichloroethane	79-01-6	4.44E-05	CALPUFF	8.04E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Trichloroethene/1,1,2-Trichloroethane	79-01-6	4.44E-05	CALPUFF	8.04E-05	24-hour	1200	—	Sch. 6	URT	—	Below URT	
Trichlorofluoromethane	75-69-4	4.44E-05	CALPUFF	8.04E-05	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Trichlorotrifluoroethane	26523-64-8	4.44E-05	CALPUFF	8.04E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Vanadium	7440-62-2	5.11E-07	CALPUFF	9.25E-07	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Vinyl Chloride	75-01-4	4.44E-05	CALPUFF	8.04E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Vinyl Chloride	75-01-4	4.44E-05	CALPUFF	8.04E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Xylenes	1330-20-7	1.37E-04	CALPUFF	2.72E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11, 19
Xylenes	1330-20-7	1.37E-04	CALPUFF	2.48E-04	24-hour	730	Health	Sch. 3	Standard	B1	<1%	Notes 10, 19 URT - Note 8, Table 4
Xylenes	1330-20-7	1.37E-04	CALPUFF	2.48E-04	24-hour	7300	—	Sch. 6	URT	—	Below URT	
Zinc	7440-66-6	3.18E-04	CALPUFF	5.75E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	
Polychlorinated Biphenyls (PCB)	1336-36-3	2.27E-07	CALPUFF	2.65E-07	24-hour	0.15	Health	Sch. 3	Guideline	B1	<1%	Note 21
Suspended particulate matter (< 44 µm diameter)	N/A -1	2.00E-01	CALPUFF	4.02E-01	24-hour	120	Visibility	Sch. 3	Guideline	B1	<1%	
Particulate matter (< 10 µm diameter)	N/A -3	1.46E-01	CALPUFF	3.04E-01	24-hour	50	Health	AAQC			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	1.44E-01	CALPUFF	3.01E-01	24-hour	27	Health	CAAQS			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	1.44E-01	CALPUFF	1.52E-02	Annual	8.8	Health	CAAQS			0%	

Table 5 (Scenario C)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
1,1,1-Trichloroethane	71-55-6	4.85E-05	CALPUFF	6.82E-05	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	
1,1-Dichloroethene	75-35-4	4.85E-05	CALPUFF	6.82E-05	24-hour	10	Health	Sch. 3	Standard	B1	<1%	
1,2,3,4-tetrachlorobenzene	634-66-2	5.06E-08	CALPUFF	7.11E-08	24-hour	600	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	5.06E-08	CALPUFF	7.11E-08	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3-trichlorobenzene	87-61-6	5.97E-08	CALPUFF	8.39E-08	24-hour	135	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,4-trichlorobenzene	120-82-1	7.34E-08	CALPUFF	1.03E-07	24-hour	400	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichlorobenzene	95-50-1	1.97E-07	CALPUFF	2.29E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichloroethane	107-06-2	4.85E-05	CALPUFF	6.82E-05	24-hour	2	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,2-Dichloroethane	107-06-2	4.85E-05	CALPUFF	6.82E-05	24-hour	200	—	Sch. 6	URT	—	Below URT	
1,2-Dichloropropane	78-87-5	4.85E-05	CALPUFF	6.82E-05	24-hour	2400	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
1,3,5-trichlorobenzene	108-70-3	5.06E-08	CALPUFF	7.11E-08	24-hour	3.6	Health	Sch. 3	SL-JSL	B2	Below B2	
1,3-Butadiene	106-99-0	4.85E-05	CALPUFF	3.96E-06	Annual	2	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
1,3-Butadiene	106-99-0	4.85E-05	CALPUFF	6.82E-05	24-hour	300	—	Sch. 6	URT	—	Below URT	
1,3-Butadiene	106-99-0	4.85E-05	CALPUFF	3.96E-06	Annual	20	—	—	AAV	—	0%	
1,3-Dichlorobenzene	541-73-1	3.01E-07	CALPUFF	4.24E-07	24-hour	50	Health	Sch. 3	SL-JSL	B2	Below B2	
1,4-Dichlorobenzene	106-46-7	2.33E-07	CALPUFF	3.28E-07	24-hour	95	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,4-Dichlorobenzene	106-46-7	2.33E-07	CALPUFF	3.28E-07	24-hour	950	—	Sch. 6	URT	—	Below URT	
1-Methylnaphthalene	90-12-0	2.68E-07	CALPUFF	3.77E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
1-Methylphenanthrene	832-69-9	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4,5-tetrachlorophenol	4901-51-3	4.14E-07	CALPUFF	5.82E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4-trichlorophenol	15950-66-0	2.49E-07	CALPUFF	3.50E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	7.55E-07	CALPUFF	1.06E-06	24-hour	0.75	Health	Sch. 3	SL-JSL	B2	Below B2	
2,3,5-trichlorophenol	933-78-8	2.49E-07	CALPUFF	3.50E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,6-trichlorophenol	933-75-5	2.49E-07	CALPUFF	3.50E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3-dichlorophenol	576-24-9	4.20E-06	CALPUFF	5.91E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,4 & 2,5-dichlorophenol	120-83-2	4.20E-06	CALPUFF	5.91E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,5-trichlorophenol	95-95-4	2.49E-07	CALPUFF	3.50E-07	24-hour	220	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,6-trichlorophenol	88-06-2	2.49E-07	CALPUFF	3.50E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,6-dichlorophenol	87-65-0	4.20E-06	CALPUFF	5.91E-06	24-hour	19	Health	Sch. 3	SL-JSL	B2	Below B2	
2-Butanone	78-93-3	4.85E-05	CALPUFF	6.82E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
2-Butanone	78-93-3	4.85E-05	CALPUFF	6.82E-05	24-hour	10000	—	Sch. 6	URT	—	Below URT	
2-Chloronaphthalene	91-58-7	5.06E-08	CALPUFF	7.11E-08	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
2-methylanthracene	613-12-7	8.53E-08	CALPUFF	1.20E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2-Methylnaphthalene	91-57-6	4.51E-07	CALPUFF	6.34E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2-monochlorophenol	95-57-8	4.19E-06	CALPUFF	5.90E-06	24-hour	18	Health	Sch. 3	SL-JSL	B2	Below B2	
3,4,5-trichlorophenol	609-19-8	4.67E-06	CALPUFF	6.56E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,4-dichlorophenol	95-77-2	1.47E-05	CALPUFF	2.07E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,5-dichlorophenol	591-35-5	4.20E-06	CALPUFF	5.91E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-Methylcholanthrene	56-49-5	2.49E-07	CALPUFF	3.50E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-monochlorophenol	108-43-0	4.19E-06	CALPUFF	5.90E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
4-monochlorophenol	106-48-9	4.19E-06	CALPUFF	5.90E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
7,12-Dimethylbenzo(a)anthracene	57-97-6	2.19E-07	CALPUFF	3.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9,10-dimethylanthracene	781-43-1	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9-Methylphenanthrene	883-20-5	2.56E-07	CALPUFF	3.60E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthene	83-32-9	7.80E-08	CALPUFF	1.10E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthylene	208-96-8	6.31E-08	CALPUFF	8.87E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acetone	67-64-1	9.85E-05	CALPUFF	1.39E-04	24-hour	11880	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Acetone	67-64-1	9.85E-05	CALPUFF	1.39E-04	24-hour	118800	—	Sch. 6	URT	—	Below URT	

Table 5 (Scenario C)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Ammonia	7664-41-7	1.67E-02	CALPUFF	2.35E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Ammonia	7664-41-7	1.67E-02	CALPUFF	2.35E-02	24-hour	1000	—	Sch. 6	URT	—	Below URT	
Anthracene	120-12-7	6.46E-08	CALPUFF	9.08E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Antimony	7440-36-0	1.67E-06	CALPUFF	2.35E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	
Arsenic	7440-38-2	1.12E-06	CALPUFF	1.57E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	
Barium	7440-39-3	2.81E-04	CALPUFF	3.95E-04	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Benzene	71-43-2	4.85E-05	CALPUFF	6.82E-05	24-hour	0.45	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Benzene	71-43-2	4.85E-05	CALPUFF	6.82E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Benzene	71-43-2	4.85E-05	CALPUFF	3.96E-06	Annual	4.5	—	—	AAV	—	0%	
Benzo(a)Anthracene	56-55-3	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)fluorene	238-84-6	6.09E-08	CALPUFF	8.56E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)Pyrene	50-32-8	5.06E-08	CALPUFF	4.13E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Notes 6, 7, Table 2, 3 URT - Note 8, Table 4
Benzo(a)Pyrene	50-32-8	5.06E-08	CALPUFF	7.11E-08	24-hour	0.005	—	Sch. 6	URT	—	Below URT	
Benzo(a)Pyrene	50-32-8	5.06E-08	CALPUFF	4.13E-09	Annual	0.0001	—	—	AAV	—	0%	
Benzo(b)Fluoranthene	205-99-2	1.36E-07	CALPUFF	1.91E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(b)fluorene	243-17-4	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(e)Pyrene	192-97-2	9.50E-08	CALPUFF	1.34E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(g,h,i)Perylene	191-24-2	1.43E-07	CALPUFF	2.00E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(k)Fluoranthene	207-08-9	8.16E-08	CALPUFF	1.15E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Beryllium	7440-41-7	1.12E-06	CALPUFF	1.57E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	
Biphenyl	92-52-4	1.68E-06	CALPUFF	1.96E-05	1-hour	60	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
Bromodichloromethane	75-27-4	4.85E-05	CALPUFF	6.82E-05	24-hour	350	Health	Sch. 3	SL-JSL	B2	Below B2	
Bromodichloromethane	75-27-4	4.85E-05	CALPUFF	6.82E-05	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Bromoform	75-25-2	4.85E-05	CALPUFF	6.82E-05	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	
Bromomethane	74-83-9	4.85E-05	CALPUFF	6.82E-05	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	
Cadmium	7440-43-9	1.70E-04	CALPUFF	2.39E-04	24-hour	0.025	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Cadmium	7440-43-9	1.70E-04	CALPUFF	2.39E-04	24-hour	0.25	—	Sch. 6	URT	—	Below URT	
Carbon Monoxide	630-08-0	9.70E-01	CALPUFF	1.64E+00	½-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 17
Carbon Tetrachloride	56-23-5	4.85E-05	CALPUFF	6.82E-05	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Carbon Tetrachloride	56-23-5	4.85E-05	CALPUFF	6.82E-05	24-hour	24	—	Sch. 6	URT	—	Below URT	
Chloroform	67-66-3	4.85E-05	CALPUFF	6.82E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Chloroform	67-66-3	4.85E-05	CALPUFF	6.82E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Chromium	7440-47-3	2.50E-05	CALPUFF	3.51E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 22 URT - Note 8, Table 4
Chromium	7440-47-3	2.50E-05	CALPUFF	3.51E-05	24-hour	5	—	Sch. 6	URT	—	Below URT	
Chrysene/Triphenylene	218-01-9	6.58E-07	CALPUFF	9.25E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cobalt	7440-48-4	1.07E-06	CALPUFF	1.50E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	
Copper	7440-50-8	6.59E-05	CALPUFF	9.27E-05	24-hour	50	Health	Sch. 3	Standard	B1	<1%	
Coronene	191-07-1	2.49E-07	CALPUFF	3.50E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cumene (Isopropylbenzene)	98-82-8	4.85E-05	CALPUFF	6.82E-05	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Dibenzo(a,c)Anthracene	215-58-7	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,e)pyrene	192-65-4	2.49E-07	CALPUFF	3.50E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,h)Anthracene	53-70-3	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibromochloromethane	124-48-1	4.85E-05	CALPUFF	6.82E-05	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below B2	
Dichlorodifluoromethane	75-71-8	4.85E-05	CALPUFF	6.82E-05	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Dioxins, Furans and Dioxin-like PCBs	N/A	0.0015 µg TEQ/s	CALPUFF	0.0017 pg TEQ/m3	24-hour	0.1 pg TEQ/m3	Health	Sch. 3	Standard	B1	2%	
Ethylbenzene	100-41-4	4.85E-05	CALPUFF	9.32E-04	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11

Table 5 (Scenario C)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Ethylbenzene	100-41-4	4.85E-05	CALPUFF	6.82E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Ethylbenzene	100-41-4	4.85E-05	CALPUFF	6.82E-05	24-hour	10000	—	Sch. 6	URT	—	Below URT	
Ethylene Dibromide	106-93-4	4.85E-05	CALPUFF	6.82E-05	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	
Fluoranthene	206-44-0	5.60E-07	CALPUFF	7.88E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Fluorene	86-73-7	2.19E-07	CALPUFF	3.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Hexachlorobenzene	118-74-1	5.06E-08	CALPUFF	7.11E-08	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below B2	
Hexachlorobenzene	118-74-1	5.06E-08	CALPUFF	7.11E-08	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Hydrogen Chloride	7647-01-0	2.18E-01	CALPUFF	3.07E-01	24-hour	20	Health	Sch. 3	Standard	B1	2%	URT - Note 8, Table 4
Hydrogen Chloride	7647-01-0	2.18E-01	CALPUFF	3.07E-01	24-hour	200	—	Sch. 6	URT	—	Below URT	
Hydrogen Fluoride	7664-39-3	2.67E-03	CALPUFF	3.75E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Hydrogen Fluoride	7664-39-3	2.67E-03	CALPUFF	7.08E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Indeno(1,2,3-cd)Pyrene	193-39-5	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Lead	7439-92-1	1.21E-03	CALPUFF	1.70E-03	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	1.21E-03	CALPUFF	3.22E-04	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	1.21E-03	CALPUFF	1.70E-03	24-hour	2	—	Sch. 6	URT	—	Below URT	
M&P-Xylene	108-38-3	1.01E-04	CALPUFF	1.42E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Mercury	7439-97-6	3.64E-04	CALPUFF	5.11E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Mercury	7439-97-6	3.64E-04	CALPUFF	5.11E-04	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	4.85E-05	CALPUFF	6.82E-05	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	4.85E-05	CALPUFF	6.82E-05	24-hour	2200	—	Sch. 6	URT	—	Below URT	
Methylene Chloride	75-09-2	1.08E-04	CALPUFF	1.52E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Methylene Chloride	75-09-2	1.08E-04	CALPUFF	1.52E-04	24-hour	22000	—	Sch. 6	URT	—	Below URT	
Molybdenum	7439-98-7	1.03E-04	CALPUFF	1.45E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	
Monochlorobenzene	108-90-7	2.72E-06	CALPUFF	3.17E-05	1-hour	3500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Monochlorobenzene	108-90-7	2.72E-06	CALPUFF	5.23E-05	10-minute	4,500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
m-terphenyl	92-06-8	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Naphthalene	91-20-3	1.13E-06	CALPUFF	1.59E-06	24-hour	22.5	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Naphthalene	91-20-3	1.13E-06	CALPUFF	2.18E-05	10-minute	50	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Nickel	7440-02-0	1.87E-05	CALPUFF	1.53E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Nickel	7440-02-0	1.87E-05	CALPUFF	2.62E-05	24-hour	2	—	Sch. 6	URT	—	Below URT	
Nickel	7440-02-0	1.87E-05	CALPUFF	1.53E-06	Annual	0.4	—	—	AAV	—	0%	
Nitrogen Oxides	10102-44-0	3.35E+00	CALPUFF	4.72E+00	24-hour	200	Health	Sch. 3	Standard	B1	2%	Notes 10, 28
Nitrogen Oxides	10102-44-0	3.35E+00	CALPUFF	3.91E+01	1-hour	400	Health	Sch. 3	Standard	B1	10%	Notes 10, 28
o-Terphenyl	84-15-1	6.46E-08	CALPUFF	9.08E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
O-Xylene	95-47-6	4.85E-05	CALPUFF	6.82E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pentachlorobenzene	608-93-5	5.06E-08	CALPUFF	7.11E-08	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below B2	
Pentachlorophenol	87-86-5	5.18E-06	CALPUFF	7.28E-06	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	
Perylene	198-55-0	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	

Table 5 (Scenario C)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Phenanthrene	85-01-8	2.84E-06	CALPUFF	3.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Picene	213-46-7	2.49E-07	CALPUFF	3.50E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
p-terphenyl	92-94-4	5.06E-08	CALPUFF	7.11E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pyrene	129-00-0	5.60E-07	CALPUFF	7.88E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Selenium	7782-49-2	5.58E-06	CALPUFF	7.84E-06	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Silver	7440-22-4	1.12E-06	CALPUFF	1.57E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	
Styrene	100-42-5	4.85E-05	CALPUFF	6.82E-05	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Sulphur Dioxide	7446-09-5	8.49E-01	CALPUFF	9.89E+00	1-hour	100	Health & Vegetation	Sch. 3	Standard	B1	10%	Note 10, URT - Note 8, Table 4
Sulphur Dioxide	7446-09-5	8.49E-01	CALPUFF	6.94E-02	Annual	10	Health & Vegetation	Sch. 3	Standard	B1	<1%	Note 10, URT - Note 8, Table 5
Tetrachloroethene	127-18-4	4.85E-05	CALPUFF	6.82E-05	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Tetrachloroethene	127-18-4	4.85E-05	CALPUFF	6.82E-05	24-hour	3600	—	Sch. 6	URT	—	Below URT	
Tetralin	119-64-2	3.22E-07	CALPUFF	4.52E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Thallium	7440-28-0	1.12E-06	CALPUFF	1.57E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Toluene	108-88-3	6.75E-03	CALPUFF	9.50E-03	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
trans,1,2-Dichloroethene	156-60-5	4.85E-05	CALPUFF	6.82E-05	24-hour	105	Health	Sch. 3	Guideline	B1	<1%	
Trichloroethene/1,1,2-Trichloroethane	79-01-6	4.85E-05	CALPUFF	6.82E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Trichloroethene/1,1,2-Trichloroethane	79-01-6	4.85E-05	CALPUFF	6.82E-05	24-hour	1200	—	Sch. 6	URT	—	Below URT	
Trichlorofluoromethane	75-69-4	4.85E-05	CALPUFF	6.82E-05	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Trichlorotrifluoroethane	26523-64-8	4.85E-05	CALPUFF	6.82E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Vanadium	7440-62-2	5.58E-07	CALPUFF	7.84E-07	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Vinyl Chloride	75-01-4	4.85E-05	CALPUFF	6.82E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Vinyl Chloride	75-01-4	4.85E-05	CALPUFF	6.82E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Xylenes	1330-20-7	1.50E-04	CALPUFF	2.87E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11, 19
Xylenes	1330-20-7	1.50E-04	CALPUFF	2.10E-04	24-hour	730	Health	Sch. 3	Standard	B1	<1%	Notes 10, 19 URT - Note 8, Table 4
Xylenes	1330-20-7	1.50E-04	CALPUFF	2.10E-04	24-hour	7300	—	Sch. 6	URT	—	Below URT	
Zinc	7440-66-6	3.47E-04	CALPUFF	4.87E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	
Polychlorinated Biphenyls (PCB)	1336-36-3	2.47E-07	CALPUFF	2.89E-07	24-hour	0.15	Health	Sch. 3	Guideline	B1	<1%	Note 21
Suspended particulate matter (< 44 µm diameter)	N/A -1	2.18E-01	CALPUFF	3.48E-01	24-hour	120	Visibility	Sch. 3	Guideline	B1	<1%	
Particulate matter (< 10 µm diameter)	N/A -3	1.59E-01	CALPUFF	2.79E-01	24-hour	50	Health	AAQC			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	1.57E-01	CALPUFF	2.78E-01	24-hour	27	Health	CAAQS			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	1.57E-01	CALPUFF	1.26E-02	Annual	8.8	Health	CAAQS			0%	

Table 5 (Scenario D)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
1,1,1-Trichloroethane	71-55-6	2.42E-05	CALPUFF	4.99E-05	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	
1,1-Dichloroethene	75-35-4	2.42E-05	CALPUFF	4.99E-05	24-hour	10	Health	Sch. 3	Standard	B1	<1%	
1,2,3,4-tetrachlorobenzene	634-66-2	2.53E-08	CALPUFF	5.20E-08	24-hour	600	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	2.53E-08	CALPUFF	5.20E-08	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3-trichlorobenzene	87-61-6	2.98E-08	CALPUFF	6.14E-08	24-hour	135	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,4-trichlorobenzene	120-82-1	3.67E-08	CALPUFF	7.55E-08	24-hour	400	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichlorobenzene	95-50-1	9.83E-08	CALPUFF	1.51E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichloroethane	107-06-2	2.42E-05	CALPUFF	4.99E-05	24-hour	2	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,2-Dichloroethane	107-06-2	2.42E-05	CALPUFF	4.99E-05	24-hour	200	—	Sch. 6	URT	—	Below URT	
1,2-Dichloropropane	78-87-5	2.42E-05	CALPUFF	4.99E-05	24-hour	2400	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
1,3,5-trichlorobenzene	108-70-3	2.53E-08	CALPUFF	5.20E-08	24-hour	3.6	Health	Sch. 3	SL-JSL	B2	Below B2	
1,3-Butadiene	106-99-0	2.42E-05	CALPUFF	3.87E-06	Annual	2	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
1,3-Butadiene	106-99-0	2.42E-05	CALPUFF	4.99E-05	24-hour	300	—	Sch. 6	URT	—	Below URT	
1,3-Butadiene	106-99-0	2.42E-05	CALPUFF	3.87E-06	Annual	20	—	—	AAV	—	0%	
1,3-Dichlorobenzene	541-73-1	1.51E-07	CALPUFF	3.10E-07	24-hour	50	Health	Sch. 3	SL-JSL	B2	Below B2	
1,4-Dichlorobenzene	106-46-7	1.17E-07	CALPUFF	2.40E-07	24-hour	95	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,4-Dichlorobenzene	106-46-7	1.17E-07	CALPUFF	2.40E-07	24-hour	950	—	Sch. 6	URT	—	Below URT	
1-Methylnaphthalene	90-12-0	1.34E-07	CALPUFF	2.76E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
1-Methylphenanthrene	832-69-9	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4,5-tetrachlorophenol	4901-51-3	2.07E-07	CALPUFF	4.26E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4-trichlorophenol	15950-66-0	1.24E-07	CALPUFF	2.56E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	3.78E-07	CALPUFF	7.77E-07	24-hour	0.75	Health	Sch. 3	SL-JSL	B2	Below B2	
2,3,5-trichlorophenol	933-78-8	1.24E-07	CALPUFF	2.56E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,6-trichlorophenol	933-75-5	1.24E-07	CALPUFF	2.56E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3-dichlorophenol	576-24-9	2.10E-06	CALPUFF	4.32E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,4 & 2,5-dichlorophenol	120-83-2	2.10E-06	CALPUFF	4.32E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,5-trichlorophenol	95-95-4	1.24E-07	CALPUFF	2.56E-07	24-hour	220	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,6-trichlorophenol	88-06-2	1.24E-07	CALPUFF	2.56E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,6-dichlorophenol	87-65-0	2.10E-06	CALPUFF	4.32E-06	24-hour	19	Health	Sch. 3	SL-JSL	B2	Below B2	
2-Butanone	78-93-3	2.42E-05	CALPUFF	4.99E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
2-Butanone	78-93-3	2.42E-05	CALPUFF	4.99E-05	24-hour	10000	—	Sch. 6	URT	—	Below URT	
2-Chloronaphthalene	91-58-7	2.53E-08	CALPUFF	5.20E-08	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
2-methylanthracene	613-12-7	4.26E-08	CALPUFF	8.78E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2-Methylnaphthalene	91-57-6	2.25E-07	CALPUFF	4.64E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2-monochlorophenol	95-57-8	2.10E-06	CALPUFF	4.32E-06	24-hour	18	Health	Sch. 3	SL-JSL	B2	Below B2	
3,4,5-trichlorophenol	609-19-8	2.33E-06	CALPUFF	4.80E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,4-dichlorophenol	95-77-2	7.37E-06	CALPUFF	1.52E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,5-dichlorophenol	591-35-5	2.10E-06	CALPUFF	4.32E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-Methylcholanthrene	56-49-5	1.24E-07	CALPUFF	2.56E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-monochlorophenol	108-43-0	2.10E-06	CALPUFF	4.32E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
4-monochlorophenol	106-48-9	2.10E-06	CALPUFF	4.32E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
7,12-Dimethylbenzo(a)anthracene	57-97-6	1.10E-07	CALPUFF	2.26E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9,10-dimethylanthracene	781-43-1	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9-Methylphenanthrene	883-20-5	1.28E-07	CALPUFF	2.63E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthene	83-32-9	3.90E-08	CALPUFF	8.03E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthylene	208-96-8	3.15E-08	CALPUFF	6.49E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acetone	67-64-1	4.93E-05	CALPUFF	1.01E-04	24-hour	11880	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4

Table 5 (Scenario D)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Acetone	67-64-1	4.93E-05	CALPUFF	1.01E-04	24-hour	118800	—	Sch. 6	URT	—	Below URT	
Ammonia	7664-41-7	8.36E-03	CALPUFF	1.72E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Ammonia	7664-41-7	8.36E-03	CALPUFF	1.72E-02	24-hour	1000	—	Sch. 6	URT	—	Below URT	
Anthracene	120-12-7	3.23E-08	CALPUFF	6.65E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Antimony	7440-36-0	8.36E-07	CALPUFF	1.72E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	
Arsenic	7440-38-2	5.58E-07	CALPUFF	1.15E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	
Barium	7440-39-3	1.41E-04	CALPUFF	2.89E-04	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Benzene	71-43-2	2.42E-05	CALPUFF	4.99E-05	24-hour	0.45	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Benzene	71-43-2	2.42E-05	CALPUFF	4.99E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Benzene	71-43-2	2.42E-05	CALPUFF	3.87E-06	Annual	4.5	—	—	AAV	—	0%	
Benzo(a)Anthracene	56-55-3	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)fluorene	238-84-6	3.05E-08	CALPUFF	6.27E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)Pyrene	50-32-8	2.53E-08	CALPUFF	4.04E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Notes 6, 7, Table 2, 3 URT - Note 8, Table 4
Benzo(a)Pyrene	50-32-8	2.53E-08	CALPUFF	5.20E-08	24-hour	0.005	—	Sch. 6	URT	—	Below URT	
Benzo(a)Pyrene	50-32-8	2.53E-08	CALPUFF	4.04E-09	Annual	0.0001	—	—	AAV	—	0%	
Benzo(b)Fluoranthene	205-99-2	6.80E-08	CALPUFF	1.40E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(b)fluorene	243-17-4	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(e)Pyrene	192-97-2	4.75E-08	CALPUFF	9.78E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(g,h,i)Perylene	191-24-2	7.13E-08	CALPUFF	1.47E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(k)Fluoranthene	207-08-9	4.08E-08	CALPUFF	8.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Beryllium	7440-41-7	5.58E-07	CALPUFF	1.15E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	
Biphenyl	92-52-4	8.40E-07	CALPUFF	1.29E-05	1-hour	60	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
Bromodichloromethane	75-27-4	2.42E-05	CALPUFF	4.99E-05	24-hour	350	Health	Sch. 3	SL-JSL	B2	Below B2	
Bromodichloromethane	75-27-4	2.42E-05	CALPUFF	4.99E-05	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Bromoform	75-25-2	2.42E-05	CALPUFF	4.99E-05	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	
Bromomethane	74-83-9	2.42E-05	CALPUFF	4.99E-05	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	
Cadmium	7440-43-9	8.48E-05	CALPUFF	1.75E-04	24-hour	0.025	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Cadmium	7440-43-9	8.48E-05	CALPUFF	1.75E-04	24-hour	0.25	—	Sch. 6	URT	—	Below URT	
Carbon Monoxide	630-08-0	4.85E-01	CALPUFF	1.20E+00	½-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 17
Carbon Tetrachloride	56-23-5	2.42E-05	CALPUFF	4.99E-05	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Carbon Tetrachloride	56-23-5	2.42E-05	CALPUFF	4.99E-05	24-hour	24	—	Sch. 6	URT	—	Below URT	
Chloroform	67-66-3	2.42E-05	CALPUFF	4.99E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Chloroform	67-66-3	2.42E-05	CALPUFF	4.99E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Chromium	7440-47-3	1.25E-05	CALPUFF	2.57E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 22 URT - Note 8, Table 4
Chromium	7440-47-3	1.25E-05	CALPUFF	2.57E-05	24-hour	5	—	Sch. 6	URT	—	Below URT	
Chrysene/Triphenylene	218-01-9	3.29E-07	CALPUFF	6.77E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cobalt	7440-48-4	5.33E-07	CALPUFF	1.10E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	
Copper	7440-50-8	3.30E-05	CALPUFF	6.79E-05	24-hour	50	Health	Sch. 3	Standard	B1	<1%	
Coronene	191-07-1	1.24E-07	CALPUFF	2.56E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cumene (Isopropylbenzene)	98-82-8	2.42E-05	CALPUFF	4.99E-05	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Dibenzo(a,c)Anthracene	215-58-7	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,e)pyrene	192-65-4	1.24E-07	CALPUFF	2.56E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,h)Anthracene	53-70-3	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibromochloromethane	124-48-1	2.42E-05	CALPUFF	4.99E-05	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below B2	
Dichlorodifluoromethane	75-71-8	2.42E-05	CALPUFF	4.99E-05	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 15

Table 5 (Scenario D)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Dioxins, Furans and Dioxin-like PCBs	N/A	0.0007 µg TEQ/s	CALPUFF	0.0008 pg TEQ/m3	24-hour	0.1 pg TEQ/m3	Health	Sch. 3	Standard	B1	<1%	
Ethylbenzene	100-41-4	2.42E-05	CALPUFF	6.15E-04	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Ethylbenzene	100-41-4	2.42E-05	CALPUFF	4.99E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Ethylbenzene	100-41-4	2.42E-05	CALPUFF	4.99E-05	24-hour	10000	—	Sch. 6	URT	—	Below URT	
Ethylene Dibromide	106-93-4	2.42E-05	CALPUFF	4.99E-05	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	
Fluoranthene	206-44-0	2.80E-07	CALPUFF	5.77E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Fluorene	86-73-7	1.10E-07	CALPUFF	2.26E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Hexachlorobenzene	118-74-1	2.53E-08	CALPUFF	5.20E-08	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below B2	
Hexachlorobenzene	118-74-1	2.53E-08	CALPUFF	5.20E-08	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Hydrogen Chloride	7647-01-0	1.09E-01	CALPUFF	2.25E-01	24-hour	20	Health	Sch. 3	Standard	B1	1%	URT - Note 8, Table 4
Hydrogen Chloride	7647-01-0	1.09E-01	CALPUFF	2.25E-01	24-hour	200	—	Sch. 6	URT	—	Below URT	
Hydrogen Fluoride	7664-39-3	1.33E-03	CALPUFF	2.75E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Hydrogen Fluoride	7664-39-3	1.33E-03	CALPUFF	7.04E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Indeno(1,2,3-cd)Pyrene	193-39-5	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Lead	7439-92-1	6.06E-04	CALPUFF	1.25E-03	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	6.06E-04	CALPUFF	3.20E-04	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	6.06E-04	CALPUFF	1.25E-03	24-hour	2	—	Sch. 6	URT	—	Below URT	
M&P-Xylene	108-38-3	5.06E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Mercury	7439-97-6	1.82E-04	CALPUFF	3.74E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Mercury	7439-97-6	1.82E-04	CALPUFF	3.74E-04	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	2.42E-05	CALPUFF	4.99E-05	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	2.42E-05	CALPUFF	4.99E-05	24-hour	2200	—	Sch. 6	URT	—	Below URT	
Methylene Chloride	75-09-2	5.42E-05	CALPUFF	1.12E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Methylene Chloride	75-09-2	5.42E-05	CALPUFF	1.12E-04	24-hour	22000	—	Sch. 6	URT	—	Below URT	
Molybdenum	7439-98-7	5.15E-05	CALPUFF	1.06E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	
Monochlorobenzene	108-90-7	1.36E-06	CALPUFF	2.09E-05	1-hour	3500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Monochlorobenzene	108-90-7	1.36E-06	CALPUFF	3.45E-05	10-minute	4,500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
m-terphenyl	92-06-8	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Naphthalene	91-20-3	5.66E-07	CALPUFF	1.17E-06	24-hour	22.5	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Naphthalene	91-20-3	5.66E-07	CALPUFF	1.44E-05	10-minute	50	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Nickel	7440-02-0	9.33E-06	CALPUFF	1.49E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Nickel	7440-02-0	9.33E-06	CALPUFF	1.92E-05	24-hour	2	—	Sch. 6	URT	—	Below URT	
Nickel	7440-02-0	9.33E-06	CALPUFF	1.49E-06	Annual	0.4	—	—	AAV	—	0%	
Nitrogen Oxides	10102-44-0	1.68E+00	CALPUFF	3.45E+00	24-hour	200	Health	Sch. 3	Standard	B1	2%	Notes 10, 28
Nitrogen Oxides	10102-44-0	1.68E+00	CALPUFF	2.58E+01	1-hour	400	Health	Sch. 3	Standard	B1	6%	Notes 10, 28
o-Terphenyl	84-15-1	3.23E-08	CALPUFF	6.65E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
O-Xylene	95-47-6	2.42E-05	CALPUFF	4.99E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pentachlorobenzene	608-93-5	2.53E-08	CALPUFF	5.20E-08	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below B2	

Table 5 (Scenario D)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Pentachlorophenol	87-86-5	2.59E-06	CALPUFF	5.33E-06	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	
Perylene	198-55-0	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Phenanthrene	85-01-8	1.42E-06	CALPUFF	2.92E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Picene	213-46-7	1.24E-07	CALPUFF	2.56E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
p-terphenyl	92-94-4	2.53E-08	CALPUFF	5.20E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pyrene	129-00-0	2.80E-07	CALPUFF	5.77E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Selenium	7782-49-2	2.79E-06	CALPUFF	5.74E-06	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Silver	7440-22-4	5.58E-07	CALPUFF	1.15E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	
Styrene	100-42-5	2.42E-05	CALPUFF	4.99E-05	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Sulphur Dioxide	7446-09-5	4.25E-01	CALPUFF	6.53E+00	1-hour	100	ealth & Vegetati	Sch. 3	Standard	B1	7%	Note 10, URT - Note 8, Table 4
Sulphur Dioxide	7446-09-5	4.25E-01	CALPUFF	6.78E-02	Annual	10	ealth & Vegetati	Sch. 3	Standard	B1	<1%	Note 10, URT - Note 8, Table 5
Tetrachloroethene	127-18-4	2.42E-05	CALPUFF	4.99E-05	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Tetrachloroethene	127-18-4	2.42E-05	CALPUFF	4.99E-05	24-hour	3600	—	Sch. 6	URT	—	Below URT	
Tetralin	119-64-2	1.61E-07	CALPUFF	3.31E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Thallium	7440-28-0	5.58E-07	CALPUFF	1.15E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Toluene	108-88-3	3.38E-03	CALPUFF	6.95E-03	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
trans,1,2-Dichloroethene	156-60-5	2.42E-05	CALPUFF	4.99E-05	24-hour	105	Health	Sch. 3	Guideline	B1	<1%	
Trichloroethene/1,1,2-Trichloroethane	79-01-6	2.42E-05	CALPUFF	4.99E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Trichloroethene/1,1,2-Trichloroethane	79-01-6	2.42E-05	CALPUFF	4.99E-05	24-hour	1200	—	Sch. 6	URT	—	Below URT	
Trichlorofluoromethane	75-69-4	2.42E-05	CALPUFF	4.99E-05	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Trichlorotrifluoroethane	26523-64-8	2.42E-05	CALPUFF	4.99E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Vanadium	7440-62-2	2.79E-07	CALPUFF	5.74E-07	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Vinyl Chloride	75-01-4	2.42E-05	CALPUFF	4.99E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Vinyl Chloride	75-01-4	2.42E-05	CALPUFF	4.99E-05	24-hour	100	—	Sch. 6	URT	—	Below URT	
Xylenes	1330-20-7	7.48E-05	CALPUFF	1.90E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11, 19
Xylenes	1330-20-7	7.48E-05	CALPUFF	1.54E-04	24-hour	730	Health	Sch. 3	Standard	B1	<1%	Notes 10, 19 URT - Note 8, Table 4
Xylenes	1330-20-7	7.48E-05	CALPUFF	1.54E-04	24-hour	7300	—	Sch. 6	URT	—	Below URT	
Zinc	7440-66-6	1.73E-04	CALPUFF	3.57E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	
Polychlorinated Biphenyls (PCB)	1336-36-3	1.24E-07	CALPUFF	1.44E-07	24-hour	0.15	Health	Sch. 3	Guideline	B1	<1%	Note 21
Suspended particulate matter (< 44 µm diameter)	N/A -1	1.09E-01	CALPUFF	3.34E-01	24-hour	120	Visibility	Sch. 3	Guideline	B1	<1%	
Particulate matter (< 10 µm diameter)	N/A -3	7.94E-02	CALPUFF	2.72E-01	24-hour	50	Health	AAQC			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	7.85E-02	CALPUFF	2.72E-01	24-hour	27	Health	CAAQS			1%	
Particulate matter (< 2.5 µm diameter)	N/A -4	7.85E-02	CALPUFF	1.15E-02	Annual	8.8	Health	CAAQS			0%	

Table 5 (Scenario E)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [OU/s]	Air Dispersion Model Used	Maximum POI Concentration [OU/m³]	Averaging Period	MECP POI Limit [µOU/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Guideline [%]	Notes
Odour	71-55-6	2.15E+04	CALPUFF	7.27E-01	10-minute	1	Odour		Guideline		73%	

Table (ii) and Table 5 (Scenario F)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
1,1,1-Trichloroethane	71-55-6	8.89E-05	CALPUFF	1.04E-04	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	
1,1-Dichloroethene	75-35-4	8.89E-05	CALPUFF	1.04E-04	24-hour	10	Health	Sch. 3	Standard	B1	<1%	
1,2,3,4-tetrachlorobenzene	634-66-2	9.27E-08	CALPUFF	1.08E-07	24-hour	600	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	9.27E-08	CALPUFF	1.08E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,3-trichlorobenzene	87-61-6	1.09E-07	CALPUFF	1.28E-07	24-hour	135	Health	Sch. 3	SL-JSL	B2	Below B2	
1,2,4-trichlorobenzene	120-82-1	1.35E-07	CALPUFF	1.57E-07	24-hour	400	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichlorobenzene	95-50-1	3.60E-07	CALPUFF	3.75E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	
1,2-Dichloroethane	107-06-2	8.89E-05	CALPUFF	1.04E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,2-Dichloroethane	107-06-2	8.89E-05	CALPUFF	1.04E-04	24-hour	200	—	Sch. 6	URT	—	Below URT	
1,2-Dichloropropane	78-87-5	8.89E-05	CALPUFF	1.04E-04	24-hour	2400	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
1,3,5-trichlorobenzene	108-70-3	9.27E-08	CALPUFF	1.08E-07	24-hour	3.6	Health	Sch. 3	SL-JSL	B2	Below B2	
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	5.04E-06	Annual	2	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	1.04E-04	24-hour	300	—	Sch. 6	URT	—	Below URT	
1,3-Butadiene	106-99-0	8.89E-05	CALPUFF	5.04E-06	Annual	20	—	—	AAV	—	0%	
1,3-Dichlorobenzene	541-73-1	5.52E-07	CALPUFF	6.45E-07	24-hour	50	Health	Sch. 3	SL-JSL	B2	Below B2	
1,4-Dichlorobenzene	106-46-7	4.28E-07	CALPUFF	5.00E-07	24-hour	95	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
1,4-Dichlorobenzene	106-46-7	4.28E-07	CALPUFF	5.00E-07	24-hour	950	—	Sch. 6	URT	—	Below URT	
1-Methylnaphthalene	90-12-0	4.91E-07	CALPUFF	5.74E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
1-Methylphenanthrene	832-69-9	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4,5-tetrachlorophenol	4901-51-3	7.59E-07	CALPUFF	8.87E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,4-trichlorophenol	15950-66-0	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	1.38E-06	CALPUFF	1.62E-06	24-hour	0.75	Health	Sch. 3	SL-JSL	B2	Below B2	
2,3,5-trichlorophenol	933-78-8	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3,6-trichlorophenol	933-75-5	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,3-dichlorophenol	576-24-9	7.70E-06	CALPUFF	8.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2,4 & 2,5-dichlorophenol	120-83-2	7.70E-06	CALPUFF	8.99E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,5-trichlorophenol	95-95-4	4.56E-07	CALPUFF	5.33E-07	24-hour	220	Health	Sch. 3	SL-JSL	B2	Below B2	
2,4,6-trichlorophenol	88-06-2	4.56E-07	CALPUFF	5.33E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2,6-dichlorophenol	87-65-0	7.70E-06	CALPUFF	8.99E-06	24-hour	19	Health	Sch. 3	SL-JSL	B2	Below B2	
2-Butanone	78-93-3	8.89E-05	CALPUFF	1.04E-04	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
2-Butanone	78-93-3	8.89E-05	CALPUFF	1.04E-04	24-hour	10000	—	Sch. 6	URT	—	Below URT	
2-Chloronaphthalene	91-58-7	9.27E-08	CALPUFF	1.08E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2	
2-methylanthracene	613-12-7	1.56E-07	CALPUFF	1.83E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
2-Methylnaphthalene	91-57-6	8.26E-07	CALPUFF	9.65E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2	
2-monochlorophenol	95-57-8	7.69E-06	CALPUFF	8.98E-06	24-hour	18	Health	Sch. 3	SL-JSL	B2	Below B2	
3,4,5-trichlorophenol	609-19-8	8.56E-06	CALPUFF	9.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,4-dichlorophenol	95-77-2	2.70E-05	CALPUFF	3.16E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3,5-dichlorophenol	591-35-5	7.70E-06	CALPUFF	8.99E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-Methylcholanthrene	56-49-5	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
3-monochlorophenol	108-43-0	7.69E-06	CALPUFF	8.98E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
4-monochlorophenol	106-48-9	7.69E-06	CALPUFF	8.98E-06	24-hour	15	Health	Sch. 3	SL-JSL	B2	Below B2	
7,12-Dimethylbenzo(a)anthracene	57-97-6	4.02E-07	CALPUFF	4.70E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9,10-dimethylanthracene	781-43-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
9-Methylphenanthrene	883-20-5	4.69E-07	CALPUFF	5.48E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthene	83-32-9	1.43E-07	CALPUFF	1.67E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acenaphthylene	208-96-8	1.16E-07	CALPUFF	1.35E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Acetone	67-64-1	1.81E-04	CALPUFF	2.11E-04	24-hour	11880	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Acetone	67-64-1	1.81E-04	CALPUFF	2.11E-04	24-hour	118800	—	Sch. 6	URT	—	Below URT	

Table (ii) and Table 5 (Scenario F)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Ammonia	7664-41-7	3.07E-02	CALPUFF	3.58E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Ammonia	7664-41-7	3.07E-02	CALPUFF	3.58E-02	24-hour	1000	—	Sch. 6	URT	—	Below URT	
Anthracene	120-12-7	1.18E-07	CALPUFF	1.38E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Antimony	7440-36-0	3.07E-06	CALPUFF	3.58E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	
Arsenic	7440-38-2	2.04E-06	CALPUFF	2.39E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	
Barium	7440-39-3	5.16E-04	CALPUFF	6.02E-04	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Benzene	71-43-2	8.89E-05	CALPUFF	1.04E-04	24-hour	0.45	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Benzene	71-43-2	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Benzene	71-43-2	8.89E-05	CALPUFF	5.04E-06	Annual	4.5	—	—	AAV	—	0%	
Benzo(a)Anthracene	56-55-3	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)fluorene	238-84-6	1.12E-07	CALPUFF	1.30E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	5.25E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Notes 6, 7, Table 2, 3 URT - Note 8, Table 4
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	1.08E-07	24-hour	0.005	—	Sch. 6	URT	—	Below URT	
Benzo(a)Pyrene	50-32-8	9.27E-08	CALPUFF	5.25E-09	Annual	0.0001	—	—	AAV	—	0%	
Benzo(b)Fluoranthene	205-99-2	2.49E-07	CALPUFF	2.91E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(b)fluorene	243-17-4	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(e)Pyrene	192-97-2	1.74E-07	CALPUFF	2.03E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(g,h,i)Perylene	191-24-2	2.61E-07	CALPUFF	3.05E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Benzo(k)Fluoranthene	207-08-9	1.50E-07	CALPUFF	1.75E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Beryllium	7440-41-7	2.04E-06	CALPUFF	2.39E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	
Biphenyl	92-52-4	3.08E-06	CALPUFF	3.21E-05	1-hour	60	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
Bromodichloromethane	75-27-4	8.89E-05	CALPUFF	1.04E-04	24-hour	350	Health	Sch. 3	SL-JSL	B2	Below B2	
Bromodichloromethane	75-27-4	8.89E-05	CALPUFF	1.04E-04	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Bromoform	75-25-2	8.89E-05	CALPUFF	1.04E-04	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	
Bromomethane	74-83-9	8.89E-05	CALPUFF	1.04E-04	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	
Cadmium	7440-43-9	3.11E-04	CALPUFF	3.63E-04	24-hour	0.025	Health	Sch. 3	Standard	B1	1%	URT - Note 8, Table 4
Cadmium	7440-43-9	3.11E-04	CALPUFF	3.63E-04	24-hour	0.25	—	Sch. 6	URT	—	Below URT	
Carbon Monoxide	630-08-0	1.78E+00	CALPUFF	2.49E+00	½-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 17
Carbon Tetrachloride	56-23-5	8.89E-05	CALPUFF	1.04E-04	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Carbon Tetrachloride	56-23-5	8.89E-05	CALPUFF	1.04E-04	24-hour	24	—	Sch. 6	URT	—	Below URT	
Chloroform	67-66-3	8.89E-05	CALPUFF	1.04E-04	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Chloroform	67-66-3	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Chromium	7440-47-3	4.58E-05	CALPUFF	5.35E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 22 URT - Note 8, Table 4
Chromium	7440-47-3	4.58E-05	CALPUFF	5.35E-05	24-hour	5	—	Sch. 6	URT	—	Below URT	
Chrysene/Triphenylene	218-01-9	1.21E-06	CALPUFF	1.41E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cobalt	7440-48-4	1.96E-06	CALPUFF	2.28E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	
Copper	7440-50-8	1.21E-04	CALPUFF	1.41E-04	24-hour	50	Health	Sch. 3	Standard	B1	<1%	
Coronene	191-07-1	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Cumene (Isopropylbenzene)	98-82-8	8.89E-05	CALPUFF	1.04E-04	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Dibenzo(a,c)Anthracene	215-58-7	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,e)pyrene	192-65-4	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibenzo(a,h)Anthracene	53-70-3	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Dibromochloromethane	124-48-1	8.89E-05	CALPUFF	1.04E-04	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below B2	
Dichlorodifluoromethane	75-71-8	8.89E-05	CALPUFF	1.04E-04	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Dioxins, Furans and Dioxin-like PCBs	N/A	0.0027 µg TEQ/s	CALPUFF	0.0031 pg TEQ/m3	24-hour	0.1 pg TEQ/m3	Health	Sch. 3	Standard	B1	3%	
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.53E-03	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11

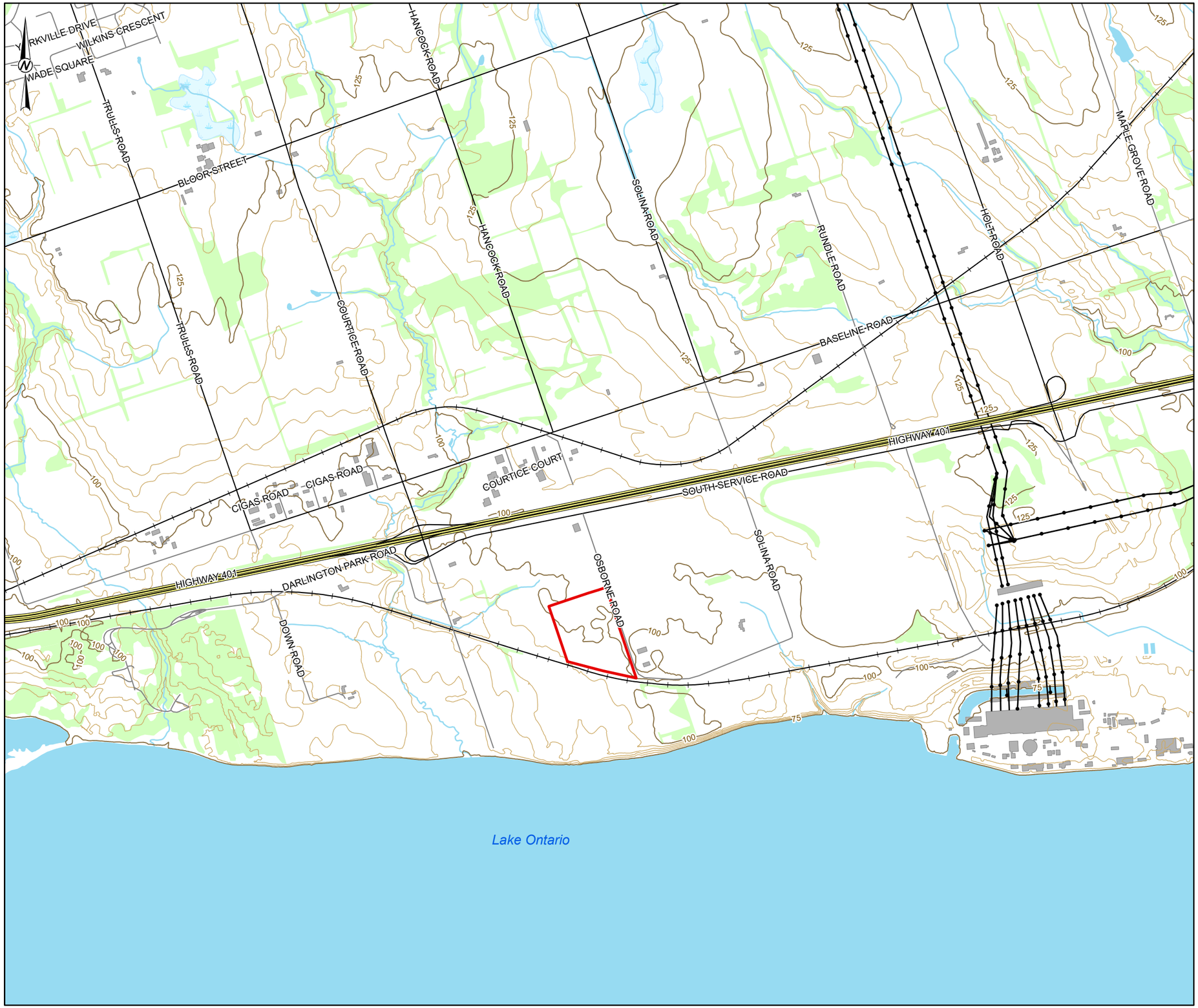
Table (ii) and Table 5 (Scenario F)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.04E-04	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Ethylbenzene	100-41-4	8.89E-05	CALPUFF	1.04E-04	24-hour	10000	—	Sch. 6	URT	—	Below URT	
Ethylene Dibromide	106-93-4	8.89E-05	CALPUFF	1.04E-04	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	
Fluoranthene	206-44-0	1.03E-06	CALPUFF	1.20E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Fluorene	86-73-7	4.02E-07	CALPUFF	4.70E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Hexachlorobenzene	118-74-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below B2	
Hexachlorobenzene	118-74-1	9.27E-08	CALPUFF	1.08E-07	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	
Hydrogen Chloride	7647-01-0	4.00E-01	CALPUFF	4.67E-01	24-hour	20	Health	Sch. 3	Standard	B1	2%	URT - Note 8, Table 4
Hydrogen Chloride	7647-01-0	4.00E-01	CALPUFF	4.67E-01	24-hour	200	—	Sch. 6	URT	—	Below URT	
Hydrogen Fluoride	7664-39-3	4.89E-03	CALPUFF	5.71E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Hydrogen Fluoride	7664-39-3	4.89E-03	CALPUFF	8.33E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24
Indeno(1,2,3-cd)Pyrene	193-39-5	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Lead	7439-92-1	2.22E-03	CALPUFF	2.60E-03	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	2.22E-03	CALPUFF	3.79E-04	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4
Lead	7439-92-1	2.22E-03	CALPUFF	2.60E-03	24-hour	2	—	Sch. 6	URT	—	Below URT	
M&P-Xylene	108-38-3	1.85E-04	CALPUFF	2.17E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Mercury	7439-97-6	6.67E-04	CALPUFF	7.79E-04	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Mercury	7439-97-6	6.67E-04	CALPUFF	7.79E-04	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	CALPUFF	1.04E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	8.89E-05	CALPUFF	1.04E-04	24-hour	2200	—	Sch. 6	URT	—	Below URT	
Methylene Chloride	75-09-2	1.99E-04	CALPUFF	2.32E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Methylene Chloride	75-09-2	1.99E-04	CALPUFF	2.32E-04	24-hour	22000	—	Sch. 6	URT	—	Below URT	
Molybdenum	7439-98-7	1.89E-04	CALPUFF	2.21E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	
Monochlorobenzene	108-90-7	4.99E-06	CALPUFF	5.20E-05	1-hour	3500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Monochlorobenzene	108-90-7	4.99E-06	CALPUFF	8.58E-05	10-minute	4,500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
m-terphenyl	92-06-8	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Naphthalene	91-20-3	2.08E-06	CALPUFF	2.43E-06	24-hour	22.5	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Naphthalene	91-20-3	2.08E-06	CALPUFF	3.57E-05	10-minute	50	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11
Nickel	7440-02-0	3.42E-05	CALPUFF	1.94E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4
Nickel	7440-02-0	3.42E-05	CALPUFF	4.00E-05	24-hour	2	—	Sch. 6	URT	—	Below URT	
Nickel	7440-02-0	3.42E-05	CALPUFF	1.94E-06	Annual	0.4	—	—	AAV	—	0%	
Nitrogen Oxides	10102-44-0	6.49E+00	CALPUFF	1.04E+02	24-hour	200	Health	Sch. 3	Standard	B1	52%	Notes 10, 28
Nitrogen Oxides	10102-44-0	6.49E+00	CALPUFF	2.57E+02	1-hour	400	Health	Sch. 3	Standard	B1	64%	Notes 10, 28
o-Terphenyl	84-15-1	1.18E-07	CALPUFF	1.38E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
O-Xylene	95-47-6	8.89E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pentachlorobenzene	608-93-5	9.27E-08	CALPUFF	1.08E-07	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below B2	
Pentachlorophenol	87-86-5	9.49E-06	CALPUFF	1.11E-05	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	
Perylene	198-55-0	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	

Table (ii) and Table 5 (Scenario F)
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes
Phenanthrene	85-01-8	5.20E-06	CALPUFF	6.08E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Picene	213-46-7	4.56E-07	CALPUFF	5.33E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
p-terphenyl	92-94-4	9.27E-08	CALPUFF	1.08E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Pyrene	129-00-0	1.03E-06	CALPUFF	1.20E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Selenium	7782-49-2	1.02E-05	CALPUFF	1.19E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	
Silver	7440-22-4	2.04E-06	CALPUFF	2.39E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	
Styrene	100-42-5	8.89E-05	CALPUFF	1.04E-04	24-hour	400	Health	Sch. 3	Standard	B1	<1%	
Sulphur Dioxide	7446-09-5	1.56E+00	CALPUFF	1.62E+01	1-hour	100	Health & Vegetation	Sch. 3	Standard	B1	16%	Note 10, URT - Note 8, Table 4
Sulphur Dioxide	7446-09-5	1.56E+00	CALPUFF	8.83E-02	Annual	10	Health & Vegetation	Sch. 3	Standard	B1	<1%	Note 10, URT - Note 8, Table 5
Tetrachloroethene	127-18-4	8.89E-05	CALPUFF	1.04E-04	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Tetrachloroethene	127-18-4	8.89E-05	CALPUFF	1.04E-04	24-hour	3600	—	Sch. 6	URT	—	Below URT	
Tetralin	119-64-2	5.90E-07	CALPUFF	6.89E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Thallium	7440-28-0	2.04E-06	CALPUFF	2.39E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below B2	
Toluene	108-88-3	1.24E-02	CALPUFF	1.45E-02	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13
trans,1,2-Dichloroethene	156-60-5	8.89E-05	CALPUFF	1.04E-04	24-hour	105	Health	Sch. 3	Guideline	B1	<1%	
Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	CALPUFF	1.04E-04	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Trichloroethene/1,1,2-Trichloroethane	79-01-6	8.89E-05	CALPUFF	1.04E-04	24-hour	1200	—	Sch. 6	URT	—	Below URT	
Trichlorofluoromethane	75-69-4	8.89E-05	CALPUFF	1.04E-04	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 15
Trichlorotrifluoroethane	26523-64-8	8.89E-05	CALPUFF	1.04E-04	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	
Vanadium	7440-62-2	1.02E-06	CALPUFF	1.19E-06	24-hour	2	Health	Sch. 3	Standard	B1	<1%	
Vinyl Chloride	75-01-4	8.89E-05	CALPUFF	1.04E-04	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4
Vinyl Chloride	75-01-4	8.89E-05	CALPUFF	1.04E-04	24-hour	100	—	Sch. 6	URT	—	Below URT	
Xylenes	1330-20-7	2.74E-04	CALPUFF	4.72E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11, 19
Xylenes	1330-20-7	2.74E-04	CALPUFF	3.20E-04	24-hour	730	Health	Sch. 3	Standard	B1	<1%	Notes 10, 19 URT - Note 8, Table 4
Xylenes	1330-20-7	2.74E-04	CALPUFF	3.20E-04	24-hour	7300	—	Sch. 6	URT	—	Below URT	
Zinc	7440-66-6	6.35E-04	CALPUFF	7.42E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	
Polychlorinated Biphenyls (PCB)	1336-36-3	4.53E-07	CALPUFF	5.29E-07	24-hour	0.15	Health	Sch. 3	Guideline	B1	<1%	Note 21
Suspended particulate matter (< 44 µm diameter)	N/A -1	3.34E-01	CALPUFF	6.64	24-hour	120	Visibility	Sch. 3	Guideline	B1	6%	
Particulate matter (< 10 µm diameter)	N/A -3	3.34E-01	CALPUFF	6.06	24-hour	50	Health	AAQC			12%	
Particulate matter (< 2.5 µm diameter)	N/A -4	3.31E-01	CALPUFF	6.06	24-hour	27	Health	CAAQS			22%	
Particulate matter (< 2.5 µm diameter)	N/A -4	3.31E-01	CALPUFF	9.63E-01	Annual	8.8	Health	CAAQS			11%	

Figures



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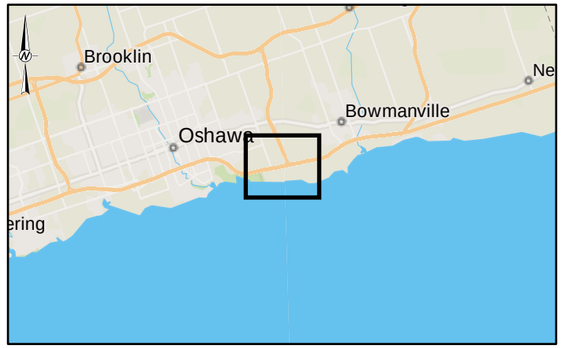

SCALE 1:500,000

LEGEND

- MAJOR CONTOUR (25 M)
- MINOR CONTOUR (5 M)
- EXPRESSWAY
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- RAILWAY
- UTILITY LINE
- WATERCOURSE
- WATERBODY
- WETLAND
- WOODLOT
- BUILDING FOOTPRINT
- APPROXIMATE SITE BOUNDARY

0 200 400 800

1:20,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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CLIENT

REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT

DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE

SITE LOCATION PLAN

CONSULTANT

YYYY-MM-DD	2025-06-19
DESIGNED	----
PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	1

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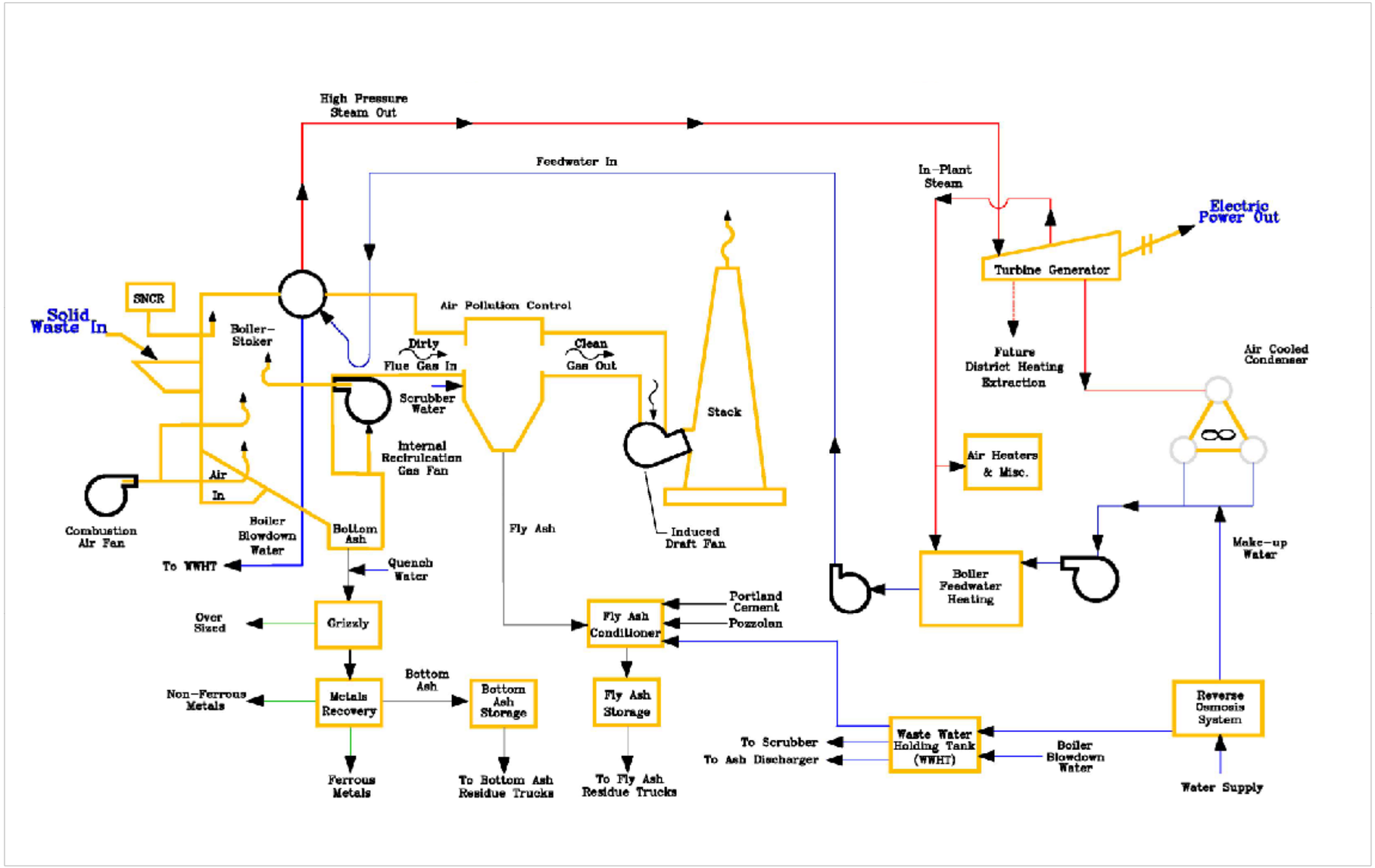

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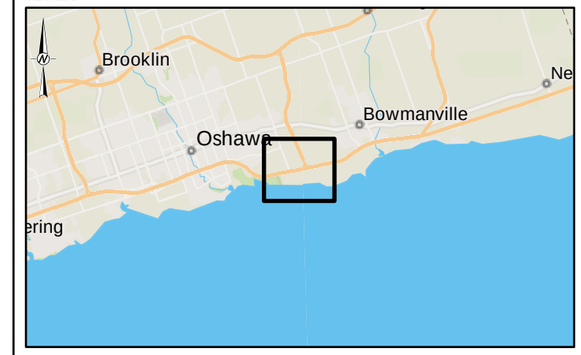

SCALE 1:500,000

0 110 220 440

1:11,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

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CLIENT
REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT
DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE
SIMPLIFIED PROCESS FLOW DIAGRAM

CONSULTANT

YYYY-MM-DD	2025-06-19
DESIGNED	----
PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	2

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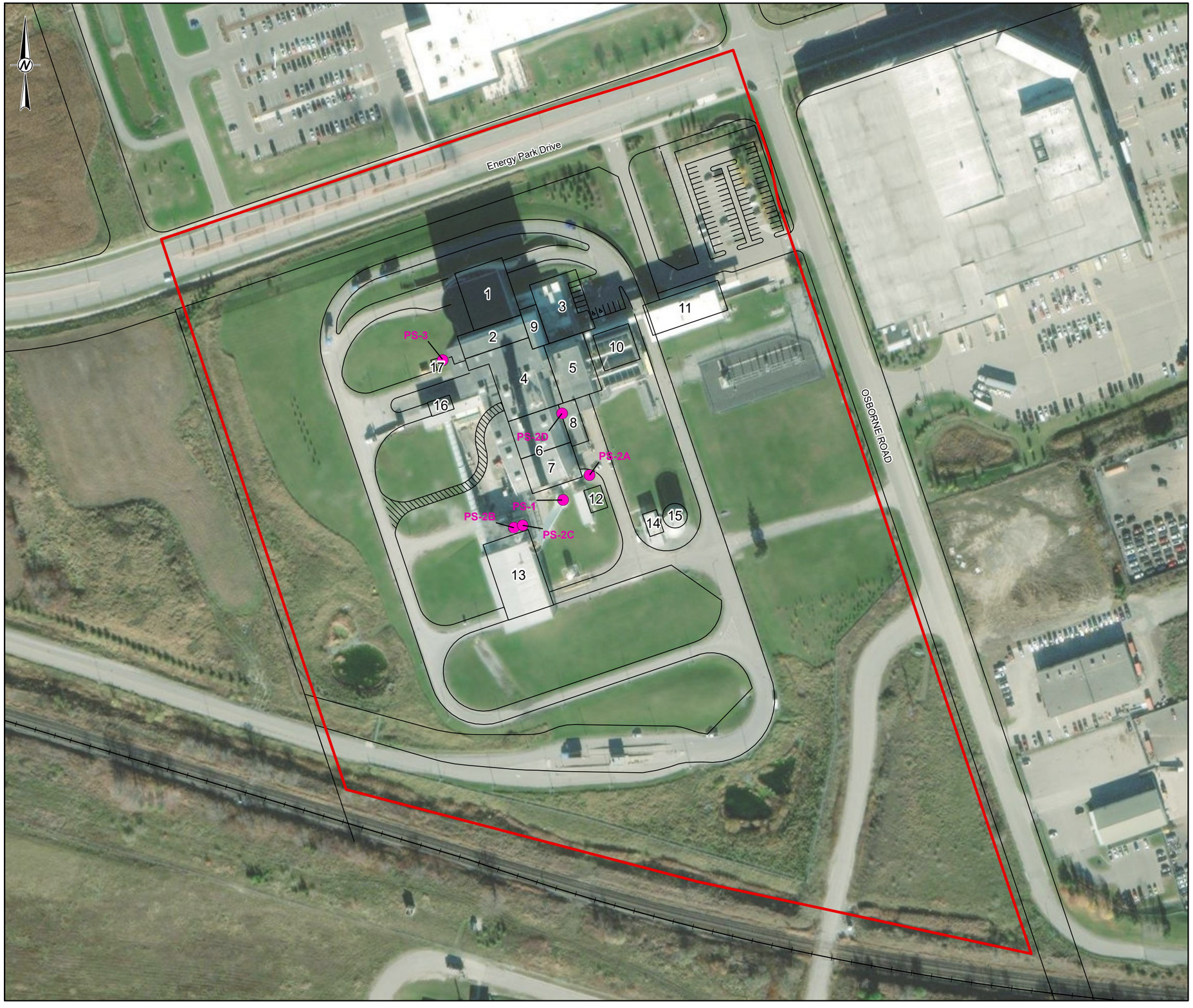

KEY MAP

SCALE 1:100,000

LEGEND

- POINT SOURCE
- RAILWAY
- SITE ROAD (PAVED)
- SITE ROAD (GRAVEL)
- ROOF PLAN
- APPROXIMATE SITE BOUNDARY

Point Source	Description
PS-1	Main Stack
PS-2A	Carbon Silo Baghouse Exhaust
PS-2B	Pozzolan Silo Baghouse Exhaust
PS-2C	Portland Cement Silo Baghouse Exhaust
PS-2D	Lime Silo Baghouse Exhaust
PS-3	Diesel Generator

ID	Building	Height (m)
1	Tipping Building	15.0
2	Refuse Building	35.1
3	Admin Building	5.3
4	Boiler Building	35.1
5	Turbine Building	19.0
6	Scrubber Building	35.1
7	Baghouse Building	25.0
8	Maintenance and Storage Building	12.1
9	Control Room	24.2
10	Air Cooled Condensers	24.7
11	Visitor Centre	11.3
12	Electrical Building	5.0
13	Residue Storage Building	17.2
14	Fire Water Pump House	10.0
15	Fire Water Tank	8.0
16	Grizzly Building	6.0
17	Diesel Genset	2.5

0 20 40 80

1:2,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
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CLIENT
REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT
DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE
DISPERSION MODELLING PLAN

CONSULTANT

YYYY-MM-DD	2025-06-19
DESIGNED	----
PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	3

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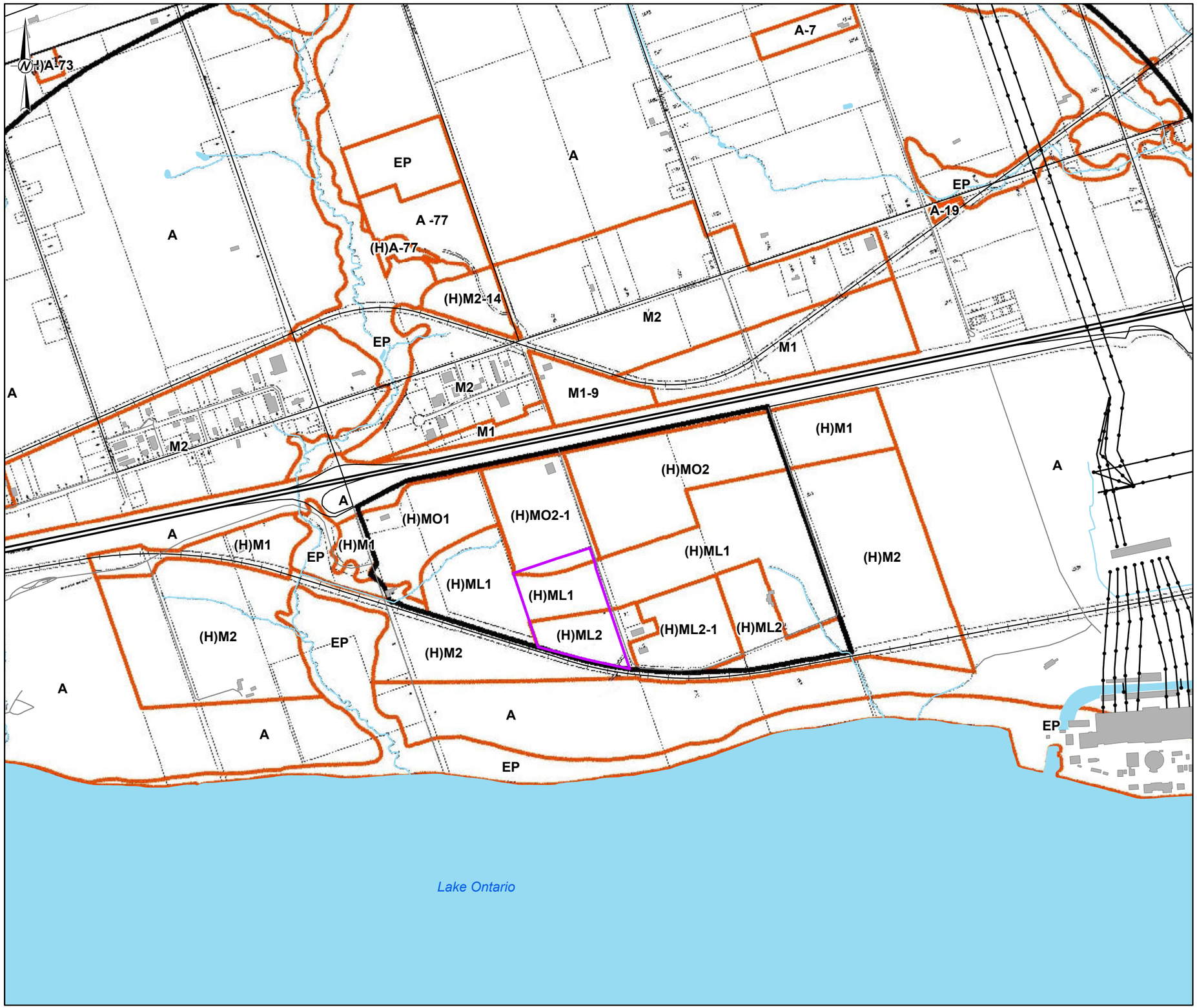

KEY MAP

SCALE 1:500,000

LEGEND

- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- RAILWAY
- UTILITY LINE
- WATERCOURSE
- WATERBODY
- BUILDING FOOTPRINT
- APPROXIMATE SITE BOUNDARY
- ZONING
  - A - AGRICULTURAL
  - M1 - LIGHT INDUSTRIAL
  - M2 - EENERAL INDUSTRIAL
  - MO1 - ENERGY PARK OFFICE
  - MO2 - ENERGY PARK PRESTIGE
  - ML1 - ENERGY PARK LIGHT INDUSTRIAL
  - ML2 - ENERGY PARK GENERAL INDUSTRIAL
  - EP - ENVIRONMENTAL PROTECTION

0 150 300 600

1:15,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE DATA - MNR NRVIS, OBTAINED 2004, CANMAP V2006.4
3. ZONING - THE TOWN OF NEWCASTLE ZONING BY-LAW 84-63
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REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT

DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE

SCALED AREA LOCATION PLAN

CONSULTANT

YYYY-MM-DD	2025-06-19
DESIGNED	----
PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	4

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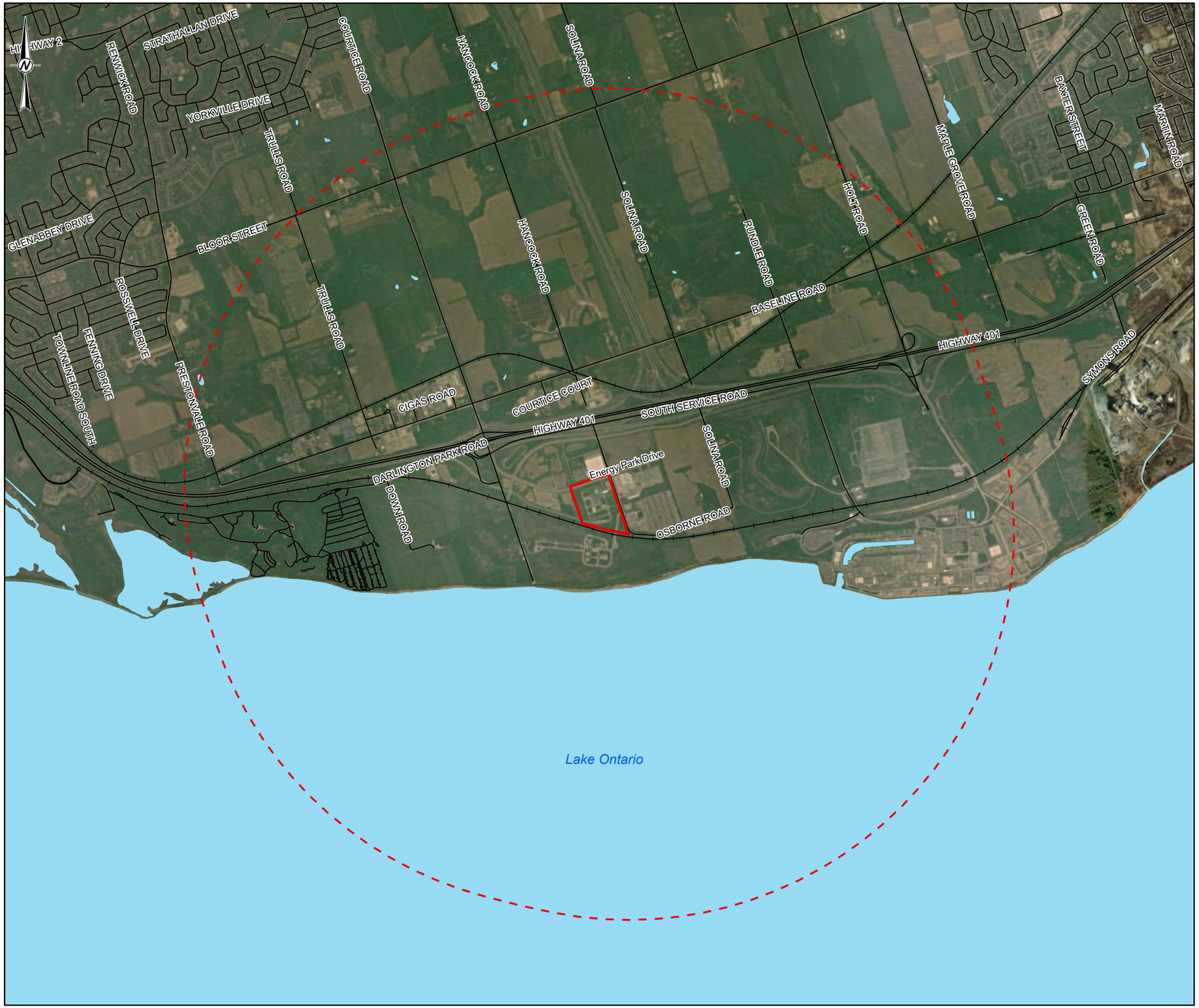

KEY MAP

SCALE 1:500,000

LEGEND

- ROAD
- RAILWAY
- WATERBODY
- 3 KM SITE BOUNDARY BUFFER
- APPROXIMATE SITE BOUNDARY

0 300 600 1,200

1:30,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT
DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE
3 KM PROPERTY BOUNDARY BUFFER

CONSULTANT

YYYY-MM-DD	2025-06-19
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PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	5

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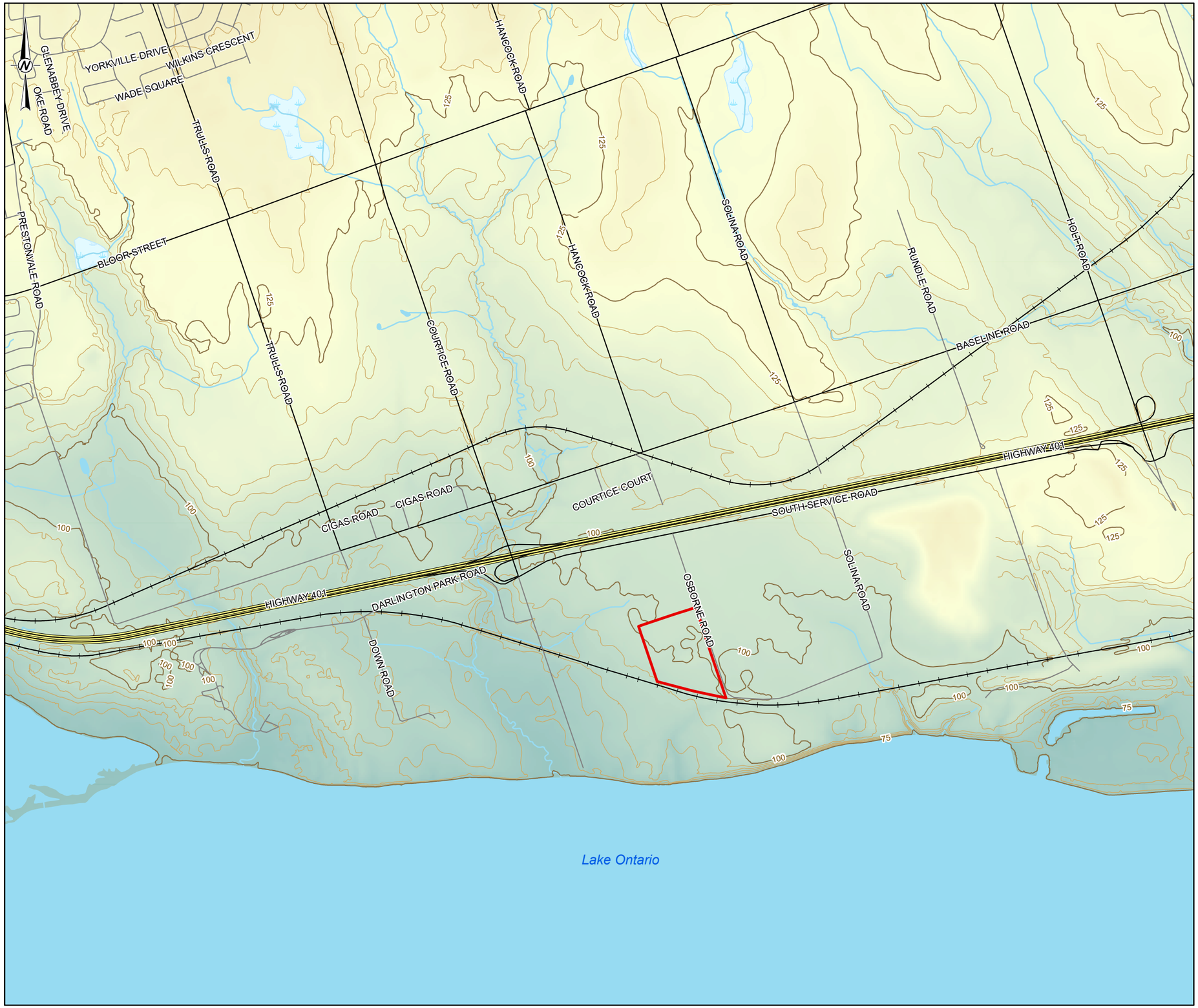

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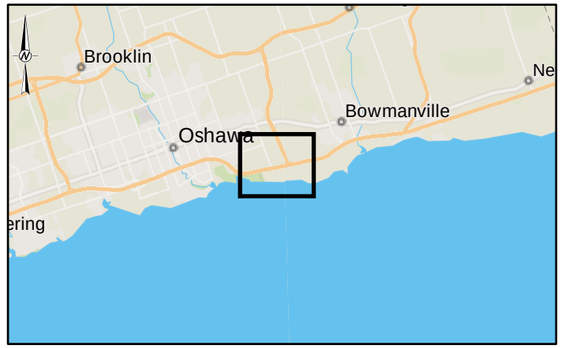

SCALE 1:500,000

LEGEND

- MAJOR CONTOUR (25 M)
- MINOR CONTOUR (5 M)
- EXPRESSWAY
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- RAILWAY
- WATERCOURSE
- WATERBODY
- WETLAND
- APPROXIMATE SITE BOUNDARY

ELEVATION (MASL)

HIGH : 200

LOW : 50

0 200 400 800

1:20,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT

DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE

TERRAIN ELEVATION

CONSULTANT

wsp

YYYY-MM-DD	2025-06-19
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PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	6

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25mm

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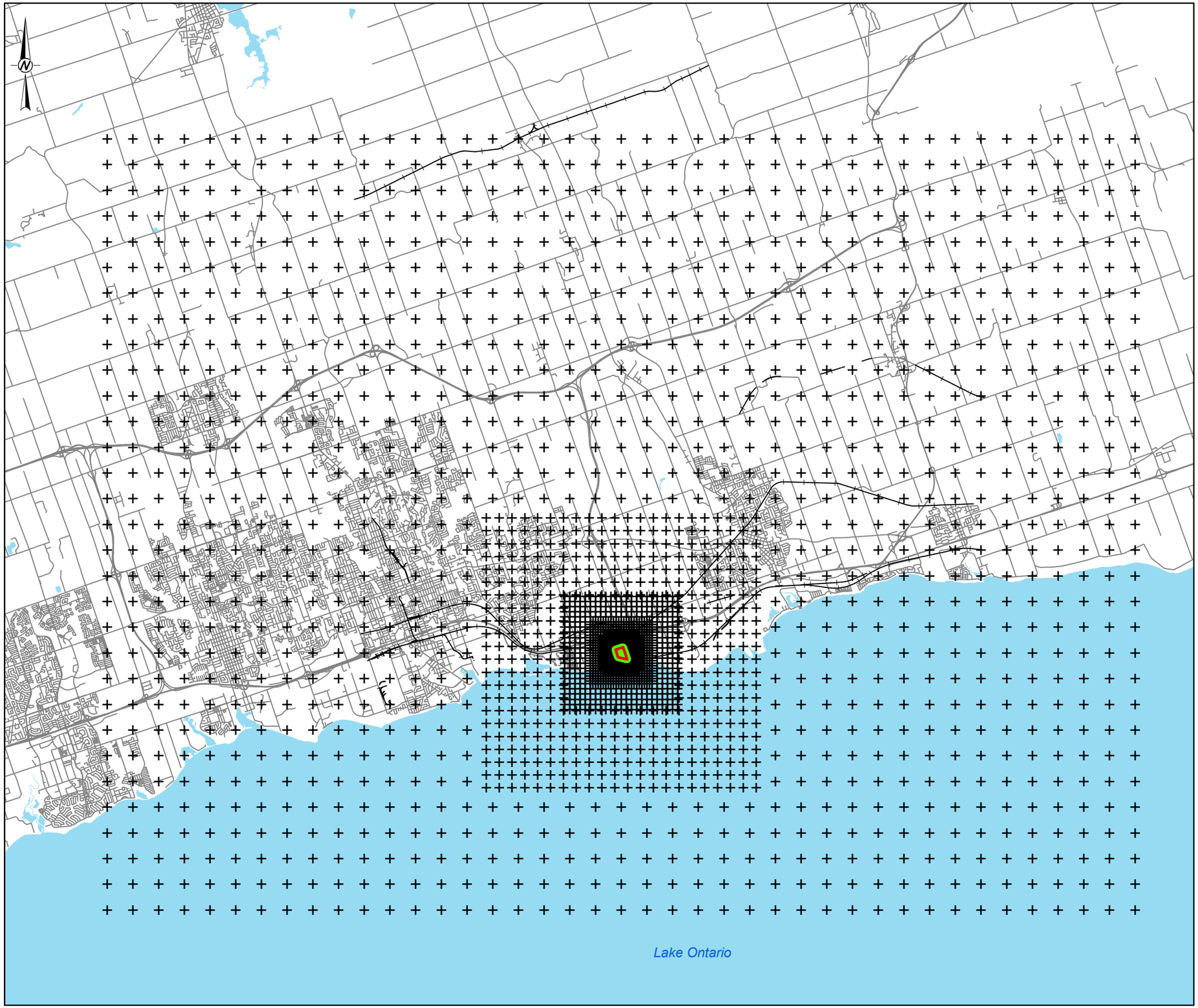

KEY MAP

SCALE 1:5,000,000

LEGEND

- 10 M PROPERTY BOUNDARY RECEPTOR
- GRIDDED RECEPTOR
- ROAD
- RAILWAY
- WATERBODY
- APPROXIMATE SITE BOUNDARY

0 1,500 3,000 6,000

1:150,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT

DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE

DISPERSION MODELLING GRIDDED RECEPTORS

CONSULTANT

YYYY-MM-DD	2025-06-19
DESIGNED	----
PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	7

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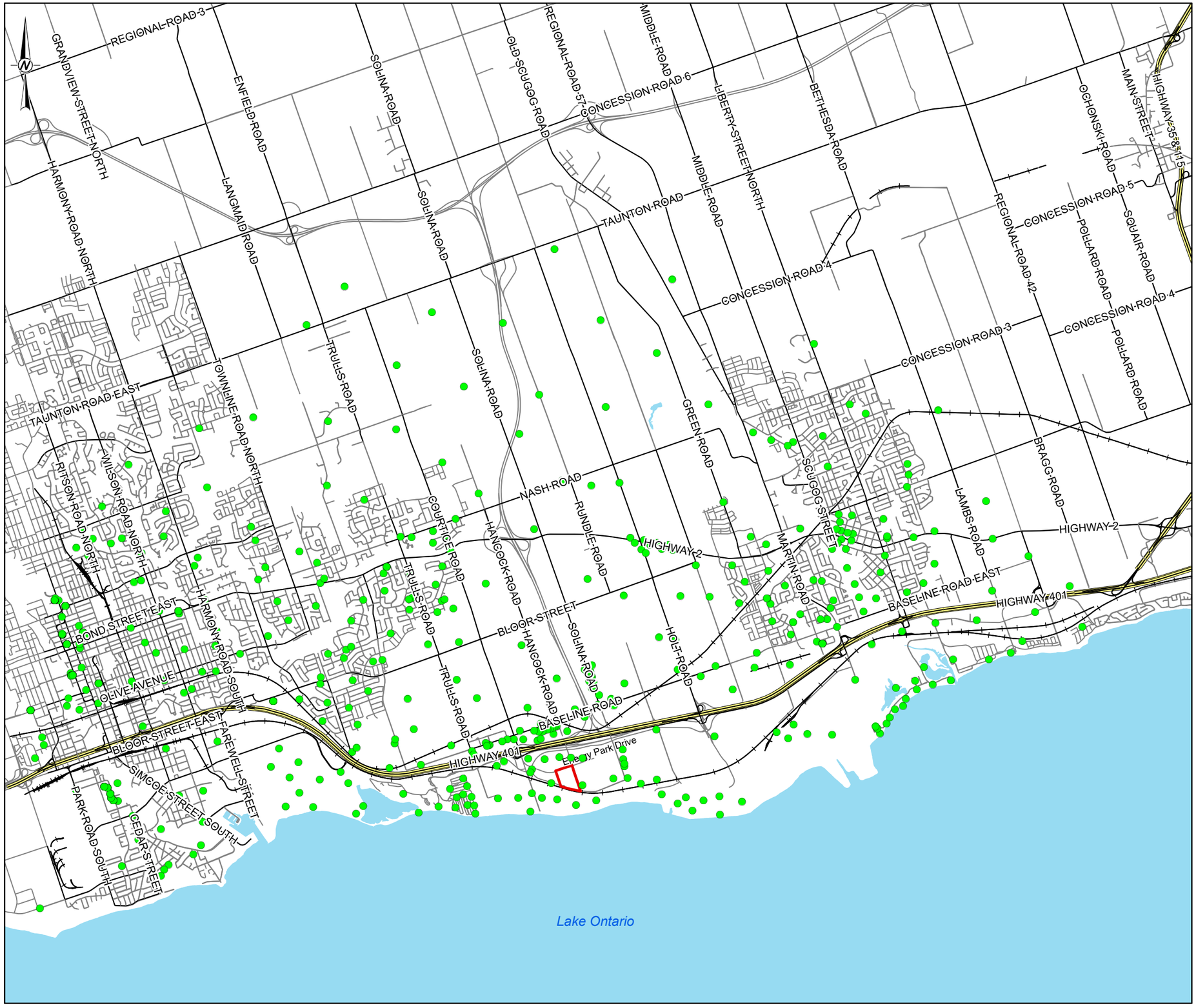

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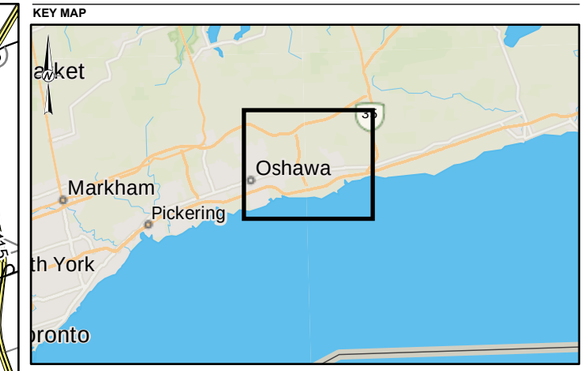

SCALE 1:1,000,000

LEGEND

- SENSITIVE RECEPTOS
- EXPRESSWAY
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- RAILWAY
- WATERBODY
- APPROXIMATE SITE BOUNDARY

0 750 1,500 3,000

1:70,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

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CLIENT

REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT

DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE

DISPERSION MODELLING SENSITIVE RECEPTORS

CONSULTANT

wsp

YYYY-MM-DD	2025-06-19
DESIGNED	----
PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	8

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25mm

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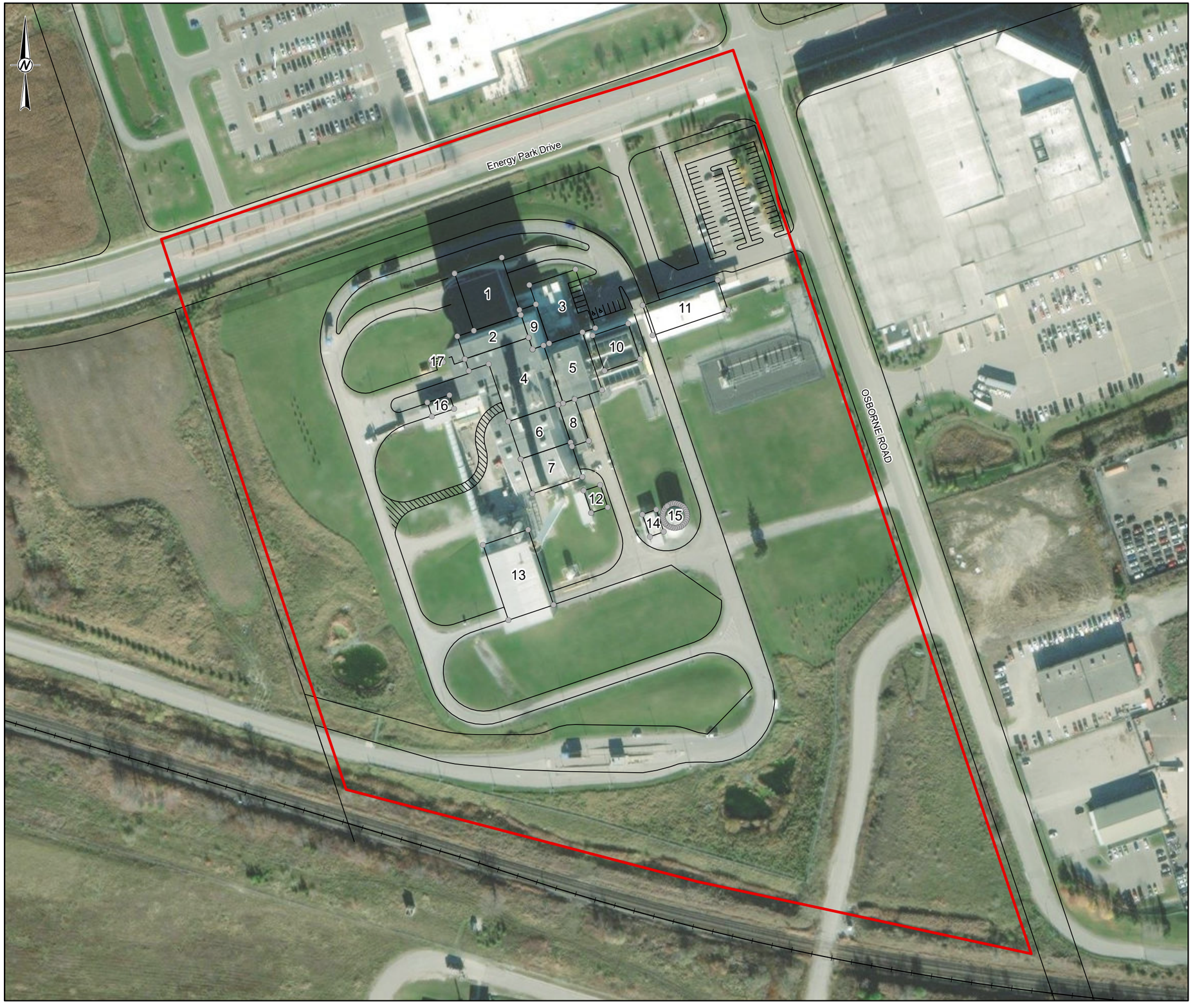

KEY MAP

SCALE 1:100,000

LEGEND

- RAILWAY
- SITE ROAD (PAVED)
- SITE ROAD (GRAVEL)
- ROOF PLAN
- APPROXIMATE SITE BOUNDARY

ID	Building	Height (m)
1	Tipping Building	15.0
2	Refuse Building	35.1
3	Admin Building	5.3
4	Boiler Building	35.1
5	Turbine Building	19.0
6	Scrubber Building	35.1
7	Baghouse Building	25.0
8	Maintenance and Storage Building	12.1
9	Control Room	24.2
10	Air Cooled Condensers	24.7
11	Visitor Centre	11.3
12	Electrical Building	5.0
13	Residue Storage Building	17.2
14	Fire Water Pump House	10.0
15	Fire Water Tank	8.0
16	Grizzly Building	6.0
17	Diesel Genset	2.5

0 20 40 80

1:2,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
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CLIENT
REWORLD/DURHAM YORK ENERGY CENTRE

PROJECT
DURHAM YORK ENERGY CENTRE ESDM UPDATE
DURHAM YORK ENERGY CENTRE

TITLE
BUILDING LOCATION PLAN – COURTICE ROAD ENTRANCE

CONSULTANT

YYYY-MM-DD	2025-06-19
DESIGNED	----
PREPARED	GU
REVIEWED	MN
APPROVED	LM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0046793.6287	0001	0	9

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APPENDIX A

Emission Rate Calculations

Source 1 (Scenario A)

Main Stack - Normal Operation - Two Trains

Source Description: Emissions from the main stack under the maximum operating scenario to operate at 110% MCR at 13 MJ/kg HHV for each train
It was conservatively assumed to be operating at maximum capacity 24 hours per day, 7 days per week.

Operating Rate: Both boilers are operating at 110% MCR and 13 MJ/kg HHV

Methodology: Engineering calculations. The maximum volumetric flow rate measured during 2018- 2024 source testing was taken and assumed to be the 100% MCR operating scenario. Since the facility can operate at 110% MCR on occasion, this represents the worst-case operation, therefore the maximum volumetric flow rate from source testing was increased by 10% to account for the 110% MCR scenario.

Source: Emission concentrations are taken from Facility specific in-stack emission limits where applicable. For contaminants without in-stack emission limits, the maximum emission concentrations taken from the 2024 Source testing data was used. For contaminants for which no data was available, manufacturers specifications were used and/or published emission factors were used.

Train Parameters:

Maximum flow rate measured between 2018-2024, representing the 100% MCR operating scenario	20.20	m^3/s at reference conditions of 0% Moisture, 11% Oxygen and 298.15K temperature, Spring 2022 compliance				
Max Volumetric Flow Rate per Train during normal 110% MCR operating scenario	=	20.20	Rm^3/s	x	1.10	
Max Volumetric flow rate per train during 110% MCR operating scenario	=	22.22	m^3/s at reference conditions of 0% Moisture, 11% Oxygen and 298.15K temperature			

Sample Calculation 1: Particulate matter emission per train

Emission Rate [g/s] = Concentration[mg/dscm] x volumetric flow rate [dm^3/s] x 1/1000 [mg/g]

$$= \frac{9.00 \ \frac{mg}{m^3} \times 22.22 \ \frac{m^3}{s} \times 1}{1{,}000 \ mg} \ g$$

$$= \frac{2.00E\text{-}01 \ g}{s}$$

Prepared by: PS and MN
Reviewed by: KA

Source Emissions:

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
Nitrogen Oxides	10102-44-0	121	mg/Rm³	ECA Limit	2.69E+00	5.38E+00
Carbon Monoxide	630-08-0	40	mg/Rm³	ECA Limit	8.89E-01	1.78E+00
Sulphur Dioxide	7446-09-5	35	mg/Rm³	ECA Limit	7.79E-01	1.56E+00
Filterable TSP	N/A -2	9	mg/Rm³	ECA Limit	2.00E-01	4.00E-01
Lead	7439-92-1	50.0	µg/Rm³	ECA Limit	1.11E-03	2.22E-03
Cadmium	7440-43-9	7.0	µg/Rm³	ECA Limit	1.56E-04	3.11E-04
Mercury	7439-97-6	15.0	µg/Rm³	ECA Limit	3.33E-04	6.67E-04
Dioxins, Furans and Dioxin- like PC	N/A -6	60	pg/Rm³	ECA Limit	0.0013 µg TEQ/s	0.0027 µg TEQ/s
Hydrogen Chloride	7647-01-0	9.0	mg/Rm³	ECA Limit	2.00E-01	4.00E-01

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
PM_{10}	N/A -3	6.55E+00	mg/Rm³	2024 Source Testing Data	1.46E-01	2.91E-01
$PM_{2.5}$	N/A -4	6.48E+00	mg/Rm³	2024 Source Testing Data	1.44E-01	2.88E-01
Total Suspended Particulate	N/A -1	6.55E+00	mg/Rm³	2024 Source Testing Data	1.46E-01	2.91E-01
Hydrogen Fluoride	7664-39-3	1.10E-01	mg/Rm³	2024 Source Testing Data	2.44E-03	4.89E-03
Ammonia	7664-41-7	6.90E-01	mg/Rm³	2024 Source Testing Data	1.53E-02	3.07E-02
Antimony	7440-36-0	6.90E-02	µg/Rm³	2024 Source Testing Data	1.53E-06	3.07E-06
Arsenic	7440-38-2	4.60E-02	µg/Rm³	2024 Source Testing Data	1.02E-06	2.04E-06
Barium	7440-39-3	1.16E+01	µg/Rm³	2024 Source Testing Data	2.58E-04	5.16E-04
Beryllium	7440-41-7	4.60E-02	µg/Rm³	2024 Source Testing Data	1.02E-06	2.04E-06
Chromium	7440-47-3	1.03E+00	µg/Rm³	2024 Source Testing Data	2.29E-05	4.58E-05
Cobalt	7440-48-4	4.40E-02	µg/Rm³	2024 Source Testing Data	9.78E-07	1.96E-06
Copper	7440-50-8	2.72E+00	µg/Rm³	2024 Source Testing Data	6.04E-05	1.21E-04
Molybdenum	7439-98-7	4.25E+00	µg/Rm³	2024 Source Testing Data	9.44E-05	1.89E-04
Nickel	7440-02-0	7.70E-01	µg/Rm³	2024 Source Testing Data	1.71E-05	3.42E-05
Selenium	7782-49-2	2.30E-01	µg/Rm³	2024 Source Testing Data	5.11E-06	1.02E-05
Silver	7440-22-4	4.60E-02	µg/Rm³	2024 Source Testing Data	1.02E-06	2.04E-06
Thallium	7440-28-0	4.60E-02	µg/Rm³	2024 Source Testing Data	1.02E-06	2.04E-06
Vanadium	7440-62-2	2.30E-02	µg/Rm³	2024 Source Testing Data	5.11E-07	1.02E-06
Zinc	7440-66-6	1.43E+01	µg/Rm³	2024 Source Testing Data	3.18E-04	6.35E-04
Polychlorinated Biphenyls (PCB)	1336-36-3	1.02E+04	pg/Rm³	2024 Source Testing Data	2.27E-07	4.53E-07
Monochlorobenzene	108-90-7	1.12E+02	ng/Rm³	2024 Source Testing Data	2.50E-06	4.99E-06
1,3-Dichlorobenzene	541-73-1	1.24E+01	ng/Rm³	2024 Source Testing Data	2.76E-07	5.52E-07
1,4-Dichlorobenzene	106-46-7	9.63E+00	ng/Rm³	2024 Source Testing Data	2.14E-07	4.28E-07
1,2-Dichlorobenzene	95-50-1	8.11E+00	ng/Rm³	2024 Source Testing Data	1.80E-07	3.60E-07
1,3,5-trichlorobenzene	108-70-3	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
1,2,4-trichlorobenzene	120-82-1	3.03E+00	ng/Rm³	2024 Source Testing Data	6.73E-08	1.35E-07
1,2,3-trichlorobenzene	87-61-6	2.46E+00	ng/Rm³	2024 Source Testing Data	5.47E-08	1.09E-07
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
1,2,3,4-tetrachlorobenzene	634-66-2	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Pentachlorobenzene	608-93-5	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Hexachlorobenzene	118-74-1	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
2-monochlorophenol	95-57-8	1.73E+02	ng/Rm³	2024 Source Testing Data	3.84E-06	7.69E-06
3-monochlorophenol	108-43-0	1.73E+02	ng/Rm³	2024 Source Testing Data	3.84E-06	7.69E-06
4-monochlorophenol	106-48-9	1.73E+02	ng/Rm³	2024 Source Testing Data	3.84E-06	7.69E-06
2,6-dichlorophenol	87-65-0	1.73E+02	ng/Rm³	2024 Source Testing Data	3.85E-06	7.70E-06
2,4 & 2,5-dichlorophenol	120-83-2	1.73E+02	ng/Rm³	2024 Source Testing Data	3.85E-06	7.70E-06
3,5-dichlorophenol	591-35-5	1.73E+02	ng/Rm³	2024 Source Testing Data	3.85E-06	7.70E-06
2,3-dichlorophenol	576-24-9	1.73E+02	ng/Rm³	2024 Source Testing Data	3.85E-06	7.70E-06
3,4-dichlorophenol	95-77-2	6.08E+02	ng/Rm³	2024 Source Testing Data	1.35E-05	2.70E-05
2,4,6-trichlorophenol	88-06-2	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07
2,3,6-trichlorophenol	933-75-5	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07

Prepared by: PS and MN
Reviewed by: KA

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
2,3,5-trichlorophenol	933-78-8	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07
2,4,5-trichlorophenol	95-95-4	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07
2,3,4-trichlorophenol	15950-66-0	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07
3,4,5-trichlorophenol	609-19-8	1.93E+02	ng/Rm³	2024 Source Testing Data	4.28E-06	8.56E-06
2,3,5,6/2,3,4,6-tetrachlorophenol	58-90-2	3.12E+01	ng/Rm³	2024 Source Testing Data	6.92E-07	1.38E-06
2,3,4,5-tetrachlorophenol	4901-51-3	1.71E+01	ng/Rm³	2024 Source Testing Data	3.80E-07	7.59E-07
Pentachlorophenol	87-86-5	2.14E+02	ng/Rm³	2024 Source Testing Data	4.75E-06	9.49E-06
Acenaphthene	83-32-9	3.22E+00	ng/Rm³	2024 Source Testing Data	7.15E-08	1.43E-07
Acenaphthylene	208-96-8	2.60E+00	ng/Rm³	2024 Source Testing Data	5.78E-08	1.16E-07
Anthracene	120-12-7	2.66E+00	ng/Rm³	2024 Source Testing Data	5.92E-08	1.18E-07
Benzo(a)Anthracene	56-55-3	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Benzo(b)Fluoranthene	205-99-2	5.61E+00	ng/Rm³	2024 Source Testing Data	1.25E-07	2.49E-07
Benzo(k)Fluoranthene	207-08-9	3.37E+00	ng/Rm³	2024 Source Testing Data	7.48E-08	1.50E-07
Benzo(a)fluorene	238-84-6	2.51E+00	ng/Rm³	2024 Source Testing Data	5.58E-08	1.12E-07
Benzo(b)fluorene	243-17-4	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Benzo(g,h,i)Perylene	191-24-2	5.88E+00	ng/Rm³	2024 Source Testing Data	1.31E-07	2.61E-07
Benzo(a)Pyrene	50-32-8	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Benzo(e)Pyrene	192-97-2	3.92E+00	ng/Rm³	2024 Source Testing Data	8.71E-08	1.74E-07
Biphenyl	92-52-4	6.93E+01	ng/Rm³	2024 Source Testing Data	1.54E-06	3.08E-06
2-Chloronaphthalene	91-58-7	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Chrysene/Triphenylene	218-01-9	2.71E+01	ng/Rm³	2024 Source Testing Data	6.03E-07	1.21E-06
Coronene	191-07-1	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07
Dibenzo(a,c)Anthracene	215-58-7	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Dibenzo(a,h)Anthracene	53-70-3	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Dibenzo(a,e)pyrene	192-65-4	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07
9,10-dimethylanthracene	781-43-1	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
7,12-Dimethylbenzo(a)anthracene	57-97-6	9.05E+00	ng/Rm³	2024 Source Testing Data	2.01E-07	4.02E-07
Fluoranthene	206-44-0	2.31E+01	ng/Rm³	2024 Source Testing Data	5.14E-07	1.03E-06
Fluorene	86-73-7	9.05E+00	ng/Rm³	2024 Source Testing Data	2.01E-07	4.02E-07
Indeno(1,2,3-cd)Pyrene	193-39-5	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
2-methylanthracene	613-12-7	3.52E+00	ng/Rm³	2024 Source Testing Data	7.82E-08	1.56E-07
3-Methylcholanthrene	56-49-5	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07
1-Methylnaphthalene	90-12-0	1.11E+01	ng/Rm³	2024 Source Testing Data	2.46E-07	4.91E-07
2-Methylnaphthalene	91-57-6	1.86E+01	ng/Rm³	2024 Source Testing Data	4.13E-07	8.26E-07
1-Methylphenanthrene	832-69-9	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
9-Methylphenanthrene	883-20-5	1.06E+01	ng/Rm³	2024 Source Testing Data	2.34E-07	4.69E-07
Naphthalene	91-20-3	4.67E+01	ng/Rm³	2024 Source Testing Data	1.04E-06	2.08E-06
Perylene	198-55-0	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Phenanthrene	85-01-8	1.17E+02	ng/Rm³	2024 Source Testing Data	2.60E-06	5.20E-06
Picene	213-46-7	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	4.56E-07
Pyrene	129-00-0	2.31E+01	ng/Rm³	2024 Source Testing Data	5.14E-07	1.03E-06
Tetralin	119-64-2	1.33E+01	ng/Rm³	2024 Source Testing Data	2.95E-07	5.90E-07
m-terphenyl	92-06-8	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
o-Terphenyl	84-15-1	2.66E+00	ng/Rm³	2024 Source Testing Data	5.92E-08	1.18E-07
p-terphenyl	92-94-4	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	9.27E-08
Acetone	67-64-1	4.06E+00	µg/Rm³	2024 Source Testing Data	9.03E-05	1.81E-04
Benzene	71-43-2	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Bromodichloromethane	75-27-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Bromoform	75-25-2	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Bromomethane	74-83-9	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
1,3-Butadiene	106-99-0	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
2-Butanone	78-93-3	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Carbon Tetrachloride	56-23-5	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Chloroform	67-66-3	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Cumene (Isopropylbenzene)	98-82-8	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Dibromochloromethane	124-48-1	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05

Prepared by: PS and MN
Reviewed by: KA

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
Dichlorodifluoromethane	75-71-8	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
1,2-Dichloroethane	107-06-2	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
trans,1,2-Dichloroethene	156-60-5	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
1,1-Dichloroethene	75-35-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
1,2-Dichloropropane	78-87-5	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Ethylbenzene	100-41-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Ethylene Dibromide	106-93-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Mesitylene (1,3,5-Trimethylbenzen	108-67-8	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Methylene Chloride	75-09-2	4.47E+00	µg/Rm³	2024 Source Testing Data	9.94E-05	1.99E-04
Styrene	100-42-5	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Tetrachloroethene	127-18-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Toluene	108-88-3	2.79E+02	µg/Rm³	2024 Source Testing Data	6.19E-03	1.24E-02
1,1,1-Trichloroethane	71-55-6	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Trichloroethene/1,1,2-Trichloroeth	79-01-6	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Trichlorotrifluoroethane	26523-64-8	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Trichlorofluoromethane	75-69-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
M&P-Xylene	108-38-3	4.17E+00	µg/Rm³	2024 Source Testing Data	9.27E-05	1.85E-04
O-Xylene	95-47-6	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05
Xylenes	1330-20-7	6.17E+00	µg/Rm³	2024 Source Testing Data	1.37E-04	2.74E-04
Vinyl Chloride	75-01-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	8.89E-05

Prepared by: PS and MN
Reviewed by: KA

Source 1 (Scenario B)

Main Stack - Normal Operation - One Train Only

Source Description: Emissions from the main stack under the maximum operating scenario to operate at 110% MCR at 13 MJ/kg HHV only one train operating. It was conservatively assumed to be operating at maximum capacity 24 hours per day, 7 days per week.

Operating Rate: One boiler is operating at 110% MCR and one unit offline.

Methodology: Engineering calculations. The maximum volumetric flow rate measured during 2018- 2024 source testing was taken and assumed to be the 100% MCR operating scenario. Since the facility can operate at 110% MCR on occasion, this represents the worst-case operation, therefore the maximum volumetric flow rate from source testing was increased by 10% to account for the 110% MCR scenario.

Source: Emission concentrations are taken from Facility specific in-stack emission limits where applicable. For contaminants without in-stack emission limits, the maximum emission concentrations taken from the 2024 Source testing data was used. For contaminants for which no data was available, manufacturers specifications were used and/or published emission factors were used.

Train Parameters:

Maximum flow rate measured between 2018-2024, representing the 100% MCR operating scenario	20.20	m^3/s at reference conditions of 0% Moisture, 11% Oxygen and 298.15K temperature, Spring 2022 compliance				
Max Volumetric Flow Rate per Train during normal 110% MCR operating scenario	=	20.20	Rm^3/s	x	1.10	
Max Volumetric flow rate per train during 110% MCR operating scenario	=	22.22	m^3/s at reference conditions of 0% Moisture, 11% Oxygen and 298.15K temperature			

Sample Calculation 1: Particulate matter emission per train

Emission Rate [g/s] = Concentration[mg/dscm] x volumetric flow rate [dm^3/s] x 1/1000 [mg/g]

$$= \frac{9.00\ \frac{mg}{m^3} \times 22.22\ \frac{m^3}{s} \times 1\ \frac{g}{1{,}000\ mg}}{}$$

$$= \frac{2.00E\text{-}01\ g}{s}$$

Prepared by: PS and MN
Reviewed by: KA

Source Emissions:

Indicator Compound	CAS Number	Concentration per train	Units(1)	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
Nitrogen Oxides	10102-44-0	121	mg/Rm³	ECA Limit	2.69E+00	2.69E+00
Carbon Monoxide	630-08-0	40	mg/Rm³	ECA Limit	8.89E-01	8.89E-01
Sulphur Dioxide	7446-09-5	35	mg/Rm³	ECA Limit	7.79E-01	7.79E-01
Filterable TSP	N/A -2	9	mg/Rm³	ECA Limit	2.00E-01	2.00E-01
Lead	7439-92-1	50.0	µg/Rm³	ECA Limit	1.11E-03	1.11E-03
Cadmium	7440-43-9	7.0	µg/Rm³	ECA Limit	1.56E-04	1.56E-04
Mercury	7439-97-6	15.0	µg/Rm³	ECA Limit	3.33E-04	3.33E-04
Dioxins, Furans and Dioxin- lil	N/A -6	60	pg/Rm³	ECA Limit	0.0013 µg TEQ/s	0.0013 µg TEQ/s
Hydrogen Chloride	7647-01-0	9.00	mg/Rm³	ECA Limit	2.00E-01	2.00E-01

Indicator Compound	CAS Number	Concentration per train	Units(1)	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
PM_{10}	N/A -3	6.55E+00	mg/Rm³	2024 Source Testing Data	1.46E-01	1.46E-01
$PM_{2.5}$	N/A -4	6.48E+00	mg/Rm³	2024 Source Testing Data	1.44E-01	1.44E-01
Total Suspended Particulate	N/A -1	6.55E+00	mg/Rm³	2024 Source Testing Data	1.46E-01	1.46E-01
Hydrogen Fluoride	7664-39-3	1.10E-01	mg/Rm³	2024 Source Testing Data	2.44E-03	2.44E-03
Ammonia	7664-41-7	6.90E-01	mg/Rm³	2024 Source Testing Data	1.53E-02	1.53E-02
Antimony	7440-36-0	6.90E-02	µg/Rm³	2024 Source Testing Data	1.53E-06	1.53E-06
Arsenic	7440-38-2	4.60E-02	µg/Rm³	2024 Source Testing Data	1.02E-06	1.02E-06
Barium	7440-39-3	1.16E+01	µg/Rm³	2024 Source Testing Data	2.58E-04	2.58E-04
Beryllium	7440-41-7	4.60E-02	µg/Rm³	2024 Source Testing Data	1.02E-06	1.02E-06
Chromium	7440-47-3	1.03E+00	µg/Rm³	2024 Source Testing Data	2.29E-05	2.29E-05
Cobalt	7440-48-4	4.40E-02	µg/Rm³	2024 Source Testing Data	9.78E-07	9.78E-07
Copper	7440-50-8	2.72E+00	µg/Rm³	2024 Source Testing Data	6.04E-05	6.04E-05
Molybdenum	7439-98-7	4.25E+00	µg/Rm³	2024 Source Testing Data	9.44E-05	9.44E-05
Nickel	7440-02-0	7.70E-01	µg/Rm³	2024 Source Testing Data	1.71E-05	1.71E-05
Selenium	7782-49-2	2.30E-01	µg/Rm³	2024 Source Testing Data	5.11E-06	5.11E-06
Silver	7440-22-4	4.60E-02	µg/Rm³	2024 Source Testing Data	1.02E-06	1.02E-06
Thallium	7440-28-0	4.60E-02	µg/Rm³	2024 Source Testing Data	1.02E-06	1.02E-06
Vanadium	7440-62-2	2.30E-02	µg/Rm³	2024 Source Testing Data	5.11E-07	5.11E-07
Zinc	7440-66-6	1.43E+01	µg/Rm³	2024 Source Testing Data	3.18E-04	3.18E-04
Polychlorinated Biphenyls (PCB)	1336-36-3	1.02E+04	pg/Rm³	2024 Source Testing Data	2.27E-07	2.27E-07
Monochlorobenzene	108-90-7	1.12E+02	ng/Rm³	2024 Source Testing Data	2.50E-06	2.50E-06
1,3-Dichlorobenzene	541-73-1	1.24E+01	ng/Rm³	2024 Source Testing Data	2.76E-07	2.76E-07
1,4-Dichlorobenzene	106-46-7	9.63E+00	ng/Rm³	2024 Source Testing Data	2.14E-07	2.14E-07
1,2-Dichlorobenzene	95-50-1	8.11E+00	ng/Rm³	2024 Source Testing Data	1.80E-07	1.80E-07
1,3,5-trichlorobenzene	108-70-3	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
1,2,4-trichlorobenzene	120-82-1	3.03E+00	ng/Rm³	2024 Source Testing Data	6.73E-08	6.73E-08
1,2,3-trichlorobenzene	87-61-6	2.46E+00	ng/Rm³	2024 Source Testing Data	5.47E-08	5.47E-08
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
1,2,3,4-tetrachlorobenzene	634-66-2	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Pentachlorobenzene	608-93-5	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Hexachlorobenzene	118-74-1	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
2-monochlorophenol	95-57-8	1.73E+02	ng/Rm³	2024 Source Testing Data	3.84E-06	3.84E-06
3-monochlorophenol	108-43-0	1.73E+02	ng/Rm³	2024 Source Testing Data	3.84E-06	3.84E-06
4-monochlorophenol	106-48-9	1.73E+02	ng/Rm³	2024 Source Testing Data	3.84E-06	3.84E-06
2,6-dichlorophenol	87-65-0	1.73E+02	ng/Rm³	2024 Source Testing Data	3.85E-06	3.85E-06
2,4 & 2,5-dichlorophenol	120-83-2	1.73E+02	ng/Rm³	2024 Source Testing Data	3.85E-06	3.85E-06
3,5-dichlorophenol	591-35-5	1.73E+02	ng/Rm³	2024 Source Testing Data	3.85E-06	3.85E-06
2,3-dichlorophenol	576-24-9	1.73E+02	ng/Rm³	2024 Source Testing Data	3.85E-06	3.85E-06
3,4-dichlorophenol	95-77-2	6.08E+02	ng/Rm³	2024 Source Testing Data	1.35E-05	1.35E-05
2,4,6-trichlorophenol	88-06-2	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07

Prepared by: PS and MN
Reviewed by: KA

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
2,3,6-trichlorophenol	933-75-5	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07
2,3,5-trichlorophenol	933-78-8	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07
2,4,5-trichlorophenol	95-95-4	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07
2,3,4-trichlorophenol	15950-66-0	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07
3,4,5-trichlorophenol	609-19-8	1.93E+02	ng/Rm³	2024 Source Testing Data	4.28E-06	4.28E-06
2,3,5,6/2,3,4,6-tetrachlorophe	58-90-2	3.12E+01	ng/Rm³	2024 Source Testing Data	6.92E-07	6.92E-07
2,3,4,5-tetrachlorophenol	4901-51-3	1.71E+01	ng/Rm³	2024 Source Testing Data	3.80E-07	3.80E-07
Pentachlorophenol	87-86-5	2.14E+02	ng/Rm³	2024 Source Testing Data	4.75E-06	4.75E-06
Acenaphthene	83-32-9	3.22E+00	ng/Rm³	2024 Source Testing Data	7.15E-08	7.15E-08
Acenaphthylene	208-96-8	2.60E+00	ng/Rm³	2024 Source Testing Data	5.78E-08	5.78E-08
Anthracene	120-12-7	2.66E+00	ng/Rm³	2024 Source Testing Data	5.92E-08	5.92E-08
Benzo(a)Anthracene	56-55-3	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Benzo(b)Fluoranthene	205-99-2	5.61E+00	ng/Rm³	2024 Source Testing Data	1.25E-07	1.25E-07
Benzo(k)Fluoranthene	207-08-9	3.37E+00	ng/Rm³	2024 Source Testing Data	7.48E-08	7.48E-08
Benzo(a)fluorene	238-84-6	2.51E+00	ng/Rm³	2024 Source Testing Data	5.58E-08	5.58E-08
Benzo(b)fluorene	243-17-4	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Benzo(g,h,i)Perylene	191-24-2	5.88E+00	ng/Rm³	2024 Source Testing Data	1.31E-07	1.31E-07
Benzo(a)Pyrene	50-32-8	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Benzo(e)Pyrene	192-97-2	3.92E+00	ng/Rm³	2024 Source Testing Data	8.71E-08	8.71E-08
Biphenyl	92-52-4	6.93E+01	ng/Rm³	2024 Source Testing Data	1.54E-06	1.54E-06
2-Chloronaphthalene	91-58-7	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Chrysene/Triphenylene	218-01-9	2.71E+01	ng/Rm³	2024 Source Testing Data	6.03E-07	6.03E-07
Coronene	191-07-1	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07
Dibenzo(a,c)Anthracene	215-58-7	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Dibenzo(a,h)Anthracene	53-70-3	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Dibenzo(a,e)pyrene	192-65-4	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07
9,10-dimethylanthracene	781-43-1	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
7,12-Dimethylbenzo(a)anthra	57-97-6	9.05E+00	ng/Rm³	2024 Source Testing Data	2.01E-07	2.01E-07
Fluoranthene	206-44-0	2.31E+01	ng/Rm³	2024 Source Testing Data	5.14E-07	5.14E-07
Fluorene	86-73-7	9.05E+00	ng/Rm³	2024 Source Testing Data	2.01E-07	2.01E-07
Indeno(1,2,3-cd)Pyrene	193-39-5	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
2-methylanthracene	613-12-7	3.52E+00	ng/Rm³	2024 Source Testing Data	7.82E-08	7.82E-08
3-Methylcholanthrene	56-49-5	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07
1-Methylnaphthalene	90-12-0	1.11E+01	ng/Rm³	2024 Source Testing Data	2.46E-07	2.46E-07
2-Methylnaphthalene	91-57-6	1.86E+01	ng/Rm³	2024 Source Testing Data	4.13E-07	4.13E-07
1-Methylphenanthrene	832-69-9	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
9-Methylphenanthrene	883-20-5	1.06E+01	ng/Rm³	2024 Source Testing Data	2.34E-07	2.34E-07
Naphthalene	91-20-3	4.67E+01	ng/Rm³	2024 Source Testing Data	1.04E-06	1.04E-06
Perylene	198-55-0	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Phenanthrene	85-01-8	1.17E+02	ng/Rm³	2024 Source Testing Data	2.60E-06	2.60E-06
Picene	213-46-7	1.03E+01	ng/Rm³	2024 Source Testing Data	2.28E-07	2.28E-07
Pyrene	129-00-0	2.31E+01	ng/Rm³	2024 Source Testing Data	5.14E-07	5.14E-07
Tetralin	119-64-2	1.33E+01	ng/Rm³	2024 Source Testing Data	2.95E-07	2.95E-07
m-terphenyl	92-06-8	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
o-Terphenyl	84-15-1	2.66E+00	ng/Rm³	2024 Source Testing Data	5.92E-08	5.92E-08
p-terphenyl	92-94-4	2.09E+00	ng/Rm³	2024 Source Testing Data	4.63E-08	4.63E-08
Acetone	67-64-1	4.06E+00	µg/Rm³	2024 Source Testing Data	9.03E-05	9.03E-05
Benzene	71-43-2	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Bromodichloromethane	75-27-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Bromoform	75-25-2	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Bromomethane	74-83-9	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
1,3-Butadiene	106-99-0	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
2-Butanone	78-93-3	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Carbon Tetrachloride	56-23-5	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Chloroform	67-66-3	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Cumene (Isopropylbenzene)	98-82-8	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05

Prepared by: PS and MN
Reviewed by: KA

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
Dibromochloromethane	124-48-1	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Dichlorodifluoromethane	75-71-8	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
1,2-Dichloroethane	107-06-2	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
trans,1,2-Dichloroethene	156-60-5	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
1,1-Dichloroethene	75-35-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
1,2-Dichloropropane	78-87-5	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Ethylbenzene	100-41-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Ethylene Dibromide	106-93-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Mesitylene (1,3,5-Trimethylbe	108-67-8	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Methylene Chloride	75-09-2	4.47E+00	µg/Rm³	2024 Source Testing Data	9.94E-05	9.94E-05
Styrene	100-42-5	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Tetrachloroethene	127-18-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Toluene	108-88-3	2.79E+02	µg/Rm³	2024 Source Testing Data	6.19E-03	6.19E-03
1,1,1-Trichloroethane	71-55-6	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Trichloroethene/1,1,2-Trichlor	79-01-6	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Trichlorotrifluoroethane	26523-64-8	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Trichlorofluoromethane	75-69-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
M&P-Xylene	108-38-3	4.17E+00	µg/Rm³	2024 Source Testing Data	9.27E-05	9.27E-05
O-Xylene	95-47-6	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05
Xylenes	1330-20-7	6.17E+00	µg/Rm³	2024 Source Testing Data	1.37E-04	1.37E-04
Vinyl Chloride	75-01-4	2.00E+00	µg/Rm³	2024 Source Testing Data	4.44E-05	4.44E-05

Prepared by: PS and MN
Reviewed by: KA

Source 1 (Scenario C)

Main Stack - Start Up - Phase 2 - Two Trains

Source Description: Emissions from the main stack under start-up (Phase 2) with both boilers operational. Under phase 2, the boilers are operational at operating point 4. Additional heat is provided by natural gas fired auxilliary boilers. This phase lasts approximately 1 hour.

Operating Rate: Under this scenario, both boilers are under Phase 2 of the start up. It has been assumed that 40% of heat input (at operation point 1) is from natural gas and 60% from MSW.

Methodology: Emission Factor
Source: The Source of each MSW firing emission concentration is documented in the Source Description sheet for Source 1A.
Natural gas firing emission factors are taken from US EPA AP42 chapter 1.4

Train Parameters:

Maximum flow rate measured between 2018-2024, representing the 100% MCR operating scenario for MSW firing	20.20	m^3/s at reference conditions of 0% Moisture, 11% Oxygen and 298.15K temperature, Spring 2022 compliance			
Volumetric Flow Rate per Train during normal 60% MCR operating scenario, MSW firing	=	20.20	Rm^3/s	x	0.60
Volumetric flow rate per train during 60% MCR operating scenario MSW firing	=	12.12	m^3/s at reference conditions of 0% Moisture, 11% Oxygen and 298.15K temperature		
Maximum Heat Input (Auxiliary Boiler - Natural Gas Firing)	44.8	MMBtu/hr	(two burners operating at 40% of max input of 56 MMBtu/hr)		

Sample Calculation 1: Carbon monoxide emission per train

Emission Rate [g/s] = Concentration[ppmdv] x Flow Rate [dm^3/s] x molecular weight of carbon monoxide [g/mol] ÷ molar volume of ideal gas[m^3/mol] x 10^{-6}

$$= \frac{40.00\ mg/Rm^3 \times 12\ \frac{m^3}{s} \times \frac{1\ g}{1{,}000\ mg}}{}$$

$$= \frac{4.85E\text{-}01\ g}{s}$$

Sample Calculation 1: Particulate matter emission per train

Emission Rate [g/s] = Concentration[mg/dscm] x volumetric flow rate [dm^3/s] x 1/1000 [mg/g]

$$= \frac{9.00\ \frac{mg}{m^3} \times 12.12\ \frac{m^3}{s} \times \frac{1\ g}{1{,}000\ mg}}{}$$

$$= \frac{1.09E\text{-}01\ g}{s}$$

Prepared by: PS and MN
Reviewed by: KA

Source Emissions:

		MSW Firing Boiler					Natural Gas Firing Auxiliary Boiler		Total Emission Rate [g/s]
Indicator Compound	**CAS Number**	**Concentration per train**	**Units(1)**	**Concentration Reference**	**Emission Rate per Train [g/s]**	**Total Emission Rate [g/s]**	**US EPA EF [lb/10^6 scf]***	**Emission Rate per Train [g/s]****	
Nitrogen Oxides	10102-44-0	121	mg/Rm³	ECA Limit	1.47E+00	1.47E+00	3.80E+01	2.10E-01	3.35E+00
Carbon Monoxide	630-08-0	40	mg/Rm³	ECA Limit	4.85E-01	4.85E-01	—	—	9.70E-01
Sulphur Dioxide	7446-09-5	35	mg/Rm³	ECA Limit	4.24E-01	4.24E-01	—	—	8.48E-01
Filterable TSP	N/A -2	9	mg/Rm³	ECA Limit	1.09E-01	1.09E-01	—	—	2.18E-01
Lead	7439-92-1	50.0	µg/Rm³	ECA Limit	6.06E-04	6.06E-04	—	—	1.21E-03
Cadmium	7440-43-9	7.0	µg/Rm³	ECA Limit	8.48E-05	8.48E-05	—	—	1.70E-04
Mercury	7439-97-6	15.0	µg/Rm³	ECA Limit	1.82E-04	1.82E-04	—	—	3.64E-04
Dioxins, Furans and Dioxin- li	N/A -6	60	pg/Rm³	ECA Limit	0.0007 µg TEQ/s	0.0007 µg TEQ/s	—	—	0.0015 µg TEQ/s
Hydrogen Chloride	7647-01-0	9.00	mg/Rm³	ECA Limit	1.09E-01	1.09E-01	—	—	2.18E-01

*Source: USEPA AP-42, Section 1.4 (Natural Gas Combustion), <100MMBTU low NOx burner with SNCR
** 50 lb/106 scf x 0.76 (SNCR reduction)/1020 mmBtu/106 scf * 44.8 MMBtu/hr*454 g/lb/3600 s/hr

Indicator Compound	**CAS Number**	**Concentration per train**	**Units(1)**	**Concentration Reference**	**Emission Rate per Train [g/s]**	**Total Emission Rate [g/s]**	**US EPA EF [lb/10^6 scf]**	**Emission Rate per Train [g/s]**	**Total Emission Rate [g/s]**
PM_{10}	N/A -3	6.55E+00	mg/Rm³	2024 Source Testing Data	7.94E-02	7.94E-02	—	—	1.59E-01
$PM_{2.5}$	N/A -4	6.48E+00	mg/Rm³	2024 Source Testing Data	7.85E-02	7.85E-02	—	—	1.57E-01
Total Suspended Particulate	N/A -1	9.00E+00	mg/Rm³	ECA Limit	1.09E-01	1.09E-01	—	—	2.18E-01
Hydrogen Fluoride	7664-39-3	1.10E-01	mg/Rm³	2024 Source Testing Data	1.33E-03	1.33E-03	—	—	2.67E-03
Ammonia	7664-41-7	6.90E-01	mg/Rm³	2024 Source Testing Data	8.36E-03	8.36E-03	—	—	1.67E-02
Antimony	7440-36-0	6.90E-02	µg/Rm³	2024 Source Testing Data	8.36E-07	8.36E-07	—	—	1.67E-06
Arsenic	7440-38-2	4.60E-02	µg/Rm³	2024 Source Testing Data	5.58E-07	5.58E-07	—	—	1.12E-06
Barium	7440-39-3	1.16E+01	µg/Rm³	2024 Source Testing Data	1.41E-04	1.41E-04	—	—	2.81E-04
Beryllium	7440-41-7	4.60E-02	µg/Rm³	2024 Source Testing Data	5.58E-07	5.58E-07	—	—	1.12E-06
Chromium	7440-47-3	1.03E+00	µg/Rm³	2024 Source Testing Data	1.25E-05	1.25E-05	—	—	2.50E-05
Cobalt	7440-48-4	4.40E-02	µg/Rm³	2024 Source Testing Data	5.33E-07	5.33E-07	—	—	1.07E-06
Copper	7440-50-8	2.72E+00	µg/Rm³	2024 Source Testing Data	3.30E-05	3.30E-05	—	—	6.59E-05
Molybdenum	7439-98-7	4.25E+00	µg/Rm³	2024 Source Testing Data	5.15E-05	5.15E-05	—	—	1.03E-04
Nickel	7440-02-0	7.70E-01	µg/Rm³	2024 Source Testing Data	9.33E-06	9.33E-06	—	—	1.87E-05
Selenium	7782-49-2	2.30E-01	µg/Rm³	2024 Source Testing Data	2.79E-06	2.79E-06	—	—	5.58E-06
Silver	7440-22-4	4.60E-02	µg/Rm³	2024 Source Testing Data	5.58E-07	5.58E-07	—	—	1.12E-06
Thallium	7440-28-0	4.60E-02	µg/Rm³	2024 Source Testing Data	5.58E-07	5.58E-07	—	—	1.12E-06
Vanadium	7440-62-2	2.30E-02	µg/Rm³	2024 Source Testing Data	2.79E-07	2.79E-07	—	—	5.58E-07
Zinc	7440-66-6	1.43E+01	µg/Rm³	2024 Source Testing Data	1.73E-04	1.73E-04	—	—	3.47E-04
Polychlorinated Biphenyls (PCB)	1336-36-3	1.02E+04	pg/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.47E-07
Monochlorobenzene	108-90-7	1.12E+02	ng/Rm³	2024 Source Testing Data	1.36E-06	1.36E-06	—	—	2.72E-06
1,3-Dichlorobenzene	541-73-1	1.24E+01	ng/Rm³	2024 Source Testing Data	1.51E-07	1.51E-07	—	—	3.01E-07
1,4-Dichlorobenzene	106-46-7	9.63E+00	ng/Rm³	2024 Source Testing Data	1.17E-07	1.17E-07	—	—	2.33E-07
1,2-Dichlorobenzene	95-50-1	8.11E+00	ng/Rm³	2024 Source Testing Data	9.83E-08	9.83E-08	—	—	1.97E-07
1,3,5-trichlorobenzene	108-70-3	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
1,2,4-trichlorobenzene	120-82-1	3.03E+00	ng/Rm³	2024 Source Testing Data	3.67E-08	3.67E-08	—	—	7.34E-08
1,2,3-trichlorobenzene	87-61-6	2.46E+00	ng/Rm³	2024 Source Testing Data	2.98E-08	2.98E-08	—	—	5.97E-08
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
1,2,3,4-tetrachlorobenzene	634-66-2	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Pentachlorobenzene	608-93-5	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Hexachlorobenzene	118-74-1	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
2-monochlorophenol	95-57-8	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	4.19E-06
3-monochlorophenol	108-43-0	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	4.19E-06
4-monochlorophenol	106-48-9	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	4.19E-06
2,6-dichlorophenol	87-65-0	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	4.20E-06
2,4 & 2,5-dichlorophenol	120-83-2	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	4.20E-06
3,5-dichlorophenol	591-35-5	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	4.20E-06
2,3-dichlorophenol	576-24-9	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	4.20E-06
3,4-dichlorophenol	95-77-2	6.08E+02	ng/Rm³	2024 Source Testing Data	7.37E-06	7.37E-06	—	—	1.47E-05
2,4,6-trichlorophenol	88-06-2	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
2,3,6-trichlorophenol	933-75-5	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
2,3,5-trichlorophenol	933-78-8	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
2,4,5-trichlorophenol	95-95-4	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
2,3,4-trichlorophenol	15950-66-0	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
3,4,5-trichlorophenol	609-19-8	1.93E+02	ng/Rm³	2024 Source Testing Data	2.33E-06	2.33E-06	—	—	4.67E-06
2,3,5,6/2,3,4,6-tetrachlorophe	58-90-2	3.12E+01	ng/Rm³	2024 Source Testing Data	3.78E-07	3.78E-07	—	—	7.55E-07
2,3,4,5-tetrachlorophenol	4901-51-3	1.71E+01	ng/Rm³	2024 Source Testing Data	2.07E-07	2.07E-07	—	—	4.14E-07
Pentachlorophenol	87-86-5	2.14E+02	ng/Rm³	2024 Source Testing Data	2.59E-06	2.59E-06	—	—	5.18E-06
Acenaphthene	83-32-9	3.22E+00	ng/Rm³	2024 Source Testing Data	3.90E-08	3.90E-08	—	—	7.80E-08
Acenaphthylene	208-96-8	2.60E+00	ng/Rm³	2024 Source Testing Data	3.15E-08	3.15E-08	—	—	6.31E-08

Prepared by: PS and MN
Reviewed by: KA

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]	US EPA EF [lb/10^6 scf]	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
Anthracene	120-12-7	2.66E+00	ng/Rm³	2024 Source Testing Data	3.23E-08	3.23E-08	—	—	6.46E-08
Benzo(a)Anthracene	56-55-3	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Benzo(b)Fluoranthene	205-99-2	5.61E+00	ng/Rm³	2024 Source Testing Data	6.80E-08	6.80E-08	—	—	1.36E-07
Benzo(k)Fluoranthene	207-08-9	3.37E+00	ng/Rm³	2024 Source Testing Data	4.08E-08	4.08E-08	—	—	8.16E-08
Benzo(a)fluorene	238-84-6	2.51E+00	ng/Rm³	2024 Source Testing Data	3.05E-08	3.05E-08	—	—	6.09E-08
Benzo(b)fluorene	243-17-4	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Benzo(g,h,i)Perylene	191-24-2	5.88E+00	ng/Rm³	2024 Source Testing Data	7.13E-08	7.13E-08	—	—	1.43E-07
Benzo(a)Pyrene	50-32-8	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Benzo(e)Pyrene	192-97-2	3.92E+00	ng/Rm³	2024 Source Testing Data	4.75E-08	4.75E-08	—	—	9.50E-08
Biphenyl	92-52-4	6.93E+01	ng/Rm³	2024 Source Testing Data	8.40E-07	8.40E-07	—	—	1.68E-06
2-Chloronaphthalene	91-58-7	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Chrysene/Triphenylene	218-01-9	2.71E+01	ng/Rm³	2024 Source Testing Data	3.29E-07	3.29E-07	—	—	6.58E-07
Coronene	191-07-1	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
Dibenzo(a,c)Anthracene	215-58-7	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Dibenzo(a,h)Anthracene	53-70-3	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Dibenzo(a,e)pyrene	192-65-4	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
9,10-dimethylanthracene	781-43-1	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
7,12-Dimethylbenzo(a)anthra	57-97-6	9.05E+00	ng/Rm³	2024 Source Testing Data	1.10E-07	1.10E-07	—	—	2.19E-07
Fluoranthene	206-44-0	2.31E+01	ng/Rm³	2024 Source Testing Data	2.80E-07	2.80E-07	—	—	5.60E-07
Fluorene	86-73-7	9.05E+00	ng/Rm³	2024 Source Testing Data	1.10E-07	1.10E-07	—	—	2.19E-07
Indeno(1,2,3-cd)Pyrene	193-39-5	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
2-methylanthracene	613-12-7	3.52E+00	ng/Rm³	2024 Source Testing Data	4.26E-08	4.26E-08	—	—	8.53E-08
3-Methylcholanthrene	56-49-5	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
1-Methylnaphthalene	90-12-0	1.11E+01	ng/Rm³	2024 Source Testing Data	1.34E-07	1.34E-07	—	—	2.68E-07
2-Methylnaphthalene	91-57-6	1.86E+01	ng/Rm³	2024 Source Testing Data	2.25E-07	2.25E-07	—	—	4.51E-07
1-Methylphenanthrene	832-69-9	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
9-Methylphenanthrene	883-20-5	1.06E+01	ng/Rm³	2024 Source Testing Data	1.28E-07	1.28E-07	—	—	2.56E-07
Naphthalene	91-20-3	4.67E+01	ng/Rm³	2024 Source Testing Data	5.66E-07	5.66E-07	—	—	1.13E-06
Perylene	198-55-0	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Phenanthrene	85-01-8	1.17E+02	ng/Rm³	2024 Source Testing Data	1.42E-06	1.42E-06	—	—	2.84E-06
Picene	213-46-7	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	2.49E-07
Pyrene	129-00-0	2.31E+01	ng/Rm³	2024 Source Testing Data	2.80E-07	2.80E-07	—	—	5.60E-07
Tetralin	119-64-2	1.33E+01	ng/Rm³	2024 Source Testing Data	1.61E-07	1.61E-07	—	—	3.22E-07
m-terphenyl	92-06-8	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
o-Terphenyl	84-15-1	2.66E+00	ng/Rm³	2024 Source Testing Data	3.23E-08	3.23E-08	—	—	6.46E-08
p-terphenyl	92-94-4	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	5.06E-08
Acetone	67-64-1	4.06E+00	µg/Rm³	2024 Source Testing Data	4.93E-05	4.93E-05	—	—	9.85E-05
Benzene	71-43-2	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Bromodichloromethane	75-27-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Bromoform	75-25-2	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Bromomethane	74-83-9	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
1,3-Butadiene	106-99-0	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
2-Butanone	78-93-3	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Carbon Tetrachloride	56-23-5	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Chloroform	67-66-3	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Cumene (Isopropylbenzene)	98-82-8	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Dibromochloromethane	124-48-1	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Dichlorodifluoromethane	75-71-8	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
1,2-Dichloroethane	107-06-2	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
trans,1,2-Dichloroethene	156-60-5	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
1,1-Dichloroethene	75-35-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
1,2-Dichloropropane	78-87-5	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Ethylbenzene	100-41-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Ethylene Dibromide	106-93-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Mesitylene (1,3,5-Trimethylbe	108-67-8	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Methylene Chloride	75-09-2	4.47E+00	µg/Rm³	2024 Source Testing Data	5.42E-05	5.42E-05	—	—	1.08E-04
Styrene	100-42-5	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Tetrachloroethene	127-18-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Toluene	108-88-3	2.79E+02	µg/Rm³	2024 Source Testing Data	3.38E-03	3.38E-03	—	—	6.75E-03
1,1,1-Trichloroethane	71-55-6	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Trichloroethene/1,1,2-Trichlor	79-01-6	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Trichlorotrifluoroethane	26523-64-8	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Trichlorofluoromethane	75-69-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
M&P-Xylene	108-38-3	4.17E+00	µg/Rm³	2024 Source Testing Data	5.06E-05	5.06E-05	—	—	1.01E-04
O-Xylene	95-47-6	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05
Xylenes	1330-20-7	6.17E+00	µg/Rm³	2024 Source Testing Data	7.48E-05	7.48E-05	—	—	1.50E-04
Vinyl Chloride	75-01-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	4.85E-05

Prepared by: PS and MN
Reviewed by: KA

Source 1 (Scenario D)

Main Stack - Start Up - Phase 2 - One Train Only

Source Description: Emissions from the main stack under start-up (Phase 2) with only one boiler operational. Under phase 2, the boiler is operational at operating point 4. Additional heat is provided by a natural gas fired auxilliary boiler. This phase lasts approximately 1 hour. Only 1 train is operational.

Operating Rate: Under this scenario, one train is operational under Phase 2 of the start up. It has been assumed that 40% of heat input (at operation point 1) is from natural gas and 60% from MSW. The second train is not operational. This is considered the most likely start up condition.

Methodology: Emission Factor
Source: The Source of each MSW firing emission concentration is documented in the Source Description sheet for Source 1A.
Natural gas firing emission factors are taken from US EPA AP42 chapter 1.4

Train Parameters:

Maximum flow rate measured between 2018-2024, representing the 100% MCR operating scenario for MSW firing	20.20	m³/s at reference conditions of 0% Moisture, 11% Oxygen and 298.15K temperature, Spring 2022 compliance			
Volumetric Flow Rate per Train during normal 60% MCR operating scenario, MSW firing	=	20.20	Rm³/s	x	0.60
Volumetric flow rate per train during 60% MCR operating scenario MSW firing	=	12.12	m³/s at reference conditions of 0% Moisture, 11% Oxygen and 298.15K temperature		
Maximum Heat Input (Auxiliary Boiler - Natural Gas Firing)	44.8	MMBtu/hr	(two burners operating at 40% of max input of 56 MMBtu/hr)		

Sample Calculation 1: Carbon monoxide emission per train

Emission Rate [g/s] = Concentration[mg/dscm] x volumetric flow rate [dm³/s] x 1/1000 [mg/g]

$$= \frac{40.00\ \text{mg/Rm}^3}{} \cdot \frac{12\ \text{m}^3}{\text{s}} \cdot \frac{1\ \text{g}}{1{,}000\ \text{mg}} \cdot \frac{1}{1000000}$$

$$= \frac{4.85\text{E-01}\ \text{g}}{\text{s}}$$

Sample Calculation 2: Particulate matter emission per train

Emission Rate [g/s] = Concentration[mg/dscm] x volumetric flow rate [dm³/s] x 1/1000 [mg/g]

$$= \frac{9.00\ \text{mg}}{\text{m}^3} \cdot \frac{12.12\ \text{m}^3}{\text{s}} \cdot \frac{1\ \text{g}}{1{,}000\ \text{mg}}$$

$$= \frac{1.09\text{E-01}\ \text{g}}{\text{s}}$$

Source Emissions:

		MSW Firing Boiler					Natural Gas Firing Auxiliary Boiler		Total Emission Rate [g/s]
Indicator Compound	**CAS Number**	**Concentration per train**	**Units(1)**	**Concentration Reference**	**Emission Rate per Train [g/s]**	**Total Emission Rate [g/s]**	**US EPA EF [lb/10⁶ scf]***	**Emission Rate per Train [g/s]****	
Nitrogen Oxides	10102-44-0	121	mg/Rm³	ECA Limit	1.47E+00	1.47E+00	3.80E+01	2.10E-01	1.68E+00
Carbon Monoxide	630-08-0	40	mg/Rm³	ECA Limit	4.85E-01	4.85E-01	—	—	4.85E-01
Sulphur Dioxide	7446-09-5	35	mg/Rm³	ECA Limit	4.24E-01	4.24E-01	—	—	4.24E-01
Filterable TSP	N/A -2	9	mg/Rm³	ECA Limit	1.09E-01	1.09E-01	—	—	1.09E-01
Lead	7439-92-1	50.0	µg/Rm³	ECA Limit	6.06E-04	6.06E-04	—	—	6.06E-04
Cadmium	7440-43-9	7.0	µg/Rm³	ECA Limit	8.48E-05	8.48E-05	—	—	8.48E-05
Mercury	7439-97-6	15.0	µg/Rm³	ECA Limit	1.82E-04	1.82E-04	—	—	1.82E-04
Dioxins, Furans and Dioxin-	N/A -6	60	pg/Rm³	ECA Limit	0.0007 µg TEQ/s	0.0007 µg TEQ/s	—	—	0.0007 µg TEQ/s
Hydrogen Chloride	7647-01-0	9.00	mg/Rm³	ECA Limit	1.09E-01	1.09E-01	—	—	1.09E-01

*Source: USEPA AP-42, Section 1.4 (Natural Gas Combustion), <100MMBTU low NOx burner with SNCR
** 50 lb/106 scf x 0.76 (SNCR reduction)/1020 mmBtu/106 scf * 44.8 MMBtu/hr*454 g/lb/3600 s/hr

Prepared by: PS and MN
Reviewed by: KA

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]	US EPA EF [lb/10^6 scf]	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
PM_{10}	N/A -3	6.55E+00	mg/Rm³	2024 Source Testing Data	7.94E-02	7.94E-02	—	—	7.94E-02
$PM_{2.5}$	N/A -4	6.48E+00	mg/Rm³	2024 Source Testing Data	7.85E-02	7.85E-02	—	—	7.85E-02
Total Suspended Particulate	N/A -1	9.00E+00	mg/Rm³	ECA Limit	1.09E-01	1.09E-01	—	—	1.09E-01
Hydrogen Fluoride	7664-39-3	1.10E-01	mg/Rm³	2024 Source Testing Data	1.33E-03	1.33E-03	—	—	1.33E-03
Ammonia	7664-41-7	6.90E-01	mg/Rm³	2024 Source Testing Data	8.36E-03	8.36E-03	—	—	8.36E-03
Antimony	7440-36-0	6.90E-02	µg/Rm³	2024 Source Testing Data	8.36E-07	8.36E-07	—	—	8.36E-07
Arsenic	7440-38-2	4.60E-02	µg/Rm³	2024 Source Testing Data	5.58E-07	5.58E-07	—	—	5.58E-07
Barium	7440-39-3	1.16E+01	µg/Rm³	2024 Source Testing Data	1.41E-04	1.41E-04	—	—	1.41E-04
Beryllium	7440-41-7	4.60E-02	µg/Rm³	2024 Source Testing Data	5.58E-07	5.58E-07	—	—	5.58E-07
Chromium	7440-47-3	1.03E+00	µg/Rm³	2024 Source Testing Data	1.25E-05	1.25E-05	—	—	1.25E-05
Cobalt	7440-48-4	4.40E-02	µg/Rm³	2024 Source Testing Data	5.33E-07	5.33E-07	—	—	5.33E-07
Copper	7440-50-8	2.72E+00	µg/Rm³	2024 Source Testing Data	3.30E-05	3.30E-05	—	—	3.30E-05
Molybdenum	7439-98-7	4.25E+00	µg/Rm³	2024 Source Testing Data	5.15E-05	5.15E-05	—	—	5.15E-05
Nickel	7440-02-0	7.70E-01	µg/Rm³	2024 Source Testing Data	9.33E-06	9.33E-06	—	—	9.33E-06
Selenium	7782-49-2	2.30E-01	µg/Rm³	2024 Source Testing Data	2.79E-06	2.79E-06	—	—	2.79E-06
Silver	7440-22-4	4.60E-02	µg/Rm³	2024 Source Testing Data	5.58E-07	5.58E-07	—	—	5.58E-07
Thallium	7440-28-0	4.60E-02	µg/Rm³	2024 Source Testing Data	5.58E-07	5.58E-07	—	—	5.58E-07
Vanadium	7440-62-2	2.30E-02	µg/Rm³	2024 Source Testing Data	2.79E-07	2.79E-07	—	—	2.79E-07
Zinc	7440-66-6	1.43E+01	µg/Rm³	2024 Source Testing Data	1.73E-04	1.73E-04	—	—	1.73E-04
Polychlorinated Biphenyls (PCB)	1336-36-3	1.02E+04	pg/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
Monochlorobenzene	108-90-7	1.12E+02	ng/Rm³	2024 Source Testing Data	1.36E-06	1.36E-06	—	—	1.36E-06
1,3-Dichlorobenzene	541-73-1	1.24E+01	ng/Rm³	2024 Source Testing Data	1.51E-07	1.51E-07	—	—	1.51E-07
1,4-Dichlorobenzene	106-46-7	9.63E+00	ng/Rm³	2024 Source Testing Data	1.17E-07	1.17E-07	—	—	1.17E-07
1,2-Dichlorobenzene	95-50-1	8.11E+00	ng/Rm³	2024 Source Testing Data	9.83E-08	9.83E-08	—	—	9.83E-08
1,3,5-trichlorobenzene	108-70-3	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
1,2,4-trichlorobenzene	120-82-1	3.03E+00	ng/Rm³	2024 Source Testing Data	3.67E-08	3.67E-08	—	—	3.67E-08
1,2,3-trichlorobenzene	87-61-6	2.46E+00	ng/Rm³	2024 Source Testing Data	2.98E-08	2.98E-08	—	—	2.98E-08
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	95-94-3	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
1,2,3,4-tetrachlorobenzene	634-66-2	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Pentachlorobenzene	608-93-5	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Hexachlorobenzene	118-74-1	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
2-monochlorophenol	95-57-8	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	2.10E-06
3-monochlorophenol	108-43-0	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	2.10E-06
4-monochlorophenol	106-48-9	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	2.10E-06
2,6-dichlorophenol	87-65-0	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	2.10E-06
2,4 & 2,5-dichlorophenol	120-83-2	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	2.10E-06
3,5-dichlorophenol	591-35-5	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	2.10E-06
2,3-dichlorophenol	576-24-9	1.73E+02	ng/Rm³	2024 Source Testing Data	2.10E-06	2.10E-06	—	—	2.10E-06
3,4-dichlorophenol	95-77-2	6.08E+02	ng/Rm³	2024 Source Testing Data	7.37E-06	7.37E-06	—	—	7.37E-06
2,4,6-trichlorophenol	88-06-2	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
2,3,6-trichlorophenol	933-75-5	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
2,3,5-trichlorophenol	933-78-8	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
2,4,5-trichlorophenol	95-95-4	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
2,3,4-trichlorophenol	15950-66-0	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
3,4,5-trichlorophenol	609-19-8	1.93E+02	ng/Rm³	2024 Source Testing Data	2.33E-06	2.33E-06	—	—	2.33E-06
2,3,5,6/2,3,4,6-tetrachlorophe	58-90-2	3.12E+01	ng/Rm³	2024 Source Testing Data	3.78E-07	3.78E-07	—	—	3.78E-07
2,3,4,5-tetrachlorophenol	4901-51-3	1.71E+01	ng/Rm³	2024 Source Testing Data	2.07E-07	2.07E-07	—	—	2.07E-07
Pentachlorophenol	87-86-5	2.14E+02	ng/Rm³	2024 Source Testing Data	2.59E-06	2.59E-06	—	—	2.59E-06
Acenaphthene	83-32-9	3.22E+00	ng/Rm³	2024 Source Testing Data	3.90E-08	3.90E-08	—	—	3.90E-08
Acenaphthylene	208-96-8	2.60E+00	ng/Rm³	2024 Source Testing Data	3.15E-08	3.15E-08	—	—	3.15E-08
Anthracene	120-12-7	2.66E+00	ng/Rm³	2024 Source Testing Data	3.23E-08	3.23E-08	—	—	3.23E-08
Benzo(a)Anthracene	56-55-3	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Benzo(b)Fluoranthene	205-99-2	5.61E+00	ng/Rm³	2024 Source Testing Data	6.80E-08	6.80E-08	—	—	6.80E-08
Benzo(k)Fluoranthene	207-08-9	3.37E+00	ng/Rm³	2024 Source Testing Data	4.08E-08	4.08E-08	—	—	4.08E-08
Benzo(a)fluorene	238-84-6	2.51E+00	ng/Rm³	2024 Source Testing Data	3.05E-08	3.05E-08	—	—	3.05E-08
Benzo(b)fluorene	243-17-4	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Benzo(g,h,i)Perylene	191-24-2	5.88E+00	ng/Rm³	2024 Source Testing Data	7.13E-08	7.13E-08	—	—	7.13E-08
Benzo(a)Pyrene	50-32-8	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Benzo(e)Pyrene	192-97-2	3.92E+00	ng/Rm³	2024 Source Testing Data	4.75E-08	4.75E-08	—	—	4.75E-08
Biphenyl	92-52-4	6.93E+01	ng/Rm³	2024 Source Testing Data	8.40E-07	8.40E-07	—	—	8.40E-07
2-Chloronaphthalene	91-58-7	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Chrysene/Triphenylene	218-01-9	2.71E+01	ng/Rm³	2024 Source Testing Data	3.29E-07	3.29E-07	—	—	3.29E-07
Coronene	191-07-1	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
Dibenzo(a,c)Anthracene	215-58-7	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Dibenzo(a,h)Anthracene	53-70-3	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Dibenzo(a,e)pyrene	192-65-4	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
9,10-dimethylanthracene	781-43-1	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
7,12-Dimethylbenzo(a)anthra	57-97-6	9.05E+00	ng/Rm³	2024 Source Testing Data	1.10E-07	1.10E-07	—	—	1.10E-07
Fluoranthene	206-44-0	2.31E+01	ng/Rm³	2024 Source Testing Data	2.80E-07	2.80E-07	—	—	2.80E-07
Fluorene	86-73-7	9.05E+00	ng/Rm³	2024 Source Testing Data	1.10E-07	1.10E-07	—	—	1.10E-07
Indeno(1,2,3-cd)Pyrene	193-39-5	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
2-methylanthracene	613-12-7	3.52E+00	ng/Rm³	2024 Source Testing Data	4.26E-08	4.26E-08	—	—	4.26E-08
3-Methylcholanthrene	56-49-5	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
1-Methylnaphthalene	90-12-0	1.11E+01	ng/Rm³	2024 Source Testing Data	1.34E-07	1.34E-07	—	—	1.34E-07
2-Methylnaphthalene	91-57-6	1.86E+01	ng/Rm³	2024 Source Testing Data	2.25E-07	2.25E-07	—	—	2.25E-07
1-Methylphenanthrene	832-69-9	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08

Prepared by: PS and MN
Reviewed by: KA

Indicator Compound	CAS Number	Concentration per train	Units[1]	Concentration Reference	Emission Rate per Train [g/s]	Total Emission Rate [g/s]	US EPA EF [lb/10^6 scf]	Emission Rate per Train [g/s]	Total Emission Rate [g/s]
9-Methylphenanthrene	883-20-5	1.06E+01	ng/Rm³	2024 Source Testing Data	1.28E-07	1.28E-07	—	—	1.28E-07
Naphthalene	91-20-3	4.67E+01	ng/Rm³	2024 Source Testing Data	5.66E-07	5.66E-07	—	—	5.66E-07
Perylene	198-55-0	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Phenanthrene	85-01-8	1.17E+02	ng/Rm³	2024 Source Testing Data	1.42E-06	1.42E-06	—	—	1.42E-06
Picene	213-46-7	1.03E+01	ng/Rm³	2024 Source Testing Data	1.24E-07	1.24E-07	—	—	1.24E-07
Pyrene	129-00-0	2.31E+01	ng/Rm³	2024 Source Testing Data	2.80E-07	2.80E-07	—	—	2.80E-07
Tetralin	119-64-2	1.33E+01	ng/Rm³	2024 Source Testing Data	1.61E-07	1.61E-07	—	—	1.61E-07
m-terphenyl	92-06-8	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
o-Terphenyl	84-15-1	2.66E+00	ng/Rm³	2024 Source Testing Data	3.23E-08	3.23E-08	—	—	3.23E-08
p-terphenyl	92-94-4	2.09E+00	ng/Rm³	2024 Source Testing Data	2.53E-08	2.53E-08	—	—	2.53E-08
Acetone	67-64-1	4.06E+00	µg/Rm³	2024 Source Testing Data	4.93E-05	4.93E-05	—	—	4.93E-05
Benzene	71-43-2	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Bromodichloromethane	75-27-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Bromoform	75-25-2	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Bromomethane	74-83-9	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
1,3-Butadiene	106-99-0	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
2-Butanone	78-93-3	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Carbon Tetrachloride	56-23-5	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Chloroform	67-66-3	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Cumene (Isopropylbenzene)	98-82-8	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Dibromochloromethane	124-48-1	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Dichlorodifluoromethane	75-71-8	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
1,2-Dichloroethane	107-06-2	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
trans,1,2-Dichloroethene	156-60-5	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
1,1-Dichloroethene	75-35-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
1,2-Dichloropropane	78-87-5	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Ethylbenzene	100-41-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Ethylene Dibromide	106-93-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Mesitylene (1,3,5-Trimethylb	108-67-8	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Methylene Chloride	75-09-2	4.47E+00	µg/Rm³	2024 Source Testing Data	5.42E-05	5.42E-05	—	—	5.42E-05
Styrene	100-42-5	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Tetrachloroethene	127-18-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Toluene	108-88-3	2.79E+02	µg/Rm³	2024 Source Testing Data	3.38E-03	3.38E-03	—	—	3.38E-03
1,1,1-Trichloroethane	71-55-6	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Trichloroethene/1,1,2-Trichlo	79-01-6	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Trichlorotrifluoroethane	26523-64-8	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Trichlorofluoromethane	75-69-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
M&P-Xylene	108-38-3	4.17E+00	µg/Rm³	2024 Source Testing Data	5.06E-05	5.06E-05	—	—	5.06E-05
O-Xylene	95-47-6	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05
Xylenes	1330-20-7	6.17E+00	µg/Rm³	2024 Source Testing Data	7.48E-05	7.48E-05	—	—	7.48E-05
Vinyl Chloride	75-01-4	2.00E+00	µg/Rm³	2024 Source Testing Data	2.42E-05	2.42E-05	—	—	2.42E-05

Prepared by: PS and MN
Reviewed by: KA

Source 1 (Scenario E)

Main Stack (Off-Line Operation)

Source Description: Emissions from the main stack under the potential scenario where both trains are off-line for an extended period of time and the pit has MSW. Under this scenario, the fans would still be operating, drawing air through the combustion system, releasing uncombusted odourous air into the atmosphere.

Operating Rate: Under this scenario, maximum emissions occur when both combustion air fans are operational but both trains are off-line.

Methodology: Source Testing
Source: Zorix Odour Source Test Report - November 23, 2015

Date	Operating Condtion	Odour Concentration (OU/m3)	Geometric Mean (OU/m3)
8-Oct-15	Maximum Capacity on charging floor (1st day)	861	912
8-Oct-15	Maximum Capacity on charging floor (1st day)	939	
8-Oct-15	Maximum Capacity on charging floor (1st day)	939	
9-Oct-15	Maximum Capacity on charging floor (2nd day)	664	861
9-Oct-15	Maximum Capacity on charging floor (2nd day)	1,117	
9-Oct-15	Maximum Capacity on charging floor (2nd day)	861	

Fan Parameters: Flow Rate (per fan) 42500 m^3/hr at ambient conditions
11.81 m^3/s

Total Flow Rate 23.61 m^3/s

Source Emissions:
Sample Calculation: Odour Emissions

Emission Rate [g/s] = Average Recognition Threshold [OU/m^3] x Total Fan Flow Rate [m^3/s]

$$= \frac{912 \ OU}{m^3} \cdot \frac{23.61 \ m^3}{s}$$

$$= \frac{2.15E+04 \ OU}{s}$$

Source 2

Silo Filling

Source Description: There are four (4) silos at the facility. Emissions occur during silo filling and are controlled via a baghouse. Properties of each silo are given in the following table:

Parameter	Pebble Lime	Carbon	Pozzolan	Portland Cement
Usage rate (lb/hr)	401	60	207	227
Delivery Payload (tons)	20	20	25	20
Fill Frequency (days)	4.2	27.8	10.1	7.3
Deliveries per year	88.8	14.1	37.3	50.7

Operating Rate: Maximum emissions occur during silo filling which takes approximately 4 hours per silo.

Methodology: Emission Factor
Source: Provided by Reworld

Train Parameters: Baghouse Filter Efficiency 0.0344 g/m3

Filter Flow Rate 0.31 m3/s

Sample Calculation: Particulate Matter from Pebble Lime Silo

Emission Rate [g/s] = Flow Rate [m3/s] x Filter Efficiency [g/m3]

$$= \frac{0.03\ \frac{g}{m^3}}{} \Big| \frac{0.31\ m^3}{s}$$

$$= \frac{1.07E\text{-}02\ \frac{g}{s}}{}$$

Prepared by: PS and MN
Reviewed by: KA

Source Emissions:

Silo	Contaminant	CAS Number	Emission Rate [g/s]
Pebble Lime	Total Particulate Matter	N/A	1.07E-02
	PM_{10}	N/A	1.07E-02
	$PM_{2.5}$	N/A	1.07E-02
Carbon	Total Particulate Matter	N/A	1.07E-02
	PM_{10}	N/A	1.07E-02
	PM2.5	N/A	1.07E-02
Pozzolan	Total Particulate Matter	N/A	1.07E-02
	PM_{10}	N/A	1.07E-02
	$PM_{2.5}$	N/A	1.07E-02
Portland Cement	Total Particulate Matter	N/A	1.07E-02
	PM_{10}	N/A	1.07E-02
	$PM_{2.5}$	N/A	1.07E-02

Prepared by: PS and MN
Reviewed by: KA

Source 3

Stand-by Generator

Source Description: The Facility has one stand-by generator with a 250 kw power rating

Operating Rate: Maximum emissions occur when the diesel generator is operating at 100% capacity.

Methodology: Emission Factor
Source: Diesel firing emission factors are taken from US EPA AP42 chapter 3.4

Equipment Parameters Maximum Power Rating

250 kW
369 HP, estimated from KW with 10% added to account for operational variability.
2.6 MMBtu/hr, based on 7000 BTU/hp-hr, AP-42 Table 3.4-1.

Sample Calculation : Nitrogen Oxides

Emission Rate [g/s] = Emission Factor [lb/hp-hr] x Maximum Heat Input [hp/hr] x 454[g/lb] / 3600 [hr/s]

$$= \frac{0.02\ \text{lb}}{\text{hp-hr}} \cdot \frac{369\ \text{HP}}{\text{hr}} \cdot \frac{454\ \text{g}}{1\ \text{lb}} \cdot \frac{1\ \text{hr}}{3600\ \text{s}}$$

$$= \frac{1.12\text{E+00}\ \text{g}}{\text{s}}$$

Source Emissions:

Contaminant	CAS Number	US EPA EF [lb/hp-hr]	Units	Emission Rate [g/s]
Nitrogen Oxides	10102-44-0	2.40E-02	lb/hp-hr	1.12E+00

Prepared by: PS and MN
Reviewed by: KA

Source 4

Residual Ash Building Exhaust Fans

Source Description: The residual ash building is used for storage of residual bottom ash. This material is typically cooled and moist with a nominal 20 to 25% moisture content. The residual ash building has two fans each with a flow rate of 20,000 cfm. Each fan is fitted with a filter to control particulate emissions.

Operating Rate: Maximum emissions occur when both fans are in operation

Methodology: Engineering Calculation
Source: Provided by Reworld

Train Parameters:

Filter Efficiency	0.00022	grains/ft^3
	0.0005	g/m^3
Total Flow Rate	40000	ft^3/min
	18.87	m^3/s

Sample Calculation: Particulate Matter from Exhaust Fan Flow Rate

Emission Rate [g/s] = Flow Rate [m^3/s] x Filter Efficiency [g/m^3]

$$= \frac{0.0005\ \text{g}}{\text{m}^3} \Big| \frac{18.87\ \text{m}^3}{\text{s}}$$

$$= \frac{9.50\text{E-}03\ \text{g}}{\text{s}}$$

Source	Contaminant	CAS Number	Emission Rate [g/s]
Residual Ash Building Exhaust Fans	Total Particulate Matter	N/A	9.50E-03
	PM_{10}	N/A	9.50E-03
	$PM_{2.5}$	N/A	9.50E-03

Prepared by: PS and MN
Reviewed by: KA

APPENDIX B

Stack Testing Report

Report No. 22327

ORTECH
AN ALLIANCE TECHNICAL GROUP COMPANY

Report:

Covanta Durham York Renewable Energy Limited Partnership Durham York Energy Centre 2024 Compliance Emission Testing in Accordance with Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX

Date: June 20, 2024

Report:

Covanta Durham York Renewable Energy Limited Partnership Durham York Energy Centre 2024 Compliance Emission Testing in Accordance with Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX

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Revision History

Version	Date	Summary Changes/Purpose of Revision
1	June 20, 2024	None

NOTICE:
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EXECUTIVE SUMMARY

ORTECH Consulting Alliance Inc. (ORTECH) completed the annual compliance emission testing program at the Durham York Energy Centre (DYEC) located in Courtice, Ontario between March 18 and March 21, 2024. The emission testing program was performed to satisfy the requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP) Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX. Section 7(1) of the ECA states that "the owner shall perform annual source testing, in accordance with the procedures and schedule outlined in the attached Schedule E, to determine the rates of emissions of the test contaminants from the stack. The program shall be conducted not later than six months after the commencement date of operation of the facility/equipment and subsequent source testing programs shall be conducted once every calendar year thereafter". A list of the test programs conducted by ORTECH to date is provided below:

Test Program	Test Date	ORTECH Report No.
2015 Compliance	September/October 2015	21546
2016 Voluntary	May 2016	21656
2016 Compliance	October/November 2016	21698
2017 Voluntary	May 2017	21754
2017 Compliance	October 2017	21800
2018 Voluntary	May/June 2018	21840
2018 Compliance	September 2018	21880
2019 Voluntary	June 2019	21936
2019 Compliance	September 2019	21960
2020 Voluntary	June 2020	22001
2020 Compliance	November 2020	22050
2021 Voluntary	June 2021	22081
2021 Compliance	November/December 2021	22085
2022 Voluntary	May 2022	22158
2022 Compliance	November/December 2022	22160
2023 Voluntary	April 2023	22230
2023 Compliance	September/October 2023	22235
2024 Compliance	March 2024	22327

Source testing was performed on the Baghouse (BH) Outlet of Boiler No. 1 and BH Outlet of Boiler No. 2 for the test contaminants listed in Schedule D of the ECA.

Triplicate emission tests were completed for particulate matter, metals, semi-volatile organic compounds, acid gases, volatile organic compounds, aldehydes and combustion gases at the BH Outlet of each Boiler. Triplicate emission tests were also completed for total hydrocarbons at the Quench Inlet of each Boiler. The contaminant groups included in the emission test program and the reference test methods used are summarized below:

Test Groups	Reference Method
Particulate and Metals	US EPA Method 29
$PM_{2.5}$/PM_{10} and Condensable Particulate	US EPA Methods 201A and 202
Semi-Volatile Organic Compounds	Environment Canada Method EPS 1/RM/2
Volatile Organic Compounds	US EPA SW-846 Method 0030 (SLO VOST modification)
Aldehydes	NCASI Method ISS/FP-A105.01
Halides and Ammonia	US EPA Method 26A
Combustion Gases:	
Oxygen and Carbon Dioxide	Facility CEM
Carbon Monoxide	Facility CEM
Sulphur Dioxide	Facility CEM
Nitrogen Oxides	Facility CEM
Total Hydrocarbons	ORTECH per US EPA Method 25A

Schedule C of ECA No. 7306-8FDKNX lists in-stack limits for the emissions of various compounds. In-stack emissions limits are given for particulate matter, mercury, cadmium, lead, dioxins and furans and organic matter for comparison with the results from compliance source testing. In-stack emission limits are also given for hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide calculated as the rolling arithmetic average of data measured by a continuous emission monitoring system (CEMS).

Since relative accuracy and system bias testing was conducted in August 2023, the data recorded by the DYEC CEMS was used to assess against the in-stack emissions limits detailed in Schedule C of the ECA for hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide. Note the DYEC CEMS data for the days when isokinetic testing was performed at each unit (March 18 to March 21, 2024) was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA. Concentration data measured by ORTECH on March 19, 2024 was used to assess against the total hydrocarbons (organic matter) in-stack emissions limit detailed in Schedule C of the ECA.

Consistent with the approach commonly required by the MECP for compliance emission testing programs, the following results are conservative in the sense that when the analytical result is reported to be below the detection limit, the full detection limit is used to calculate emission data and is shown by a "<" symbol. Also, when one or both Boiler results are reported to be below the detection limit, the detection limit was used to conservatively estimate the total emission rate for the Main Stack.

The MECP "Summary of Standards and Guidelines to Support Ontario Regulation 419/05 – Air Pollution – Local Air Quality", dated April 2012, provides an updated framework for calculating dioxin and furan toxicity equivalent concentrations which includes emission data for 12 dioxin-like PCBs. This document was replaced by "Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", however the dioxin and furan toxicity equivalent calculation methodology remains the same. The dioxins, furans and dioxin-like PCBs toxicity equivalent emission data was also calculated using half the detection limit for those compounds not detected. The half detection limit data was used to assess against the dispersion modelling Point of Impingement limit. The toxicity equivalent concentrations calculated using the full detection limit, for those compounds less than the reportable detection limit, were used to assess against the in-stack limit detailed in Schedule C of the ECA.

The average results for the tests conducted at Boiler No. 1, along with the respective in-stack emission limits, are summarized in the following table:

Parameter	Test No. 1	Test No. 2	Test No. 3	Average	In-Stack Limit
Total Power Output (MWh/day)*	-	-	-	388	-
Average Combustion Zone Temp. (°C)*	-	-	-	1222	-
Steam (tonnes/day)*	-	-	-	794	-
MSW Combusted (tonnes/day)*	-	-	-	223	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	1362	-
Carbon Injection (kg/day)*	-	-	-	128	-
Lime Injection (kg/day)*	-	-	-	3550	-
Filterable Particulate (mg/Rm^3) (1)	1.58	0.84	1.52	1.31	9
PM_{10} with Condensable (mg/Rm^3) (1)	6.06	<6.26	<6.30	<6.21	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	5.99	<5.98	<6.10	<6.02	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.090	<0.089	<0.10	<0.093	-
Ammonia (mg/Rm^3) (1)	0.47	0.69	0.58	0.58	-
Cadmium (µg/Rm^3) (1)	0.088	0.16	<0.019	<0.090	7
Lead (µg/Rm^3) (1)	0.51	0.26	0.15	0.31	50
Mercury (µg/Rm^3) (1)	<0.098	0.067	0.32	<0.16	15
Antimony (µg/Rm^3) (1)	0.069	<0.044	<0.039	<0.051	-
Arsenic (µg/Rm^3) (1)	<0.044	<0.044	<0.039	<0.042	-
Barium (µg/Rm^3) (1)	10.6	10.5	9.33	10.1	-
Beryllium (µg/Rm^3) (1)	<0.044	<0.044	<0.039	<0.042	-
Chromium (µg/Rm^3) (1)	0.96	1.03	0.70	0.90	-
Cobalt (µg/Rm^3) (1)	0.032	<0.044	<0.039	<0.038	-
Copper (µg/Rm^3) (1)	2.72	1.64	1.19	1.85	-
Molybdenum (µg/Rm^3) (1)	4.01	4.25	3.39	3.88	-
Nickel (µg/Rm^3) (1)	0.68	0.77	0.44	0.63	-
Selenium (µg/Rm^3) (1)	<0.22	<0.22	<0.19	<0.21	-
Silver (µg/Rm^3) (1)	<0.044	<0.044	<0.039	<0.042	-
Thallium (µg/Rm^3) (1)	<0.044	<0.044	<0.039	<0.042	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.022	<0.019	<0.021	-
Zinc (µg/Rm^3) (1)	14.3	10.3	8.26	11.0	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<1.97	<3.06	<1.88	<2.30	60
Total Chlorobenzenes (ng/Rm^3) (1)	<113	<99.6	<127	<113	-
Total Chlorophenols (ng/Rm^3) (5)	<521	<1828	NQ	<1163	-
Total PAHs (ng/Rm^3) (1)	<222	<399	<343	<321	-
VOCs (µg/Rm^3) (1)	<117	<62.4	<73.4	<84.3	-
Aldehydes (µg/Rm^3) (1)	<82.1	<15.5	<52.3	<50.0	-
Total VOCs (µg/Rm^3) (1) (4)	<199	<77.9	<126	<134	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.1	0.1	0	0.1	50

* based on process data provided by Covanta
(1) dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.
(2) dry basis as equivalent methane (average of each 60 minute test with data recorded in 1-minute intervals).
(3) calculated using the NATO/CCMS (1989) toxicity equivalence factors and the full detection limit for those isomers below the analytical detection limit, dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.
(4) Includes all components from the volatile organic compounds test list in the ECA (i.e. Volatile Organic Sampling Train and Aldehyde Sampling train components).
(5) Total chlorophenols were not quantifiable (NQ) due to spike recovery loses during the extraction of the samples by the analytical laboratory.

The average results for the tests conducted at Boiler No. 2, along with the respective in-stack emission limits, are summarized in the following table:

Parameter	Test No. 1	Test No. 2	Test No. 3	Average	In-Stack Limit
Total Power Output (MWh/day)*	-	-	-	388	-
Average Combustion Zone Temp. (°C)*	-	-	-	1280	-
Steam (tonnes/day)*	-	-	-	800	-
MSW Combusted (tonnes/day)*	-	-	-	218	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	522	-
Carbon Injection (kg/day)*	-	-	-	124	-
Lime Injection (kg/day)*	-	-	-	3539	-
Filterable Particulate (mg/Rm^3) (1)	1.73	1.44	1.28	1.48	9
PM_{10} with Condensable (mg/Rm^3) (1)	<5.39	<6.55	<5.19	<5.71	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<4.98	<6.48	<5.00	<5.49	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.11	<0.098	<0.097	<0.10	-
Ammonia (mg/Rm^3) (1)	0.37	0.30	0.28	0.32	-
Cadmium (µg/Rm^3) (1)	0.014	0.055	0.10	0.057	7
Lead (µg/Rm^3) (1)	0.22	0.21	0.33	0.26	50
Mercury (µg/Rm^3) (1)	0.44	1.21	<0.089	<0.58	15
Antimony (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Arsenic (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Barium (µg/Rm^3) (1)	10.6	11.1	11.6	11.1	-
Beryllium (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Chromium (µg/Rm^3) (1)	0.90	0.88	0.95	0.91	-
Cobalt (µg/Rm^3) (1)	0.042	<0.023	<0.023	<0.029	-
Copper (µg/Rm^3) (1)	1.34	1.51	1.13	1.33	-
Molybdenum (µg/Rm^3) (1)	4.04	4.20	4.09	4.11	-
Nickel (µg/Rm^3) (1)	0.50	0.59	0.58	0.56	-
Selenium (µg/Rm^3) (1)	<0.22	<0.23	<0.23	<0.23	-
Silver (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Thallium (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.023	<0.023	<0.023	-
Zinc (µg/Rm^3) (1)	9.95	10.9	10.1	10.3	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<1.81	<2.00	<1.83	<1.88	60
Total Chlorobenzenes (ng/Rm^3) (1)	<156	<59.3	<152	<122	-
Total Chlorophenols (ng/Rm^3) (5)	NQ	NQ	<1471	<1380	-
Total PAHs (ng/Rm^3) (1)	<142	<315	<167	<208	-
VOCs (µg/Rm^3) (1)	<338	<279	<227	<281	-
Aldehydes (µg/Rm^3) (1)	<211	<188	<199	<199	-
Total VOCs (µg/Rm^3) (1) (4)	<549	<467	<426	<480	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.6	0.1	0	0.2	50

* based on process data provided by Covanta

(1) dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.

(2) dry basis as equivalent methane (average of each 60 minute test with data recorded in 1-minute intervals).

(3) calculated using the NATO/CCMS (1989) toxicity equivalence factors and the full detection limit for those isomers below the analytical detection limit, dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.

(4) Includes all components from the volatile organic compounds test list in the ECA (i.e. Volatile Organic Sampling Train and Aldehyde Sampling train components).

(5) Total chlorophenols were not quantifiable (NQ) due to spike recovery loses during the extraction of the samples by the analytical laboratory.

A summary of the minimum, average and maximum concentrations for the combustion gases measured by the DYEC CEMS with in-stack limits listed in the ECA is provided below for the two units.

Boiler No.	Parameter	Minimum	Average	Maximum	In-Stack Limit
Boiler No. 1	Carbon Monoxide (mg/Rm^3) (1)	4.0	6.1	9.5	40
	Hydrogen Chloride (mg/Rm^3) (2)	0.2	0.3	0.5	9
	Nitrogen Oxides (mg/Rm^3) (2)	110	111	113	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	0.2	1.8	35
Boiler No. 2	Carbon Monoxide (mg/Rm^3) (1)	5.5	8.0	12.4	40
	Hydrogen Chloride (mg/Rm^3) (2)	2.1	2.2	2.4	9
	Nitrogen Oxides (mg/Rm^3) (2)	106	108	109	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	0.39	2.4	35

(1) 4-hour average measured by DYEC CEMS, dry at 25°C and 1 atmosphere adjusted to 11% oxygen by volume
(2) 24-hour average measured by DYEC CEMS, dry at 25°C and 1 atmosphere adjusted to 11% oxygen by volume

The emission data measured at each Boiler BH Outlet during the testing program was combined and used to assess the emissions from the Main Stack against the current point of impingement criteria detailed in Ontario Regulation 419/05.

Dispersion modelling was completed using the CALPUFF model (using Version 7.2.1 level 150618 as approved by the MECP in May 2021) by WSP Canada Inc. A summary of the results are provided in the tables appended to this report (Appendix 27) based on calculated ground level Point of Impingement (POI) concentrations for the average total Main Stack emissions. As shown in the tables, the calculated impingement concentrations for all the contaminants were well below the relevant MECP standards.

In summary, the key results of the emission testing program are:

- The facility was maintained within the operational parameters defined by the amended ECA that constitutes normal operation during the stack test periods. Testing was conducted at a steam production rate of greater than 766 tonnes of steam per day for each Boiler (approximately 94.9% of maximum continuous rating). The maximum continuous rating for the facility is 1614.7 tonnes of steam per day for the two Boilers combined (33.64 tonnes of steam per hour or 807.4 tonnes per day for each Boiler).
- The in-stack concentrations of the components listed in the ECA were all below the concentration limits provided in Schedule C of the ECA.
- Using CALPUFF dispersion modelling techniques, the predicted maximum point of impingement concentrations, based on the average test results for both boilers, show DYEC to be operating well below all current standards in Regulation 419/05 under the Ontario Environmental Protection Act and other MECP criteria including guidelines and upper risk thresholds.

Tables referenced in this report for the tests conducted at Boiler No. 1 and Boiler No. 2 are provided in Appendix 1 and Appendix 2, respectively.

1. INTRODUCTION

ORTECH Consulting Alliance (ORTECH) completed the annual compliance emission testing program at the Durham York Energy Centre (DYEC) located in Courtice, Ontario between March 18 to March 21, 2024. The emission testing program was performed to satisfy the requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP) Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX. Section 7(1) of the ECA states that "the owner shall perform annual source testing, in accordance with the procedures and schedule outlined in the attached Schedule E, to determine the rates of emissions of the test contaminants from the stack. The program shall be conducted not later than six months after the commencement date of operation of the facility/equipment and subsequent source testing programs shall be conducted once every calendar year thereafter". A list of the test programs conducted by ORTECH to date is provided below:

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2021 Compliance	November/December 2021	22085
2022 Voluntary	May 2022	22158
2022 Compliance	November/December 2022	22160
2023 Voluntary	April 2023	22230
2023 Compliance	September/October 2023	22235
2024 Compliance	March 2024	22327

Source testing was performed on the Baghouse (BH) Outlet of Boiler No. 1 and BH Outlet of Boiler No. 2 for the test contaminants listed in Schedule D of the ECA. Triplicate emission tests were also completed for total hydrocarbons at the Quench Inlet of each Boiler.

Prior to commencing the test program, a Pre-Test Plan letter was submitted to the MECP stating that the sampling program would follow the procedures detailed in ORTECH Pre-Test Plan No. 22050, "Covanta Durham York Renewable Energy Limited Partnership Compliance Emission Testing in Accordance with Amended Environmental Compliance Approval (Air) No. 7306-8FDKNX", dated September 8, 2020. Provided in Appendix 3 is a copy of the Pre-Test Plan acceptance email received from the MECP, dated February 14, 2024, indicating acceptance of the proposed sampling strategy. A copy of the Amended Environmental Compliance Approval, including amendment notices, is also provided in Appendix 3.

2. PROCESS DESCRIPTION

DYEC is a thermal treatment facility with a maximum thermal treatment rate of 140,000 tonnes/year of municipal solid waste (MSW), as established by the Amended ECA. ECA Notice No. 2, dated December 23, 2021, allows the facility to receive and thermally treat up to 142,000 tonnes/year of MSW for the 2021 operating year. The maximum continuous rating (MCR) for the facility is defined as 218 tonnes per day, per unit, of MSW with a heat content of 13 MJ/kg per train. The steam production MCR is 33.64 tonnes per hour for each Boiler.

The facility was built to operate on a continuous basis; 24 hours/day, seven days/weeks, 365 days/year. Waste may be delivered six days per week between 7:00 am to 7:00 pm. The proposed operating schedule may be adjusted depending on demand and facility needs within the established setup indicated in the ECA (i.e., waste can only be received from Monday to Saturday - excluding statutory holidays, and between 7:00 am and 7:00 pm - ECA's Condition 4(1)(b)).

MSW arrives at the facility via covered refuse trucks and is deposited in a storage pit within the receiving building. Facility operators manage MSW by moving and mixing MSW within the storage pit with the overhead grapple cranes. The MSW is lifted from the pit by crane and fed into the fuel hopper for each thermal treatment train.

The facility consists of two thermal treatment trains, each equipped with independently operated boilers/furnaces and air pollution control equipment. The treated exhaust gases are vented to a common 87.6 m stack and released to atmosphere.

2.1 Control Equipment

Flue gasses pass through a dry recirculating type scrubber for acid control and a fabric filter for particulate control. A Selective Non-Catalytic Reduction System (SNCR) with ammonia injection is used for NO_X control. Powdered carbon is injected for mercury, and dioxin and furan control between the dry recirculating type scrubber and the fabric filter.

2.2 Continuous Emission Monitoring Systems

Continuous Emissions Monitors are installed in the vertical ductwork between the economizer and dry recirculating type scrubber (location referred to as the Quench Inlet), and in the vertical ductwork between the fabric filter and the ID fan (location referred to as the BH Outlet).

A summary of the CEMS installed at each location is provided below:

Unit	Location	Analyzer Manufacturer	Model No.	Serial No.	Parameter	Range
1	Quench Inlet	Environmental SA	MIR 9000	2684	CO (Low)	0-500 ppm
					CO (High)	0-2000 ppm
					HCl	0-1500 ppm
					O_2 (Dry)	0-25%
		Ametek	RM CEM O_2/IQ	10217710-2	O_2 (Wet)	0-25%
1	BH Outlet	Environmental SA	MIR 9000	2686	NO_X	0-500 ppm
					SO_2	0-200 ppm
					HCl	0-100 ppm
					HF	0-100 ppm
					CO (Low)	0-500 ppm
					CO (High)	0-2000 ppm
					O_2 (Dry)	0-25%
					CO_2	0-25%
		Ametek	RM CEM O_2/IQ	10217710-1	O_2 (Wet)	0-25%
		Tethys	EXM400	F130304	NH_3	0-50 ppm
		OSI	OFS-2000W	13020629	Flow	0-40 m/s
		Teledyne	Light Hawk 560	5602492	Opacity	0-100%
		Environmental SA	Graphite 52M	647	THC	0-100 ppm
		Environmental SA	Amesa	1825-269	Dioxin/Furan	0-10 ng/m^3
2	Quench Inlet	Environmental SA	MIR 9000	2685	CO (Low)	0-500 ppm
					CO (High)	0-2000 ppm
					HCl	0-1500 ppm
					O_2 (Dry)	0-25%
		Ametek	RM CEM O2/IQ	10218084-1	O_2 (Wet)	0-25%
2	BH Outlet	Environmental SA	MIR 9000	2687	NO_X	0-500 ppm
					SO_2	0-200 ppm
					HCl	0-100 ppm
					HF	0-100 ppm
					CO (Low)	0-500 ppm
					CO (High)	0-2000 ppm
					O_2 (Dry)	0-25%
					CO_2	0-25%
		Ametek	RM CEM O2/IQ	10218084-2	O_2 (Wet)	0-25%
		Tethys	EXM400	F130303	NH_3	0-50 ppm
		OSI	OFS-2000W	13020633	Flow	0-40 m/s
		Teledyne	Light Hawk 560	5602493	Opacity	0-100%
		Environmental SA	Graphite 52M	648	THC	0-100 ppm
		Environmental SA	Amesa	1825-284	Dioxin/Furan	0-10 ng/m^3

3. SAMPLING LOCATIONS

The BH Outlet sampling ports are located on the vertical circular ductwork between the baghouse outlet and the ID Fan inlet. There are two 6-inch ports, located 90 degrees apart, at the same elevation and a single 4-inch port located approximately 0.8 m upstream of the 6-inch ports. The two 6-inch sampling ports were used for isokinetic sampling and the 4-inch ports were used for all non-isokinetic sampling.

The BH Outlet duct has an inside diameter of 1.37 meters (54 inches) at the sampling ports. The two 6-inch ports are approximately 4.4 duct diameters (6.1 meters) downstream and 0.68 duct diameters (0.94 meters) upstream from the nearest flow disturbances.

The Quench Inlet sampling ports are located on the circular ductwork between the Boiler Outlet and the Recirculating Type Dry Scrubber Inlet. There are two 6-inch ports, located 90 degrees apart, at the same height. The Quench Inlet duct has a diameter of 1.37 meters (54 inches) at the sampling ports. The ports are located approximately 3.8 duct diameters (5.2 meters) downstream and 4.7 duct diameters (6.4 meters) upstream from the nearest flow disturbances.

The sampling ports are located at a “non-ideal” location as defined by the Ontario Source Testing Code. An “ideal” location is defined as being at least eight stack diameters downstream and at least two stack diameters upstream of flow disturbances.

Cyclonic flow checks were performed by ORTECH at the BH Outlet and Quench Inlet sampling locations on each Boiler on September 22, 2015. The cyclonic flow checks were performed using an S-type pitot tube and manometer following the procedures detailed in Ontario Source Testing Code Method 1. Briefly, the pitot tube was positioned at each sampling point so that the planes of the face openings were parallel to the cross-sectional axis of the duct. The pitot tube was then rotated about its longitudinal axis until the manometer reading was zero. The absolute value of the rotational angle was recorded to the nearest degree at each point. The average of the recorded angles was calculated at each location. If the average angle is less than 15°, cyclonic flow is not present and sampling may proceed as normal.

The results for the cyclonic flow checks are summarized below:

Sampling Location	Performance Specification	Average Angle (°)	Cyclonic Flow Present
Boiler No. 1 Quench Inlet	Average <15°	6.6	No
Boiler No. 2 Quench Inlet	Average <15°	8.4	No
Boiler No. 1 BH Outlet	Average <15°	8.8	No
Boiler No. 2 BH Outlet	Average <15°	8.1	No

In addition, reverse flow was not observed at any point at any of the four sample locations during the cyclonic flow checks or during any test.

4. SAMPLING PROCEDURES

4.1 General

This section outlines the sampling procedures as well as pre-test and on-site internal quality assurance/quality control (QA/QC) procedures which were utilized in the testing program. The procedures described in this section ensured that representative samples were collected and that the integrity of the collected samples was maintained. The use of these sampling procedures significantly reduced the possibility of sample contamination from external sources. Sample handling and documentation requirements were key factors in this program.

Triplicate emission tests were completed for particulate matter, metals, semi-volatile organic compounds, acid gases, volatile organic compounds, aldehydes and combustion gases at the BH Outlet of each Boiler. Triplicate emission tests were also completed for total hydrocarbons at the Quench Inlet of each Boiler. The contaminant groups included in the emission test program and the reference test methods used are summarized below:

Test Groups	Reference Method
Particulate and Metals	US EPA Method 29
$PM_{2.5}/PM_{10}$ and Condensable Particulate	US EPA Methods 201A and 202
Semi-Volatile Organic Compounds	Environment Canada Method EPS 1/RM/2
Volatile Organic Compounds	US EPA SW-846 Method 0030 (SLO VOST modification)
Aldehydes	NCASI Method ISS/FP-A105.01
Halides and Ammonia	US EPA Method 26A
Combustion Gases:	
Oxygen and Carbon Dioxide	Facility CEM
Carbon Monoxide	Facility CEM
Sulphur Dioxide	Facility CEM
Nitrogen Oxides	Facility CEM
Total Hydrocarbons	ORTECH per US EPA Method 25A

Since relative accuracy and system bias testing was conducted in August 2023, the data recorded by the DYEC CEMS was used to assess against the in-stack emissions limits detailed in Schedule C of the ECA for hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide. Note the DYEC CEMS data for the days when isokinetic testing was performed at each unit (March 18 to March 21, 2024) was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA. Concentration data measured by ORTECH on March 19, 2024 was used to assess against the total hydrocarbons (organic matter) in-stack emissions limit detailed in Schedule C of the ECA.

4.2 Particulate and Metals

Particulate and metals were sampled using the sampling procedures outlined in US EPA Method 29. Major components of the sampling train were as follows:

- A glass nozzle and probe liner assembly
- A quartz fiber filter with a low metal background
- The first impinger was initially empty to collect moisture
- The second and third impingers initially contained 100 mL each of 5% nitric acid/10% hydrogen peroxide solution to collect metals
- The fourth impinger was initially empty
- The fifth and sixth impingers initially contained 100 mL each of 4% potassium permanganate/10% sulphuric acid solution to collect mercury
- The seventh impinger contained silica gel

Each test for particulate matter and metals involved the collection of stack gas sampled isokinetically at twelve points centered on equal areas along each of two traverses (at 90° to each other) of the BH Outlet duct. Each of the twenty-four points was sampled for 7.5 minutes for a total actual sampling time of one hundred and eighty minutes.

At 2.5 minute time increments throughout each test the following information was measured and recorded on field data sheets:

- Elapsed sampling time
- Dry gas meter volume
- Pitot tube pressure
- Stack gas temperature
- Probe, oven and impinger temperatures
- Dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

The particulate and metals field data sheets are provided in Appendix 4.

At the start and finish of sampling each traverse the sampling train was leak-checked. A valid leak-check as specified by the sampling method is a leakage rate of less than 0.00057 cubic meters per minute (m^3/min) or 4% of the estimated sampling rate, whichever is less. All of the leak-checks, as detailed on the field data sheets, were acceptable.

A blank train was prepared and the samples recovered in a manner identical to the test sampling trains for each Boiler.

4.3 Particle Size Distribution

Particle Size Distribution (PSD) tests were performed at each of the BH Outlet sample locations in accordance with the test procedures described in US EPA Method 201A using PM_{10} and $PM_{2.5}$ combined cyclone heads and US EPA Method 202. Sampling was conducted for approximately one hundred and twenty minutes at six points across each traverse of the duct using isokinetic dwell time sampling. At approximately ten minute time increments throughout each test the following information was measured and recorded on field data sheets:

- Elapsed sampling time
- Dry gas meter volume
- Pitot tube pressure
- Stack gas temperature
- Probe, oven and impinger temperatures
- Dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

Field data sheets for the PSD tests are provided in Appendix 5.

A blank train was prepared and samples recovered in a manner identical to the test sampling trains for each Boiler.

4.4 Semi-Volatile Organic Compounds

Semi-volatile organic compounds (SVOC), including dioxins and furans, polychlorinated biphenyls (PCBs), chlorobenzenes (CBs), chlorophenols (CPs) and polycyclic aromatic hydrocarbons (PAHs) were sampled at the BH Outlet of each Boiler using the sampling train and sampling procedures outlined in Environment Canada Report EPS 1/RM/2. Major components of the sampling train were as follows:

- A glass nozzle and probe liner assembly
- A clean and proven glass fiber filter
- Amberlite XAD-2 sorbent resin was used in a trap to collect semi-volatile organics
- The first impinger was initially empty
- The second impinger contained 100 mL of ethylene glycol
- The third impinger was initially empty
- The fourth impinger contained silica gel

All test train and auxiliary glassware were cleaned according to the methods as outlined in Environment Canada EPS 1/RM/2 except that the methods were modified by combining proofing extracts prior to analysis for the target analytes.

Each test for semi-volatile organic compounds at the BH Outlet involved the collection of stack gas sampled isokinetically at twelve points centered on equal areas along each of two traverses (at 90° to each other) of the duct. Each of the twenty-four points was sampled for ten minutes for a total actual sampling time of two hundred and forty minutes.

At five minute time increments the following information was measured and recorded on field data sheets:

- Elapsed sampling time
- Dry gas meter volume
- Pitot tube pressure
- Stack gas temperature
- Probe, oven and impinger outlet temperatures
- XAD-2 trap outlet temperature
- Dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

Field data sheets for the SVOC tests are provided in Appendix 6.

At the start and finish of sampling each traverse, the sampling train was leak-checked. A valid leak-check as specified by the sampling method is a leakage rate of less than 0.00057 m^3/min or 4% of the estimated average sampling rate, whichever is less. All of the leak-checks for the tests reported, as detailed on the field data sheets, were acceptable.

A blank train was prepared in a manner identical to the test trains for each Boiler. It was assembled, transported and left at the sampling site for a period of time equal to the test trains. The blank train was treated at the sampling site in the same manner as the test trains and a gas volume was drawn through the blank train approximately equal to the leak-check volume for the test trains.

4.5 Acid Gases

Hydrogen fluoride, hydrogen chloride and ammonia were sampled together using the sampling train and sampling procedures outlined in US EPA Method 26A. Major components of the test train were as follows:

- A glass nozzle and probe liner assembly
- The first and second impingers contained 100 mL of 0.1N H_2SO_4
- The third impinger was initially empty
- The fourth impinger contained silica gel

At five minute time increments throughout each test the following information was measured and recorded on field data sheets:

- Elapsed sampling time
- Dry gas meter volume
- Pitot tube pressure
- Stack gas temperature
- Probe, oven and impinger temperatures
- Dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

Field data sheets for the acid gases tests are provided in Appendix 7.

At the start and finish of each test the sampling train was leak-checked. A valid leak-check as specified by the sampling method is a leakage rate of less than 0.00057 m^3/min or 4% of the estimated average sampling rate, whichever is less.

A blank train was prepared and samples recovered in a manner identical to the test sampling trains for each Boiler.

4.6 Volatile Organic Compounds

Volatile Organic Compound (VOC) sampling was performed in accordance with US EPA SW-846 Method 0030 (SLO-VOST modification). Briefly, the sampling method involved withdrawing a sample of the stack gas through a heated glass lined sampling probe containing a glass wool plug to remove particulate material. The sample was then passed through a water cooled condenser and a Tenax GC adsorbent tube, as the primary volatile organic collection device. Condensate was collected in an initial condensate trap and the sample was then drawn through a second condenser and a combined secondary Tenax GC/charcoal adsorbent tube, as the secondary volatile organic collection device. The sampled gas stream then passed through a silica gel trap to remove any remaining traces of moisture prior to the rotameter, pump and dry gas meter.

During each test, a single forty minute run was completed at an approximate flowrate of 0.5 L/min. A fourth run was also conducted and the tube pair was archived in case a sample was lost during desorption or analysis. The analytical results from the three runs performed were combined and used to calculate test average results for the respective source. The samples for Test No. 1, Test No. 2 and Test No. 3 were analyzed and reported for each boiler.

At five minute time increments throughout sampling each pair of tubes, the following information was measured and recorded:

- Elapsed sampling time
- Dry gas meter volume
- Stack gas temperature
- Probe and first condenser outlet temperatures
- Dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

The sampling train components were cleaned using the procedures in US EPA SW-846 Method 0030, Volatile Organic Sampling Train (VOST).

Field data sheets for the VOST tests are provided in Appendix 8.

Blank tube samples analyzed for the program included two pairs of field blank tubes, a trip blank pair of tubes and one laboratory blank pair of tubes.

4.7 Aldehydes

Some of the compounds listed as VOC's (acetaldehyde, formaldehyde and acrolein) are more commonly classified as aldehydes. These compounds were captured in a separate test train in accordance with NCASI Method ISS/FP-A105.01.

Major components of the test train were as follows:

- A Teflon probe liner assembly was used.
- The first, second and third impingers contained approximately 15 mL each of o-Benzylhydroxylamine (BHA).
- The fourth impinger contained silica gel

A single test for aldehydes involved the collection of gas sampled at a single point in the duct at a sampling flowrate of approximately 0.5 liters per minute for sixty minutes. Note due to an error by the sampling crew, the aldehyde sampling rate for Boiler No. 1 was 2 liters per minute for sixty minutes.

At five minute time increments throughout each test, the following information was measured and recorded for the train:

- Elapsed sampling time
- Dry gas meter volume
- Stack gas temperature
- Probe, oven, impinger outlet and dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

Field data sheets for the aldehyde tests are provided in Appendix 9.

4.8 Combustion Gases

In August 2023, relative accuracy and system bias testing was conducted on the Continuous Emission Monitoring Systems (CEMS) installed at the Quench Inlet and BH Outlet of each Boiler. DYEC CEMS met the performance parameters detailed in Schedule F of the ECA. Therefore, the data recorded by the DYEC CEMS was used to assess against the in-stack emissions limits detailed in Schedule C of the ECA for hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide.

Combustion gases, including carbon dioxide, carbon monoxide, hydrogen chloride, nitrogen oxides, oxygen, sulphur dioxide and total hydrocarbons, were measured continuously at the BH Outlet during the emission testing program by the DYEC CEMs. Oxygen was also measured continuously by the DYEC CEMS at the Quench Inlet.

DYEC provided 1-hour average concentrations for each clock hour using the 1-minute combustion gas data measured by the DYEC CEMs during each isokinetic test day at each Boiler. The data measured by the DYEC CEMS, from March 18, 2024 at 08:00 to March 21, 2024 at 16:00, was used to assess against the in-stack emission limit stated in the ECA for each boiler.

A 24-hour rolling average was determined for hydrogen chloride, nitrogen oxides and sulphur dioxide using the calculated 1-hour average data to compare to the in-stack emission limits stated in the ECA. A 4-hour rolling average was determined for carbon monoxide using the calculated 1-hour average data to compare to the in-stack emission limit stated in the ECA.

Total hydrocarbon concentrations were measured by ORTECH following the procedures detailed in US EPA Method 25A. Triplicate one-hour tests were conducted at the Quench Inlet and BH Outlet of each Boiler on March 19, 2024. The total hydrocarbon data measured by ORTECH at the Quench Inlet sample locations was used to assess against the in-stack emissions limits detailed in Schedule C of the ECA.

5. SAMPLE RECOVERY AND ANALYSIS

All sample analysis was performed by ALS Canada Ltd. except for the volatile organic compounds. The VOC samples were analyzed by Bureau Veritas. Copies of Sample Logs/Chain of Custody Forms for all samples submitted for chemical analysis are provided in Appendix 10.

5.1 Particulate and Metals

Before loading of the field test trains commenced, recovery data sheets were prepared to record initial weights of the test train components. These sheets were also used during sample recovery to record final weights and determine moisture gains and sample volumes. The particulate and metals train recovery data sheets are provided in Appendix 11.

Following the conclusion of each test performed with the metals train, the probe was disconnected and all openings sealed with Teflon tape. The test trains, including the probes, were taken to the on-site ORTECH mobile laboratory for sample recovery. The train recovery procedure is briefly described as follows.

The test trains were visually inspected to ensure that no damage occurred during transportation. The condition of the test train was noted. Filter and impinger content colors were recorded. The filter housing was disassembled and the filter carefully transferred to its pre-test petri dish with the use of Teflon coated tweezers.

All the impingers were wiped dry on the outside then weighed and the results used to determine the stack gas moisture content.

The front half of the sampling train was brushed and rinsed thoroughly with acetone. A nylon bristle probe brush was used to assist in dislodging particulate material which may have adhered to the inside surfaces of the nozzle and probe assembly. The front half was then rinsed in triplicate using 0.1 N nitric acid but no brushing was performed.

The contents of the first four impingers were combined. Triplicate rinses of the impingers and connecting glassware back to and including the Teflon filter support was performed with 0.1 N nitric acid and combined with the impinger solution sample.

The contents of the fifth and sixth impingers were combined. The impingers with connecting glassware were then rinsed in triplicate with approximately 100 mL of fresh potassium permanganate solution followed by a triplicate rinse with 100 mL of distilled, de-ionized water. All of the glassware rinses were added to the sample container.

Any brown residue which was present in the fifth and sixth impingers was removed by incrementally rinsing with small amounts of 8 N hydrochloric acid. These acid rinses were added to a separate sample bottle which initially contained 150 mL of distilled, de-ionized water. The impingers were then rinsed with distilled, de-ionized water into the same sample container.

Each sample container was sealed, labeled and the fluid level marked (where appropriate) once that portion of the recovery was completed. The samples were then checked against the master sample log/chain of custody form and refrigerated until they were delivered to the analytical laboratory for analysis.

The test samples were prepared and analyzed for metals according to US EPA Method 29 (modified). The inorganic analytical reports are provided in Appendix 12.

5.2 Particle Size Distribution

Prior to loading the field test trains, recovery data sheets were prepared to record initial weights of the test train components. These sheets were also used during sample recovery to record final weights and determine moisture gains and sample volumes. The train recovery data sheets are provided in Appendix 13.

The particle size distribution (PSD) samples were recovered in much the same way as the particulate samples from the particulate and metals trains. Following the conclusion of each test performed with the PSD trains, the probe was disconnected and all openings sealed with Teflon tape. The sample recoveries were performed in the on-site ORTECH sample recovery trailer.

The test trains were visually inspected to ensure that no damage during movement had occurred. The recovery procedure is briefly described as follows.

The condition of the test train was noted and the filter and impinger colours were recorded. The nozzle, PM_{10} cyclone walls, collection cup and outside of the exit stem was brushed and rinsed thoroughly with acetone into a glass sample container to determine particulate greater than PM_{10}. The PM_{10} cup and connecting parts were rinsed with acetone in a glass sample container to determine particulate less than PM_{10} but greater than $PM_{2.5}$. The $PM_{2.5}$ cup and connecting parts up to the back-up filter were rinsed with acetone into a glass sample container to determine particulate less than $PM_{2.5}$. The back-up filter was transferred to its original petri dish.

The impingers were wiped dry on the outside then weighed and the results used to determine the stack gas moisture content. The back half of the sampling train was then purged with nitrogen at 14 lpm for 1 hour as soon as possible after the completion of each test.

The back-half of the sampling train was recovered following the procedures detailed in US EPA Method 202 for condensable particulate. The contents of the first impinger were poured into a glass sample bottle and rinses of the impinger and connecting glassware were performed with water which was added to the sample. The glassware was then rinsed with acetone and the rinse was repeated in duplicate with hexane. The acetone and hexane rinses were combined into a single glass sample bottle.

Each sample container was sealed, labeled and the fluid level marked (where appropriate) once that portion of the recovery was completed. The samples were then checked against the master sample log/chain of custody form and refrigerated until they were delivered to the analytical laboratory for analysis.

The particle size and condensable particulate matter results are presented with the inorganic analytical reports provided in Appendix 12.

5.3 Semi-Volatile Organic Compounds

Prior to loading the field test trains, recovery data sheets were prepared to record initial weights of the test train components. These sheets were also used during sample recovery to record final weights and determine moisture gains and sample volumes. The train recovery data sheets are provided in Appendix 14.

Following the conclusion of each test performed with the semi-volatile organics train, the probe was disconnected and all openings sealed with Teflon tape. The test trains, including the probes, were taken to the on-site ORTECH mobile laboratory for sample recovery. The train recovery procedure is briefly described as follows.

The condition of the test train was noted. Filter, XAD-2 trap and impinger content colours were recorded. The filter housing was disassembled and the filter carefully transferred, with the use of Teflon coated tweezers, to a piece of pre-cleaned aluminum foil. Each filter was then folded in half onto itself within the foil, the foil ends crimped, then placed in a pre-cleaned glass petri dish. Both the foil containing the filter(s) and the glass Petri dish were labeled.

All of the impingers were wiped dry on the outside then weighed and the results used to determine the stack gas moisture content.

The front half of the sampling train, up to but not including the trap, was brushed and rinsed thoroughly with acetone. A Teflon probe brush was used to assist in dislodging particulate material that may have adhered to the inside surfaces of the cyclone bypass and filter top assembly. This front half rinse was then repeated using hexane, with no brushing, and all rinsing was combined with the probe rinse sample. The filter bottom, filter bottom u-tube and trap inlet stem were soaked for five minutes in each of acetone and hexane then rinsed.

The XAD-2 trap was drained of excess cooling water and weighed. The ends were then sealed with Teflon tape and the trap was labeled and wrapped in aluminum foil. Since ORTECH uses a one piece trap and condenser, the five minute soak of this component was performed by the analytical laboratory.

The contents of the first three impingers were combined in a pre-cleaned amber glass sample bottle. Triplicate rinses of the impingers and connecting glassware back to and including the trap bottom u-tube were performed first with HPLC water, which was added to the impinger solution sample, and then with acetone followed by hexane. The acetone and hexane rinses were combined in a separate sample bottle from the impinger solutions.

Each sample container was sealed and labeled once that portion of the recovery was completed. The samples were then checked against the master sample log/chain of custody form then refrigerated until they were delivered to the analytical laboratory for analysis.

Semi-volatile organic analyses were performed on single composite extracts for each test according to EPS 1/RM/3 and EPS 1/RM/23. These methods were modified slightly to include other semi-volatile organic compounds following the Environment Canada NITEP/Mid-Connecticut combustion test procedures. These analytical improvements have been implemented over many years and have been identified and approved through laboratory accreditation and acceptance by the MECP.

The SVOC analytical reports are provided in Appendix 15.

5.4 Acid Gases

Following the conclusion of each test performed with the acid gas train, the probe was disconnected and all openings sealed with Teflon tape. The test trains were taken to the on-site ORTECH mobile laboratory for sample recovery. The train recovery procedure is briefly described as follows.

The test trains were visually inspected to ensure that no damage occurred during transportation. The condition of the test train was noted and the impinger content colors were recorded. All the impingers were wiped dry on the outside then weighed and the results used to determine the stack gas moisture content.

The contents of the first three impingers were combined. Triplicate rinses of the impingers and connecting glassware back to and including the Teflon filter support was performed with high purity water and combined with the impinger solution sample.

Each sample container was sealed, labeled and the fluid level marked (where appropriate) once that portion of the recovery was completed. The samples were then checked against the master sample log/chain of custody form and refrigerated until they were transported to the laboratory for analysis.

Analysis for hydrogen fluoride, hydrogen chloride and ammonia was performed via ion chromatography.

Train recovery data sheets are provided in Appendix 16. The acid gases analytical results are presented with inorganic analytical reports in Appendix 12.

5.5 Volatile Organics Train Recovery

Following the conclusion of each tube pair run performed with the volatile organic sampling train (VOST), the tubes were removed from the train, capped and placed in appropriately labeled test tubes which were also capped. The tubes were sent to the analytical laboratory for volatile organic compound (VOC) analysis.

The VOST samples were analyzed via SW846 Method 5041A/8260B. Briefly, after spiking with internal and surrogate standards, the traps were thermally desorbed through a clam shell heater then through a chilled aqueous purge to remove the bulk of the moisture onto a secondary trap. These secondary traps are further dried using a counter current flow of helium. The secondary traps are then thermally desorbed into a VOC sample concentrator and again the VOCs are thermally transferred/concentrated onto a GC column. The VOC compounds are separated via gas chromatography (GC) and analyzed via GC/MS.

The condensate collected from each tube pair run was carefully transferred to a glass bottle and combined as a single sample for each sampling location. The condensate samples were archived for future analysis if necessary.

The VOST analytical reports are provided in Appendix 17.

5.6 Aldehydes

Following the conclusion of each test performed with the Aldehyde Train the probe was disconnected and all openings were sealed with Teflon tape. The test train was then recovered on site in an ORTECH sample recovery trailer separate from all other test train recoveries and solvents. The train recovery procedure is briefly described as follows.

The condition of the test train was noted. All the impingers were wiped dry and weighed. The contents of the impingers were transferred into a glass sample container. The probe and impingers were rinsed with a small amount of DI water followed by a small amount of hexane into the same sample container.

Each sample container was sealed, labeled and the fluid level marked (where appropriate) once that portion of the recovery was completed. The samples were then checked against the master sample log/chain of custody form and refrigerated until they were transported to the laboratory for analysis.

Analysis for formaldehyde, acetaldehyde and acrolein was performed via GC/MS. The sample recovery data sheets are provided in Appendix 18 and the analytical results are presented in Appendix 19.

6. INTERNAL AND EXTERNAL QA/QC PROGRAM

6.1 General

As with other emission testing programs conducted by ORTECH, a comprehensive internal quality assurance/quality control (QA/QC) program was included.

Blank sampling trains were recovered and analyzed or reagent blanks were analyzed using the same procedures as the test trains to provide background concentrations of the emission test components.

6.2 Pre-Test Activities

Prior to the commencement of the emission testing program, the following activities were performed:

- Preparation, pre-cleaning and proofing of the manual stack sampling trains and sample containers.
- Preparation and quality checks of chemicals, reagents, filters and XAD-2 adsorbent resin.
- Calibration of all sampling and monitoring equipment.
- Development (and review) of data acquisition, data reduction and summary procedures.
- Development of internal QA/QC field data sheets.
- Review of equipment calibration logs.
- Review of proposed field and laboratory procedures.

All proving data for the Semi-Volatile Organics Train glassware and auxiliary equipment was deemed acceptable prior to the test program.

A proof rinse of the sampling probes was collected and archived for future analysis if necessary.

For each batch of VOST tubes, a minimum of 1 pair in 10 was analyzed to demonstrate an absence of significant background contaminants from the tubes prior to the test program.

Proving data for the Aldehyde Trail solutions was deemed acceptable prior to the test program.

The proof data for the semi-volatile organics glassware, aldehydes solutions and VOST tubes is provided in Appendix 20.

All equipment used in the field testing program was calibrated and checked prior to the field testing program. Pertinent equipment calibration data is supplied in Appendix 21.

As part of ORTECH's internal QA/QC, data acquisition, data reduction and summary procedures were already in place and periodic spot checks of the computer programs were performed using known data sets.

6.3 Emission Testing QA/QC Results

Prior to the field testing program, preliminary data was acquired to perform the required calculations for choosing a nozzle size to permit isokinetic sampling.

The internal diameter of each duct was verified and the appropriate number of sampling points was marked on each sampling probe.

The following general QA/QC criteria were satisfied for each of the test trains where applicable:

- All sampling equipment was cleaned and proven clean (where applicable) prior to the commencement of the field testing program.
- All sampling equipment passed a visual and operational check prior to use in the field.
- Oil filled manometer gauges which had been properly leveled and zeroed were used to measure the velocity pressure.
- All sampling data was recorded in ink on preformatted data sheets at least once every 5 minutes and/or at least twice during sampling each traverse point.
- Any unusual occurrences were noted during each test on the appropriate data form.
- The field team leader reviewed all calibration and sampling data forms daily.
- Only tapered edge sampling nozzles and S-type pitot tubes that had been visually inspected and caliper measured, and deemed acceptable, were used for sampling.
- Each leg of the S-type pitot was leak-checked before the start of testing. The leak-checks were all acceptable (no leak detected).
- Each entire sampling train met acceptable leak-check criteria before and after each test, and during any move from one sampling traverse to another. If a test did not meet the leak-check criteria the test was voided and repeated.
- The S-type pitot tube and sampling nozzle were maintained parallel to the flow during testing and care was taken to ensure that they did not scrape the ports when being inserted and removed from the stack.
- The probe and filter components were maintained at 120°C ± 14°C during testing. If the probe or filter temperature was outside of the acceptable range the test was halted until the temperature could be brought back into the acceptable range.
- The process was monitored by Covanta personnel to ensure it was operating as close as possible to the maximum continuous rating stated in the ECA. Covanta notified ORTECH when to commence sampling each day and if sampling should be paused due to issues with the process.

Note due to an error by the sampling crew, the aldehyde sampling rate for Boiler No. 1 was 2 liters per minute for sixty minutes and not at 0.5 liters per minute per the test method. The total collected was similar to the amounts collected in the blank train. The emission data is lower than typical due to the increased sample volume for the test train.

6.4 Sample Recovery, Handling and Custody

ORTECH's sample identification scheme and system for handling and processing samples was initiated as part of ORTECH's sample tracking system for stack emission samples. All samples were identified by a unique sample number comprised of a series of numbers and letters. A master sample log/chain of custody form was maintained by the QA/QC designate and was made available to the ORTECH personnel designated to perform the sample recovery for a specific sampling train. Once a sample was collected it was labeled and checked against the sample log by the QA/QC designate.

The information contained within the sample number and the sample log enabled the sampling, recovery, data reduction and report writing personnel to easily determine the test date, test number, test type and train sample identification for a given sample. To ensure continuity, the analytical laboratory was requested to use the ORTECH number for sample identification.

The ORTECH personnel responsible for delivering samples used the master sample log/chain of custody form to document the transfer of the samples to the analytical laboratory. Appropriate care was taken when shipping the samples in order to maintain sample integrity. Once the samples and master sample log/chain of custody forms were received by the analytical laboratory, the laboratory personnel verified that all samples had been received and their integrity maintained. The laboratory personnel then signed the master log and made a photocopy which ORTECH personnel received as a record of the chain of custody for the samples.

6.5 Analytical Results

ORTECH uses a one piece condenser and XAD-2 trap for SVOC collection, this component of the test train was Teflon sealed and wrapped with foil prior to being transported to the analytical laboratory where it was given the required five minute soaking with each of acetone and hexane. This is consistent with all SVOC test programs conducted by ORTECH and the modification was documented in the Pre-Test Plan approved by the MECP.

Analyses for the present emission testing program were performed using acceptable laboratory procedures in accordance with the specified analytical protocols. Adherence to the prescribed QA/QC procedures ensured data of consistent and measurable quality. Analytical quality control focused on the use of control standards to provide a measure of analytical accuracy. Replicate analysis (usually duplicate analysis) of the same sample was used as a means of determining precision of the various analytical procedures. Also specific acceptance criteria were defined for various analytical operations including calibrations, control standard analysis, drift checks, blanks, etc.

The following general QA/QC procedures were incorporated into the analytical effort:

- the on-site Field Supervisor reviewed all data and QA/QC data on a daily basis for completeness and acceptability
- master sample logs were maintained for all samples collected
- analytical QA/QC data was tabulated by the analytical laboratories using appropriate charts or forms
- all hard copy raw data was maintained in organized files

Specific analytical QA/QC procedures are presented in the analytical reports and are briefly summarized below.

6.5.1 Metals Sample Analysis QA/QC

The analysis of the Method 29 stack samples involved sample digestion followed by Inductively Coupled Argon Plasma Mass Spectroscopy (ICP-MS) analysis. The analysis for mercury employed cold vapour atomic absorption (CVAA). The analytical QA/QC is described as follows and the results are provided in the analytical report.

ICPMS Analysis

The quality assurance activities conducted by the analytical laboratory are detailed in the Quality Assurance Report provided in the analytical report. Specific QA/QC results are summarized below:

- One duplicate sample analysis was performed for the test program. The relative percent difference was less than 11.3% well within the acceptable limit of less than ±20%, for elements that are greater than 5 times the minimum detection limit, except for copper in the back half. The copper relative percent difference was greater than 20%; the greater value was used to calculate the emission data.
- A blank spike (performed as a pre-digestion spike) was analyzed with the test samples. All of the recovery results were between 93-103%. The acceptable limit is 80-115% of the true value.
- A matrix spike (performed as a post digestion spike) was analyzed with the test samples. All of the recovery results were between 94-104%. The acceptable limit is 70-130% of the true value.

The following general analytical QA/QC requirements must also be met or the samples are re-analyzed:

- An instrument calibration check standard was analyzed immediately after the calibration curve and must be within 90%-110% of the actual concentrations.
- Instrument calibration blank check sample were analyzed with every 10 samples and must be within three times the minimum detection limit.
- A continuing calibration check is run every 10 samples and must be within 85%-115% of the actual concentrations.
- Instrument (interference) check sample for ICP-MS analysis was analyzed before and after each analytical run. The value(s) found for the interference check sample must be within 80%-120% of the true value.

Barium, chromium, copper, lead, molybdenum, nickel and zinc were detected in the blank trains at levels greater than the limit of reporting. Chromium, copper, molybdenum and nickel were observed by the analytical laboratory in the method blank at levels greater than the limit of reporting. The test sample data may be biased high for these compounds as a result of this potential background.

Mercury Analysis

The quality assurance activities conducted by the analytical laboratory are detailed in the Quality Assurance Report provided in the analytical report. Specific QA/QC results are summarized below:

- One duplicate sample analysis was performed for each fraction. However, mercury was not detected on any of the fractions in quantities greater than the detection limit.
- A blank spike (performed as a pre-digestion spike) was analyzed with the test samples. All of the recovery results were between 91-96% within the acceptable limit of 90-110% of the true value, except for Fraction 1B. The recovery for Fraction 1B was 76% (86% in the duplicate), however mercury was not detected in this fraction in any of the test samples.
- A matrix spike (performed as a post digestion spike) was analyzed with the test samples. All of the recovery results were between 90-97%, within the acceptable limit of 85-115% of the true value.

The following general analytical QA/QC requirements must also be met or the samples are re-analyzed:

- A 5 point calibration was performed.
- An instrument check calibration standard was analyzed immediately after the calibration and must be within 90%-110% of the actual concentration
- One mid-range calibration standard was analyzed after 10 samples and at the end of the run and must be within 85%-115% of the actual concentration.
- Instrument calibration blank check sample is analyzed with every 10 samples and must be within three times the minimum detection limit.

6.5.2 Acid Gas Sample Analysis QA/QC

Analyses of the acid gas samples from the Method 26A sampling train was performed by Ion Chromatography (IC). The quality assurance activities conducted by the analytical laboratory are detailed in the Quality Assurance Report provided in the analytical report. Specific QA/QC results are summarized below:

- All of the hydrogen chloride and hydrogen fluoride analyses were conducted in duplicate. One duplicate sample analysis was also performed for ammonia. The relative percent difference was less than 1%, well within the acceptable limit of less than ±20% for compounds that are greater than 5 times the minimum detection limit.
- A blank spike sample was analyzed with the test samples. The recovery results for the blank spike sample were 101% for hydrogen chloride, 103% for hydrogen fluoride and 98.1% for ammonia, within the acceptable range of 90-110%.
- A matrix spike (spike confirmation) sample was analyzed with every 20 samples to confirm the identity of each peak. The recovery results of the matrix spike sample were 104% for hydrogen chloride, 104% for hydrogen fluoride and 102% for ammonia, within the acceptable range of 85-115%.

The following general analytical QA/QC requirements must also be met or the samples are re-analyzed:

- A 6 point calibration bracketing the expected range.
- An instrument check calibration standard was analyzed immediately after the calibration and must be within 90%-110% of the actual concentration.
- A complete set of calibration standards were analyzed at the end of the analysis and must be within 10% of the true value.
- One mid-range calibration standard was analyzed after 10 samples and at the end of the run and must be within 90%-110% of the actual concentration.
- Instrument calibration blank check samples were analyzed with every 10 samples and must be within three times the minimum detection limit for each ion.

6.5.3 Aldehyde Sample Analysis QA/QC

Analysis for formaldehyde, acetaldehyde and acrolein was performed via GC/MS. The formaldehyde, acetaldehyde and acrolein BHA media sent to the field was deemed acceptable. The values reported by the analytical laboratory are not blank corrected.

Two laboratory control samples were prepared by the analytical laboratory and analyzed with the test samples (Field Spike and 10 µg). The acrolein recoveries were 5% and 81%, the formaldehyde recoveries were 130% and 51% and the acetaldehyde recoveries were 124% and 146%.

The laboratory method and field blanks all showed levels of formaldehyde similar to the levels in the samples. Therefore, formaldehyde levels in the field samples are suspected to be false positives and represent maximum possible levels.

Acetaldehyde and acrolein in the laboratory method blank was much higher than in any of the samples. The method blank shows significant contamination. The second field blank showed low levels of acetaldehyde at levels similar to the field samples. Therefore, acetaldehyde levels in the field samples are suspected to be false positives and represent maximum possible values.

6.5.4 SVOC Sample Analysis QA/QC

The combined filter, probe rinse, Amberlite XAD-2 cartridge, impinger solutions and associated rinse and soaking solutions for each of the semi-volatile organics trains were analyzed together as one sample per test.

Staff at ALS added extraction standards to all samples prior to extraction. Clean-up standards were added just prior to the clean-up process. Recoveries of the clean-up standards provide an indication on the losses that occur during the extract clean-up. The analytical report includes the lists of the field spike, extraction and clean-up standards used. The analysis of samples involved complex sample extraction and cleanup, followed by HRMS/MS analysis.

Recovery of the dioxin and furan field spike standards were between 61-112% which indicates good extraction efficiency and provides a high degree of confidence in the results obtained from the dioxin and furan test trains.

Per the analytical reports for chlorobenzenes, the recoveries of select labelled extraction standards were below the method control limit, however the reported results are not expected to be biased.

Per the analytical reports for chlorophenols, the revised extraction scheme designed for improved monochlorobenzene recoveries removed the acidied/extraction step that enhanced chlorophenol recoveries. Therefore, chlorophenol recoveries were in some cases very low. Re-analysis using another fraction of the extract (on extracts where chlorobenzene fraction that showed good recoveries of the chlorobenzenes) did not provide improved data but showed similar recoveries. Reporting limits were raised significantly for the very low recoveries corresponding to observable levels after correction for recoveries. LCS target recoveries confirmed that in general targets by isotope dilution technique still provided estimates of chlorophenols even in the presence of poor ES recoveries. Selected samples with very low monochlorophenol ES recoveries had insufficient responses to provide estimates on the monochlorophenol targets.

The chlorophenol detection limits reported are significantly higher than the detection limits typically reported by the analytical laboratory (<1000 ng vs <60 ng). The emission data is elevated as a result for those compounds reported.

6.5.5 Volatile Organic Compound Analysis QA/QC

Prior to sampling VOST tube pairs were cleaned and conditioned under helium sweep (approximately 50 mL/min flow) through each tube in an oven at 280°C for at least 12 hours. One VOST pair was analyzed and proven clean for every 10 pairs cleaned. VOST tubes were end-capped and stored sealed in individual screw-capped vials at 4°C between conditioning and shipment to the field.

Two field blanks, a trip blank and a laboratory method blank were analyzed with the test sample tubes. VOST tubes were desorbed and analyzed, combined as pairs, according to SW846 Method 5041A/8260B.

Toluene was detected in one of the field blank samples in quantities significantly higher than the analytical detection limit. The field blank samples are taken to the sampling location, opened then recapped to provide background levels at the sampling location. The trip blank is taken to the sampling location but remains sealed.

The analytical report includes the field standards, internal standards and surrogate standards used. The surrogate recoveries for each of the surrogates should be between 50 - 150%. The recoveries for each test sample were between 89 - 118%.

7. RESULTS AND DISCUSSION

Emission tests were completed for particulate matter, particle size distribution, condensable particulate matter, metals, semi-volatile organic compounds, aldehydes, acid gases and volatile organic compounds at the Boiler No. 1 BH Outlet and Boiler No. 2 BH Outlet.

Combustion gases, including hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide were measured during the emission testing program (March 18 to March 21, 2024) by the DYEC CEMS. Total hydrocarbon concentrations were also measured at the BH Outlet and Quench Inlet by ORTECH on March 19, 2024.

Tables referenced in this report for the tests conducted at Boiler No. 1 and Boiler No. 2 are provided in Appendix 1 and Appendix 2, respectively.

Detailed test schedules are provided in Table 1 and Table 2 of Appendix 1 and Appendix 2 for Boiler No. 1 and Boiler No. 2, respectively.

7.1 Stack Gas Sampling Parameters

Emission test calculations for the particulate and metals, particle size, acid gases, and SVOC tests conducted are provided in Appendix 22 to Appendix 25, respectively.

Stack gas sampling parameters for the tests conducted at each location are summarized in Table 3 (Appendix 1 and Appendix 2). These parameters include calibration data, nozzle diameter, dry gas volume sampled and average percentage of isokineticity for each test.

7.2 Stack Gas Physical Parameters

Stack gas physical parameters for tests conducted at each BH Outlet location are presented in Table 4 (Appendix 1 and Appendix 2). The average values from the isokinetic tests at each site are summarized below:

Stack Gas Parameter	Boiler No. 1 BH Outlet*	Boiler No. 2 BH Outlet*
Gas Temperature (°C)	138	139
Moisture by Volume (%)	15.9	16.9
Velocity (m/s)	18.7	17.8
Static Pressure (kPa)	-2.94	-2.89
Absolute Pressure (kPa)	96.7	96.8
Carbon Dioxide by Volume (%)**	10.6	11.0
Oxygen by Volume (%)**	8.57	8.28

* Excludes the isokinetic Acid Gases tests as testing was conducted on a single traverse of the duct
** dry basis, measured by DYEC CEMS

7.3 Volumetric Flowrate Data

Stack gas volumetric flowrates for the tests conducted at each BH Outlet location are presented in Table 5 (Appendix 1 and Appendix 2). The average flowrate values from the tests at each site are summarized below:

Volumetric Flowrate	Boiler No. 1 BH Outlet*	Boiler No. 2 BH Outlet*
Actual Flowrate (m^3/s)	27.7	26.3
Dry Reference Flowrate (Rm^3/s)**	16.1	15.1
Dry Adjusted Flowrate (Rm^3/s)***	20.0	19.3
Wet Reference Flowrate (Rm^3/s)**	19.1	18.2

* Excludes the isokinetic Acid Gases tests as testing was conducted on a single traverse of the duct
** at 25°C and 1 atmosphere
*** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

7.4 Particulate Emission Data

Filterable particulate emission data obtained from each of the particulate and metals tests conducted at the BH Outlet of each Boiler is presented in Table 6 (Appendix 1 and Appendix 2). Average filterable particulate emission data for each BH Outlet location is summarized below:

Particulate Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (mg/m^3)	0.95	1.09
Dry Reference Conc. (mg/Rm^3)*	1.62	1.89
Dry Adjusted Conc. (mg/Rm^3)**	1.31	1.48
Wet Reference Conc. (mg/Rm^3)*	1.37	1.57
Emission Rate (mg/s)	26.4	28.3

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The ECA stipulates maximum in-stack limits for the emissions of various compounds including particulate matter. The average particulate dry adjusted concentration at the Boiler No. 1 BH Outlet (1.31 mg/Rm^3, adjusted to 11% oxygen) and the Boiler No. 2 BH Outlet (1.48 mg/Rm^3, adjusted to 11% oxygen) were well below the maximum limit (9 mg/Rm^3, adjusted to 11% oxygen) stated in the ECA.

The amount of particulate matter detected in the blank sampling train filter and acetone probe rinse samples for Boiler No. 1 BH Outlet was 3.9 mg and 0.2 mg, respectively. The amount of particulate detected in the blank sampling train filter and acetone probe rinse samples for Boiler No. 2 BH Outlet was 4.4 mg and 0.3 mg, respectively. Although these levels are significant relative to the amount detected in the test trains, the blank analysis was not subtracted from the test sample analyses during calculation of the particulate emission data.

Particle size distribution tests were also conducted at the BH Outlet of each Boiler. PM_{10} and $PM_{2.5}$ emission data is detailed in Table 7 (Appendix 1 and Appendix 2) for each location. Average emission data for each BH Outlet location is summarized below:

PM_{10} and $PM_{2.5}$ Emission Parameter	PM_{10}		$PM_{2.5}$	
	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (mg/m^3)	<0.71	<0.79	<0.58	<0.63
Dry Reference Conc. (mg/Rm^3)*	<1.22	<1.37	<1.00	<1.09
Dry Adjusted Conc. (mg/Rm^3)**	<1.00	<1.08	<0.82	<0.86
Wet Reference Conc. (mg/Rm^3)*	<1.03	<1.14	<0.85	<0.91
Emission Rate (mg/s)	<20.2	<21.5	<16.5	<17.2

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Condensable particulate emission data obtained from the back-half of each of the particle size distribution tests conducted at the BH Outlet for each Boiler is presented in Table 8 (Appendix 1 and Appendix 2). Average condensable particulate emission data for each BH Outlet location is summarized below:

Condensable Particulate Emission Parameter	Inorganic Fraction		Organic Fraction	
	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (mg/m^3)	1.57	1.59	2.13	1.78
Dry Reference Conc. (mg/Rm^3)*	2.69	2.77	3.63	3.11
Dry Adjusted Conc. (mg/Rm^3)**	2.21	2.18	2.99	2.45
Wet Reference Conc. (mg/Rm^3)*	2.28	2.30	3.08	2.58
Emission Rate (mg/s)	44.7	43.5	60.3	48.8

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The amount of condensable particulate detected in the blank sampling train for Boiler No. 1 was 0.3 mg for the inorganic fraction and 2.9 mg for the organic fraction. The amount of condensable particulate detected in the blank sampling train for Boiler No. 2 was 0.4 mg for the inorganic fraction and 3.5 mg for the organic fraction. Although these levels are significant relative to the amount detected in the test trains, the blank analysis was not subtracted from the test sample analyses during calculation of the condensable particulate emission data.

The average PM_{10} and $PM_{2.5}$ results, including condensable particulate matter, are summarized below for each Boiler:

PM_{10} and $PM_{2.5}$ + Condensable Emission Parameter	PM_{10} + Condensable		$PM_{2.5}$ + Condensable	
	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (mg/m^3)	<4.41	<4.16	<4.29	<4.00
Dry Reference Conc. (mg/Rm^3)*	<7.54	<7.25	<7.32	<6.97
Dry Adjusted Conc. (mg/Rm^3)**	<6.21	<5.71	<6.02	<5.49
Wet Reference Conc. (mg/Rm^3)*	<6.40	<6.02	<6.21	<5.79
Emission Rate (mg/s)	<125	<114	<122	<110

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

7.5 Acid Gases

Hydrogen chloride, hydrogen fluoride and ammonia emission data for the tests conducted at the BH Outlet of each Boiler are presented in Table 9 (Appendix 1 and Appendix 2). Hydrogen fluoride was not detected in any of the test samples in quantities greater than the detection limit. The detection limit was used to calculate hydrogen fluoride emission data. Hydrogen chloride and ammonia were detected in quantities greater than the detection limit in all of the samples collected at each location.

Average hydrogen chloride, hydrogen fluoride and ammonia emission data for the tests conducted at the BH Outlet of each Boiler is summarized below:

Acid Gases Emission Parameter	Hydrogen Chloride		Hydrogen Fluoride		Ammonia	
	Boiler No. 1	Boiler No. 2	Boiler No. 1	Boiler No. 2	Boiler No. 1	Boiler No. 2
Actual Conc. (mg/m^3)	1.81	2.43	<0.066	<0.073	0.41	0.23
Dry Reference Conc. (mg/Rm^3)*	3.12	4.19	<0.11	<0.13	0.71	0.40
Dry Adjusted Conc. (mg/Rm^3)**	2.55	3.33	<0.093	<0.10	0.58	0.32
Wet Reference Conc. (mg/Rm^3)*	2.61	3.50	<0.095	<0.11	0.59	0.33
Emission Rate (mg/s)	49.5	63.9	<1.80	<1.92	11.3	6.08
Dry Adjusted Conc. (ppm)**	1.71	2.23	<0.11	<0.12	0.83	0.46

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Hydrogen chloride, hydrogen fluoride and ammonia were not detected in the blank samples in quantities greater than the detection limit. The blank analysis was not subtracted from the test sample analyses during calculation of the emission data.

7.6 Combustion Gas Emission Data

Combustion gases, including carbon dioxide, carbon monoxide, hydrogen chloride, nitrogen oxides, oxygen and sulphur dioxide, were measured continuously at the BH Outlet during the emission testing program by the DYEC CEMs. Oxygen was also measured at the Quench Inlet by the DYEC CEMS. The oxygen, carbon dioxide and carbon monoxide concentrations for each test period were used to calculate the molecular weight of the gas stream. The oxygen concentration data was also used to correct the dry reference concentration data to 11% oxygen.

DYEC provided 1-hour average concentrations for each clock hour using the 1-minute combustion gas data measured by the DYEC CEMs during each isokinetic test day at each Boiler. The data measured by the DYEC CEMS, from March 18, 2024 at 08:00 to March 21, 2024 at 16:00, was used to assess against the in-stack emission limit stated in the ECA for each boiler. A 24-hour rolling average was determined for hydrogen chloride, nitrogen oxides and sulphur dioxide using the 1-hour average data for the isokinetic test days at each unit to compare to the in-stack limits stated in the ECA. A 4-hour rolling average was determined for carbon monoxide using the calculated 1-hour average data for the isokinetic test days at each unit to compare to the in-stack limit stated in the ECA.

The minimum, average and maximum 1-hour, 4-hour and 24-hour combustion gas data measured by the DYEC CEMS is summarized in Table 10 (Appendix 1 and Appendix 2). The maximum concentration, along with the in-stack limit stated in the ECA, is summarized in the following table for each component.

Combustion Gases Emission Parameter		In-Stack ECA Limit	Maximum Concentration	
			Boiler No. 1	Boiler No. 2
BH Outlet	Oxygen (%, 1-hr)	-	9.33	9.59
	Carbon Monoxide (mg/Rm^3, 4-hr)*	≤ 40	9.5	12.4
	Sulphur Dioxide (mg/Rm^3, 24-hr)*	≤ 35	1.8	2.4
	Nitrogen Oxides (mg/Rm^3, 24-hr)*	≤ 121	113	109
	Hydrogen Chloride (mg/Rm^3, 24-hr)*	≤ 9	0.5	2.4
	Total Hydrocarbons (mg/Rm^3, 1-hr)*	-	1	0
Quench Inlet	Oxygen (%, 1-hr)	≥ 6	7 (minimum)	6 (minimum)

* dry at reference conditions, adjusted to 11% oxygen
** dry at reference conditions

Total hydrocarbon concentration data was measured by ORTECH on March 19, 2024 at the Quench Inlet and BH Outlet sampling locations. The results of the total hydrocarbons tests are summarized in Table 10 (Appendix 1 and Appendix 2). The average THC concentration for each location, along with the in-stack limit stated in the ECA, is summarized in the following table.

Combustion Gases Emission Parameter		Limit	Average Concentration	
			Boiler No. 1	Boiler No. 2
BH Outlet	Total Hydrocarbons (1-minute)*	-	0	0.3
	Total Hydrocarbons (10-minute)**	-	0	0.3
Quench Inlet	Total Hydrocarbons (1-minute)*	-	0.1	0.2
	Total Hydrocarbons (10-minute)**	50	0.03	0.2

* ppm dry basis, expressed as equivalent methane (average of each 60 minute test with data recorded in 1-minute intervals)

** ppm dry basis, expressed as equivalent methane (average of each 60 minute test calculated using the 10-minute rolling average)

The one-minute average total hydrocarbon data and the 10-minute total hydrocarbon data measured by ORTECH and expressed on a dry basis as equivalent methane is provided in Appendix 26.

7.7 Metal Emission Data

Metal analytical results for the tests performed at the BH Outlet of each Boiler are given in Tables 11, 12 and 13 (Appendix 1 and Appendix 2) for Test No. 1, Test No. 2 and Test No. 3, respectively. Metal concentrations and emission rates are shown in Tables 14, 15 and 16 for Test No. 1, Test No. 2 and Test No. 3, respectively.

Summaries of the metal actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates including the coefficients of variation for the tests performed are provided in Tables 17, 18, 19, 20 and 21, respectively. Table 22 summarizes the average metal emission data for the tests performed.

Table 23 summarizes the results from the blank metals trains. The amount of metals detected in the blank trains was significant when compared to the amounts collected in the test trains since most of the metals in the test trains were at or near the detection limit. The emission data was not corrected for the blank data.

The metals analysis of the Method 29 test trains was performed on two separate analytical fractions, the probe and filter hydrofluoric acid digest and analysis of the train impingers and associated rinses. In instances where all analyses were reported to be below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, and the remaining fraction was assigned a value of zero. In instances where any given fraction was detected that value was used to calculate emission data, and the remaining undetected fraction were assigned a value of zero.

The ECA stipulates maximum in-stack limits for the emissions of various compounds including cadmium and lead.

The average cadmium emission data is summarized below:

Cadmium Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (µg/m^3)	<0.064	0.042
Dry Reference Conc. (µg/Rm^3)*	<0.11	0.073
Dry Adjusted Conc. (µg/Rm^3)**	<0.090	0.057
Wet Reference Conc. (µg/Rm^3)*	<0.093	0.061
Emission Rate (mg/s)	<0.0018	0.0011

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The average lead emission data is summarized below:

Lead Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (µg/m^3)	0.22	0.19
Dry Reference Conc. (µg/Rm^3)*	0.38	0.32
Dry Adjusted Conc. (µg/Rm^3)**	0.31	0.26
Wet Reference Conc. (µg/Rm^3)*	0.32	0.27
Emission Rate (mg/s)	0.0061	0.0049

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The cadmium and lead dry adjusted concentrations were well below the maximum in-stack emission limits stated in the ECA (7 µg/Rm^3, adjusted to 11% oxygen for cadmium and 50 µg/Rm^3, adjusted to 11% oxygen for lead).

7.8 Mercury Emission Data

Mercury analysis, concentration and emission data are also summarized in the metals emission tables. As is the case with all other analyses the mercury analytical results are not blank corrected.

The average mercury emission data is summarized below:

Mercury Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (µg/m^3)	<0.12	<0.43
Dry Reference Conc. (µg/Rm^3)*	<0.20	<0.74
Dry Adjusted Conc. (µg/Rm^3)**	<0.16	<0.58
Wet Reference Conc. (µg/Rm^3)*	<0.17	<0.62
Emission Rate (mg/s)	<0.0033	<0.011

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The mercury dry adjusted concentrations were well below the maximum in-stack emission limit stated in the ECA of 15 µg/Rm^3, adjusted to 11% oxygen.

7.9 Semi-Volatile Organic Emission Data

The combined filter and probe rinse, and combined Amberlite XAD-2 cartridge and impinger solutions for each of the semi-volatile organics trains were analyzed together (one analysis per test) for semi-volatile organic compounds including select dioxins, furans, dioxin-like polychlorinated biphenyls (PCBs), chlorobenzenes (CBs), chlorophenols (CPs) and polycyclic aromatic hydrocarbons (PAHs) at the BH Outlet of each Boiler.

7.9.1 Dioxins and Furans Emission Data

Dioxins and furans are groups of chemically related chlorinated organic compounds or congeners. There are seventy-five dioxin congeners and one hundred and thirty five furan congeners. The individual congeners all have different molecular structures and they may also have different molecular formulae. Individual congeners, which have the same molecular formula but different molecular structure, are referred to as isomers. Groups of isomers are referred to as congener groups or homologues. The basic dioxin and furan molecules have the molecular formulae $C_{12}H_8O_2$ and $C_{12}H_8O$, respectively. In chlorinated dioxin and furans, between one and eight chlorine atoms may replace an equal number of hydrogen atoms in the basic molecule.

The following table lists the chlorinated dioxin and furan congener groups, and the number of isomers present in each group:

Congener Group Abbreviation		Number of Chlorine Atoms Per Molecule	Molecular Formula	Number of Isomers Per Congener Group
Dioxins	M1CDD	1	$C_{12}H_7ClO_2$	2
	D2CDD	2	$C_{12}H_6Cl_2O_2$	10
	T3CDD	3	$C_{12}H_5Cl_3O_2$	14
	T4CDD	4	$C_{12}H_4Cl_4O_2$	22
	P5CDD	5	$C_{12}H_3Cl_5O_2$	14
	H6CDD	6	$C_{12}H_2Cl_6O_2$	10
	H7CDD	7	$C_{12}H_1Cl_7O_2$	2
	O8CDD	8	$C_{12}Cl_8O_2$	1
Furans	M1CDF	1	$C_{12}H_7ClO$	4
	D2CDF	2	$C_{12}H_6Cl_2O$	16
	T3CDF	3	$C_{12}H_5Cl_3O$	28
	T4CDF	4	$C_{12}H_4Cl_4O$	38
	P5CDF	5	$C_{12}H_3Cl_5O$	28
	H6CDF	6	$C_{12}H_2Cl_6O$	16
	H7CDF	7	$C_{12}H_1Cl_7O$	4
	O8CDF	8	$C_{12}Cl_8O$	1

In Ontario, the MECP normally requires that only the higher tetra to octa (T4CDD to O8CDD) dioxin congeners and the higher tetra to octa (T4CDF to O8CDF) furan congeners are included in air emission testing. This is because the lower mono to tri congener groups (M1CDD to T3CDD and M1CDF to T3CDF) are considered to be generally less toxic than the higher congener groups and the test procedures have not been validated for these lower groups. In addition, it is acceptable to the MECP to use only specific isomers in the higher congener groups to compare emission data with the MECP criteria for dioxin and furan emissions.

Dioxin and furan congener group analytical results and emission data for the tests performed at the BH Outlet of each Boiler are given in Table 24 to Table 32 (Appendix 1 and Appendix 2). The results are shown as congener groups from T4CDF to O8CDF and T4CDD to O8CDD, as normally required by the MECP.

The average dioxin congener group emission data for each location is summarized below:

Dioxin Congener Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (ng/m^3)	0.090	0.092
Dry Reference Conc. (ng/Rm^3)*	0.16	0.16
Dry Adjusted Conc. (ng/Rm^3)**	0.12	0.13
Wet Reference Conc. (ng/Rm^3)*	0.13	0.13
Emission Rate (ng/s)	2.42	2.38

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The average furan congener group emission data for each location is summarized below:

Furan Congener Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (ng/m^3)	<0.028	<0.016
Dry Reference Conc. (ng/Rm^3)*	<0.048	<0.028
Dry Adjusted Conc. (ng/Rm^3)**	<0.037	<0.022
Wet Reference Conc. (ng/Rm^3)*	<0.040	<0.023
Emission Rate (ng/s)	<0.75	<0.42

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The amounts of dioxin and furan congeners detected in the blank sampling trains and in the laboratory blank were insignificant when compared to the amounts detected in the test trains. The blank sampling train analytical results are shown in Table 33. The blank analyses were not subtracted from the test sample analyses during calculation of the dioxin and furan congener emission data.

Dioxin, furan and dioxin-like PCB specific isomer analytical results and emission data for the tests performed are given in Table 34 to Table 42 (Appendix 1 and 2) for the BH Outlets. The isomers included in these tables are considered the most toxic of all the dioxin and furan isomers. They are characterized by having chlorine atoms located at the 2, 3, 7 and 8 positions of the basic dioxin and furan molecules.

The blank sampling train analytical results are shown in Table 43 for the BH Outlet. The blank analyses were not subtracted from the test sample analyses during the calculation of the dioxin and furan isomer emission data.

Several schemes have been proposed for calculating dioxin and furan toxic equivalents (TEQ's) in which different factors have been assigned to the various isomers and congener groups. Calculations in this report are based on the methods preferred by the MECP, which use WHO and NATO/CCMS (1989) toxicity equivalence factors (TEFs).

The purpose in calculating dioxin and furan emission rates as toxic equivalents is to provide a means of assessing and comparing the effects of dioxin and furan emission rates for different emission sources. In these calculations, 2,3,7,8-T4CDD, the most toxic of all the dioxin and furan isomers, is assigned an arbitrary value of 1.0 for a toxic equivalency factor.

Then, other dioxin and furan isomers are assigned toxic equivalency factors which are based on their relative toxicity compared with 2,3,7,8-T4CDD. Emission rates for each isomer are multiplied by their assigned factor and the products are summed to provide the toxic equivalency emission rate.

The MECP "Summary of Standards and Guidelines to Support Ontario Regulation 419/05 – Air Pollution – Local Air Quality", dated April 2012, provided a new framework for calculating dioxin and furan toxicity equivalent concentrations which includes emission data for 12 dioxin-like PCBs. This document was replaced by "Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", however the dioxin and furan toxicity equivalent calculation methodology remains the same.

Tables 44 to 49 show the dioxins, furans and dioxin-like PCBs toxicity equivalent emission data calculated using the full detection limit for those compounds not detected. Table 50 show the dioxins, furans and dioxin-like PCBs toxicity equivalent emission data calculated using half the detection limit for those compounds not detected.

The average dioxin, furan and dioxin-like PCBs toxicity equivalent emission data calculated using the WHO toxicity equivalence factors and half the detection limit (Table 50 in Appendix 1 and Appendix 2) is summarized below. Per the MECP standards and guidelines referenced above, dioxin, furan and dioxin-like PCB toxicity equivalent emission data calculated using the WHO toxicity equivalence factors and half the detection limit are used for dispersion modelling analysis for comparison with the point of impingement criteria discussed in Section 8.

Total Dioxin and Furan Isomer and PBCs Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (pg TEQ/m^3)	1.67	1.34
Dry Reference Conc. (pg TEQ/Rm^3)*	2.89	2.35
Dry Adjusted Conc. (pg TEQ/Rm^3)**	2.25	1.83
Wet Reference Conc. (pg TEQ/Rm^3)*	2.40	1.95
Emission Rate (ng TEQ/s)	0.045	0.035

* at 25°C and 1 atmosphere

** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The average dioxin and furan dry adjusted toxicity equivalent concentration calculated using the NATO/CCMS (1989) toxicity equivalence factors and the full detection limit (Table 46B in Appendix 1 and Appendix 2) is summarized below. Dioxin and furan toxicity equivalent emission data for the BH Outlet, calculated using the NATO/CCMS (1989) toxicity equivalence factors and the full detection limit, is used for comparison with the in-stack emission limit specified in the ECA.

Dioxin and Furan Isomer Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Dry Adjusted Conc. (pg TEQ/Rm^3)*	<2.30	<1.88

* at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The dioxin and furan dry adjusted TEQ concentration at the BH Outlet of each Boiler was well below the maximum in-stack emission limit stated in the ECA of 60 pgTEQ/Rm^3, adjusted to 11% oxygen.

7.9.2 Chlorobenzene and Chlorophenol Emission Data

As with dioxins and furans, chlorobenzenes and chlorophenols are groups of compounds that have different molecular structures and may also have different numbers of chlorine atoms in the basic molecule. Chlorobenzenes have the structure of the benzene molecule except that between one and six chlorine atoms are substituted for an equal number of hydrogen atoms in the benzene ring. Benzene has the molecular formula C_6H_6. Chlorobenzene congener groups have the molecular formulae C_6H_5Cl, $C_6H_4Cl_2$, $C_6H_3Cl_3$, $C_6H_2Cl_4$, C_6HCl_5 and C_6Cl_6. Chlorophenols have the structure of the phenol molecule except that between one and five chlorine atoms are substituted for an equal number of hydrogen atoms in the benzene ring. Phenol has the molecular formula C_6H_5OH. Chlorophenol congener groups have the molecular formulae C_6H_4ClOH, $C_6H_3Cl_2OH$, $C_6H_2Cl_3OH$, C_6HCl_4OH and C_6Cl_5OH.

Chlorobenzene congener and isomer analytical results and emission data are given in Table 51 to Table 59 for the BH Outlet.

Amounts collected were assumed to be equivalent to the detection limit, where the analytical results were below the detection limit.

The average total chlorobenzene emission data is presented below:

Chlorobenzenes Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (ng/m^3)	<84.1	<89.7
Dry Reference Conc. (ng/Rm^3)*	<146	<156
Dry Adjusted Conc. (ng/Rm^3)**	<113	<122
Wet Reference Conc. (ng/Rm^3)*	<121	<130
Emission Rate (µg/s)	<2.25	<2.29

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Blank sampling train and laboratory blank analytical results for chlorobenzenes are given in Table 60. The blank analyses were not subtracted from the test sample analyses during the calculation of chlorobenzene emission data.

Chlorophenol congener and isomer analytical results and emission data is given in Table 61 to Table 69 for the BH Outlet of each Boiler.

Amounts collected were assumed to be equivalent to the detection limit, where the analytical results were below the detection limits (<DL). The chlorophenol detection limits reported are significantly higher than the detection limits typically reported by the analytical laboratory (<300 or <1000 ng vs <60 ng). The emission data is elevated as a result for those compounds reported. For some samples, select isomers could not be reported due to an absence of recovery on the corresponding extraction standards.

The average total chlorophenol emission data is presented below:

Chlorophenol Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (ng/m^3)	<862	<1013
Dry Reference Conc. (ng/Rm^3)*	<1494	<1765
Dry Adjusted Conc. (ng/Rm^3)**	<1163	<1380
Wet Reference Conc. (ng/Rm^3)*	<1240	<1468
Emission Rate (µg/s)	<23.1	<26.0

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Blank sampling train and laboratory blank analytical results for chlorophenols are given in Table 70. The blank analyses were not subtracted from the test sample analyses during the calculation of chlorophenol emission data.

7.9.3 Polycyclic Aromatic Hydrocarbon Emission Data

The SVOC samples from the BH Outlet sampling location on each Boiler were also analyzed for select polycyclic aromatic hydrocarbon (PAH) compounds.

Analytical results and PAH emission data for the tests performed are provided in Table 71, 72 and Table 73 for Test No. 1, Test No. 2 and Test No. 3, respectively. PAH actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates are shown in Tables 74 to 78, respectively. A summary of the average emission data is given in Table 79.

The average total PAH emission data is presented below:

Total PAH Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (ng/m^3)	<239	<153
Dry Reference Conc. (ng/Rm^3)*	<413	<268
Dry Adjusted Conc. (ng/Rm^3)**	<321	<208
Wet Reference Conc. (ng/Rm^3)*	<343	<222
Emission Rate (µg/s)	<6.40	<3.97

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Table 80 summarizes the lab blank and blank train PAH analyses. There were significant levels of PAHs in the blank trains. The blank train sample analyses were not subtracted from the test train sample analyses for the purposes of emission rate calculations.

7.10 Aldehydes

Acetaldehyde, formaldehyde and acrolein emission data for the tests conducted at the BH Outlet of each Boiler is presented in Table 81.

Average acetaldehyde, formaldehyde and acrolein emission data for the tests conducted at the BH Outlet of each Boiler is summarized below:

Aldehydes Emission Parameter	Acetaldehyde		Formaldehyde		Acrolein	
	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (µg/m^3)	1.82	7.53	34.7	137	<0.48	<2.00
Dry Reference Conc. (µg/Rm^3)*	3.17	13.3	60.5	241	<0.83	<3.52
Dry Adjusted Conc. (µg/Rm^3)**	2.46	10.2	46.9	186	<0.65	<2.72
Wet Reference Conc. (µg/Rm^3)*	2.63	11.0	50.2	200	<0.69	<2.91
Emission Rate (mg/s)	0.049	0.20	0.93	3.59	<0.013	<0.052

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note due to an error by the sampling crew, the aldehyde sampling rate for Boiler No. 1 was 2 liters per minute for sixty minutes and not at 0.5 liters per minute per the test method. The total collected was similar to the amounts collected in the blank train. The emission data is lower than typical due to the increased sample volume for the test train.

Acetaldehyde, formaldehyde and acrolein detected in the method blank in quantities significantly greater than the detection limit and in quantities similar to or greater than the test samples.

7.11 Volatile Organic Emission Data

Three forty-minute test runs were completed at each BH Outlet for volatile organic compounds using SLO-VOST. One backup pair of tubes was collected for each Boiler and archived in case a sample was lost during the analytical extraction process.

Volatile organic analysis data for the tests is provided in Table 82, 83 and Table 84 for Test No. 1, Test No. 2 and Test No. 3. The average test results of volatile organic actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates are shown in Table 85 to 89, respectively. The average volatile organic emission data is summarized in Table 90.

The average total VOC emission data collected from the VOST sampling train is presented below:

VOC Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Actual Conc. (µg/m^3)	<62.6	<205
Dry Reference Conc. (µg/Rm^3)*	<109	<360
Dry Adjusted Conc. (µg/Rm^3)**	<84.3	<281
Wet Reference Conc. (µg/Rm^3)*	<90.7	<301
Emission Rate (mg/s)	<1.68	<5.26

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

The average total VOC emission data, including acetaldehyde, formaldehyde and acrolein, per the list provided in Schedule D of the ECA is presented below:

VOC Emission Parameter	Boiler No. 1 BH Outlet	Boiler No. 2 BH Outlet
Dry Reference Conc. (µg/Rm^3)*	<174	<618
Dry Adjusted Conc. (µg/Rm^3)**	<134	<480
Emission Rate (mg/s)	<2.67	<9.10

* at 25°C and 1 atmosphere
** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Analysis of blank adsorbent tubes is provided in Table 91. Test sample analyses were not blank corrected during the calculation of the emission data.

8. DISPERSION MODELLING

The emission data measured during the testing program was used to assess emissions from the main stack against the point of impingement criteria detailed in Ontario Regulation 419/05 or the applicable MECP guideline.

Dispersion modelling was completed using the CALPUFF model (using Version 7.2.1 level 150618 as approved by the MECP in May 2021) by WSP Canada Inc. The dispersion modelling results are detailed in Appendix 27. WSP can provide the dispersion modelling zip files upon request.

The predicted ground level Point of Impingement (POI) concentrations calculated based on the average total emission rate for each contaminant included in the March 2024 emission testing program, was well below the applicable standard, guideline or upper risk threshold. The contaminants with the highest predicted concentrations relative to the standard were nitrogen oxides (11% of the 1-hour standard and 3% of the 24-hour standard with meteorological anomaly removal) and chromium (hexavalent) (2% of the annual standard), all other contaminants were 1% or less than the relevant standard with meteorological anomaly removal.

Note the particulate and metals sampling train collects total chromium, including metallic, divalent, trivalent and hexavalent forms of chromium. For the predicted POI, it was assumed all chromium collected was hexavalent chromium; this is a conservative assumption and may overestimate the hexavalent chromium emissions from the facility. The chromium emission data was also assessed against the chromium (metallic, divalent and trivalent forms) standard and was <1% of the standard with meteorological anomaly removal.

9. FACILITY PROCESS DATA

Continuous Emission Monitoring (CEM) data was supplied by DYEC personnel for the emission test program. The 1-hour CEM System data was provided for the following process parameters at the BH Outlet sampling locations:

- Hydrogen Chloride (mg/Rm^3, adjusted to 11% oxygen)
- Nitrogen Oxides (mg/Rm^3, adjusted to 11% oxygen)
- Sulphur Dioxide (mg/Rm^3, adjusted to 11% oxygen)
- Carbon Monoxide (mg/Rm^3, adjusted to 11% oxygen)
- Oxygen (% volume, dry)
- Total Hydrocarbons (mg/Rm^3, adjusted to 11% oxygen)

DYEC provided 1-hour average concentrations for each clock hour using the 1-minute combustion gas data measured by the DYEC CEMs during each isokinetic test day at each Boiler. DYEC CEMS data was provided from March 18 to March 21, 2024 for each boiler. A 24-hour rolling average was determined for hydrogen chloride, nitrogen oxides and sulphur dioxide using the 1-hour average data for the isokinetic test days at each unit to compare to the in-stack limits stated in the ECA. A 4-hour rolling average was determined for carbon monoxide using the calculated 1-hour average data for the isokinetic test days at each unit to compare to the in-stack limit stated in the ECA.

The combustion gas concentrations, expressed as 1-hour average concentrations, 4-hour rolling average and 24-hour rolling average where applicable, at the Boiler No. 1 BH Outlet and Boiler No. 2 BH Outlet are provided in Appendix 28.

1-minute CEM data provided by DYEC was used to calculate the average oxygen, carbon dioxide and carbon monoxide concentrations for each isokinetic test period. The average oxygen, carbon dioxide and carbon monoxide concentrations were used to calculate the molecular weight of the gas stream. The average oxygen concentrations were also used to adjust the dry reference concentration data to 11% oxygen. The 1-minute data for the isokinetic test periods has been retained by ORTECH and can be provided upon request.

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The facility process data was also supplied by DYEC personnel for each test day. Hourly process data has been retained by Covanta and can be provided upon request. The process data is summarized below:

Test Date	Total Power Output* (MWh/d)	Aux. Fuel Combusted** (m^3/d)		Avg. Combustion Zone Temp. (°C)		Steam (tonnes/d)		MSW Combusted*** (tonnes/d)		NO_X Reagent Inj. Rate (liters/d)		Carbon Inj. Rate (kg/d)		Lime Inj. Rate (kg/d)	
		Boiler No. 1	Boiler No. 2	Boiler No. 1	Boiler No. 2	Boiler No. 1	Boiler No. 2	Boiler No. 1	Boiler No. 2	Boiler No. 1	Boiler No. 2	Boiler No. 1	Boiler No. 2	Boiler No. 1	Boiler No. 2
18-Mar-24	392	0	0	1200	1270	802	800	222	218	1648	583	128	124	3589	3668
19-Mar-24	392	0	0	1216	1271	802	800	223	221	1377	569	128	124	3516	3506
20-Mar-24	393	0	0	1231	1282	800	798	227	222	1301	448	128	124	3470	3453
21-Mar-24	373	0	0	1240	1296	773	766	218	212	1122	489	128	125	3623	3528
Average	388	0	0	1222	1280	794	800	223	218	1362	522	128	124	3550	3539

* Gross turbine output

** Auxiliary fuel was not combusted during the conduct of reference test runs to demonstrate ECA compliance

*** Calculated by crane scales.

10. CONCLUSIONS

The main conclusions which can be drawn from the present emission testing program are:

- The facility was maintained within the operational parameters defined by the amended ECA that constitutes normal operation during the stack test periods. Testing was conducted at a steam production rate of greater than 766 tonnes of steam per day for each Boiler (approximately 94.9% of maximum continuous rating). The maximum continuous rating for the facility is 1614.7 tonnes of steam per day for the two Boilers combined (33.64 tonnes of steam per hour or 807.4 tonnes per day for each Boiler).
- The in-stack concentrations of the components listed in the ECA were all below the concentration limits provided in the ECA.
- Using CALPUFF dispersion modelling techniques (using Version 7.2.1 level 150618 as approved by the MECP in December 2021), the predicted maximum point of impingement concentrations, based on the average test results for both boilers, show DYEC to be operating well below the current standards in Regulation 419/05 (Schedule 3) under the Ontario Environmental Protection Act and other MECP criteria including guidelines and upper risk thresholds.

Schedule C of ECA No. 7306-8FDKNX lists in-stack limits for the emissions of various compounds. Emissions limits are given for particulate matter, mercury, cadmium, lead, dioxins and furans and organic matter as the results from compliance source testing. Emission limits are also given for hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide calculated as the rolling arithmetic average of data measured by a CEMS.

Since relative accuracy and system bias testing was conducted in August 2023, the data recorded by the DYEC CEMS was used to assess against the in-stack emissions limits detailed in Schedule C of the ECA for hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide. Note the DYEC CEMS data for the days when isokinetic testing was performed at each unit (March 18 to March 21, 2024) was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA.

Total hydrocarbon concentration data was measured by ORTECH on March 19, 2024 at the Quench Inlet and BH Outlet sampling locations. The total hydrocarbon data measured by ORTECH at the Quench Inlet sample locations was well below the total hydrocarbons (organic matter) in-stack emissions limit detailed in Schedule C of the ECA.

The average results for the tests conducted at Boiler No. 1, along with the respective in-stack emission limits, are summarized in the following table:

Parameter	Test No. 1	Test No. 2	Test No. 3	Average	In-Stack Limit
Total Power Output (MWh/day)*	-	-	-	388	-
Average Combustion Zone Temp. (°C)*	-	-	-	1222	-
Steam (tonnes/day)*	-	-	-	794	-
MSW Combusted (tonnes/day)*	-	-	-	223	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	1362	-
Carbon Injection (kg/day)*	-	-	-	128	-
Lime Injection (kg/day)*	-	-	-	3550	-
Filterable Particulate (mg/Rm^3) (1)	1.58	0.84	1.52	1.31	9
PM_{10} with Condensable (mg/Rm^3) (1)	6.06	<6.26	<6.30	<6.21	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	5.99	<5.98	<6.10	<6.02	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.090	<0.089	<0.10	<0.093	-
Ammonia (mg/Rm^3) (1)	0.47	0.69	0.58	0.58	-
Cadmium (µg/Rm^3) (1)	0.088	0.16	<0.019	<0.090	7
Lead (µg/Rm^3) (1)	0.51	0.26	0.15	0.31	50
Mercury (µg/Rm^3) (1)	<0.098	0.067	0.32	<0.16	15
Antimony (µg/Rm^3) (1)	0.069	<0.044	<0.039	<0.051	-
Arsenic (µg/Rm^3) (1)	<0.044	<0.044	<0.039	<0.042	-
Barium (µg/Rm^3) (1)	10.6	10.5	9.33	10.1	-
Beryllium (µg/Rm^3) (1)	<0.044	<0.044	<0.039	<0.042	-
Chromium (µg/Rm^3) (1)	0.96	1.03	0.70	0.90	-
Cobalt (µg/Rm^3) (1)	0.032	<0.044	<0.039	<0.038	-
Copper (µg/Rm^3) (1)	2.72	1.64	1.19	1.85	-
Molybdenum (µg/Rm^3) (1)	4.01	4.25	3.39	3.88	-
Nickel (µg/Rm^3) (1)	0.68	0.77	0.44	0.63	-
Selenium (µg/Rm^3) (1)	<0.22	<0.22	<0.19	<0.21	-
Silver (µg/Rm^3) (1)	<0.044	<0.044	<0.039	<0.042	-
Thallium (µg/Rm^3) (1)	<0.044	<0.044	<0.039	<0.042	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.022	<0.019	<0.021	-
Zinc (µg/Rm^3) (1)	14.3	10.3	8.26	11.0	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<1.97	<3.06	<1.88	<2.30	60
Total Chlorobenzenes (ng/Rm^3) (1)	<113	<99.6	<127	<113	-
Total Chlorophenols (ng/Rm^3) (5)	<521	<1828	NQ	<1163	-
Total PAHs (ng/Rm^3) (1)	<222	<399	<343	<321	-
VOCs (µg/Rm^3) (1)	<117	<62.4	<73.4	<84.3	-
Aldehydes (µg/Rm^3) (1)	<82.1	<15.5	<52.3	<50.0	-
Total VOCs (µg/Rm^3) (1) (4)	<199	<77.9	<126	<134	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.1	0.1	0	0.1	50

* based on process data provided by Covanta
(1) dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.
(2) dry basis as equivalent methane (average of each 60 minute test with data recorded in 1-minute intervals).
(3) calculated using the NATO/CCMS (1989) toxicity equivalence factors and the full detection limit for those isomers below the analytical detection limit, dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.
(4) Includes all components from the volatile organic compounds test list in the ECA (i.e. Volatile Organic Sampling Train and Aldehyde Sampling train components).
(5) Total chlorophenols were not quantifiable (NQ) due to spike recovery loses during the extraction of the samples by the analytical laboratory.

The average results for the tests conducted at Boiler No. 2, along with the respective in-stack emission limits, are summarized in the following table:

Parameter	Test No. 1	Test No. 2	Test No. 3	Average	In-Stack Limit
Total Power Output (MWh/day)*	-	-	-	388	-
Average Combustion Zone Temp. (°C)*	-	-	-	1280	-
Steam (tonnes/day)*	-	-	-	800	-
MSW Combusted (tonnes/day)*	-	-	-	218	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	522	-
Carbon Injection (kg/day)*	-	-	-	124	-
Lime Injection (kg/day)*	-	-	-	3539	-
Filterable Particulate (mg/Rm^3) (1)	1.73	1.44	1.28	1.48	9
PM_{10} with Condensable (mg/Rm^3) (1)	<5.39	<6.55	<5.19	<5.71	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<4.98	<6.48	<5.00	<5.49	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.11	<0.098	<0.097	<0.10	-
Ammonia (mg/Rm^3) (1)	0.37	0.30	0.28	0.32	-
Cadmium (µg/Rm^3) (1)	0.014	0.055	0.10	0.057	7
Lead (µg/Rm^3) (1)	0.22	0.21	0.33	0.26	50
Mercury (µg/Rm^3) (1)	0.44	1.21	<0.089	<0.58	15
Antimony (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Arsenic (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Barium (µg/Rm^3) (1)	10.6	11.1	11.6	11.1	-
Beryllium (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Chromium (µg/Rm^3) (1)	0.90	0.88	0.95	0.91	-
Cobalt (µg/Rm^3) (1)	0.042	<0.023	<0.023	<0.029	-
Copper (µg/Rm^3) (1)	1.34	1.51	1.13	1.33	-
Molybdenum (µg/Rm^3) (1)	4.04	4.20	4.09	4.11	-
Nickel (µg/Rm^3) (1)	0.50	0.59	0.58	0.56	-
Selenium (µg/Rm^3) (1)	<0.22	<0.23	<0.23	<0.23	-
Silver (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Thallium (µg/Rm^3) (1)	<0.044	<0.046	<0.045	<0.045	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.023	<0.023	<0.023	-
Zinc (µg/Rm^3) (1)	9.95	10.9	10.1	10.3	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<1.81	<2.00	<1.83	<1.88	60
Total Chlorobenzenes (ng/Rm^3) (1)	<156	<59.3	<152	<122	-
Total Chlorophenols (ng/Rm^3) (5)	NQ	NQ	<1471	<1380	-
Total PAHs (ng/Rm^3) (1)	<142	<315	<167	<208	-
VOCs (µg/Rm^3) (1)	<338	<279	<227	<281	-
Aldehydes (µg/Rm^3) (1)	<211	<188	<199	<199	-
Total VOCs (µg/Rm^3) (1) (4)	<549	<467	<426	<480	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.6	0.1	0	0.2	50

* based on process data provided by Covanta

(1) dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.

(2) dry basis as equivalent methane (average of each 60 minute test with data recorded in 1-minute intervals).

(3) calculated using the NATO/CCMS (1989) toxicity equivalence factors and the full detection limit for those isomers below the analytical detection limit, dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.

(4) Includes all components from the volatile organic compounds test list in the ECA (i.e. Volatile Organic Sampling Train and Aldehyde Sampling train components).

(5) Total chlorophenols were not quantifiable (NQ) due to spike recovery loses during the extraction of the samples by the analytical laboratory.

A summary of the minimum, average and maximum concentrations for the combustion gases measured by the DYEC CEMS with in-stack limits listed in the ECA is provided below for the two units.

Boiler No.	Parameter	Minimum	Average	Maximum	In-Stack Limit
Boiler No. 1	Carbon Monoxide (mg/Rm^3) (1)	4.0	6.1	9.5	40
	Hydrogen Chloride (mg/Rm^3) (2)	0.2	0.3	0.5	9
	Nitrogen Oxides (mg/Rm^3) (2)	110	111	113	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	0.2	1.8	35
Boiler No. 2	Carbon Monoxide (mg/Rm^3) (1)	5.5	8.0	12.4	40
	Hydrogen Chloride (mg/Rm^3) (2)	2.1	2.2	2.4	9
	Nitrogen Oxides (mg/Rm^3) (2)	106	108	109	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	0.39	2.4	35

(1) 4-hour average measured by DYEC CEMS, dry at 25°C and 1 atmosphere adjusted to 11% oxygen by volume
(2) 24-hour average measured by DYEC CEMS, dry at 25°C and 1 atmosphere adjusted to 11% oxygen by volume

APPENDIX 1

Boiler No. 1 BH Outlet
Data Tables
(93 pages)

TABLE 1
Covanta - Durham York Energy Centre
Boiler No. 1
Isokinetic Sampling Train Test Schedules

Particulate and Metals Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time* min
1	March 18, 2024	10:09	13:20	180
2	March 18, 2024	14:10	17:17	180
3	March 19, 2024	15:26	18:35	180

Particle Size Distribution Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time* min
1	March 19, 2024	8:24	10:26	120
2	March 19, 2024	11:02	13:04	120
3	March 19, 2024	13:50	15:53	120

Acid Gases Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time* min
1	March 18, 2024	10:10	11:10	60
2	March 18, 2024	11:54	12:54	60
3	March 18, 2024	13:32	14:32	60

Semi-Volatile Organic Compounds Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time* min
1	March 20, 2024	8:10	12:23	240
2	March 20, 2024	13:18	17:30	240
3	March 21, 2024	8:07	12:15	240

* Actual sampling time excluding leak-checks, traverse changes and process down time.

TABLE 2
Covanta - Durham York Energy Centre
Boiler No. 1
Organic Compounds Test Schedules

Acrolein and Aldehydes Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time min
1	March 20, 2024	11:30	12:30	60
2	March 20, 2024	12:47	13:47	60
3	March 20, 2024	14:05	15:05	60

Volatile Organic Compounds Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time min
1	March 20, 2024	7:57	8:37	40
2	March 20, 2024	8:43	9:23	40
3	March 20, 2024	9:29	10:09	40
4	March 20, 2024	10:15	10:55	40

Total Hydrocarbons Trains

Sampling Location	Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time min
BH Outlet	1	March 19, 2024	12:40	13:40	60
BH Outlet	2	March 19, 2024	13:50	14:50	60
BH Outlet	3	March 19, 2024	15:00	16:00	60
Quench Inlet	1	March 19, 2024	12:40	13:40	60
Quench Inlet	2	March 19, 2024	13:50	14:50	60
Quench Inlet	3	March 19, 2024	15:00	16:00	60

TABLE 3
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Stack Gas Sampling Parameters

Particulate and Metals Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.843	0.986	6.34	3.721	101.3
2	0.843	0.986	6.34	3.712	99.7
3	0.844	1.018	6.57	4.078	98.9

Particle Size Distribution Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.843	0.987	4.51	1.197	91.2
2	0.843	0.987	4.51	1.209	93.3
3	0.843	0.987	4.51	1.200	93.6

Acid Gases Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.844	1.018	6.57	1.292	98.8
2	0.844	1.018	6.57	1.352	99.6
3	0.844	1.018	6.57	1.355	100.1

Semi-Volatile Organic Compounds Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.844	1.018	6.57	5.053	99.3
2	0.844	1.018	6.57	5.106	99.9
3	0.844	1.018	6.57	5.142	100.3

* Dry at 25°C and 1 atmosphere

TABLE 4
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Stack Gas Physical Parameters

Particulate and Metals Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Static Pressure kPa	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	139	16.1	18.6	-2.92	96.8	10.4	8.80
2	140	15.4	18.7	-2.92	96.8	10.3	8.87
3	137	15.2	19.2	-2.96	96.2	10.7	8.43
Average	139	15.6	18.8	-2.93	96.6	10.5	8.70

Particle Size Distribution Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Static Pressure kPa	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	137	14.3	19.1	-2.96	96.7	10.4	8.75
2	139	16.3	19.5	-2.96	96.4	10.2	9.12
3	137	15.0	18.9	-2.96	96.2	10.3	8.73
Average	138	15.2	19.2	-2.96	96.4	10.3	8.87

Acid Gases Trains **

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Static Pressure kPa	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	136	15.7	18.3	-2.92	96.8	10.4	8.76
2	138	15.9	19.1	-2.92	96.8	10.4	8.84
3	138	16.6	19.2	-2.92	96.7	10.3	8.80
Average	137	16.1	18.8	-2.92	96.8	10.4	8.80

Semi-Volatile Organics Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Static Pressure kPa	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	138	16.7	18.2	-2.96	96.2	11.0	8.11
2	137	17.3	18.3	-2.96	96.6	10.9	8.15
3	138	17.0	18.0	-2.89	98.4	10.9	8.19
Average	138	17.0	18.1	-2.94	97.1	10.9	8.15

* Dry basis, measured by the DYEC CEMS

** Sampling was conducted isokinetically on a single traverse in the duct.

TABLE 5
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Stack Gas Volumetric Flowrates

Particulate and Metals Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	27.4	15.9	19.4	19.0
2	27.6	16.1	19.6	19.1
3	28.4	16.6	21.0	19.6
Average	27.8	16.2	20.0	19.2

Particle Size Distribution Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	28.3	16.8	20.6	19.6
2	28.8	16.6	19.8	19.8
3	28.0	16.4	20.2	19.3
Average	28.4	16.6	20.2	19.6

Acid Gases Trains ***

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	27.0	15.8	19.4	18.8
2	28.2	16.4	20.0	19.5
3	28.4	16.4	20.0	19.7
Average	27.8	16.2	19.8	19.3

Semi-Volatile Organics Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	26.8	15.4	19.9	18.5
2	27.0	15.5	19.9	18.7
3	26.6	15.5	19.9	18.7
Average	26.8	15.5	19.9	18.6

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

*** Sampling was conducted isokinetically on a single traverse in the duct. Volumetric flowrates from the corresponding particulate and metals tests were used to calculate emission data.

TABLE 6
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Particulate Emission Data

Test No.	Particulate Collected			Dry Gas Volume Sampled	Particulate Concentration				Particulate Emission Rate
	Probe Rinse	Main Filter	Total		Actual	Dry Reference	Dry Adjusted	Wet Reference	
	mg	mg	mg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	mg/s
1	3.9	3.3	7.2	3.721	1.12	1.94	1.58	1.62	30.7
2	1.1	2.7	3.8	3.712	0.60	1.02	0.84	0.87	16.5
3	1.9	5.9	7.8	4.078	1.12	1.91	1.52	1.62	31.8
Average					0.95	1.62	1.31	1.37	26.4
Blank	0.2	3.9	4.1						

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 7
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
$PM_{2.5}$ and PM_{10} Emission Data

$PM_{2.5}$

Test No.	Total Collected mg	Dry Volume Sampled Rm^3*	$PM_{2.5}$ Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Emission Rate mg/s
1	0.8	1.197	0.40	0.67	0.54	0.57	11.2
2	<1.0	1.209	<0.48	<0.83	<0.70	<0.69	<13.7
3	<1.8	1.200	<0.88	<1.50	<1.22	<1.27	<24.6
Average			<0.58	<1.00	<0.82	<0.85	<16.5
Blank	<1.1						

PM_{10}

Test No.	Total Collected mg	Dry Volume Sampled Rm^3*	PM_{10} Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Emission Rate mg/s
1	0.9	1.197	0.45	0.75	0.61	0.64	12.6
2	<1.4	1.209	<0.67	<1.16	<0.97	<0.97	<19.2
3	<2.1	1.200	<1.03	<1.75	<1.42	<1.49	<28.7
Average			<0.71	<1.22	<1.00	<1.03	<20.2
Blank	<1.4						

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 8
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Condensable Particulate Emission Data

Inorganic Condensable Particulate

Test No.	Total Collected mg	Dry Volume Sampled Rm^3*	Inorganic Condensable Particulate Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Emission Rate mg/s
1	3.3	1.197	1.64	2.76	2.25	2.36	46.3
2	3.2	1.209	1.53	2.65	2.22	2.22	43.9
3	3.2	1.200	1.56	2.67	2.17	2.27	43.7
Average			1.57	2.69	2.21	2.28	44.7
Blank	0.3						

Organic Condensable Particulate

Test No.	Total Collected mg	Dry Volume Sampled Rm^3*	Organic Condensable Particulate Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Emission Rate mg/s
1	4.70	1.197	2.33	3.93	3.20	3.37	66.0
2	4.40	1.209	2.10	3.64	3.06	3.05	60.4
3	4.00	1.200	1.95	3.33	2.71	2.83	54.7
Average			2.13	3.63	2.99	3.08	60.3
Blank	2.90						

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 9
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Halides and Ammonia Emission Data

Hydrogen Chloride

Test No.	HCl Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Chloride Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HCl Emission Rate mg/s
1	3.56	1.292	1.60	2.76	2.25	2.31	43.8
2	4.36	1.352	1.87	3.22	2.64	2.70	51.2
3	4.56	1.355	1.95	3.37	2.75	2.82	53.5
Average			1.81	3.12	2.55	2.61	49.5
Blank	<0.154						

Hydrogen Fluoride

Test No.	HF Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Fluoride Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HF Emission Rate mg/s
1	<0.142	1.292	<0.064	<0.11	<0.090	<0.092	<1.75
2	<0.147	1.352	<0.063	<0.11	<0.089	<0.091	<1.73
3	<0.165	1.355	<0.071	<0.12	<0.10	<0.10	<1.93
Average			<0.066	<0.11	<0.093	<0.095	<1.80
Blank	<0.106						

Ammonia

Test No.	Ammonia Collected mg	Dry Volume Sampled Rm^3*	Ammonia Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Ammonia Emission Rate mg/s
1	0.744	1.292	0.33	0.58	0.47	0.48	9.15
2	1.14	1.352	0.49	0.84	0.69	0.71	13.4
3	0.960	1.355	0.41	0.71	0.58	0.59	11.3
Average			0.41	0.71	0.58	0.59	11.3
Blank	<0.020						

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 10
Covanta - Durham York Energy Centre
Boiler No. 1
Combustion Gas Analyses

Data measured by the DYEC CEMS from March 18 to March 21, 2024

Sampling Location	Parameter	Minimum	Average	Maximum
BH Outlet	Oxygen (%, 1 hr Avg)	7.82	8.52	9.33
BH Outlet	Carbon Monoxide (mg/Rm^3, 1 hr Avg) *	3	6	14
BH Outlet	Carbon Monoxide (mg/Rm^3, 4 hr Avg) *	4.0	6.1	9.5
BH Outlet	Sulphur Dioxide (mg/Rm^3, 1 hr Avg) *	0	0.7	40
BH Outlet	Sulphur Dioxide (mg/Rm^3, 24 hr Avg) *	0	0.2	1.8
BH Outlet	Nitrogen Oxides (mg/Rm^3, 1 hr Avg) *	83	111	141
BH Outlet	Nitrogen Oxides (mg/Rm^3, 24 hr Avg) *	110	111	113
BH Outlet	Hydrogen Chloride (mg/Rm^3, 1 hr Avg) *	0	0	2
BH Outlet	Hydrogen Chloride (mg/Rm^3, 24 hr Avg) *	0.2	0.3	0.5
BH Outlet	Total Hydrocarbons (mg/Rm^3, 1 hr Avg) *	0	0	1
Quench Inlet	Oxygen (%, 1 hr Avg)	7	8	9

Data measured by the ORTECH CEMS on March 19, 2024

Sampling Location	Test No.	Parameter	Minimum	Average	Maximum
BH Outlet	1	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0	0
BH Outlet	2	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0	0
BH Outlet	3	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0	0
Average		Total Hydrocarbons (ppm dry, 1-min Avg)		0	
Quench Inlet	1	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0.1	0.8
Quench Inlet	2	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0.1	0.6
Quench Inlet	3	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0	0
Average		Total Hydrocarbons (ppm dry, 1-min Avg)		0.1	
Quench Inlet	1	Total Hydrocarbons (ppm dry, 10-min Avg)	0	0	0.4
Quench Inlet	2	Total Hydrocarbons (ppm dry, 10-min Avg)	0	0.1	0.4
Quench Inlet	3	Total Hydrocarbons (ppm dry, 10-min Avg)	0	0	0
Average		Total Hydrocarbons (ppm dry, 10-min Avg)		0.03	

* Reference conditions, dry basis adjusted to 11% oxygen

TABLE 11
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Metals Analyses Test No. 1

Metal	Probe & Filter Hydrofluoric Acid Digest	Impingers & Rinses	Total Collected
	µg	µg	µg
Antimony	0.32	<0.1	0.32
Arsenic	<1	<0.2	<0.20
Barium	47.3	0.77	48.1
Beryllium	<0.2	<0.1	<0.20
Cadmium	0.17	0.23	0.40
Chromium	3.59	0.79	4.38
Cobalt	<0.2	0.15	0.15
Copper	4.56	7.78	12.3
Lead	1.26	1.06	2.32
Mercury *	<0.015	<0.225	<0.45
Molybdenum	18.2	<0.1	18.2
Nickel	1.90	1.19	3.09
Selenium	<2	<1	<1.00
Silver	<0.2	<0.1	<0.20
Thallium	<0.2	<0.05	<0.20
Vanadium	<1	<0.1	<0.10
Zinc	56.4	8.54	64.9
Total			<157

* Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected. Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 12
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Metals Analyses Test No. 2

Metal	Probe & Filter Hydrofluoric Acid Digest	Impingers & Rinses	Total Collected
	µg	µg	µg
Antimony	<0.2	<0.1	<0.20
Arsenic	<1	<0.2	<0.20
Barium	46.4	0.83	47.2
Beryllium	<0.2	<0.1	<0.20
Cadmium	0.51	0.23	0.74
Chromium	3.32	1.35	4.67
Cobalt	<0.2	<0.1	<0.20
Copper	3.89	3.53	7.42
Lead	0.75	0.44	1.19
Mercury *	<0.015	0.30	0.30
Molybdenum	19.2	<0.1	19.2
Nickel	1.91	1.58	3.49
Selenium	<2	<1	<1.00
Silver	<0.2	0.13	<0.20
Thallium	<0.2	<0.05	<0.20
Vanadium	<1	<0.1	<0.10
Zinc	40.0	6.55	46.6
Total			<133

* Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected. Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 13
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Metals Analyses Test No. 3

Metal	Probe & Filter Hydrofluoric Acid Digest	Impingers & Rinses	Total Collected
	µg	µg	µg
Antimony	<0.2	<0.1	<0.20
Arsenic	<1	<0.2	<0.20
Barium	47.4	0.73	48.1
Beryllium	<0.2	<0.1	<0.20
Cadmium	<0.1	<0.05	<0.10
Chromium	3.03	0.58	3.61
Cobalt	<0.2	<0.1	<0.20
Copper	2.89	3.27	6.16
Lead	0.53	0.26	0.80
Mercury *	<0.015	1.64	1.64
Molybdenum	17.5	<0.1	17.5
Nickel	1.29	0.99	2.28
Selenium	<2	<1	<1.00
Silver	<0.2	<0.1	<0.20
Thallium	<0.2	<0.05	<0.20
Vanadium	<1	<0.1	<0.10
Zinc	36.2	6.40	42.6
Total			<125

* Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected. Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 14
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Metals Emission Data Test No. 1

Metal	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Antimony	0.32	0.049	0.085	0.069	0.071	0.0013
Arsenic	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00085
Barium	48.1	7.50	12.9	10.6	10.8	0.21
Beryllium	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00085
Cadmium	0.40	0.062	0.11	0.088	0.090	0.0017
Chromium	4.38	0.68	1.18	0.96	0.99	0.019
Cobalt	0.15	0.023	0.040	0.032	0.033	0.00063
Copper	12.3	1.92	3.32	2.72	2.78	0.053
Lead	2.32	0.36	0.62	0.51	0.52	0.0099
Mercury	<0.45	<0.069	<0.12	<0.098	<0.10	<0.0019
Molybdenum	18.2	2.84	4.89	4.01	4.09	0.078
Nickel	3.09	0.48	0.83	0.68	0.69	0.013
Selenium	<1.00	<0.16	<0.27	<0.22	<0.22	<0.0043
Silver	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00085
Thallium	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00085
Vanadium	<0.10	<0.016	<0.027	<0.022	<0.022	<0.00043
Zinc	64.9	10.1	17.5	14.3	14.6	0.28
Total	<157	<24.4	<42.1	<34.5	<35.2	<0.67

Dry Gas Volume Sampled (Rm^3*) :	3.721
Actual Flowrate (m^3/s) :	27.4
Dry Reference Flowrate (Rm^3/s*) :	15.9
Dry Adjusted Flowrate (Rm^3/s**) :	19.4
Wet Reference Flowrate (Rm^3/s*) :	19.0

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 15
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Metals Emission Data Test No. 2

Metal	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Antimony	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00087
Arsenic	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00087
Barium	47.2	7.42	12.7	10.5	10.7	0.20
Beryllium	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00087
Cadmium	0.74	0.12	0.20	0.16	0.17	0.0032
Chromium	4.67	0.73	1.26	1.03	1.06	0.020
Cobalt	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00087
Copper	7.42	1.17	2.00	1.64	1.68	0.032
Lead	1.19	0.19	0.32	0.26	0.27	0.0051
Mercury	0.30	0.047	0.081	0.067	0.069	0.0013
Molybdenum	19.2	3.02	5.17	4.25	4.36	0.083
Nickel	3.49	0.55	0.94	0.77	0.79	0.015
Selenium	<1.00	<0.16	<0.27	<0.22	<0.23	<0.0043
Silver	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00087
Thallium	<0.20	<0.031	<0.054	<0.044	<0.045	<0.00087
Vanadium	<0.10	<0.016	<0.027	<0.022	<0.023	<0.00043
Zinc	46.6	7.32	12.5	10.3	10.6	0.20
Total	<133	<20.9	<35.9	<29.5	<30.2	<0.58

Dry Gas Volume Sampled (Rm^3*) :	3.712
Actual Flowrate (m^3/s) :	27.6
Dry Reference Flowrate (Rm^3/s*) :	16.1
Dry Adjusted Flowrate (Rm^3/s**) :	19.6
Wet Reference Flowrate (Rm^3/s*) :	19.1

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 16
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Metals Emission Data Test No. 3

Metal	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Antimony	<0.20	<0.029	<0.049	<0.039	<0.042	<0.00081
Arsenic	<0.20	<0.029	<0.049	<0.039	<0.042	<0.00081
Barium	48.1	6.90	11.8	9.33	10.0	0.20
Beryllium	<0.20	<0.029	<0.049	<0.039	<0.042	<0.00081
Cadmium	<0.10	<0.014	<0.025	<0.019	<0.021	<0.00041
Chromium	3.61	0.52	0.89	0.70	0.75	0.015
Cobalt	<0.20	<0.029	<0.049	<0.039	<0.042	<0.00081
Copper	6.16	0.88	1.51	1.19	1.28	0.025
Lead	0.80	0.11	0.19	0.15	0.17	0.0032
Mercury	1.64	0.24	0.40	0.32	0.34	0.0067
Molybdenum	17.5	2.51	4.29	3.39	3.63	0.071
Nickel	2.28	0.33	0.56	0.44	0.47	0.0093
Selenium	<1.00	<0.14	<0.25	<0.19	<0.21	<0.0041
Silver	<0.20	<0.029	<0.049	<0.039	<0.042	<0.00081
Thallium	<0.20	<0.029	<0.049	<0.039	<0.042	<0.00081
Vanadium	<0.10	<0.014	<0.025	<0.019	<0.021	<0.00041
Zinc	42.6	6.11	10.4	8.26	8.85	0.17
Total	<125	<17.9	<30.7	<24.3	<26.0	<0.51

Dry Gas Volume Sampled (Rm^3*) :	4.078
Actual Flowrate (m^3/s) :	28.4
Dry Reference Flowrate (Rm^3/s*) :	16.6
Dry Adjusted Flowrate (Rm^3/s**) :	21.0
Wet Reference Flowrate (Rm^3/s*) :	19.6

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 17
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Metal Actual Concentrations

Metal	Actual Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/m³	µg/m³	µg/m³	µg/m³	%
Antimony	0.049	<0.031	<0.029	<0.036	30.5
Arsenic	<0.031	<0.031	<0.029	<0.030	5.0
Barium	7.50	7.42	6.90	7.27	4.5
Beryllium	<0.031	<0.031	<0.029	<0.030	5.0
Cadmium	0.062	0.12	<0.014	<0.064	79.5
Chromium	0.68	0.73	0.52	0.65	17.5
Cobalt	0.023	<0.031	<0.029	<0.028	15.7
Copper	1.92	1.17	0.88	1.32	40.7
Lead	0.36	0.19	0.11	0.22	57.7
Mercury	<0.069	0.047	0.24	<0.12	87.6
Molybdenum	2.84	3.02	2.51	2.79	9.3
Nickel	0.48	0.55	0.33	0.45	25.2
Selenium	<0.16	<0.16	<0.14	<0.15	5.0
Silver	<0.031	<0.031	<0.029	<0.030	5.0
Thallium	<0.031	<0.031	<0.029	<0.030	5.0
Vanadium	<0.016	<0.016	<0.014	<0.015	5.0
Zinc	10.1	7.32	6.11	7.85	26.3
Total	<24.4	<20.9	<17.9	<21.1	15.4

TABLE 18
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Metal Dry Reference Concentrations

Metal	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Antimony	0.085	<0.054	<0.049	<0.063	30.9
Arsenic	<0.054	<0.054	<0.049	<0.052	5.3
Barium	12.9	12.7	11.8	12.5	4.8
Beryllium	<0.054	<0.054	<0.049	<0.052	5.3
Cadmium	0.11	0.20	<0.025	<0.11	79.4
Chromium	1.18	1.26	0.89	1.11	17.7
Cobalt	0.040	<0.054	<0.049	<0.047	15.4
Copper	3.32	2.00	1.51	2.28	41.1
Lead	0.62	0.32	0.19	0.38	58.1
Mercury	<0.12	0.081	0.40	<0.20	87.3
Molybdenum	4.89	5.17	4.29	4.78	9.4
Nickel	0.83	0.94	0.56	0.78	25.3
Selenium	<0.27	<0.27	<0.25	<0.26	5.3
Silver	<0.054	<0.054	<0.049	<0.052	5.3
Thallium	<0.054	<0.054	<0.049	<0.052	5.3
Vanadium	<0.027	<0.027	<0.025	<0.026	5.3
Zinc	17.5	12.5	10.4	13.5	26.7
Total	<42.1	<35.9	<30.7	<36.2	15.8

* At 25°C and 1 atmosphere

TABLE 19
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Metal Dry Adjusted Concentrations

Metal	Dry Adjusted Concentration				Coefficient
	Test No. 1 µg/Rm³**	Test No. 2 µg/Rm³**	Test No. 3 µg/Rm³**	Average µg/Rm³**	of Variation %
Antimony	0.069	<0.044	<0.039	<0.051	32.1
Arsenic	<0.044	<0.044	<0.039	<0.042	7.3
Barium	10.6	10.5	9.33	10.1	6.8
Beryllium	<0.044	<0.044	<0.039	<0.042	7.3
Cadmium	0.088	0.16	<0.019	<0.090	80.1
Chromium	0.96	1.03	0.70	0.90	19.5
Cobalt	0.032	<0.044	<0.039	<0.038	15.5
Copper	2.72	1.64	1.19	1.85	42.3
Lead	0.51	0.26	0.15	0.31	59.2
Mercury	<0.098	0.067	0.32	<0.16	85.2
Molybdenum	4.01	4.25	3.39	3.88	11.4
Nickel	0.68	0.77	0.44	0.63	27.1
Selenium	<0.22	<0.22	<0.19	<0.21	7.3
Silver	<0.044	<0.044	<0.039	<0.042	7.3
Thallium	<0.044	<0.044	<0.039	<0.042	7.3
Vanadium	<0.022	<0.022	<0.019	<0.021	7.3
Zinc	14.3	10.3	8.26	11.0	28.1
Total	<34.5	<29.5	<24.3	<29.4	17.4

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 20
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Metal Wet Reference Concentrations

Metal	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Antimony	0.071	<0.045	<0.042	<0.053	30.3
Arsenic	<0.045	<0.045	<0.042	<0.044	4.8
Barium	10.8	10.7	10.0	10.5	4.3
Beryllium	<0.045	<0.045	<0.042	<0.044	4.8
Cadmium	0.090	0.17	<0.021	<0.093	79.5
Chromium	0.99	1.06	0.75	0.93	17.3
Cobalt	0.033	<0.045	<0.042	<0.040	15.8
Copper	2.78	1.68	1.28	1.91	40.4
Lead	0.52	0.27	0.17	0.32	57.5
Mercury	<0.10	0.069	0.34	<0.17	87.8
Molybdenum	4.09	4.36	3.63	4.03	9.1
Nickel	0.69	0.79	0.47	0.65	25.1
Selenium	<0.22	<0.23	<0.21	<0.22	4.8
Silver	<0.045	<0.045	<0.042	<0.044	4.8
Thallium	<0.045	<0.045	<0.042	<0.044	4.8
Vanadium	<0.022	<0.023	<0.021	<0.022	4.8
Zinc	14.6	10.6	8.85	11.3	26.1
Total	<35.2	<30.2	<26.0	<30.5	15.1

* At 25°C and 1 atmosphere

TABLE 21
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Metal Emission Rates

Metal	Emission Rate				Coefficient
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	of Variation %
Antimony	0.0013	<0.00087	<0.00081	<0.0010	29.0
Arsenic	<0.00085	<0.00087	<0.00081	<0.00085	3.3
Barium	0.21	0.20	0.20	0.20	2.6
Beryllium	<0.00085	<0.00087	<0.00081	<0.00085	3.3
Cadmium	0.0017	0.0032	<0.00041	<0.0018	79.2
Chromium	0.019	0.020	0.015	0.018	16.0
Cobalt	0.00063	<0.00087	<0.00081	<0.00077	16.3
Copper	0.053	0.032	0.025	0.037	39.2
Lead	0.0099	0.0051	0.0032	0.0061	56.4
Mercury	<0.0019	0.0013	0.0067	<0.0033	89.4
Molybdenum	0.078	0.083	0.071	0.077	7.8
Nickel	0.013	0.015	0.0093	0.013	23.9
Selenium	<0.0043	<0.0043	<0.0041	<0.0042	3.3
Silver	<0.00085	<0.00087	<0.00081	<0.00085	3.3
Thallium	<0.00085	<0.00087	<0.00081	<0.00085	3.3
Vanadium	<0.00043	<0.00043	<0.00041	<0.00042	3.3
Zinc	0.28	0.20	0.17	0.22	24.7
Total	<0.67	<0.58	<0.51	<0.59	13.7

TABLE 22
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Metal Emission Data

Metal	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Antimony	<0.036	<0.063	<0.051	<0.053	<0.0010
Arsenic	<0.030	<0.052	<0.042	<0.044	<0.00085
Barium	7.27	12.5	10.1	10.5	0.20
Beryllium	<0.030	<0.052	<0.042	<0.044	<0.00085
Cadmium	<0.064	<0.11	<0.090	<0.093	<0.0018
Chromium	0.65	1.11	0.90	0.93	0.018
Cobalt	<0.028	<0.047	<0.038	<0.040	<0.00077
Copper	1.32	2.28	1.85	1.91	0.037
Lead	0.22	0.38	0.31	0.32	0.0061
Mercury	<0.12	<0.20	<0.16	<0.17	<0.0033
Molybdenum	2.79	4.78	3.88	4.03	0.077
Nickel	0.45	0.78	0.63	0.65	0.013
Selenium	<0.15	<0.26	<0.21	<0.22	<0.0042
Silver	<0.030	<0.052	<0.042	<0.044	<0.00085
Thallium	<0.030	<0.052	<0.042	<0.044	<0.00085
Vanadium	<0.015	<0.026	<0.021	<0.022	<0.00042
Zinc	7.85	13.5	11.0	11.3	0.22
Total	<21.1	<36.2	<29.4	<30.5	<0.59

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 23
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Blank Train Metal Analyses

Metal	Probe & Filter Hydrofluoric Acid Digest µg	Impingers & Rinses µg	Total Collected µg
Antimony	<0.2	<0.1	<0.20
Arsenic	<1	<0.2	<0.20
Barium	46.5	0.51	47.0
Beryllium	<0.2	<0.1	<0.20
Cadmium	<0.1	<0.05	<0.10
Chromium	4.80	0.45	5.25
Cobalt	<0.2	<0.1	<0.20
Copper	3.02	4.98	8.00
Lead	<0.5	0.29	0.29
Mercury *	<0.015	<0.225	<0.23
Molybdenum	19.2	<0.1	19.2
Nickel	2.27	0.27	2.54
Selenium	<2	<1	<1.00
Silver	<0.2	<0.1	<0.20
Thallium	<0.2	<0.05	<0.20
Vanadium	<1	<0.1	<0.10
Zinc	32.8	<3	32.8
Total			<117

* Includes the permanganate impingers.

Note: "<" indicates that the analyte was not detected. Where all values are reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate the total collected in the blank, the remaining fractions are assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate the total collected in the blank.

TABLE 24
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Congener Group Emission Data
Test No. 1

Dioxins

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzo-p-dioxins	82.8	0.0094	0.016	0.013	0.014	0.25
Pentachlorodibenzo-p-dioxins	153	0.017	0.030	0.023	0.025	0.47
Hexachlorodibenzo-p-dioxins	265	0.030	0.052	0.041	0.044	0.81
Heptachlorodibenzo-p-dioxins	203	0.023	0.040	0.031	0.033	0.62
Octachlorodibenzo-p-dioxin	115	0.013	0.023	0.018	0.019	0.35
Total	819	0.093	0.16	0.13	0.13	2.50

Furans

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzofurans	38.9	0.0044	0.0077	0.0060	0.0064	0.12
Pentachlorodibenzofurans	32.3	0.0037	0.0064	0.0049	0.0053	0.098
Hexachlorodibenzofurans	42.2	0.0048	0.0084	0.0065	0.0070	0.13
Heptachlorodibenzofurans	17.2	0.0020	0.0034	0.0026	0.0028	0.052
Octachlorodibenzofuran	16.7	0.0019	0.0033	0.0026	0.0028	0.051
Total	147	0.017	0.029	0.023	0.024	0.45

Dry Gas Volume Sampled (Rm^3*) :	5.053
Actual Flowrate (m^3/s) :	26.8
Dry Reference Flowrate (Rm^3/s*) :	15.4
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 25
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Congener Group Emission Data
Test No. 2

Dioxins

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzo-p-dioxins	91.2	0.010	0.018	0.014	0.015	0.28
Pentachlorodibenzo-p-dioxins	95.2	0.011	0.019	0.015	0.015	0.29
Hexachlorodibenzo-p-dioxins	247	0.028	0.048	0.038	0.040	0.75
Heptachlorodibenzo-p-dioxins	235	0.026	0.046	0.036	0.038	0.71
Octachlorodibenzo-p-dioxin	151	0.017	0.030	0.023	0.025	0.46
Total	819	0.092	0.16	0.12	0.13	2.49

Furans

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzofurans	268	0.030	0.052	0.041	0.044	0.81
Pentachlorodibenzofurans	84.3	0.0095	0.017	0.013	0.014	0.26
Hexachlorodibenzofurans	69.0	0.0078	0.014	0.011	0.011	0.21
Heptachlorodibenzofurans	33.5	0.0038	0.0066	0.0051	0.0054	0.10
Octachlorodibenzofuran	<22	<0.0025	<0.0043	<0.0034	<0.0036	<0.067
Total	<477	<0.054	<0.093	<0.073	<0.077	<1.45

Dry Gas Volume Sampled (Rm^3*) :	5.106
Actual Flowrate (m^3/s) :	27.0
Dry Reference Flowrate (Rm^3/s*) :	15.5
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.7

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 26
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Congener Group Emission Data
Test No. 3

Dioxins

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzo-p-dioxins	96.5	0.011	0.019	0.015	0.016	0.29
Pentachlorodibenzo-p-dioxins	92.3	0.010	0.018	0.014	0.015	0.28
Hexachlorodibenzo-p-dioxins	262	0.030	0.051	0.040	0.042	0.79
Heptachlorodibenzo-p-dioxins	198	0.022	0.039	0.030	0.032	0.60
Octachlorodibenzo-p-dioxin	110	0.012	0.021	0.017	0.018	0.33
Total	759	0.086	0.15	0.11	0.12	2.29

Furans

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzofurans	44.9	0.0051	0.0087	0.0068	0.0072	0.14
Pentachlorodibenzofurans	15.4	0.0017	0.0030	0.0023	0.0025	0.046
Hexachlorodibenzofurans	26.4	0.0030	0.0051	0.0040	0.0043	0.080
Heptachlorodibenzofurans	9.48	0.0011	0.0018	0.0014	0.0015	0.029
Octachlorodibenzofuran	16.2	0.0018	0.0032	0.0025	0.0026	0.049
Total	112	0.013	0.022	0.017	0.018	0.34

Dry Gas Volume Sampled (Rm^3*) :	5.142
Actual Flowrate (m^3/s) :	26.6
Dry Reference Flowrate (Rm^3/s*) :	15.5
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.7

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 27
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Congener Group Actual Concentrations

Dioxins

Congener Group	Actual Concentration Test No. 1 ng/m³	Test No. 2 ng/m³	Test No. 3 ng/m³	Average ng/m³	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.0094	0.010	0.011	0.010	7.5
Pentachlorodibenzo-p-dioxins	0.017	0.011	0.010	0.013	30.6
Hexachlorodibenzo-p-dioxins	0.030	0.028	0.030	0.029	4.3
Heptachlorodibenzo-p-dioxins	0.023	0.026	0.022	0.024	8.9
Octachlorodibenzo-p-dioxin	0.013	0.017	0.012	0.014	17.3
Total	0.093	0.092	0.086	0.090	4.3

Furans

Congener Group	Actual Concentration Test No. 1 ng/m³	Test No. 2 ng/m³	Test No. 3 ng/m³	Average ng/m³	Coefficient of Variation %
Tetrachlorodibenzofurans	0.0044	0.030	0.0051	0.013	111
Pentachlorodibenzofurans	0.0037	0.0095	0.0017	0.0050	81.1
Hexachlorodibenzofurans	0.0048	0.0078	0.0030	0.0052	46.4
Heptachlorodibenzofurans	0.0020	0.0038	0.0011	0.0023	60.6
Octachlorodibenzofuran	0.0019	<0.0025	0.0018	<0.0021	17.0
Total	0.017	<0.054	0.013	<0.028	81.3

TABLE 28
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Congener Group Dry Reference Concentrations

Dioxins

Congener Group	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Tetrachlorodibenzo-p-dioxins	0.016	0.018	0.019	0.018	6.8
Pentachlorodibenzo-p-dioxins	0.030	0.019	0.018	0.022	31.1
Hexachlorodibenzo-p-dioxins	0.052	0.048	0.051	0.051	4.1
Heptachlorodibenzo-p-dioxins	0.040	0.046	0.039	0.042	9.5
Octachlorodibenzo-p-dioxin	0.023	0.030	0.021	0.025	17.8
Total	0.16	0.16	0.15	0.16	5.1

Furans

Congener Group	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Tetrachlorodibenzofurans	0.0077	0.052	0.0087	0.023	111
Pentachlorodibenzofurans	0.0064	0.017	0.0030	0.0086	81.4
Hexachlorodibenzofurans	0.0084	0.014	0.0051	0.0090	47.0
Heptachlorodibenzofurans	0.0034	0.0066	0.0018	0.0039	61.1
Octachlorodibenzofuran	0.0033	<0.0043	0.0032	<0.0036	17.5
Total	0.029	<0.093	0.022	<0.048	81.8

* At 25°C and 1 atmosphere

TABLE 29
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Congener Group Dry Adjusted Concentrations

Dioxins

Congener Group	Dry Adjusted Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.013	0.014	0.015	0.014	7.1
Pentachlorodibenzo-p-dioxins	0.023	0.015	0.014	0.017	30.7
Hexachlorodibenzo-p-dioxins	0.041	0.038	0.040	0.039	3.8
Heptachlorodibenzo-p-dioxins	0.031	0.036	0.030	0.032	9.6
Octachlorodibenzo-p-dioxin	0.018	0.023	0.017	0.019	18.0
Total	0.13	0.12	0.11	0.12	4.9

Furans

Congener Group	Dry Adjusted Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzofurans	0.0060	0.041	0.0068	0.018	111
Pentachlorodibenzofurans	0.0049	0.013	0.0023	0.0067	81.6
Hexachlorodibenzofurans	0.0065	0.011	0.0040	0.0070	47.1
Heptachlorodibenzofurans	0.0026	0.0051	0.0014	0.0031	61.2
Octachlorodibenzofuran	0.0026	<0.0034	0.0025	<0.0028	17.7
Total	0.023	<0.073	0.017	<0.037	82.0

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 30
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Congener Group Wet Reference Concentrations

Dioxins

Congener Group	Wet Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Tetrachlorodibenzo-p-dioxins	0.014	0.015	0.016	0.015	6.6
Pentachlorodibenzo-p-dioxins	0.025	0.015	0.015	0.019	31.3
Hexachlorodibenzo-p-dioxins	0.044	0.040	0.042	0.042	4.3
Heptachlorodibenzo-p-dioxins	0.033	0.038	0.032	0.035	9.4
Octachlorodibenzo-p-dioxin	0.019	0.025	0.018	0.020	17.7
Total	0.13	0.13	0.12	0.13	5.2

Furans

Congener Group	Wet Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Tetrachlorodibenzofurans	0.0064	0.044	0.0072	0.019	111
Pentachlorodibenzofurans	0.0053	0.014	0.0025	0.0072	81.3
Hexachlorodibenzofurans	0.0070	0.011	0.0043	0.0075	46.9
Heptachlorodibenzofurans	0.0028	0.0054	0.0015	0.0033	60.9
Octachlorodibenzofuran	0.0028	<0.0036	0.0026	<0.0030	17.4
Total	0.024	<0.077	0.018	<0.040	81.6

* At 25°C and 1 atmosphere

TABLE 31
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Congener Group Emission Rates

Dioxins

Congener Group	Emission Rate Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.25	0.28	0.29	0.27	7.1
Pentachlorodibenzo-p-dioxins	0.47	0.29	0.28	0.34	30.7
Hexachlorodibenzo-p-dioxins	0.81	0.75	0.79	0.78	3.8
Heptachlorodibenzo-p-dioxins	0.62	0.71	0.60	0.64	9.6
Octachlorodibenzo-p-dioxin	0.35	0.46	0.33	0.38	18.0
Total	2.50	2.49	2.29	2.42	4.9

Furans

Congener Group	Emission Rate Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	Coefficient of Variation %
Tetrachlorodibenzofurans	0.12	0.81	0.14	0.36	111
Pentachlorodibenzofurans	0.098	0.26	0.046	0.13	81.6
Hexachlorodibenzofurans	0.13	0.21	0.080	0.14	47.1
Heptachlorodibenzofurans	0.052	0.10	0.029	0.061	61.2
Octachlorodibenzofuran	0.051	<0.067	0.049	<0.056	17.7
Total	0.45	<1.45	0.34	<0.75	82.0

TABLE 32
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Dioxin and Furan Congener Group Emission Data

Dioxins

Congener Group	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzo-p-dioxins	0.010	0.018	0.014	0.015	0.27
Pentachlorodibenzo-p-dioxins	0.013	0.022	0.017	0.019	0.34
Hexachlorodibenzo-p-dioxins	0.029	0.051	0.039	0.042	0.78
Heptachlorodibenzo-p-dioxins	0.024	0.042	0.032	0.035	0.64
Octachlorodibenzo-p-dioxin	0.014	0.025	0.019	0.020	0.38
Total	0.090	0.16	0.12	0.13	2.42

Furans

Congener Group	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzofurans	0.013	0.023	0.018	0.019	0.36
Pentachlorodibenzofurans	0.0050	0.0086	0.0067	0.0072	0.13
Hexachlorodibenzofurans	0.0052	0.0090	0.0070	0.0075	0.14
Heptachlorodibenzofurans	0.0023	0.0039	0.0031	0.0033	0.061
Octachlorodibenzofuran	<0.0021	<0.0036	<0.0028	<0.0030	<0.056
Total	<0.028	<0.048	<0.037	<0.040	<0.75

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 33
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Blank Dioxin and Furan Congener Group Analyses

Dioxins

Congener Group	Blank Train pg	Method Blank pg
Tetrachlorodibenzo-p-dioxins	<0.61	<0.61
Pentachlorodibenzo-p-dioxins	<1.1	<0.74
Hexachlorodibenzo-p-dioxins	<1.1	<0.92
Heptachlorodibenzo-p-dioxins	4.42	3.09
Octachlorodibenzo-p-dioxin	8.95	6.93
Total	<16.2	<12.3

Furans

Congener Group	Blank Train pg	Method Blank pg
Tetrachlorodibenzofurans	0.57	<0.5
Pentachlorodibenzofurans	2.95	<0.7
Hexachlorodibenzofurans	<0.65	<0.5
Heptachlorodibenzofurans	<0.98	3.88
Octachlorodibenzofuran	<2.7	<3.9
Total	<7.85	<9.57

"<" indicates that the amount detected is less than the detection limit
In these cases the value of the detection limit was used to calculate the total collected.

TABLE 34
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Specific Isomer Emission Data
Test No. 1

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<1.5	<0.17	<0.30	<0.23	<0.25	<0.0046
12378-pentachlorodibenzo-p-dioxin	3.90	0.44	0.77	0.60	0.64	0.012
123478-hexachlorodibenzo-p-dioxin	5.90	0.67	1.17	0.90	0.97	0.018
123678-hexachlorodibenzo-p-dioxin	<12	<1.36	<2.37	<1.84	<1.98	<0.037
123789-hexachlorodibenzo-p-dioxin	8.36	0.95	1.65	1.28	1.38	0.025
1234678-heptachlorodibenzo-p-dioxin	96.7	11.0	19.1	14.8	15.9	0.29
Octachlorodibenzo-p-dioxin	115	13.1	22.8	17.6	18.9	0.35
2378-tetrachlorodibenzofuran	<1.8	<0.20	<0.36	<0.28	<0.30	<0.0055
12378-pentachlorodibenzofuran	4.87	0.55	0.96	0.75	0.80	0.015
23478-pentachlorodibenzofuran	<6.4	<0.73	<1.27	<0.98	<1.05	<0.020
123478-hexachlorodibenzofuran	<3.6	<0.41	<0.71	<0.55	<0.59	<0.011
123678-hexachlorodibenzofuran	5.61	0.64	1.11	0.86	0.92	0.017
234678-hexachlorodibenzofuran	6.74	0.77	1.33	1.03	1.11	0.021
123789-hexachlorodibenzofuran	<2.4	<0.27	<0.47	<0.37	<0.40	<0.0073
1234678-heptachlorodibenzofuran	17.2	1.96	3.40	2.63	2.83	0.052
1234789-heptachlorodibenzofuran	<3.7	<0.42	<0.73	<0.57	<0.61	<0.011
Octachlorodibenzofuran	16.7	1.90	3.30	2.56	2.75	0.051
PCB 81	<8.3	<0.94	<1.64	<1.27	<1.37	<0.025
PCB 77	277	31.5	54.8	42.4	45.6	0.84
PCB 123	56.6	6.44	11.2	8.67	9.32	0.17
PCB 118	2930	333	580	449	483	8.93
PCB 114	77.2	8.78	15.3	11.8	12.7	0.24
PCB 105	905	103	179	139	149	2.76
PCB 126	<5.5	<0.63	<1.09	<0.84	<0.91	<0.017
PCB 167	27.4	3.12	5.42	4.20	4.51	0.084
PCB 156/157	84.1	9.56	16.6	12.9	13.9	0.26
PCB 169	<6.5	<0.74	<1.29	<1.00	<1.07	<0.020
PCB 189	<2.9	<0.33	<0.57	<0.44	<0.48	<0.0088
Total Dioxins & Furans Only	<312	<35.5	<61.8	<47.8	<51.5	<0.95
Total PCBs Only	<4381	<498	<867	<671	<722	<13.4
Total Dioxins & Furans and PCBs	<4693	<534	<929	<719	<773	<14.3

Dry Gas Volume Sampled (Rm^3*) :	5.053
Actual Flowrate (m^3/s) :	26.8
Dry Reference Flowrate (Rm^3/s*) :	15.4
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 35
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Specific Isomer Emission Data
Test No. 2

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<1.3	<0.15	<0.25	<0.20	<0.21	<0.0039
12378-pentachlorodibenzo-p-dioxin	4.25	0.48	0.83	0.65	0.69	0.013
123478-hexachlorodibenzo-p-dioxin	5.60	0.63	1.10	0.85	0.91	0.017
123678-hexachlorodibenzo-p-dioxin	14.3	1.61	2.80	2.18	2.32	0.043
123789-hexachlorodibenzo-p-dioxin	7.86	0.88	1.54	1.20	1.28	0.024
1234678-heptachlorodibenzo-p-dioxin	114	12.8	22.3	17.4	18.5	0.35
Octachlorodibenzo-p-dioxin	151	17.0	29.6	23.0	24.5	0.46
2378-tetrachlorodibenzofuran	10.2	1.15	2.00	1.56	1.66	0.031
12378-pentachlorodibenzofuran	<6.5	<0.73	<1.27	<0.99	<1.06	<0.020
23478-pentachlorodibenzofuran	15.3	1.72	3.00	2.33	2.48	0.046
123478-hexachlorodibenzofuran	6.93	0.78	1.36	1.06	1.12	0.021
123678-hexachlorodibenzofuran	8.36	0.94	1.64	1.28	1.36	0.025
234678-hexachlorodibenzofuran	10.8	1.21	2.12	1.65	1.75	0.033
123789-hexachlorodibenzofuran	<6.1	<0.69	<1.19	<0.93	<0.99	<0.019
1234678-heptachlorodibenzofuran	26.8	3.01	5.25	4.09	4.35	0.081
1234789-heptachlorodibenzofuran	6.71	0.75	1.31	1.02	1.09	0.020
Octachlorodibenzofuran	<22	<2.47	<4.31	<3.36	<3.57	<0.067
PCB 81	20.6	2.32	4.03	3.14	3.34	0.063
PCB 77	345	38.8	67.6	52.6	56.0	1.05
PCB 123	207	23.3	40.5	31.6	33.6	0.63
PCB 118	11600	1304	2272	1770	1883	35.2
PCB 114	302	34.0	59.1	46.1	49.0	0.92
PCB 105	3780	425	740	577	614	11.5
PCB 126	26.6	2.99	5.21	4.06	4.32	0.081
PCB 167	104	11.7	20.4	15.9	16.9	0.32
PCB 156/157	311	35.0	60.9	47.4	50.5	0.94
PCB 169	8.41	0.95	1.65	1.28	1.37	0.026
PCB 189	<2.4	<0.27	<0.47	<0.37	<0.39	<0.0073
Total Dioxins & Furans Only	<418	<47.0	<81.9	<63.8	<67.9	<1.27
Total PCBs Only	<16707	<1878	<3272	<2549	<2712	<50.7
Total Dioxins & Furans and PCBs	<17125	<1925	<3354	<2612	<2780	<52.0

Dry Gas Volume Sampled (Rm³*) :	5.106
Actual Flowrate (m³/s) :	27.0
Dry Reference Flowrate (Rm³/s*) :	15.5
Dry Adjusted Flowrate (Rm³/s**) :	19.9
Wet Reference Flowrate (Rm³/s*) :	18.7

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 36
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Specific Isomer Emission Data
Test No. 3

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<1.1	<0.12	<0.21	<0.17	<0.18	<0.0033
12378-pentachlorodibenzo-p-dioxin	4.45	0.50	0.87	0.67	0.72	0.013
123478-hexachlorodibenzo-p-dioxin	5.06	0.57	0.98	0.77	0.82	0.015
123678-hexachlorodibenzo-p-dioxin	<11	<1.25	<2.14	<1.67	<1.77	<0.033
123789-hexachlorodibenzo-p-dioxin	6.82	0.77	1.33	1.03	1.10	0.021
1234678-heptachlorodibenzo-p-dioxin	93.7	10.6	18.2	14.2	15.1	0.28
Octachlorodibenzo-p-dioxin	110	12.5	21.4	16.7	17.7	0.33
2378-tetrachlorodibenzofuran	2.40	0.27	0.47	0.36	0.39	0.0072
12378-pentachlorodibenzofuran	<4.4	<0.50	<0.86	<0.67	<0.71	<0.013
23478-pentachlorodibenzofuran	<6.6	<0.75	<1.28	<1.00	<1.06	<0.020
123478-hexachlorodibenzofuran	<3.0	<0.34	<0.58	<0.45	<0.48	<0.0090
123678-hexachlorodibenzofuran	4.93	0.56	0.96	0.75	0.79	0.015
234678-hexachlorodibenzofuran	7.33	0.83	1.43	1.11	1.18	0.022
123789-hexachlorodibenzofuran	<2.2	<0.25	<0.43	<0.33	<0.35	<0.0066
1234678-heptachlorodibenzofuran	<17	<1.93	<3.31	<2.58	<2.74	<0.051
1234789-heptachlorodibenzofuran	3.01	0.34	0.59	0.46	0.49	0.0091
Octachlorodibenzofuran	16.2	1.84	3.15	2.45	2.61	0.049
PCB 81	<11	<1.25	<2.14	<1.67	<1.77	<0.033
PCB 77	364	41.2	70.8	55.1	58.7	1.10
PCB 123	153	17.3	29.8	23.2	24.7	0.46
PCB 118	11300	1281	2198	1712	1822	34.1
PCB 114	281	31.8	54.6	42.6	45.3	0.85
PCB 105	3080	349	599	467	496	9.28
PCB 126	<11	<1.25	<2.14	<1.67	<1.77	<0.033
PCB 167	72.7	8.24	14.1	11.0	11.7	0.22
PCB 156/157	176	19.9	34.2	26.7	28.4	0.53
PCB 169	7.22	0.82	1.40	1.09	1.16	0.022
PCB 189	<2.5	<0.28	<0.49	<0.38	<0.40	<0.0075
Total Dioxins & Furans Only	<299	<33.9	<58.2	<45.3	<48.2	<0.90
Total PCBs Only	<15458	<1752	<3006	<2342	<2492	<46.6
Total Dioxins & Furans and PCBs	<15758	<1786	<3064	<2387	<2540	<47.5

Dry Gas Volume Sampled (Rm^3*) :	5.142
Actual Flowrate (m^3/s) :	26.6
Dry Reference Flowrate (Rm^3/s*) :	15.5
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.7

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 37
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Specific Isomer Actual Concentrations

Specific Isomer	Actual Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	pg/m³	pg/m³	pg/m³	pg/m³	%
2378-tetrachlorodibenzo-p-dioxin	<0.17	<0.15	<0.12	<0.15	15.6
12378-pentachlorodibenzo-p-dioxin	0.44	0.48	0.50	0.48	6.4
123478-hexachlorodibenzo-p-dioxin	0.67	0.63	0.57	0.62	7.8
123678-hexachlorodibenzo-p-dioxin	<1.36	1.61	<1.25	<1.41	13.1
123789-hexachlorodibenzo-p-dioxin	0.95	0.88	0.77	0.87	10.3
1234678-heptachlorodibenzo-p-dioxin	11.0	12.8	10.6	11.5	10.2
Octachlorodibenzo-p-dioxin	13.1	17.0	12.5	14.2	17.3
2378-tetrachlorodibenzofuran	<0.20	1.15	0.27	<0.54	97.1
12378-pentachlorodibenzofuran	0.55	<0.73	<0.50	<0.59	20.4
23478-pentachlorodibenzofuran	<0.73	1.72	<0.75	<1.07	53.2
123478-hexachlorodibenzofuran	<0.41	0.78	<0.34	<0.51	46.3
123678-hexachlorodibenzofuran	0.64	0.94	0.56	0.71	28.2
234678-hexachlorodibenzofuran	0.77	1.21	0.83	0.94	25.8
123789-hexachlorodibenzofuran	<0.27	<0.69	<0.25	<0.40	61.0
1234678-heptachlorodibenzofuran	1.96	3.01	<1.93	<2.30	26.9
1234789-heptachlorodibenzofuran	<0.42	0.75	0.34	<0.51	43.4
Octachlorodibenzofuran	1.90	<2.47	1.84	<2.07	17.0
PCB 81	<0.94	2.32	<1.25	<1.50	48.0
PCB 77	31.5	38.8	41.2	37.2	13.6
PCB 123	6.44	23.3	17.3	15.7	54.5
PCB 118	333	1304	1281	973	56.9
PCB 114	8.78	34.0	31.8	24.9	56.2
PCB 105	103	425	349	292	57.6
PCB 126	<0.63	2.99	<1.25	<1.62	75.7
PCB 167	3.12	11.7	8.24	7.68	56.2
PCB 156/157	9.56	35.0	19.9	21.5	59.4
PCB 169	<0.74	0.95	0.82	<0.83	12.5
PCB 189	<0.33	<0.27	<0.28	<0.29	10.7
Total Dioxins & Furans Only	<35.5	<47.0	<33.9	<38.8	18.4
Total PCBs Only	<498	<1878	<1752	<1376	55.4
Total Dioxins & Furans and PCBs	<534	<1925	<1786	<1415	54.2

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 38
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Specific Isomer Dry Reference Concentrations

Specific Isomer	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	pg/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.30	<0.25	<0.21	<0.26	16.3
12378-pentachlorodibenzo-p-dioxin	0.77	0.83	0.87	0.82	5.8
123478-hexachlorodibenzo-p-dioxin	1.17	1.10	0.98	1.08	8.5
123678-hexachlorodibenzo-p-dioxin	<2.37	2.80	<2.14	<2.44	13.7
123789-hexachlorodibenzo-p-dioxin	1.65	1.54	1.33	1.51	11.0
1234678-heptachlorodibenzo-p-dioxin	19.1	22.3	18.2	19.9	10.8
Octachlorodibenzo-p-dioxin	22.8	29.6	21.4	24.6	17.8
2378-tetrachlorodibenzofuran	<0.36	2.00	0.47	<0.94	97.6
12378-pentachlorodibenzofuran	0.96	<1.27	<0.86	<1.03	21.0
23478-pentachlorodibenzofuran	<1.27	3.00	<1.28	<1.85	53.8
123478-hexachlorodibenzofuran	<0.71	1.36	<0.58	<0.88	46.9
123678-hexachlorodibenzofuran	1.11	1.64	0.96	1.24	28.8
234678-hexachlorodibenzofuran	1.33	2.12	1.43	1.62	26.3
123789-hexachlorodibenzofuran	<0.47	<1.19	<0.43	<0.70	61.5
1234678-heptachlorodibenzofuran	3.40	5.25	<3.31	<3.99	27.5
1234789-heptachlorodibenzofuran	<0.73	1.31	0.59	<0.88	43.9
Octachlorodibenzofuran	3.30	<4.31	3.15	<3.59	17.5
PCB 81	<1.64	4.03	<2.14	<2.61	48.4
PCB 77	54.8	67.6	70.8	64.4	13.1
PCB 123	11.2	40.5	29.8	27.2	54.6
PCB 118	580	2272	2198	1683	56.8
PCB 114	15.3	59.1	54.6	43.0	56.1
PCB 105	179	740	599	506	57.7
PCB 126	<1.09	5.21	<2.14	<2.81	76.1
PCB 167	5.42	20.4	14.1	13.3	56.4
PCB 156/157	16.6	60.9	34.2	37.3	59.8
PCB 169	<1.29	1.65	1.40	<1.45	12.7
PCB 189	<0.57	<0.47	<0.49	<0.51	11.0
Total Dioxins & Furans Only	<61.8	<81.9	<58.2	<67.3	19.0
Total PCBs Only	<867	<3272	<3006	<2382	55.4
Total Dioxins & Furans and PCBs	<929	<3354	<3064	<2449	54.1

* At 25°C and 1 atmosphere

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 39
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Specific Isomer Dry Adjusted Concentrations

Specific Isomer	Dry Adjusted Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	pg/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.23	<0.20	<0.17	<0.20	15.9
12378-pentachlorodibenzo-p-dioxin	0.60	0.65	0.67	0.64	6.1
123478-hexachlorodibenzo-p-dioxin	0.90	0.85	0.77	0.84	8.3
123678-hexachlorodibenzo-p-dioxin	<1.84	2.18	<1.67	<1.90	13.8
123789-hexachlorodibenzo-p-dioxin	1.28	1.20	1.03	1.17	10.8
1234678-heptachlorodibenzo-p-dioxin	14.8	17.4	14.2	15.5	11.0
Octachlorodibenzo-p-dioxin	17.6	23.0	16.7	19.1	18.0
2378-tetrachlorodibenzofuran	<0.28	1.56	0.36	<0.73	97.7
12378-pentachlorodibenzofuran	0.75	<0.99	<0.67	<0.80	21.1
23478-pentachlorodibenzofuran	<0.98	2.33	<1.00	<1.44	54.0
123478-hexachlorodibenzofuran	<0.55	1.06	<0.45	<0.69	47.1
123678-hexachlorodibenzofuran	0.86	1.28	0.75	0.96	29.0
234678-hexachlorodibenzofuran	1.03	1.65	1.11	1.26	26.5
123789-hexachlorodibenzofuran	<0.37	<0.93	<0.33	<0.54	61.7
1234678-heptachlorodibenzofuran	2.63	4.09	<2.58	<3.10	27.7
1234789-heptachlorodibenzofuran	<0.57	1.02	0.46	<0.68	44.1
Octachlorodibenzofuran	2.56	<3.36	2.45	<2.79	17.7
PCB 81	<1.27	3.14	<1.67	<2.03	48.7
PCB 77	42.4	52.6	55.1	50.1	13.5
PCB 123	8.67	31.6	23.2	21.1	54.8
PCB 118	449	1770	1712	1310	57.0
PCB 114	11.8	46.1	42.6	33.5	56.3
PCB 105	139	577	467	394	57.8
PCB 126	<0.84	4.06	<1.67	<2.19	76.3
PCB 167	4.20	15.9	11.0	10.4	56.6
PCB 156/157	12.9	47.4	26.7	29.0	60.0
PCB 169	<1.00	1.28	1.09	<1.12	13.0
PCB 189	<0.44	<0.37	<0.38	<0.40	10.6
Total Dioxins & Furans Only	<47.8	<63.8	<45.3	<52.3	19.1
Total PCBs Only	<671	<2549	<2342	<1854	55.5
Total Dioxins & Furans and PCBs	<719	<2612	<2387	<1906	54.3

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 40
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Specific Isomer Wet Reference Concentrations

Specific Isomer	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	pg/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.25	<0.21	<0.18	<0.21	16.5
12378-pentachlorodibenzo-p-dioxin	0.64	0.69	0.72	0.68	5.5
123478-hexachlorodibenzo-p-dioxin	0.97	0.91	0.82	0.90	8.7
123678-hexachlorodibenzo-p-dioxin	<1.98	2.32	<1.77	<2.02	13.7
123789-hexachlorodibenzo-p-dioxin	1.38	1.28	1.10	1.25	11.2
1234678-heptachlorodibenzo-p-dioxin	15.9	18.5	15.1	16.5	10.7
Octachlorodibenzo-p-dioxin	18.9	24.5	17.7	20.4	17.7
2378-tetrachlorodibenzofuran	<0.30	1.66	0.39	<0.78	97.5
12378-pentachlorodibenzofuran	0.80	<1.06	<0.71	<0.86	20.9
23478-pentachlorodibenzofuran	<1.05	2.48	<1.06	<1.53	53.6
123478-hexachlorodibenzofuran	<0.59	1.12	<0.48	<0.73	46.8
123678-hexachlorodibenzofuran	0.92	1.36	0.79	1.03	28.7
234678-hexachlorodibenzofuran	1.11	1.75	1.18	1.35	26.1
123789-hexachlorodibenzofuran	<0.40	<0.99	<0.35	<0.58	61.3
1234678-heptachlorodibenzofuran	2.83	4.35	<2.74	<3.31	27.3
1234789-heptachlorodibenzofuran	<0.61	1.09	0.49	<0.73	43.8
Octachlorodibenzofuran	2.75	<3.57	2.61	<2.98	17.4
PCB 81	<1.37	3.34	<1.77	<2.16	48.3
PCB 77	45.6	56.0	58.7	53.4	12.9
PCB 123	9.32	33.6	24.7	22.5	54.5
PCB 118	483	1883	1822	1396	56.7
PCB 114	12.7	49.0	45.3	35.7	56.0
PCB 105	149	614	496	420	57.6
PCB 126	<0.91	4.32	<1.77	<2.33	76.0
PCB 167	4.51	16.9	11.7	11.0	56.3
PCB 156/157	13.9	50.5	28.4	30.9	59.7
PCB 169	<1.07	1.37	1.16	<1.20	12.5
PCB 189	<0.48	<0.39	<0.40	<0.42	11.2
Total Dioxins & Furans Only	<51.5	<67.9	<48.2	<55.8	18.8
Total PCBs Only	<722	<2712	<2492	<1975	55.2
Total Dioxins & Furans and PCBs	<773	<2780	<2540	<2031	54.0

* At 25°C and 1 atmosphere

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 41
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Specific Isomer Emission Rates

Specific Isomer	Emission Rate Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/s	ng/s	ng/s	ng/s	%
2378-tetrachlorodibenzo-p-dioxin	<0.0046	<0.0039	<0.0033	<0.0039	15.9
12378-pentachlorodibenzo-p-dioxin	0.012	0.013	0.013	0.013	6.1
123478-hexachlorodibenzo-p-dioxin	0.018	0.017	0.015	0.017	8.3
123678-hexachlorodibenzo-p-dioxin	<0.037	0.043	<0.033	<0.038	13.8
123789-hexachlorodibenzo-p-dioxin	0.025	0.024	0.021	0.023	10.8
1234678-heptachlorodibenzo-p-dioxin	0.29	0.35	0.28	0.31	11.0
Octachlorodibenzo-p-dioxin	0.35	0.46	0.33	0.38	18.0
2378-tetrachlorodibenzofuran	<0.0055	0.031	0.0072	<0.015	97.7
12378-pentachlorodibenzofuran	0.015	<0.020	<0.013	<0.016	21.1
23478-pentachlorodibenzofuran	<0.020	0.046	<0.020	<0.029	54.0
123478-hexachlorodibenzofuran	<0.011	0.021	<0.0090	<0.014	47.1
123678-hexachlorodibenzofuran	0.017	0.025	0.015	0.019	29.0
234678-hexachlorodibenzofuran	0.021	0.033	0.022	0.025	26.5
123789-hexachlorodibenzofuran	<0.0073	<0.019	<0.0066	<0.011	61.7
1234678-heptachlorodibenzofuran	0.052	0.081	<0.051	<0.062	27.7
1234789-heptachlorodibenzofuran	<0.011	0.020	0.0091	<0.014	44.1
Octachlorodibenzofuran	0.051	<0.067	0.049	<0.056	17.7
PCB 81	<0.025	0.063	<0.033	<0.040	48.7
PCB 77	0.84	1.05	1.10	1.00	13.5
PCB 123	0.17	0.63	0.46	0.42	54.8
PCB 118	8.93	35.2	34.1	26.1	57.0
PCB 114	0.24	0.92	0.85	0.67	56.3
PCB 105	2.76	11.5	9.28	7.84	57.8
PCB 126	<0.017	0.081	<0.033	<0.044	76.3
PCB 167	0.084	0.32	0.22	0.21	56.6
PCB 156/157	0.26	0.94	0.53	0.58	60.0
PCB 169	<0.020	0.026	0.022	<0.022	13.0
PCB 189	<0.0088	<0.0073	<0.0075	<0.0079	10.6
Total Dioxins & Furans Only	<0.95	<1.27	<0.90	<1.04	19.1
Total PCBs Only	<13.4	<50.7	<46.6	<36.9	55.5
Total Dioxins & Furans and PCBs	<14.3	<52.0	<47.5	<37.9	54.3

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 42
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Dioxin and Furan Specific Isomer Emission Data

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<0.15	<0.26	<0.20	<0.21	<0.0039
12378-pentachlorodibenzo-p-dioxin	0.48	0.82	0.64	0.68	0.013
123478-hexachlorodibenzo-p-dioxin	0.62	1.08	0.84	0.90	0.017
123678-hexachlorodibenzo-p-dioxin	<1.41	<2.44	<1.90	<2.02	<0.038
123789-hexachlorodibenzo-p-dioxin	0.87	1.51	1.17	1.25	0.023
1234678-heptachlorodibenzo-p-dioxin	11.5	19.9	15.5	16.5	0.31
Octachlorodibenzo-p-dioxin	14.2	24.6	19.1	20.4	0.38
2378-tetrachlorodibenzofuran	<0.54	<0.94	<0.73	<0.78	<0.015
12378-pentachlorodibenzofuran	<0.59	<1.03	<0.80	<0.86	<0.016
23478-pentachlorodibenzofuran	<1.07	<1.85	<1.44	<1.53	<0.029
123478-hexachlorodibenzofuran	<0.51	<0.88	<0.69	<0.73	<0.014
123678-hexachlorodibenzofuran	0.71	1.24	0.96	1.03	0.019
234678-hexachlorodibenzofuran	0.94	1.62	1.26	1.35	0.025
123789-hexachlorodibenzofuran	<0.40	<0.70	<0.54	<0.58	<0.011
1234678-heptachlorodibenzofuran	<2.30	<3.99	<3.10	<3.31	<0.062
1234789-heptachlorodibenzofuran	<0.51	<0.88	<0.68	<0.73	<0.014
Octachlorodibenzofuran	<2.07	<3.59	<2.79	<2.98	<0.056
PCB 81	<1.50	<2.61	<2.03	<2.16	<0.040
PCB 77	37.2	64.4	50.1	53.4	1.00
PCB 123	15.7	27.2	21.1	22.5	0.42
PCB 118	973	1683	1310	1396	26.1
PCB 114	24.9	43.0	33.5	35.7	0.67
PCB 105	292	506	394	420	7.84
PCB 126	<1.62	<2.81	<2.19	<2.33	<0.044
PCB 167	7.68	13.3	10.4	11.0	0.21
PCB 156/157	21.5	37.3	29.0	30.9	0.58
PCB 169	<0.83	<1.45	<1.12	<1.20	<0.022
PCB 189	<0.29	<0.51	<0.40	<0.42	<0.0079
Total Dioxins & Furans Only	<38.8	<67.3	<52.3	<55.8	<1.04
Total PCBs Only	<1376	<2382	<1854	<1975	<36.9
Total Dioxins & Furans and PCBs	<1415	<2449	<1906	<2031	<37.9

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 43
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Blank Dioxin and Furan Specific Isomer Analyses

Specific Isomer	Blank Train pg	Method Blank pg
2378-tetrachlorodibenzo-p-dioxin	<0.61	<0.61
12378-pentachlorodibenzo-p-dioxin	<1.1	<0.85
123478-hexachlorodibenzo-p-dioxin	<1.1	<0.92
123678-hexachlorodibenzo-p-dioxin	<1.0	<0.89
123789-hexachlorodibenzo-p-dioxin	<0.99	<0.87
1234678-heptachlorodibenzo-p-dioxin	4.42	3.09
Octachlorodibenzo-p-dioxin	8.95	6.93
2378-tetrachlorodibenzofuran	<0.51	<0.53
12378-pentachlorodibenzofuran	2.95	<2.3
23478-pentachlorodibenzofuran	<0.85	<0.70
123478-hexachlorodibenzofuran	<0.53	<0.69
123678-hexachlorodibenzofuran	<0.52	<0.47
234678-hexachlorodibenzofuran	<0.54	<1.20
123789-hexachlorodibenzofuran	<0.65	<1.20
1234678-heptachlorodibenzofuran	<0.79	3.88
1234789-heptachlorodibenzofuran	<0.98	<0.69
Octachlorodibenzofuran	<2.7	<3.9
PCB 81	<3.9	<5.8
PCB 77	<6.4	<5.8
PCB 123	<4.3	<6.8
PCB 118	<30	<6.3
PCB 114	<4.2	<6.8
PCB 105	16.3	<6.2
PCB 126	<4.1	<6.4
PCB 167	<2.6	<5.3
PCB 156/157	6.89	<7.5
PCB 169	<2.6	<5.2
PCB 189	<2.0	<3.0
Total Dioxins & Furans Only	<29.2	<29.7
Total PCBs Only	<83.3	<65.1
Total Dioxins & Furans and PCBs	<112	<94.8

"<" indicates that the amount detected is less than the detection limit
In these cases the value of the detection limit was used to calculate the total collected.

TABLE 44
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Toxicity Equivalent Actual Concentrations

Specific Isomer	Toxicity Equivalency Factor	Actual Concentration Test No. 1 pg TEQ/m³	Test No. 2 pg TEQ/m³	Test No. 3 pg TEQ/m³	Average pg TEQ/m³
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.17	<0.15	<0.12	<0.15
12378-pentachlorodibenzo-p-dioxin	1.00000	0.44	0.48	0.50	0.48
123478-hexachlorodibenzo-p-dioxin	0.10000	0.067	0.063	0.057	0.062
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.14	0.16	<0.12	<0.14
123789-hexachlorodibenzo-p-dioxin	0.10000	0.095	0.088	0.077	0.087
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.11	0.13	0.11	0.11
Octachlorodibenzo-p-dioxin	0.00030	0.0039	0.0051	0.0037	0.0043
2378-tetrachlorodibenzofuran	0.10000	<0.020	0.11	0.027	<0.054
12378-pentachlorodibenzofuran	0.03000	0.017	<0.022	<0.015	<0.018
23478-pentachlorodibenzofuran	0.30000	<0.22	0.52	<0.22	<0.32
123478-hexachlorodibenzofuran	0.10000	<0.041	0.078	<0.034	<0.051
123678-hexachlorodibenzofuran	0.10000	0.064	0.094	0.056	0.071
234678-hexachlorodibenzofuran	0.10000	0.077	0.12	0.083	0.094
123789-hexachlorodibenzofuran	0.10000	<0.027	<0.069	<0.025	<0.040
1234678-heptachlorodibenzofuran	0.01000	0.020	0.030	<0.019	<0.023
1234789-heptachlorodibenzofuran	0.01000	<0.0042	0.0075	0.0034	<0.0051
Octachlorodibenzofuran	0.00030	0.00057	<0.00074	0.00055	<0.00062
PCB 81	0.00030	<0.00028	0.00069	<0.00037	<0.00045
PCB 77	0.00010	0.0032	0.0039	0.0041	0.0037
PCB 123	0.00003	0.00019	0.00070	0.00052	0.00047
PCB 118	0.00003	0.010	0.039	0.038	0.029
PCB 114	0.00003	0.00026	0.0010	0.00096	0.00075
PCB 105	0.00003	0.0031	0.013	0.010	0.0088
PCB 126	0.10000	<0.063	0.30	<0.12	<0.16
PCB 167	0.00003	0.000093	0.00035	0.00025	0.00023
PCB 156/157	0.00003	0.00029	0.0010	0.00060	0.00064
PCB 169	0.03000	<0.022	0.028	0.025	<0.025
PCB 189	0.00003	<0.0000099	<0.0000081	<0.0000085	<0.0000088
Total Dioxins & Furans Only		<1.52	<2.12	<1.49	<1.71
Total PCBs Only		<0.10	<0.39	<0.20	<0.23
Total Dioxins & Furans and PCBs		<1.62	<2.51	<1.69	<1.94

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 45
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Toxicity Equivalent Dry Reference Concentrations

Specific Isomer	Toxicity Equivalency Factor	Dry Reference Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.30	<0.25	<0.21	<0.26
12378-pentachlorodibenzo-p-dioxin	1.00000	0.77	0.83	0.87	0.82
123478-hexachlorodibenzo-p-dioxin	0.10000	0.12	0.11	0.098	0.11
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.24	0.28	<0.21	<0.24
123789-hexachlorodibenzo-p-dioxin	0.10000	0.17	0.15	0.13	0.15
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.19	0.22	0.18	0.20
Octachlorodibenzo-p-dioxin	0.00030	0.0068	0.0089	0.0064	0.0074
2378-tetrachlorodibenzofuran	0.10000	<0.036	0.20	0.047	<0.094
12378-pentachlorodibenzofuran	0.03000	0.029	<0.038	<0.026	<0.031
23478-pentachlorodibenzofuran	0.30000	<0.38	0.90	<0.39	<0.55
123478-hexachlorodibenzofuran	0.10000	<0.071	0.14	<0.058	<0.088
123678-hexachlorodibenzofuran	0.10000	0.11	0.16	0.096	0.12
234678-hexachlorodibenzofuran	0.10000	0.13	0.21	0.14	0.16
123789-hexachlorodibenzofuran	0.10000	<0.047	<0.12	<0.043	<0.070
1234678-heptachlorodibenzofuran	0.01000	0.034	0.052	<0.033	<0.040
1234789-heptachlorodibenzofuran	0.01000	<0.0073	0.013	0.0059	<0.0088
Octachlorodibenzofuran	0.00030	0.00099	<0.0013	0.00095	<0.0011
PCB 81	0.00030	<0.00049	0.0012	<0.00064	<0.00078
PCB 77	0.00010	0.0055	0.0068	0.0071	0.0064
PCB 123	0.00003	0.00034	0.0012	0.00089	0.00081
PCB 118	0.00003	0.017	0.068	0.066	0.050
PCB 114	0.00003	0.00046	0.0018	0.0016	0.0013
PCB 105	0.00003	0.0054	0.022	0.018	0.015
PCB 126	0.10000	<0.11	0.52	<0.21	<0.28
PCB 167	0.00003	0.00016	0.00061	0.00042	0.00040
PCB 156/157	0.00003	0.00050	0.0018	0.0010	0.0011
PCB 169	0.03000	<0.039	0.049	0.042	<0.043
PCB 189	0.00003	<0.000017	<0.000014	<0.000015	<0.000015
Total Dioxins & Furans Only		<2.64	<3.70	<2.55	<2.96
Total PCBs Only		<0.18	<0.67	<0.35	<0.40
Total Dioxins & Furans and PCBs		<2.81	<4.37	<2.90	<3.36

* At 25°C and 1 atmosphere

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 46
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Toxicity Equivalent Dry Adjusted Concentrations
Calculated Using the Full Detection Limit

Specific Isomer	Toxicity Equivalency Factor	Dry Adjusted Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.23	<0.20	<0.17	<0.20
12378-pentachlorodibenzo-p-dioxin	1.00000	0.60	0.65	0.67	0.64
123478-hexachlorodibenzo-p-dioxin	0.10000	0.090	0.085	0.077	0.084
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.18	0.22	<0.17	<0.19
123789-hexachlorodibenzo-p-dioxin	0.10000	0.13	0.12	0.10	0.12
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.15	0.17	0.14	0.15
Octachlorodibenzo-p-dioxin	0.00030	0.0053	0.0069	0.0050	0.0057
2378-tetrachlorodibenzofuran	0.10000	<0.028	0.16	0.036	<0.073
12378-pentachlorodibenzofuran	0.03000	0.022	<0.030	<0.020	<0.024
23478-pentachlorodibenzofuran	0.30000	<0.29	0.70	<0.30	<0.43
123478-hexachlorodibenzofuran	0.10000	<0.055	0.11	<0.045	<0.069
123678-hexachlorodibenzofuran	0.10000	0.086	0.13	0.075	0.096
234678-hexachlorodibenzofuran	0.10000	0.10	0.16	0.11	0.13
123789-hexachlorodibenzofuran	0.10000	<0.037	<0.093	<0.033	<0.054
1234678-heptachlorodibenzofuran	0.01000	0.026	0.041	<0.026	<0.031
1234789-heptachlorodibenzofuran	0.01000	<0.0057	0.010	0.0046	<0.0068
Octachlorodibenzofuran	0.00030	0.00077	<0.0010	0.00074	<0.00084
PCB 81	0.00030	<0.00038	0.00094	<0.00050	<0.00061
PCB 77	0.00010	0.0042	0.0053	0.0055	0.0050
PCB 123	0.00003	0.00026	0.00095	0.00070	0.00063
PCB 118	0.00003	0.013	0.053	0.051	0.039
PCB 114	0.00003	0.00035	0.0014	0.0013	0.0010
PCB 105	0.00003	0.0042	0.017	0.014	0.012
PCB 126	0.10000	<0.084	0.41	<0.17	<0.22
PCB 167	0.00003	0.00013	0.00048	0.00033	0.00031
PCB 156/157	0.00003	0.00039	0.0014	0.00080	0.00087
PCB 169	0.03000	<0.030	0.038	0.033	<0.034
PCB 189	0.00003	<0.000013	<0.000011	<0.000011	<0.000012
Total Dioxins & Furans Only		<2.04	<2.88	<1.99	<2.30
Total PCBs Only		<0.14	<0.53	<0.27	<0.31
Total Dioxins & Furans and PCBs		<2.18	<3.40	<2.26	<2.61

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 46A
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Toxicity Equivalent Dry Adjusted Concentrations
Calculated Using Half the Detection Limit

Specific Isomer	Toxicity Equivalency Factor	Dry Adjusted Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00000	0.11	0.099	0.083	0.099
12378-pentachlorodibenzo-p-dioxin	1.00000	0.60	0.65	0.67	0.64
123478-hexachlorodibenzo-p-dioxin	0.10000	0.090	0.085	0.077	0.084
123678-hexachlorodibenzo-p-dioxin	0.10000	0.092	0.22	0.083	0.13
123789-hexachlorodibenzo-p-dioxin	0.10000	0.13	0.12	0.10	0.12
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.15	0.17	0.14	0.15
Octachlorodibenzo-p-dioxin	0.00030	0.0053	0.0069	0.0050	0.0057
2378-tetrachlorodibenzofuran	0.10000	0.014	0.16	0.036	0.069
12378-pentachlorodibenzofuran	0.03000	0.022	0.015	0.010	0.016
23478-pentachlorodibenzofuran	0.30000	0.15	0.70	0.15	0.33
123478-hexachlorodibenzofuran	0.10000	0.028	0.11	0.023	0.052
123678-hexachlorodibenzofuran	0.10000	0.086	0.13	0.075	0.096
234678-hexachlorodibenzofuran	0.10000	0.10	0.16	0.11	0.13
123789-hexachlorodibenzofuran	0.10000	0.018	0.047	0.017	0.027
1234678-heptachlorodibenzofuran	0.01000	0.026	0.041	0.013	0.027
1234789-heptachlorodibenzofuran	0.01000	0.0028	0.010	0.0046	0.0059
Octachlorodibenzofuran	0.00030	0.00077	0.00050	0.00074	0.00067
PCB 81	0.00030	0.00019	0.00094	0.00025	0.00046
PCB 77	0.00010	0.0042	0.0053	0.0055	0.0050
PCB 123	0.00003	0.00026	0.00095	0.00070	0.00063
PCB 118	0.00003	0.013	0.053	0.051	0.039
PCB 114	0.00003	0.00035	0.0014	0.0013	0.0010
PCB 105	0.00003	0.0042	0.017	0.014	0.012
PCB 126	0.10000	0.042	0.41	0.083	0.18
PCB 167	0.00003	0.00013	0.00048	0.00033	0.00031
PCB 156/157	0.00003	0.00039	0.0014	0.00080	0.00087
PCB 169	0.03000	0.015	0.038	0.033	0.029
PCB 189	0.00003	0.0000067	0.0000055	0.0000057	0.0000059
Total Dioxins & Furans Only		1.62	2.7	1.61	1.98
Total PCBs Only		0.080	0.53	0.19	0.27
Total Dioxins & Furans and PCBs		1.70	3.24	1.80	2.25

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: The value of half the detection limit was used to calculate emission data for those analytes not detected.

TABLE 46B
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Toxicity Equivalent Dry Adjusted Concentrations
Calculated Using the Full Detection Limit

Specific Isomer	Toxicity Equivalency Factor	Dry Adjusted Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00	<0.23	<0.20	<0.17	<0.20
12378-pentachlorodibenzo-p-dioxin	0.50	0.30	0.32	0.34	0.32
123478-hexachlorodibenzo-p-dioxin	0.10	0.090	0.085	0.077	0.084
123678-hexachlorodibenzo-p-dioxin	0.10	<0.18	0.22	<0.17	<0.19
123789-hexachlorodibenzo-p-dioxin	0.10	0.13	0.12	0.10	0.12
1234678-heptachlorodibenzo-p-dioxin	0.010	0.15	0.17	0.14	0.15
Octachlorodibenzo-p-dioxin	0.0010	0.018	0.023	0.017	0.019
2378-tetrachlorodibenzofuran	0.10	<0.028	0.16	0.036	<0.073
12378-pentachlorodibenzofuran	0.050	0.037	<0.050	<0.033	<0.040
23478-pentachlorodibenzofuran	0.50	<0.49	1.17	<0.50	<0.72
123478-hexachlorodibenzofuran	0.10	<0.055	0.11	<0.045	<0.069
123678-hexachlorodibenzofuran	0.10	0.086	0.13	0.075	0.096
234678-hexachlorodibenzofuran	0.10	0.10	0.16	0.11	0.13
123789-hexachlorodibenzofuran	0.10	<0.037	<0.093	<0.033	<0.054
1234678-heptachlorodibenzofuran	0.010	0.026	0.041	<0.026	<0.031
1234789-heptachlorodibenzofuran	0.010	<0.0057	0.010	0.0046	<0.0068
Octachlorodibenzofuran	0.0010	0.0026	<0.0034	0.0025	<0.0028
Total Dioxins & Furans		<1.97	<3.06	<1.88	<2.30
In-Stack Emission Limit					60

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

NATO/CCMS (1989) Toxicity Equivalency Factors

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 47
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Toxicity Equivalent Wet Reference Concentrations

Specific Isomer	Toxicity Equivalency Factor	Wet Reference Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.25	<0.21	<0.18	<0.21
12378-pentachlorodibenzo-p-dioxin	1.00000	0.64	0.69	0.72	0.68
123478-hexachlorodibenzo-p-dioxin	0.10000	0.097	0.091	0.082	0.090
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.20	0.23	<0.18	<0.20
123789-hexachlorodibenzo-p-dioxin	0.10000	0.14	0.13	0.11	0.13
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.16	0.19	0.15	0.17
Octachlorodibenzo-p-dioxin	0.00030	0.0057	0.0074	0.0053	0.0061
2378-tetrachlorodibenzofuran	0.10000	<0.030	0.17	0.039	<0.078
12378-pentachlorodibenzofuran	0.03000	0.024	<0.032	<0.021	<0.026
23478-pentachlorodibenzofuran	0.30000	<0.32	0.75	<0.32	<0.46
123478-hexachlorodibenzofuran	0.10000	<0.059	0.11	<0.048	<0.073
123678-hexachlorodibenzofuran	0.10000	0.092	0.14	0.079	0.10
234678-hexachlorodibenzofuran	0.10000	0.11	0.18	0.12	0.13
123789-hexachlorodibenzofuran	0.10000	<0.040	<0.099	<0.035	<0.058
1234678-heptachlorodibenzofuran	0.01000	0.028	0.044	<0.027	<0.033
1234789-heptachlorodibenzofuran	0.01000	<0.0061	0.011	0.0049	<0.0073
Octachlorodibenzofuran	0.00030	0.00083	<0.0011	0.00078	<0.00089
PCB 81	0.00030	<0.00041	0.0010	<0.00053	<0.00065
PCB 77	0.00010	0.0046	0.0056	0.0059	0.0053
PCB 123	0.00003	0.00028	0.0010	0.00074	0.00068
PCB 118	0.00003	0.014	0.056	0.055	0.042
PCB 114	0.00003	0.00038	0.0015	0.0014	0.0011
PCB 105	0.00003	0.0045	0.018	0.015	0.013
PCB 126	0.10000	<0.091	0.43	<0.18	<0.23
PCB 167	0.00003	0.00014	0.00051	0.00035	0.00033
PCB 156/157	0.00003	0.00042	0.0015	0.00085	0.00093
PCB 169	0.03000	<0.032	0.041	0.035	<0.036
PCB 189	0.00003	<0.000014	<0.000012	<0.000012	<0.000013
Total Dioxins & Furans Only		<2.19	<3.06	<2.11	<2.46
Total PCBs Only		<0.15	<0.56	<0.29	<0.33
Total Dioxins & Furans and PCBs		<2.34	<3.62	<2.40	<2.79

* At 25°C and 1 atmosphere

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 48
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dioxin and Furan Toxicity Equivalent Emission Rates

Specific Isomer	Toxicity Equivalency Factor	Emission Rate Test No. 1 ng TEQ/s	Test No. 2 ng TEQ/s	Test No. 3 ng TEQ/s	Average ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.0046	<0.0039	<0.0033	<0.0039
12378-pentachlorodibenzo-p-dioxin	1.00000	0.012	0.013	0.013	0.013
123478-hexachlorodibenzo-p-dioxin	0.10000	0.0018	0.0017	0.0015	0.0017
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.0037	0.0043	<0.0033	<0.0038
123789-hexachlorodibenzo-p-dioxin	0.10000	0.0025	0.0024	0.0021	0.0023
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.0029	0.0035	0.0028	0.0031
Octachlorodibenzo-p-dioxin	0.00030	0.00011	0.00014	0.000099	0.00011
2378-tetrachlorodibenzofuran	0.10000	<0.00055	0.0031	0.00072	<0.0015
12378-pentachlorodibenzofuran	0.03000	0.00045	<0.00059	<0.00040	<0.00048
23478-pentachlorodibenzofuran	0.30000	<0.0059	0.014	<0.0060	<0.0086
123478-hexachlorodibenzofuran	0.10000	<0.0011	0.0021	<0.00090	<0.0014
123678-hexachlorodibenzofuran	0.10000	0.0017	0.0025	0.0015	0.0019
234678-hexachlorodibenzofuran	0.10000	0.0021	0.0033	0.0022	0.0025
123789-hexachlorodibenzofuran	0.10000	<0.00073	<0.0019	<0.00066	<0.0011
1234678-heptachlorodibenzofuran	0.01000	0.00052	0.00081	<0.00051	<0.00062
1234789-heptachlorodibenzofuran	0.01000	<0.00011	0.00020	0.000091	<0.00014
Octachlorodibenzofuran	0.00030	0.000015	<0.000020	0.000015	<0.000017
PCB 81	0.00030	<0.0000076	0.000019	<0.0000099	<0.000012
PCB 77	0.00010	0.000084	0.00010	0.00011	0.00010
PCB 123	0.00003	0.0000052	0.000019	0.000014	0.000013
PCB 118	0.00003	0.00027	0.0011	0.0010	0.00078
PCB 114	0.00003	0.0000071	0.000028	0.000025	0.000020
PCB 105	0.00003	0.000083	0.00034	0.00028	0.00024
PCB 126	0.10000	<0.0017	0.0081	<0.0033	<0.0044
PCB 167	0.00003	0.0000025	0.0000095	0.0000066	0.0000062
PCB 156/157	0.00003	0.0000077	0.000028	0.000016	0.000017
PCB 169	0.03000	<0.00059	0.00077	0.00065	<0.00067
PCB 189	0.00003	<0.00000027	<0.00000022	<0.00000023	<0.00000024
Total Dioxins & Furans Only		<0.041	<0.057	<0.040	<0.046
Total PCBs Only		<0.0027	<0.010	<0.0055	<0.0062
Total Dioxins & Furans and PCBs		<0.043	<0.068	<0.045	<0.052

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 49
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Dioxin and Furan Toxicity Equivalent Emission Data
Calculated Using the Full Detection Limit

Specific Isomer	Actual Concentration pg TEQ/m³	Dry Reference Concentration pg TEQ/Rm³*	Dry Adjusted Concentration pg TEQ/Rm³**	Wet Reference Concentration pg TEQ/Rm³*	Emission Rate ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	<0.15	<0.26	<0.20	<0.21	<0.0039
12378-pentachlorodibenzo-p-dioxin	0.48	0.82	0.64	0.68	0.013
123478-hexachlorodibenzo-p-dioxin	0.062	0.11	0.084	0.090	0.0017
123678-hexachlorodibenzo-p-dioxin	<0.14	<0.24	<0.19	<0.20	<0.0038
123789-hexachlorodibenzo-p-dioxin	0.087	0.15	0.12	0.13	0.0023
1234678-heptachlorodibenzo-p-dioxin	0.11	0.20	0.15	0.17	0.0031
Octachlorodibenzo-p-dioxin	0.0043	0.0074	0.0057	0.0061	0.00011
2378-tetrachlorodibenzofuran	<0.054	<0.094	<0.073	<0.078	<0.0015
12378-pentachlorodibenzofuran	<0.018	<0.031	<0.024	<0.026	<0.00048
23478-pentachlorodibenzofuran	<0.32	<0.55	<0.43	<0.46	<0.0086
123478-hexachlorodibenzofuran	<0.051	<0.088	<0.069	<0.073	<0.0014
123678-hexachlorodibenzofuran	0.071	0.12	0.096	0.10	0.0019
234678-hexachlorodibenzofuran	0.094	0.16	0.13	0.13	0.0025
123789-hexachlorodibenzofuran	<0.040	<0.070	<0.054	<0.058	<0.0011
1234678-heptachlorodibenzofuran	<0.023	<0.040	<0.031	<0.033	<0.00062
1234789-heptachlorodibenzofuran	<0.0051	<0.0088	<0.0068	<0.0073	<0.00014
Octachlorodibenzofuran	<0.00062	<0.0011	<0.00084	<0.00089	<0.000017
PCB 81	<0.00045	<0.00078	<0.00061	<0.00065	<0.000012
PCB 77	0.0037	0.0064	0.0050	0.0053	0.00010
PCB 123	0.00047	0.00081	0.00063	0.00068	0.000013
PCB 118	0.029	0.050	0.039	0.042	0.00078
PCB 114	0.00075	0.0013	0.0010	0.0011	0.000020
PCB 105	0.0088	0.015	0.012	0.013	0.00024
PCB 126	<0.16	<0.28	<0.22	<0.23	<0.0044
PCB 167	0.00023	0.00040	0.00031	0.00033	0.0000062
PCB 156/157	0.00064	0.0011	0.00087	0.00093	0.000017
PCB 169	<0.025	<0.043	<0.034	<0.036	<0.00067
PCB 189	<0.0000088	<0.000015	<0.000012	<0.000013	<0.00000024
Total Dioxins & Furans Only	<1.71	<2.96	<2.30	<2.46	<0.046
Total PCBs Only	<0.23	<0.40	<0.31	<0.33	<0.0062
Total Dioxins & Furans and PCBs	<1.94	<3.36	<2.61	<2.79	<0.052

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 50
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Dioxin and Furan Toxicity Equivalent Emission Data
Calculated Using Half the Detection Limit

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg TEQ/m³	pg TEQ/Rm³*	pg TEQ/Rm³**	pg TEQ/Rm³*	ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	0.074	0.13	0.099	0.11	0.0020
12378-pentachlorodibenzo-p-dioxin	0.48	0.82	0.64	0.68	0.013
123478-hexachlorodibenzo-p-dioxin	0.062	0.11	0.084	0.090	0.0017
123678-hexachlorodibenzo-p-dioxin	0.097	0.17	0.13	0.14	0.0026
123789-hexachlorodibenzo-p-dioxin	0.087	0.15	0.12	0.13	0.0023
1234678-heptachlorodibenzo-p-dioxin	0.11	0.20	0.15	0.17	0.0031
Octachlorodibenzo-p-dioxin	0.0043	0.0074	0.0057	0.0061	0.00011
2378-tetrachlorodibenzofuran	0.051	0.088	0.069	0.073	0.0014
12378-pentachlorodibenzofuran	0.012	0.020	0.016	0.017	0.00031
23478-pentachlorodibenzofuran	0.25	0.43	0.33	0.35	0.0066
123478-hexachlorodibenzofuran	0.038	0.067	0.052	0.055	0.0010
123678-hexachlorodibenzofuran	0.071	0.12	0.096	0.10	0.0019
234678-hexachlorodibenzofuran	0.094	0.16	0.13	0.13	0.0025
123789-hexachlorodibenzofuran	0.020	0.035	0.027	0.029	0.00054
1234678-heptachlorodibenzofuran	0.020	0.034	0.027	0.029	0.00053
1234789-heptachlorodibenzofuran	0.0044	0.0076	0.0059	0.0063	0.00012
Octachlorodibenzofuran	0.00050	0.00086	0.00067	0.00071	0.000013
PCB 81	0.00034	0.00059	0.00046	0.00049	0.0000092
PCB 77	0.0037	0.0064	0.0050	0.0053	0.00010
PCB 123	0.00047	0.00081	0.00063	0.00068	0.000013
PCB 118	0.029	0.050	0.039	0.042	0.00078
PCB 114	0.00075	0.0013	0.0010	0.0011	0.000020
PCB 105	0.0088	0.015	0.012	0.013	0.00024
PCB 126	0.13	0.23	0.18	0.19	0.0035
PCB 167	0.00023	0.00040	0.00031	0.00033	0.0000062
PCB 156/157	0.00064	0.0011	0.00087	0.00093	0.000017
PCB 169	0.021	0.037	0.029	0.031	0.00057
PCB 189	0.0000044	0.0000077	0.0000059	0.0000064	0.00000012
Total Dioxins & Furans Only	1.47	2.55	1.98	2.12	0.039
Total PCBs Only	0.20	0.34	0.27	0.28	0.0053
Total Dioxins & Furans and PCBs	1.67	2.89	2.25	2.40	0.045

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: The value of half the detection limit was used to calculate emission data for those analytes not detected.

TABLE 51
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Emission Data for Chlorobenzenes
Test No. 1

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Monochlorobenzene	516	58.7	102	79.0	85.0	1.57
1,3-Dichlorobenzene	55.8	6.35	11.0	8.55	9.19	0.17
1,4-Dichlorobenzene	50.5	5.74	9.99	7.73	8.32	0.15
1,2-Dichlorobenzene	30.6	3.48	6.06	4.69	5.04	0.093
Total Dichlorobenzene	137	15.6	27.1	21.0	22.6	0.42
1,3,5-trichlorobenzene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
1,2,4-trichlorobenzene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
1,2,3-trichlorobenzene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Total Trichlorobenzene	<36.0	<4.09	<7.12	<5.51	<5.93	<0.11
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<12	<1.36	<2.37	<1.84	<1.98	<0.037
1,2,3,4-tetrachlorobenzene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Total Tetrachlorobenzene	<24.0	<2.73	<4.75	<3.68	<3.95	<0.073
Pentachlorobenzene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Hexachlorobenzene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Total Chlorobenzenes	<737	<83.8	<146	<113	<121	<2.25

Dry Gas Volume Sampled (Rm^3*) :	5.053
Actual Flowrate (m^3/s) :	26.8
Dry Reference Flowrate (Rm^3/s*) :	15.4
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 52
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Emission Data for Chlorobenzenes
Test No. 2

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Monochlorobenzene	418	47.0	81.9	63.8	67.9	1.27
1,3-Dichlorobenzene	58.2	6.54	11.4	8.88	9.45	0.18
1,4-Dichlorobenzene	60.0	6.75	11.8	9.15	9.74	0.18
1,2-Dichlorobenzene	32.7	3.68	6.40	4.99	5.31	0.099
Total Dichlorobenzene	151	17.0	29.6	23.0	24.5	0.46
1,3,5-trichlorobenzene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
1,2,4-trichlorobenzene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
1,2,3-trichlorobenzene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Total Trichlorobenzene	<36.0	<4.05	<7.05	<5.49	<5.84	<0.11
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<12	<1.35	<2.35	<1.83	<1.95	<0.036
1,2,3,4-tetrachlorobenzene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Total Tetrachlorobenzene	<24.0	<2.70	<4.70	<3.66	<3.90	<0.073
Pentachlorobenzene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Hexachlorobenzene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Total Chlorobenzenes	<653	<73.4	<128	<99.6	<106	<1.98

Dry Gas Volume Sampled (Rm^3*) :	5.106
Actual Flowrate (m^3/s) :	27.0
Dry Reference Flowrate (Rm^3/s*) :	15.5
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.7

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 53
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Emission Data for Chlorobenzenes
Test No. 3

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Monochlorobenzene	572	64.8	111	86.6	92.2	1.72
1,3-Dichlorobenzene	80.8	9.16	15.7	12.2	13.0	0.24
1,4-Dichlorobenzene	56.3	6.38	10.9	8.53	9.08	0.17
1,2-Dichlorobenzene	37.5	4.25	7.29	5.68	6.04	0.11
Total Dichlorobenzene	175	19.8	34.0	26.4	28.1	0.53
1,3,5-trichlorobenzene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
1,2,4-trichlorobenzene	15.0	1.70	2.92	2.27	2.42	0.045
1,2,3-trichlorobenzene	16.4	1.86	3.19	2.48	2.64	0.049
Total Trichlorobenzene	<43.4	<4.92	<8.44	<6.57	<7.00	<0.13
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<12	<1.36	<2.33	<1.82	<1.93	<0.036
1,2,3,4-tetrachlorobenzene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Total Tetrachlorobenzene	<24.0	<2.72	<4.67	<3.64	<3.87	<0.072
Pentachlorobenzene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Hexachlorobenzene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Total Chlorobenzenes	<838	<95.0	<163	<127	<135	<2.53

Dry Gas Volume Sampled (Rm³*) :	5.142
Actual Flowrate (m³/s) :	26.6
Dry Reference Flowrate (Rm³/s*) :	15.5
Dry Adjusted Flowrate (Rm³/s**) :	19.9
Wet Reference Flowrate (Rm³/s*) :	18.7

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 54
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Actual Concentrations for Chlorobenzenes

Specific Isomer	Actual Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/m³	ng/m³	ng/m³	ng/m³	%
Monochlorobenzene	58.7	47.0	64.8	56.8	15.9
1,3-Dichlorobenzene	6.35	6.54	9.16	7.35	21.3
1,4-Dichlorobenzene	5.74	6.75	6.38	6.29	8.1
1,2-Dichlorobenzene	3.48	3.68	4.25	3.80	10.5
Total Dichlorobenzene	15.6	17.0	19.8	17.4	12.3
1,3,5-trichlorobenzene	<1.36	<1.35	<1.36	<1.36	0.6
1,2,4-trichlorobenzene	<1.36	<1.35	1.70	<1.47	13.5
1,2,3-trichlorobenzene	<1.36	<1.35	1.86	<1.52	19.0
Total Trichlorobenzene	<4.09	<4.05	<4.92	<4.35	11.3
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<1.36	<1.35	<1.36	<1.36	0.6
1,2,3,4-tetrachlorobenzene	<1.36	<1.35	<1.36	<1.36	0.6
Total Tetrachlorobenzene	<2.73	<2.70	<2.72	<2.72	0.6
Pentachlorobenzene	<1.36	<1.35	<1.36	<1.36	0.6
Hexachlorobenzene	<1.36	<1.35	<1.36	<1.36	0.6
Total Chlorobenzenes	<83.8	<73.4	<95.0	<84.1	12.8

TABLE 55
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dry Reference Concentrations for Chlorobenzenes

Specific Isomer	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Monochlorobenzene	102	81.9	111	98.4	15.3
1,3-Dichlorobenzene	11.0	11.4	15.7	12.7	20.4
1,4-Dichlorobenzene	9.99	11.8	10.9	10.9	8.1
1,2-Dichlorobenzene	6.06	6.40	7.29	6.58	9.7
Total Dichlorobenzene	27.1	29.6	34.0	30.2	11.5
1,3,5-trichlorobenzene	<2.37	<2.35	<2.33	<2.35	0.9
1,2,4-trichlorobenzene	<2.37	<2.35	2.92	<2.55	12.6
1,2,3-trichlorobenzene	<2.37	<2.35	3.19	<2.64	18.1
Total Trichlorobenzene	<7.12	<7.05	<8.44	<7.54	10.4
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<2.37	<2.35	<2.33	<2.35	0.9
1,2,3,4-tetrachlorobenzene	<2.37	<2.35	<2.33	<2.35	0.9
Total Tetrachlorobenzene	<4.75	<4.70	<4.67	<4.71	0.9
Pentachlorobenzene	<2.37	<2.35	<2.33	<2.35	0.9
Hexachlorobenzene	<2.37	<2.35	<2.33	<2.35	0.9
Total Chlorobenzenes	<146	<128	<163	<146	12.1

* At 25°C and 1 atmosphere

TABLE 56
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Dry Adjusted Concentrations for Chlorobenzenes

Specific Isomer	Dry Adjusted Concentration				Coefficient of Variation %
	Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	
Monochlorobenzene	79.0	63.8	86.6	76.5	15.2
1,3-Dichlorobenzene	8.55	8.88	12.2	9.89	20.7
1,4-Dichlorobenzene	7.73	9.15	8.53	8.47	8.4
1,2-Dichlorobenzene	4.69	4.99	5.68	5.12	10.0
Total Dichlorobenzene	21.0	23.0	26.4	23.5	11.8
1,3,5-trichlorobenzene	<1.84	<1.83	<1.82	<1.83	0.6
1,2,4-trichlorobenzene	<1.84	<1.83	2.27	<1.98	12.8
1,2,3-trichlorobenzene	<1.84	<1.83	2.48	<2.05	18.3
Total Trichlorobenzene	<5.51	<5.49	<6.57	<5.86	10.6
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<1.84	<1.83	<1.82	<1.83	0.6
1,2,3,4-tetrachlorobenzene	<1.84	<1.83	<1.82	<1.83	0.6
Total Tetrachlorobenzene	<3.68	<3.66	<3.64	<3.66	0.6
Pentachlorobenzene	<1.84	<1.83	<1.82	<1.83	0.6
Hexachlorobenzene	<1.84	<1.83	<1.82	<1.83	0.6
Total Chlorobenzenes	<113	<99.6	<127	<113	12.1

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 57
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Wet Reference Concentrations for Chlorobenzenes

Specific Isomer	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Monochlorobenzene	85.0	67.9	92.2	81.7	15.3
1,3-Dichlorobenzene	9.19	9.45	13.0	10.6	20.3
1,4-Dichlorobenzene	8.32	9.74	9.08	9.04	7.9
1,2-Dichlorobenzene	5.04	5.31	6.04	5.46	9.5
Total Dichlorobenzene	22.6	24.5	28.1	25.1	11.3
1,3,5-trichlorobenzene	<1.98	<1.95	<1.93	<1.95	1.1
1,2,4-trichlorobenzene	<1.98	<1.95	2.42	<2.11	12.5
1,2,3-trichlorobenzene	<1.98	<1.95	2.64	<2.19	18.0
Total Trichlorobenzene	<5.93	<5.84	<7.00	<6.26	10.3
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<1.98	<1.95	<1.93	<1.95	1.1
1,2,3,4-tetrachlorobenzene	<1.98	<1.95	<1.93	<1.95	1.1
Total Tetrachlorobenzene	<3.95	<3.90	<3.87	<3.91	1.1
Pentachlorobenzene	<1.98	<1.95	<1.93	<1.95	1.1
Hexachlorobenzene	<1.98	<1.95	<1.93	<1.95	1.1
Total Chlorobenzenes	<121	<106	<135	<121	12.0

* At 25°C and 1 atmosphere

TABLE 58
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Emission Rates for Chlorobenzenes

Specific Isomer	Emission Rate Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	Coefficient of Variation %
Monochlorobenzene	1.57	1.27	1.72	1.52	15.2
1,3-Dichlorobenzene	0.17	0.18	0.24	0.20	20.7
1,4-Dichlorobenzene	0.15	0.18	0.17	0.17	8.4
1,2-Dichlorobenzene	0.093	0.099	0.11	0.10	10.0
Total Dichlorobenzene	0.42	0.46	0.53	0.47	11.8
1,3,5-trichlorobenzene	<0.037	<0.036	<0.036	<0.036	0.6
1,2,4-trichlorobenzene	<0.037	<0.036	0.045	<0.039	12.8
1,2,3-trichlorobenzene	<0.037	<0.036	0.049	<0.041	18.3
Total Trichlorobenzene	<0.11	<0.11	<0.13	<0.12	10.6
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<0.037	<0.036	<0.036	<0.036	0.6
1,2,3,4-tetrachlorobenzene	<0.037	<0.036	<0.036	<0.036	0.6
Total Tetrachlorobenzene	<0.073	<0.073	<0.072	<0.073	0.6
Pentachlorobenzene	<0.037	<0.036	<0.036	<0.036	0.6
Hexachlorobenzene	<0.037	<0.036	<0.036	<0.036	0.6
Total Chlorobenzenes	<2.25	<1.98	<2.53	<2.25	12.1

TABLE 59
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Emission Data for Chlorobenzenes

Specific Isomer	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
Monochlorobenzene	56.8	98.4	76.5	81.7	1.52
1,3-Dichlorobenzene	7.35	12.7	9.89	10.6	0.20
1,4-Dichlorobenzene	6.29	10.9	8.47	9.04	0.17
1,2-Dichlorobenzene	3.80	6.58	5.12	5.46	0.10
Total Dichlorobenzene	17.4	30.2	23.5	25.1	0.47
1,3,5-trichlorobenzene	<1.36	<2.35	<1.83	<1.95	<0.036
1,2,4-trichlorobenzene	<1.47	<2.55	<1.98	<2.11	<0.039
1,2,3-trichlorobenzene	<1.52	<2.64	<2.05	<2.19	<0.041
Total Trichlorobenzene	<4.35	<7.54	<5.86	<6.26	<0.12
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<1.36	<2.35	<1.83	<1.95	<0.036
1,2,3,4-tetrachlorobenzene	<1.36	<2.35	<1.83	<1.95	<0.036
Total Tetrachlorobenzene	<2.72	<4.71	<3.66	<3.91	<0.073
Pentachlorobenzene	<1.36	<2.35	<1.83	<1.95	<0.036
Hexachlorobenzene	<1.36	<2.35	<1.83	<1.95	<0.036
Total Chlorobenzenes	<84.1	<146	<113	<121	<2.25

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 60
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorobenzene Blank Analyses

Isomers and Congener Group Totals	Blank Train Total ng	Method Blank Total ng
Monochlorobenzene	<12	<12
1,3-Dichlorobenzene	<12	<12
1,4-Dichlorobenzene	17.7	13.3
1,2-Dichlorobenzene	<12	<12
Total Dichlorobenzene	<41.7	<37.3
1,3,5-trichlorobenzene	<12	<12
1,2,4-trichlorobenzene	<12	<12
1,2,3-trichlorobenzene	<12	<12
Total Trichlorobenzene	<36.0	<36.0
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<12	<12
1,2,3,4-tetrachlorobenzene	<12	<12
Total Tetrachlorobenzene	<24.0	<24.0
Pentachlorobenzene	<12	<12
Hexachlorobenzene	<12	<12
Total Chlorobenzenes	<138	<133

"<" indicates that the amount detected is less than the detection limit. In these cases the value of the detection limit was used to calculate the total collected.

NQ - Indicates that this compound is not quantifiable due to spike recovery loss.

TABLE 61
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Isomer and Congener Group Analysis and Emission Data
Test No. 1

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2-monochlorophenol	<300	<34.1	<59.4	<45.9	<49.4	<0.91
3 & 4-monochlorophenol	<300	<34.1	<59.4	<45.9	<49.4	<0.91
Total Monochlorophenols	<600	<68.2	<119	<91.9	<98.8	<1.83
2,6-dichlorophenol	<300	<34.1	<59.4	<45.9	<49.4	<0.91
2,4 & 2,5-dichlorophenol	<300	<34.1	<59.4	<45.9	<49.4	<0.91
3,5-dichlorophenol	<300	<34.1	<59.4	<45.9	<49.4	<0.91
2,3-dichlorophenol	<300	<34.1	<59.4	<45.9	<49.4	<0.91
3,4-dichlorophenol	787	89.5	156	121	130	2.40
Total Dichlorophenols	<1987	<226	<393	<304	<327	<6.06
2,4,6-trichlorophenol	<60	<6.82	<11.9	<9.19	<9.88	<0.18
2,3,6-trichlorophenol	<60	<6.82	<11.9	<9.19	<9.88	<0.18
2,3,5-trichlorophenol	<60	<6.82	<11.9	<9.19	<9.88	<0.18
2,4,5-trichlorophenol	<60	<6.82	<11.9	<9.19	<9.88	<0.18
2,3,4-trichlorophenol	<60	<6.82	<11.9	<9.19	<9.88	<0.18
3,4,5-trichlorophenol	<60	<6.82	<11.9	<9.19	<9.88	<0.18
Total Trichlorophenols	<360	<40.9	<71.2	<55.1	<59.3	<1.10
2,3,5,6/2,3,4,6-tetrachlorophenol	119	13.5	23.6	18.2	19.6	0.36
2,3,4,5-tetrachlorophenol	<60	<6.82	<11.9	<9.19	<9.88	<0.18
Total Tetrachlorophenols	<179	<20.4	<35.4	<27.4	<29.5	<0.55
Pentachlorophenol	278	31.6	55.0	42.6	45.8	0.85
Total Chlorophenols	<3404	<387	<674	<521	<561	<10.4

Dry Gas Volume Sampled (Rm^3*) :	5.053
Actual Flowrate (m^3/s) :	26.8
Dry Reference Flowrate (Rm^3/s*) :	15.4
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 62
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Isomer and Congener Group Analysis and Emission Data
Test No. 2

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2-monochlorophenol	<1000	<112	<196	<153	<162	<3.04
3 & 4-monochlorophenol	<1000	<112	<196	<153	<162	<3.04
Total Monochlorophenols	<2000	<225	<392	<305	<325	<6.07
2,6-dichlorophenol	<1000	<112	<196	<153	<162	<3.04
2,4 & 2,5-dichlorophenol	<1000	<112	<196	<153	<162	<3.04
3,5-dichlorophenol	<1000	<112	<196	<153	<162	<3.04
2,3-dichlorophenol	<1000	<112	<196	<153	<162	<3.04
3,4-dichlorophenol	3980	447	779	607	646	12.1
Total Dichlorophenols	<7980	<897	<1563	<1217	<1295	<24.2
2,4,6-trichlorophenol	<60	<6.75	<11.8	<9.15	<9.74	<0.18
2,3,6-trichlorophenol	<60	<6.75	<11.8	<9.15	<9.74	<0.18
2,3,5-trichlorophenol	<60	<6.75	<11.8	<9.15	<9.74	<0.18
2,4,5-trichlorophenol	<60	<6.75	<11.8	<9.15	<9.74	<0.18
2,3,4-trichlorophenol	<60	<6.75	<11.8	<9.15	<9.74	<0.18
3,4,5-trichlorophenol	<60	<6.75	<11.8	<9.15	<9.74	<0.18
Total Trichlorophenols	<360	<40.5	<70.5	<54.9	<58.4	<1.09
2,3,5,6/2,3,4,6-tetrachlorophenol	160	18.0	31.3	24.4	26.0	0.49
2,3,4,5-tetrachlorophenol	83.1	9.34	16.3	12.7	13.5	0.25
Total Tetrachlorophenols	243	27.3	47.6	37.1	39.5	0.74
Pentachlorophenol	1400	157	274	214	227	4.25
Total Chlorophenols	<11983	<1347	<2347	<1828	<1945	<36.4

Dry Gas Volume Sampled (Rm^3*) :	5.106
Actual Flowrate (m^3/s) :	27.0
Dry Reference Flowrate (Rm^3/s*) :	15.5
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.7

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 63
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Isomer and Congener Group Analysis and Emission Data
Test No. 3

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2-monochlorophenol	NQ	NQ	NQ	NQ	NQ	NQ
3 & 4-monochlorophenol	NQ	NQ	NQ	NQ	NQ	NQ
Total Monochlorophenols	NQ	NQ	NQ	NQ	NQ	NQ
2,6-dichlorophenol	<1000	<113	<194	<151	<161	<3.01
2,4 & 2,5-dichlorophenol	<1000	<113	<194	<151	<161	<3.01
3,5-dichlorophenol	<1000	<113	<194	<151	<161	<3.01
2,3-dichlorophenol	<1000	<113	<194	<151	<161	<3.01
3,4-dichlorophenol	2570	291	500	389	414	7.75
Total Dichlorophenols	<6570	<745	<1278	<995	<1059	<19.8
2,4,6-trichlorophenol	<60	<6.80	<11.7	<9.09	<9.67	<0.18
2,3,6-trichlorophenol	<60	<6.80	<11.7	<9.09	<9.67	<0.18
2,3,5-trichlorophenol	<60	<6.80	<11.7	<9.09	<9.67	<0.18
2,4,5-trichlorophenol	<60	<6.80	<11.7	<9.09	<9.67	<0.18
2,3,4-trichlorophenol	<60	<6.80	<11.7	<9.09	<9.67	<0.18
3,4,5-trichlorophenol	<60	<6.80	<11.7	<9.09	<9.67	<0.18
Total Trichlorophenols	<360	<40.8	<70.0	<54.5	<58.0	<1.09
2,3,5,6/2,3,4,6-tetrachlorophenol	205	23.2	39.9	31.1	33.0	0.62
2,3,4,5-tetrachlorophenol	114	12.9	22.2	17.3	18.4	0.34
Total Tetrachlorophenols	319	36.2	62.0	48.3	51.4	0.96
Pentachlorophenol	273	30.9	53.1	41.4	44.0	0.82
Total Chlorophenols	<7522	<852	<1463	<1139	<1213	<22.7

Dry Gas Volume Sampled (Rm^3*) :	5.142
Actual Flowrate (m^3/s) :	26.6
Dry Reference Flowrate (Rm^3/s*) :	15.5
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.7

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

NQ - Indicates that this compound is not quantifiable due to spike recovery loss.

TABLE 64
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Isomer and Congener Group Actual Concentrations

Specific Isomer	Actual Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/m³	ng/m³	ng/m³	ng/m³	%
2-monochlorophenol	<34.1	<112	NQ	<73.3	75.6
3 & 4-monochlorophenol	<34.1	<112	NQ	<73.3	75.6
Total Monochlorophenols	<68.2	<225	NQ	<147	75.6
2,6-dichlorophenol	<34.1	<112	<113	<86.6	52.5
2,4 & 2,5-dichlorophenol	<34.1	<112	<113	<86.6	52.5
3,5-dichlorophenol	<34.1	<112	<113	<86.6	52.5
2,3-dichlorophenol	<34.1	<112	<113	<86.6	52.5
3,4-dichlorophenol	89.5	447	291	276	65.0
Total Dichlorophenols	<226	<897	<745	<623	56.5
2,4,6-trichlorophenol	<6.82	<6.75	<6.80	<6.79	0.6
2,3,6-trichlorophenol	<6.82	<6.75	<6.80	<6.79	0.6
2,3,5-trichlorophenol	<6.82	<6.75	<6.80	<6.79	0.6
2,4,5-trichlorophenol	<6.82	<6.75	<6.80	<6.79	0.6
2,3,4-trichlorophenol	<6.82	<6.75	<6.80	<6.79	0.6
3,4,5-trichlorophenol	<6.82	<6.75	<6.80	<6.79	0.6
Total Trichlorophenols	<40.9	<40.5	<40.8	<40.7	0.6
2,3,5,6/2,3,4,6-tetrachlorophenol	13.5	18.0	23.2	18.3	26.6
2,3,4,5-tetrachlorophenol	<6.82	9.34	12.9	<9.70	31.6
Total Tetrachlorophenols	<20.4	27.3	36.2	<27.9	28.3
Pentachlorophenol	31.6	157	30.9	73.3	99.3
Total Chlorophenols	<387	<1347	<852	<862	55.7

TABLE 65
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Isomer and Congener Group Dry Reference Concentrations

Specific Isomer	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2-monochlorophenol	<59.4	<196	NQ	<128	75.6
3 & 4-monochlorophenol	<59.4	<196	NQ	<128	75.6
Total Monochlorophenols	<119	<392	NQ	<255	75.6
2,6-dichlorophenol	<59.4	<196	<194	<150	52.3
2,4 & 2,5-dichlorophenol	<59.4	<196	<194	<150	52.3
3,5-dichlorophenol	<59.4	<196	<194	<150	52.3
2,3-dichlorophenol	<59.4	<196	<194	<150	52.3
3,4-dichlorophenol	156	779	500	478	65.3
Total Dichlorophenols	<393	<1563	<1278	<1078	56.6
2,4,6-trichlorophenol	<11.9	<11.8	<11.7	<11.8	0.9
2,3,6-trichlorophenol	<11.9	<11.8	<11.7	<11.8	0.9
2,3,5-trichlorophenol	<11.9	<11.8	<11.7	<11.8	0.9
2,4,5-trichlorophenol	<11.9	<11.8	<11.7	<11.8	0.9
2,3,4-trichlorophenol	<11.9	<11.8	<11.7	<11.8	0.9
3,4,5-trichlorophenol	<11.9	<11.8	<11.7	<11.8	0.9
Total Trichlorophenols	<71.2	<70.5	<70.0	<70.6	0.9
2,3,5,6/2,3,4,6-tetrachlorophenol	23.6	31.3	39.9	31.6	25.8
2,3,4,5-tetrachlorophenol	<11.9	16.3	22.2	<16.8	30.8
Total Tetrachlorophenols	<35.4	47.6	62.0	<48.4	27.5
Pentachlorophenol	55.0	274	53.1	127	99.7
Total Chlorophenols	<674	<2347	<1463	<1494	56.0

* At 25°C and 1 atmosphere

TABLE 66
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Isomer and Congener Group Dry Adjusted Concentrations

Specific Isomer	Dry Adjusted Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2-monochlorophenol	<45.9	<153	NQ	<99.2	76.0
3 & 4-monochlorophenol	<45.9	<153	NQ	<99.2	76.0
Total Monochlorophenols	<91.9	<305	NQ	<198	76.0
2,6-dichlorophenol	<45.9	<153	<151	<117	52.5
2,4 & 2,5-dichlorophenol	<45.9	<153	<151	<117	52.5
3,5-dichlorophenol	<45.9	<153	<151	<117	52.5
2,3-dichlorophenol	<45.9	<153	<151	<117	52.5
3,4-dichlorophenol	121	607	389	372	65.5
Total Dichlorophenols	<304	<1217	<995	<839	56.8
2,4,6-trichlorophenol	<9.19	<9.15	<9.09	<9.14	0.6
2,3,6-trichlorophenol	<9.19	<9.15	<9.09	<9.14	0.6
2,3,5-trichlorophenol	<9.19	<9.15	<9.09	<9.14	0.6
2,4,5-trichlorophenol	<9.19	<9.15	<9.09	<9.14	0.6
2,3,4-trichlorophenol	<9.19	<9.15	<9.09	<9.14	0.6
3,4,5-trichlorophenol	<9.19	<9.15	<9.09	<9.14	0.6
Total Trichlorophenols	<55.1	<54.9	<54.5	<54.9	0.6
2,3,5,6/2,3,4,6-tetrachlorophenol	18.2	24.4	31.1	24.6	26.1
2,3,4,5-tetrachlorophenol	<9.19	12.7	17.3	<13.0	31.1
Total Tetrachlorophenols	<27.4	37.1	48.3	<37.6	27.8
Pentachlorophenol	42.6	214	41.4	99.2	99.9
Total Chlorophenols	<521	<1828	<1139	<1163	56.2

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 67
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Isomer and Congener Group Wet Reference Concentrations

Specific Isomer	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2-monochlorophenol	<49.4	<162	NQ	<106	75.4
3 & 4-monochlorophenol	<49.4	<162	NQ	<106	75.4
Total Monochlorophenols	<98.8	<325	NQ	<212	75.4
2,6-dichlorophenol	<49.4	<162	<161	<124	52.2
2,4 & 2,5-dichlorophenol	<49.4	<162	<161	<124	52.2
3,5-dichlorophenol	<49.4	<162	<161	<124	52.2
2,3-dichlorophenol	<49.4	<162	<161	<124	52.2
3,4-dichlorophenol	130	646	414	397	65.2
Total Dichlorophenols	<327	<1295	<1059	<894	56.5
2,4,6-trichlorophenol	<9.88	<9.74	<9.67	<9.77	1.1
2,3,6-trichlorophenol	<9.88	<9.74	<9.67	<9.77	1.1
2,3,5-trichlorophenol	<9.88	<9.74	<9.67	<9.77	1.1
2,4,5-trichlorophenol	<9.88	<9.74	<9.67	<9.77	1.1
2,3,4-trichlorophenol	<9.88	<9.74	<9.67	<9.77	1.1
3,4,5-trichlorophenol	<9.88	<9.74	<9.67	<9.77	1.1
Total Trichlorophenols	<59.3	<58.4	<58.0	<58.6	1.1
2,3,5,6/2,3,4,6-tetrachlorophenol	19.6	26.0	33.0	26.2	25.7
2,3,4,5-tetrachlorophenol	<9.88	13.5	18.4	<13.9	30.6
Total Tetrachlorophenols	<29.5	39.5	51.4	<40.1	27.4
Pentachlorophenol	45.8	227	44.0	106	99.6
Total Chlorophenols	<561	<1945	<1213	<1240	55.9

* At 25°C and 1 atmosphere

TABLE 68
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Isomer and Congener Group Emission Rates

Specific Isomer	Emission Rate Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	Coefficient of Variation %
2-monochlorophenol	<0.91	<3.04	NQ	<1.97	76.0
3 & 4-monochlorophenol	<0.91	<3.04	NQ	<1.97	76.0
Total Monochlorophenols	<1.83	<6.07	NQ	<3.95	76.0
2,6-dichlorophenol	<0.91	<3.04	<3.01	<2.32	52.5
2,4 & 2,5-dichlorophenol	<0.91	<3.04	<3.01	<2.32	52.5
3,5-dichlorophenol	<0.91	<3.04	<3.01	<2.32	52.5
2,3-dichlorophenol	<0.91	<3.04	<3.01	<2.32	52.5
3,4-dichlorophenol	2.40	12.1	7.75	7.41	65.5
Total Dichlorophenols	<6.06	<24.2	<19.8	<16.7	56.8
2,4,6-trichlorophenol	<0.18	<0.18	<0.18	<0.18	0.6
2,3,6-trichlorophenol	<0.18	<0.18	<0.18	<0.18	0.6
2,3,5-trichlorophenol	<0.18	<0.18	<0.18	<0.18	0.6
2,4,5-trichlorophenol	<0.18	<0.18	<0.18	<0.18	0.6
2,3,4-trichlorophenol	<0.18	<0.18	<0.18	<0.18	0.6
3,4,5-trichlorophenol	<0.18	<0.18	<0.18	<0.18	0.6
Total Trichlorophenols	<1.10	<1.09	<1.09	<1.09	0.6
2,3,5,6/2,3,4,6-tetrachlorophenol	0.36	0.49	0.62	0.49	26.1
2,3,4,5-tetrachlorophenol	<0.18	0.25	0.34	<0.26	31.1
Total Tetrachlorophenols	<0.55	0.74	0.96	<0.75	27.8
Pentachlorophenol	0.85	4.25	0.82	1.97	99.9
Total Chlorophenols	<10.4	<36.4	<22.7	<23.1	56.2

TABLE 69
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Emission Data for Chlorophenol Isomer and Congener Groups

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2-monochlorophenol	<73.3	<128	<99.2	<106	<1.97
3 & 4-monochlorophenol	<73.3	<128	<99.2	<106	<1.97
Total Monochlorophenols	<147	<255	<198	<212	<3.95
2,6-dichlorophenol	<86.6	<150	<117	<124	<2.32
2,4 & 2,5-dichlorophenol	<86.6	<150	<117	<124	<2.32
3,5-dichlorophenol	<86.6	<150	<117	<124	<2.32
2,3-dichlorophenol	<86.6	<150	<117	<124	<2.32
3,4-dichlorophenol	276	478	372	397	7.41
Total Dichlorophenols	<623	<1078	<839	<894	<16.7
2,4,6-trichlorophenol	<6.79	<11.8	<9.14	<9.77	<0.18
2,3,6-trichlorophenol	<6.79	<11.8	<9.14	<9.77	<0.18
2,3,5-trichlorophenol	<6.79	<11.8	<9.14	<9.77	<0.18
2,4,5-trichlorophenol	<6.79	<11.8	<9.14	<9.77	<0.18
2,3,4-trichlorophenol	<6.79	<11.8	<9.14	<9.77	<0.18
3,4,5-trichlorophenol	<6.79	<11.8	<9.14	<9.77	<0.18
Total Trichlorophenols	<40.7	<70.6	<54.9	<58.6	<1.09
2,3,5,6/2,3,4,6-tetrachlorophenol	18.3	31.6	24.6	26.2	0.49
2,3,4,5-tetrachlorophenol	<9.70	<16.8	<13.0	<13.9	<0.26
Total Tetrachlorophenols	<27.9	<48.4	<37.6	<40.1	<0.75
Pentachlorophenol	73.3	127	99.2	106	1.97
Total Chlorophenols	<862	<1494	<1163	<1240	<23.1

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 70
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Chlorophenol Blank Analyses

Congener Group	Media Blank Total ng	Blank Train Total ng
2-monochlorophenol	<60	NQ
3 & 4-monochlorophenol	<60	NQ
Total Monochlorophenols	<120	NQ
2,6-dichlorophenol	<200	<500
2,4 & 2,5-dichlorophenol	<60	<500
3,5-dichlorophenol	<200	1210
2,3-dichlorophenol	<200	<500
3,4-dichlorophenol	<200	1930
Total Dichlorophenols	<860	<4640
2,4,6-trichlorophenol	<60	<60
2,3,6-trichlorophenol	<60	<60
2,3,5-trichlorophenol	<60	<60
2,4,5-trichlorophenol	<60	82.6
2,3,4-trichlorophenol	<60	<60
3,4,5-trichlorophenol	<60	249
Total Trichlorophenols	<360	<572
2,3,5,6/2,3,4,6-tetrachlorophenol	<60	146
2,3,4,5-tetrachlorophenol	<60	60.4
Total Tetrachlorophenols	<120	206
Pentachlorophenol	<60	215
Total Chlorophenols	<1520	<5633

"<" indicates that the amount detected is less than the detection limit. In these cases the value of the detection limit was used to calculate the total collected.

NQ - Indicates that this compound is not quantifiable due to spike recovery loss.

TABLE 71
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 1

Compound	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Acenaphthene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Acenaphthylene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Anthracene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Benzo(a)Anthracene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Benzo(b)Fluoranthene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Benzo(k)Fluoranthene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Benzo(a)fluorene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Benzo(b)fluorene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Benzo(g,h,i)Perylene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Benzo(a)Pyrene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Benzo(e)Pyrene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Biphenyl	41.2	4.69	8.15	6.31	6.79	0.126
2-Chloronaphthalene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Chrysene/Triphenylene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Coronene	<60	<6.82	<11.9	<9.19	<9.88	<0.18
Dibenzo(a,c/a,h)Anthracene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Dibenzo(a,e)pyrene	<60	<6.82	<11.9	<9.19	<9.88	<0.18
9,10-dimethylanthracene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
7,12-Dimethylbenzo(a)anthracene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Fluoranthene	71.8	8.17	14.2	11.0	11.8	0.22
Fluorene	39.1	4.45	7.74	5.99	6.44	0.12
Indeno(1,2,3-cd)Pyrene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
2-methylanthracene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
3-Methylcholanthrene	<60	<6.82	<11.9	<9.19	<9.88	<0.18
1-Methylnaphthalene	26.8	3.05	5.30	4.10	4.42	0.082
2-Methylnaphthalene	38.3	4.36	7.58	5.87	6.31	0.12
1-Methylphenanthrene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
9-Methylphenanthrene	27.7	3.15	5.48	4.24	4.56	0.084
Naphthalene	102	11.6	20.2	15.6	16.8	0.31
Perylene	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Phenanthrene	444	50.5	87.9	68.0	73.1	1.35
Picene	<60	<6.82	<11.9	<9.19	<9.88	<0.18
Pyrene	98.4	11.2	19.5	15.1	16.2	0.30
Tetralin	41.5	4.72	8.21	6.36	6.84	0.13
m-terphenyl	<12	<1.36	<2.37	<1.84	<1.98	<0.037
o-Terphenyl	<12	<1.36	<2.37	<1.84	<1.98	<0.037
p-terphenyl	<12	<1.36	<2.37	<1.84	<1.98	<0.037
Total	<1447	<165	<286	<222	<238	<4.41

Dry Gas Volume Sampled (Rm^3*) :	5.053
Actual Flowrate (m^3/s) :	26.8
Dry Reference Flowrate (Rm^3/s*) :	15.4
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.5

* At 25°C and 1 atmosphere
** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume
Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 72
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 2

Compound	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Acenaphthene	21.2	2.38	4.15	3.23	3.44	0.064
Acenaphthylene	15.8	1.78	3.09	2.41	2.56	0.048
Anthracene	17.3	1.95	3.39	2.64	2.81	0.053
Benzo(a)Anthracene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Benzo(b)Fluoranthene	32.3	3.63	6.33	4.93	5.24	0.098
Benzo(k)Fluoranthene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Benzo(a)fluorene	16.4	1.84	3.21	2.50	2.66	0.050
Benzo(b)fluorene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Benzo(g,h,i)Perylene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Benzo(a)Pyrene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Benzo(e)Pyrene	25.8	2.90	5.05	3.94	4.19	0.078
Biphenyl	89.6	10.1	17.5	13.7	14.5	0.27
2-Chloronaphthalene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Chrysene/Triphenylene	177	19.9	34.7	27.0	28.7	0.54
Coronene	<60	<6.75	<11.8	<9.15	<9.74	<0.18
Dibenzo(a,c/a,h)Anthracene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Dibenzo(a,e)pyrene	<60	<6.75	<11.8	<9.15	<9.74	<0.18
9,10-dimethylanthracene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
7,12-Dimethylbenzo(a)anthracene	60.0	6.75	11.8	9.15	9.74	0.18
Fluoranthene	153	17.2	30.0	23.3	24.8	0.46
Fluorene	60.2	6.77	11.8	9.18	9.77	0.18
Indeno(1,2,3-cd)Pyrene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
2-methylanthracene	23.1	2.60	4.52	3.52	3.75	0.070
3-Methylcholanthrene	<60	<6.75	<11.8	<9.15	<9.74	<0.18
1-Methylnaphthalene	71.3	8.02	14.0	10.9	11.6	0.22
2-Methylnaphthalene	123	13.8	24.1	18.8	20.0	0.37
1-Methylphenanthrene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
9-Methylphenanthrene	67.7	7.61	13.3	10.3	11.0	0.21
Naphthalene	308	34.6	60.3	47.0	50.0	0.93
Perylene	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Phenanthrene	766	86.1	150	117	124	2.33
Picene	<60	<6.75	<11.8	<9.15	<9.74	<0.18
Pyrene	150	16.9	29.4	22.9	24.4	0.46
Tetralin	32.8	3.69	6.42	5.00	5.32	0.10
m-terphenyl	<12	<1.35	<2.35	<1.83	<1.95	<0.036
o-Terphenyl	12.0	1.35	2.35	1.83	1.95	0.036
p-terphenyl	<12	<1.35	<2.35	<1.83	<1.95	<0.036
Total	<2619	<294	<513	<399	<425	<7.95

Dry Gas Volume Sampled (Rm^3*) :	5.106
Actual Flowrate (m^3/s) :	27.0
Dry Reference Flowrate (Rm^3/s*) :	15.5
Dry Adjusted Flowrate (Rm^3/s**) :	19.9
Wet Reference Flowrate (Rm^3/s*) :	18.7

* At 25°C and 1 atmosphere
** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume
Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 73
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 3

Compound	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Acenaphthene	12.1	1.37	2.35	1.83	1.95	0.036
Acenaphthylene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Anthracene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Benzo(a)Anthracene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Benzo(b)Fluoranthene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Benzo(k)Fluoranthene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Benzo(a)fluorene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Benzo(b)fluorene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Benzo(g,h,i)Perylene	15.7	1.78	3.05	2.38	2.53	0.047
Benzo(a)Pyrene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Benzo(e)Pyrene	20.4	2.31	3.97	3.09	3.29	0.061
Biphenyl	458	51.9	89.1	69.4	73.8	1.38
2-Chloronaphthalene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Chrysene/Triphenylene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Coronene	<60	<6.80	<11.7	<9.09	<9.67	<0.18
Dibenzo(a,c/a,h)Anthracene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Dibenzo(a,e)pyrene	<60	<6.80	<11.7	<9.09	<9.67	<0.18
9,10-dimethylanthracene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
7,12-Dimethylbenzo(a)anthracene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Fluoranthene	88.3	10.0	17.2	13.4	14.2	0.27
Fluorene	55.1	6.24	10.7	8.35	8.88	0.17
Indeno(1,2,3-cd)Pyrene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
2-methylanthracene	15.1	1.71	2.94	2.29	2.43	0.046
3-Methylcholanthrene	<60	<6.80	<11.7	<9.09	<9.67	<0.18
1-Methylnaphthalene	54.8	6.21	10.7	8.30	8.83	0.17
2-Methylnaphthalene	96.5	10.9	18.8	14.6	15.6	0.29
1-Methylphenanthrene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
9-Methylphenanthrene	42.0	4.76	8.17	6.36	6.77	0.13
Naphthalene	172	19.5	33.5	26.1	27.7	0.52
Perylene	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Phenanthrene	644	73.0	125	97.6	103.8	1.94
Picene	<60	<6.80	<11.7	<9.09	<9.67	<0.18
Pyrene	75.8	8.59	14.7	11.5	12.2	0.23
Tetralin	42.0	4.76	8.17	6.36	6.77	0.13
m-terphenyl	<12	<1.36	<2.33	<1.82	<1.93	<0.036
o-Terphenyl	17.5	1.98	3.40	2.65	2.82	0.053
p-terphenyl	<12	<1.36	<2.33	<1.82	<1.93	<0.036
Total	<2265	<257	<441	<343	<365	<6.83

Dry Gas Volume Sampled (Rm³*) :	5.142
Actual Flowrate (m³/s) :	26.6
Dry Reference Flowrate (Rm³/s*) :	15.5
Dry Adjusted Flowrate (Rm³/s**) :	19.9
Wet Reference Flowrate (Rm³/s*) :	18.7

* At 25°C and 1 atmosphere
** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume
Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 74
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Polycyclic Aromatic Hydrocarbon Actual Concentrations

Compound	Actual Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/m³	ng/m³	ng/m³	ng/m³	%
Acenaphthene	<1.36	2.38	1.37	<1.71	34.4
Acenaphthylene	<1.36	1.78	<1.36	<1.50	15.9
Anthracene	<1.36	1.95	<1.36	<1.56	21.6
Benzo(a)Anthracene	<1.36	<1.35	<1.36	<1.36	0.6
Benzo(b)Fluoranthene	<1.36	3.63	<1.36	<2.12	61.8
Benzo(k)Fluoranthene	<1.36	<1.35	<1.36	<1.36	0.6
Benzo(a)fluorene	<1.36	1.84	<1.36	<1.52	18.3
Benzo(b)fluorene	<1.36	<1.35	<1.36	<1.36	0.6
Benzo(g,h,i)Perylene	<1.36	<1.35	1.78	<1.50	16.3
Benzo(a)Pyrene	<1.36	<1.35	<1.36	<1.36	0.6
Benzo(e)Pyrene	<1.36	2.90	2.31	<2.19	35.3
Biphenyl	4.69	10.1	51.9	22.2	116
2-Chloronaphthalene	<1.36	<1.35	<1.36	<1.36	0.6
Chrysene/Triphenylene	<1.36	19.9	<1.36	<7.54	142
Coronene	<6.82	<6.75	<6.80	<6.79	0.6
Dibenzo(a,c/a,h)Anthracene	<1.36	<1.35	<1.36	<1.36	0.6
Dibenzo(a,e)pyrene	<6.82	<6.75	<6.80	<6.79	0.6
9,10-dimethylanthracene	<1.36	<1.35	<1.36	<1.36	0.6
7,12-Dimethylbenzo(a)anthracene	<1.36	6.75	<1.36	<3.16	98.5
Fluoranthene	8.17	17.2	10.0	11.8	40.5
Fluorene	4.45	6.77	6.24	5.82	20.9
Indeno(1,2,3-cd)Pyrene	<1.36	<1.35	<1.36	<1.36	0.6
2-methylanthracene	<1.36	2.60	1.71	<1.89	33.6
3-Methylcholanthrene	<6.82	<6.75	<6.80	<6.79	0.6
1-Methylnaphthalene	3.05	8.02	6.21	5.76	43.7
2-Methylnaphthalene	4.36	13.8	10.9	9.71	50.0
1-Methylphenanthrene	<1.36	<1.35	<1.36	<1.36	0.6
9-Methylphenanthrene	3.15	7.61	4.76	5.17	43.7
Naphthalene	11.6	34.6	19.5	21.9	53.4
Perylene	<1.36	<1.35	<1.36	<1.36	0.6
Phenanthrene	50.5	86.1	73.0	69.9	25.8
Picene	<6.82	<6.75	<6.80	<6.79	0.6
Pyrene	11.2	16.9	8.59	12.2	34.6
Tetralin	4.72	3.69	4.76	4.39	13.8
m-terphenyl	<1.36	<1.35	<1.36	<1.36	0.6
o-Terphenyl	<1.36	1.35	1.98	<1.57	23.1
p-terphenyl	<1.36	<1.35	<1.36	<1.36	0.6
Total	<165	<294	<257	<239	28.0

TABLE 75
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Polycyclic Aromatic Hydrocarbon Dry Reference Concentrations

Compound	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	<2.37	4.15	2.35	<2.96	34.9
Acenaphthylene	<2.37	3.09	<2.33	<2.60	16.4
Anthracene	<2.37	3.39	<2.33	<2.70	22.1
Benzo(a)Anthracene	<2.37	<2.35	<2.33	<2.35	0.9
Benzo(b)Fluoranthene	<2.37	6.33	<2.33	<3.68	62.3
Benzo(k)Fluoranthene	<2.37	<2.35	<2.33	<2.35	0.9
Benzo(a)fluorene	<2.37	3.21	<2.33	<2.64	18.8
Benzo(b)fluorene	<2.37	<2.35	<2.33	<2.35	0.9
Benzo(g,h,i)Perylene	<2.37	<2.35	3.05	<2.59	15.4
Benzo(a)Pyrene	<2.37	<2.35	<2.33	<2.35	0.9
Benzo(e)Pyrene	<2.37	5.05	3.97	<3.80	35.5
Biphenyl	8.15	17.5	89.1	38.3	116
2-Chloronaphthalene	<2.37	<2.35	<2.33	<2.35	0.9
Chrysene/Triphenylene	<2.37	34.7	<2.33	<13.1	142
Coronene	<11.9	<11.8	<11.7	<11.8	0.9
Dibenzo(a,c/a,h)Anthracene	<2.37	<2.35	<2.33	<2.35	0.9
Dibenzo(a,e)pyrene	<11.9	<11.8	<11.7	<11.8	0.9
9,10-dimethylanthracene	<2.37	<2.35	<2.33	<2.35	0.9
7,12-Dimethylbenzo(a)anthracene	<2.37	11.8	<2.33	<5.49	98.9
Fluoranthene	14.2	30.0	17.2	20.4	40.9
Fluorene	7.74	11.8	10.7	10.1	20.8
Indeno(1,2,3-cd)Pyrene	<2.37	<2.35	<2.33	<2.35	0.9
2-methylanthracene	<2.37	4.52	2.94	<3.28	34.0
3-Methylcholanthrene	<11.9	<11.8	<11.7	<11.8	0.9
1-Methylnaphthalene	5.30	14.0	10.7	9.98	43.8
2-Methylnaphthalene	7.58	24.1	18.8	16.8	50.1
1-Methylphenanthrene	<2.37	<2.35	<2.33	<2.35	0.9
9-Methylphenanthrene	5.48	13.3	8.17	8.97	44.0
Naphthalene	20.2	60.3	33.5	38.0	53.8
Perylene	<2.37	<2.35	<2.33	<2.35	0.9
Phenanthrene	87.9	150	125	121	25.8
Picene	<11.9	<11.8	<11.7	<11.8	0.9
Pyrene	19.5	29.4	14.7	21.2	35.2
Tetralin	8.21	6.42	8.17	7.60	13.4
m-terphenyl	<2.37	<2.35	<2.33	<2.35	0.9
o-Terphenyl	<2.37	2.35	3.40	<2.71	22.2
p-terphenyl	<2.37	<2.35	<2.33	<2.35	0.9
Total	<286	<513	<441	<413	28.0

* At 25°C and 1 atmosphere

TABLE 76
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Polycyclic Aromatic Hydrocarbon Dry Adjusted Concentrations

Compound	Dry Adjusted Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	<1.84	3.23	1.83	<2.30	35.1
Acenaphthylene	<1.84	2.41	<1.82	<2.02	16.6
Anthracene	<1.84	2.64	<1.82	<2.10	22.3
Benzo(a)Anthracene	<1.84	<1.83	<1.82	<1.83	0.6
Benzo(b)Fluoranthene	<1.84	4.93	<1.82	<2.86	62.5
Benzo(k)Fluoranthene	<1.84	<1.83	<1.82	<1.83	0.6
Benzo(a)fluorene	<1.84	2.50	<1.82	<2.05	19.0
Benzo(b)fluorene	<1.84	<1.83	<1.82	<1.83	0.6
Benzo(g,h,i)Perylene	<1.84	<1.83	2.38	<2.02	15.6
Benzo(a)Pyrene	<1.84	<1.83	<1.82	<1.83	0.6
Benzo(e)Pyrene	<1.84	3.94	3.09	<2.95	35.7
Biphenyl	6.31	13.7	69.4	29.8	116
2-Chloronaphthalene	<1.84	<1.83	<1.82	<1.83	0.6
Chrysene/Triphenylene	<1.84	27.0	<1.82	<10.2	142
Coronene	<9.19	<9.15	<9.09	<9.14	0.6
Dibenzo(a,c/a,h)Anthracene	<1.84	<1.83	<1.82	<1.83	0.6
Dibenzo(a,e)pyrene	<9.19	<9.15	<9.09	<9.14	0.6
9,10-dimethylanthracene	<1.84	<1.83	<1.82	<1.83	0.6
7,12-Dimethylbenzo(a)anthracene	<1.84	9.15	<1.82	<4.27	99.1
Fluoranthene	11.0	23.3	13.4	15.9	41.2
Fluorene	5.99	9.18	8.35	7.84	21.1
Indeno(1,2,3-cd)Pyrene	<1.84	<1.83	<1.82	<1.83	0.6
2-methylanthracene	<1.84	3.52	2.29	<2.55	34.2
3-Methylcholanthrene	<9.19	<9.15	<9.09	<9.14	0.6
1-Methylnaphthalene	4.10	10.9	8.30	7.76	44.0
2-Methylnaphthalene	5.87	18.8	14.6	13.1	50.3
1-Methylphenanthrene	<1.84	<1.83	<1.82	<1.83	0.6
9-Methylphenanthrene	4.24	10.3	6.36	6.98	44.3
Naphthalene	15.6	47.0	26.1	29.6	54.0
Perylene	<1.84	<1.83	<1.82	<1.83	0.6
Phenanthrene	68.0	117	97.6	94.1	26.1
Picene	<9.19	<9.15	<9.09	<9.14	0.6
Pyrene	15.1	22.9	11.5	16.5	35.4
Tetralin	6.36	5.00	6.36	5.91	13.2
m-terphenyl	<1.84	<1.83	<1.82	<1.83	0.6
o-Terphenyl	<1.84	1.83	2.65	<2.11	22.4
p-terphenyl	<1.84	<1.83	<1.82	<1.83	0.6
Total	<222	<399	<343	<321	28.3

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 77
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Polycyclic Aromatic Hydrocarbon Wet Reference Concentrations

Compound	Wet Reference Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	<1.98	3.44	1.95	<2.46	34.7
Acenaphthylene	<1.98	2.56	<1.93	<2.16	16.3
Anthracene	<1.98	2.81	<1.93	<2.24	22.0
Benzo(a)Anthracene	<1.98	<1.95	<1.93	<1.95	1.1
Benzo(b)Fluoranthene	<1.98	5.24	<1.93	<3.05	62.2
Benzo(k)Fluoranthene	<1.98	<1.95	<1.93	<1.95	1.1
Benzo(a)fluorene	<1.98	2.66	<1.93	<2.19	18.6
Benzo(b)fluorene	<1.98	<1.95	<1.93	<1.95	1.1
Benzo(g,h,i)Perylene	<1.98	<1.95	2.53	<2.15	15.3
Benzo(a)Pyrene	<1.98	<1.95	<1.93	<1.95	1.1
Benzo(e)Pyrene	<1.98	4.19	3.29	<3.15	35.3
Biphenyl	6.79	14.5	73.8	31.7	116
2-Chloronaphthalene	<1.98	<1.95	<1.93	<1.95	1.1
Chrysene/Triphenylene	<1.98	28.7	<1.93	<10.9	142
Coronene	<9.88	<9.74	<9.67	<9.77	1.1
Dibenzo(a,c/a,h)Anthracene	<1.98	<1.95	<1.93	<1.95	1.1
Dibenzo(a,e)pyrene	<9.88	<9.74	<9.67	<9.77	1.1
9,10-dimethylanthracene	<1.98	<1.95	<1.93	<1.95	1.1
7,12-Dimethylbenzo(a)anthracene	<1.98	9.74	<1.93	<4.55	98.8
Fluoranthene	11.8	24.8	14.2	17.0	40.8
Fluorene	6.44	9.77	8.88	8.37	20.6
Indeno(1,2,3-cd)Pyrene	<1.98	<1.95	<1.93	<1.95	1.1
2-methylanthracene	<1.98	3.75	2.43	<2.72	33.8
3-Methylcholanthrene	<9.88	<9.74	<9.67	<9.77	1.1
1-Methylnaphthalene	4.42	11.6	8.83	8.27	43.7
2-Methylnaphthalene	6.31	20.0	15.6	13.9	50.0
1-Methylphenanthrene	<1.98	<1.95	<1.93	<1.95	1.1
9-Methylphenanthrene	4.56	11.0	6.77	7.44	43.9
Naphthalene	16.8	50.0	27.7	31.5	53.7
Perylene	<1.98	<1.95	<1.93	<1.95	1.1
Phenanthrene	73.1	124	103.8	100	25.7
Picene	<9.88	<9.74	<9.67	<9.77	1.1
Pyrene	16.2	24.4	12.2	17.6	35.1
Tetralin	6.84	5.32	6.77	6.31	13.5
m-terphenyl	<1.98	<1.95	<1.93	<1.95	1.1
o-Terphenyl	<1.98	1.95	2.82	<2.25	22.1
p-terphenyl	<1.98	<1.95	<1.93	<1.95	1.1
Total	<238	<425	<365	<343	27.8

* At 25°C and 1 atmosphere

TABLE 78
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Polycyclic Aromatic Hydrocarbon Emission Rates

Compound	Emission Rate				Coefficient of Variation
	Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	%
Acenaphthene	<0.037	0.064	0.036	<0.046	35.1
Acenaphthylene	<0.037	0.048	<0.036	<0.040	16.6
Anthracene	<0.037	0.053	<0.036	<0.042	22.3
Benzo(a)Anthracene	<0.037	<0.036	<0.036	<0.036	0.6
Benzo(b)Fluoranthene	<0.037	0.098	<0.036	<0.057	62.5
Benzo(k)Fluoranthene	<0.037	<0.036	<0.036	<0.036	0.6
Benzo(a)fluorene	<0.037	0.050	<0.036	<0.041	19.0
Benzo(b)fluorene	<0.037	<0.036	<0.036	<0.036	0.6
Benzo(g,h,i)Perylene	<0.037	<0.036	0.047	<0.040	15.6
Benzo(a)Pyrene	<0.037	<0.036	<0.036	<0.036	0.6
Benzo(e)Pyrene	<0.037	0.078	0.061	<0.059	35.7
Biphenyl	0.126	0.27	1.38	0.59	116
2-Chloronaphthalene	<0.037	<0.036	<0.036	<0.036	0.6
Chrysene/Triphenylene	<0.037	0.54	<0.036	<0.20	142
Coronene	<0.18	<0.18	<0.18	<0.18	0.6
Dibenzo(a,c/a,h)Anthracene	<0.037	<0.036	<0.036	<0.036	0.6
Dibenzo(a,e)pyrene	<0.18	<0.18	<0.18	<0.18	0.6
9,10-dimethylanthracene	<0.037	<0.036	<0.036	<0.036	0.6
7,12-Dimethylbenzo(a)anthracene	<0.037	0.18	<0.036	<0.085	99.1
Fluoranthene	0.22	0.46	0.27	0.32	41.2
Fluorene	0.12	0.18	0.17	0.16	21.1
Indeno(1,2,3-cd)Pyrene	<0.037	<0.036	<0.036	<0.036	0.6
2-methylanthracene	<0.037	0.070	0.046	<0.051	34.2
3-Methylcholanthrene	<0.18	<0.18	<0.18	<0.18	0.6
1-Methylnaphthalene	0.082	0.22	0.17	0.15	44.0
2-Methylnaphthalene	0.12	0.37	0.29	0.26	50.3
1-Methylphenanthrene	<0.037	<0.036	<0.036	<0.036	0.6
9-Methylphenanthrene	0.084	0.21	0.13	0.14	44.3
Naphthalene	0.31	0.93	0.52	0.59	54.0
Perylene	<0.037	<0.036	<0.036	<0.036	0.6
Phenanthrene	1.35	2.33	1.94	1.87	26.1
Picene	<0.18	<0.18	<0.18	<0.18	0.6
Pyrene	0.30	0.46	0.23	0.33	35.4
Tetralin	0.13	0.10	0.13	0.12	13.2
m-terphenyl	<0.037	<0.036	<0.036	<0.036	0.6
o-Terphenyl	<0.037	0.036	0.053	<0.042	22.4
p-terphenyl	<0.037	<0.036	<0.036	<0.036	0.6
Total	<4.41	<7.95	<6.83	<6.40	28.3

TABLE 79
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Polycyclic Aromatic Hydrocarbon Emission Data

Compound	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
Acenaphthene	<1.71	<2.96	<2.30	<2.46	<0.046
Acenaphthylene	<1.50	<2.60	<2.02	<2.16	<0.040
Anthracene	<1.56	<2.70	<2.10	<2.24	<0.042
Benzo(a)Anthracene	<1.36	<2.35	<1.83	<1.95	<0.036
Benzo(b)Fluoranthene	<2.12	<3.68	<2.86	<3.05	<0.057
Benzo(k)Fluoranthene	<1.36	<2.35	<1.83	<1.95	<0.036
Benzo(a)fluorene	<1.52	<2.64	<2.05	<2.19	<0.041
Benzo(b)fluorene	<1.36	<2.35	<1.83	<1.95	<0.036
Benzo(g,h,i)Perylene	<1.50	<2.59	<2.02	<2.15	<0.040
Benzo(a)Pyrene	<1.36	<2.35	<1.83	<1.95	<0.036
Benzo(e)Pyrene	<2.19	<3.80	<2.95	<3.15	<0.059
Biphenyl	22.2	38.3	29.8	31.7	0.59
2-Chloronaphthalene	<1.36	<2.35	<1.83	<1.95	<0.036
Chrysene/Triphenylene	<7.54	<13.1	<10.2	<10.9	<0.20
Coronene	<6.79	<11.8	<9.14	<9.77	<0.18
Dibenzo(a,c/a,h)Anthracene	<1.36	<2.35	<1.83	<1.95	<0.036
Dibenzo(a,e)pyrene	<6.79	<11.8	<9.14	<9.77	<0.18
9,10-dimethylanthracene	<1.36	<2.35	<1.83	<1.95	<0.036
7,12-Dimethylbenzo(a)anthracene	<3.16	<5.49	<4.27	<4.55	<0.085
Fluoranthene	11.8	20.4	15.9	17.0	0.32
Fluorene	5.82	10.1	7.84	8.37	0.16
Indeno(1,2,3-cd)Pyrene	<1.36	<2.35	<1.83	<1.95	<0.036
2-methylanthracene	<1.89	<3.28	<2.55	<2.72	<0.051
3-Methylcholanthrene	<6.79	<11.8	<9.14	<9.77	<0.18
1-Methylnaphthalene	5.76	9.98	7.76	8.27	0.15
2-Methylnaphthalene	9.71	16.8	13.1	13.9	0.26
1-Methylphenanthrene	<1.36	<2.35	<1.83	<1.95	<0.036
9-Methylphenanthrene	5.17	8.97	6.98	7.44	0.14
Naphthalene	21.9	38.0	29.6	31.5	0.59
Perylene	<1.36	<2.35	<1.83	<1.95	<0.036
Phenanthrene	69.9	121	94.1	100	1.87
Picene	<6.79	<11.8	<9.14	<9.77	<0.18
Pyrene	12.2	21.2	16.5	17.6	0.33
Tetralin	4.39	7.60	5.91	6.31	0.12
m-terphenyl	<1.36	<2.35	<1.83	<1.95	<0.036
o-Terphenyl	<1.57	<2.71	<2.11	<2.25	<0.042
p-terphenyl	<1.36	<2.35	<1.83	<1.95	<0.036
Total	<239	<413	<321	<343	<6.40

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 80
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Blank Polycyclic Aromatic Hydrocarbon Analyses

Compound	Blank Train ng	Media Blank ng
Acenaphthene	<12	<12
Acenaphthylene	<12	<12
Anthracene	<12	<12
Benzo(a)Anthracene	<12	<12
Benzo(b)Fluoranthene	<12	<12
Benzo(k)Fluoranthene	<12	<12
Benzo(a)fluorene	<12	<12
Benzo(b)fluorene	<12	<12
Benzo(g,h,i)Perylene	<12	<12
Benzo(a)Pyrene	<12	<12
Benzo(e)Pyrene	<12	<12
Biphenyl	<12	<12
2-Chloronaphthalene	<12	<12
Chrysene/Triphenylene	<12	<12
Coronene	<60	<60
Dibenzo(a,c/a,h)Anthracene	<12	<12
Dibenzo(a,e)pyrene	<60	<60
9,10-dimethylanthracene	<12	<12
7,12-Dimethylbenzo(a)anthracene	<12	<12
Fluoranthene	<12	<12
Fluorene	<12	<12
Indeno(1,2,3-cd)Pyrene	<12	<12
2-methylanthracene	<12	<12
3-Methylcholanthrene	<60	<60
1-Methylnaphthalene	<12	<12
2-Methylnaphthalene	14.6	<12
1-Methylphenanthrene	<12	<12
9-Methylphenanthrene	<12	<12
Naphthalene	63.2	74.5
Perylene	<12	<12
Phenanthrene	26.5	<12
Picene	<60	<60
Pyrene	<12	<12
Tetralin	19.1	20.3
m-terphenyl	<12	<12
o-Terphenyl	<12	<12
p-terphenyl	<12	<12
Total	<711	<707

"<" indicates that the amount detected is less than the detection limit. In these cases the value of the detection limit was used to calculate the total collected.

TABLE 81
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Acetaldehyde, Formaldehyde and Acrolein Emission Data

Acetaldehyde

Test No.	Total Collected µg	Dry Volume Sampled Rm^3*	Acetaldehyde Concentration Actual µg/m^3	Dry Reference µg/Rm^3*	Dry Adjusted µg/Rm^3**	Wet Reference µg/Rm^3*	Acetaldehyde Emission Rate mg/s
1	0.37	0.1175	1.81	3.15	2.44	2.62	0.048
2	0.44	0.1214	2.08	3.63	2.82	3.00	0.056
3	0.33	0.1210	1.56	2.73	2.12	2.26	0.042
Average			1.82	3.17	2.46	2.63	0.049
Blank Train	<0.1						
Method Blank	12.6						

Formaldehyde

Test No.	Total Collected µg	Dry Volume Sampled Rm^3*	Formaldehyde Concentration Actual µg/m^3	Dry Reference µg/Rm^3*	Dry Adjusted µg/Rm^3**	Wet Reference µg/Rm^3*	Formaldehyde Emission Rate mg/s
1	12.0	0.1175	58.6	102	79.0	85.0	1.57
2	1.88	0.1214	8.87	15.5	12.0	12.8	0.24
3	7.72	0.1210	36.5	63.8	49.5	52.8	0.99
Average			34.7	60.5	46.9	50.2	0.93
Blank Train	8.92						
Method Blank	5.44						

Acrolein

Test No.	Total Collected µg	Dry Volume Sampled Rm^3*	Acrolein Concentration Actual µg/m^3	Dry Reference µg/Rm^3*	Dry Adjusted µg/Rm^3**	Wet Reference µg/Rm^3*	Acrolein Emission Rate mg/s
1	<0.1	0.1175	<0.49	<0.85	<0.66	<0.71	<0.013
2	<0.1	0.1214	<0.47	<0.82	<0.64	<0.68	<0.013
3	<0.1	0.1210	<0.47	<0.83	<0.64	<0.68	<0.013
Average			<0.48	<0.83	<0.65	<0.69	<0.013
Blank Train	<0.1						
Method Blank	0.21						

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

Sampling was conducted at a single point. Volumetric flowrates from corresponding isokinetic tests were used to calculate emission data.

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 82
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organic Emission Data
Test No. 1

Compound	Total Collected µg	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Acetone	0.087	2.56	4.45	3.45	3.71	0.069
Benzene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Bromodichloromethane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Bromoform	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Bromomethane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
1,3-Butadiene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
2-Butanone	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Carbon Tetrachloride	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Chloroform	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Cumene (Isopropylbenzene)	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Dibromochloromethane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Dichlorodifluoromethane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
1,2-Dichloroethane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
trans,1,2-Dichloroethene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
1,1-Dichloroethene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
1,2-Dichloropropane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Ethylbenzene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Ethylene Dibromide	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Mesitylene (1,3,5-Trimethylbenzene)	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Methylene Chloride	0.10	2.94	5.12	3.96	4.26	0.079
Styrene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Tetrachloroethene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Toluene	1.37	40.3	70.1	54.3	58.4	1.08
1,1,1-Trichloroethane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Trichloroethene/1,1,2-Trichloroethene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Trichlorotrifluoroethane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Trichlorofluoromethane	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
M&P-Xylene	<0.10	<2.94	<5.12	<3.96	<4.26	<0.079
O-Xylene	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Vinyl Chloride	<0.050	<1.47	<2.56	<1.98	<2.13	<0.039
Total	<2.96	<87.0	<151	<117	<126	<2.33

Dry Gas Volume Sampled (Rm³*) :	0.0195
Actual Flowrate (m³/s) :	26.8
Dry Reference Flowrate (Rm³/s*) :	15.4
Dry Adjusted Flowrate (Rm³/s**) :	19.9
Wet Reference Flowrate (Rm³/s*) :	18.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 83
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organic Emission Data
Test No. 2

Compound	Total Collected µg	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Acetone	0.075	2.09	3.63	2.81	3.03	0.056
Benzene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Bromodichloromethane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Bromoform	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Bromomethane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
1,3-Butadiene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
2-Butanone	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Carbon Tetrachloride	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Chloroform	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Cumene (Isopropylbenzene)	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Dibromochloromethane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Dichlorodifluoromethane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
1,2-Dichloroethane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
trans,1,2-Dichloroethene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
1,1-Dichloroethene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
1,2-Dichloropropane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Ethylbenzene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Ethylene Dibromide	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Mesitylene (1,3,5-Trimethylbenzene)	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Methylene Chloride	0.12	3.31	5.77	4.46	4.80	0.089
Styrene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Tetrachloroethene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Toluene	0.070	1.95	3.39	2.62	2.82	0.052
1,1,1-Trichloroethane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Trichloroethene/1,1,2-Trichloroethene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Trichlorotrifluoroethane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Trichlorofluoromethane	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
M&P-Xylene	<0.10	<2.78	<4.85	<3.75	<4.03	<0.075
O-Xylene	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Vinyl Chloride	<0.050	<1.39	<2.42	<1.87	<2.02	<0.037
Total	<1.66	<46.3	<80.6	<62.4	<67.1	<1.24

Dry Gas Volume Sampled (Rm³*) :	0.0206
Actual Flowrate (m³/s) :	26.8
Dry Reference Flowrate (Rm³/s*) :	15.4
Dry Adjusted Flowrate (Rm³/s**) :	19.9
Wet Reference Flowrate (Rm³/s*) :	18.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 84
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organic Emission Data
Test No. 3

Compound	Total Collected µg	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Acetone	0.078	2.07	3.60	2.78	2.99	0.055
Benzene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Bromodichloromethane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Bromoform	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Bromomethane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
1,3-Butadiene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
2-Butanone	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Carbon Tetrachloride	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Chloroform	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Cumene (Isopropylbenzene)	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Dibromochloromethane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Dichlorodifluoromethane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
1,2-Dichloroethane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
trans,1,2-Dichloroethene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
1,1-Dichloroethene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
1,2-Dichloropropane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Ethylbenzene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Ethylene Dibromide	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Mesitylene (1,3,5-Trimethylbenzene)	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Methylene Chloride	0.097	2.57	4.47	3.46	3.72	0.069
Styrene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Tetrachloroethene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Toluene	0.48	12.8	22.3	17.3	18.6	0.34
1,1,1-Trichloroethane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Trichloroethene/1,1,2-Trichloroethene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Trichlorotrifluoroethane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Trichlorofluoromethane	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
M&P-Xylene	<0.10	<2.65	<4.61	<3.57	<3.84	<0.071
O-Xylene	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Vinyl Chloride	<0.050	<1.32	<2.30	<1.78	<1.92	<0.035
Total	<2.06	<54.5	<94.9	<73.4	<79.0	<1.46

Dry Gas Volume Sampled (Rm³*) :	0.0217
Actual Flowrate (m³/s) :	26.8
Dry Reference Flowrate (Rm³/s*) :	15.4
Dry Adjusted Flowrate (Rm³/s**) :	19.9
Wet Reference Flowrate (Rm³/s*) :	18.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 85
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organic Actual Concentrations

Compound	Actual Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	µg/m³	µg/m³	µg/m³	µg/m³	%
Acetone	2.56	2.09	2.07	2.24	12.5
Benzene	<1.47	<1.39	<1.32	<1.40	5.3
Bromodichloromethane	<1.47	<1.39	<1.32	<1.40	5.3
Bromoform	<1.47	<1.39	<1.32	<1.40	5.3
Bromomethane	<1.47	<1.39	<1.32	<1.40	5.3
1,3-Butadiene	<1.47	<1.39	<1.32	<1.40	5.3
2-Butanone	<1.47	<1.39	<1.32	<1.40	5.3
Carbon Tetrachloride	<1.47	<1.39	<1.32	<1.40	5.3
Chloroform	<1.47	<1.39	<1.32	<1.40	5.3
Cumene (Isopropylbenzene)	<1.47	<1.39	<1.32	<1.40	5.3
Dibromochloromethane	<1.47	<1.39	<1.32	<1.40	5.3
Dichlorodifluoromethane	<1.47	<1.39	<1.32	<1.40	5.3
1,2-Dichloroethane	<1.47	<1.39	<1.32	<1.40	5.3
trans,1,2-Dichloroethene	<1.47	<1.39	<1.32	<1.40	5.3
1,1-Dichloroethene	<1.47	<1.39	<1.32	<1.40	5.3
1,2-Dichloropropane	<1.47	<1.39	<1.32	<1.40	5.3
Ethylbenzene	<1.47	<1.39	<1.32	<1.40	5.3
Ethylene Dibromide	<1.47	<1.39	<1.32	<1.40	5.3
Mesitylene (1,3,5-Trimethylbenzene)	<1.47	<1.39	<1.32	<1.40	5.3
Methylene Chloride	2.94	3.31	2.57	2.94	12.7
Styrene	<1.47	<1.39	<1.32	<1.40	5.3
Tetrachloroethene	<1.47	<1.39	<1.32	<1.40	5.3
Toluene	40.3	1.95	12.8	18.4	108
1,1,1-Trichloroethane	<1.47	<1.39	<1.32	<1.40	5.3
Trichloroethene/1,1,2-Trichloroethene	<1.47	<1.39	<1.32	<1.40	5.3
Trichlorotrifluoroethane	<1.47	<1.39	<1.32	<1.40	5.3
Trichlorofluoromethane	<1.47	<1.39	<1.32	<1.40	5.3
M&P-Xylene	<2.94	<2.78	<2.65	<2.79	5.3
O-Xylene	<1.47	<1.39	<1.32	<1.40	5.3
Vinyl Chloride	<1.47	<1.39	<1.32	<1.40	5.3
Total	<87.0	<46.3	<54.5	<62.6	34.3

TABLE 86
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organic Dry Reference Concentrations

Compound	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Acetone	4.45	3.63	3.60	3.89	12.5
Benzene	<2.56	<2.42	<2.30	<2.43	5.3
Bromodichloromethane	<2.56	<2.42	<2.30	<2.43	5.3
Bromoform	<2.56	<2.42	<2.30	<2.43	5.3
Bromomethane	<2.56	<2.42	<2.30	<2.43	5.3
1,3-Butadiene	<2.56	<2.42	<2.30	<2.43	5.3
2-Butanone	<2.56	<2.42	<2.30	<2.43	5.3
Carbon Tetrachloride	<2.56	<2.42	<2.30	<2.43	5.3
Chloroform	<2.56	<2.42	<2.30	<2.43	5.3
Cumene (Isopropylbenzene)	<2.56	<2.42	<2.30	<2.43	5.3
Dibromochloromethane	<2.56	<2.42	<2.30	<2.43	5.3
Dichlorodifluoromethane	<2.56	<2.42	<2.30	<2.43	5.3
1,2-Dichloroethane	<2.56	<2.42	<2.30	<2.43	5.3
trans,1,2-Dichloroethene	<2.56	<2.42	<2.30	<2.43	5.3
1,1-Dichloroethene	<2.56	<2.42	<2.30	<2.43	5.3
1,2-Dichloropropane	<2.56	<2.42	<2.30	<2.43	5.3
Ethylbenzene	<2.56	<2.42	<2.30	<2.43	5.3
Ethylene Dibromide	<2.56	<2.42	<2.30	<2.43	5.3
Mesitylene (1,3,5-Trimethylbenzene)	<2.56	<2.42	<2.30	<2.43	5.3
Methylene Chloride	5.12	5.77	4.47	5.12	12.7
Styrene	<2.56	<2.42	<2.30	<2.43	5.3
Tetrachloroethene	<2.56	<2.42	<2.30	<2.43	5.3
Toluene	70.1	3.39	22.3	31.9	108
1,1,1-Trichloroethane	<2.56	<2.42	<2.30	<2.43	5.3
Trichloroethene/1,1,2-Trichloroethene	<2.56	<2.42	<2.30	<2.43	5.3
Trichlorotrifluoroethane	<2.56	<2.42	<2.30	<2.43	5.3
Trichlorofluoromethane	<2.56	<2.42	<2.30	<2.43	5.3
M&P-Xylene	<5.12	<4.85	<4.61	<4.86	5.3
O-Xylene	<2.56	<2.42	<2.30	<2.43	5.3
Vinyl Chloride	<2.56	<2.42	<2.30	<2.43	5.3
Total	<151	<80.6	<94.9	<109	34.3

* At 25°C and 1 atmosphere

TABLE 87
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organic Dry Adjusted Concentrations

Compound	Dry Adjusted Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Acetone	3.45	2.81	2.78	3.01	12.5
Benzene	<1.98	<1.87	<1.78	<1.88	5.3
Bromodichloromethane	<1.98	<1.87	<1.78	<1.88	5.3
Bromoform	<1.98	<1.87	<1.78	<1.88	5.3
Bromomethane	<1.98	<1.87	<1.78	<1.88	5.3
1,3-Butadiene	<1.98	<1.87	<1.78	<1.88	5.3
2-Butanone	<1.98	<1.87	<1.78	<1.88	5.3
Carbon Tetrachloride	<1.98	<1.87	<1.78	<1.88	5.3
Chloroform	<1.98	<1.87	<1.78	<1.88	5.3
Cumene (Isopropylbenzene)	<1.98	<1.87	<1.78	<1.88	5.3
Dibromochloromethane	<1.98	<1.87	<1.78	<1.88	5.3
Dichlorodifluoromethane	<1.98	<1.87	<1.78	<1.88	5.3
1,2-Dichloroethane	<1.98	<1.87	<1.78	<1.88	5.3
trans,1,2-Dichloroethene	<1.98	<1.87	<1.78	<1.88	5.3
1,1-Dichloroethene	<1.98	<1.87	<1.78	<1.88	5.3
1,2-Dichloropropane	<1.98	<1.87	<1.78	<1.88	5.3
Ethylbenzene	<1.98	<1.87	<1.78	<1.88	5.3
Ethylene Dibromide	<1.98	<1.87	<1.78	<1.88	5.3
Mesitylene (1,3,5-Trimethylbenzene)	<1.98	<1.87	<1.78	<1.88	5.3
Methylene Chloride	3.96	4.46	3.46	3.96	12.7
Styrene	<1.98	<1.87	<1.78	<1.88	5.3
Tetrachloroethene	<1.98	<1.87	<1.78	<1.88	5.3
Toluene	54.3	2.62	17.3	24.7	108
1,1,1-Trichloroethane	<1.98	<1.87	<1.78	<1.88	5.3
Trichloroethene/1,1,2-Trichloroethene	<1.98	<1.87	<1.78	<1.88	5.3
Trichlorotrifluoroethane	<1.98	<1.87	<1.78	<1.88	5.3
Trichlorofluoromethane	<1.98	<1.87	<1.78	<1.88	5.3
M&P-Xylene	<3.96	<3.75	<3.57	<3.76	5.3
O-Xylene	<1.98	<1.87	<1.78	<1.88	5.3
Vinyl Chloride	<1.98	<1.87	<1.78	<1.88	5.3
Total	<117	<62.4	<73.4	<84.3	34.3

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 88
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organic Wet Reference Concentrations

Compound	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*	%
Acetone	3.71	3.03	2.99	3.24	12.5
Benzene	<2.13	<2.02	<1.92	<2.02	5.3
Bromodichloromethane	<2.13	<2.02	<1.92	<2.02	5.3
Bromoform	<2.13	<2.02	<1.92	<2.02	5.3
Bromomethane	<2.13	<2.02	<1.92	<2.02	5.3
1,3-Butadiene	<2.13	<2.02	<1.92	<2.02	5.3
2-Butanone	<2.13	<2.02	<1.92	<2.02	5.3
Carbon Tetrachloride	<2.13	<2.02	<1.92	<2.02	5.3
Chloroform	<2.13	<2.02	<1.92	<2.02	5.3
Cumene (Isopropylbenzene)	<2.13	<2.02	<1.92	<2.02	5.3
Dibromochloromethane	<2.13	<2.02	<1.92	<2.02	5.3
Dichlorodifluoromethane	<2.13	<2.02	<1.92	<2.02	5.3
1,2-Dichloroethane	<2.13	<2.02	<1.92	<2.02	5.3
trans,1,2-Dichloroethene	<2.13	<2.02	<1.92	<2.02	5.3
1,1-Dichloroethene	<2.13	<2.02	<1.92	<2.02	5.3
1,2-Dichloropropane	<2.13	<2.02	<1.92	<2.02	5.3
Ethylbenzene	<2.13	<2.02	<1.92	<2.02	5.3
Ethylene Dibromide	<2.13	<2.02	<1.92	<2.02	5.3
Mesitylene (1,3,5-Trimethylbenzene)	<2.13	<2.02	<1.92	<2.02	5.3
Methylene Chloride	4.26	4.80	3.72	4.26	12.7
Styrene	<2.13	<2.02	<1.92	<2.02	5.3
Tetrachloroethene	<2.13	<2.02	<1.92	<2.02	5.3
Toluene	58.4	2.82	18.6	26.6	108
1,1,1-Trichloroethane	<2.13	<2.02	<1.92	<2.02	5.3
Trichloroethene/1,1,2-Trichloroethene	<2.13	<2.02	<1.92	<2.02	5.3
Trichlorotrifluoroethane	<2.13	<2.02	<1.92	<2.02	5.3
Trichlorofluoromethane	<2.13	<2.02	<1.92	<2.02	5.3
M&P-Xylene	<4.26	<4.03	<3.84	<4.04	5.3
O-Xylene	<2.13	<2.02	<1.92	<2.02	5.3
Vinyl Chloride	<2.13	<2.02	<1.92	<2.02	5.3
Total	<126	<67.1	<79.0	<90.7	34.3

* At 25°C and 1 atmosphere

TABLE 89
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organic Emission Rates

Compound	Emission Rate				Coefficient
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	of Variation %
Acetone	0.069	0.056	0.055	0.060	12.5
Benzene	<0.039	<0.037	<0.035	<0.037	5.3
Bromodichloromethane	<0.039	<0.037	<0.035	<0.037	5.3
Bromoform	<0.039	<0.037	<0.035	<0.037	5.3
Bromomethane	<0.039	<0.037	<0.035	<0.037	5.3
1,3-Butadiene	<0.039	<0.037	<0.035	<0.037	5.3
2-Butanone	<0.039	<0.037	<0.035	<0.037	5.3
Carbon Tetrachloride	<0.039	<0.037	<0.035	<0.037	5.3
Chloroform	<0.039	<0.037	<0.035	<0.037	5.3
Cumene (Isopropylbenzene)	<0.039	<0.037	<0.035	<0.037	5.3
Dibromochloromethane	<0.039	<0.037	<0.035	<0.037	5.3
Dichlorodifluoromethane	<0.039	<0.037	<0.035	<0.037	5.3
1,2-Dichloroethane	<0.039	<0.037	<0.035	<0.037	5.3
trans,1,2-Dichloroethene	<0.039	<0.037	<0.035	<0.037	5.3
1,1-Dichloroethene	<0.039	<0.037	<0.035	<0.037	5.3
1,2-Dichloropropane	<0.039	<0.037	<0.035	<0.037	5.3
Ethylbenzene	<0.039	<0.037	<0.035	<0.037	5.3
Ethylene Dibromide	<0.039	<0.037	<0.035	<0.037	5.3
Mesitylene (1,3,5-Trimethylbenzene)	<0.039	<0.037	<0.035	<0.037	5.3
Methylene Chloride	0.079	0.089	0.069	0.079	12.7
Styrene	<0.039	<0.037	<0.035	<0.037	5.3
Tetrachloroethene	<0.039	<0.037	<0.035	<0.037	5.3
Toluene	1.08	0.052	0.34	0.49	108
1,1,1-Trichloroethane	<0.039	<0.037	<0.035	<0.037	5.3
Trichloroethene/1,1,2-Trichloroethene	<0.039	<0.037	<0.035	<0.037	5.3
Trichlorotrifluoroethane	<0.039	<0.037	<0.035	<0.037	5.3
Trichlorofluoromethane	<0.039	<0.037	<0.035	<0.037	5.3
M&P-Xylene	<0.079	<0.075	<0.071	<0.075	5.3
O-Xylene	<0.039	<0.037	<0.035	<0.037	5.3
Vinyl Chloride	<0.039	<0.037	<0.035	<0.037	5.3
Total	<2.33	<1.24	<1.46	<1.68	34.3

TABLE 90
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Summary of Volatile Organic Emission Data

Compound	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³*	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Acetone	2.24	3.89	3.01	3.24	0.060
Benzene	<1.40	<2.43	<1.88	<2.02	<0.037
Bromodichloromethane	<1.40	<2.43	<1.88	<2.02	<0.037
Bromoform	<1.40	<2.43	<1.88	<2.02	<0.037
Bromomethane	<1.40	<2.43	<1.88	<2.02	<0.037
1,3-Butadiene	<1.40	<2.43	<1.88	<2.02	<0.037
2-Butanone	<1.40	<2.43	<1.88	<2.02	<0.037
Carbon Tetrachloride	<1.40	<2.43	<1.88	<2.02	<0.037
Chloroform	<1.40	<2.43	<1.88	<2.02	<0.037
Cumene (Isopropylbenzene)	<1.40	<2.43	<1.88	<2.02	<0.037
Dibromochloromethane	<1.40	<2.43	<1.88	<2.02	<0.037
Dichlorodifluoromethane	<1.40	<2.43	<1.88	<2.02	<0.037
1,2-Dichloroethane	<1.40	<2.43	<1.88	<2.02	<0.037
trans,1,2-Dichloroethene	<1.40	<2.43	<1.88	<2.02	<0.037
1,1-Dichloroethene	<1.40	<2.43	<1.88	<2.02	<0.037
1,2-Dichloropropane	<1.40	<2.43	<1.88	<2.02	<0.037
Ethylbenzene	<1.40	<2.43	<1.88	<2.02	<0.037
Ethylene Dibromide	<1.40	<2.43	<1.88	<2.02	<0.037
Mesitylene (1,3,5-Trimethylbenzene)	<1.40	<2.43	<1.88	<2.02	<0.037
Methylene Chloride	2.94	5.12	3.96	4.26	0.079
Styrene	<1.40	<2.43	<1.88	<2.02	<0.037
Tetrachloroethene	<1.40	<2.43	<1.88	<2.02	<0.037
Toluene	18.4	31.9	24.7	26.6	0.49
1,1,1-Trichloroethane	<1.40	<2.43	<1.88	<2.02	<0.037
Trichloroethene/1,1,2-Trichloroethene	<1.40	<2.43	<1.88	<2.02	<0.037
Trichlorotrifluoroethane	<1.40	<2.43	<1.88	<2.02	<0.037
Trichlorofluoromethane	<1.40	<2.43	<1.88	<2.02	<0.037
M&P-Xylene	<2.79	<4.86	<3.76	<4.04	<0.075
O-Xylene	<1.40	<2.43	<1.88	<2.02	<0.037
Vinyl Chloride	<1.40	<2.43	<1.88	<2.02	<0.037
Total	<62.6	<109	<84.3	<90.7	<1.68

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 91
Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Blank Volatile Organic Analyses

Compound	Field Blank Tube 5A/5B µg	Trip Blank Tube 15A/15B µg	Method Blank µg
Acetone	<0.050	<0.050	<0.050
Benzene	<0.050	<0.050	<0.050
Bromodichloromethane	<0.050	<0.050	<0.050
Bromoform	<0.050	<0.050	<0.050
Bromomethane	<0.050	<0.050	<0.050
1,3-Butadiene	<0.050	<0.050	<0.050
2-Butanone	<0.050	<0.050	<0.050
Carbon Tetrachloride	<0.050	<0.050	<0.050
Chloroform	<0.050	<0.050	<0.050
Cumene (Isopropylbenzene)	<0.050	<0.050	<0.050
Dibromochloromethane	<0.050	<0.050	<0.050
Dichlorodifluoromethane	<0.050	<0.050	<0.050
1,2-Dichloroethane	<0.050	<0.050	<0.050
trans,1,2-Dichloroethene	<0.050	<0.050	<0.050
1,1-Dichloroethene	<0.050	<0.050	<0.050
1,2-Dichloropropane	<0.050	<0.050	<0.050
Ethylbenzene	<0.050	<0.050	<0.050
Ethylene Dibromide	<0.050	<0.050	<0.050
Mesitylene (1,3,5-Trimethylbenzene)	<0.050	<0.050	<0.050
Methylene Chloride	<0.050	<0.050	<0.050
Styrene	<0.050	<0.050	<0.050
Tetrachloroethene	<0.050	<0.050	<0.050
Toluene	0.77	<0.050	<0.050
1,1,1-Trichloroethane	<0.050	<0.050	<0.050
Trichloroethene/1,1,2-Trichloroethene	<0.050	<0.050	<0.050
Trichlorotrifluoroethane	<0.050	<0.050	<0.050
Trichlorofluoromethane	<0.050	<0.050	<0.050
M&P-Xylene	<0.10	<0.10	<0.10
O-Xylene	<0.050	<0.050	<0.050
Vinyl Chloride	<0.050	<0.050	<0.050
Total	<2.27	<1.55	<1.55

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

APPENDIX 2

Boiler No. 2 BH Outlet
Data Tables
(93 pages)

TABLE 1
Covanta - Durham York Energy Centre
Boiler No. 2
Isokinetic Sampling Train Test Schedules

Particulate and Metals Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time* min
1	March 19, 2024	8:12	11:25	180
2	March 19, 2024	11:59	15:07	180
3	March 19, 2024	15:38	18:46	180

Particle Size Distribution Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time* min
1	March 18, 2024	10:27	12:30	120
2	March 18, 2024	14:21	16:24	120
3	March 18, 2024	16:57	18:59	120

Acid Gases Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time* min
1	March 19, 2024	8:13	9:13	60
2	March 19, 2024	9:56	10:56	60
3	March 19, 2024	11:07	12:07	60

Semi-Volatile Organic Compounds Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time* min
1	March 20, 2024	8:13	12:28	240
2	March 20, 2024	13:13	17:26	240
3	March 21, 2024	11:31	15:54	240

* Actual sampling time excluding leak-checks, traverse changes and process down time.

TABLE 2
Covanta - Durham York Energy Centre
Boiler No. 2
Organic Compounds Test Schedules

Acrolein and Aldehydes Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time min
1	March 20, 2024	12:00	13:00	60
2	March 20, 2024	13:17	14:17	60
3	March 20, 2024	14:36	15:36	60

Volatile Organic Compounds Trains

Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time min
1	March 20, 2024	7:59	8:39	40
2	March 20, 2024	8:48	9:28	40
3	March 20, 2024	9:39	10:19	40
4	March 20, 2024	10:32	11:12	40

Total Hydrocarbons Trains

Sampling Location	Test Number	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time min
BH Outlet	1	March 19, 2024	8:12	9:12	60
BH Outlet	2	March 19, 2024	9:20	10:20	60
BH Outlet	3	March 19, 2024	10:30	11:30	60
Quench Inlet	1	March 19, 2024	8:12	9:12	60
Quench Inlet	2	March 19, 2024	9:20	10:20	60
Quench Inlet	3	March 19, 2024	10:30	11:30	60

TABLE 3
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Stack Gas Sampling Parameters

Particulate and Metals Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.843	0.986	6.34	3.616	101.2
2	0.843	0.986	6.34	3.411	99.8
3	0.843	0.986	6.34	3.448	101.1

Particle Size Distribution Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.843	0.987	4.51	1.192	101.9
2	0.843	0.987	4.51	1.188	92.7
3	0.843	0.987	4.51	1.194	98.0

Acid Gases Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.844	1.018	6.57	1.277	101.4
2	0.844	1.018	6.57	1.290	99.4
3	0.844	1.018	6.57	1.281	100.0

Semi-Volatile Organic Compounds Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.843	0.986	6.34	4.506	100.4
2	0.843	0.986	6.34	4.674	100.9
3	0.843	0.986	6.34	4.592	101.3

* Dry at 25°C and 1 atmosphere

TABLE 4
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Stack Gas Physical Parameters

Particulate and Metals Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Static Pressure kPa	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	138	16.8	18.2	-2.81	96.8	10.8	8.55
2	135	16.0	17.1	-2.81	96.4	11.1	8.20
3	138	17.4	17.5	-2.81	96.3	11.0	8.14
Average	137	16.7	17.6	-2.81	96.5	11.0	8.30

Particle Size Distribution Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Static Pressure kPa	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	139	17.2	17.6	-2.94	96.8	10.8	8.57
2	139	16.8	19.3	-2.94	96.8	11.1	8.30
3	138	17.1	18.2	-2.94	96.8	11.1	8.13
Average	139	17.0	18.4	-2.94	96.8	11.0	8.33

Acid Gases Trains **

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Static Pressure kPa	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	139	18.1	18.2	-2.81	96.9	10.7	8.63
2	139	15.4	18.2	-2.81	96.8	10.7	8.64
3	139	16.1	18.2	-2.81	96.6	11.2	8.10
Average	139	16.5	18.2	-2.81	96.8	10.9	8.46

Semi-Volatile Organics Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Static Pressure kPa	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	141	16.9	17.3	-2.92	96.3	11.1	8.20
2	140	17.5	17.9	-2.92	96.6	11.2	8.01
3	140	16.5	17.0	-2.92	98.4	11.0	8.45
Average	140	17.0	17.4	-2.92	97.1	11.1	8.22

* Dry basis, measured by the DYEC CEMS

** Sampling was conducted isokinetically on a single traverse in the duct.

TABLE 5
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Stack Gas Volumetric Flowrates

Particulate and Metals Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	26.8	15.5	19.3	18.6
2	25.3	14.8	19.0	17.6
3	25.9	14.8	19.0	17.9
Average	26.0	15.0	19.1	18.0

Particle Size Distribution Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	26.1	14.9	18.6	18.0
2	28.6	16.5	21.0	19.8
3	27.0	15.5	20.0	18.7
Average	27.2	15.6	19.9	18.8

Acid Gases Trains ***

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	26.9	15.2	18.9	18.6
2	26.9	15.7	19.5	18.6
3	26.8	15.5	20.1	18.5
Average	26.9	15.5	19.5	18.6

Semi-Volatile Organics Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	25.6	14.6	18.7	17.5
2	26.5	15.0	19.6	18.2
3	25.2	14.7	18.5	17.6
Average	25.7	14.8	18.9	17.8

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

*** Sampling was conducted isokinetically on a single traverse in the duct. Volumetric flowrates from the corresponding particulate and metals tests were used to calculate emission data.

TABLE 6
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Particulate Emission Data

Test No.	Particulate Collected			Dry Gas Volume Sampled	Particulate Concentration				Particulate Emission Rate
	Probe Rinse	Main Filter	Total		Actual	Dry Reference	Dry Adjusted	Wet Reference	
	mg	mg	mg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	mg/s
1	4.9	2.9	7.8	3.616	1.24	2.16	1.73	1.80	33.3
2	3.9	2.4	6.3	3.411	1.08	1.85	1.44	1.55	27.3
3	2.7	3.0	5.7	3.448	0.94	1.65	1.28	1.37	24.4
Average					1.09	1.89	1.48	1.57	28.3
Blank	0.3	4.4	4.7						

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 7
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
$PM_{2.5}$ and PM_{10} Emission Data

$PM_{2.5}$

Test No.	Total Collected mg	Dry Volume Sampled Rm^3*	$PM_{2.5}$ Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Emission Rate mg/s
1	<1.0	1.192	<0.48	<0.84	<0.67	<0.69	<12.5
2	<1.7	1.188	<0.83	<1.43	<1.12	<1.19	<23.6
3	<1.2	1.194	<0.58	<1.01	<0.78	<0.83	<15.6
Average			<0.63	<1.09	<0.86	<0.91	<17.2
Blank	0.3						

PM_{10}

Test No.	Total Collected mg	Dry Volume Sampled Rm^3*	PM_{10} Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Emission Rate mg/s
1	<1.6	1.192	<0.77	<1.34	<1.08	<1.11	<20.0
2	<1.8	1.188	<0.87	<1.52	<1.19	<1.26	<25.0
3	<1.5	1.194	<0.72	<1.26	<0.97	<1.04	<19.5
Average			<0.79	<1.37	<1.08	<1.14	<21.5
Blank	0.5						

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 8
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Condensable Particulate Emission Data

Inorganic Condensable Particulate

Test No.	Total Collected mg	Dry Volume Sampled Rm^3*	Inorganic Condensable Particulate Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Emission Rate mg/s
1	3.0	1.192	1.44	2.52	2.02	2.08	37.5
2	3.7	1.188	1.80	3.11	2.45	2.60	51.4
3	3.2	1.194	1.54	2.68	2.08	2.22	41.5
Average			1.59	2.77	2.18	2.30	43.5
Blank	0.4						

Organic Condensable Particulate

Test No.	Total Collected mg	Dry Volume Sampled Rm^3*	Organic Condensable Particulate Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Emission Rate mg/s
1	3.4	1.192	1.63	2.85	2.29	2.36	42.5
2	4.4	1.188	2.14	3.70	2.91	3.09	61.1
3	3.3	1.194	1.59	2.76	2.14	2.29	42.8
Average			1.78	3.11	2.45	2.58	48.8
Blank	3.5						

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 9
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Halides and Ammonia Emission Data

Hydrogen Chloride

Test No.	HCl Collected mg	Dry Volume Sampled Rm^3*	Actual mg/m^3	Hydrogen Chloride Concentration Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HCl Emission Rate mg/s
1	5.92	1.277	2.67	4.64	3.71	3.85	71.6
2	4.99	1.290	2.23	3.87	3.10	3.22	59.8
3	5.22	1.281	2.38	4.07	3.18	3.42	60.3
Average			2.43	4.19	3.33	3.50	63.9
Blank	<0.154						

Hydrogen Fluoride

Test No.	HF Collected mg	Dry Volume Sampled Rm^3*	Actual mg/m^3	Hydrogen Fluoride Concentration Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HF Emission Rate mg/s
1	<0.168	1.277	<0.076	<0.13	<0.11	<0.11	<2.03
2	<0.158	1.290	<0.071	<0.12	<0.098	<0.10	<1.89
3	<0.160	1.281	<0.073	<0.12	<0.097	<0.10	<1.85
Average			<0.073	<0.13	<0.10	<0.11	<1.92
Blank	<0.106						

Ammonia

Test No.	Ammonia Collected mg	Dry Volume Sampled Rm^3*	Actual mg/m^3	Ammonia Concentration Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	Ammonia Emission Rate mg/s
1	0.586	1.277	0.26	0.46	0.37	0.38	7.09
2	0.485	1.290	0.22	0.38	0.30	0.31	5.81
3	0.463	1.281	0.21	0.36	0.28	0.30	5.35
Average			0.23	0.40	0.32	0.33	6.08
Blank	<0.020						

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 10
Covanta - Durham York Energy Centre
Boiler No. 2
Combustion Gas Analyses

Data measured by the DYEC CEMS from March 18 to March 21, 2024

Sampling Location	Parameter	Minimum	Average	Maximum
BH Outlet	Oxygen (%, 1 hr Avg)	7.48	8.37	9.59
BH Outlet	Carbon Monoxide (mg/Rm^3, 1 hr Avg) *	4	8	33
BH Outlet	Carbon Monoxide (mg/Rm^3, 4 hr Avg) *	5.5	8.0	12.4
BH Outlet	Sulphur Dioxide (mg/Rm^3, 1 hr Avg) *	0	0.77	29
BH Outlet	Sulphur Dioxide (mg/Rm^3, 24 hr Avg) *	0	0.39	2.4
BH Outlet	Nitrogen Oxides (mg/Rm^3, 1 hr Avg) *	76	108	119
BH Outlet	Nitrogen Oxides (mg/Rm^3, 24 hr Avg) *	106	108	109
BH Outlet	Hydrogen Chloride (mg/Rm^3, 1 hr Avg) *	1	2	3
BH Outlet	Hydrogen Chloride (mg/Rm^3, 24 hr Avg) *	2.1	2.2	2.4
BH Outlet	Total Hydrocarbons (mg/Rm^3, 1 hr Avg) *	0	0	0
Quench Inlet	Oxygen (%, 1 hr Avg)	6	7	9

Data measured by the ORTECH CEMS on March 19, 2024

Sampling Location	Test No.	Parameter	Minimum	Average	Maximum
BH Outlet	1	Total Hydrocarbons (ppm dry, 1-min Avg)	0.2	0.6	1.2
BH Outlet	2	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0.2	4.7
BH Outlet	3	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0.1	1.1
Average		Total Hydrocarbons (ppm dry, 1-min Avg)		0.3	
Quench Inlet	1	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0.6	1.8
Quench Inlet	2	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0.1	2.1
Quench Inlet	3	Total Hydrocarbons (ppm dry, 1-min Avg)	0	0	0
Average		Total Hydrocarbons (ppm dry, 1-min Avg)		0.2	
Quench Inlet	1	Total Hydrocarbons (ppm dry, 10-min Avg)	0	0.6	1.2
Quench Inlet	2	Total Hydrocarbons (ppm dry, 10-min Avg)	0	0.1	0.6
Quench Inlet	3	Total Hydrocarbons (ppm dry, 10-min Avg)	0	0	0
Average		Total Hydrocarbons (ppm dry, 10-min Avg)		0.2	

* Reference conditions, dry basis adjusted to 11% oxygen

TABLE 11
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Metals Analyses Test No. 1

Metal	Probe & Filter Hydrofluoric Acid Digest	Impingers & Rinses	Total Collected
	µg	µg	µg
Antimony	<0.2	<0.1	<0.20
Arsenic	<1	<0.2	<0.20
Barium	47.0	0.60	47.6
Beryllium	<0.2	<0.1	<0.20
Cadmium	<0.1	0.063	0.063
Chromium	3.42	0.63	4.05
Cobalt	<0.2	0.19	0.19
Copper	4.24	1.79	6.03
Lead	0.71	0.28	0.99
Mercury *	<0.015	1.97	1.97
Molybdenum	18.2	<0.1	18.2
Nickel	1.64	0.63	2.27
Selenium	<2	<1	<1.00
Silver	<0.2	<0.1	<0.20
Thallium	<0.2	<0.05	<0.20
Vanadium	<1	<0.1	<0.10
Zinc	40.2	4.60	44.8
Total			<128

* Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected. Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 12
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Metals Analyses Test No. 2

Metal	Probe & Filter Hydrofluoric Acid Digest µg	Impingers & Rinses µg	Total Collected µg
Antimony	<0.2	<0.1	<0.20
Arsenic	<1	<0.2	<0.20
Barium	47.9	0.68	48.6
Beryllium	<0.2	<0.1	<0.20
Cadmium	0.24	<0.05	0.24
Chromium	3.26	0.59	3.85
Cobalt	<0.2	<0.1	<0.10
Copper	3.75	2.87	6.62
Lead	0.62	0.31	0.94
Mercury *	<0.015	5.32	5.32
Molybdenum	18.4	<0.1	18.4
Nickel	1.96	0.64	2.60
Selenium	<2	<1	<1.00
Silver	<0.2	<0.1	<0.20
Thallium	<0.2	<0.05	<0.20
Vanadium	<1	<0.1	<0.10
Zinc	40.9	6.65	47.6
Total			<136

* Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected. Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 13
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Metals Analyses Test No. 3

Metal	Probe & Filter Hydrofluoric Acid Digest µg	Impingers & Rinses µg	Total Collected µg
Antimony	<0.2	<0.1	<0.20
Arsenic	<1	<0.2	<0.20
Barium	50.2	0.98	51.2
Beryllium	<0.2	<0.1	<0.20
Cadmium	0.34	0.11	0.45
Chromium	3.49	0.70	4.19
Cobalt	<0.2	<0.1	<0.10
Copper	2.13	2.87	5.00
Lead	0.76	0.71	1.46
Mercury *	<0.015	<0.40	<0.40
Molybdenum	18.1	<0.1	18.1
Nickel	1.95	0.64	2.59
Selenium	<2	<1	<1.00
Silver	<0.2	<0.1	<0.20
Thallium	<0.2	<0.05	<0.20
Vanadium	<1	<0.1	<0.10
Zinc	39.5	5.02	44.5
Total			<130

* Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected. Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 14
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Metals Emission Data Test No. 1

Metal	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Antimony	<0.20	<0.032	<0.055	<0.044	<0.046	<0.00086
Arsenic	<0.20	<0.032	<0.055	<0.044	<0.046	<0.00086
Barium	47.6	7.61	13.2	10.6	11.0	0.20
Beryllium	<0.20	<0.032	<0.055	<0.044	<0.046	<0.00086
Cadmium	0.063	0.010	0.017	0.014	0.015	0.00027
Chromium	4.05	0.65	1.12	0.90	0.93	0.017
Cobalt	0.19	0.031	0.053	0.042	0.044	0.00082
Copper	6.03	0.96	1.67	1.34	1.39	0.026
Lead	0.99	0.16	0.27	0.22	0.23	0.0043
Mercury	1.97	0.32	0.55	0.44	0.45	0.0084
Molybdenum	18.2	2.91	5.03	4.04	4.19	0.078
Nickel	2.27	0.36	0.63	0.50	0.52	0.0097
Selenium	<1.00	<0.16	<0.28	<0.22	<0.23	<0.0043
Silver	<0.20	<0.032	<0.055	<0.044	<0.046	<0.00086
Thallium	<0.20	<0.032	<0.055	<0.044	<0.046	<0.00086
Vanadium	<0.10	<0.016	<0.028	<0.022	<0.023	<0.00043
Zinc	44.8	7.17	12.4	9.95	10.3	0.19
Total	<128	<20.5	<35.5	<28.5	<29.6	<0.55

Dry Gas Volume Sampled (Rm^3*) :	3.616
Actual Flowrate (m^3/s) :	26.8
Dry Reference Flowrate (Rm^3/s*) :	15.5
Dry Adjusted Flowrate (Rm^3/s**) :	19.3
Wet Reference Flowrate (Rm^3/s*) :	18.6

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 15
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Metals Emission Data Test No. 2

Metal	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Antimony	<0.20	<0.034	<0.059	<0.046	<0.049	<0.00087
Arsenic	<0.20	<0.034	<0.059	<0.046	<0.049	<0.00087
Barium	48.6	8.33	14.2	11.1	12.0	0.21
Beryllium	<0.20	<0.034	<0.059	<0.046	<0.049	<0.00087
Cadmium	0.24	0.042	0.071	0.055	0.060	0.0011
Chromium	3.85	0.66	1.13	0.88	0.95	0.017
Cobalt	<0.10	<0.017	<0.029	<0.023	<0.025	<0.00043
Copper	6.62	1.14	1.94	1.51	1.63	0.029
Lead	0.94	0.16	0.27	0.21	0.23	0.0041
Mercury	5.32	0.91	1.56	1.21	1.31	0.023
Molybdenum	18.4	3.16	5.39	4.20	4.54	0.080
Nickel	2.60	0.45	0.76	0.59	0.64	0.011
Selenium	<1.00	<0.17	<0.29	<0.23	<0.25	<0.0043
Silver	<0.20	<0.034	<0.059	<0.046	<0.049	<0.00087
Thallium	<0.20	<0.034	<0.059	<0.046	<0.049	<0.00087
Vanadium	<0.10	<0.017	<0.029	<0.023	<0.025	<0.00043
Zinc	47.6	8.15	13.9	10.9	11.7	0.21
Total	<136	<23.4	<40.0	<31.1	<33.6	<0.59

Dry Gas Volume Sampled (Rm^3*) :	3.411
Actual Flowrate (m^3/s) :	25.3
Dry Reference Flowrate (Rm^3/s*) :	14.8
Dry Adjusted Flowrate (Rm^3/s**) :	19.0
Wet Reference Flowrate (Rm^3/s*) :	17.6

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 16
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Metals Emission Data Test No. 3

Metal	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Antimony	<0.20	<0.033	<0.058	<0.045	<0.048	<0.00086
Arsenic	<0.20	<0.033	<0.058	<0.045	<0.048	<0.00086
Barium	51.2	8.48	14.8	11.6	12.3	0.22
Beryllium	<0.20	<0.033	<0.058	<0.045	<0.048	<0.00086
Cadmium	0.45	0.074	0.13	0.10	0.11	0.0019
Chromium	4.19	0.69	1.21	0.95	1.00	0.018
Cobalt	<0.10	<0.017	<0.029	<0.023	<0.024	<0.00043
Copper	5.00	0.83	1.45	1.13	1.20	0.021
Lead	1.46	0.24	0.42	0.33	0.35	0.0063
Mercury	<0.40	<0.065	<0.11	<0.089	<0.095	<0.0017
Molybdenum	18.1	3.00	5.25	4.09	4.34	0.078
Nickel	2.59	0.43	0.75	0.58	0.62	0.011
Selenium	<1.00	<0.17	<0.29	<0.23	<0.24	<0.0043
Silver	<0.20	<0.033	<0.058	<0.045	<0.048	<0.00086
Thallium	<0.20	<0.033	<0.058	<0.045	<0.048	<0.00086
Vanadium	<0.10	<0.017	<0.029	<0.023	<0.024	<0.00043
Zinc	44.5	7.38	12.9	10.1	10.7	0.19
Total	<130	<21.6	<37.7	<29.4	<31.2	<0.56

Dry Gas Volume Sampled (Rm^3*) :	3.448
Actual Flowrate (m^3/s) :	25.9
Dry Reference Flowrate (Rm^3/s*) :	14.8
Dry Adjusted Flowrate (Rm^3/s**) :	19.0
Wet Reference Flowrate (Rm^3/s*) :	17.9

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 17
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Metal Actual Concentrations

Metal	Actual Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/m³	µg/m³	µg/m³	µg/m³	%
Antimony	<0.032	<0.034	<0.033	<0.033	3.5
Arsenic	<0.032	<0.034	<0.033	<0.033	3.5
Barium	7.61	8.33	8.48	8.14	5.7
Beryllium	<0.032	<0.034	<0.033	<0.033	3.5
Cadmium	0.010	0.042	0.074	0.042	76.3
Chromium	0.65	0.66	0.69	0.67	3.6
Cobalt	0.031	<0.017	<0.017	<0.021	36.9
Copper	0.96	1.14	0.83	0.98	15.7
Lead	0.16	0.16	0.24	0.19	25.5
Mercury	0.32	0.91	<0.065	<0.43	101
Molybdenum	2.91	3.16	3.00	3.02	4.1
Nickel	0.36	0.45	0.43	0.41	10.5
Selenium	<0.16	<0.17	<0.17	<0.17	3.5
Silver	<0.032	<0.034	<0.033	<0.033	3.5
Thallium	<0.032	<0.034	<0.033	<0.033	3.5
Vanadium	<0.016	<0.017	<0.017	<0.017	3.5
Zinc	7.17	8.15	7.38	7.57	6.9
Total	<20.5	<23.4	<21.6	<21.8	6.6

TABLE 18
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Metal Dry Reference Concentrations

Metal	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Antimony	<0.055	<0.059	<0.058	<0.057	3.1
Arsenic	<0.055	<0.059	<0.058	<0.057	3.1
Barium	13.2	14.2	14.8	14.1	6.0
Beryllium	<0.055	<0.059	<0.058	<0.057	3.1
Cadmium	0.017	0.071	0.13	0.073	77.1
Chromium	1.12	1.13	1.21	1.15	4.5
Cobalt	0.053	<0.029	<0.029	<0.037	36.9
Copper	1.67	1.94	1.45	1.69	14.6
Lead	0.27	0.27	0.42	0.32	26.6
Mercury	0.55	1.56	<0.11	<0.74	100
Molybdenum	5.03	5.39	5.25	5.23	3.5
Nickel	0.63	0.76	0.75	0.71	10.4
Selenium	<0.28	<0.29	<0.29	<0.29	3.1
Silver	<0.055	<0.059	<0.058	<0.057	3.1
Thallium	<0.055	<0.059	<0.058	<0.057	3.1
Vanadium	<0.028	<0.029	<0.029	<0.029	3.1
Zinc	12.4	13.9	12.9	13.1	6.0
Total	<35.5	<40.0	<37.7	<37.7	5.9

* At 25°C and 1 atmosphere

TABLE 19
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Metal Dry Adjusted Concentrations

Metal	Dry Adjusted Concentration				Coefficient
	Test No. 1 µg/Rm³**	Test No. 2 µg/Rm³**	Test No. 3 µg/Rm³**	Average µg/Rm³**	of Variation %
Antimony	<0.044	<0.046	<0.045	<0.045	1.4
Arsenic	<0.044	<0.046	<0.045	<0.045	1.4
Barium	10.6	11.1	11.6	11.1	4.5
Beryllium	<0.044	<0.046	<0.045	<0.045	1.4
Cadmium	0.014	0.055	0.10	0.057	76.6
Chromium	0.90	0.88	0.95	0.91	3.8
Cobalt	0.042	<0.023	<0.023	<0.029	38.9
Copper	1.34	1.51	1.13	1.33	14.4
Lead	0.22	0.21	0.33	0.26	25.7
Mercury	0.44	1.21	<0.089	<0.58	99.2
Molybdenum	4.04	4.20	4.09	4.11	2.0
Nickel	0.50	0.59	0.58	0.56	8.7
Selenium	<0.22	<0.23	<0.23	<0.23	1.4
Silver	<0.044	<0.046	<0.045	<0.045	1.4
Thallium	<0.044	<0.046	<0.045	<0.045	1.4
Vanadium	<0.022	<0.023	<0.023	<0.023	1.4
Zinc	9.95	10.9	10.1	10.3	4.8
Total	<28.5	<31.1	<29.4	<29.7	4.5

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 20
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Metal Wet Reference Concentrations

Metal	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Antimony	<0.046	<0.049	<0.048	<0.048	3.4
Arsenic	<0.046	<0.049	<0.048	<0.048	3.4
Barium	11.0	12.0	12.3	11.7	5.8
Beryllium	<0.046	<0.049	<0.048	<0.048	3.4
Cadmium	0.015	0.060	0.11	0.061	76.5
Chromium	0.93	0.95	1.00	0.96	3.9
Cobalt	0.044	<0.025	<0.024	<0.031	36.8
Copper	1.39	1.63	1.20	1.41	15.4
Lead	0.23	0.23	0.35	0.27	25.8
Mercury	0.45	1.31	<0.095	<0.62	101
Molybdenum	4.19	4.54	4.34	4.36	3.9
Nickel	0.52	0.64	0.62	0.59	10.5
Selenium	<0.23	<0.25	<0.24	<0.24	3.4
Silver	<0.046	<0.049	<0.048	<0.048	3.4
Thallium	<0.046	<0.049	<0.048	<0.048	3.4
Vanadium	<0.023	<0.025	<0.024	<0.024	3.4
Zinc	10.3	11.7	10.7	10.9	6.7
Total	<29.6	<33.6	<31.2	<31.5	6.5

* At 25°C and 1 atmosphere

TABLE 21
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Metal Emission Rates

Metal	Emission Rate				Coefficient
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	of Variation %
Antimony	<0.00086	<0.00087	<0.00086	<0.00086	0.7
Arsenic	<0.00086	<0.00087	<0.00086	<0.00086	0.7
Barium	0.20	0.21	0.22	0.21	3.7
Beryllium	<0.00086	<0.00087	<0.00086	<0.00086	0.7
Cadmium	0.00027	0.0011	0.0019	0.0011	76.3
Chromium	0.017	0.017	0.018	0.017	3.7
Cobalt	0.00082	<0.00043	<0.00043	<0.00056	39.9
Copper	0.026	0.029	0.021	0.025	14.4
Lead	0.0043	0.0041	0.0063	0.0049	25.2
Mercury	0.0084	0.023	<0.0017	<0.011	98.7
Molybdenum	0.078	0.080	0.078	0.079	1.5
Nickel	0.0097	0.011	0.011	0.011	7.9
Selenium	<0.0043	<0.0043	<0.0043	<0.0043	0.7
Silver	<0.00086	<0.00087	<0.00086	<0.00086	0.7
Thallium	<0.00086	<0.00087	<0.00086	<0.00086	0.7
Vanadium	<0.00043	<0.00043	<0.00043	<0.00043	0.7
Zinc	0.19	0.21	0.19	0.20	4.3
Total	<0.55	<0.59	<0.56	<0.57	3.9

TABLE 22
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Metal Emission Data

Metal	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Antimony	<0.033	<0.057	<0.045	<0.048	<0.00086
Arsenic	<0.033	<0.057	<0.045	<0.048	<0.00086
Barium	8.14	14.1	11.1	11.7	0.21
Beryllium	<0.033	<0.057	<0.045	<0.048	<0.00086
Cadmium	0.042	0.073	0.057	0.061	0.0011
Chromium	0.67	1.15	0.91	0.96	0.017
Cobalt	<0.021	<0.037	<0.029	<0.031	<0.00056
Copper	0.98	1.69	1.33	1.41	0.025
Lead	0.19	0.32	0.26	0.27	0.0049
Mercury	<0.43	<0.74	<0.58	<0.62	<0.011
Molybdenum	3.02	5.23	4.11	4.36	0.079
Nickel	0.41	0.71	0.56	0.59	0.011
Selenium	<0.17	<0.29	<0.23	<0.24	<0.0043
Silver	<0.033	<0.057	<0.045	<0.048	<0.00086
Thallium	<0.033	<0.057	<0.045	<0.048	<0.00086
Vanadium	<0.017	<0.029	<0.023	<0.024	<0.00043
Zinc	7.57	13.1	10.3	10.9	0.20
Total	<21.8	<37.7	<29.7	<31.5	<0.57

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 23
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Blank Train Metal Analyses

Metal	Probe & Filter Hydrofluoric Acid Digest µg	Impingers & Rinses µg	Total Collected µg
Antimony	<0.2	<0.1	<0.20
Arsenic	<1	<0.2	<0.20
Barium	46.8	0.52	47.3
Beryllium	<0.2	<0.1	<0.20
Cadmium	<0.1	<0.05	<0.10
Chromium	4.85	0.45	5.30
Cobalt	<0.2	<0.1	<0.10
Copper	2.85	2.37	5.22
Lead	<0.5	0.18	0.18
Mercury *	<0.015	<0.15	<0.15
Molybdenum	21.2	<0.1	21.2
Nickel	2.30	0.30	2.60
Selenium	<2	<1	<1.00
Silver	<0.2	<0.1	<0.20
Thallium	<0.2	<0.05	<0.20
Vanadium	<1	<0.1	<0.10
Zinc	33.3	<3	33.3
Total			<118

* Includes the permanganate impingers.

Note: "<" indicates that the analyte was not detected. Where all values are reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate the total collected in the blank, the remaining fractions are assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate the total collected in the blank.

TABLE 24
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Congener Group Emission Data
Test No. 1

Dioxins

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzo-p-dioxins	86.6	0.011	0.019	0.015	0.016	0.28
Pentachlorodibenzo-p-dioxins	152	0.019	0.034	0.026	0.028	0.49
Hexachlorodibenzo-p-dioxins	215	0.027	0.048	0.037	0.040	0.70
Heptachlorodibenzo-p-dioxins	156	0.020	0.035	0.027	0.029	0.51
Octachlorodibenzo-p-dioxin	81.9	0.010	0.018	0.014	0.015	0.27
Total	692	0.088	0.15	0.12	0.13	2.24

Furans

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzofurans	16.6	0.0021	0.0037	0.0029	0.0031	0.054
Pentachlorodibenzofurans	15.6	0.0020	0.0035	0.0027	0.0029	0.051
Hexachlorodibenzofurans	32.9	0.0042	0.0073	0.0057	0.0061	0.11
Heptachlorodibenzofurans	14.4	0.0018	0.0032	0.0025	0.0027	0.047
Octachlorodibenzofuran	<9.1	<0.0012	<0.0020	<0.0016	<0.0017	<0.029
Total	<88.6	<0.011	<0.020	<0.015	<0.016	<0.29

Dry Gas Volume Sampled (Rm^3*) :	4.506
Actual Flowrate (m^3/s) :	25.6
Dry Reference Flowrate (Rm^3/s*) :	14.6
Dry Adjusted Flowrate (Rm^3/s**) :	18.7
Wet Reference Flowrate (Rm^3/s*) :	17.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 25
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Congener Group Emission Data
Test No. 2

Dioxins

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzo-p-dioxins	69.5	0.0084	0.015	0.011	0.012	0.22
Pentachlorodibenzo-p-dioxins	153	0.019	0.033	0.025	0.027	0.49
Hexachlorodibenzo-p-dioxins	239	0.029	0.051	0.039	0.042	0.77
Heptachlorodibenzo-p-dioxins	218	0.026	0.047	0.036	0.038	0.70
Octachlorodibenzo-p-dioxin	132	0.016	0.028	0.022	0.023	0.42
Total	812	0.098	0.17	0.13	0.14	2.60

Furans

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzofurans	31.4	0.0038	0.0067	0.0051	0.0055	0.10
Pentachlorodibenzofurans	40.9	0.0050	0.0088	0.0067	0.0072	0.13
Hexachlorodibenzofurans	45.0	0.0054	0.0096	0.0074	0.0079	0.14
Heptachlorodibenzofurans	28.0	0.0034	0.0060	0.0046	0.0049	0.090
Octachlorodibenzofuran	20.3	0.0025	0.0043	0.0033	0.0036	0.065
Total	166	0.020	0.035	0.027	0.029	0.53

Dry Gas Volume Sampled (Rm^3*) :	4.674
Actual Flowrate (m^3/s) :	26.5
Dry Reference Flowrate (Rm^3/s*) :	15.0
Dry Adjusted Flowrate (Rm^3/s**) :	19.6
Wet Reference Flowrate (Rm^3/s*) :	18.2

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 26
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Congener Group Emission Data
Test No. 3

Dioxins

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzo-p-dioxins	86.3	0.011	0.019	0.015	0.016	0.28
Pentachlorodibenzo-p-dioxins	44.6	0.0057	0.0097	0.0077	0.0081	0.14
Hexachlorodibenzo-p-dioxins	266	0.034	0.058	0.046	0.048	0.85
Heptachlorodibenzo-p-dioxins	194	0.025	0.042	0.034	0.035	0.62
Octachlorodibenzo-p-dioxin	123	0.016	0.027	0.021	0.022	0.39
Total	714	0.091	0.16	0.12	0.13	2.29

Furans

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzofurans	32.3	0.0041	0.0070	0.0056	0.0059	0.10
Pentachlorodibenzofurans	25.6	0.0033	0.0056	0.0044	0.0047	0.082
Hexachlorodibenzofurans	28.1	0.0036	0.0061	0.0049	0.0051	0.090
Heptachlorodibenzofurans	30.0	0.0038	0.0065	0.0052	0.0055	0.096
Octachlorodibenzofuran	18.2	0.0023	0.0040	0.0031	0.0033	0.058
Total	134	0.017	0.029	0.023	0.024	0.43

Dry Gas Volume Sampled (Rm^3*) :	4.592
Actual Flowrate (m^3/s) :	25.2
Dry Reference Flowrate (Rm^3/s*) :	14.7
Dry Adjusted Flowrate (Rm^3/s**) :	18.5
Wet Reference Flowrate (Rm^3/s*) :	17.6

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 27
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Congener Group Actual Concentrations

Dioxins

Congener Group	Actual Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/m³	ng/m³	ng/m³	ng/m³	%
Tetrachlorodibenzo-p-dioxins	0.011	0.0084	0.011	0.010	14.5
Pentachlorodibenzo-p-dioxins	0.019	0.019	0.0057	0.014	52.8
Hexachlorodibenzo-p-dioxins	0.027	0.029	0.034	0.030	11.4
Heptachlorodibenzo-p-dioxins	0.020	0.026	0.025	0.024	14.6
Octachlorodibenzo-p-dioxin	0.010	0.016	0.016	0.014	22.5
Total	0.088	0.098	0.091	0.092	6.0

Furans

Congener Group	Actual Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/m³	ng/m³	ng/m³	ng/m³	%
Tetrachlorodibenzofurans	0.0021	0.0038	0.0041	0.0033	32.4
Pentachlorodibenzofurans	0.0020	0.0050	0.0033	0.0034	44.0
Hexachlorodibenzofurans	0.0042	0.0054	0.0036	0.0044	21.9
Heptachlorodibenzofurans	0.0018	0.0034	0.0038	0.0030	34.8
Octachlorodibenzofuran	<0.0012	0.0025	0.0023	<0.0020	36.3
Total	<0.011	0.020	0.017	<0.016	27.9

TABLE 28
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Congener Group Dry Reference Concentrations

Dioxins

Congener Group	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Tetrachlorodibenzo-p-dioxins	0.019	0.015	0.019	0.018	13.6
Pentachlorodibenzo-p-dioxins	0.034	0.033	0.0097	0.025	53.5
Hexachlorodibenzo-p-dioxins	0.048	0.051	0.058	0.052	9.9
Heptachlorodibenzo-p-dioxins	0.035	0.047	0.042	0.041	14.8
Octachlorodibenzo-p-dioxin	0.018	0.028	0.027	0.024	22.3
Total	0.15	0.17	0.16	0.16	6.9

Furans

Congener Group	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Tetrachlorodibenzofurans	0.0037	0.0067	0.0070	0.0058	31.8
Pentachlorodibenzofurans	0.0035	0.0088	0.0056	0.0059	44.9
Hexachlorodibenzofurans	0.0073	0.0096	0.0061	0.0077	23.2
Heptachlorodibenzofurans	0.0032	0.0060	0.0065	0.0052	34.2
Octachlorodibenzofuran	<0.0020	0.0043	0.0040	<0.0034	36.2
Total	<0.020	0.035	0.029	<0.028	28.3

* At 25°C and 1 atmosphere

TABLE 29
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Congener Group Dry Adjusted Concentrations

Dioxins

Congener Group	Dry Adjusted Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.015	0.011	0.015	0.014	15.0
Pentachlorodibenzo-p-dioxins	0.026	0.025	0.0077	0.020	52.8
Hexachlorodibenzo-p-dioxins	0.037	0.039	0.046	0.041	11.3
Heptachlorodibenzo-p-dioxins	0.027	0.036	0.034	0.032	14.1
Octachlorodibenzo-p-dioxin	0.014	0.022	0.021	0.019	22.0
Total	0.12	0.13	0.12	0.13	5.4

Furans

Congener Group	Dry Adjusted Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzofurans	0.0029	0.0051	0.0056	0.0045	32.1
Pentachlorodibenzofurans	0.0027	0.0067	0.0044	0.0046	43.5
Hexachlorodibenzofurans	0.0057	0.0074	0.0049	0.0060	21.3
Heptachlorodibenzofurans	0.0025	0.0046	0.0052	0.0041	34.6
Octachlorodibenzofuran	<0.0016	0.0033	0.0031	<0.0027	35.9
Total	<0.015	0.027	0.023	<0.022	27.4

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 30
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Congener Group Wet Reference Concentrations

Dioxins

Congener Group	Wet Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.016	0.012	0.016	0.015	14.3
Pentachlorodibenzo-p-dioxins	0.028	0.027	0.0081	0.021	53.3
Hexachlorodibenzo-p-dioxins	0.040	0.042	0.048	0.043	10.2
Heptachlorodibenzo-p-dioxins	0.029	0.038	0.035	0.034	14.2
Octachlorodibenzo-p-dioxin	0.015	0.023	0.022	0.020	21.9
Total	0.13	0.14	0.13	0.13	6.2

Furans

Congener Group	Wet Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzofurans	0.0031	0.0055	0.0059	0.0048	31.7
Pentachlorodibenzofurans	0.0029	0.0072	0.0047	0.0049	44.2
Hexachlorodibenzofurans	0.0061	0.0079	0.0051	0.0064	22.5
Heptachlorodibenzofurans	0.0027	0.0049	0.0055	0.0044	34.1
Octachlorodibenzofuran	<0.0017	0.0036	0.0033	<0.0029	35.9
Total	<0.016	0.029	0.024	<0.023	27.7

* At 25°C and 1 atmosphere

TABLE 31
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Congener Group Emission Rates

Dioxins

Congener Group	Emission Rate Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.28	0.22	0.28	0.26	12.3
Pentachlorodibenzo-p-dioxins	0.49	0.49	0.14	0.38	53.7
Hexachlorodibenzo-p-dioxins	0.70	0.77	0.85	0.77	10.0
Heptachlorodibenzo-p-dioxins	0.51	0.70	0.62	0.61	16.0
Octachlorodibenzo-p-dioxin	0.27	0.42	0.39	0.36	23.3
Total	2.24	2.60	2.29	2.38	8.3

Furans

Congener Group	Emission Rate Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	Coefficient of Variation %
Tetrachlorodibenzofurans	0.054	0.10	0.10	0.086	32.5
Pentachlorodibenzofurans	0.051	0.13	0.082	0.088	46.3
Hexachlorodibenzofurans	0.11	0.14	0.090	0.11	24.6
Heptachlorodibenzofurans	0.047	0.090	0.096	0.078	34.7
Octachlorodibenzofuran	<0.029	0.065	0.058	<0.051	37.1
Total	<0.29	0.53	0.43	<0.42	29.5

TABLE 32
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Dioxin and Furan Congener Group Emission Data

Dioxins

Congener Group	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzo-p-dioxins	0.010	0.018	0.014	0.015	0.26
Pentachlorodibenzo-p-dioxins	0.014	0.025	0.020	0.021	0.38
Hexachlorodibenzo-p-dioxins	0.030	0.052	0.041	0.043	0.77
Heptachlorodibenzo-p-dioxins	0.024	0.041	0.032	0.034	0.61
Octachlorodibenzo-p-dioxin	0.014	0.024	0.019	0.020	0.36
Total	0.092	0.16	0.13	0.13	2.38

Furans

Congener Group	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzofurans	0.0033	0.0058	0.0045	0.0048	0.086
Pentachlorodibenzofurans	0.0034	0.0059	0.0046	0.0049	0.088
Hexachlorodibenzofurans	0.0044	0.0077	0.0060	0.0064	0.11
Heptachlorodibenzofurans	0.0030	0.0052	0.0041	0.0044	0.078
Octachlorodibenzofuran	<0.0020	<0.0034	<0.0027	<0.0029	<0.051
Total	<0.016	<0.028	<0.022	<0.023	<0.42

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 33
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Blank Dioxin and Furan Congener Group Analyses

Dioxins

Congener Group	Blank Train pg	Method Blank pg
Tetrachlorodibenzo-p-dioxins	<0.78	<0.61
Pentachlorodibenzo-p-dioxins	<0.97	<0.74
Hexachlorodibenzo-p-dioxins	<0.96	<0.92
Heptachlorodibenzo-p-dioxins	2.37	3.09
Octachlorodibenzo-p-dioxin	4.89	6.93
Total	<9.97	<12.3

Furans

Congener Group	Blank Train pg	Laboratory Blank pg
Tetrachlorodibenzofurans	<0.47	<0.53
Pentachlorodibenzofurans	2.19	<0.74
Hexachlorodibenzofurans	<0.59	<0.52
Heptachlorodibenzofurans	<0.65	3.88
Octachlorodibenzofuran	2.49	<3.9
Total	<6.39	<9.57

"<" indicates that the amount detected is less than the detection limit
In these cases the value of the detection limit was used to calculate the total collected.

TABLE 34
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Specific Isomer Emission Data
Test No. 1

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<1.0	<0.13	<0.22	<0.17	<0.19	<0.0032
12378-pentachlorodibenzo-p-dioxin	2.96	0.37	0.66	0.51	0.55	0.0096
123478-hexachlorodibenzo-p-dioxin	4.47	0.57	0.99	0.77	0.83	0.014
123678-hexachlorodibenzo-p-dioxin	<9.8	<1.24	<2.17	<1.70	<1.81	<0.032
123789-hexachlorodibenzo-p-dioxin	5.74	0.73	1.27	0.99	1.06	0.019
1234678-heptachlorodibenzo-p-dioxin	78.1	9.88	17.3	13.5	14.5	0.25
Octachlorodibenzo-p-dioxin	81.9	10.4	18.2	14.2	15.2	0.27
2378-tetrachlorodibenzofuran	<1.2	<0.15	<0.27	<0.21	<0.22	<0.0039
12378-pentachlorodibenzofuran	<4.1	<0.52	<0.91	<0.71	<0.76	<0.013
23478-pentachlorodibenzofuran	<6.3	<0.80	<1.40	<1.09	<1.17	<0.020
123478-hexachlorodibenzofuran	<2.5	<0.32	<0.55	<0.43	<0.46	<0.0081
123678-hexachlorodibenzofuran	3.64	0.46	0.81	0.63	0.67	0.012
234678-hexachlorodibenzofuran	6.63	0.84	1.47	1.15	1.23	0.021
123789-hexachlorodibenzofuran	<2.0	<0.25	<0.44	<0.35	<0.37	<0.0065
1234678-heptachlorodibenzofuran	12.0	1.52	2.66	2.08	2.22	0.039
1234789-heptachlorodibenzofuran	2.44	0.31	0.54	0.42	0.45	0.0079
Octachlorodibenzofuran	<9.1	<1.15	<2.02	<1.58	<1.68	<0.029
PCB 81	<6.0	<0.76	<1.33	<1.04	<1.11	<0.019
PCB 77	49.3	6.24	10.9	8.54	9.13	0.16
PCB 123	<15	<1.90	<3.33	<2.60	<2.78	<0.049
PCB 118	1200	152	266	208	222	3.89
PCB 114	33.2	4.20	7.37	5.75	6.15	0.11
PCB 105	364	46.1	80.8	63.1	67.4	1.18
PCB 126	<6.8	<0.86	<1.51	<1.18	<1.26	<0.022
PCB 167	13.4	1.70	2.97	2.32	2.48	0.043
PCB 156/157	<30	<3.80	<6.66	<5.20	<5.55	<0.097
PCB 169	<3.7	<0.47	<0.82	<0.64	<0.69	<0.012
PCB 189	<1.5	<0.19	<0.33	<0.26	<0.28	<0.0049
Total Dioxins & Furans Only	<234	<29.6	<51.9	<40.5	<43.3	<0.76
Total PCBs Only	<1723	<218	<382	<299	<319	<5.58
Total Dioxins & Furans and PCBs	<1957	<248	<434	<339	<362	<6.34

Dry Gas Volume Sampled (Rm^3*) :	4.506
Actual Flowrate (m^3/s) :	25.6
Dry Reference Flowrate (Rm^3/s*) :	14.6
Dry Adjusted Flowrate (Rm^3/s**) :	18.7
Wet Reference Flowrate (Rm^3/s*) :	17.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 35
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Specific Isomer Emission Data
Test No. 2

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<0.72	<0.087	<0.15	<0.12	<0.13	<0.0023
12378-pentachlorodibenzo-p-dioxin	<2.0	<0.24	<0.43	<0.33	<0.35	<0.0064
123478-hexachlorodibenzo-p-dioxin	<4.3	<0.52	<0.92	<0.70	<0.76	<0.014
123678-hexachlorodibenzo-p-dioxin	13.5	1.63	2.89	2.21	2.38	0.043
123789-hexachlorodibenzo-p-dioxin	6.28	0.76	1.34	1.03	1.11	0.020
1234678-heptachlorodibenzo-p-dioxin	108	13.1	23.1	17.7	19.0	0.35
Octachlorodibenzo-p-dioxin	132	16.0	28.2	21.6	23.3	0.42
2378-tetrachlorodibenzofuran	<3.1	<0.38	<0.66	<0.51	<0.55	<0.0099
12378-pentachlorodibenzofuran	<4.2	<0.51	<0.90	<0.69	<0.74	<0.013
23478-pentachlorodibenzofuran	8.27	1.00	1.77	1.35	1.46	0.027
123478-hexachlorodibenzofuran	<3.6	<0.44	<0.77	<0.59	<0.63	<0.012
123678-hexachlorodibenzofuran	5.47	0.66	1.17	0.90	0.96	0.018
234678-hexachlorodibenzofuran	<7.4	<0.90	<1.58	<1.21	<1.30	<0.024
123789-hexachlorodibenzofuran	3.24	0.39	0.69	0.53	0.57	0.010
1234678-heptachlorodibenzofuran	20.6	2.49	4.41	3.37	3.63	0.066
1234789-heptachlorodibenzofuran	<4.4	<0.53	<0.94	<0.72	<0.78	<0.014
Octachlorodibenzofuran	20.3	2.46	4.34	3.32	3.58	0.065
PCB 81	49.9	6.04	10.7	8.17	8.80	0.16
PCB 77	1300	157	278	213	229	4.17
PCB 123	624	75.6	134	102	110	2.00
PCB 118	46300	5607	9906	7581	8164	149
PCB 114	1150	139	246	188	203	3.69
PCB 105	11900	1441	2546	1948	2098	38.2
PCB 126	30.1	3.65	6.44	4.93	5.31	0.097
PCB 167	278	33.7	59.5	45.5	49.0	0.89
PCB 156/157	626	75.8	133.9	102	110	2.01
PCB 169	<8.7	<1.05	<1.86	<1.42	<1.53	<0.028
PCB 189	<3.4	<0.41	<0.73	<0.56	<0.60	<0.011
Total Dioxins & Furans Only	<347	<42.1	<74.3	<56.9	<61.3	<1.11
Total PCBs Only	<62270	<7541	<13323	<10196	<10980	<200
Total Dioxins & Furans and PCBs	<62617	<7583	<13397	<10253	<11041	<201

Dry Gas Volume Sampled (Rm³*) :	4.674
Actual Flowrate (m³/s) :	26.5
Dry Reference Flowrate (Rm³/s*) :	15.0
Dry Adjusted Flowrate (Rm³/s**) :	19.6
Wet Reference Flowrate (Rm³/s*) :	18.2

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 36
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Specific Isomer Emission Data
Test No. 3

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<0.85	<0.11	<0.19	<0.15	<0.15	<0.0027
12378-pentachlorodibenzo-p-dioxin	<2.4	<0.30	<0.52	<0.42	<0.44	<0.0077
123478-hexachlorodibenzo-p-dioxin	4.33	0.55	0.94	0.75	0.79	0.014
123678-hexachlorodibenzo-p-dioxin	11.2	1.42	2.44	1.94	2.04	0.036
123789-hexachlorodibenzo-p-dioxin	6.67	0.85	1.45	1.15	1.21	0.021
1234678-heptachlorodibenzo-p-dioxin	100	12.7	21.8	17.3	18.2	0.32
Octachlorodibenzo-p-dioxin	123	15.6	26.8	21.3	22.4	0.39
2378-tetrachlorodibenzofuran	2.36	0.30	0.51	0.41	0.43	0.0076
12378-pentachlorodibenzofuran	<2.7	<0.34	<0.59	<0.47	<0.49	<0.0086
23478-pentachlorodibenzofuran	5.32	0.68	1.16	0.92	0.97	0.017
123478-hexachlorodibenzofuran	3.30	0.42	0.72	0.57	0.60	0.011
123678-hexachlorodibenzofuran	4.84	0.61	1.05	0.84	0.88	0.015
234678-hexachlorodibenzofuran	8.50	1.08	1.85	1.47	1.55	0.027
123789-hexachlorodibenzofuran	<2.9	<0.37	<0.63	<0.50	<0.53	<0.0093
1234678-heptachlorodibenzofuran	16.9	2.15	3.68	2.92	3.07	0.054
1234789-heptachlorodibenzofuran	<3.2	<0.41	<0.70	<0.55	<0.58	<0.010
Octachlorodibenzofuran	18.2	2.31	3.96	3.15	3.31	0.058
PCB 81	<10	<1.27	<2.18	<1.73	<1.82	<0.032
PCB 77	162	20.6	35.3	28.0	29.5	0.52
PCB 123	78.9	10.0	17.2	13.7	14.4	0.25
PCB 118	6020	765	1311	1042	1095	19.3
PCB 114	168	21.3	36.6	29.1	30.6	0.54
PCB 105	2050	260	446	355	373	6.56
PCB 126	<9.6	<1.22	<2.09	<1.66	<1.75	<0.031
PCB 167	60.6	7.70	13.2	10.5	11.0	0.19
PCB 156/157	183	23.2	39.9	31.7	33.3	0.59
PCB 169	<4.3	<0.55	<0.94	<0.74	<0.78	<0.014
PCB 189	3.37	0.43	0.73	0.58	0.61	0.011
Total Dioxins & Furans Only	<317	<40.2	<69.0	<54.8	<57.6	<1.01
Total PCBs Only	<8750	<1112	<1905	<1514	<1591	<28.0
Total Dioxins & Furans and PCBs	<9066	<1152	<1974	<1569	<1649	<29.0

Dry Gas Volume Sampled (Rm³*) :	4.592
Actual Flowrate (m³/s) :	25.2
Dry Reference Flowrate (Rm³/s*) :	14.7
Dry Adjusted Flowrate (Rm³/s**) :	18.5
Wet Reference Flowrate (Rm³/s*) :	17.6

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 37
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Specific Isomer Actual Concentrations

Specific Isomer	Actual Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	pg/m³	pg/m³	pg/m³	pg/m³	%
2378-tetrachlorodibenzo-p-dioxin	<0.13	<0.087	<0.11	<0.11	18.4
12378-pentachlorodibenzo-p-dioxin	0.37	<0.24	<0.30	<0.31	21.6
123478-hexachlorodibenzo-p-dioxin	0.57	<0.52	0.55	<0.55	4.2
123678-hexachlorodibenzo-p-dioxin	<1.24	1.63	1.42	<1.43	13.8
123789-hexachlorodibenzo-p-dioxin	0.73	0.76	0.85	0.78	8.0
1234678-heptachlorodibenzo-p-dioxin	9.88	13.1	12.7	11.9	14.7
Octachlorodibenzo-p-dioxin	10.4	16.0	15.6	14.0	22.5
2378-tetrachlorodibenzofuran	<0.15	<0.38	0.30	<0.28	41.2
12378-pentachlorodibenzofuran	<0.52	<0.51	<0.34	<0.46	21.6
23478-pentachlorodibenzofuran	<0.80	1.00	0.68	<0.82	20.0
123478-hexachlorodibenzofuran	<0.32	<0.44	0.42	<0.39	16.6
123678-hexachlorodibenzofuran	0.46	0.66	0.61	0.58	18.2
234678-hexachlorodibenzofuran	0.84	<0.90	1.08	<0.94	13.4
123789-hexachlorodibenzofuran	<0.25	0.39	<0.37	<0.34	22.0
1234678-heptachlorodibenzofuran	1.52	2.49	2.15	2.05	24.1
1234789-heptachlorodibenzofuran	0.31	<0.53	<0.41	<0.42	27.0
Octachlorodibenzofuran	<1.15	2.46	2.31	<1.97	36.3
PCB 81	<0.76	6.04	<1.27	<2.69	108
PCB 77	6.24	157	20.6	61.4	136
PCB 123	<1.90	75.6	10.0	<29.2	139
PCB 118	152	5607	765	2175	137
PCB 114	4.20	139	21.3	54.9	134
PCB 105	46.1	1441	260	583	129
PCB 126	<0.86	3.65	<1.22	<1.91	79.4
PCB 167	1.70	33.7	7.70	14.4	118
PCB 156/157	<3.80	75.8	23.2	<34.3	109
PCB 169	<0.47	<1.05	<0.55	<0.69	46.1
PCB 189	<0.19	<0.41	0.43	<0.34	38.8
Total Dioxins & Furans Only	<29.6	<42.1	<40.2	<37.3	18.0
Total PCBs Only	<218	<7541	<1112	<2957	135
Total Dioxins & Furans and PCBs	<248	<7583	<1152	<2994	134

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 38
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Specific Isomer Dry Reference Concentrations

Specific Isomer	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	pg/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.22	<0.15	<0.19	<0.19	18.2
12378-pentachlorodibenzo-p-dioxin	0.66	<0.43	<0.52	<0.54	21.5
123478-hexachlorodibenzo-p-dioxin	0.99	<0.92	0.94	<0.95	3.9
123678-hexachlorodibenzo-p-dioxin	<2.17	2.89	2.44	<2.50	14.4
123789-hexachlorodibenzo-p-dioxin	1.27	1.34	1.45	1.36	6.6
1234678-heptachlorodibenzo-p-dioxin	17.3	23.1	21.8	20.7	14.6
Octachlorodibenzo-p-dioxin	18.2	28.2	26.8	24.4	22.3
2378-tetrachlorodibenzofuran	<0.27	<0.66	0.51	<0.48	41.7
12378-pentachlorodibenzofuran	<0.91	<0.90	<0.59	<0.80	22.9
23478-pentachlorodibenzofuran	<1.40	1.77	1.16	<1.44	21.3
123478-hexachlorodibenzofuran	<0.55	<0.77	0.72	<0.68	16.5
123678-hexachlorodibenzofuran	0.81	1.17	1.05	1.01	18.3
234678-hexachlorodibenzofuran	1.47	<1.58	1.85	<1.64	11.9
123789-hexachlorodibenzofuran	<0.44	0.69	<0.63	<0.59	22.0
1234678-heptachlorodibenzofuran	2.66	4.41	3.68	3.58	24.4
1234789-heptachlorodibenzofuran	0.54	<0.94	<0.70	<0.73	27.7
Octachlorodibenzofuran	<2.02	4.34	3.96	<3.44	36.2
PCB 81	<1.33	10.7	<2.18	<4.73	109
PCB 77	10.9	278	35.3	108	137
PCB 123	<3.33	134	17.2	<51.3	139
PCB 118	266	9906	1311	3828	138
PCB 114	7.37	246	36.6	96.7	135
PCB 105	80.8	2546	446	1024	130
PCB 126	<1.51	6.44	<2.09	<3.35	80.5
PCB 167	2.97	59.5	13.2	25.2	119
PCB 156/157	<6.66	133.9	39.9	<60.1	110
PCB 169	<0.82	<1.86	<0.94	<1.21	47.3
PCB 189	<0.33	<0.73	0.73	<0.60	38.4
Total Dioxins & Furans Only	<51.9	<74.3	<69.0	<65.1	18.0
Total PCBs Only	<382	<13323	<1905	<5203	136
Total Dioxins & Furans and PCBs	<434	<13397	<1974	<5269	134

* At 25°C and 1 atmosphere

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 39
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Specific Isomer Dry Adjusted Concentrations

Specific Isomer	Dry Adjusted Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	pg/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.17	<0.12	<0.15	<0.15	19.0
12378-pentachlorodibenzo-p-dioxin	0.51	<0.33	<0.42	<0.42	22.2
123478-hexachlorodibenzo-p-dioxin	0.77	<0.70	0.75	<0.74	4.8
123678-hexachlorodibenzo-p-dioxin	<1.70	2.21	1.94	<1.95	13.2
123789-hexachlorodibenzo-p-dioxin	0.99	1.03	1.15	1.06	7.9
1234678-heptachlorodibenzo-p-dioxin	13.5	17.7	17.3	16.2	14.2
Octachlorodibenzo-p-dioxin	14.2	21.6	21.3	19.0	22.0
2378-tetrachlorodibenzofuran	<0.21	<0.51	0.41	<0.37	40.7
12378-pentachlorodibenzofuran	<0.71	<0.69	<0.47	<0.62	21.6
23478-pentachlorodibenzofuran	<1.09	1.35	0.92	<1.12	19.5
123478-hexachlorodibenzofuran	<0.43	<0.59	0.57	<0.53	16.1
123678-hexachlorodibenzofuran	0.63	0.90	0.84	0.79	17.7
234678-hexachlorodibenzofuran	1.15	<1.21	1.47	<1.28	13.4
123789-hexachlorodibenzofuran	<0.35	0.53	<0.50	<0.46	21.5
1234678-heptachlorodibenzofuran	2.08	3.37	2.92	2.79	23.5
1234789-heptachlorodibenzofuran	0.42	<0.72	<0.55	<0.57	26.4
Octachlorodibenzofuran	<1.58	3.32	3.15	<2.68	35.9
PCB 81	<1.04	8.17	<1.73	<3.65	108
PCB 77	8.54	213	28.0	83.1	136
PCB 123	<2.60	102	13.7	<39.5	138
PCB 118	208	7581	1042	2944	137
PCB 114	5.75	188	29.1	74.4	134
PCB 105	63.1	1948	355	789	129
PCB 126	<1.18	4.93	<1.66	<2.59	78.8
PCB 167	2.32	45.5	10.5	19.4	118
PCB 156/157	<5.20	102	31.7	<46.5	108
PCB 169	<0.64	<1.42	<0.74	<0.94	45.5
PCB 189	<0.26	<0.56	0.58	<0.47	38.5
Total Dioxins & Furans Only	<40.5	<56.9	<54.8	<50.7	17.5
Total PCBs Only	<299	<10196	<1514	<4003	135
Total Dioxins & Furans and PCBs	<339	<10253	<1569	<4054	133

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 40
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Specific Isomer Wet Reference Concentrations

Specific Isomer	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	pg/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.19	<0.13	<0.15	<0.16	18.7
12378-pentachlorodibenzo-p-dioxin	0.55	<0.35	<0.44	<0.45	22.0
123478-hexachlorodibenzo-p-dioxin	0.83	<0.76	0.79	<0.79	4.4
123678-hexachlorodibenzo-p-dioxin	<1.81	2.38	2.04	<2.08	13.7
123789-hexachlorodibenzo-p-dioxin	1.06	1.11	1.21	1.13	6.9
1234678-heptachlorodibenzo-p-dioxin	14.5	19.0	18.2	17.2	14.1
Octachlorodibenzo-p-dioxin	15.2	23.3	22.4	20.3	21.9
2378-tetrachlorodibenzofuran	<0.22	<0.55	0.43	<0.40	41.1
12378-pentachlorodibenzofuran	<0.76	<0.74	<0.49	<0.66	22.6
23478-pentachlorodibenzofuran	<1.17	1.46	0.97	<1.20	20.6
123478-hexachlorodibenzofuran	<0.46	<0.63	0.60	<0.57	16.1
123678-hexachlorodibenzofuran	0.67	0.96	0.88	0.84	17.8
234678-hexachlorodibenzofuran	1.23	<1.30	1.55	<1.36	12.2
123789-hexachlorodibenzofuran	<0.37	0.57	<0.53	<0.49	21.6
1234678-heptachlorodibenzofuran	2.22	3.63	3.07	2.98	23.9
1234789-heptachlorodibenzofuran	0.45	<0.78	<0.58	<0.60	27.0
Octachlorodibenzofuran	<1.68	3.58	3.31	<2.86	35.9
PCB 81	<1.11	8.80	<1.82	<3.91	109
PCB 77	9.13	229	29.5	89.3	136
PCB 123	<2.78	110	14.4	<42.4	139
PCB 118	222	8164	1095	3160	138
PCB 114	6.15	203	30.6	79.8	134
PCB 105	67.4	2098	373	846	129
PCB 126	<1.26	5.31	<1.75	<2.77	79.8
PCB 167	2.48	49.0	11.0	20.8	119
PCB 156/157	<5.55	110	33.3	<49.7	109
PCB 169	<0.69	<1.53	<0.78	<1.00	46.5
PCB 189	<0.28	<0.60	0.61	<0.50	38.2
Total Dioxins & Furans Only	<43.3	<61.3	<57.6	<54.1	17.6
Total PCBs Only	<319	<10980	<1591	<4297	136
Total Dioxins & Furans and PCBs	<362	<11041	<1649	<4351	134

* At 25°C and 1 atmosphere

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 41
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Specific Isomer Emission Rates

Specific Isomer	Emission Rate Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/s	ng/s	ng/s	ng/s	%
2378-tetrachlorodibenzo-p-dioxin	<0.0032	<0.0023	<0.0027	<0.0028	16.9
12378-pentachlorodibenzo-p-dioxin	0.0096	<0.0064	<0.0077	<0.0079	20.2
123478-hexachlorodibenzo-p-dioxin	0.014	<0.014	0.014	<0.014	2.7
123678-hexachlorodibenzo-p-dioxin	<0.032	0.043	0.036	<0.037	15.9
123789-hexachlorodibenzo-p-dioxin	0.019	0.020	0.021	0.020	6.9
1234678-heptachlorodibenzo-p-dioxin	0.25	0.35	0.32	0.31	15.7
Octachlorodibenzo-p-dioxin	0.27	0.42	0.39	0.36	23.3
2378-tetrachlorodibenzofuran	<0.0039	<0.0099	0.0076	<0.0071	42.8
12378-pentachlorodibenzofuran	<0.013	<0.013	<0.0086	<0.012	23.2
23478-pentachlorodibenzofuran	<0.020	0.027	0.017	<0.021	22.6
123478-hexachlorodibenzofuran	<0.0081	<0.012	0.011	<0.010	17.7
123678-hexachlorodibenzofuran	0.012	0.018	0.015	0.015	19.5
234678-hexachlorodibenzofuran	0.021	<0.024	0.027	<0.024	11.9
123789-hexachlorodibenzofuran	<0.0065	0.010	<0.0093	<0.0087	23.1
1234678-heptachlorodibenzofuran	0.039	0.066	0.054	0.053	25.7
1234789-heptachlorodibenzofuran	0.0079	<0.014	<0.010	<0.011	29.2
Octachlorodibenzofuran	<0.029	0.065	0.058	<0.051	37.1
PCB 81	<0.019	0.16	<0.032	<0.071	110
PCB 77	0.16	4.17	0.52	1.62	137
PCB 123	<0.049	2.00	0.25	<0.77	140
PCB 118	3.89	149	19.3	57.2	139
PCB 114	0.11	3.69	0.54	1.45	135
PCB 105	1.18	38.2	6.56	15.3	131
PCB 126	<0.022	0.097	<0.031	<0.050	81.9
PCB 167	0.043	0.89	0.19	0.38	120
PCB 156/157	<0.097	2.01	0.59	<0.90	111
PCB 169	<0.012	<0.028	<0.014	<0.018	48.8
PCB 189	<0.0049	<0.011	0.011	<0.0089	39.1
Total Dioxins & Furans Only	<0.76	<1.11	<1.01	<0.96	19.1
Total PCBs Only	<5.58	<200	<28.0	<77.8	137
Total Dioxins & Furans and PCBs	<6.34	<201	<29.0	<78.8	135

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 42
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Dioxin and Furan Specific Isomer Emission Data

Specific Isomer	Actual Concentration pg/m³	Dry Reference Concentration pg/Rm³*	Dry Adjusted Concentration pg/Rm³**	Wet Reference Concentration pg/Rm³*	Emission Rate ng/s
2378-tetrachlorodibenzo-p-dioxin	<0.11	<0.19	<0.15	<0.16	<0.0028
12378-pentachlorodibenzo-p-dioxin	<0.31	<0.54	<0.42	<0.45	<0.0079
123478-hexachlorodibenzo-p-dioxin	<0.55	<0.95	<0.74	<0.79	<0.014
123678-hexachlorodibenzo-p-dioxin	<1.43	<2.50	<1.95	<2.08	<0.037
123789-hexachlorodibenzo-p-dioxin	0.78	1.36	1.06	1.13	0.020
1234678-heptachlorodibenzo-p-dioxin	11.9	20.7	16.2	17.2	0.31
Octachlorodibenzo-p-dioxin	14.0	24.4	19.0	20.3	0.36
2378-tetrachlorodibenzofuran	<0.28	<0.48	<0.37	<0.40	<0.0071
12378-pentachlorodibenzofuran	<0.46	<0.80	<0.62	<0.66	<0.012
23478-pentachlorodibenzofuran	<0.82	<1.44	<1.12	<1.20	<0.021
123478-hexachlorodibenzofuran	<0.39	<0.68	<0.53	<0.57	<0.010
123678-hexachlorodibenzofuran	0.58	1.01	0.79	0.84	0.015
234678-hexachlorodibenzofuran	<0.94	<1.64	<1.28	<1.36	<0.024
123789-hexachlorodibenzofuran	<0.34	<0.59	<0.46	<0.49	<0.0087
1234678-heptachlorodibenzofuran	2.05	3.58	2.79	2.98	0.053
1234789-heptachlorodibenzofuran	<0.42	<0.73	<0.57	<0.60	<0.011
Octachlorodibenzofuran	<1.97	<3.44	<2.68	<2.86	<0.051
PCB 81	<2.69	<4.73	<3.65	<3.91	<0.071
PCB 77	61.4	108	83.1	89.3	1.62
PCB 123	<29.2	<51.3	<39.5	<42.4	<0.77
PCB 118	2175	3828	2944	3160	57.2
PCB 114	54.9	96.7	74.4	79.8	1.45
PCB 105	583	1024	789	846	15.3
PCB 126	<1.91	<3.35	<2.59	<2.77	<0.050
PCB 167	14.4	25.2	19.4	20.8	0.38
PCB 156/157	<34.3	<60.1	<46.5	<49.7	<0.90
PCB 169	<0.69	<1.21	<0.94	<1.00	<0.018
PCB 189	<0.34	<0.60	<0.47	<0.50	<0.0089
Total Dioxins & Furans Only	<37.3	<65.1	<50.7	<54.1	<0.96
Total PCBs Only	<2957	<5203	<4003	<4297	<77.8
Total Dioxins & Furans and PCBs	<2994	<5269	<4054	<4351	<78.8

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 43
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Blank Dioxin and Furan Specific Isomer Analyses

Specific Isomer	Blank Train pg	Method Blank pg
2378-tetrachlorodibenzo-p-dioxin	<0.78	<0.61
12378-pentachlorodibenzo-p-dioxin	<0.97	<0.85
123478-hexachlorodibenzo-p-dioxin	<0.96	<0.92
123678-hexachlorodibenzo-p-dioxin	<0.93	<0.89
123789-hexachlorodibenzo-p-dioxin	<0.91	<0.87
1234678-heptachlorodibenzo-p-dioxin	2.37	3.09
Octachlorodibenzo-p-dioxin	4.89	6.93
2378-tetrachlorodibenzofuran	<0.47	<0.53
12378-pentachlorodibenzofuran	2.19	<2.3
23478-pentachlorodibenzofuran	<0.67	<0.70
123478-hexachlorodibenzofuran	<0.48	<0.69
123678-hexachlorodibenzofuran	<0.47	<0.47
234678-hexachlorodibenzofuran	<0.48	<1.20
123789-hexachlorodibenzofuran	<0.59	<1.20
1234678-heptachlorodibenzofuran	<0.53	3.88
1234789-heptachlorodibenzofuran	<0.65	<0.69
Octachlorodibenzofuran	2.49	<3.9
PCB 81	<4.7	<5.8
PCB 77	<4.8	<5.8
PCB 123	<5.2	<6.8
PCB 118	<16	<6.3
PCB 114	<5.3	<6.8
PCB 105	<5.5	<6.2
PCB 126	<5.2	<6.4
PCB 167	<3.1	<5.3
PCB 156/157	<4.5	<7.5
PCB 169	<3.2	<5.2
PCB 189	<2.5	<3.0
Total Dioxins & Furans Only	<20.8	<29.7
Total PCBs Only	<60.0	<65.1
Total Dioxins & Furans and PCBs	<80.8	<94.8

"<" indicates that the amount detected is less than the detection limit
In these cases the value of the detection limit was used to calculate the total collected.

TABLE 44
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Toxicity Equivalent Actual Concentrations

Specific Isomer	Toxicity Equivalency Factor	Actual Concentration Test No. 1 pg TEQ/m³	Test No. 2 pg TEQ/m³	Test No. 3 pg TEQ/m³	Average pg TEQ/m³
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.13	<0.087	<0.11	<0.11
12378-pentachlorodibenzo-p-dioxin	1.00000	0.37	<0.24	<0.30	<0.31
123478-hexachlorodibenzo-p-dioxin	0.10000	0.057	<0.052	0.055	<0.055
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.12	0.16	0.14	<0.14
123789-hexachlorodibenzo-p-dioxin	0.10000	0.073	0.076	0.085	0.078
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.099	0.13	0.13	0.12
Octachlorodibenzo-p-dioxin	0.00030	0.0031	0.0048	0.0047	0.0042
2378-tetrachlorodibenzofuran	0.10000	<0.015	<0.038	0.030	<0.028
12378-pentachlorodibenzofuran	0.03000	<0.016	<0.015	<0.010	<0.014
23478-pentachlorodibenzofuran	0.30000	<0.24	0.30	0.20	<0.25
123478-hexachlorodibenzofuran	0.10000	<0.032	<0.044	0.042	<0.039
123678-hexachlorodibenzofuran	0.10000	0.046	0.066	0.061	0.058
234678-hexachlorodibenzofuran	0.10000	0.084	<0.090	0.11	<0.094
123789-hexachlorodibenzofuran	0.10000	<0.025	0.039	<0.037	<0.034
1234678-heptachlorodibenzofuran	0.01000	0.015	0.025	0.021	0.021
1234789-heptachlorodibenzofuran	0.01000	0.0031	<0.0053	<0.0041	<0.0042
Octachlorodibenzofuran	0.00030	<0.00035	0.00074	0.00069	<0.00059
PCB 81	0.00030	<0.00023	0.0018	<0.00038	<0.00081
PCB 77	0.00010	0.00062	0.016	0.0021	0.0061
PCB 123	0.00003	<0.000057	0.0023	0.00030	<0.00087
PCB 118	0.00003	0.0046	0.17	0.023	0.065
PCB 114	0.00003	0.00013	0.0042	0.00064	0.0016
PCB 105	0.00003	0.0014	0.043	0.0078	0.017
PCB 126	0.10000	<0.086	0.36	<0.12	<0.19
PCB 167	0.00003	0.000051	0.0010	0.00023	0.00043
PCB 156/157	0.00003	<0.00011	0.0023	0.00070	<0.0010
PCB 169	0.03000	<0.014	<0.032	<0.016	<0.021
PCB 189	0.00003	<0.0000057	<0.000012	0.000013	<0.000010
Total Dioxins & Furans Only		<1.33	<1.38	<1.34	<1.35
Total PCBs Only		<0.11	<0.63	<0.17	<0.31
Total Dioxins & Furans and PCBs		<1.44	<2.01	<1.52	<1.66

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 45
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Toxicity Equivalent Dry Reference Concentrations

Specific Isomer	Toxicity Equivalency Factor	Dry Reference Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.22	<0.15	<0.19	<0.19
12378-pentachlorodibenzo-p-dioxin	1.00000	0.66	<0.43	<0.52	<0.54
123478-hexachlorodibenzo-p-dioxin	0.10000	0.099	<0.092	0.094	<0.095
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.22	0.29	0.24	<0.25
123789-hexachlorodibenzo-p-dioxin	0.10000	0.13	0.13	0.15	0.14
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.17	0.23	0.22	0.21
Octachlorodibenzo-p-dioxin	0.00030	0.0055	0.0085	0.0080	0.0073
2378-tetrachlorodibenzofuran	0.10000	<0.027	<0.066	0.051	<0.048
12378-pentachlorodibenzofuran	0.03000	<0.027	<0.027	<0.018	<0.024
23478-pentachlorodibenzofuran	0.30000	<0.42	0.53	0.35	<0.43
123478-hexachlorodibenzofuran	0.10000	<0.055	<0.077	0.072	<0.068
123678-hexachlorodibenzofuran	0.10000	0.081	0.12	0.11	0.10
234678-hexachlorodibenzofuran	0.10000	0.15	<0.16	0.19	<0.16
123789-hexachlorodibenzofuran	0.10000	<0.044	0.069	<0.063	<0.059
1234678-heptachlorodibenzofuran	0.01000	0.027	0.044	0.037	0.036
1234789-heptachlorodibenzofuran	0.01000	0.0054	<0.0094	<0.0070	<0.0073
Octachlorodibenzofuran	0.00030	<0.00061	0.0013	0.0012	<0.0010
PCB 81	0.00030	<0.00040	0.0032	<0.00065	<0.0014
PCB 77	0.00010	0.0011	0.028	0.0035	0.011
PCB 123	0.00003	<0.00010	0.0040	0.00052	<0.0015
PCB 118	0.00003	0.0080	0.30	0.039	0.11
PCB 114	0.00003	0.00022	0.0074	0.0011	0.0029
PCB 105	0.00003	0.0024	0.076	0.013	0.031
PCB 126	0.10000	<0.15	0.64	<0.21	<0.33
PCB 167	0.00003	0.000089	0.0018	0.00040	0.00076
PCB 156/157	0.00003	<0.00020	0.0040	0.0012	<0.0018
PCB 169	0.03000	<0.025	<0.056	<0.028	<0.036
PCB 189	0.00003	<0.000010	<0.000022	0.000022	<0.000018
Total Dioxins & Furans Only		<2.34	<2.44	<2.30	<2.36
Total PCBs Only		<0.19	<1.12	<0.30	<0.54
Total Dioxins & Furans and PCBs		<2.52	<3.56	<2.60	<2.89

* At 25°C and 1 atmosphere

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 46
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Toxicity Equivalent Dry Adjusted Concentrations
Calculated Using the Full Detection Limit

Specific Isomer	Toxicity Equivalency Factor	Dry Adjusted Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.17	<0.12	<0.15	<0.15
12378-pentachlorodibenzo-p-dioxin	1.00000	0.51	<0.33	<0.42	<0.42
123478-hexachlorodibenzo-p-dioxin	0.10000	0.077	<0.070	0.075	<0.074
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.17	0.22	0.19	<0.19
123789-hexachlorodibenzo-p-dioxin	0.10000	0.099	0.10	0.12	0.11
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.14	0.18	0.17	0.16
Octachlorodibenzo-p-dioxin	0.00030	0.0043	0.0065	0.0064	0.0057
2378-tetrachlorodibenzofuran	0.10000	<0.021	<0.051	0.041	<0.037
12378-pentachlorodibenzofuran	0.03000	<0.021	<0.021	<0.014	<0.019
23478-pentachlorodibenzofuran	0.30000	<0.33	0.41	0.28	<0.34
123478-hexachlorodibenzofuran	0.10000	<0.043	<0.059	0.057	<0.053
123678-hexachlorodibenzofuran	0.10000	0.063	0.090	0.084	0.079
234678-hexachlorodibenzofuran	0.10000	0.11	<0.12	0.15	<0.13
123789-hexachlorodibenzofuran	0.10000	<0.035	0.053	<0.050	<0.046
1234678-heptachlorodibenzofuran	0.01000	0.021	0.034	0.029	0.028
1234789-heptachlorodibenzofuran	0.01000	0.0042	<0.0072	<0.0055	<0.0057
Octachlorodibenzofuran	0.00030	<0.00047	0.0010	0.00094	<0.00080
PCB 81	0.00030	<0.00031	0.0025	<0.00052	<0.0011
PCB 77	0.00010	0.00085	0.021	0.0028	0.0083
PCB 123	0.00003	<0.000078	0.0031	0.00041	<0.0012
PCB 118	0.00003	0.0062	0.23	0.031	0.088
PCB 114	0.00003	0.00017	0.0056	0.00087	0.0022
PCB 105	0.00003	0.0019	0.058	0.011	0.024
PCB 126	0.10000	<0.12	0.49	<0.17	<0.26
PCB 167	0.00003	0.000070	0.0014	0.00031	0.00058
PCB 156/157	0.00003	<0.00016	0.0031	0.00095	<0.0014
PCB 169	0.03000	<0.019	<0.043	<0.022	<0.028
PCB 189	0.00003	<0.0000078	<0.000017	0.000017	<0.000014
Total Dioxins & Furans Only		<1.82	<1.87	<1.83	<1.84
Total PCBs Only		<0.15	<0.86	<0.24	<0.41
Total Dioxins & Furans and PCBs		<1.97	<2.72	<2.07	<2.25

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 46A
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Toxicity Equivalent Dry Adjusted Concentrations
Calculated Using Half the Detection Limit

Specific Isomer	Toxicity Equivalency Factor	Dry Adjusted Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00000	0.087	0.059	0.074	0.073
12378-pentachlorodibenzo-p-dioxin	1.00000	0.51	0.16	0.21	0.29
123478-hexachlorodibenzo-p-dioxin	0.10000	0.077	0.035	0.075	0.063
123678-hexachlorodibenzo-p-dioxin	0.10000	0.085	0.22	0.19	0.17
123789-hexachlorodibenzo-p-dioxin	0.10000	0.099	0.10	0.12	0.11
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.14	0.18	0.17	0.16
Octachlorodibenzo-p-dioxin	0.00030	0.0043	0.0065	0.0064	0.0057
2378-tetrachlorodibenzofuran	0.10000	0.010	0.025	0.041	0.026
12378-pentachlorodibenzofuran	0.03000	0.011	0.010	0.0070	0.0093
23478-pentachlorodibenzofuran	0.30000	0.16	0.41	0.28	0.28
123478-hexachlorodibenzofuran	0.10000	0.022	0.029	0.057	0.036
123678-hexachlorodibenzofuran	0.10000	0.063	0.090	0.084	0.079
234678-hexachlorodibenzofuran	0.10000	0.11	0.061	0.15	0.11
123789-hexachlorodibenzofuran	0.10000	0.017	0.053	0.025	0.032
1234678-heptachlorodibenzofuran	0.01000	0.021	0.034	0.029	0.028
1234789-heptachlorodibenzofuran	0.01000	0.0042	0.0036	0.0028	0.0035
Octachlorodibenzofuran	0.00030	0.00024	0.0010	0.00094	0.00073
PCB 81	0.00030	0.00016	0.0025	0.00026	0.00096
PCB 77	0.00010	0.00085	0.021	0.0028	0.0083
PCB 123	0.00003	0.000039	0.0031	0.00041	0.0012
PCB 118	0.00003	0.0062	0.23	0.031	0.088
PCB 114	0.00003	0.00017	0.0056	0.00087	0.0022
PCB 105	0.00003	0.0019	0.058	0.011	0.024
PCB 126	0.10000	0.059	0.49	0.083	0.21
PCB 167	0.00003	0.000070	0.0014	0.00031	0.00058
PCB 156/157	0.00003	0.000078	0.0031	0.00095	0.0014
PCB 169	0.03000	0.0096	0.021	0.011	0.014
PCB 189	0.00003	0.0000039	0.0000084	0.000017	0.0000099
Total Dioxins & Furans Only		1.43	1.48	1.51	1.47
Total PCBs Only		0.078	0.84	0.14	0.35
Total Dioxins & Furans and PCBs		1.51	2.32	1.66	1.83

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: The value of half the detection limit was used to calculate emission data for those analytes not detected.

TABLE 46B
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Toxicity Equivalent Dry Adjusted Concentrations
Calculated Using the Full Detection Limit

Specific Isomer	Toxicity Equivalency Factor	Dry Adjusted Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00	<0.17	<0.12	<0.15	<0.15
12378-pentachlorodibenzo-p-dioxin	0.50	0.26	<0.16	<0.21	<0.21
123478-hexachlorodibenzo-p-dioxin	0.10	0.077	<0.070	0.075	<0.074
123678-hexachlorodibenzo-p-dioxin	0.10	<0.17	0.22	0.19	<0.19
123789-hexachlorodibenzo-p-dioxin	0.10	0.099	0.10	0.12	0.11
1234678-heptachlorodibenzo-p-dioxin	0.01	0.14	0.18	0.17	0.16
Octachlorodibenzo-p-dioxin	0.001	0.014	0.022	0.021	0.019
2378-tetrachlorodibenzofuran	0.10	<0.021	<0.051	0.041	<0.037
12378-pentachlorodibenzofuran	0.05	<0.036	<0.034	<0.023	<0.031
23478-pentachlorodibenzofuran	0.50	<0.55	0.68	0.46	<0.56
123478-hexachlorodibenzofuran	0.10	<0.043	<0.059	0.057	<0.053
123678-hexachlorodibenzofuran	0.10	0.063	0.090	0.084	0.079
234678-hexachlorodibenzofuran	0.10	0.11	<0.12	0.15	<0.13
123789-hexachlorodibenzofuran	0.10	<0.035	0.053	<0.050	<0.046
1234678-heptachlorodibenzofuran	0.01	0.021	0.034	0.029	0.028
1234789-heptachlorodibenzofuran	0.01	0.0042	<0.0072	<0.0055	<0.0057
Octachlorodibenzofuran	0.001	<0.0016	0.0033	0.0031	<0.0027
Total Dioxins & Furans		<1.81	<2.00	<1.83	<1.88
In-Stack Emission Limit					60

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

NATO/CCMS (1989) Toxicity Equivalency Factors

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 47
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Toxicity Equivalent Wet Reference Concentrations

Specific Isomer	Toxicity Equivalency Factor	Wet Reference Concentration Test No. 1 pg TEQ/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.19	<0.13	<0.15	<0.16
12378-pentachlorodibenzo-p-dioxin	1.00000	0.55	<0.35	<0.44	<0.45
123478-hexachlorodibenzo-p-dioxin	0.10000	0.083	<0.076	0.079	<0.079
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.18	0.24	0.20	<0.21
123789-hexachlorodibenzo-p-dioxin	0.10000	0.11	0.11	0.12	0.11
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.14	0.19	0.18	0.17
Octachlorodibenzo-p-dioxin	0.00030	0.0045	0.0070	0.0067	0.0061
2378-tetrachlorodibenzofuran	0.10000	<0.022	<0.055	0.043	<0.040
12378-pentachlorodibenzofuran	0.03000	<0.023	<0.022	<0.015	<0.020
23478-pentachlorodibenzofuran	0.30000	<0.35	0.44	0.29	<0.36
123478-hexachlorodibenzofuran	0.10000	<0.046	<0.063	0.060	<0.057
123678-hexachlorodibenzofuran	0.10000	0.067	0.096	0.088	0.084
234678-hexachlorodibenzofuran	0.10000	0.12	<0.13	0.15	<0.14
123789-hexachlorodibenzofuran	0.10000	<0.037	0.057	<0.053	<0.049
1234678-heptachlorodibenzofuran	0.01000	0.022	0.036	0.031	0.030
1234789-heptachlorodibenzofuran	0.01000	0.0045	<0.0078	<0.0058	<0.0060
Octachlorodibenzofuran	0.00030	<0.00051	0.0011	0.00099	<0.00086
PCB 81	0.00030	<0.00033	0.0026	<0.00055	<0.0012
PCB 77	0.00010	0.00091	0.023	0.0029	0.0089
PCB 123	0.00003	<0.000083	0.0033	0.00043	<0.0013
PCB 118	0.00003	0.0067	0.24	0.033	0.095
PCB 114	0.00003	0.00018	0.0061	0.00092	0.0024
PCB 105	0.00003	0.0020	0.063	0.011	0.025
PCB 126	0.10000	<0.13	0.53	<0.17	<0.28
PCB 167	0.00003	0.000074	0.0015	0.00033	0.00063
PCB 156/157	0.00003	<0.00017	0.0033	0.0010	<0.0015
PCB 169	0.03000	<0.021	<0.046	<0.023	<0.030
PCB 189	0.00003	<0.0000083	<0.000018	0.000018	<0.000015
Total Dioxins & Furans Only		<1.95	<2.01	<1.92	<1.96
Total PCBs Only		<0.16	<0.92	<0.25	<0.44
Total Dioxins & Furans and PCBs		<2.11	<2.93	<2.17	<2.40

* At 25°C and 1 atmosphere

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 48
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dioxin and Furan Toxicity Equivalent Emission Rates

Specific Isomer	Toxicity Equivalency Factor	Emission Rate Test No. 1 ng TEQ/s	Test No. 2 ng TEQ/s	Test No. 3 ng TEQ/s	Average ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	1.00000	<0.0032	<0.0023	<0.0027	<0.0028
12378-pentachlorodibenzo-p-dioxin	1.00000	0.0096	<0.0064	<0.0077	<0.0079
123478-hexachlorodibenzo-p-dioxin	0.10000	0.0014	<0.0014	0.0014	<0.0014
123678-hexachlorodibenzo-p-dioxin	0.10000	<0.0032	0.0043	0.0036	<0.0037
123789-hexachlorodibenzo-p-dioxin	0.10000	0.0019	0.0020	0.0021	0.0020
1234678-heptachlorodibenzo-p-dioxin	0.01000	0.0025	0.0035	0.0032	0.0031
Octachlorodibenzo-p-dioxin	0.00030	0.000080	0.00013	0.00012	0.00011
2378-tetrachlorodibenzofuran	0.10000	<0.00039	<0.00099	0.00076	<0.00071
12378-pentachlorodibenzofuran	0.03000	<0.00040	<0.00040	<0.00026	<0.00035
23478-pentachlorodibenzofuran	0.30000	<0.0061	0.0080	0.0051	<0.0064
123478-hexachlorodibenzofuran	0.10000	<0.00081	<0.0012	0.0011	<0.0010
123678-hexachlorodibenzofuran	0.10000	0.0012	0.0018	0.0015	0.0015
234678-hexachlorodibenzofuran	0.10000	0.0021	<0.0024	0.0027	<0.0024
123789-hexachlorodibenzofuran	0.10000	<0.00065	0.0010	<0.00093	<0.00087
1234678-heptachlorodibenzofuran	0.01000	0.00039	0.00066	0.00054	0.00053
1234789-heptachlorodibenzofuran	0.01000	0.000079	<0.00014	<0.00010	<0.00011
Octachlorodibenzofuran	0.00030	<0.0000088	0.000020	0.000017	<0.000015
PCB 81	0.00030	<0.0000058	0.000048	<0.0000096	<0.000021
PCB 77	0.00010	0.000016	0.00042	0.000052	0.00016
PCB 123	0.00003	<0.0000015	0.000060	0.0000076	<0.000023
PCB 118	0.00003	0.00012	0.0045	0.00058	0.0017
PCB 114	0.00003	0.0000032	0.00011	0.000016	0.000043
PCB 105	0.00003	0.000035	0.0011	0.00020	0.00046
PCB 126	0.10000	<0.0022	0.0097	<0.0031	<0.0050
PCB 167	0.00003	0.0000013	0.000027	0.0000058	0.000011
PCB 156/157	0.00003	<0.0000029	0.000060	0.000018	<0.000027
PCB 169	0.03000	<0.00036	<0.00084	<0.00041	<0.00054
PCB 189	0.00003	<0.00000015	<0.00000033	0.00000032	<0.00000027
Total Dioxins & Furans Only		<0.034	<0.037	<0.034	<0.035
Total PCBs Only		<0.0027	<0.017	<0.0044	<0.0080
Total Dioxins & Furans and PCBs		<0.037	<0.053	<0.038	<0.043

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 49
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Dioxin and Furan Toxicity Equivalent Emission Data
Calculated Using the Full Detection Limit

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg TEQ/m³	pg TEQ/Rm³*	pg TEQ/Rm³**	pg TEQ/Rm³*	ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	<0.11	<0.19	<0.15	<0.16	<0.0028
12378-pentachlorodibenzo-p-dioxin	<0.31	<0.54	<0.42	<0.45	<0.0079
123478-hexachlorodibenzo-p-dioxin	<0.055	<0.095	<0.074	<0.079	<0.0014
123678-hexachlorodibenzo-p-dioxin	<0.14	<0.25	<0.19	<0.21	<0.0037
123789-hexachlorodibenzo-p-dioxin	0.078	0.14	0.11	0.11	0.0020
1234678-heptachlorodibenzo-p-dioxin	0.12	0.21	0.16	0.17	0.0031
Octachlorodibenzo-p-dioxin	0.0042	0.0073	0.0057	0.0061	0.00011
2378-tetrachlorodibenzofuran	<0.028	<0.048	<0.037	<0.040	<0.00071
12378-pentachlorodibenzofuran	<0.014	<0.024	<0.019	<0.020	<0.00035
23478-pentachlorodibenzofuran	<0.25	<0.43	<0.34	<0.36	<0.0064
123478-hexachlorodibenzofuran	<0.039	<0.068	<0.053	<0.057	<0.0010
123678-hexachlorodibenzofuran	0.058	0.10	0.079	0.084	0.0015
234678-hexachlorodibenzofuran	<0.094	<0.16	<0.13	<0.14	<0.0024
123789-hexachlorodibenzofuran	<0.034	<0.059	<0.046	<0.049	<0.00087
1234678-heptachlorodibenzofuran	0.021	0.036	0.028	0.030	0.00053
1234789-heptachlorodibenzofuran	<0.0042	<0.0073	<0.0057	<0.0060	<0.00011
Octachlorodibenzofuran	<0.00059	<0.0010	<0.00080	<0.00086	<0.000015
PCB 81	<0.00081	<0.0014	<0.0011	<0.0012	<0.000021
PCB 77	0.0061	0.011	0.0083	0.0089	0.00016
PCB 123	<0.00087	<0.0015	<0.0012	<0.0013	<0.000023
PCB 118	0.065	0.11	0.088	0.095	0.0017
PCB 114	0.0016	0.0029	0.0022	0.0024	0.000043
PCB 105	0.017	0.031	0.024	0.025	0.00046
PCB 126	<0.19	<0.33	<0.26	<0.28	<0.0050
PCB 167	0.00043	0.00076	0.00058	0.00063	0.000011
PCB 156/157	<0.0010	<0.0018	<0.0014	<0.0015	<0.000027
PCB 169	<0.021	<0.036	<0.028	<0.030	<0.00054
PCB 189	<0.000010	<0.000018	<0.000014	<0.000015	<0.00000027
Total Dioxins & Furans Only	<1.35	<2.36	<1.84	<1.96	<0.035
Total PCBs Only	<0.31	<0.54	<0.41	<0.44	<0.0080
Total Dioxins & Furans and PCBs	<1.66	<2.89	<2.25	<2.40	<0.043

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 50
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Dioxin and Furan Toxicity Equivalent Emission Data
Calculated Using Half the Detection Limit

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg TEQ/m³	pg TEQ/Rm³*	pg TEQ/Rm³**	pg TEQ/Rm³*	ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	0.054	0.094	0.073	0.078	0.0014
12378-pentachlorodibenzo-p-dioxin	0.22	0.38	0.29	0.31	0.0055
123478-hexachlorodibenzo-p-dioxin	0.046	0.080	0.063	0.066	0.0012
123678-hexachlorodibenzo-p-dioxin	0.12	0.21	0.17	0.18	0.0032
123789-hexachlorodibenzo-p-dioxin	0.078	0.14	0.11	0.11	0.0020
1234678-heptachlorodibenzo-p-dioxin	0.12	0.21	0.16	0.17	0.0031
Octachlorodibenzo-p-dioxin	0.0042	0.0073	0.0057	0.0061	0.00011
2378-tetrachlorodibenzofuran	0.019	0.033	0.026	0.027	0.00048
12378-pentachlorodibenzofuran	0.0069	0.012	0.0093	0.010	0.00018
23478-pentachlorodibenzofuran	0.21	0.36	0.28	0.30	0.0054
123478-hexachlorodibenzofuran	0.027	0.046	0.036	0.038	0.00068
123678-hexachlorodibenzofuran	0.058	0.10	0.079	0.084	0.0015
234678-hexachlorodibenzofuran	0.079	0.14	0.11	0.11	0.0020
123789-hexachlorodibenzofuran	0.023	0.041	0.032	0.034	0.00061
1234678-heptachlorodibenzofuran	0.021	0.036	0.028	0.030	0.00053
1234789-heptachlorodibenzofuran	0.0026	0.0045	0.0035	0.0038	0.000067
Octachlorodibenzofuran	0.00053	0.00093	0.00073	0.00077	0.000014
PCB 81	0.00071	0.0012	0.00096	0.0010	0.000019
PCB 77	0.0061	0.011	0.0083	0.0089	0.00016
PCB 123	0.00087	0.0015	0.0012	0.0013	0.000023
PCB 118	0.065	0.11	0.088	0.095	0.0017
PCB 114	0.0016	0.0029	0.0022	0.0024	0.000043
PCB 105	0.017	0.031	0.024	0.025	0.00046
PCB 126	0.16	0.27	0.21	0.23	0.0041
PCB 167	0.00043	0.00076	0.00058	0.00063	0.000011
PCB 156/157	0.0010	0.0018	0.0014	0.0015	0.000026
PCB 169	0.010	0.018	0.014	0.015	0.00027
PCB 189	0.0000073	0.000013	0.0000099	0.000011	0.00000019
Total Dioxins & Furans Only	1.08	1.89	1.47	1.57	0.028
Total PCBs Only	0.26	0.46	0.35	0.38	0.0068
Total Dioxins & Furans and PCBs	1.34	2.35	1.83	1.95	0.035

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

World Health Organization Toxicity Equivalency Factors as detailed in O. Reg. 419/05.

Note: The value of half the detection limit was used to calculate emission data for those analytes not detected.

TABLE 51
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Emission Data for Chlorobenzenes
Test No. 1

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Monochlorobenzene	649	82.1	144	112	120	2.10
1,3-Dichlorobenzene	67.4	8.53	15.0	11.7	12.5	0.22
1,4-Dichlorobenzene	54.8	6.94	12.2	9.50	10.1	0.18
1,2-Dichlorobenzene	45.5	5.76	10.1	7.88	8.42	0.15
Total Dichlorobenzene	168	21.2	37.2	29.1	31.0	0.54
1,3,5-trichlorobenzene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
1,2,4-trichlorobenzene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
1,2,3-trichlorobenzene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Total Trichlorobenzene	<36.0	<4.56	<7.99	<6.24	<6.67	<0.12
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<12	<1.52	<2.66	<2.08	<2.22	<0.039
1,2,3,4-tetrachlorobenzene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Total Tetrachlorobenzene	<24.0	<3.04	<5.33	<4.16	<4.44	<0.078
Pentachlorobenzene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Hexachlorobenzene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Total Chlorobenzenes	<901	<114	<200	<156	<167	<2.92

Dry Gas Volume Sampled (Rm^3*) :	4.506
Actual Flowrate (m^3/s) :	25.6
Dry Reference Flowrate (Rm^3/s*) :	14.6
Dry Adjusted Flowrate (Rm^3/s**) :	18.7
Wet Reference Flowrate (Rm^3/s*) :	17.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 52
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Emission Data for Chlorobenzenes
Test No. 2

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Monochlorobenzene	197	23.9	42.1	32.3	34.7	0.63
1,3-Dichlorobenzene	32.2	3.90	6.89	5.27	5.68	0.10
1,4-Dichlorobenzene	30.4	3.68	6.50	4.98	5.36	0.098
1,2-Dichlorobenzene	18.4	2.23	3.94	3.01	3.24	0.059
Total Dichlorobenzene	81.0	9.81	17.3	13.3	14.3	0.26
1,3,5-trichlorobenzene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
1,2,4-trichlorobenzene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
1,2,3-trichlorobenzene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Total Trichlorobenzene	<36.0	<4.36	<7.70	<5.89	<6.35	<0.12
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<12	<1.45	<2.57	<1.96	<2.12	<0.039
1,2,3,4-tetrachlorobenzene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Total Tetrachlorobenzene	<24.0	<2.91	<5.13	<3.93	<4.23	<0.077
Pentachlorobenzene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Hexachlorobenzene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Total Chlorobenzenes	<362	<43.8	<77.4	<59.3	<63.8	<1.16

Dry Gas Volume Sampled (Rm^3*) :	4.674
Actual Flowrate (m^3/s) :	26.5
Dry Reference Flowrate (Rm^3/s*) :	15.0
Dry Adjusted Flowrate (Rm^3/s**) :	19.6
Wet Reference Flowrate (Rm^3/s*) :	18.2

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 53
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Emission Data for Chlorobenzenes
Test No. 3

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Monochlorobenzene	621	78.9	135	107	113	1.99
1,3-Dichlorobenzene	70.9	9.01	15.4	12.3	12.9	0.23
1,4-Dichlorobenzene	48.7	6.19	10.6	8.43	8.86	0.16
1,2-Dichlorobenzene	45.8	5.82	9.97	7.93	8.33	0.15
Total Dichlorobenzene	165	21.0	36.0	28.6	30.1	0.53
1,3,5-trichlorobenzene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
1,2,4-trichlorobenzene	17.6	2.24	3.83	3.05	3.20	0.056
1,2,3-trichlorobenzene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Total Trichlorobenzene	<42	<5.28	<9.06	<7.20	<7.57	<0.13
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<12	<1.52	<2.61	<2.08	<2.18	<0.038
1,2,3,4-tetrachlorobenzene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Total Tetrachlorobenzene	<24.0	<3.05	<5.23	<4.15	<4.37	<0.077
Pentachlorobenzene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Hexachlorobenzene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Total Chlorobenzenes	<876	<111	<191	<152	<159	<2.80

Dry Gas Volume Sampled (Rm^3*) :	4.592
Actual Flowrate (m^3/s) :	25.2
Dry Reference Flowrate (Rm^3/s*) :	14.7
Dry Adjusted Flowrate (Rm^3/s**) :	18.5
Wet Reference Flowrate (Rm^3/s*) :	17.6

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 54
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Actual Concentrations for Chlorobenzenes

Specific Isomer	Actual Concentration Test No. 1 ng/m³	Test No. 2 ng/m³	Test No. 3 ng/m³	Average ng/m³	Coefficient of Variation %
Monochlorobenzene	82.1	23.9	78.9	61.6	53.1
1,3-Dichlorobenzene	8.53	3.90	9.01	7.15	39.5
1,4-Dichlorobenzene	6.94	3.68	6.19	5.60	30.4
1,2-Dichlorobenzene	5.76	2.23	5.82	4.60	44.7
Total Dichlorobenzene	21.2	9.81	21.0	17.3	37.6
1,3,5-trichlorobenzene	<1.52	<1.45	<1.52	<1.50	2.6
1,2,4-trichlorobenzene	<1.52	<1.45	2.24	<1.74	25.0
1,2,3-trichlorobenzene	<1.52	<1.45	<1.52	<1.50	2.6
Total Trichlorobenzene	<4.56	<4.36	<5.28	<4.73	10.3
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<1.52	<1.45	<1.52	<1.50	2.6
1,2,3,4-tetrachlorobenzene	<1.52	<1.45	<1.52	<1.50	2.6
Total Tetrachlorobenzene	<3.04	<2.91	<3.05	<3.00	2.6
Pentachlorobenzene	<1.52	<1.45	<1.52	<1.50	2.6
Hexachlorobenzene	<1.52	<1.45	<1.52	<1.50	2.6
Total Chlorobenzenes	<114	<43.8	<111	<89.7	44.3

TABLE 55
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dry Reference Concentrations for Chlorobenzenes

Specific Isomer	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Monochlorobenzene	144	42.1	135	107	52.7
1,3-Dichlorobenzene	15.0	6.89	15.4	12.4	38.6
1,4-Dichlorobenzene	12.2	6.50	10.6	9.76	30.0
1,2-Dichlorobenzene	10.1	3.94	9.97	8.00	44.0
Total Dichlorobenzene	37.2	17.3	36.0	30.2	36.9
1,3,5-trichlorobenzene	<2.66	<2.57	<2.61	<2.61	1.8
1,2,4-trichlorobenzene	<2.66	<2.57	3.83	<3.02	23.3
1,2,3-trichlorobenzene	<2.66	<2.57	<2.61	<2.61	1.8
Total Trichlorobenzene	<7.99	<7.70	<9.06	<8.25	8.7
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<2.66	<2.57	<2.61	<2.61	1.8
1,2,3,4-tetrachlorobenzene	<2.66	<2.57	<2.61	<2.61	1.8
Total Tetrachlorobenzene	<5.33	<5.13	<5.23	<5.23	1.8
Pentachlorobenzene	<2.66	<2.57	<2.61	<2.61	1.8
Hexachlorobenzene	<2.66	<2.57	<2.61	<2.61	1.8
Total Chlorobenzenes	<200	<77.4	<191	<156	43.7

* At 25°C and 1 atmosphere

TABLE 56
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Dry Adjusted Concentrations for Chlorobenzenes

Specific Isomer	Dry Adjusted Concentration				Coefficient of Variation %
	Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	
Monochlorobenzene	112	32.3	107	84.1	53.5
1,3-Dichlorobenzene	11.7	5.27	12.3	9.74	39.8
1,4-Dichlorobenzene	9.50	4.98	8.43	7.63	30.9
1,2-Dichlorobenzene	7.88	3.01	7.93	6.27	45.0
Total Dichlorobenzene	29.1	13.3	28.6	23.6	38.0
1,3,5-trichlorobenzene	<2.08	<1.96	<2.08	<2.04	3.2
1,2,4-trichlorobenzene	<2.08	<1.96	3.05	<2.36	25.1
1,2,3-trichlorobenzene	<2.08	<1.96	<2.08	<2.04	3.2
Total Trichlorobenzene	<6.24	<5.89	<7.20	<6.44	10.5
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<2.08	<1.96	<2.08	<2.04	3.2
1,2,3,4-tetrachlorobenzene	<2.08	<1.96	<2.08	<2.04	3.2
Total Tetrachlorobenzene	<4.16	<3.93	<4.15	<4.08	3.2
Pentachlorobenzene	<2.08	<1.96	<2.08	<2.04	3.2
Hexachlorobenzene	<2.08	<1.96	<2.08	<2.04	3.2
Total Chlorobenzenes	<156	<59.3	<152	<122	44.7

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 57
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Wet Reference Concentrations for Chlorobenzenes

Specific Isomer	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Monochlorobenzene	120	34.7	113	89.3	53.1
1,3-Dichlorobenzene	12.5	5.68	12.9	10.4	39.1
1,4-Dichlorobenzene	10.1	5.36	8.86	8.12	30.5
1,2-Dichlorobenzene	8.42	3.24	8.33	6.67	44.5
Total Dichlorobenzene	31.0	14.3	30.1	25.1	37.4
1,3,5-trichlorobenzene	<2.22	<2.12	<2.18	<2.17	2.5
1,2,4-trichlorobenzene	<2.22	<2.12	3.20	<2.51	23.8
1,2,3-trichlorobenzene	<2.22	<2.12	<2.18	<2.17	2.5
Total Trichlorobenzene	<6.67	<6.35	<7.57	<6.86	9.2
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<2.22	<2.12	<2.18	<2.17	2.5
1,2,3,4-tetrachlorobenzene	<2.22	<2.12	<2.18	<2.17	2.5
Total Tetrachlorobenzene	<4.44	<4.23	<4.37	<4.35	2.5
Pentachlorobenzene	<2.22	<2.12	<2.18	<2.17	2.5
Hexachlorobenzene	<2.22	<2.12	<2.18	<2.17	2.5
Total Chlorobenzenes	<167	<63.8	<159	<130	44.2

* At 25°C and 1 atmosphere

TABLE 58
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Emission Rates for Chlorobenzenes

Specific Isomer	Emission Rate Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	Coefficient of Variation %
Monochlorobenzene	2.10	0.63	1.99	1.57	52.0
1,3-Dichlorobenzene	0.22	0.10	0.23	0.18	37.7
1,4-Dichlorobenzene	0.18	0.098	0.16	0.14	28.8
1,2-Dichlorobenzene	0.15	0.059	0.15	0.12	43.2
Total Dichlorobenzene	0.54	0.26	0.53	0.44	36.0
1,3,5-trichlorobenzene	<0.039	<0.039	<0.038	<0.039	0.6
1,2,4-trichlorobenzene	<0.039	<0.039	0.056	<0.045	22.9
1,2,3-trichlorobenzene	<0.039	<0.039	<0.038	<0.039	0.6
Total Trichlorobenzene	<0.12	<0.12	<0.13	<0.12	8.1
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<0.039	<0.039	<0.038	<0.039	0.6
1,2,3,4-tetrachlorobenzene	<0.039	<0.039	<0.038	<0.039	0.6
Total Tetrachlorobenzene	<0.078	<0.077	<0.077	<0.077	0.6
Pentachlorobenzene	<0.039	<0.039	<0.038	<0.039	0.6
Hexachlorobenzene	<0.039	<0.039	<0.038	<0.039	0.6
Total Chlorobenzenes	<2.92	<1.16	<2.80	<2.29	42.8

TABLE 59
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Emission Data for Chlorobenzenes

Specific Isomer	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
Monochlorobenzene	61.6	107	84.1	89.3	1.57
1,3-Dichlorobenzene	7.15	12.4	9.74	10.4	0.18
1,4-Dichlorobenzene	5.60	9.76	7.63	8.12	0.14
1,2-Dichlorobenzene	4.60	8.00	6.27	6.67	0.12
Total Dichlorobenzene	17.3	30.2	23.6	25.1	0.44
1,3,5-trichlorobenzene	<1.50	<2.61	<2.04	<2.17	<0.039
1,2,4-trichlorobenzene	<1.74	<3.02	<2.36	<2.51	<0.045
1,2,3-trichlorobenzene	<1.50	<2.61	<2.04	<2.17	<0.039
Total Trichlorobenzene	<4.73	<8.25	<6.44	<6.86	<0.12
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<1.50	<2.61	<2.04	<2.17	<0.039
1,2,3,4-tetrachlorobenzene	<1.50	<2.61	<2.04	<2.17	<0.039
Total Tetrachlorobenzene	<3.00	<5.23	<4.08	<4.35	<0.077
Pentachlorobenzene	<1.50	<2.61	<2.04	<2.17	<0.039
Hexachlorobenzene	<1.50	<2.61	<2.04	<2.17	<0.039
Total Chlorobenzenes	<89.7	<156	<122	<130	<2.29

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 60
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorobenzene Blank Analyses

Isomers and Congener Group Totals	Blank Train Total ng	Method Blank Total ng
Monochlorobenzene	<12	<12
1,3-Dichlorobenzene	<12	<12
1,4-Dichlorobenzene	22.6	13.3
1,2-Dichlorobenzene	<12	<12
Total Dichlorobenzene	<46.6	<37.3
1,3,5-trichlorobenzene	<12	<12
1,2,4-trichlorobenzene	<12	<12
1,2,3-trichlorobenzene	<12	<12
Total Trichlorobenzene	<36.0	<36.0
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<12	<12
1,2,3,4-tetrachlorobenzene	<12	<12
Total Tetrachlorobenzene	<24.0	<24.0
Pentachlorobenzene	<12	<12
Hexachlorobenzene	<12	<12
Total Chlorobenzenes	<143	<133

"<" indicates that the amount detected is less than the detection limit. In these cases the value of the detection limit was used to calculate the total collected.

TABLE 61
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Isomer and Congener Group Analysis and Emission Data
Test No. 1

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2-monochlorophenol	NQ	NQ	NQ	NQ	NQ	NQ
3 & 4-monochlorophenol	NQ	NQ	NQ	NQ	NQ	NQ
Total Monochlorophenols	NQ	NQ	NQ	NQ	NQ	NQ
2,6-dichlorophenol	<1000	<127	<222	<173	<185	<3.24
2,4 & 2,5-dichlorophenol	<1000	<127	<222	<173	<185	<3.24
3,5-dichlorophenol	<1000	<127	<222	<173	<185	<3.24
2,3-dichlorophenol	<1000	<127	<222	<173	<185	<3.24
3,4-dichlorophenol	2940	372	652	509	544	9.53
Total Dichlorophenols	<6940	<878	<1540	<1202	<1285	<22.5
2,4,6-trichlorophenol	<60	<7.59	<13.3	<10.4	<11.1	<0.19
2,3,6-trichlorophenol	<60	<7.59	<13.3	<10.4	<11.1	<0.19
2,3,5-trichlorophenol	<60	<7.59	<13.3	<10.4	<11.1	<0.19
2,4,5-trichlorophenol	<60	<7.59	<13.3	<10.4	<11.1	<0.19
2,3,4-trichlorophenol	<60	<7.59	<13.3	<10.4	<11.1	<0.19
3,4,5-trichlorophenol	1110	140	246	192	206	3.60
Total Trichlorophenols	<1410	<178	<313	<244	<261	<4.57
2,3,5,6/2,3,4,6-tetrachlorophenol	162	20.5	36.0	28.1	30.0	0.52
2,3,4,5-tetrachlorophenol	72.6	9.19	16.1	12.6	13.4	0.24
Total Tetrachlorophenols	235	29.7	52.1	40.6	43.4	0.76
Pentachlorophenol	1070	135	237	185	198	3.47
Total Chlorophenols	<9655	<1222	<2143	<1673	<1788	<31.3

Dry Gas Volume Sampled (Rm^3*) :	4.506
Actual Flowrate (m^3/s) :	25.6
Dry Reference Flowrate (Rm^3/s*) :	14.6
Dry Adjusted Flowrate (Rm^3/s**) :	18.7
Wet Reference Flowrate (Rm^3/s*) :	17.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

NQ - Indicates that this compound is not quantifiable due to spike recovery loss.

TABLE 62
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Isomer and Congener Group Analysis and Emission Data
Test No. 2

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2-monochlorophenol	NQ	NQ	NQ	NQ	NQ	NQ
3 & 4-monochlorophenol	NQ	NQ	NQ	NQ	NQ	NQ
Total Monochlorophenols	NQ	NQ	NQ	NQ	NQ	NQ
2,6-dichlorophenol	<1000	<121	<214	<164	<176	<3.21
2,4 & 2,5-dichlorophenol	<1000	<121	<214	<164	<176	<3.21
3,5-dichlorophenol	<1000	<121	<214	<164	<176	<3.21
2,3-dichlorophenol	<1000	<121	<214	<164	<176	<3.21
3,4-dichlorophenol	1400	170	300	229	247	4.49
Total Dichlorophenols	<5400	<654	<1155	<884	<952	<17.3
2,4,6-trichlorophenol	<60	<7.27	<12.8	<9.82	<10.6	<0.19
2,3,6-trichlorophenol	<60	<7.27	<12.8	<9.82	<10.6	<0.19
2,3,5-trichlorophenol	<60	<7.27	<12.8	<9.82	<10.6	<0.19
2,4,5-trichlorophenol	<60	<7.27	<12.8	<9.82	<10.6	<0.19
2,3,4-trichlorophenol	<60	<7.27	<12.8	<9.82	<10.6	<0.19
3,4,5-trichlorophenol	<60	<7.27	<12.8	<9.82	<10.6	<0.19
Total Trichlorophenols	<360	<43.6	<77.0	<58.9	<63.5	<1.16
2,3,5,6/2,3,4,6-tetrachlorophenol	164	19.9	35.1	26.9	28.9	0.53
2,3,4,5-tetrachlorophenol	60.7	7.35	13.0	9.94	10.7	0.19
Total Tetrachlorophenols	225	27.2	48.1	36.8	39.6	0.72
Pentachlorophenol	90.3	10.9	19.3	14.8	15.9	0.29
Total Chlorophenols	<6075	<736	<1300	<995	<1071	<19.5

Dry Gas Volume Sampled (Rm^3*) :	4.674
Actual Flowrate (m^3/s) :	26.5
Dry Reference Flowrate (Rm^3/s*) :	15.0
Dry Adjusted Flowrate (Rm^3/s**) :	19.6
Wet Reference Flowrate (Rm^3/s*) :	18.2

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

NQ - Indicates that this compound is not quantifiable due to spike recovery loss.

TABLE 63
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Isomer and Congener Group Analysis and Emission Data
Test No. 3

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2-monochlorophenol	<1000	<127	<218	<173	<182	<3.20
3 & 4-monochlorophenol	<1000	<127	<218	<173	<182	<3.20
Total Monochlorophenols	<2000	<254	<436	<346	<364	<6.40
2,6-dichlorophenol	<1000	<127	<218	<173	<182	<3.20
2,4 & 2,5-dichlorophenol	<1000	<127	<218	<173	<182	<3.20
3,5-dichlorophenol	<1000	<127	<218	<173	<182	<3.20
2,3-dichlorophenol	<1000	<127	<218	<173	<182	<3.20
3,4-dichlorophenol	1790	227	390	310	326	5.73
Total Dichlorophenols	<5790	<736	<1261	<1002	<1053	<18.5
2,4,6-trichlorophenol	<60	<7.62	<13.1	<10.4	<10.9	<0.19
2,3,6-trichlorophenol	<60	<7.62	<13.1	<10.4	<10.9	<0.19
2,3,5-trichlorophenol	<60	<7.62	<13.1	<10.4	<10.9	<0.19
2,4,5-trichlorophenol	<60	<7.62	<13.1	<10.4	<10.9	<0.19
2,3,4-trichlorophenol	<60	<7.62	<13.1	<10.4	<10.9	<0.19
3,4,5-trichlorophenol	<60	<7.62	<13.1	<10.4	<10.9	<0.19
Total Trichlorophenols	<360	<45.7	<78.4	<62.3	<65.5	<1.15
2,3,5,6/2,3,4,6-tetrachlorophenol	173	22.0	37.7	29.9	31.5	0.55
2,3,4,5-tetrachlorophenol	73.1	9.29	15.9	12.6	13.3	0.23
Total Tetrachlorophenols	246	31.3	53.6	42.6	44.8	0.79
Pentachlorophenol	107	13.6	23.3	18.5	19.5	0.34
Total Chlorophenols	<8503	<1080	<1852	<1471	<1547	<27.2

Dry Gas Volume Sampled (Rm^3*) :	4.592
Actual Flowrate (m^3/s) :	25.2
Dry Reference Flowrate (Rm^3/s*) :	14.7
Dry Adjusted Flowrate (Rm^3/s**) :	18.5
Wet Reference Flowrate (Rm^3/s*) :	17.6

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 64
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Isomer and Congener Group Actual Concentrations

Specific Isomer	Actual Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/m³	ng/m³	ng/m³	ng/m³	%
2-monochlorophenol	NQ	NQ	<127	<127	-
3 & 4-monochlorophenol	NQ	NQ	<127	<127	-
Total Monochlorophenols	NQ	NQ	<254	<254	-
2,6-dichlorophenol	<127	<121	<127	<125	2.6
2,4 & 2,5-dichlorophenol	<127	<121	<127	<125	2.6
3,5-dichlorophenol	<127	<121	<127	<125	2.6
2,3-dichlorophenol	<127	<121	<127	<125	2.6
3,4-dichlorophenol	372	170	227	256	40.7
Total Dichlorophenols	<878	<654	<736	<756	15.0
2,4,6-trichlorophenol	<7.59	<7.27	<7.62	<7.49	2.6
2,3,6-trichlorophenol	<7.59	<7.27	<7.62	<7.49	2.6
2,3,5-trichlorophenol	<7.59	<7.27	<7.62	<7.49	2.6
2,4,5-trichlorophenol	<7.59	<7.27	<7.62	<7.49	2.6
2,3,4-trichlorophenol	<7.59	<7.27	<7.62	<7.49	2.6
3,4,5-trichlorophenol	140	<7.27	<7.62	<51.8	148
Total Trichlorophenols	<178	<43.6	<45.7	<89.3	86.5
2,3,5,6/2,3,4,6-tetrachlorophenol	20.5	19.9	22.0	20.8	5.2
2,3,4,5-tetrachlorophenol	9.19	7.35	9.29	8.61	12.7
Total Tetrachlorophenols	29.7	27.2	31.3	29.4	6.9
Pentachlorophenol	135	10.9	13.6	53.3	133
Total Chlorophenols	<1222	<736	<1080	<1013	24.7

TABLE 65
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Isomer and Congener Group Dry Reference Concentrations

Specific Isomer	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2-monochlorophenol	NQ	NQ	<218	<218	-
3 & 4-monochlorophenol	NQ	NQ	<218	<218	-
Total Monochlorophenols	NQ	NQ	<436	<436	-
2,6-dichlorophenol	<222	<214	<218	<218	1.8
2,4 & 2,5-dichlorophenol	<222	<214	<218	<218	1.8
3,5-dichlorophenol	<222	<214	<218	<218	1.8
2,3-dichlorophenol	<222	<214	<218	<218	1.8
3,4-dichlorophenol	652	300	390	447	41.0
Total Dichlorophenols	<1540	<1155	<1261	<1319	15.1
2,4,6-trichlorophenol	<13.3	<12.8	<13.1	<13.1	1.8
2,3,6-trichlorophenol	<13.3	<12.8	<13.1	<13.1	1.8
2,3,5-trichlorophenol	<13.3	<12.8	<13.1	<13.1	1.8
2,4,5-trichlorophenol	<13.3	<12.8	<13.1	<13.1	1.8
2,3,4-trichlorophenol	<13.3	<12.8	<13.1	<13.1	1.8
3,4,5-trichlorophenol	246	<12.8	<13.1	<90.7	148
Total Trichlorophenols	<313	<77.0	<78.4	<156	87.0
2,3,5,6/2,3,4,6-tetrachlorophenol	36.0	35.1	37.7	36.2	3.6
2,3,4,5-tetrachlorophenol	16.1	13.0	15.9	15.0	11.7
Total Tetrachlorophenols	52.1	48.1	53.6	51.2	5.6
Pentachlorophenol	237	19.3	23.3	93.4	134
Total Chlorophenols	<2143	<1300	<1852	<1765	24.3

* At 25°C and 1 atmosphere

TABLE 66
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Isomer and Congener Group Dry Adjusted Concentrations

Specific Isomer	Dry Adjusted Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2-monochlorophenol	NQ	NQ	<173	<173	'-
3 & 4-monochlorophenol	NQ	NQ	<173	<173	-
Total Monochlorophenols	NQ	NQ	<346	<346	-
2,6-dichlorophenol	<173	<164	<173	<170	3.2
2,4 & 2,5-dichlorophenol	<173	<164	<173	<170	3.2
3,5-dichlorophenol	<173	<164	<173	<170	3.2
2,3-dichlorophenol	<173	<164	<173	<170	3.2
3,4-dichlorophenol	509	229	310	349	41.3
Total Dichlorophenols	<1202	<884	<1002	<1030	15.6
2,4,6-trichlorophenol	<10.4	<9.82	<10.4	<10.2	3.2
2,3,6-trichlorophenol	<10.4	<9.82	<10.4	<10.2	3.2
2,3,5-trichlorophenol	<10.4	<9.82	<10.4	<10.2	3.2
2,4,5-trichlorophenol	<10.4	<9.82	<10.4	<10.2	3.2
2,3,4-trichlorophenol	<10.4	<9.82	<10.4	<10.2	3.2
3,4,5-trichlorophenol	192	<9.82	<10.4	<70.8	149
Total Trichlorophenols	<244	<58.9	<62.3	<122	87.0
2,3,5,6/2,3,4,6-tetrachlorophenol	28.1	26.9	29.9	28.3	5.5
2,3,4,5-tetrachlorophenol	12.6	9.94	12.6	11.7	13.2
Total Tetrachlorophenols	40.6	36.8	42.6	40.0	7.4
Pentachlorophenol	185	14.8	18.5	72.9	134
Total Chlorophenols	<1673	<995	<1471	<1380	25.2

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 67
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Isomer and Congener Group Wet Reference Concentrations

Specific Isomer	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2-monochlorophenol	NQ	NQ	<182	<182	-
3 & 4-monochlorophenol	NQ	NQ	<182	<182	-
Total Monochlorophenols	NQ	NQ	<364	<364	-
2,6-dichlorophenol	<185	<176	<182	<181	2.5
2,4 & 2,5-dichlorophenol	<185	<176	<182	<181	2.5
3,5-dichlorophenol	<185	<176	<182	<181	2.5
2,3-dichlorophenol	<185	<176	<182	<181	2.5
3,4-dichlorophenol	544	247	326	372	41.4
Total Dichlorophenols	<1285	<952	<1053	<1097	15.6
2,4,6-trichlorophenol	<11.1	<10.6	<10.9	<10.9	2.5
2,3,6-trichlorophenol	<11.1	<10.6	<10.9	<10.9	2.5
2,3,5-trichlorophenol	<11.1	<10.6	<10.9	<10.9	2.5
2,4,5-trichlorophenol	<11.1	<10.6	<10.9	<10.9	2.5
2,3,4-trichlorophenol	<11.1	<10.6	<10.9	<10.9	2.5
3,4,5-trichlorophenol	206	<10.6	<10.9	<75.7	149
Total Trichlorophenols	<261	<63.5	<65.5	<130	87.3
2,3,5,6/2,3,4,6-tetrachlorophenol	30.0	28.9	31.5	30.1	4.2
2,3,4,5-tetrachlorophenol	13.4	10.7	13.3	12.5	12.3
Total Tetrachlorophenols	43.4	39.6	44.8	42.6	6.3
Pentachlorophenol	198	15.9	19.5	77.8	134
Total Chlorophenols	<1788	<1071	<1547	<1468	24.8

* At 25°C and 1 atmosphere

TABLE 68
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Isomer and Congener Group Emission Rates

Specific Isomer	Emission Rate Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	Coefficient of Variation %
2-monochlorophenol	NQ	NQ	<3.20	<3.20	-
3 & 4-monochlorophenol	NQ	NQ	<3.20	<3.20	-
Total Monochlorophenols	NQ	NQ	<6.40	<6.40	-
2,6-dichlorophenol	<3.24	<3.21	<3.20	<3.22	0.6
2,4 & 2,5-dichlorophenol	<3.24	<3.21	<3.20	<3.22	0.6
3,5-dichlorophenol	<3.24	<3.21	<3.20	<3.22	0.6
2,3-dichlorophenol	<3.24	<3.21	<3.20	<3.22	0.6
3,4-dichlorophenol	9.53	4.49	5.73	6.58	39.8
Total Dichlorophenols	<22.5	<17.3	<18.5	<19.5	13.9
2,4,6-trichlorophenol	<0.19	<0.19	<0.19	<0.19	0.6
2,3,6-trichlorophenol	<0.19	<0.19	<0.19	<0.19	0.6
2,3,5-trichlorophenol	<0.19	<0.19	<0.19	<0.19	0.6
2,4,5-trichlorophenol	<0.19	<0.19	<0.19	<0.19	0.6
2,3,4-trichlorophenol	<0.19	<0.19	<0.19	<0.19	0.6
3,4,5-trichlorophenol	3.60	<0.19	<0.19	<1.33	148
Total Trichlorophenols	<4.57	<1.16	<1.15	<2.29	86.0
2,3,5,6/2,3,4,6-tetrachlorophenol	0.52	0.53	0.55	0.54	3.0
2,3,4,5-tetrachlorophenol	0.24	0.19	0.23	0.22	10.4
Total Tetrachlorophenols	0.76	0.72	0.79	0.76	4.4
Pentachlorophenol	3.47	0.29	0.34	1.37	133
Total Chlorophenols	<31.3	<19.5	<27.2	<26.0	23.0

TABLE 69
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Emission Data for Chlorophenol Isomer and Congener Groups

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2-monochlorophenol	<127	<218	<173	<182	<3.20
3 & 4-monochlorophenol	<127	<218	<173	<182	<3.20
Total Monochlorophenols	<254	<436	<346	<364	<6.40
2,6-dichlorophenol	<125	<218	<170	<181	<3.22
2,4 & 2,5-dichlorophenol	<125	<218	<170	<181	<3.22
3,5-dichlorophenol	<125	<218	<170	<181	<3.22
2,3-dichlorophenol	<125	<218	<170	<181	<3.22
3,4-dichlorophenol	256	447	349	372	6.58
Total Dichlorophenols	<756	<1319	<1030	<1097	<19.5
2,4,6-trichlorophenol	<7.49	<13.1	<10.2	<10.9	<0.19
2,3,6-trichlorophenol	<7.49	<13.1	<10.2	<10.9	<0.19
2,3,5-trichlorophenol	<7.49	<13.1	<10.2	<10.9	<0.19
2,4,5-trichlorophenol	<7.49	<13.1	<10.2	<10.9	<0.19
2,3,4-trichlorophenol	<7.49	<13.1	<10.2	<10.9	<0.19
3,4,5-trichlorophenol	<51.8	<90.7	<70.8	<75.7	<1.33
Total Trichlorophenols	<89.3	<156	<122	<130	<2.29
2,3,5,6/2,3,4,6-tetrachlorophenol	20.8	36.2	28.3	30.1	0.54
2,3,4,5-tetrachlorophenol	8.61	15.0	11.7	12.5	0.22
Total Tetrachlorophenols	29.4	51.2	40.0	42.6	0.76
Pentachlorophenol	53.3	93.4	72.9	77.8	1.37
Total Chlorophenols	<1013	<1765	<1380	<1468	<26.0

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 70
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Chlorophenol Blank Analyses

Congener Group	Media Blank Total ng	Blank Train Total ng
2-monochlorophenol	<60	<500
3 & 4-monochlorophenol	<60	<500
Total Monochlorophenols	<120	<1000
2,6-dichlorophenol	<200	<500
2,4 & 2,5-dichlorophenol	<60	<500
3,5-dichlorophenol	<200	856
2,3-dichlorophenol	<200	<500
3,4-dichlorophenol	<200	1270
Total Dichlorophenols	<860	<3626
2,4,6-trichlorophenol	<60	<60
2,3,6-trichlorophenol	<60	<60
2,3,5-trichlorophenol	<60	<60
2,4,5-trichlorophenol	<60	86.4
2,3,4-trichlorophenol	<60	<60
3,4,5-trichlorophenol	<60	251
Total Trichlorophenols	<360	<577
2,3,5,6/2,3,4,6-tetrachlorophenol	<60	124
2,3,4,5-tetrachlorophenol	<60	64.9
Total Tetrachlorophenols	<120	189
Pentachlorophenol	<60	247
Total Chlorophenols	<1520	<5639

"<" indicates that the amount detected is less than the detection limit. In these cases the value of the detection limit was used to calculate the total collected.

TABLE 71
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 1

Compound	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Acenaphthene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Acenaphthylene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Anthracene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Benzo(a)Anthracene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Benzo(b)Fluoranthene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Benzo(k)Fluoranthene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Benzo(a)fluorene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Benzo(b)fluorene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Benzo(g,h,i)Perylene	34.7	4.39	7.70	6.01	6.42	0.11
Benzo(a)Pyrene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Benzo(e)Pyrene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Biphenyl	14.9	1.89	3.31	2.58	2.76	0.048
2-Chloronaphthalene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Chrysene/Triphenylene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Coronene	<60	<7.59	<13.3	<10.4	<11.1	<0.19
Dibenzo(a,c/a,h)Anthracene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Dibenzo(a,e)pyrene	<60	<7.59	<13.3	<10.4	<11.1	<0.19
9,10-dimethylanthracene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
7,12-Dimethylbenzo(a)anthracene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Fluoranthene	19.4	2.46	4.31	3.36	3.59	0.063
Fluorene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Indeno(1,2,3-cd)Pyrene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
2-methylanthracene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
3-Methylcholanthrene	<60	<7.59	<13.3	<10.4	<11.1	<0.19
1-Methylnaphthalene	12.4	1.57	2.75	2.15	2.30	0.040
2-Methylnaphthalene	22.1	2.80	4.90	3.83	4.09	0.072
1-Methylphenanthrene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
9-Methylphenanthrene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Naphthalene	71.0	8.99	15.8	12.3	13.1	0.23
Perylene	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Phenanthrene	72.0	9.11	16.0	12.5	13.3	0.23
Picene	<60	<7.59	<13.3	<10.4	<11.1	<0.19
Pyrene	26.3	3.33	5.84	4.56	4.87	0.085
Tetralin	17.9	2.27	3.97	3.10	3.31	0.058
m-terphenyl	<12	<1.52	<2.66	<2.08	<2.22	<0.039
o-Terphenyl	<12	<1.52	<2.66	<2.08	<2.22	<0.039
p-terphenyl	<12	<1.52	<2.66	<2.08	<2.22	<0.039
Total	<819	<104	<182	<142	<152	<2.65

Dry Gas Volume Sampled (Rm^3*) :	4.506
Actual Flowrate (m^3/s) :	25.6
Dry Reference Flowrate (Rm^3/s*) :	14.6
Dry Adjusted Flowrate (Rm^3/s**) :	18.7
Wet Reference Flowrate (Rm^3/s*) :	17.5

* At 25°C and 1 atmosphere
** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume
Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 72
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 2

Compound	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Acenaphthene	17.8	2.16	3.81	2.91	3.14	0.057
Acenaphthylene	16.0	1.94	3.42	2.62	2.82	0.051
Anthracene	13.1	1.59	2.80	2.14	2.31	0.042
Benzo(a)Anthracene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Benzo(b)Fluoranthene	34.0	4.12	7.27	5.57	6.00	0.11
Benzo(k)Fluoranthene	20.7	2.51	4.43	3.39	3.65	0.066
Benzo(a)fluorene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Benzo(b)fluorene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Benzo(g,h,i)Perylene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Benzo(a)Pyrene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Benzo(e)Pyrene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Biphenyl	59.8	7.24	12.8	9.79	10.5	0.19
2-Chloronaphthalene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Chrysene/Triphenylene	49.3	5.97	10.5	8.07	8.69	0.16
Coronene	<60	<7.27	<12.8	<9.82	<10.6	<0.19
Dibenzo(a,c/a,h)Anthracene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Dibenzo(a,e)pyrene	<60	<7.27	<12.8	<9.82	<10.6	<0.19
9,10-dimethylanthracene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
7,12-Dimethylbenzo(a)anthracene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Fluoranthene	134	16.2	28.7	21.9	23.6	0.43
Fluorene	39.1	4.74	8.37	6.40	6.89	0.13
Indeno(1,2,3-cd)Pyrene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
2-methylanthracene	18.7	2.26	4.00	3.06	3.30	0.060
3-Methylcholanthrene	<60	<7.27	<12.8	<9.82	<10.6	<0.19
1-Methylnaphthalene	35.2	4.26	7.53	5.76	6.21	0.11
2-Methylnaphthalene	56.4	6.83	12.1	9.23	9.95	0.18
1-Methylphenanthrene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
9-Methylphenanthrene	55.6	6.73	11.9	9.10	9.80	0.18
Naphthalene	117	14.2	25.0	19.2	20.6	0.38
Perylene	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Phenanthrene	656	79.4	140	107	116	2.11
Picene	<60	<7.27	<12.8	<9.82	<10.6	<0.19
Pyrene	86.9	10.5	18.6	14.2	15.3	0.28
Tetralin	79.9	9.68	17.1	13.1	14.1	0.26
m-terphenyl	<12	<1.45	<2.57	<1.96	<2.12	<0.039
o-Terphenyl	15.5	1.88	3.32	2.54	2.73	0.050
p-terphenyl	<12	<1.45	<2.57	<1.96	<2.12	<0.039
Total	<1925	<233	<412	<315	<339	<6.18

Dry Gas Volume Sampled (Rm^3*) :	4.674
Actual Flowrate (m^3/s) :	26.5
Dry Reference Flowrate (Rm^3/s*) :	15.0
Dry Adjusted Flowrate (Rm^3/s**) :	19.6
Wet Reference Flowrate (Rm^3/s*) :	18.2

* At 25°C and 1 atmosphere
** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume
Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 73
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 3

Compound	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Acenaphthene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Acenaphthylene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Anthracene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Benzo(a)Anthracene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Benzo(b)Fluoranthene	18.7	2.38	4.07	3.24	3.40	0.060
Benzo(k)Fluoranthene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Benzo(a)fluorene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Benzo(b)fluorene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Benzo(g,h,i)Perylene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Benzo(a)Pyrene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Benzo(e)Pyrene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Biphenyl	33.8	4.29	7.36	5.85	6.15	0.11
2-Chloronaphthalene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Chrysene/Triphenylene	19.5	2.48	4.25	3.37	3.55	0.062
Coronene	<60	<7.62	<13.1	<10.4	<10.9	<0.19
Dibenzo(a,c/a,h)Anthracene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Dibenzo(a,e)pyrene	<60	<7.62	<13.1	<10.4	<10.9	<0.19
9,10-dimethylanthracene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
7,12-Dimethylbenzo(a)anthracene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Fluoranthene	41.9	5.32	9.12	7.25	7.62	0.13
Fluorene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Indeno(1,2,3-cd)Pyrene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
2-methylanthracene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
3-Methylcholanthrene	<60	<7.62	<13.1	<10.4	<10.9	<0.19
1-Methylnaphthalene	15.2	1.93	3.31	2.63	2.76	0.049
2-Methylnaphthalene	25.6	3.25	5.57	4.43	4.66	0.082
1-Methylphenanthrene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
9-Methylphenanthrene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Naphthalene	79.2	10.1	17.2	13.7	14.4	0.25
Perylene	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Phenanthrene	118	15.0	25.7	20.4	21.5	0.38
Picene	<60	<7.62	<13.1	<10.4	<10.9	<0.19
Pyrene	33.6	4.27	7.32	5.81	6.11	0.11
Tetralin	61.6	7.83	13.4	10.7	11.2	0.20
m-terphenyl	<12	<1.52	<2.61	<2.08	<2.18	<0.038
o-Terphenyl	<12	<1.52	<2.61	<2.08	<2.18	<0.038
p-terphenyl	<12	<1.52	<2.61	<2.08	<2.18	<0.038
Total	<963	<122	<210	<167	<175	<3.08

Dry Gas Volume Sampled (Rm^3*) :	4.592
Actual Flowrate (m^3/s) :	25.2
Dry Reference Flowrate (Rm^3/s*) :	14.7
Dry Adjusted Flowrate (Rm^3/s**) :	18.5
Wet Reference Flowrate (Rm^3/s*) :	17.6

* At 25°C and 1 atmosphere
** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume
Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 74
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Polycyclic Aromatic Hydrocarbon Actual Concentrations

Compound	Actual Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/m³	ng/m³	ng/m³	ng/m³	%
Acenaphthene	<1.52	2.16	<1.52	<1.73	21.1
Acenaphthylene	<1.52	1.94	<1.52	<1.66	14.5
Anthracene	<1.52	1.59	<1.52	<1.54	2.4
Benzo(a)Anthracene	<1.52	<1.45	<1.52	<1.50	2.6
Benzo(b)Fluoranthene	<1.52	4.12	2.38	<2.67	49.6
Benzo(k)Fluoranthene	<1.52	2.51	<1.52	<1.85	30.7
Benzo(a)fluorene	<1.52	<1.45	<1.52	<1.50	2.6
Benzo(b)fluorene	<1.52	<1.45	<1.52	<1.50	2.6
Benzo(g,h,i)Perylene	4.39	<1.45	<1.52	<2.46	68.2
Benzo(a)Pyrene	<1.52	<1.45	<1.52	<1.50	2.6
Benzo(e)Pyrene	<1.52	<1.45	<1.52	<1.50	2.6
Biphenyl	1.89	7.24	4.29	4.47	60.0
2-Chloronaphthalene	<1.52	<1.45	<1.52	<1.50	2.6
Chrysene/Triphenylene	<1.52	5.97	2.48	<3.32	70.5
Coronene	<7.59	<7.27	<7.62	<7.49	2.6
Dibenzo(a,c/a,h)Anthracene	<1.52	<1.45	<1.52	<1.50	2.6
Dibenzo(a,e)pyrene	<7.59	<7.27	<7.62	<7.49	2.6
9,10-dimethylanthracene	<1.52	<1.45	<1.52	<1.50	2.6
7,12-Dimethylbenzo(a)anthracene	<1.52	<1.45	<1.52	<1.50	2.6
Fluoranthene	2.46	16.2	5.32	8.00	90.8
Fluorene	<1.52	4.74	<1.52	<2.59	71.6
Indeno(1,2,3-cd)Pyrene	<1.52	<1.45	<1.52	<1.50	2.6
2-methylanthracene	<1.52	2.26	<1.52	<1.77	24.2
3-Methylcholanthrene	<7.59	<7.27	<7.62	<7.49	2.6
1-Methylnaphthalene	1.57	4.26	1.93	2.59	56.5
2-Methylnaphthalene	2.80	6.83	3.25	4.29	51.5
1-Methylphenanthrene	<1.52	<1.45	<1.52	<1.50	2.6
9-Methylphenanthrene	<1.52	6.73	<1.52	<3.26	92.3
Naphthalene	8.99	14.2	10.1	11.1	24.7
Perylene	<1.52	<1.45	<1.52	<1.50	2.6
Phenanthrene	9.11	79.4	15.0	34.5	113
Picene	<7.59	<7.27	<7.62	<7.49	2.6
Pyrene	3.33	10.5	4.27	6.04	64.8
Tetralin	2.27	9.68	7.83	6.59	58.5
m-terphenyl	<1.52	<1.45	<1.52	<1.50	2.6
o-Terphenyl	<1.52	1.88	<1.52	<1.64	12.5
p-terphenyl	<1.52	<1.45	<1.52	<1.50	2.6
Total	<104	<233	<122	<153	45.7

TABLE 75
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Polycyclic Aromatic Hydrocarbon Dry Reference Concentrations

Compound	Dry Reference Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	<2.66	3.81	<2.61	<3.03	22.3
Acenaphthylene	<2.66	3.42	<2.61	<2.90	15.7
Anthracene	<2.66	2.80	<2.61	<2.69	3.6
Benzo(a)Anthracene	<2.66	<2.57	<2.61	<2.61	1.8
Benzo(b)Fluoranthene	<2.66	7.27	4.07	<4.67	50.6
Benzo(k)Fluoranthene	<2.66	4.43	<2.61	<3.24	32.0
Benzo(a)fluorene	<2.66	<2.57	<2.61	<2.61	1.8
Benzo(b)fluorene	<2.66	<2.57	<2.61	<2.61	1.8
Benzo(g,h,i)Perylene	7.70	<2.57	<2.61	<4.29	68.7
Benzo(a)Pyrene	<2.66	<2.57	<2.61	<2.61	1.8
Benzo(e)Pyrene	<2.66	<2.57	<2.61	<2.61	1.8
Biphenyl	3.31	12.8	7.36	7.82	60.9
2-Chloronaphthalene	<2.66	<2.57	<2.61	<2.61	1.8
Chrysene/Triphenylene	<2.66	10.5	4.25	<5.82	71.7
Coronene	<13.3	<12.8	<13.1	<13.1	1.8
Dibenzo(a,c/a,h)Anthracene	<2.66	<2.57	<2.61	<2.61	1.8
Dibenzo(a,e)pyrene	<13.3	<12.8	<13.1	<13.1	1.8
9,10-dimethylanthracene	<2.66	<2.57	<2.61	<2.61	1.8
7,12-Dimethylbenzo(a)anthracene	<2.66	<2.57	<2.61	<2.61	1.8
Fluoranthene	4.31	28.7	9.12	14.0	91.9
Fluorene	<2.66	8.37	<2.61	<4.55	72.7
Indeno(1,2,3-cd)Pyrene	<2.66	<2.57	<2.61	<2.61	1.8
2-methylanthracene	<2.66	4.00	<2.61	<3.09	25.5
3-Methylcholanthrene	<13.3	<12.8	<13.1	<13.1	1.8
1-Methylnaphthalene	2.75	7.53	3.31	4.53	57.7
2-Methylnaphthalene	4.90	12.1	5.57	7.52	52.6
1-Methylphenanthrene	<2.66	<2.57	<2.61	<2.61	1.8
9-Methylphenanthrene	<2.66	11.9	<2.61	<5.72	93.4
Naphthalene	15.8	25.0	17.2	19.3	25.7
Perylene	<2.66	<2.57	<2.61	<2.61	1.8
Phenanthrene	16.0	140	25.7	60.7	114
Picene	<13.3	<12.8	<13.1	<13.1	1.8
Pyrene	5.84	18.6	7.32	10.6	65.9
Tetralin	3.97	17.1	13.4	11.5	58.9
m-terphenyl	<2.66	<2.57	<2.61	<2.61	1.8
o-Terphenyl	<2.66	3.32	<2.61	<2.86	13.7
p-terphenyl	<2.66	<2.57	<2.61	<2.61	1.8
Total	<182	<412	<210	<268	46.9

* At 25°C and 1 atmosphere

TABLE 76
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Polycyclic Aromatic Hydrocarbon Dry Adjusted Concentrations

Compound	Dry Adjusted Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	<2.08	2.91	<2.08	<2.36	20.5
Acenaphthylene	<2.08	2.62	<2.08	<2.26	13.9
Anthracene	<2.08	2.14	<2.08	<2.10	1.8
Benzo(a)Anthracene	<2.08	<1.96	<2.08	<2.04	3.2
Benzo(b)Fluoranthene	<2.08	5.57	3.24	<3.63	49.0
Benzo(k)Fluoranthene	<2.08	3.39	<2.08	<2.52	30.1
Benzo(a)fluorene	<2.08	<1.96	<2.08	<2.04	3.2
Benzo(b)fluorene	<2.08	<1.96	<2.08	<2.04	3.2
Benzo(g,h,i)Perylene	6.01	<1.96	<2.08	<3.35	68.8
Benzo(a)Pyrene	<2.08	<1.96	<2.08	<2.04	3.2
Benzo(e)Pyrene	<2.08	<1.96	<2.08	<2.04	3.2
Biphenyl	2.58	9.79	5.85	6.07	59.4
2-Chloronaphthalene	<2.08	<1.96	<2.08	<2.04	3.2
Chrysene/Triphenylene	<2.08	8.07	3.37	<4.51	69.9
Coronene	<10.4	<9.82	<10.4	<10.2	3.2
Dibenzo(a,c/a,h)Anthracene	<2.08	<1.96	<2.08	<2.04	3.2
Dibenzo(a,e)pyrene	<10.4	<9.82	<10.4	<10.2	3.2
9,10-dimethylanthracene	<2.08	<1.96	<2.08	<2.04	3.2
7,12-Dimethylbenzo(a)anthracene	<2.08	<1.96	<2.08	<2.04	3.2
Fluoranthene	3.36	21.9	7.25	10.9	90.3
Fluorene	<2.08	6.40	<2.08	<3.52	70.9
Indeno(1,2,3-cd)Pyrene	<2.08	<1.96	<2.08	<2.04	3.2
2-methylanthracene	<2.08	3.06	<2.08	<2.41	23.6
3-Methylcholanthrene	<10.4	<9.82	<10.4	<10.2	3.2
1-Methylnaphthalene	2.15	5.76	2.63	3.51	55.9
2-Methylnaphthalene	3.83	9.23	4.43	5.83	50.8
1-Methylphenanthrene	<2.08	<1.96	<2.08	<2.04	3.2
9-Methylphenanthrene	<2.08	9.10	<2.08	<4.42	91.8
Naphthalene	12.3	19.2	13.7	15.1	24.1
Perylene	<2.08	<1.96	<2.08	<2.04	3.2
Phenanthrene	12.5	107	20.4	46.8	113
Picene	<10.4	<9.82	<10.4	<10.2	3.2
Pyrene	4.56	14.2	5.81	8.20	64.1
Tetralin	3.10	13.1	10.7	8.95	58.2
m-terphenyl	<2.08	<1.96	<2.08	<2.04	3.2
o-Terphenyl	<2.08	2.54	<2.08	<2.23	11.9
p-terphenyl	<2.08	<1.96	<2.08	<2.04	3.2
Total	<142	<315	<167	<208	45.1

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 77
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Polycyclic Aromatic Hydrocarbon Wet Reference Concentrations

Compound	Wet Reference Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	<2.22	3.14	<2.18	<2.51	21.5
Acenaphthylene	<2.22	2.82	<2.18	<2.41	14.9
Anthracene	<2.22	2.31	<2.18	<2.24	2.9
Benzo(a)Anthracene	<2.22	<2.12	<2.18	<2.17	2.5
Benzo(b)Fluoranthene	<2.22	6.00	3.40	<3.87	49.8
Benzo(k)Fluoranthene	<2.22	3.65	<2.18	<2.68	31.1
Benzo(a)fluorene	<2.22	<2.12	<2.18	<2.17	2.5
Benzo(b)fluorene	<2.22	<2.12	<2.18	<2.17	2.5
Benzo(g,h,i)Perylene	6.42	<2.12	<2.18	<3.57	69.1
Benzo(a)Pyrene	<2.22	<2.12	<2.18	<2.17	2.5
Benzo(e)Pyrene	<2.22	<2.12	<2.18	<2.17	2.5
Biphenyl	2.76	10.5	6.15	6.48	60.2
2-Chloronaphthalene	<2.22	<2.12	<2.18	<2.17	2.5
Chrysene/Triphenylene	<2.22	8.69	3.55	<4.82	70.9
Coronene	<11.1	<10.6	<10.9	<10.9	2.5
Dibenzo(a,c/a,h)Anthracene	<2.22	<2.12	<2.18	<2.17	2.5
Dibenzo(a,e)pyrene	<11.1	<10.6	<10.9	<10.9	2.5
9,10-dimethylanthracene	<2.22	<2.12	<2.18	<2.17	2.5
7,12-Dimethylbenzo(a)anthracene	<2.22	<2.12	<2.18	<2.17	2.5
Fluoranthene	3.59	23.6	7.62	11.6	91.3
Fluorene	<2.22	6.89	<2.18	<3.77	71.9
Indeno(1,2,3-cd)Pyrene	<2.22	<2.12	<2.18	<2.17	2.5
2-methylanthracene	<2.22	3.30	<2.18	<2.57	24.6
3-Methylcholanthrene	<11.1	<10.6	<10.9	<10.9	2.5
1-Methylnaphthalene	2.30	6.21	2.76	3.76	56.9
2-Methylnaphthalene	4.09	9.95	4.66	6.23	51.8
1-Methylphenanthrene	<2.22	<2.12	<2.18	<2.17	2.5
9-Methylphenanthrene	<2.22	9.80	<2.18	<4.74	92.7
Naphthalene	13.1	20.6	14.4	16.1	25.0
Perylene	<2.22	<2.12	<2.18	<2.17	2.5
Phenanthrene	13.3	116	21.5	50.2	113
Picene	<11.1	<10.6	<10.9	<10.9	2.5
Pyrene	4.87	15.3	6.11	8.77	65.1
Tetralin	3.31	14.1	11.2	9.54	58.5
m-terphenyl	<2.22	<2.12	<2.18	<2.17	2.5
o-Terphenyl	<2.22	2.73	<2.18	<2.38	12.9
p-terphenyl	<2.22	<2.12	<2.18	<2.17	2.5
Total	<152	<339	<175	<222	46.1

* At 25°C and 1 atmosphere

TABLE 78
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Polycyclic Aromatic Hydrocarbon Emission Rates

Compound	Emission Rate				Coefficient
	Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	of Variation %
Acenaphthene	<0.039	0.057	<0.038	<0.045	23.8
Acenaphthylene	<0.039	0.051	<0.038	<0.043	17.1
Anthracene	<0.039	0.042	<0.038	<0.040	5.0
Benzo(a)Anthracene	<0.039	<0.039	<0.038	<0.039	0.6
Benzo(b)Fluoranthene	<0.039	0.11	0.060	<0.069	52.0
Benzo(k)Fluoranthene	<0.039	0.066	<0.038	<0.048	33.5
Benzo(a)fluorene	<0.039	<0.039	<0.038	<0.039	0.6
Benzo(b)fluorene	<0.039	<0.039	<0.038	<0.039	0.6
Benzo(g,h,i)Perylene	0.11	<0.039	<0.038	<0.063	67.7
Benzo(a)Pyrene	<0.039	<0.039	<0.038	<0.039	0.6
Benzo(e)Pyrene	<0.039	<0.039	<0.038	<0.039	0.6
Biphenyl	0.048	0.19	0.11	0.12	62.1
2-Chloronaphthalene	<0.039	<0.039	<0.038	<0.039	0.6
Chrysene/Triphenylene	<0.039	0.16	0.062	<0.087	73.1
Coronene	<0.19	<0.19	<0.19	<0.19	0.6
Dibenzo(a,c/a,h)Anthracene	<0.039	<0.039	<0.038	<0.039	0.6
Dibenzo(a,e)pyrene	<0.19	<0.19	<0.19	<0.19	0.6
9,10-dimethylanthracene	<0.039	<0.039	<0.038	<0.039	0.6
7,12-Dimethylbenzo(a)anthracene	<0.039	<0.039	<0.038	<0.039	0.6
Fluoranthene	0.063	0.43	0.13	0.21	93.2
Fluorene	<0.039	0.13	<0.038	<0.068	74.2
Indeno(1,2,3-cd)Pyrene	<0.039	<0.039	<0.038	<0.039	0.6
2-methylanthracene	<0.039	0.060	<0.038	<0.046	27.0
3-Methylcholanthrene	<0.19	<0.19	<0.19	<0.19	0.6
1-Methylnaphthalene	0.040	0.11	0.049	0.067	59.2
2-Methylnaphthalene	0.072	0.18	0.082	0.11	54.2
1-Methylphenanthrene	<0.039	<0.039	<0.038	<0.039	0.6
9-Methylphenanthrene	<0.039	0.18	<0.038	<0.085	94.7
Naphthalene	0.23	0.38	0.25	0.29	27.3
Perylene	<0.039	<0.039	<0.038	<0.039	0.6
Phenanthrene	0.23	2.11	0.38	0.91	115
Picene	<0.19	<0.19	<0.19	<0.19	0.6
Pyrene	0.085	0.28	0.11	0.16	67.4
Tetralin	0.058	0.26	0.20	0.17	59.7
m-terphenyl	<0.039	<0.039	<0.038	<0.039	0.6
o-Terphenyl	<0.039	0.050	<0.038	<0.042	15.1
p-terphenyl	<0.039	<0.039	<0.038	<0.039	0.6
Total	<2.65	<6.18	<3.08	<3.97	48.4

TABLE 79
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Polycyclic Aromatic Hydrocarbon Emission Data

Compound	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
Acenaphthene	<1.73	<3.03	<2.36	<2.51	<0.045
Acenaphthylene	<1.66	<2.90	<2.26	<2.41	<0.043
Anthracene	<1.54	<2.69	<2.10	<2.24	<0.040
Benzo(a)Anthracene	<1.50	<2.61	<2.04	<2.17	<0.039
Benzo(b)Fluoranthene	<2.67	<4.67	<3.63	<3.87	<0.069
Benzo(k)Fluoranthene	<1.85	<3.24	<2.52	<2.68	<0.048
Benzo(a)fluorene	<1.50	<2.61	<2.04	<2.17	<0.039
Benzo(b)fluorene	<1.50	<2.61	<2.04	<2.17	<0.039
Benzo(g,h,i)Perylene	<2.46	<4.29	<3.35	<3.57	<0.063
Benzo(a)Pyrene	<1.50	<2.61	<2.04	<2.17	<0.039
Benzo(e)Pyrene	<1.50	<2.61	<2.04	<2.17	<0.039
Biphenyl	4.47	7.82	6.07	6.48	0.12
2-Chloronaphthalene	<1.50	<2.61	<2.04	<2.17	<0.039
Chrysene/Triphenylene	<3.32	<5.82	<4.51	<4.82	<0.087
Coronene	<7.49	<13.1	<10.2	<10.9	<0.19
Dibenzo(a,c/a,h)Anthracene	<1.50	<2.61	<2.04	<2.17	<0.039
Dibenzo(a,e)pyrene	<7.49	<13.1	<10.2	<10.9	<0.19
9,10-dimethylanthracene	<1.50	<2.61	<2.04	<2.17	<0.039
7,12-Dimethylbenzo(a)anthracene	<1.50	<2.61	<2.04	<2.17	<0.039
Fluoranthene	8.00	14.0	10.9	11.6	0.21
Fluorene	<2.59	<4.55	<3.52	<3.77	<0.068
Indeno(1,2,3-cd)Pyrene	<1.50	<2.61	<2.04	<2.17	<0.039
2-methylanthracene	<1.77	<3.09	<2.41	<2.57	<0.046
3-Methylcholanthrene	<7.49	<13.1	<10.2	<10.9	<0.19
1-Methylnaphthalene	2.59	4.53	3.51	3.76	0.067
2-Methylnaphthalene	4.29	7.52	5.83	6.23	0.11
1-Methylphenanthrene	<1.50	<2.61	<2.04	<2.17	<0.039
9-Methylphenanthrene	<3.26	<5.72	<4.42	<4.74	<0.085
Naphthalene	11.1	19.3	15.1	16.1	0.29
Perylene	<1.50	<2.61	<2.04	<2.17	<0.039
Phenanthrene	34.5	60.7	46.8	50.2	0.91
Picene	<7.49	<13.1	<10.2	<10.9	<0.19
Pyrene	6.04	10.6	8.20	8.77	0.16
Tetralin	6.59	11.5	8.95	9.54	0.17
m-terphenyl	<1.50	<2.61	<2.04	<2.17	<0.039
o-Terphenyl	<1.64	<2.86	<2.23	<2.38	<0.042
p-terphenyl	<1.50	<2.61	<2.04	<2.17	<0.039
Total	<153	<268	<208	<222	<3.97

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 80
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Blank Polycyclic Aromatic Hydrocarbon Analyses

Compound	Blank Train ng	Media Blank ng
Acenaphthene	<12	<12
Acenaphthylene	<12	<12
Anthracene	<12	<12
Benzo(a)Anthracene	<12	<12
Benzo(b)Fluoranthene	<12	<12
Benzo(k)Fluoranthene	<12	<12
Benzo(a)fluorene	<12	<12
Benzo(b)fluorene	<12	<12
Benzo(g,h,i)Perylene	<12	<12
Benzo(a)Pyrene	<12	<12
Benzo(e)Pyrene	<12	<12
Biphenyl	<12	<12
2-Chloronaphthalene	<12	<12
Chrysene/Triphenylene	<12	<12
Coronene	<60	<60
Dibenzo(a,c/a,h)Anthracene	<12	<12
Dibenzo(a,e)pyrene	<60	<60
9,10-dimethylanthracene	<12	<12
7,12-Dimethylbenzo(a)anthracene	<12	<12
Fluoranthene	<12	<12
Fluorene	<12	<12
Indeno(1,2,3-cd)Pyrene	<12	<12
2-methylanthracene	<12	<12
3-Methylcholanthrene	<60	<60
1-Methylnaphthalene	<12	<12
2-Methylnaphthalene	<12	<12
1-Methylphenanthrene	<12	<12
9-Methylphenanthrene	<12	<12
Naphthalene	43.7	74.5
Perylene	<12	<12
Phenanthrene	<12	<12
Picene	<60	<60
Pyrene	<12	<12
Tetralin	15.6	20.3
m-terphenyl	<12	<12
o-Terphenyl	<12	<12
p-terphenyl	<12	<12
Total	<671	<707

"<" indicates that the amount detected is less than the detection limit. In these cases the value of the detection limit was used to calculate the total collected.

TABLE 81
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Acetaldehyde, Formaldehyde and Acrolein Emission Data

Acetaldehyde

Test No.	Total Collected µg	Dry Volume Sampled Rm^3*	Actual µg/m^3	Acetaldehyde Concentration Dry Reference µg/Rm^3*	Dry Adjusted µg/Rm^3**	Wet Reference µg/Rm^3*	Acetaldehyde Emission Rate mg/s
1	0.44	0.0261	9.59	16.8	13.1	14.0	0.25
2	0.34	0.0297	6.49	11.4	8.79	9.44	0.17
3	0.34	0.0296	6.51	11.5	8.82	9.47	0.17
Average			7.53	13.3	10.2	11.0	0.20
Blank Train	0.38						
Method Blank	12.6						

Formaldehyde

Test No.	Total Collected µg	Dry Volume Sampled Rm^3*	Actual µg/m^3	Formaldehyde Concentration Dry Reference µg/Rm^3*	Dry Adjusted µg/Rm^3**	Wet Reference µg/Rm^3*	Formaldehyde Emission Rate mg/s
1	6.54	0.0261	142	250	195	208	3.65
2	6.81	0.0297	130	229	176	189	3.45
3	7.23	0.0296	138	244	187	201	3.67
Average			137	241	186	200	3.59
Blank Train	10.2						
Method Blank	5.44						

Acrolein

Test No.	Total Collected µg	Dry Volume Sampled Rm^3*	Actual µg/m^3	Acrolein Concentration Dry Reference µg/Rm^3*	Dry Adjusted µg/Rm^3**	Wet Reference µg/Rm^3*	Acrolein Emission Rate mg/s
1	<0.1	0.0261	<2.18	<3.83	<2.98	<3.18	<0.056
2	<0.1	0.0297	<1.91	<3.37	<2.59	<2.78	<0.051
3	<0.1	0.0296	<1.92	<3.38	<2.59	<2.79	<0.051
Average			<2.00	<3.52	<2.72	<2.91	<0.052
Blank Train	<0.1						
Method Blank	0.21						

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

Sampling was conducted at a single point. Volumetric flowrates from corresponding isokinetic tests were used to calculate emission data.

* At 25 °C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 82
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organic Emission Data
Test No. 1

Compound	Total Collected µg	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Acetone	0.11	2.98	5.22	4.08	4.35	0.076
Benzene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Bromodichloromethane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Bromoform	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Bromomethane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
1,3-Butadiene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
2-Butanone	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Carbon Tetrachloride	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Chloroform	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Cumene (Isopropylbenzene)	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Dibromochloromethane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Dichlorodifluoromethane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
1,2-Dichloroethane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
trans,1,2-Dichloroethene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
1,1-Dichloroethene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
1,2-Dichloropropane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Ethylbenzene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Ethylene Dibromide	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Mesitylene (1,3,5-Trimethylbenzene)	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Methylene Chloride	0.051	1.41	2.46	1.92	2.06	0.036
Styrene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Tetrachloroethene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Toluene	7.39	204	357	279	298	5.21
1,1,1-Trichloroethane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Trichloroethene/1,1,2-Trichloroethene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Trichlorotrifluoroethane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Trichlorofluoromethane	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
M&P-Xylene	0.11	3.03	5.32	4.15	4.44	0.078
O-Xylene	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Vinyl Chloride	<0.050	<1.38	<2.42	<1.89	<2.02	<0.035
Total	<8.96	<247	<433	<338	<361	<6.32

Dry Gas Volume Sampled (Rm³*) :	0.0207
Actual Flowrate (m³/s) :	25.6
Dry Reference Flowrate (Rm³/s*) :	14.6
Dry Adjusted Flowrate (Rm³/s**) :	18.7
Wet Reference Flowrate (Rm³/s*) :	17.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 83
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organic Emission Data
Test No. 2

Compound	Total Collected µg	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Acetone	0.087	2.45	4.30	3.35	3.58	0.063
Benzene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Bromodichloromethane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Bromoform	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Bromomethane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
1,3-Butadiene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
2-Butanone	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Carbon Tetrachloride	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Chloroform	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Cumene (Isopropylbenzene)	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Dibromochloromethane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Dichlorodifluoromethane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
1,2-Dichloroethane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
trans,1,2-Dichloroethene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
1,1-Dichloroethene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
1,2-Dichloropropane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Ethylbenzene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Ethylene Dibromide	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Mesitylene (1,3,5-Trimethylbenzene)	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Methylene Chloride	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Styrene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Tetrachloroethene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Toluene	5.70	161	281	220	235	4.11
1,1,1-Trichloroethane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Trichloroethene/1,1,2-Trichloroethene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Trichlorotrifluoroethane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Trichlorofluoromethane	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
M&P-Xylene	<0.10	<2.82	<4.94	<3.86	<4.12	<0.072
O-Xylene	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Vinyl Chloride	<0.050	<1.41	<2.47	<1.93	<2.06	<0.036
Total	<7.24	<204	<357	<279	<298	<5.22

Dry Gas Volume Sampled (Rm³*) :	0.0202
Actual Flowrate (m³/s) :	25.6
Dry Reference Flowrate (Rm³/s*) :	14.6
Dry Adjusted Flowrate (Rm³/s**) :	18.7
Wet Reference Flowrate (Rm³/s*) :	17.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 84
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organic Emission Data
Test No. 3

Compound	Total Collected µg	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Acetone	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Benzene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Bromodichloromethane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Bromoform	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Bromomethane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
1,3-Butadiene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
2-Butanone	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Carbon Tetrachloride	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Chloroform	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Cumene (Isopropylbenzene)	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Dibromochloromethane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Dichlorodifluoromethane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
1,2-Dichloroethane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
trans,1,2-Dichloroethene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
1,1-Dichloroethene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
1,2-Dichloropropane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Ethylbenzene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Ethylene Dibromide	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Mesitylene (1,3,5-Trimethylbenzene)	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Methylene Chloride	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Styrene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Tetrachloroethene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Toluene	4.19	122	214	167	178	3.12
1,1,1-Trichloroethane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Trichloroethene/1,1,2-Trichloroethene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Trichlorotrifluoroethane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Trichlorofluoromethane	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
M&P-Xylene	<0.10	<2.91	<5.10	<3.98	<4.26	<0.074
O-Xylene	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Vinyl Chloride	<0.050	<1.45	<2.55	<1.99	<2.13	<0.037
Total	<5.69	<166	<290	<227	<242	<4.24

Dry Gas Volume Sampled (Rm³*) :	0.0196
Actual Flowrate (m³/s) :	25.6
Dry Reference Flowrate (Rm³/s*) :	14.6
Dry Adjusted Flowrate (Rm³/s**) :	18.7
Wet Reference Flowrate (Rm³/s*) :	17.5

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 85
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organic Actual Concentrations

Compound	Actual Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	µg/m³	µg/m³	µg/m³	µg/m³	%
Acetone	2.98	2.45	<1.45	<2.29	33.7
Benzene	<1.38	<1.41	<1.45	<1.41	2.7
Bromodichloromethane	<1.38	<1.41	<1.45	<1.41	2.7
Bromoform	<1.38	<1.41	<1.45	<1.41	2.7
Bromomethane	<1.38	<1.41	<1.45	<1.41	2.7
1,3-Butadiene	<1.38	<1.41	<1.45	<1.41	2.7
2-Butanone	<1.38	<1.41	<1.45	<1.41	2.7
Carbon Tetrachloride	<1.38	<1.41	<1.45	<1.41	2.7
Chloroform	<1.38	<1.41	<1.45	<1.41	2.7
Cumene (Isopropylbenzene)	<1.38	<1.41	<1.45	<1.41	2.7
Dibromochloromethane	<1.38	<1.41	<1.45	<1.41	2.7
Dichlorodifluoromethane	<1.38	<1.41	<1.45	<1.41	2.7
1,2-Dichloroethane	<1.38	<1.41	<1.45	<1.41	2.7
trans,1,2-Dichloroethene	<1.38	<1.41	<1.45	<1.41	2.7
1,1-Dichloroethene	<1.38	<1.41	<1.45	<1.41	2.7
1,2-Dichloropropane	<1.38	<1.41	<1.45	<1.41	2.7
Ethylbenzene	<1.38	<1.41	<1.45	<1.41	2.7
Ethylene Dibromide	<1.38	<1.41	<1.45	<1.41	2.7
Mesitylene (1,3,5-Trimethylbenzene)	<1.38	<1.41	<1.45	<1.41	2.7
Methylene Chloride	1.41	<1.41	<1.45	<1.42	1.9
Styrene	<1.38	<1.41	<1.45	<1.41	2.7
Tetrachloroethene	<1.38	<1.41	<1.45	<1.41	2.7
Toluene	204	161	122	162	25.3
1,1,1-Trichloroethane	<1.38	<1.41	<1.45	<1.41	2.7
Trichloroethene/1,1,2-Trichloroethene	<1.38	<1.41	<1.45	<1.41	2.7
Trichlorotrifluoroethane	<1.38	<1.41	<1.45	<1.41	2.7
Trichlorofluoromethane	<1.38	<1.41	<1.45	<1.41	2.7
M&P-Xylene	3.03	<2.82	<2.91	<2.92	3.7
O-Xylene	<1.38	<1.41	<1.45	<1.41	2.7
Vinyl Chloride	<1.38	<1.41	<1.45	<1.41	2.7
Total	<247	<204	<166	<205	19.8

TABLE 86
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organic Dry Reference Concentrations

Compound	Dry Reference Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*	%
Acetone	5.22	4.30	<2.55	<4.02	33.7
Benzene	<2.42	<2.47	<2.55	<2.48	2.7
Bromodichloromethane	<2.42	<2.47	<2.55	<2.48	2.7
Bromoform	<2.42	<2.47	<2.55	<2.48	2.7
Bromomethane	<2.42	<2.47	<2.55	<2.48	2.7
1,3-Butadiene	<2.42	<2.47	<2.55	<2.48	2.7
2-Butanone	<2.42	<2.47	<2.55	<2.48	2.7
Carbon Tetrachloride	<2.42	<2.47	<2.55	<2.48	2.7
Chloroform	<2.42	<2.47	<2.55	<2.48	2.7
Cumene (Isopropylbenzene)	<2.42	<2.47	<2.55	<2.48	2.7
Dibromochloromethane	<2.42	<2.47	<2.55	<2.48	2.7
Dichlorodifluoromethane	<2.42	<2.47	<2.55	<2.48	2.7
1,2-Dichloroethane	<2.42	<2.47	<2.55	<2.48	2.7
trans,1,2-Dichloroethene	<2.42	<2.47	<2.55	<2.48	2.7
1,1-Dichloroethene	<2.42	<2.47	<2.55	<2.48	2.7
1,2-Dichloropropane	<2.42	<2.47	<2.55	<2.48	2.7
Ethylbenzene	<2.42	<2.47	<2.55	<2.48	2.7
Ethylene Dibromide	<2.42	<2.47	<2.55	<2.48	2.7
Mesitylene (1,3,5-Trimethylbenzene)	<2.42	<2.47	<2.55	<2.48	2.7
Methylene Chloride	2.46	<2.47	<2.55	<2.49	1.9
Styrene	<2.42	<2.47	<2.55	<2.48	2.7
Tetrachloroethene	<2.42	<2.47	<2.55	<2.48	2.7
Toluene	357	281	214	284	25.3
1,1,1-Trichloroethane	<2.42	<2.47	<2.55	<2.48	2.7
Trichloroethene/1,1,2-Trichloroethene	<2.42	<2.47	<2.55	<2.48	2.7
Trichlorotrifluoroethane	<2.42	<2.47	<2.55	<2.48	2.7
Trichlorofluoromethane	<2.42	<2.47	<2.55	<2.48	2.7
M&P-Xylene	5.32	<4.94	<5.10	<5.12	3.7
O-Xylene	<2.42	<2.47	<2.55	<2.48	2.7
Vinyl Chloride	<2.42	<2.47	<2.55	<2.48	2.7
Total	<433	<357	<290	<360	19.8

* At 25°C and 1 atmosphere

TABLE 87
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organic Dry Adjusted Concentrations

Compound	Dry Adjusted Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Acetone	4.08	3.35	<1.99	<3.14	33.7
Benzene	<1.89	<1.93	<1.99	<1.94	2.7
Bromodichloromethane	<1.89	<1.93	<1.99	<1.94	2.7
Bromoform	<1.89	<1.93	<1.99	<1.94	2.7
Bromomethane	<1.89	<1.93	<1.99	<1.94	2.7
1,3-Butadiene	<1.89	<1.93	<1.99	<1.94	2.7
2-Butanone	<1.89	<1.93	<1.99	<1.94	2.7
Carbon Tetrachloride	<1.89	<1.93	<1.99	<1.94	2.7
Chloroform	<1.89	<1.93	<1.99	<1.94	2.7
Cumene (Isopropylbenzene)	<1.89	<1.93	<1.99	<1.94	2.7
Dibromochloromethane	<1.89	<1.93	<1.99	<1.94	2.7
Dichlorodifluoromethane	<1.89	<1.93	<1.99	<1.94	2.7
1,2-Dichloroethane	<1.89	<1.93	<1.99	<1.94	2.7
trans,1,2-Dichloroethene	<1.89	<1.93	<1.99	<1.94	2.7
1,1-Dichloroethene	<1.89	<1.93	<1.99	<1.94	2.7
1,2-Dichloropropane	<1.89	<1.93	<1.99	<1.94	2.7
Ethylbenzene	<1.89	<1.93	<1.99	<1.94	2.7
Ethylene Dibromide	<1.89	<1.93	<1.99	<1.94	2.7
Mesitylene (1,3,5-Trimethylbenzene)	<1.89	<1.93	<1.99	<1.94	2.7
Methylene Chloride	1.92	<1.93	<1.99	<1.95	1.9
Styrene	<1.89	<1.93	<1.99	<1.94	2.7
Tetrachloroethene	<1.89	<1.93	<1.99	<1.94	2.7
Toluene	279	220	167	222	25.3
1,1,1-Trichloroethane	<1.89	<1.93	<1.99	<1.94	2.7
Trichloroethene/1,1,2-Trichloroethene	<1.89	<1.93	<1.99	<1.94	2.7
Trichlorotrifluoroethane	<1.89	<1.93	<1.99	<1.94	2.7
Trichlorofluoromethane	<1.89	<1.93	<1.99	<1.94	2.7
M&P-Xylene	4.15	<3.86	<3.98	<4.00	3.7
O-Xylene	<1.89	<1.93	<1.99	<1.94	2.7
Vinyl Chloride	<1.89	<1.93	<1.99	<1.94	2.7
Total	<338	<279	<227	<281	19.8

* At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 88
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organic Wet Reference Concentrations

Compound	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Acetone	4.35	3.58	<2.13	<3.36	33.7
Benzene	<2.02	<2.06	<2.13	<2.07	2.7
Bromodichloromethane	<2.02	<2.06	<2.13	<2.07	2.7
Bromoform	<2.02	<2.06	<2.13	<2.07	2.7
Bromomethane	<2.02	<2.06	<2.13	<2.07	2.7
1,3-Butadiene	<2.02	<2.06	<2.13	<2.07	2.7
2-Butanone	<2.02	<2.06	<2.13	<2.07	2.7
Carbon Tetrachloride	<2.02	<2.06	<2.13	<2.07	2.7
Chloroform	<2.02	<2.06	<2.13	<2.07	2.7
Cumene (Isopropylbenzene)	<2.02	<2.06	<2.13	<2.07	2.7
Dibromochloromethane	<2.02	<2.06	<2.13	<2.07	2.7
Dichlorodifluoromethane	<2.02	<2.06	<2.13	<2.07	2.7
1,2-Dichloroethane	<2.02	<2.06	<2.13	<2.07	2.7
trans,1,2-Dichloroethene	<2.02	<2.06	<2.13	<2.07	2.7
1,1-Dichloroethene	<2.02	<2.06	<2.13	<2.07	2.7
1,2-Dichloropropane	<2.02	<2.06	<2.13	<2.07	2.7
Ethylbenzene	<2.02	<2.06	<2.13	<2.07	2.7
Ethylene Dibromide	<2.02	<2.06	<2.13	<2.07	2.7
Mesitylene (1,3,5-Trimethylbenzene)	<2.02	<2.06	<2.13	<2.07	2.7
Methylene Chloride	2.06	<2.06	<2.13	<2.08	1.9
Styrene	<2.02	<2.06	<2.13	<2.07	2.7
Tetrachloroethene	<2.02	<2.06	<2.13	<2.07	2.7
Toluene	298	235	178	237	25.3
1,1,1-Trichloroethane	<2.02	<2.06	<2.13	<2.07	2.7
Trichloroethene/1,1,2-Trichloroethene	<2.02	<2.06	<2.13	<2.07	2.7
Trichlorotrifluoroethane	<2.02	<2.06	<2.13	<2.07	2.7
Trichlorofluoromethane	<2.02	<2.06	<2.13	<2.07	2.7
M&P-Xylene	4.44	<4.12	<4.26	<4.27	3.7
O-Xylene	<2.02	<2.06	<2.13	<2.07	2.7
Vinyl Chloride	<2.02	<2.06	<2.13	<2.07	2.7
Total	<361	<298	<242	<301	19.8

* At 25°C and 1 atmosphere

TABLE 89
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organic Emission Rates

Compound	Emission Rate				Coefficient
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	of Variation %
Acetone	0.076	0.063	<0.037	<0.059	33.7
Benzene	<0.035	<0.036	<0.037	<0.036	2.7
Bromodichloromethane	<0.035	<0.036	<0.037	<0.036	2.7
Bromoform	<0.035	<0.036	<0.037	<0.036	2.7
Bromomethane	<0.035	<0.036	<0.037	<0.036	2.7
1,3-Butadiene	<0.035	<0.036	<0.037	<0.036	2.7
2-Butanone	<0.035	<0.036	<0.037	<0.036	2.7
Carbon Tetrachloride	<0.035	<0.036	<0.037	<0.036	2.7
Chloroform	<0.035	<0.036	<0.037	<0.036	2.7
Cumene (Isopropylbenzene)	<0.035	<0.036	<0.037	<0.036	2.7
Dibromochloromethane	<0.035	<0.036	<0.037	<0.036	2.7
Dichlorodifluoromethane	<0.035	<0.036	<0.037	<0.036	2.7
1,2-Dichloroethane	<0.035	<0.036	<0.037	<0.036	2.7
trans,1,2-Dichloroethene	<0.035	<0.036	<0.037	<0.036	2.7
1,1-Dichloroethene	<0.035	<0.036	<0.037	<0.036	2.7
1,2-Dichloropropane	<0.035	<0.036	<0.037	<0.036	2.7
Ethylbenzene	<0.035	<0.036	<0.037	<0.036	2.7
Ethylene Dibromide	<0.035	<0.036	<0.037	<0.036	2.7
Mesitylene (1,3,5-Trimethylbenzene)	<0.035	<0.036	<0.037	<0.036	2.7
Methylene Chloride	0.036	<0.036	<0.037	<0.036	1.9
Styrene	<0.035	<0.036	<0.037	<0.036	2.7
Tetrachloroethene	<0.035	<0.036	<0.037	<0.036	2.7
Toluene	5.21	4.11	3.12	4.15	25.3
1,1,1-Trichloroethane	<0.035	<0.036	<0.037	<0.036	2.7
Trichloroethene/1,1,2-Trichloroethene	<0.035	<0.036	<0.037	<0.036	2.7
Trichlorotrifluoroethane	<0.035	<0.036	<0.037	<0.036	2.7
Trichlorofluoromethane	<0.035	<0.036	<0.037	<0.036	2.7
M&P-Xylene	0.078	<0.072	<0.074	<0.075	3.7
O-Xylene	<0.035	<0.036	<0.037	<0.036	2.7
Vinyl Chloride	<0.035	<0.036	<0.037	<0.036	2.7
Total	<6.32	<5.22	<4.24	<5.26	19.8

TABLE 90
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Summary of Volatile Organic Emission Data

Compound	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³*	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Acetone	<2.29	<4.02	<3.14	<3.36	<0.059
Benzene	<1.41	<2.48	<1.94	<2.07	<0.036
Bromodichloromethane	<1.41	<2.48	<1.94	<2.07	<0.036
Bromoform	<1.41	<2.48	<1.94	<2.07	<0.036
Bromomethane	<1.41	<2.48	<1.94	<2.07	<0.036
1,3-Butadiene	<1.41	<2.48	<1.94	<2.07	<0.036
2-Butanone	<1.41	<2.48	<1.94	<2.07	<0.036
Carbon Tetrachloride	<1.41	<2.48	<1.94	<2.07	<0.036
Chloroform	<1.41	<2.48	<1.94	<2.07	<0.036
Cumene (Isopropylbenzene)	<1.41	<2.48	<1.94	<2.07	<0.036
Dibromochloromethane	<1.41	<2.48	<1.94	<2.07	<0.036
Dichlorodifluoromethane	<1.41	<2.48	<1.94	<2.07	<0.036
1,2-Dichloroethane	<1.41	<2.48	<1.94	<2.07	<0.036
trans,1,2-Dichloroethene	<1.41	<2.48	<1.94	<2.07	<0.036
1,1-Dichloroethene	<1.41	<2.48	<1.94	<2.07	<0.036
1,2-Dichloropropane	<1.41	<2.48	<1.94	<2.07	<0.036
Ethylbenzene	<1.41	<2.48	<1.94	<2.07	<0.036
Ethylene Dibromide	<1.41	<2.48	<1.94	<2.07	<0.036
Mesitylene (1,3,5-Trimethylbenzene)	<1.41	<2.48	<1.94	<2.07	<0.036
Methylene Chloride	<1.42	<2.49	<1.95	<2.08	<0.036
Styrene	<1.41	<2.48	<1.94	<2.07	<0.036
Tetrachloroethene	<1.41	<2.48	<1.94	<2.07	<0.036
Toluene	162	284	222	237	4.15
1,1,1-Trichloroethane	<1.41	<2.48	<1.94	<2.07	<0.036
Trichloroethene/1,1,2-Trichloroethene	<1.41	<2.48	<1.94	<2.07	<0.036
Trichlorotrifluoroethane	<1.41	<2.48	<1.94	<2.07	<0.036
Trichlorofluoromethane	<1.41	<2.48	<1.94	<2.07	<0.036
M&P-Xylene	<2.92	<5.12	<4.00	<4.27	<0.075
O-Xylene	<1.41	<2.48	<1.94	<2.07	<0.036
Vinyl Chloride	<1.41	<2.48	<1.94	<2.07	<0.036
Total	<205	<360	<281	<301	<5.26

* At 25°C and 1 atmosphere

** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

TABLE 91
Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Blank Volatile Organic Analyses

Compound	Field Blank Tube 16A/16B µg	Trip Blank Tube 15A/15B µg	Method Blank µg
Acetone	<0.050	<0.050	<0.050
Benzene	<0.050	<0.050	<0.050
Bromodichloromethane	<0.050	<0.050	<0.050
Bromoform	<0.050	<0.050	<0.050
Bromomethane	<0.050	<0.050	<0.050
1,3-Butadiene	<0.050	<0.050	<0.050
2-Butanone	<0.050	<0.050	<0.050
Carbon Tetrachloride	<0.050	<0.050	<0.050
Chloroform	<0.050	<0.050	<0.050
Cumene (Isopropylbenzene)	<0.050	<0.050	<0.050
Dibromochloromethane	<0.050	<0.050	<0.050
Dichlorodifluoromethane	<0.050	<0.050	<0.050
1,2-Dichloroethane	<0.050	<0.050	<0.050
trans,1,2-Dichloroethene	<0.050	<0.050	<0.050
1,1-Dichloroethene	<0.050	<0.050	<0.050
1,2-Dichloropropane	<0.050	<0.050	<0.050
Ethylbenzene	<0.050	<0.050	<0.050
Ethylene Dibromide	<0.050	<0.050	<0.050
Mesitylene (1,3,5-Trimethylbenzene)	<0.050	<0.050	<0.050
Methylene Chloride	<0.050	<0.050	<0.050
Styrene	<0.050	<0.050	<0.050
Tetrachloroethene	<0.050	<0.050	<0.050
Toluene	<0.050	<0.050	<0.050
1,1,1-Trichloroethane	<0.050	<0.050	<0.050
Trichloroethene/1,1,2-Trichloroethene	<0.050	<0.050	<0.050
Trichlorotrifluoroethane	<0.050	<0.050	<0.050
Trichlorofluoromethane	<0.050	<0.050	<0.050
M&P-Xylene	<0.10	<0.10	<0.10
O-Xylene	<0.050	<0.050	<0.050
Vinyl Chloride	<0.050	<0.050	<0.050
Total	<1.55	<1.55	<1.55

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

APPENDIX 3

Pre-Test Plan Acceptance Letter
and ECA No. 7306-8FDKNX
(107 pages)

aMinistry of the Environment, Conservation and Parks
Technical Assessment and Standards Development Branch
40 St. Clair Avenue West
7th Floor
Toronto ON M4V 1M2
Phone: 416.327.5519
Fax: 416.327.2936

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Direction des évaluations techniques et de l'élaboration des normes
40, avenue St. Clair Ouest
7e étage
Toronto, ON M4V 1M2
Tél: 416 .327.5519
Téléc: 416. 327.2936

Ontario

Via email: cbelore@ortech.ca

TSS File No.: CR:SA: 110240:24

2024/02/14

Chris Belore
ORTECH Consulting Inc.

Dear Mr. Belore:

Subject: Pre-test plan review for source testing to be conducted at Durham York Energy Centre

We received your pre-test plan letter (Project #22327), dated February 5, 2024, prepared on behalf of the Durham-York Energy Centre (DYEC) and referring to source testing to be conducted at their facility in Clarington, Ontario.

Testing is a requirement under amended Environmental Compliance Approval No. 7306-8FDKNX issued June 28, 2011.

The letter outlines the intent to use the previously approved pre-test plan (submitted 09/08/2020) for the 2024 annual compliance source testing.

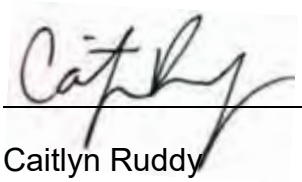
The use of the previously approved pre-test plan (TSS File No. CR:SA:109912:20 dated 10/14/2020) is acceptable for the 2024 testing program.

We have noted the sampling schedule to commence the week of March 18, 2024. If changes to this schedule occur, please notify both the MECP's York-Durham District Office and the Source Testing Group.

Just a reminder that the source testing report is required to be submitted in electronic format to District Office and to the source testing group at sourcetesting@ontario.ca.

If you have any questions with regards to this assessment, I can be reached by phone at 437-995-2835 or by email at sourcetesting@ontario.ca

Sincerely,



Caitlyn Ruddy
Source Assessment Specialist
Technology Standards Section

cc: C. Dugas – Manager, MECP York-Durham D.O. (celeste.dugas@ontario.ca)
D. Keene- ECO MECP York-Durham D.O (david.keene@ontario.ca)
J. Butchart – Issues Project Coordinator, MECP York-Durham D.O. (jeff.butchart@ontario.ca)
Ben Parayankuzhiyil – Facility Manager, Covanta DYEC L.P (bparayanku@covanta.com)
Darek T. Teeters – VP General Manager, Covanta DYEC L.P. (dteeters@covanta.com)
Rick Kohler – Environmental Engineer, Covanta DYEC L.P. (rkohler@covant.com)
Supreet Kaur Meng – Environmental Specialist, Covanta DYEC L.P. (skaur2@covanta.com)
Andrew Evans – Durham Region (andrew.evans@durham.ca)
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Lipika Saha- Durham Region (Lipika.saha@durham.ca)
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Laura McDowell – York Region (laura.mcdowell@york.ca)
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Jennifer Khemai – York Region (email: jennifer.khemai@york.ca)
J. McKerrall –TSS (jeffrey.mckerrall@ontario.ca)
B. Fullerton- TSS (bill.fullerton@ontario.ca)

File AQ-02 (Durham-York Energy Centre)

Doc.Mgmt # 5AH020018

Ontario

Ministry of the Environment
Ministère de l'Environnement

CERTIFICATE OF APPROVAL
MULTI-MEDIA
Number 7306-8FDKNX
Issue Date: June 28, 2011

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3

and

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

and

Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
72 Osbourne Road
Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham

You have applied in accordance with Sections 9 and 27 of the Environmental Protection Act and Section 53 of the Ontario Water Resources Act for approval of:

A thermal treatment facility to be used for the receipt and manual and/or mechanical sorting of solid non-hazardous post-diversion municipal waste (Waste), temporary storage and thermal treatment of the Waste, abatement of the emissions from the processes and activities undertaken at the Site, handling, screening, sorting and/or conditioning of the residual wastes and management of the wastewater and the non-contact stormwater generated at the Site. The Facility's maximum Waste thermal treatment rate is 140,000 tonnes per year of Waste, the nominal electricity generation rate is 20 Megawatts and the nominal steam generation rate 72,000 kilograms per hour of steam.

The facility consists of the following major processes and support units:

(1) two (2) identical combustion trains, each having a nominal capacity of 218 tonnes of Waste per day venting into the atmosphere via a common exhaust stack, having an exit diameter of 1.71 metres, extending 87.6 metres above grade.

Each combustion train is an independent process train and it consists of the following main components:

(a) a stoker grate steam Boiler, having a design heat input of 118 Gigajoules per hour, equipped with a natural gas fired auxiliary Low NOx burner, having a nominal heat input of 59.5 Gigajoules per hour; and

(b) the following air pollution control equipment:

(i) a Selective Non Catalytic Reduction System (SNCR System) with ammonia injection for NOx control;
(ii) an activated carbon injection system, to reduce mercury and dioxins in flue gas;
(iii) a dry recirculation lime injection scrubber to control acid gases;
(iv) a pulse jet type baghouse to control particulate emissions;

(2) one (1) steam turbine generator set having a rated capacity of 20 Megawatts;

(3) waste and reagent storage as described in Condition 2.:

(4) fly ash conditioning system including two (2) surge bins, two (2) pugmills and seven (7) curing/storage bunkers;

(5) bottom ash sorting system including conveyors, screens, a rotary drum magnet and an eddy separator;

(6) one (1) emergency diesel generator, rated at 250 Kilowatts;

(7) natural gas-fired combustion equipment for comfort heating;

(8) a wastewater management system for collection, recirculation and reuse of the process water; and

(9) a stormwater management facility for collection, transmission and discharge of non-contact runoff at the Site, as described in the attached Schedule "G",

Note: Use of the site for any other type of waste is not approved under this Certificate, and requires obtaining a separate approval amending this Certificate.

For the purpose of this Provisional Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"***Acoustic Assessment Report***" means the report, prepared in accordance with *Publication NPC-233* by Paul Niejadlik / Golder Associates Ltd. and dated March 2011 submitted in support of the application, that documents all sources of noise emissions and Noise Control Measures present at the Facility;

"**Acoustic Assessment Summary Table**" means a table summarizing the results of the Acoustic Assessment Report;

"**Acoustic Audit**" means an investigative procedure consisting of measurements of all noise emissions due to the operation of the Facility, assessed in comparison to the Performance Limits for the Facility regarding noise emissions, completed in accordance with the procedures set in the Ministry's *Publication NPC-103* and reported in accordance with the Ministry's *Publication NPC-233;*

"**Acoustic Audit Report**" means a report presenting the results of an Acoustic Audit, prepared in accordance with the Ministry's *Publication NPC-233;*

"**Acoustical Consultant**" means a person currently active in the field of environmental acoustics and noise/vibration control, who is familiar with Ministry noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from a Facility;

"**Air Standards Manager**" means the Manager, Human Toxicology and Air Standards Section, Standards Development Branch, or any other person who represents and carries out the duties of the Manager, Human Toxicology and Air Standards Section, Standards Development Branch, as those duties relate to the conditions of this Certificate;

"**APC Building**" means the building at the Site where the APC Equipment and the reagent indoor storage tanks are located;

"**APC Equipment**" means all the air pollution control equipment at the Facility, including the SNCR System, the activated carbon injection system, the dry recirculation lime injection scrubber and the pulse jet type baghouse to control emissions from the combustion chamber of the Boilers, the dust collectors to control emissions from the Residue Building and the dust collectors to control emissions from the reagent storage silos;

"**Boiler Building**" means the building at the Site where the Boilers, turbine generator and the air cooled condenser(s) are located;

"**Boilers**" means the two (2) steam boilers firing the approved Waste described in this Certificate;

"**Bulky Unprocessable Items**" means the incoming Waste received at the Site that cannot be processed in the Equipment;

"**CEM Systems**" means the continuous monitoring and recording systems used to measure and record the temperature and the emissions from the Boilers as specified in the attached Schedule "F";

"**Certificate**" means this entire provisional Certificate of Approval, issued in accordance with Sections 39 and 9 of the *EPA* and Section 53 of the *OWRA,* and includes any schedules attached to it, the application and the supporting documentation listed in the attached Schedule "A;

"***40 CFR 60***" means title 40, part 60 under the Code of Federal Regulations (Air Programs, U.S. Environmental Protection Agency), revised as of July 1, 1990, published by the Office of the Federal Register, National Archives and Records, Administration in the United States of America;

"**Complaint**" means a complaint received either by the Owner or the District Manager that has been confirmed by staff of the Ministry and the cause of which is attributed to the Owner's activities at the Facility;

"**Commencement Date of Operation**" means the date when the approved Waste is first received at the Site;

"**Compound of Concern**" means a contaminant that, based on generally available information, may be emitted to the atmosphere in a quantity from any source at the Facility that is significant either in comparison to the relevant Ministry Point of Impingement Limit or if a Ministry Point of Impingement Limit is not available for the compound then, based on generally available toxicological information, the compound has the potential to cause an adverse effect as defined by the *EPA* at a Point of Impingement;

"**Controlled Shutdown**" means an immediate cut-off of all waste into the Boilers, while maintaining the operation of the combustion chamber and the APC Equipment within the Performance Requirements;

"**Description Section**" means the section on page one of the Certificate describing the Owner's operations and the Equipment located at the Facility and specifying the Facility Production Limit for the Facility;

"**Dioxins and Furans**" means polychlorinated dibenzo-dioxins and polychlorinated dibenzofurans;

"**Director**" means any person appointed in writing by the Minister of the Environment pursuant to section 5 of the *EPA* and pursuant to section 5 of the *OWRA* as a Director for the purposes of Part V of the *EPA,* section 9 of the *EPA* and section 53 of the *OWRA;*

"**District Manager**" means the District Manager of the York Durham District Office of the Ministry;

"**Emergency Shutdown**" means an immediate cut-off of all waste feed into the Boilers, followed by an accelerated extinction of all combustion in the Boilers, while maintaining the combustion temperature within the Performance Requirements, except when unreasonable;

"**Emission Summary Table**" means the table prepared in accordance with *O. Reg. 419/05* and the Procedure Document listing the appropriate Point of Impingement concentrations of each Compound of Concern from the Facility and providing comparison to the corresponding Ministry Point of Impingement Limit;

"*EAA*" means the Environmental Assessment Act, R.S.O. 1990, c. E.18, as amended;

"**EA Approval**" means the Notice of Approval to Proceed with the Undertaking signed by the Minister of the Environment on November 3, 2010, EA File No. 04-EA-02-08;

"*EPA*" means the Environmental Protection Act, R.S.O. 1990, c. E.19, as amended;

"**Equipment**" means equipment or processes associated with the thermal treatment of the approved Waste described in this Certificate and in the Supporting Documentation referred to herein and any other equipment or processes handling wastes and reagents;

"**ESDM Report**" means the Emission Summary and Dispersion Modelling Report prepared in accordance with the Procedure Document by Golder Associates and dated March 2011 submitted in support of the application, and includes any amendments to the ESDM Report listed in the attached Schedule "A" and all subsequent up-dated ESDM Reports as applicable;

"**Facility**" means the entire operation associated with thermal treatment of Waste located on the property where the Equipment is located;

"**Facility Production Limit**" means the production limit placed on the main product(s) or raw materials used by the Facility that represents the design capacity of the Facility and assists in the definition of the operations approved by the Director;

"**Grizzly Building**" means the building at the Site where the bottom ash is screened and where the oversized constituents of the bottom ash (grizzly overs) are temporarily stored prior to transport for subsequent storage in the Residue Building;

"**Independent Acoustical Consultant**" means an Acoustical Consultant who is not representing the Owner and was not involved in preparing the Acoustic Assessment Report or the design/implementation of Noise Control Measures for the Facility and/or Equipment. The Independent Acoustical Consultant shall not be retained by the Acoustical Consultant involved in the noise impact assessment or the design/implementation of Noise Control Measures for the Facility and/or Equipment;

"**I-TEF**" means International Toxic Equivalency Factor derived for each dioxin and furan congener by comparing its toxicity to the toxicity of 2,3,7,8 tetrachloro dibenzo-p-dioxin, as recommended by the North Atlantic Treaty Organization Committee on Challenges to Modern Society (NATO CCMS) in 1989 and adopted by Canada in 1990;

"**I-TEQ**" means International Toxic Equivalent of dioxins and furans calculated using the I-TEFs, as recommended by the NATO CCMS in 1989 and adopted by Canada in 1990;

"**Manager**" means the Manager, Technology Standards Section, Standards Development Branch, who has been appointed under Section 5 of the *EPA* for the purposes of Section 11(1)2 of the *O. Reg. 419/05,* or any other person who represents and carries out the duties of the Manager,

Technology Standards Section, Standards Development Branch, as those duties relate to the conditions of this Certificate;

"**Ministry**" means the ministry of the government of Ontario responsible for the *EPA* and the *OWRA* and includes all officials, employees or other persons acting on its behalf or the Ontario Ministry of the Environment;

"**Municipality**" means the Municipality of Clarington;

"*NMA*" means the *Nutrient Management Act*, 2002, S.O. 2002, c. 4, as amended;

"**Noise Control Measures**" means measures to reduce the noise emission from the Facility and/or Equipment including, but not limited to silencers, acoustic louvers, enclosures, absorptive treatment, plenums and barriers;

"**LDR**" means the Lands Disposal Restrictions referred to in sections 74 through 85 of the *O. Reg. 347,* which prohibit the disposal of hazardous wastes on land until they have been treated to meet the treatment standards under the *O. Reg. 347;*

"**Leachate Toxicity Criteria**" means the concentrations of any of the contaminants listed in Schedule 4 at a concentration equal to or in excess of the concentration specified for that contaminant in Schedule 4 using the Toxicity Characteristic Leaching Procedure, defined in the *O. Reg. 347*;

"***O. Reg. 419/05***" means the *Ontario Regulation 419/05,* Air Pollution – Local Air Quality enacted under the *EPA,* as amended;

*"**O. Reg. 347**"* means the *Ontario Regulation 347,* R.R.O 1990 (General –Waste Management) enacted under the *EPA,* as amended;

"*OWRA*" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40, as amended;

"**Owner**" means any person that is responsible for the establishment and operation of the Site being approved by this Certificate, and it includes The Regional Municipality of Durham, The Regional Municipality of York, and Covanta Durham York Renewable Energy Limited Partnership (operator), their successors and assignees;

"*PA*" means the *Pesticides Act*, R.S.O. 1990, c.P. 11, as amended;

"**Performance Requirements**" means the performance requirements and emission limits specified in the section of this Certificate entitled "Performance Requirements";

"**Point of Impingement**" means any point outside the Facility in the natural environment and as defined by s.2 of the *O. Reg. 419/05;*

"**Point of Reception**" means the Point of Reception as defined by *Publication NPC-205* and/or *Publication NPC-232*, as applicable;

"**Pre-test Information**" means the information outlined in Section 1.1 of the Source Testing Code;

"**Procedure Document**" means the Ministry's document entitled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated July 2005, as amended;

"**Professional Engineer**" means a Professional Engineer as defined within the *Professional Engineers Act*, R.S.O. 1990, c. P.28, as amended;

"**Provincial Officer**" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the *OWRA* or Section 5 of the *EPA* or Section 17 of the *PA* or Section 4 of the *NMA* or Section 8 of the *SDWA;*

"***Publication NPC-103***" means the Ministry's Publication NPC-103 of the Model Municipal Noise Control By-Law, Final Report, dated August 1978, published by the Ministry, as amended;

"***Publication NPC-205***" means the Ministry's Publication NPC-205, entitled "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", dated October, 1995, as amended;

"***Publication NPC-207***" means the Ministry's draft technical publication entitled "Impulse Vibration in Residential Buildings", dated November 1983, supplementing the Model Municipal Noise Control By-Law, Final Report, dated August 1978, published by the Ministry, as amended;

"***Publication NPC-232***" means the Ministry's Publication NPC-232, entitled "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", dated October, 1995, as amended;

"***Publication NPC-233***" means the Ministry's Publication NPC-233, entitled "Information to be Submitted for Approval of Stationary Sources of Sound", dated October, 1995, as amended;

"**Rejected Waste**" means either municipal waste which cannot be processed at the Facility or waste which the Site is not approved to accept. Rejected Waste includes but is not limited to the Bulky Unprocessable Items and the Unacceptable Waste;

"**Regional Director**" means the Regional Director of the Central Region of the Ministry;

"**Regions**" means The Regional Municipality of Durham and The Regional Municipality of York;

*"**Report EPS 1/PG/7**"* means the Environment Canada Report EPS 1/PG/7, entitled "Protocols and Performance Specifications for Continuous Monitoring of Gaseous Emissions from Thermal Generation", dated September, 1993, as amended;

"**Residual Waste**" means waste resulting from the Waste processing activities at the Site. Residual Waste is limited to the recovered ferrous metals, the recovered non-ferrous metals, the bottom ash (consisting of the ash fines and the grizzly overs) and the fly ash (untreated and following conditioning);

"**Residue Building**" means the building at the Site where the bottom ash and the fly ash are processed, temporarily stored and loaded in transport vehicles for off-site disposal;

"**Schedules**" means the following schedules "A", "B", "C", "D", "F" and "G", attached to the Certificate and forming part of the Certificate;

"***SDWA***" means the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, as amended;

"**Sensitive Receptor**" means any location where routine or normal activities occurring at reasonably expected times would experience adverse effect(s) from odour discharges from the Facility, including one or a combination of:

(a) private residences or public facilities where people sleep (e.g.: single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.);

(b) institutional facilities (e.g.: schools, churches, community centres, day care centres, recreational centres, etc.);

(c) outdoor public recreational areas (e.g.: trailer parks, play grounds, picnic areas, etc.); and

(d) other outdoor public areas where there are continuous human activities (e.g.: commercial plazas and office buildings);

"**Site**" means the property where the Owner has located and operates the Facility and the Works and located at 72 Osbourne Road, 27, Concession Broken Front, Part 1 in the Municipality of Clarington, Regional Municipality of Durham;

"**Source Testing**" means monitoring, sampling and testing to measure emissions resulting from operating the Facility under conditions which yield the worst case emissions within the approved operating range of the Facility;

"***Source Testing Code***" means the Ministry's document entitled "Source Testing Code, Version 2, Report No. ARB-66-80", dated November 1980, as amended;

"**Stack**" means the stack that discharges emissions from the Boilers after those emissions have been controlled by the associated APC Equipment;

"**Substantial Completion**" has the same meaning as "substantial performance" in the *Construction Lien Act* R.S.O. 1990, c.C-30, as amended;

"**Supporting Documentation**" means the documents listed in the attached Schedule "A" of this Certificate which forms part of this Certificate;

"**Test Contaminants**" means the contaminants set out in the attached Schedule "D";

"**Tipping Building**" means the building at the Site where the incoming Waste is received, sorted and temporarily stored;

"**Total Power Failure**" means the loss of the external power supply and concurrent loss of all in-plant power generation;

"**Trained Personnel**" means one or more Site personnel trained in accordance with the requirements of Condition 9.;

"**Waste**" means municipal solid waste as defined in the *O. Reg. 347* and limited to the approved waste set out in Condition No. 2.(2);

"**Waste Processing Rate** means the mass of Waste fed into one of the Boilers;

"**Works**" means the sewage works described in the Owner's application, this Certificate and in the Supporting Documentation referred to herein, to the extent approved by this Certificate;

"**Unacceptable Waste**" means the incoming Waste received at the Site that does not meet the incoming Waste quality criteria set out in this Certificate, is of hazardous nature and requires caution when handling; and

"**Undiluted Gases**" means the flue gas stream which contains oxygen, carbon monoxide, total hydrocarbons and all contaminants in the same concentrations as they exist in the flue gas stream emerging from an individual piece of equipment, such as the combustion chamber of one Boiler or one baghouse, and into which gas stream no ambient air and/or no other gas stream originating from another piece of equipment, except for dilution air introduced within the CEM Systems, has been introduced.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

GENERAL PROVISIONS

1. GENERAL

Compliance

(1) The Owner shall ensure compliance with all the conditions of this Certificate and shall ensure that any person authorized to carry out work on or operate any aspect of the Site, including the Works, is notified of this Certificate and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Certificate.

Build in Accordance

(3) (a) Except as otherwise provided by this Certificate, the Site shall be designed, developed, built, operated, monitored, inspected and maintained in accordance with the following applications:

(i) Applications for a Certificate of Approval (Air) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of

Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(ii) Applications for a Provisional Certificate of Approval (Waste Disposal Site) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(iii) Applications for a Certificate of Approval of Municipal and Private Sewage Works dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(b) (i) Any design optimization or modification that is inconsistent with the conceptual design set out in the Supporting Documentation in Schedule "A" shall be clearly identified, along with an explanation of the reasons for the change and submitted to the Director for approval.

(ii) If a change to the conceptual design is submitted to the Director for approval, no construction of the Site shall commence prior to the Director approving, in writing, the final conceptual design of the Site.

As-built Drawings

(4) (a) Within ninety (90) days of the completion of the initial successful Source Testing program, a set of as-built drawings showing the Facility and the Works and bearing the stamp of a Professional Engineer, shall be prepared and retained at the Site.

(b) These drawings shall be kept up-to-date through revisions undertaken from time to time and a copy shall be retained at the location of the Site or at the operational office of the Owner for the operational life of the Site.

(c) Notwithstanding provisions of Condition 1.(4)(b), an amendment to this Certificate shall be sought for changes to the as-built drawings, requiring approval.

(d) The as-built drawings shall be made available to Ministry staff upon request.

Interpretation

(5) Where there is a conflict between a provision of any document, including the application referred to in this Certificate and the conditions of this Certificate, the conditions in this Certificate shall take precedence.

(6) Where there is a conflict between the applications and a provision in any documents listed in Schedule "A", the applications shall take precedence, unless it is clear that the purpose of the document was to amend the applications and that the Ministry approved the amendment.

(7) Where there is a conflict between any two documents listed in Schedule "A", other than the applications, the document bearing the most recent date shall take precedence.

(8) The requirements of this Certificate are severable. If any requirement of this Certificate, or the application of any requirement of this Certificate to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Certificate shall not be affected thereby.

Other Legal Obligations

(9) The issuance of, and compliance with the conditions of this Certificate does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner to furnish any further information related to compliance with this Certificate.

Adverse Effects

(10) The Site shall be constructed, operated and maintained in a manner which ensures the health and safety of all persons and prevents adverse effects on the natural environment or on any persons.

(11) The Owner shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the approved operations at the Site, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

(12) Despite the Owner or any other person fulfilling any obligations imposed by this Certificate, the person remains responsible for any contravention of any other condition of this Certificate or any applicable statute, regulation, or other legal requirement resulting from any act or emission that caused the adverse effect to the natural environment or impairment of water quality.

(13) If at any time odours, pests, litter, dust, noise or other such negative effects are generated at this Site and cause an adverse effect, the Owner shall take immediate appropriate remedial action that may be necessary to alleviate the adverse effect, including suspension of all waste management activities if necessary.

Change of Ownership

(14) The Owner shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any changes:

(a) the ownership of the Site;
(b) the operator of the Site;
(c) the address of the Owner;
(d) the partners, where the Owner is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R.S.O. 1990, c. B.17, as amended, shall be included in the notification;
(e) the name of the corporation where the Owner is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act*, R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

(15) No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance. In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Certificate, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Inspections by the Ministry

(16) No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the *OWRA*, the *EPA*, the *PA*, the *SDWA* or the *NMA* of any place to which this Certificate relates, and without limiting the foregoing:

(a) to enter upon the premises where the approved processing is undertaken, or the location where the records required by the conditions of this Certificate are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Certificate;
(c) to inspect the Site, related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this Certificate;
(e) to conduct interviews with staff, contractors, agents and assignees of the Owner; and
(f) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Certificate or the *EPA*, the *OWRA*, the *PA*, the *SDWA* or the *NMA*.

Information

(17) Any information requested by the Ministry, concerning the operation of the Site and its operation under this Certificate, including but not limited to any records required to be kept by this Certificate, manuals, plans, records, data, procedures and supporting documentation shall be provided to the Ministry, in a timely manner, upon request.

(18) The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this Certificate or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

(a) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Certificate or any statute, regulation or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

(19) The Owner shall ensure that a copy of this Certificate, in its entirety and including all its Notices of Amendment and the Supporting Documentation listed in Schedule "A" are retained at the Site at all times.

2. **SERVICE AREA, APPROVED WASTE TYPES, RATES and STORAGE**

(1) The service area for the Site is the area within the jurisdictional boundaries of The Regional Municipality of Durham and The Regional Municipality of York.

(2) The operation of this Site is limited to:

(a) receipt, temporary storage, transfer and processing, including thermal treatment, of solid non-hazardous waste remaining after Waste Diversion required by the EA Approval, limited to Waste from the following sources:

(i) domestic waste and Industrial Commercial and Institutional waste from the Regions' curbside collection and/or from the Regions' waste management facilities; and

(ii) waste generated on-Site through activities not relating to the handling and processing of Waste (ie. office, lunch room, etc.);

(b) collection and management of the stormwater run-off generated at the Site.

(3) The following Unacceptable Waste is prohibited from being accepted at the Site:

(a) hazardous waste, as defined in the *O. Reg. 347;*
(b) wastes which have been source-separated for the purposes of diversion;

(c) international waste generated outside of Canada, but collected within the jurisdictional boundaries of The Regional Municipality of Durham and The Regional Municipality of York.

(4) Waste Receipt Rate:

(a) The maximum daily amount of Waste that is approved to be accepted at the Site shall not exceed 1,520 tonnes per day.

(5) Storage Restrictions:

Solids:

(a) A maximum of 7,350 cubic metres shall be stored inside the Waste pit within the Tipping Building as shown in the Supporting Documentation.

(b) Rejected Waste, limited to the Bulky Unprocessable Items removed from the incoming Waste in the Tipping Building shall be stored:

(i) in two (2) roll-off bins having a maximum total storage capacity of 30 cubic metres, located within the confines of the Tipping Building; and/or

(ii) in the appropriate dedicated bunkers, located within the confines of the Residue Building and described in Conditions 2.(5)(c), 2.(5)(d) and 2.(5)(d), below.

(c) A maximum of approximately 77 tonnes or 106 cubic metres of the Residual Waste, limited to the recovered ferrous metals, shall be stored in one (1) dedicated bunker, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(d) A maximum of approximately 120 tonnes or 100 cubic metres of the Residual Waste, limited to the recovered non-ferrous metals, shall be stored in one (1) dedicated bunker, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(e) A maximum of 630 tonnes of the Residual Waste, limited to bottom ash shall be stored in two (2) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(f) A maximum of 700 tonnes of the Residual Waste, limited to the fly ash shall be stored in seven (7) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of thirty six (36) days.

(g) A maximum of 85 cubic metres of activated carbon for the carbon injection system shall be stored in one (1) outdoor tank, located adjacent to the APC Building.

(h) A maximum of 150 cubic metres of lime for the dry scrubber shall be stored in one (1) or more indoor tank(s), located within the confines of the APC Building.

(i) If required, recirculated residue shall be stored in one (1) or more indoor tank(s), located within the confines of the APC Building.

(j) A maximum of 35 tonnes or 25 cubic metres of cement for fly ash conditioning shall be stored in one (1) outdoor silo, located adjacent to the Residue Building.

(k) A maximum of 25 tonnes or 45 cubic metres of pozzolan for fly ash conditioning shall be stored in one (1) outdoor silo, located adjacent to the Residue Building.

Liquids:

(l) (i) A maximum of 36 cubic metres or 40 tonnes of aqueous ammonia for the SNCR System shall be stored in one (1) outdoor tank, located adjacent to the APC Building.

(ii) The Owner shall ensure that the aqueous ammonia storage tank is equipped with a liquid level monitoring device designed to provide a visual and an auditory alarm when the high level setpoint is reached.

(iii) The aqueous ammonia storage tank spill containment area and the loading area shall be designed in accordance with the requirements in the Ministry's document entitled *"Guidelines for Environmental Protection Measures at Chemical and Waste Storage Facilities"* dated May 2007, as amended.

(6) No outdoor storage of waste, including storage in vehicles, is approved under this Certificate.

(7) The Owner shall ensure that storage of all wastes is undertaken in a manner that does not cause an adverse effect or a hazard to the environment or any person.

(8) (a) Waste received at the Site shall be processed within four (4) days from its receipt at the Site.

(b) Emergency Waste storage duration extension:

(i) The Owner may store the incoming Waste inside the tipping pit within the confines of the Tipping Building for up-to seven (7) days from its receipt at the Site, on an emergency basis only.

(ii) Within twenty four (24) hours from the start of the emergency storage of the incoming Waste, the Owner shall notify, in writing, the District Manager that the incoming Waste is being stored longer then four (4) days.

(iii) Should there be public complaints about the extended incoming Waste storage, the Owner, in consultation with the District Manager, shall determine the cause of the complaints, propose appropriate abatement measures, including but not be limited to the removal and off-site disposal of the Waste contained in the tipping pit, and implement the said measures upon receiving written concurrence from the District Manager within the time frame acceptable to the District Manager.

(9) In the event that Waste cannot be processed at the Site and the Site is at its approved storage capacity, the Owner shall cease accepting additional Waste. Receipt of additional Waste may be resumed once such receipt complies with the waste storage limitations approved in this Certificate.

3. **SIGNS and SITE SECURITY**

(1) Prior to receipt of Waste at the Site, the Owner shall ensure that a sign is posted at the entrance to the Site. The sign shall be visible from the main road leading to the Site. The following information shall be included on the sign:

(a) name of the Owner;
(b) this Certificate number;
(c) hours during which the Site is open;
(d) waste types that are approved to be accepted at the Site;
(e) Owner's telephone number to which complaints may be directed;
(f) Owner's twenty-four hour emergency telephone number (if different from above);
(g) a warning against unauthorized access; and
(h) a warning against dumping at the Site.

(2) The Owner shall ensure that appropriate and visible signs are posted at the Site clearly identifying the wastes and the process reagents and stating warnings about the nature and any possible hazards of the wastes and the reagents.

(3) The Owner shall ensure that appropriate and visible signs are posted at the Site to prohibit smoking, open flames or sources of ignition from being allowed near any flammable materials storage areas.

(4) The Owner shall install and maintain appropriate and visible signs at the Site to direct vehicles to the Waste receiving and Residual Waste removal areas and to the reagent unloading areas.

(5) The Owner shall post appropriate and visible signs along the traffic route providing clear directions to the Site.

(6) The Owner shall ensure that the Site is fenced in and that all entrances are secured by lockable gates to restrict access only to authorized personnel when the Site is not open.

(7) The Owner shall ensure that access to the Site, with the exception of the area designated as a Public Information Centre, is regulated and that no unauthorized persons are permitted at the Site without the Trained Personnel escort.

(8) The Owner shall ensure that the Site is operated in a safe and secure manner, and that Waste, the Residual Waste and the Unacceptable Waste are properly handled, packaged or contained and stored so as not to pose any threat to the general public and the Site personnel.

4. SITE OPERATIONS

(1) **Operating hours:**

(a) The Site is approved to operate twenty-four (24) hours per day three hundred and sixty-five (365) days per year.

(b) Notwithstanding Condition 4.(1)(a), Waste shall only be received at the Site and the Residual Waste shall only be transferred from the Site between 7:00 a.m. and 7:00 p.m. Monday to Saturday. No receipt of the Waste or transfer of the Residual Waste shall be undertaken on statutory holidays.

(c) Emergency Receipt of Waste:

(i) The Owner may receive Waste at the Site outside of the operating hours specified in Condition 4.(1)(b), above, on an emergency basis only.

(ii) Within twenty four (24) hours from the receipt of Waste outside of the approved receiving hours, the Owner shall notify, in writing, the District Manager that Waste was received outside of the approved receiving hours.

(iii) Should there be complaints about Waste shipments outside of the approved hours, the Owner, in consultation with the District Manager, shall determine the cause of the complaint, propose appropriate abatement measures and implement the said measures upon receiving written concurrence from the District Manager within the time frame acceptable to the District Manager.

(2) **Incoming Waste receipt:**

(a) At the weigh scale, the Trained Personnel shall:

(i) inspect the required documentation prior to acceptance of the incoming Waste at the Site; and

(ii) inspect the incoming Waste with radiation detection equipment.

(b) In the Tipping Building, the Trained Personnel shall:

(i) visually inspect all incoming Waste being unloaded into the Waste pit; and

(ii) once per hour, or as accepted by the District Manager, unload the incoming Waste on the tipping floor for a manual visual inspection and sorting of the incoming Waste.

(c) The Owner shall only accept the incoming Waste that is delivered in vehicles that have been approved by the Ministry.

(d) The Owner shall ensure that all unloading of incoming Waste at the Site takes place entirely within the confines of the Tipping Building.

(3) **Unacceptable Waste handling:**

(a) In the event that waste that is not approved under this Certificate is inadvertently accepted at the Site, the Owner shall ensure that the Unacceptable Waste:

(i) is stored in a way that ensures that no adverse effects result from its storage;
(ii) is segregated from all other waste;
(iii) is handled and removed from the Site in accordance with the *O. Reg. 347* and the *EPA*; and
(iv) is removed from the Site within (4) days of its receipt or as acceptable to the District Manager.

(b) The Owner shall ensure that all loading of the Unacceptable Waste into transport vehicles is carried out entirely within the confines of the Tipping Building.

(4) **Waste Sorting:**

(a) The Trained Personnel shall remove the Bulky Unprocessable Items and Unacceptable Waste from the incoming Waste prior to charging of the Waste to the Boilers.

(b) All sorting of the incoming Waste at the Site shall be undertaken indoors, within the confines of the Tipping Building and/or the Refuse Building.

(5) **Residual Waste Handling and Disposal:**

(a) (i) Except for transportation of the Residual Waste between the Grizzly Building and the Residue Building, the Owner shall ensure that all

handling of the bottom ash and its segregated constituents, and of the fly ash, is undertaken within the confines of enclosed conveyors and enclosed buildings.

(ii) The Owner shall ensure that all loading of the Residual Waste into vehicles for its transport from the Site is carried out entirely within the confines of the Residue Building.

(b) (i) Different constituents of the Residual Waste shall not be comingled prior to the required compliance testing, unless all Residual Waste is to be disposed of at a Waste Disposal Site that is approved to accept hazardous waste.

(ii) The Owner shall ensure that the equipment used in handling of the hazardous wastes or that came in direct contact with the hazardous wastes is not used to handle other wastes.

(iii) On an emergency basis, the Owner may use equipment used to handle the hazardous wastes to handle other wastes provided that prior to such use the equipment has been thoroughly cleaned first.

(c) (i) Only haulers approved by the Ministry shall be used to transport the Residual Waste from the Site.

(ii) The Residual Waste shall be transported from the Site in appropriately covered vehicles that will not allow fugitive dust emissions to be emitted into the natural environment during the said transport.

d) Residual Waste generated at the Site shall be disposed of shall only be disposed of at an approved waste disposal site in accordance with the requirements in the *EPA* and the *O. Reg. 347* or at a location with the appropriate jurisdictional approval or a license, if required.

(e) Should the Residual Waste limited to the conditioned fly ash and/or the bottom ash be deemed a hazardous waste, the ash shall be disposed of at an approved waste disposal site in accordance with the Land Disposal Restrictions requirements in the *EPA* and the *O. Reg.* 347 or at a location with the appropriate jurisdictional approval or a license, if required.

(6) **Wastewater Management**

(a) The Owner shall ensure that all wastewater generated at the Site is contained within enclosed buildings, tanks, pipes and conveyors at the Site and the approved outdoor Wastewater Settling Basin.

(b) The Owner shall ensure that all wastewater generated at the Site is collected in leak-proof and sufficiently designed wastewater storage facilities:

(i) Wastewater Holding Tank, to collect the continuous reject water flow from the Boiler make-up water treatment system and the Boiler blowdown, having an approximate holding capacity of 100 cubic metres, located within the confines of the Boiler Building and venting to the atmosphere; and

(ii) Wastewater Settling Basin, to collect the wastewater from the floor drains in the buildings at the Site, except for the Tipping Building and the Residue Building, the ash discharger overflow and drain water, the Boiler and turbine-generator washdown water and the APC Equipment area washdown water, having an approximate holding capacity of 38 cubic metres, located outdoors, open to the atmosphere and equipped with a filter basket and an oil skimmer board.

(c) The wastewater pumps shall be located in the area designed in accordance with the Supporting Documentation to ensure that any potential leaks or drips are contained and directed to the Wastewater Settling Basin.

(d) (i) The wastewater level in the Wastewater Holding Tank shall be monitored and controlled to ensure that the wastewater inflow to the Tank does not cause the Tank overflow.

(ii) The wastewater level in the Wastewater Settling Basin shall be monitored and controlled to ensure that the atmospheric precipitation does not cause an overflow from the Basin.

(e) The Owner shall regularly empty, and clean as necessary, all sumps, wastewater storage/holding areas and equipment that are used to contain, collect and handling the wastewater generated at the Site.

(f) Should the Owner find it necessary to remove the wastewater from the Site, the wastewater shall only be disposed of at a Ministry-approved site in accordance with the site's certificate of approval or be discharged to the sanitary sewer in accordance with the agreement with the municipality accepting the discharge.

(g) The floors of the Tipping Building and the Residue Building shall be sufficiently sloped to facilitate the flow of the wastewater generated from the floor cleaning activities and from the truck washdown towards the designated wastewater collection area.

(h) The Owner shall ensure that the Wastewater Settling Basin is regularly cleaned out and that it does not become a source of odour emissions.

(7) All activities approved under this Certificate shall only be carried out by appropriately Trained Personnel.

5. EQUIPMENT and SITE INSPECTIONS and MAINTENANCE

Operation and Maintenance

(1) Prior to the receipt of the Waste at the Site, the Owner shall prepare and update as necessary, an Operation and Maintenance Manual for all the Equipment, the APC Equipment, the CEM Systems, the Works and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility. The Manual shall be prepared in accordance with the written manufacturer's and/or supplier's specifications and good engineering practice.

As a minimum, the Operation and Maintenance Manual shall specify:

(a) operation procedures of the Equipment, the APC Equipment, the CEM Systems, the Works, and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility, in accordance with manufacturers' recommendations and good engineering practices to achieve compliance with this Certificate, the *EPA,* the *OWRA* and their Regulations;
(b) calibration procedures for the CEM Systems as required by this Certificate;
(c) procedures for start-up and shutdown, including Controlled Shutdown and Emergency Shutdown;
(d) quality assurance procedures for the operation and calibration of the CEM Systems in accordance with *40 CFR 60*, Appendix F or *Report EPS 1/PG/7,* as appropriate;
(e) Waste receiving and screening procedures;
(f) Waste, Rejected Waste and Residual Waste handling procedures;
(g) testing and monitoring procedures as required by this Certificate;
(h) maintenance and preventative maintenance procedures as required by this Certificate;
(i) Facility inspection, including frequency of inspections, procedures;
(j) procedure for handling complaints as required by this Certificate.
(k) contingency measures to resolve upset conditions and/or minimize the environmental impacts from the Facility;
(l) emergency response procedures, including procedures for dealing with power failure, fire, explosion, spills and any other potential emergencies;
(m) procedures for record keeping activities as required by this Certificate;
(n) description of the responsibilities of the Site personnel and the personnel training protocols; and
(o) a list of personnel positions responsible for operation and maintenance, including supervisory personnel and personnel responsible for handling of the emergency situations, recording and reporting pursuant to the requirements of this Certificate, along with the training and experience required for the positions and a description of the responsibilities.

(2) A copy of this Operations and Maintenance Manual shall be kept at the Site, be accessible to the Site personnel at all times and be updated, as required. The Operations and Maintenance Manual shall be available for inspection by a Provincial Officer upon request.

(3) The Owner shall implement the operation, maintenance, preventative maintenance and calibration procedures set out in the Operations and Maintenance Manual required by this Certificate.

Critical Spare Parts

(4) (a) The Owner shall prepare a list of critical spare parts, update this list annually or more frequently, if necessary, to ensure that this list is maintained up-to-date and shall be available for inspection by a Provincial Officer upon request.

(b) The Owner shall ensure that the critical spare parts are available at the Site at all times or are immediately available from an off-Site supplier.

Inspections

(5) Prior to receipt of the Waste at the Site, the Owner shall prepare a comprehensive written inspection program which includes inspections of all aspects of the Site's operations including, but not limited to the following:

(a) buildings and the indoor waste storage facilities and presence of dust and odour and leaks in or near any openings, such as doorways, window, vent, louver or any other opening;
(b) outdoor Residual Waste transport equipment, and the presence of dust and leaks at or near transfer points or the equipment seams;
(c) the Equipment, the APC Equipment, the CEM Systems, the Works and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility;
(d) spill containment areas, loading areas and the conditions around the Wastewater Settling Basin;
(e) security fencing, gates, barriers and signs;
(f) off-site nuisance impacts such as odour, dust, litter, etc.
(g) presence of stormwater pooling at the Site; and
(h) condition of the on-Site roads for presence of leaks and drips from the waste delivery trucks or excessive dust emissions.

(6) The inspections, except for the inspection of the Works, are to be undertaken daily by the Trained Personnel in accordance with the inspection program to ensure that the Facility is maintained in good working order at all times and that no off-Site impacts are occurring. Any deficiencies detected during these regular inspections must be promptly corrected.

Inspections and Maintenance of the Works

(7) The Owner shall inspect the Works at least once a year and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

6. PERFORMANCE REQUIREMENTS

(1) The Owner shall, ensure that the Facility/Equipment is designed and operated in such a manner as to ensure that the following Performance Requirements are met:

(a) the maximum 10-minute average concentration of odour at the most impacted Sensitive Receptor, resulting from the operation of the Facility/Equipment, calculated in accordance with the procedures outlined in the attached Schedule "B", shall not exceed 1 odour unit;

(b) the noise emissions from the Facility shall comply with the limits set out in Ministry *Publication NPC-205;*

(c) the vibration emissions from the Facility shall comply with the limits set out in Ministry *Publication NPC-207.*

(2) The Owner shall ensure that the Boilers and the associated APC Equipment and the CEM Systems are designed and operated in such a manner as to ensure that the following Performance Requirements are met:

(a) (i) The temperature in the combustion zone of each Boiler shall reach a minimum of 1000 degrees Celsius (°C) for one second, prior to introduction of the Waste into the combustion chamber of the Boiler during the start-up, and thereafter maintained during the entire thermal treatment cycle and subsequent shutdown until all Waste combustion is completed.

(ii) Compliance with the minimum temperature requirement shall be demonstrated by direct measurement at the location where the combustion gases have achieved the residence time of one second at a minimum temperature of 1000°C (the Target Location) or by correlation of the required temperature of 1000°C for one second to the temperature measured downstream of the Target Location as proven by a method acceptable to the Director.

(b) The concentration of residual oxygen in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, as measured and recorded by the CEM System, shall not be less than 6 percent by volume on a dry basis.

(c) (i) The operational target for the concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler is 40 milligrams per dry cubic metre, as a 4-hour rolling average, normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals, as measured and recorded by the CEM System, for the period from and including initial commissioning of the facility to twelve months following the completion of the first Source Testing program.

(ii) The 4-hour average concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, as measured and recorded by the CEM System, shall not be more than 40 milligrams per dry cubic metre, normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals, after the first twelve months following the completion of the first Source Testing program.

(d) The emissions from the Boilers after those emissions have been controlled by the associated APC Equipment for discharge into the atmosphere via the Stack shall comply with the emission concentration limits listed in the attached Schedule "C", as measured by a CEM System or by Source Testing as applicable.

(e) The Boilers shall include combustion air control systems, which are capable of automatically adjusting the distribution and the quantity of combustion air, in such a manner that changes in the Waste Processing Rate and/or Waste composition or irregularities in the loading and/or combustion shall not adversely affect the performance of the Boilers.

(f) The Boilers shall provide and maintain a high degree of gas turbulence and mixing in the combustion chamber.

(g) The Boilers shall achieve the temperature, oxygen availability and turbulence requirements over the complete range of operating parameters, including feed rate, feed characteristics, combustion air, flue gas flow rate and heat losses.

(h) The inlet temperature into each baghouse of the APC Equipment of the Boilers shall not be less than 120°C and not more than 185°C.

(3) The Owner shall install and maintain visual and audible alarm systems to alert the Facility/Equipment operators of any potential deviation from the above Performance Requirements for parameters that are continuously monitored by applicable CEM Systems and shall forthwith take all reasonable actions to bring the Equipment/Facility into compliance with all Performance Conditions.

(4) In the event that the CEM Systems indicate that emissions from the Boilers and the Stack exceed any Performance Requirements in the attached Schedule "C" for a continuous three (3) hour period, the Owner shall forthwith cut-off all Waste feed into the affected Boiler and initiate an Emergency Shutdown, while maintaining a temperature of 1000°C, as practicable, in the combustion zone of the Boiler.

Residual Waste Compliance Criteria

(5) (a) The Residual Waste generated at the Site and destined for a non-hazardous waste disposal site in Ontario shall not meet any of the criteria from the definition of "hazardous waste" set out in the *O. Reg. 347.*

(b) The Residual Waste that meets any of the criteria from the definition of "hazardous waste" set out in the *O. Reg.* 347 shall be handled and disposed of in accordance with the LDR requirements set out in the *EPA* and the *O. Reg. 347.*

(6) The Residual Waste, limited to the bottom ash, destined for a non-hazardous waste disposal site shall meet the definition of "incinerator ash" set out in the *O. Reg. 347.*

7. TESTING, MONITORING and AUDITING

Source Testing

(1) The Owner shall perform annual Source Testing in accordance with the procedures and schedule outlined in the attached Schedule "E", to determine the rate of emission of the Test Contaminants from the Stack. The first Source Testing program shall be conducted not later than six (6) months after the Commencement Date of Operation of the Facility/Equipment and subsequent Source Testing program shall be conducted once (1) every calendar year thereafter.

Continuous Monitoring

(2) The Owner shall select, test and install appropriate CEM Systems and continuous recording devices in accordance with the requirements outlined in the attached Schedule "F" to conduct and maintain a program to continuously monitor, as a minimum, the following parameters prior to commencement of operation of the Boilers:

(a) the temperature at one (1) second downstream of the combustion zone of each Boiler where most of the combustion has been completed and the combustion temperature is fully developed;

(b) the inlet temperature of the gases into each baghouse of the APC Equipment of each Boiler;

(c) the concentration of carbon monoxide, oxygen and organic matter (as methane) in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler;

(d) the opacity and moisture content of the flue gas and the concentration of oxygen, nitrogen oxides, sulphur dioxide, hydrogen chloride, hydrogen fluoride and ammonia in the Undiluted Gases leaving the baghouse of the APC Equipment of each Boiler.

Long-Term Sampling for Dioxins and Furans

(3) (a) The Owner shall develop, install, maintain and update as necessary a long-term sampling system, with a minimum monthly sampling frequency, to measure the concentration of Dioxins and Furans in the Undiluted Gases leaving the APC Equipment associated with each Boiler. The performance of

this sampling system will be evaluated during the annual Source Testing programs in accordance with the principles outlined by 40 CFR 60, Appendix B, Specification 4.

(b) The Owner shall evaluate the performance of the long-term sampling system in determining Dioxins and Furans emission trends and/or fluctuations as well as demonstrating the ongoing performance of the APC Equipment associated with the Boilers.

Ambient Air Monitoring

(4) (a) The Regions shall develop and implement the Ambient Air Monitoring and Reporting Plan, in accordance with the requirements set out in the EA Approval and as determined to be acceptable by the Regional Director.

(b) The Regions shall report the results of the Ambient Air Monitoring program to the Regional Director in accordance with the Ambient Air Monitoring and Reporting Plan and in accordance with the requirements of Condition 14.

(c) The Regions shall post the Ambient Air Monitoring and Reporting Plan and the results of the Ambient Air Monitoring program on the Owner's web site for the Facility in accordance with the requirements of the EA Approval and Condition 15.

Noise Monitoring - Acoustic Audit

(5) The Owner:

(a) shall carry out Acoustic Audit measurements on the actual noise emissions due to the operation of the Facility. The Acoustic Audit measurements shall be carried out in accordance with the procedures in *Publication NPC-103* and in accordance to the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director;

(b) shall submit an Acoustic Audit Report on the results of the Acoustic Audit, prepared by an Independent Acoustical Consultant, in accordance with the requirements of *Publication NPC-233* and the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director, to the District Manager and the Director, not later than three (3) months after the commencement of operation of the Facility.

(6) The Director:

(a) may not accept the results of the Acoustic Audit if the requirements of *Publication NPC-233* or the approved Noise Monitoring and Reporting Plan were not followed;

(b) may require the Owner to repeat the Acoustic Audit if the results of the Acoustic Audit are found unacceptable to the Director.

Residual Waste Testing

(7) (a) A minimum of six (6) months prior to the Commencement Date of Operation, the Owner shall submit to the Director for approval, a Testing Protocol for testing of the bottom ash for compliance with the criteria set out in the "incinerator ash" definition from the *O. Reg.* 347 and for testing of the Residual Waste for compliance with the criteria set out in this Certificate.

(b) As a minimum, the Testing Protocol shall comply with the Ministry's regulatory requirements for sampling and testing of waste, including the requirements set out in the Ministry's document entitled "Principles of Sampling and Analysis of Waste for TCLP under Ontario Regulation 347", dated February 2002, as amended.

(c) The Testing Protocol shall include the rationale for the proposed methods and the following:

(i) a sampling protocol, including the proposed number of samples to be taken and their locations, to ensure that representative sample(s) are being tested for compliance with this Certificate;

(ii) sample(s) handling and preserving procedures;

(iii) analytical protocol for the applicable contaminants to ensure that appropriate analytical method(s) are being used for compliance testing required by this Certificate; and

(iv) a testing protocol for the bottom ash during the Site commissioning period.

(d) The Owner shall implement the Testing Protocol on the Commencement Date of Operation.

(8) For handling of the bottom ash as a solid non-hazardous waste, the Owner shall follow the following schedule for compliance testing:

(a) for the Site commissioning period, the bottom ash shall be tested in accordance with the Testing Protocol approved by the Director;

(b) for the period following the Site commissioning period, the bottom ash shall be tested for the content of the combustible materials on an annual basis, until the compliance testing results indicate that the bottom ash meets the "incinerator ash" definition from the *O. Reg. 347* for three (3) consecutive years, following which a triennial compliance testing event may be carried out;

(c) should any annual or triennial compliance testing event indicate that the bottom ash does not meet the "incinerator ash" definition, prior to each of the next three (3) shipments from the Site, compliance testing of each of the three (3) shipments shall be carried out. Once three (3) consecutive tests re - establish compliance with the "incinerator ash" definition from the *O. Reg. 347* and that the bottom ash does not exceed the Leachate Toxicity Criteria, the compliance testing schedule set out in Condition 7.(8)(b) may be resumed; and

(d) should the results of any compliance testing of the bottom ash indicate that the concentrations of the leachate toxic contaminants in the bottom ash equal to or exceed the Leachate Toxicity Criteria, the bottom ash shall be handled as a hazardous waste. Once three (3) consecutive tests re - establish that the bottom ash does not exceed the Leachate Toxicity Criteria, the bottom ash compliance testing schedule set out in Condition 7.(8)(b) may be resumed.

(9) (a) For handling of the bottom ash as a hazardous waste and for handling of the fly ash, prior to final disposal at a hazardous waste landfill site in Ontario, the Owner shall undertake any sampling and testing that would be required to comply with the LDR requirements set out in the *EPA* and the *O. Reg. 347.*

(b) The Owner shall follow the following schedule for compliance testing:

(i) prior to each of the first three (3) shipments of the ash from the Site, the ash shall be tested so that for the compliance with the LDR requirements can be demonstrated;

(ii) following the three (3) initial compliance testing events, the ash shall be tested on an annual basis, until the compliance testing results indicate that the ash meets the LDR requirements during the three (3) consecutive years, following which a triennial compliance testing may be carried out; and

(iii) should any annual or triennial compliance testing event indicate that the ash does not meet the LDR requirements, prior to next three (3) shipments from the Site, compliance testing of each of the three (3) shipments shall be carried out. Once three (3) consecutive tests re - establish compliance with the LDR requirements, the compliance testing schedule set out in Condition 7.(9)(b)(ii) may be resumed.

Soil Testing:

(10) (a) Within one hundred and twenty (120) days from the date of this Certificate, the Regions shall undertake the soil testing in accordance with the Soil Testing Plan required by this Certificate.

(b) The soil testing shall be repeated every three (3) years or as agreed upon in writing by the Regional Director.

Disposal of Residual Waste

(11) The Owners shall ensure that no portion of the Residual Waste undergoing compliance testing is transferred from the Site until the results of the compliance testing required by this Certificate demonstrate compliance with the relevant Ministry's requirements.

(12) Bottom ash that is not a hazardous waste, as defined in the *O. Reg. 347,* may be disposed of at an approved non-hazardous waste landfill site or at a site approved to accept such waste by an appropriate government agency of equivalent jurisdiction.

(13) Residual Waste shall be treated to comply with the LDR requirements set out in the *EPA* and the *O. Reg. 347* prior to disposal of at an approved hazardous waste landfill site or at a site approved to accept such waste by an appropriate government agency of equivalent jurisdiction.

Groundwater and Surface Water Monitoring

(14) (a) The Regions shall develop and implement the Groundwater and Surface Water Monitoring Plan, in accordance with the requirements set out in the EA Approval and as determined to be acceptable to the Regional Director.

(b) The Regions shall report the results of the Groundwater and Surface Water Monitoring program to the Regional Director and to the Director in accordance with the schedule set out in the EA Approval and in accordance with the requirements of Condition 14.

(c) The Regions shall post the Groundwater and Surface Water Monitoring Plan and the results of the Groundwater and Surface Water Monitoring program on the Owner's web site for the Facility in accordance with the requirements of the EA Approval and Condition 15.

8. NUISANCE IMPACT CONTROL and HOUSEKEEPING

Odour Management

(1) (a) The Owner shall maintain a negative air pressure atmosphere in the Tipping Building at all times to contain any potential odours within the confines of the Tipping Building.

(b) (i) Once per year, or as required by the District Manager, the Owner shall undertake a test to measure the worse case scenario negative air pressure atmosphere throughout the Tipping Building, while the activities approved in this Certificate are carried out in the Tipping Building.

(ii) Notwithstanding the requirements set out in Condition 8.(1)(b)(i), the Owner shall install sufficient instrumentation to measure the air flow into the Boilers and demonstrate that adequate air flow is maintained

to maintain a negative air pressure atmosphere throughout the Tipping Building.

(c) In the event that adequate negative air pressure cannot be maintained, the Owner shall implement any necessary additional odour containment and control measures, including, but not necessarily limited to, those in the required Contingency and Emergency Response Plan.

(2) The Owner shall ensure that the entrance and exit doors into the Tipping Building, the Residue Building and the Grizzly Building are kept closed at all times except to permit the entry or exit of the respective waste transport vehicles and waste handling equipment into and out of these Buildings.

(3) The Owner shall ensure that, at all times, the air from the Tipping Building, the Residue Building, the Grizzly Building and from the Equipment is exhausted through an appropriate and fully functional APC Equipment approved by this Certificate.

(4) The Owner shall undertake appropriate housekeeping activities, including regular cleaning of the tipping floor to control potential sources of fugitive odour emissions.

(5) The Owner shall ensure that no Waste handling equipment or empty storage containers are stored outside, unless they have been washed to prevent fugitive odour emissions.

(6) The Owner shall regularly clean all equipment and storage areas that are used to handle, process and store waste at the Site, including the surfaces of the outdoor spill containment areas, as required.

(7) (i) Prior to the receipt of Waste at the Site, the Owner shall provide documentation which outlines the testing carried out by a licensed structural engineer to confirm the effectiveness of the containment in the buildings, conveyors and tanks and silos at the Site.

(ii) The testing shall be carried out and repeated as directed by the District Manager in accordance with the test protocol prepared in consultation with and approved by the District Manager.

(iii) These tests shall be repeated as directed or agreed by the District Manager.

(8) The Owner shall prepare and implement an Odour Management and Mitigation Plan in accordance with the requirements set out in the EA Approval and as determined to be acceptable to the Regional Director.

(9) (a) In addition to the requirements set out in the EA Approval, the Odour Management and Mitigation Plan shall include the following:

(i) identification of all potential sources of odourous emissions;

(ii) description of the preventative and control measures to minimize odourous emissions from the identified sources;
(iii) procedures for the implementation of the Odour Management and Mitigation Plan;
(iv) inspection and maintenance procedures to ensure effective implementation of the Odour Management and Mitigation Plan; and
(v) procedures for verification and recording the progress of the implementation of the Odour Management and Mitigation Plan.

(b) The Owner shall continue to submit an updated Odour Management and Mitigation Plan until such time as the Regional Director notifies the Owner in writing that further submissions are no longer required.

Vehicles and Traffic

(10) (a) The Owner shall ensure that all vehicles transporting waste to and from the Site are not leaking or dripping waste when arriving at or leaving the Site.

(b) Should the Owner become aware that the truck(s) delivering waste to the Site have leaked wastewater on the municipal roadways, the Owner shall immediately report the violation to the owner of the vehicle(s) and to the District Manager.

(c) The Owner shall ensure that the exterior of all vehicles delivering Waste to the Site or hauling waste from the Site is washed prior to the trucks' departure from the Site, if necessary.

(d) Any necessary truck washing shall occur only in the designated wash down area of the Tipping Building or the Residue Building.

(11) The Owner shall ensure that there is no queuing or parking of vehicles that are waiting to enter the Site on any roadway that is not a distinct part of the Site.

Litter

(12) The Owner shall:

(a) take all practical steps to prevent the escape of litter from the Site;
(b) pick up litter around the Site on a daily basis, or more frequently if necessary; and
(c) if necessary, erect litter fences around the areas causing a litter problem.

Dust

(13) The Owner shall ensure that all on-site roads and operations/yard areas are regularly swept/washed to prevent dust impacts off-Site.

Vermin and Vectors

(14) The Owner shall:

(a) implement necessary housekeeping procedures to eliminate sources and potential sources of attraction for vermin and vectors; and

(b) hire a qualified, licensed pest control professional to design and implement a pest control plan for the Site. The pest control plan shall remain in place, and be updated from time to time as necessary, until the Site has been closed and this Certificate has been revoked.

Visual Screening

(15) The Owner shall provide visual screening for the Site in accordance with the documentation included in the attached Schedule "A".

9. STAFF TRAINING

(1) (a) The Owner shall ensure that all operators of the Site are trained with respect to the following, as per the specific job requirements of each individual operator:

(i) terms and conditions of this Certificate and the requirements of the EA Approval;
(ii) operation and management of the Site, or area(s) within the Site, as per the specific job requirements of each individual operator, and which may include procedures for receiving, screening and identifying Waste, refusal, handling, processing and temporarily storing wastes, operation of the Equipment, the APC Equipment, the CEM System and the Works;
(iii) testing, monitoring and operating requirements;
(iv) maintenance and inspection procedures;
(v) recording procedures;
(vi) nuisance impact control and housekeeping procedures;
(vii) procedures for recording and responding to public complaints;
(viii) an outline of the responsibilities of Site personnel including roles and responsibilities during emergency situations;
(ix) the Contingency and Emergency Response Plan including exit locations and evacuation routing, and location of relevant equipment available for emergency situations;
(x) environmental, and occupational health and safety concerns pertaining to the wastes to be handled;
(xi) emergency first-aid information; and
(xii) relevant waste management legislation and regulations, including the *EPA*, the *OWRA*, the *O. Reg. 347*, the *O. Reg. 419/05* and the Ministry guidelines affecting thermal treatment facilities.

(2) The Owner shall ensure that all personnel are trained in the requirements of this Certificate relevant to the employee's position:

(a) upon commencing employment at the Site in a particular position;
(b) whenever items listed in Condition 9.(1) are changed or updated; and
(c) during the planned refresher training.

10. COMPLAINTS / ODOUR-CONTAMINANT EMISSIONS RESPONSE PROCEDURE

(1) The Owner or a designated representative of the Owner shall be available to receive public complaints caused by the operations at the Site twenty-four (24) hours per day, seven (7) days per week.

(2) If at any time, the Owner or the Ministry receives a complaint or the Owner or the Provincial Officer detects an emission of odour or any contaminant, (Emission Event), from the Site, in addition to the requirements set out in the EA approval, the Owner shall record all relevant information in the computerized tracking system and shall respond to the complaint/Emission Event according to the following procedure:

Step 1: Record of Complaint/Emission Event

(a) (i) The Owner shall record each complaint/Emission Event and each record shall include the following:

(A) name, address and the telephone number of the complainant, if known;
(B) time and date of the complaint/Emission Event;
(C) details of the complaint; and

(ii) After the complaint/Emission Event has been recorded in the tracking system, the Owner shall immediately report to the District Manager by phone or e-mail during office hours and to the Ministry's Spills Actions Centre at 1-800-268-6060 after office hours on the receipt of the complaint or occurrence of the Emission Event.

Step 2: Investigation and Handling of Complaint/Emission Event

(b) The Owner shall immediately initiate investigation of the complaint/Emission Event. As a minimum, the investigation shall include the following:

(i) determination of the activities being undertaken at the Site at the time of the complaint/Emission Event;
(ii) meteorological conditions including, but not limited to the ambient temperature, approximate wind speed and its direction.
(iii) determination if the complaint is attributed to activities being undertaken at the Site and if so, the possible cause(s) of the complaint/Emission Event; and

(iv) determination of the remedial action(s) to address the cause(s) of the Complaint/Emission Event, and the schedule for the implementation of the necessary remedial action(s).

(c) The Owner shall respond to the complainant, if known, and the response shall include the results of the investigation of the Complaint, the action(s) taken or planned to be taken to address the cause(s) of the Complaint, and if any follow-up response(s) will be provided.

(d) Upon completed investigation of the Complaint/Emission event, the Owner shall, within three (3) business days, submit a report to the District Manager on the Complaint, on the action(s) taken or planned to be taken to address the cause(s) of the Complaint and on all proposed action(s) to prevent recurrence of the Complaint/Emission Event in the future.

(3) If, in the opinion of the District Manager, failure of the APC Equipment and/or any other process or equipment upset or malfunction results in off-site Complaint/Emission Event, confirmed by the Owner or a Provincial Officer of the Ministry, the Owner shall, immediately upon notification from the District Manager, implement any necessary additional control measures, including, but not necessarily limited to, those in the Contingency and Emergency Response Plan required by this Certificate.

(4) If the District Manager deems the additional control measures taken as per condition 10.(3) to be unsuitable, insufficient or ineffective, the District Manager may direct the Owner, in writing, to take further measures to address the noted failure, upset or malfunction including pursuant to section 39 of the *EPA* requiring a reduction in the receipt of Waste, cessation of the receipt of Waste, removal and off-site disposal of Waste from the Tipping Building as well as making repairs or modifications to equipment or processes.

11. CONTINGENCY and EMERGENCY RESPONSE PLAN

(1) (a) The Owner shall develop and implement a Contingency and Emergency Response Plan in accordance with the requirements set out in the EA Approval.

(b) Notwithstanding the requirements set out in the EA Approval, the Contingency and Emergency Response Plan shall be prepared in consultation with the District Manager or designate, the local Municipality and the Fire Department.

(2) In addition to the requirements set out in the EA Approval, the Contingency and Emergency Response Plan, as a minimum, shall include the following:

(a) the Site plan clearly showing the equipment layout and all storage areas for wastes and reagents;

(b) a list of Site personnel responsible for the implementation of the contingency measures and various emergency response tasks and their training requirements;
(c) a list of equipment and materials required for the implementation of the contingency measures and the emergency situation response;
(d) maintenance and testing program for equipment required for the implementation of the contingency measures and the emergency situation response;
(e) procedures to be undertaken as part of the implementation of the contingency measures and the emergency situation response;
(f) names and telephone numbers of waste management companies available for emergency response;
(g) notification protocol, with names and telephone numbers of persons to be contacted, including the Owner, the Site personnel, the Ministry of the Environment Spills Action Centre and the York Durham District, the local Fire and Police Departments, the local Municipality, the local Medical Officer of Health, and the Ministry of Labour;
(h) procedures and actions to be taken should the incoming Waste not meet the applicable quality criteria specified in this Certificate;
(i) procedures and actions to be taken should the outgoing Residual Waste fail to meet the criteria specified in this Certificate;
(j) procedures and actions to be taken should the current disposal options for the outgoing Residual Waste become unavailable;
(k) design of the contingency measure, procedures and actions should the emissions from the Site, including the fugitive odour/dust emissions, cause occurrences of public Complaints;
(l) procedures and actions to be taken should the Owner be unable to maintain the negative pressure in the Tipping Building;
(m) procedures and actions to be taken should the occurrence of Complaints require the Owner to suspend the waste processing activities at the Site; and
(n) identification and risk assessment of all reasonably foreseeable incidents that may result in a discharge into the natural environment of any contaminant in an amount, concentration or level in excess of that prescribed by the Regulations and/or imposed by this Certificate, including but not limited to:
    (i) a breakdown of the Facility/Equipment or part of the Facility/Equipment, including the APC Equipment and the CEM Systems associated with the Boilers;
    (ii) CEM Systems indicate that the Boilers and associated APC Equipment have been out of compliance with the Performance Requirements;
    (iii) any change in process parameters which may result in non compliance with the Performance Requirements;
    (iv) power failure resulting in the use of the Emergency Diesel Generator or Total Power Failure; and
    (v) description of the preventative and control measures to minimize the occurrence or impacts of the above incidents; and
    (vi) procedures for corrective measures and timelines to take to address the above incidents in a timely manner to effectively prevent or minimize the discharge of any contaminant into the natural environment and continue to maintain compliance with the *EPA* , the Regulations and

this Certificate, including procedures for Waste Processing Rate reduction, waste feed cut-off, Controlled Shutdown or Emergency Shutdown of the Boilers as applicable.

(3) The Owner shall submit the finalized Contingency and Emergency Response Plan to the Director a minimum of one hundred and twenty (120) days prior to the Commencement Date of Operation, for approval.

(4) An up-to-date version of the Contingency and Emergency Response Plan shall be kept at the Site at all times, in a central location available to all staff, and it shall be available for inspection by a Provincial Officer upon request.

(5) The Owner shall ensure that the names and telephone numbers of the persons to be contacted in the event of an emergency situation are kept up-to-date, and that these numbers are prominently displayed at the Site and at all times available to all staff and emergency response personnel.

(6) The Contingency and Emergency Response Plan shall be reviewed on a regular basis and updated, as necessary. The revised version of the Contingency and Emergency Response Plan shall be submitted to the local Municipality and the Fire Department for comments and to the District Manager for comments and concurrence.

(7) The Owner shall implement the recommendations of the updated Contingency and Emergency Response Plan, immediately upon receipt of the written concurrence from the District Manager.

12. EMERGENCY SITUATION RESPONSE and REPORTING

(1) The Owner shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this Site and manage any emergency situation in accordance with the Contingency and Emergency Response Plan.

(2) The Owner shall ensure that the equipment and materials listed in the Contingency and Emergency Response Plan are immediately available at the Site, are in a good state of repair, and fully operational at all times.

(3) The Owner shall ensure that all Site personnel responsible for the emergency situation response are fully trained in the use of the equipment and related materials, and in the procedures to be employed in the event of an emergency.

(4) All Spills as defined in the *EPA* shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the emergency situation, and the action taken for clean-up, correction and prevention of future occurrences.

13. SUBMISSIONS to the REGIONAL DIRECTOR or DISTRICT MANAGER

(1) The Owner shall notify the District Manager in writing, at least six (60) days prior to the scheduled date for the first receipt of Waste at the Site, as to whether or not the construction of the Facility has been carried out in accordance with this Certificate to a point of Substantial Completion.

(2) (a) The Owner shall forthwith notify the District Manager and the Spills Action Centre by telephone, when any of the following incidents occur that may result in a discharge into the natural environment of any contaminant in an amount, concentration or level in excess of that prescribed by the Regulations and/or imposed by this Certificate:

(i) CEM Systems indicate that the Boilers and associated APC Equipment have been out of compliance with the Performance Requirements triggering a Waste Processing Rate Reduction, Waste Feed cut-off, Controlled Shutdown or Emergency Shutdown as specified in the Emergency Response and Contingency Plan;
(ii) failure of the APC Equipment associated with the Boilers; and
(iii) power failure resulting in the use of the emergency diesel generator or Total Power Failure;

(b) In addition to fulfilling the notification requirements from the *EPA,* the Owner shall prepare and submit a written report to the District Manager with respect to any of the above said occurrences, within five (5) calendar days of the occurrence, in the following format:

(i) date of the occurrence;
(ii) general description of the occurrence;
(iii) duration of the occurrence;
(iv) effect of the occurrence on the emissions from the Facility;
(v) measures taken to alleviate the effect of the occurrence on the emissions from the Facility; and
(vi) measures taken to prevent the occurrence of the same or similar occurrence in the future.

(3) Should a Spill, as defined in the *EPA*, occur at the Site, in addition to fulfilling the requirements from the *EPA* and applicable regulations, the Owner shall submit to the District Manager a written report within three (3) calendar days outlining the nature of the Spill, remedial measure taken and the measures taken to prevent future occurrences at the Site.

(4) (a) Within ninety (90) days from the date of this Certificate, the Regions shall prepare and submit to the District Manager for concurrence, a Soil Testing Plan to monitor the impact of the Site operations at the locations where the ambient air monitoring is proposed by the Owner in accordance with the requirements set out in the EA Approval.

(b) (i) This Plan shall ensure that representative samples of the soil to be tested are collected in sufficient numbers and that the samples are properly preserved and tested so that reliable data on the soil characteristics is collected.

(ii) As a minimum, the Plan shall include testing for cadmium, lead, chromium, nickel, cobalt, copper, molybdenum, selenium, zinc and mercury, Dioxins and Furans.

(iii) This Plan shall comply with the Ministry's regulatory requirements for sampling and testing of soil and it shall include the rationale for the proposed methods.

(iv) This Plan be kept at the Site at all times and be available for inspection by a Provincial Officer upon request.

14. RECORDS KEEPING

(1) Any information requested by the Ministry concerning the Facility and its operation under this Certificate, including, but not limited to, any records required to be kept by this Certificate, shall be provided to the Ministry, upon request, in a timely manner.

(2) The Owner shall retain, for a minimum of seven (7) years from the date of their creation, except as noted below, all reports, records and information described in this Certificate.

Daily Activities

(3) The Owner shall maintain an on-Site written or digital record of activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. As a minimum, the record shall include the following:

(a) date of record and the name and signature of the person completing the report;
(b) quantity and source of the incoming Waste received at the Site;
(c) records of the estimated quantity of Waste thermally treated in the Boilers;
(d) quantity of the Unacceptable Waste received at the Site by the end of the approved Waste receipt period and the type(s) of the Unacceptable Waste received;
(e) quantity and type of the Residual Waste shipped from the Site, including any required outgoing Residual Waste characterization results;
(f) destination and/or receiving site(s) for the Residual Waste shipped from the Site;
(g) quantity and type of any Rejected Waste accepted at the Site;
(h) destination and/or receiving site(s) for the Rejected Waste shipped from the Site;
(i) housekeeping activities, including litter collection and washing/cleaning activities, etc.
(j) amount of electricity produced;

(k) amount of excess electricity exported to the electrical grid.

Monitoring and Testing Records

(4) The Owner shall maintain an on-Site written or digital record of activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. As a minimum, the record shall include the following:

(a) day and time of the activity;
(b) all original records produced by the recording devices associated with the CEM Systems;
(c) a summary of daily records of readings of the CEM Systems, including:
  (i) the daily minimum and maximum 4-hour average readings for carbon monoxide;
  (ii) the daily minimum and maximum one hour average readings for oxygen;
  (iii) the daily minimum and maximum 10-minute average readings for organic matter;
  (iv) the daily minimum and maximum 24-hour average readings for sulphur dioxide;
  (v) the daily minimum and maximum 24-hour average readings for nitrogen oxides;
  (vi) the daily minimum and maximum 24-hour average readings for hydrogen chloride;
  (vii) the daily minimum and maximum 6-minute average and 2-hour average opacity readings; and
  (viii) the daily minimum and maximum one-hour average readings for temperature measurements.
(d) records of all excursions from the applicable Performance Requirements as measured by the CEM Systems, duration of the excursions, reasons for the excursions and corrective measures taken to eliminate the excursions;
(e) all records produced during any Acoustic Audit;
(f) all records produced during any Source Testing;
(g) all records produced by the long term sampling program for Dioxins and Furans required by this Certificate;
(h) all records produced during the Residual Waste compliance testing;
(i) all records produced during the Soil Testing;
(j) all records produced during the Groundwater and Surface Water Monitoring required by this Certificate;
(k) all records produced during the Ambient Air Monitoring required by this Certificate;
(l) all records associated with radiation monitoring of the incoming Waste, including but not limited to:
  (i) transaction number;
  (ii) hauler;
  (iii) vehicle ID;
  (iv) alarm level;
  (v) maximum CPS;
  (vi) uSv/hr;

(vii) comment;
(viii) background CPS;
(ix) driver time in and out; and
(x) name of the Trainer Personnel that carried out the monitoring.

(m) results of the containment testing carried out in the buildings, conveyors, tanks and silos, as required;
(n) results the negative pressure in the Tipping Building carried out, as required.

Inspections/Maintenance/Repairs

(5) The Owner shall maintain an on-Site written or digital record of inspections and maintenance as required by this Certificate. As a minimum, the record shall include the following:

(a) the name and signature of the Trained Personnel that conducted the inspection;
(b) the date and time of the inspection;
(c) the list of any deficiencies discovered, including the need for a maintenance or repair activity;
(d) the recommendations for remedial action;
(e) the date, time and description of actions (repair or maintenance) undertaken;
(f) the name and signature of the Trained Personnel who undertook the remedial action; and
(g) an estimate of the quantity of any materials removed during cleaning of the Works.

Emergency Situations

(6) The Owner shall maintain an on-Site written or digital record of the emergency situations. As a minimum, the record shall include the following:

(a) the type of an emergency situation;
(b) description of how the emergency situation was handled;
(c) the type and amount of material spilled, if applicable;
(d) a description of how the material was cleaned up and stored, if generated; and
(e) the location and time of final disposal, if applicable; and
(f) description of the preventative and control measures undertaken to minimize the potential for re-occurrence of the emergency situation in the future.

Complaints Response Records

(7) The Owner shall establish and maintain a written or digital record of complaints received and the responses made as required by this Certificate.

Training

(8) The Owner shall maintain an on-Site written or digital record of training as required by this Certificate. As a minimum, the record shall include the following:

(a) date of training;
(b) name and signature of person who has been trained; and
(c) description of the training provided.

Reports

(9) The Owner shall keep at the Site the following reports required by this Certificate:

(a) the ESDM Report
(b) the Acoustic Assessment Report;
(c) the Annual Report; and
(d) the Third Party Audit.

15. REPORTING

Annual Report

(1) By March 31st following the end of each operating year, the Owner shall prepare and submit to the District Manager and to the Advisory Committee, an Annual Report summarizing the operation of the Site covering the previous calendar year. This Annual Report shall include, as a minimum, the following information:

(a) a summary of the quality and the quantity of the Wastes accepted at the Site, including the maximum amount of the Waste received annually and daily and the sources of the Waste;

(b) a summary of the quality and the quantity of the Residual Waste shipped from the Site, including the analytical data required to characterize the Residual Waste, the off-Site destinations for the Residual Waste and its subsequent use, if known;

(c) estimated material balance for each month documenting the maximum amount of wastes stored at the Site;

(d) annual water usage;

(e) annual amount of the electricity produced and the annual amount of the electricity exported to the electrical grid;

(f) summaries and conclusions from the records required by Conditions 14.(3) through 14.(8) of this Certificate;

(g) the Emission Summary Table and the Acoustic Assessment Summary Table for the Facility as of December 31 from the previous calendar year;

(h) a summary of dates, duration and reasons for any environmental and operational problems, Boilers downtime, APC Equipment and CEM System malfunctions that may have negatively impacted the quality of the environment or any incidents triggered by the Emergency Response and

Contingency Plan and corrective measures taken to eliminate the environmental impacts of the incidents;

(i) a summary of the dates, duration and reasons for all excursions from the applicable Performance Requirements as measured by the CEM Systems or as reported by the annual Source Testing, reasons for the excursions and corrective measures taken to eliminate the excursions;

(j) results of the evaluation of the performance of the long-term sampling system in determining the Dioxins and Furans emission trends and/or fluctuations for the year reported on as well as demonstrating the ongoing performance of the APC Equipment associated with the Boilers;

(k) dates of all environmental complaints relating to the Site together with cause of the Complaints and actions taken to prevent future Complaints and/or events that could lead to future Complaints;

(l) any environmental and operational problems that could have negatively impacted the environment, discovered as a result of daily inspections or otherwise and any mitigative actions taken;

(m) a summary of any emergency situations that have occurred at the Site and how they were handled;

(n) the results and an interpretive analysis of the results of the groundwater and surface water, including an assessment of the need to amend the monitoring programs;

(o) summaries of the Advisory Committee meetings, including the issues raised by the public and their current status;

(p) any recommendations to improve the environmental and process performance of the Site in the future;

(q) statement of compliance with this Certificate, including compliance with the *O. Reg. 419/05* and all air emission limits based on the results of source testing, continuous monitoring and engineering calculations, as may be appropriate; and

(r) interpretation of the results and comparison to the results from previous Annual Reports to demonstrate the Facility's impact on the environment.

Third Party Audit

(2) (a) The Regions shall ensure that an independent technical review of the operations at the Site is undertaken in accordance with the requirements of the EA Approval.

(b) In addition to the Third Party Audit requirements set out in the EA approval, the Third Party Audit shall include the following:

(i) a review of the data from the monitoring and testing required by this Certificate;
(ii) a review of all complaints received about the operation of the Facility;
(iii) any recommendations for improving the operation of the Facility received from the Advisory Committee; and
(iv) a recommendation of any improvements that could be made to ensure that the operation of the Facility is optimized and is protective of the health and safety of people and the environment.

(3) The Regions shall submit a Written Audit Report on the results of the independent technical review to the Regional Director in accordance with the Audit Plan and retain a copy at the Site.

Soil Testing Report

(4) Within one (1) month of completion of each Soil Testing event, the Regions shall submit to the District Manager a Soil Testing Report, which includes the details on the sampling/testing procedures, the results of the testing and a comparison with the results obtained during the previous Soil Testing.

16. PUBLIC ACCESS TO DOCUMENTATION

(1) The Owner shall, at all times, maintain documentation that describes the current operations of the Facility. The Owner shall post the documentation at the website for the undertaking and during regular business hours, the Owner shall make the following documents available for inspection at the Site by any interested member of the public, upon submission to the Ministry for review:

(a) a current ESDM Report that demonstrates compliance with the Performance Limits for the Facility regarding all Compounds of Concern;

(b) a current Acoustic Assessment Report that demonstrates compliance with the Performance Limits for the Facility regarding noise emissions;

(c) the most recent Annual Report;

(d) the most current Third Party Audit Report;

(e) Odour Management and Mitigation Plan, prepared in accordance with the requirements of the EA Approval;

(f) Noise Monitoring and Reporting Plan, prepared in accordance with the requirements of the EA Approval; and

(g) Groundwater and Surface Water Monitoring and Reporting Plan, prepared in accordance with the requirements of the EA Approval.

(2) The Owner shall ensure that necessary hardware and software are provided at a location available to the public, to provide on-line real-time reporting of the operating parameter data for the Facility, including acceptable operating limits, stack emissions, and all other parameters for which continuous monitoring is required and that continuous records of the same be kept and made available to the public.

17. ADVISORY COMMITTEE

(1) The Regions shall establish an Advisory Committee in accordance with the requirements set out in the EA Approval.

18. CLOSURE of the SITE

(1) A minimum of nine (9) months prior to closure of the Site, the Owner shall submit, for approval by the Director, a written Closure Plan for the Site. This Plan shall include, as a minimum, a description of the work that will be done to facilitate closure of the Site and a schedule for completion of that work.

(2) Within ten (10) days after closure of the Site, the Owner shall notify the Director and the District Manager, in writing, that the Site is closed and that the approved Closure Plan has been implemented.

SCHEDULE "A"

Supporting Documentation

(1) Applications for a Certificate of Approval (Air) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) Emission Summary and Dispersion Modelling Report, dated March 2011, prepared by Golder Associates;

(b) Acoustic Assessment Report prepared by Golder Associates Ltd., dated March 2011 and signed by Paul Niejadlik.

(2) Applications for a Provisional Certificate of Approval (Waste Disposal Site) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) Attachment #1 containing the "Design and Operations Report", dated March 2011, prepared by Golder Associates Ltd.;

(b) Attachment #3 containing the "Public Consultation Report", dated March 2011, prepared by Golder Associates Ltd.;

(c) Attachment #4 containing the Host Community Agreement

(d) Attachment #5 containing the proof of legal name for Covanta Durham York Renewable Energy Limited Partnership; and

(e) A letter May 24, 2011 from Anthony Ciccone, Golder Associates Ltd., to Margaret Wojcik, Ontario Ministry of the Environment, providing additional technical information on the proposal and attaching a report entitled "Amendment #1 Durham York Energy Centre Design and Operations Report", dated May 2011;

(3) Applications for a Certificate of Approval of Municipal and Private Sewage Works dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of Durham and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) "Surface Water and Groundwater Technical Study Report" dated July 2009, prepared by Jacques Whitford, Markham, Ontario (CD Report).

(b) "Stormwater Design Model Output" prepared by Sigma Energy, dated March 2001 (CD Report).

(c) Clearance letter from Central Lake Ontario Conservation date February 22, 2011.

(d) A letter dated March 23, 2011, from Brian Bahor, Covanta Energy Corporation, to Stefanos Habtom, Ontario Ministry of the Environment, providing additional technical design information on the proposed stormwater management ponds.

SCHEDULE "B"

Procedure to calculate and record the 10-minute average concentration of odour at the Point of Impingement and at the most impacted Sensitive Receptor

(a) Calculate and record one-hour average concentration of odour at the Point of Impingement and at the most impacted Sensitive Receptor, employing CALPUFF atmospheric dispersion model or the dispersion model acceptable to the Director that employs at least five (5) years of hourly local meteorological data and that can provide results reported as individual one-hour average odour concentrations.

(b) Convert and record each of the one-hour average concentrations predicted over the five (5) years of hourly local meteorological data at the Point of Impingement and at the most impacted Sensitive Receptor to 10-minute average concentrations using the One-hour Average to 10-Minute Average Conversion described below; and

(c) Record and present the 10-Minute Average concentrations predicted to occur over a five (5) year period at the Point of Impingement and at the most impacted Sensitive Receptor in a histogram. The histogram shall identify all predicted 10-minute average odour concentration occurrences in terms of frequency, identifying the number of occurrences over the entire range of predicted odour concentration in increments of not more than 1/10 of one odour unit. The maximum 10-minute average concentration of odour at the Sensitive Receptor will be considered to be the maximum odour concentration at the most impacted Sensitive Receptor that occurs and is represented in the histogram, disregarding outlying data points on the histogram as agreed to by the Director.

One-hour Average To 10-minute Average Conversion

1. Use the following formula to convert and record one-hour average concentrations predicted by the CALPUFF atmospheric dispersion model or by the dispersion model acceptable to the Director to 10-minute average concentrations:

$$X10min = X60min*1.65$$

where X10min = 10-minute average concentration
X60min = one-hour average concentration

SCHEDULE "C"

PERFORMANCE REQUIREMENTS

In-Stack Emission Limits

Parameter	In-Stack Emission Limit	Verification of Compliance
Total Suspended Particulate Matter (filterable particulate measured in accordance with the Ontario Source Testing Code)	9 mg/Rm3	Results from compliance Source Testing
cadmium	7 µg/Rm3	Results from compliance Source Testing
lead	50 µg/Rm3	Results from compliance Source Testing
mercury	15 µg/Rm3	Results from compliance Source Testing
dioxins and furans	60 pg/Rm3	Results from compliance Source Testing; results expressed as I-TEQ
hydrochloric acid (HCl)	9 mg/Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
sulphur dioxide (SO2)	35 mg/Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
nitrogen oxides (NOx)	121 mg/ Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
organic matter (undiluted, expressed as equivalent methane)	50 ppmdv (33 mg/ Rm3)	Results from compliance source testing
carbon monoxide	35 ppmdv (40 mg/Rm3)	Calculated as the rolling arithmetic average of four (4) hours of data measured by a CEM System that provides data at least once every fifteen minutes, in accordance with condition 6 (2) (c)
opacity	10 percent	Calculated as the rolling arithmetic average of six (6) minutes of data measured by a CEM System that provides data at least once every minute
	5 percent	Calculated as the rolling arithmetic average of two (2) hours of data measured by a CEM System that provides data at least once every

		fifteen minutes

mg/Rm3- milligrams per reference cubic metre;

pg/Rm3 - picograms per reference cubic metre

ppmdv parts per million by dry volume,

µg/Rm3 - micrograms per reference cubic metre

R- reference conditions - 25 degrees Celsius, 101.3 kilopascals, dry basis, 11% oxygen

SCHEDULE "D"

TEST CONTAMINANTS

Hydrogen Chloride
Hydrogen Fluoride
Oxides of Nitrogen expressed as Nitrogen Dioxide
Sulphur Dioxide
Total Hydrocarbons, expressed as methane on wet basis
Carbon Dioxide
Total Suspended Particulate Matter (< 44 microns)
Total PM-10 including condensables
Total PM-2.5 including condensables

Metals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Selenium
Silver
Thallium
Vanadium
Zinc

Schedule "D" - Cont'd

Chlorobenzenes	Chlorophenols
	2-monochlorophenol (2-MCP)
Monochlorobenzene (MCB)	3-monochlorophenol (3-MCP)
1,2-Dichlorobenzene (1,2-DCB)	4-monochlorophenol (4-MCP)
1,3-Dichlorobenzene (1,3-DCB)	2,3-dichlorophenol (2,3-DCP)
1,4-Dichlorobenzene (1,4-DCB)	2,4-dichlorophenol (2,4-DCP)
1,2,3-Trichlorobenzene (1,2,3-TCB)	2,5-dichlorophenol (2,5-DCP)
1,2,4-Trichlorobenzene (1,2,4-TCB)	2,6-dichlorophenol (2,6-DCP)
1,3,5-Trichlorobenzene (1,3,5-TCB)	3,4-dichlorophenol (3,4-DCP)
1,2,3,4-Tetrachlorobenzene (1,2,3,4-TeCB)	3,5-dichlorophenol (3,5-DCP)
1,2,3,5-Tetrachlorobenzene (1,2,3,5-TeCB)	2,3,4-trichlorophenol (2,3,4-T3CP)
1,2,4,5-Tetrachlorobenzene (1,2,4,5-TeCB)	2,3,5-trichlorophenol (2,3,5-T3CP)
Pentachlorobenzene (PeCB)	2,3,6-trichlorophenol (2,3,6-T3CP)
Hexachlorobenzene (HxCB)	2,4,5-trichlorophenol (2,4,5-T3CP)
	2,4,6-trichlorophenol (2,4,6-T3CP)
	3,4,5-trichlorophenol (3,4,5-T3CP)
	2,3,4,5-tetrachlorophenol (2,3,4,5-T4CP)
	2,3,4,6-tetrachlorophenol (2,3,4,6-T4CP)
	2,3,5,6-tetrachlorophenol (2,3,5,6-T4CP)
	Pentachlorophenol (PeCP)

Schedule "D" - Cont'd

Co-Planar PCBs (Dioxin-like PCBs)	Volatile Organic Matter
PCB-077 (3,3',4,4'-TCB)	Acetaldehyde
PCB-081 (3,4,4',5-TCB)	Acetone
PCB-105 (2,3,3',4,4'-PeCB)	Acrolein
PCB-114 (2,3,4,4',5-PeCB)	Benzene
PCB-118 (2,3',4,4',5-PeCB)	Bromodichloromethane
PCB-123 (2',3,4,4',5-PeCB)	Bromoform
PCB-126 (3,3',4,4',5-PeCB)	Bromomethane
PCB-156 (2,3,3',4,4',5-HxCB)	Butadiene, 1,3 -
PCB-157 (2,3,3',4,4',5'-HxCB)	Butanone, 2 -
PCB-167 (2,3',4,4',5,5'-HxCB)	Carbon Tetrachloride
PCB-169 (3,3',4,4',5,5'-HxCB)	Chloroform
PCB-189 (2,3,3',4,4',5,5'-HpCB)	Cumene
	Dibromochloromethane
	Dichlorodifluoromethane
	Dichloroethane, 1,2 -
	Dichloroethene, Trans - 1,2
	Dichloroethene, 1,1 -
	Dichloropropane, 1,2 -
	Ethylbenzene
	Ethylene Dibromide
	Formaldehyde
	Mesitylene
	Methylene Chloride
	Styrene
	Tetrachloroethene
	Toluene
	Trichloroethane, 1,1,1 -
	Trichloroethene
	Trichloroethylene, 1,1,2 -
	Trichlorotrifluoroethane
	Trichlorofluoromethane
	Xylenes, M-, P- and O-
	Vinyl Chloride

Schedule "D" - Cont'd

Polycyclic Organic Matter	Dioxin/Furan Isomers
Acenaphthylene	
Acenaphthene	2,3,7,8-Tetrachlorodibenzo-p-dioxin
Anthracene	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
Benzo(a)anthracene	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
Benzo(b)fluoranthene	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
Benzo(k)fluoranthene	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
Benzo(a)fluorene	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
Benzo(b)fluorene	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin
Benzo(ghi)perylene	
Benzo(a)pyrene	2,3,7,8-Tetrachlorodibenzofuran
Benzo(e)pyrene	2,3,4,7,8-Pentachlorodibenzofuran
Biphenyl	1,2,3,7,8-Pentachlorodibenzofuran
2-Chloronaphthalene	1,2,3,4,7,8-Hexachlorodibenzofuran
Chrysene	1,2,3,6,7,8-Hexachlorodibenzofuran
Coronene	1,2,3,7,8,9-Hexachlorodibenzofuran
Dibenzo(a,c)anthracene	2,3,4,6,7,8-Hexachlorodibenzofuran
Dibenzo(a,h)anthracene	1,2,3,4,6,7,8-Heptachlorodibenzofuran
Dibenzo(a,e)pyrene	1,2,3,4,7,8,9-Heptachlorodibenzofuran
9,10-Dimethylanthracene	1,2,3,4,6,7,8,9-Octachlorodibenzofuran
7,12-Dimethylbenzo(a)anthracene	
Fluoranthene	
Fluorene	
Indeno(1,2,3-cd)pyrene	
2-Methylanthracene	
3-Methylcholanthrene	
1-Methylnaphthalene	
2-Methylnaphthalene	
1-Methylphenanthrene	
9-Methylphenanthrene	
Naphthalene	
Perylene	
Phenanthrene	
Picene	
Pyrene	
Tetralin	
M-terphenyl	
O-terphenyl	
P-terphenyl	
Triphenylene	

SCHEDULE "E"

SOURCE TESTING PROCEDURES

1. The Owner shall submit, to the Manager a test protocol including the Pre-Test Information required by the Source Testing Code, at least two (2) months prior to the scheduled Source Testing date.

2. (1) For the purpose of the Source Testing program, the Owner is temporarily permitted to operate the Boilers at a residual oxygen concentration below the performance limit outlined in Condition 6.(2)(b) during the period of the Source Testing. The Owner shall ensure that the concentration of residual oxygen in the Undiluted Gases leaving the combustion zone of the Boilers, as measured and recorded by the CEM System, shall not be less than 5 percent by volume on a dry basis, during this Source Testing program.

   (2) If the Source Testing results demonstrate that compliance with the Performance Requirements can be maintained at a residual oxygen concentration below the performance limit outlined in Condition 6.(2)(b), the Owner may apply to the Director for approval to alter the required residual oxygen concentration.

3. The Owner shall finalize the test protocol in consultation with the Manager.

4. The Owner shall not commence the Source Testing until the Manager has accepted the test protocol.

5. The Owner shall complete the first Source Testing not later than six (6) months after Commencement of Operation of the Facility/Equipment.

6. The Owner shall conduct subsequent Source Testing at least once (1) every calendar year thereafter.

7. The Owner shall notify the District Manager and the Manager in writing of the location, date and time of any impending Source Testing required by this Certificate, at least fifteen (15) days prior to the Source Testing.

8. The Owner shall submit a report on the Source Testing programs to the District Manager and the Manager not later than three (3) months after completing each Source Testing program. The report shall be in the format described in the Source Testing Code, and shall also include, but not be limited to:

   (1) an executive summary;
   (2) records of operating conditions; including process description, records of waste composition and feed rate during the Source Testing;
   (3) all records produced by the CEM Equipment;
   (4) procedures followed during the Source Testing and any deviation from the proposed test protocol and the reasons therefore;
   (5) the results of the analyses of the stack emissions;

(6) a summary table that compares the Source Testing results, the monitoring data and the records of operating conditions during the Source Testing to the requirements imposed by the *EPA*, the Regulation and/or the Performance Requirements;

(7) the results of dispersion calculations in accordance with the *O. Reg. 419/05*, indicating the maximum concentration of the Test Contaminants, at the Point of Impingement.

(8) an updated site wide emission source inventory to assess the aggregate point of impingement concentrations of the Test Contaminants.

9. The Owner shall ensure that the Source Testing Report is made available and easily accessible for review by the public at the Facility, immediately after the document is submitted to the Ministry.

10. The Director may not accept the results of the Source Testing if:

(1) the Source Testing Code or the requirements of the Manager were not followed; or

(2) the Owner did not notify the District Manager and the Manager of the Source Testing; or

(3) the Owner failed to provide a complete report on the Source Testing.

11. If the Director does not accept the results of the Source Testing, the Director may require re-testing.

SCHEDULE "F"

PARAMETER:
Temperature

LOCATION:
The sample point for the Continuous Temperature Monitor shall be located at a point where the temperature in the combustion zone of the Boilers has reached at least 1000°C for a period of not less than one second. Compliance shall be proven by direct measurement or/and a correlation between the measured temperature and the intended target proven by a method acceptable to the Director.

PERFORMANCE:
The Continuous Temperature Monitor shall meet the following minimum performance specifications for the following parameters.

	PARAMETERS	SPECIFICATION
1)	Type:	"K", "J" or other type or alternative measurement device with equivalent measurement accuracy and suitable to the temperature range being measured
2)	Accuracy:	± 1.5 percent of the minimum gas temperature

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor without a significant loss of accuracy and with a time resolution of 1 minutes or better. Temperature readings for record keeping and reporting purposes shall be kept as one-hour average values.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 95 percent of the time for each calendar quarter.

PARAMETER:
Carbon Monoxide

INSTALLATION:
The Continuous Carbon Monoxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (parts per million, ppm):	0 to ≥100 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Carbon Monoxide Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤10 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3) Calibration Error:	≤ 2.5 percent of actual concentration
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 5 percent of span value
7) Span Calibration Drift (24-hour):	≤5 percent of span value
8) Response Time (90 percent response to a step change):	≤180 seconds
9) Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Oxygen

INSTALLATION:
The Continuous Oxygen Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of oxygen in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler and in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (percentage):	0 - 20 or 0 - 25
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Oxygen Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (percentage):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤10 percent of the mean value of the reference method test data
3) Calibration Error:	0.25 percent O_2
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 0.5 percent O_2
7) Span Calibration Drift (24-hour):	≤ 0.5 percent O_2
8) Response Time (90 percent response to a step change):	≤ 90 seconds
9) Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better. Oxygen concentration readings for record keeping and reporting purposes shall be kept as one-hour average values.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Hydrogen Chloride

INSTALLATION:
The Continuous Hydrogen Chloride Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of hydrogen chloride in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (parts per million, ppm):	0 to ≥100 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Hydrogen Chloride Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤ 20 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3) Calibration Error:	≤ 2 percent of actual concentration
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 5 percent of span value
7) Span Calibration Drift (24-hour):	≤ 5 percent of span value
8) Response Time (90 percent response to a step change):	≤ 240 seconds
9) Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated daily at the sample point, to ensure that it meets the drift limits specified above, during the periods of the operation of the . The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 5 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Nitrogen Oxides

INSTALLATION:
The Continuous Nitrogen Oxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of nitrogen oxides in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Analyzer Operating Range (parts per million, ppm):	0 to ≥200 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Nitrogen Oxides Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data
3) Calibration Error:	≤ 2 percent of actual concentration
4) System Bias:	≤4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 2.5 percent of span value
7) Span Calibration Drift (24-hour):	≤ 2.5 percent of span value
8) Response Time (90 percent response to a step change):	≤ 240 seconds
9) Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Sulphur Dioxide

INSTALLATION:
The Continuous Sulphur Dioxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of sulphur dioxide in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1. Range (parts per million, ppm):	0 to ≥100 ppm
2. Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Sulphur Dioxide Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1. Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2. Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data
3. Calibration Error:	≤ 2 percent of actual concentration
4. System Bias:	≤ 4 percent of the mean value of the reference method test data
5. Procedure for Zero and Span Calibration Check:	all system components checked
6. Zero Calibration Drift (24-hour):	≤ 2.5 percent of span value
7. Span Calibration Drift (24-hour):	≤ 2.5 percent of span value
8. Response Time (90 percent response to a step change):	≤ 200 seconds
9. Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Total Hydrocarbons

INSTALLATION:
The Total Hydrocarbons Monitor shall be installed at an accessible location where the measurements are representative of the concentrations of Organic Matter (as methane) in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler and shall meet the following installation specifications.

PARAMETERS		SPECIFICATION
1.	Detector Type:	Flame Ionization
2.	Oven Temperature:	160°C minimum
3.	Flame Temperature:	1800 °C minimum at the corona of the hydrogen flame
4.	Range (parts per million, ppm):	0 to ≥200 ppm
5.	Calibration Gas:	propane in air or nitrogen
6.	Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Total Hydrocarbons Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS		SPECIFICATION
1.	Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2.	Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3.	System Bias:	≤ 4 percent of the mean value of the reference method test data
4.	Noise:	≤ 1 percent of span value on most sensitive range
5.	Repeatability:	≤ 1 percent of span value
6.	Linearity (response with propane in air):	≤ 3 percent of span value over all ranges
7.	Calibration Error:	≤ 2 percent of actual concentration
8.	Procedure for Zero and Span Calibration Check:	all system components checked on all ranges
9.	Zero Calibration Drift (24-hours):	≤ 2.5 percent of span value on all ranges
10.	Span Calibration Drift (24-hours):	≤ 2.5 percent of span value
11.	Response Time (90 percent response to a step change):	≤ 60 seconds
12.	Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better. Measurements of concentrations of organic matter (as methane) shall be kept as 10 minute average values for record keeping and reporting purposes.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER: Opacity

INSTALLATION: The Continuous Opacity Monitor shall be installed at an accessible location where the measurements are representative of the actual opacity of the Undiluted Gases leaving the APC Equipment associated with each Boiler and shall meet the following design and installation specifications.

PARAMETERS		SPECIFICATION
1)	Wavelength at Peak Spectral Response (nanometres, nm):	500 - 600
2)	Wavelength at Mean Spectral Response (nm):	500 - 600
3)	Detector Angle of View:	≤ 5 degrees
4)	Angle of Projection:	≤ 5 degrees
5)	Range (percent of opacity):	0 -100

PERFORMANCE:
The Continuous Opacity Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS		SPECIFICATION
1)	Span Value (percent opacity):	2 times the average normal opacity of the source
2)	Calibration Error:	≤3 percent opacity
3)	Attenuator Calibration:	≤2 percent opacity
4)	Response Time (95 percent response to a step change):	≤ 10 seconds
5)	Schedule for Zero and Calibration Checks:	daily minimum
6)	Procedure for Zero and Calibration Checks:	all system components checked
7)	Zero Calibration Drift (24-hours):	≤ 2 percent opacity
8)	Span Calibration Drift (24-hours):	≤ 2 percent opacity
9)	Conditioning Test Period:	≥ 168 hours without corrective maintenance
10)	Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated, to ensure that it meets the drift limits specified above, during the periods of the operation of the Equipment. The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 30 seconds or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Moisture, Hydrogen Fluoride and Ammonia

Selection and Installation

The Owner shall select and install a CEM System, to measure moisture content of the stack gases, the concentration of hydrogen fluoride and ammonia in the Undiluted Gases leaving the APC Equipment associated with each Boiler, as follows:

a) Design and Performance Specifications shall be in accordance with 40 CFR 60, Appendix B, Specification 4.

b) The Owner shall select the probe locations in compliance with 40 CFR 60, Appendix B, Specification 2.

Test Procedures

The Owner shall verify compliance with the Design and Performance Specifications in accordance with 40 CFR 60, Appendix B, Specification 4, with the reference method for the relative accuracy test being Method 4. of the Source Testing Code.

In furtherance of, but without limiting the generality of the foregoing, the mean difference between the calibration gas value and the analyzer response value at each of the four test concentrations shall be less than 5 percent of the measurement range.

SCHEDULE "G"

A stormwater management facility to service a 10.0 ha drainage area of the Durham York Energy Centre located on the west side of Osbourne Road and north of the CN Rail, Lot 27, Concession Broken Front, Part, Municipality of Clarington, Regional Municipality of Durham, designed to provide quality and quantity control of stormwater run-off by attenuating runoff from storm events up to 1:100 years return frequency to or below the pre-development levels, consisting of:

East Stormwater Management Pond (East SWM Pond)

A stormwater management facility to service a 5.7 ha drainage area comprising of the eastern part of the Durham York Energy Centre consisting of the following:

- one (1) approximately 128 m long drainage ditch collecting stormwater runoff from the north eastern part of the site, having an average horizontal slope of 1.56%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- one (1) approximately 199 m long drainage ditch collecting stormwater runoff from the eastern part of the site, having an average horizontal slope of 2.77%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- approximately fourteen (14) catch basins/maintenance holes and a total of 466.8 m long 450 mm diameter and 34.6 m of 600 mm diameter corrugated PE stormwater sewers conveying stormwater runoff collected from the north and north eastern part of the site, discharging to a forebay of a wet extended detention stormwater management pond described below;

- one (1) forebay with approximate bottom dimensions of 11.0 m wide and 34.8 m long and depth of 1.0 m, equipped with 600 mm diameter corrugated HDPE inlet pipe, a rip-rap covered inlet structure, and a forebay berm with top elevation of 95.0 m masl, discharging to a wet extended detention pond described below;

- one (1) wet extended detention stormwater management pond located at the south east part of the site, with approximate bottom dimensions of 21.0 m wide and 71.4 m long and a maximum depth of 2.7 m at 96.70 m masl elevation, having side slopes of 3H:1V and 5H:1V near the outlet structure, providing a permanent pool storage capacity of 1,008 m^3 at elevation 95.0 m masl, an active storage capacity of 3,099 m^3 at 96.70 m masl elevation, and total storage capacity of 4,107 m^3, equipped with an outlet structure consisting of a 150 mm diameter reverse slope inlet pipe with a gate valve and a 450 mm diameter perforated pipe riser fitted with 75 mm diameter orifice plate, a 75 mm diameter maintenance discharge pipe with a gate valve, and an emergency overflow structure at elevation 97.0 m masl, discharging through a 450 mm diameter outlet pipe to existing swale along the northern side of the CN Rail line to Tooley Creek and eventually to Lake Ontario;

West Stormwater Management Pond (West SWM Pond)

A stormwater management facility to service a 4.3 ha drainage area comprising of the western part of the Durham York Energy Centre consisting of the following:

- one (1) approximately 296 m long drainage ditch collecting stormwater runoff from the north western part of the site, having an average horizontal slope of 1.0%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- approximately five (5) catch basins/maintenance holes and a total of 272.2 m long 450 mm diameter corrugated PE stormwater sewers conveying stormwater runoff collected from the western part of the site, discharging to a forebay of a wet extended detention stormwater management pond described below;

- one (1) forebay with approximate bottom dimensions of 13.0 m wide and 26.0 m long and depth of 1.0 m, equipped with 450 mm diameter corrugated HDPE inlet pipe, a rip-rap covered inlet structure, and a forebay berm with top elevation of 95.0 m masl, discharging to a wet extended detention pond described below;

- one (1) wet extended detention stormwater management pond located at the south western part of the site, with approximate bottom dimensions of 13.0 m wide and 58.0 m long and a maximum depth of 2.5 m at 96.5 m masl elevation, having side slopes of 3H:1V and 5H:1V near the outlet structure, providing a permanent storage capacity of 623 m^3 at elevation 95.0 m masl, an active storage capacity of 2,054 m^3 at 96.50 m masl elevation, and total storage capacity of 2,677 m^3, equipped with an outlet structure consisting of a 150 mm diameter reverse slope inlet pipe with a gate valve and a 450 mm diameter perforated pipe riser fitted with 75 mm diameter orifice plate, a 75 mm diameter maintenance discharge pipe with a gate valve, and an emergency overflow structure at elevation 96.80 m masl, discharging through a 450 mm diameter outlet pipe to existing swale along the northern side of the CN Rail line to Tooley Creek and eventually to Lake Ontario;

including all associated controls and appurtenances.

The reasons for the imposition of these terms and conditions are as follows:

GENERAL

Conditions 1.(1), (2), (5), (6), (7), (8), (9), (10), (11), (12), (13), (17), (18) and (19) are included to clarify the legal rights and responsibilities of the Owner.

Conditions Nos.1.(3) and (4) are included to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

Condition No. 1.(14) is included to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.

Condition No.1.(15) is included to restrict potential transfer or encumbrance of the Site without the notification to the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Certificate.

Condition No. 1.(16) is included to ensure that the appropriate Ministry staff has ready access to the operations of the Site which are approved under this Certificate. The Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *EPA*, the *OWRA*, the *PA*, the *NMA* and the *SDWA*.

SERVICE AREA, APPROVED WASTE TYPES, RATES and STORAGE

Condition No. 2. is included to specify the approved waste receipt rates, the approved waste types and the service area from which waste may be accepted at the Site based on the Owner's application and supporting documentation. Condition No. 2. is also included to specify the maximum amount of waste that is approved to be stored at the Site.

SIGNS and SITE SECURITY

Condition No. 3. is included to ensure that the Site's users, operators and the public are fully aware of important information and restrictions related to the operation of the Site. Condition No. 3. is also included to ensure that the Site is sufficiently secured, supervised and operated by properly trained personnel and to ensure controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site personnel is on duty.

SITE OPERATIONS

Condition No. 4. is included to outline the operational requirements for the Facility to ensure that the said operation does not result in an adverse effect or a hazard to the natural environment or any person.

EQUIPMENT and SITE INSPECTIONS and MAINTENANCE

Condition No. 5. is included to require the Site to be maintained and inspected thoroughly on a regular basis to ensure that the operations at the Site are undertaken in a manner which does not result in an adverse effect or a hazard to the health and safety of the environment or any person.

PERFORMANCE REQUIREMENTS

Condition No. 6 is included to set out the minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the Facility.

TESTING, MONITORING and AUDITING

Condition No. 7. is to require the Owner to gather accurate information on the operation of the Facility so that the environmental impact and subsequent compliance with the *EPA*, the *OWRA*, their Regulations and this Certificate can be verified.

NUISANCE IMPACT CONTROL and HOUSEKEEPING

Condition No. 8. is included to ensure that the Site is operated and maintained in an environmentally acceptable manner which does not result in a negative impact on the natural environment or any person. Condition No. 8 is also included to specify odour control measures to minimize a potential for odour emissions from the Site.

STAFF TRAINING

Condition No. 9. is included to ensure that staff are properly trained in the operation of the equipment and instrumentation used at the Site, in the emergency response procedures and on the requirements and restrictions related to the Site operations under this Certificate.

COMPLAINTS RECORDING PROCEDURE

Condition No.10. is included to require the Owner to respond to any environmental complaints resulting from the Facility appropriately and in a timely manner and that appropriate actions are taken to prevent any further incidents that may cause complaints in the future.

CONTINGENCY and EMERGENCY RESPONSE PLAN and EMERGENCY SITUATIONS RESPONSE AND REPORTING

Conditions Nos.11. and 12. are included to ensure that the Owner is prepared and properly equipped to take immediate action in the event of an emergency situation.

SUBMISSIONS to the REGIONAL DIRECTOR or DISTRICT MANAGER

Condition No. 13. is included to set out the requirements for the submissions to the District Manager and the Regional Director regarding the operation of the Facility and the activities required by this Certificate.

RECORDS KEEPING

Condition No.14. is included to ensure that detailed records of Site activities, inspections, monitoring and upsets are recorded and maintained for inspection and information purposes.

REPORTING

Condition No.15. is to ensure that regular review of site, operations and monitoring is carried out and findings documented by a third party for determining whether or not the Site is being operated in compliance with this Certificate of Approval, the EPA and its regulations and whether or not any changes should be considered.

PUBLIC ACCESS to DOCUMENTATION

Condition No.16. is included to ensure that the public has access to information on the operation of the Site in order to participate in the activities of the Advisory Committee in a meaningful and effective way.

ADVISORY COMMITTEE

Condition No.17. is included to require the Owner to establish a forum for the exchange of information and public dialogue on activities carried out at the Site and to ensure that the local residents are properly informed of the activities at the Site and that their concerns can be heard and acted upon , as necessary. Open communication with the public and local authorities is important in helping to maintain high standards for the operation of the Site and protection of the natural environment. Condition 16. is also included to ensure that the requirements of the EA Approval are fulfilled.

CLOSURE of the SITE

Condition No.18. is included to ensure that the final closure of the Site is completed in accordance with Ministry's standards.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, and in accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written Notice served upon me, the Environmental Review Tribunal, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act and Section 101 of the

Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 9 and 39, *Environmental Protection Act*
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted site is approved under Section 9 and Section 27 of the Environmental Protection Act and Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 28th day of June, 2011

Signature
Ian Parrott, P .Eng.
Director
Section 9, *EPA*
Section 39, *EPA*
Section 53, *OWRA*

MW,QN,SH/

c: District Manager, MOE York-Durham
Regional Director, MOE Central Region

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Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 1
Issue Date: August 12, 2014

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3

and

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

and

Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
72 Osbourne Rd Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment, , as follows:

1. The following definition has been added:

"Contingency and Emergency Response Plan" also means the document entitled "Spill Contingency and Emergency Response Plan";

2. The following Conditions are amended to read as follows:

2.(5)(b)(iii) The Owner may use equipment used to handle the hazardous wastes to handle other wastes provided that prior to such use the equipment has been thoroughly cleaned first.

4.(5)(e) A maximum of 630 tonnes of the Residual Waste, limited to the bottom ash shall be stored in two (2) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is as follows:

(i) The storage duration is limited to a maximum of seven (7) days.

(ii) Should longer storage duration be required to accommodate the duration of the required compliance testing, a minimum of forty eight (48) hours before the storage extension is commenced, the Owner shall notify the District Manager of the required extension. The notification shall include the duration of the extension and the reasons.

3. The following Conditions are added:

7.(7) (e) The Owner shall carry out the required bottom and fly ash compliance testing in accordance with the document entitled "Ash Sampling and Testing Protocol", listed in the attached Schedule.

11.8 Containment evaluations performed under the Spill Contingency and Emergency Response Plan shall be conducted by the Owner in accordance to procedures agreed by the District Manager pursuant to Conditions 8.(7)(i),(ii) and (iii).

4. The following documents have been added to Schedule "A":

4. October 31, 2013 letter from Mirka Januszkiewicz, the Regional Municipality of Durham to Ian Parrott, Ministry of the Environment and Climate Change, requesting approval of the Ash Sampling and Testing Protocol and the document entitled "Durham York Energy Centre, Ash Sampling and Testing Protocol", prepared by by Golder Associates and dated June 2014.

5. Document entitled "Durham York Energy Centre, Spill Contingency & Emergency Response Plan" prepared by Covanta Durham York Renewable Energy Limited Partnership and dated January 13, 2014, excluding section entitled "Containment Evaluation".

6. Document entitled "Durham York Energy Centre, Protocol for the Measurement of Combustion Temperature and the Development of Time and Temperature Correlations", prepared by Covanta Durham York Renewable Energy Limited Partnership and dated June 2014.

7. Document entitled "Durham York Energy Centre, Noise Monitoring and Reporting Plan", prepared by Golder Associates and dated September 2011.

The reasons for this amendment to the Approval are as follows:

to approve the "Ash Sampling and Testing Protocol" as required Condition 7.(7)(a), the "Durham York Energy Centre, Spill Contingency & Emergency Response Plan", as required Condition 11.(3), "Durham York Energy Centre, Noise Monitoring and Reporting Plan" as required Condition 7.(5)(a) and "Durham York Energy Centre, Protocol for the Measurement of Combustion Temperature and the Development of Time and Temperature Correlations" as proposed by the applicant.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served

upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal 's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-3717 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of August, 2014

Ian Parrott, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

MW/
c: District Manager, MOE York-Durham
n/a, The Regional Municipality of Durham

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Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 2
Issue Date: October 24, 2014

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3

and
The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

and

TransRiver Canada Incorporated, as general partner for and on behalf of Covanta Durham York Renewable Energy Limited Partnership
445 South St
Morristown, New Jersey
USA 07960

Site Location: Durham York Energy Centre
1835 Energy Drive
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment , as follows:

1. The address of the Site has been changed to read as follows:

Durham York Energy Centre
1835 Energy Drive
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

2. The following definitions have been added:

" **Operator** " means any person other than the Regions' employees, authorized by the Regions as having the charge, management or control of any aspect of the Site and includes TransRiver Canada Incorporated, as general partner for and on behalf of Covanta Durham York Renewable Energy Limited Partnership, the partnership under the laws of Nova Scotia more particularly described in the October 6, 2014 letter from Joanna Rosengarten to the Ministry of Environment and Climate Change, and includes its successors and assignees, their successors and assignees;

" **Regions** " means any person that is responsible for the establishment or operation of the Site being approved by this Approval, and it includes The Regional Municipality of Durham and The Regional Municipality of York, their successors and assignees;

2. The following definition has been amended to read as follows:

" **Site** " means the property referred to as Durham York Energy Centre where the Owner has located and operates the Facility and the Works and located at 1835 Energy Drive in the Municipality of Clarington, Regional Municipality of Durham;

" **Owner** " within the context of this Approval, means the Regions and the Operator;

3. The following Conditions have been amended to read as follows:

"General: Change of Ownership" Conditions 1.(14) and 1.(15):

(14) The Regions shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any changes:

(a) the ownership of the Site;
(b) the operator of the Site;
(c) the address of the Regions;
(d) the partners, where the Regions are or at any time become a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R.S.O. 1990, c. B.17, as amended, shall be included in the notification;
(e) the name of the corporation where the Regions are or at any time become a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act*, R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

(15) No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance. In the event of any change in ownership of the Site, other than change to a successor municipality, the Regions shall notify the successor of and provide the successor with a copy of this Approval, and the Regions shall provide a copy of the notification to the District Manager and the Director.

"Service Area, Approved Waste Types, Rates And Storage: Storage Restrictions" Condition 2.(5)(e):

2.(5)(e) (i) A maximum of 630 tonnes of the Residual Waste, limited to the bottom ash shall be stored in two (2) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation.

(ii) The storage duration of bottom ash in the bunkers is limited to a maximum of seven (7) days.

(iii) Should additional storage location(s) and a longer storage duration be required during testing, a minimum of forty eight (48) hours before the storage parameters are changed from those approved in Condition 2.(5)(e)(i) and (ii), the Owner shall notify the District Manager, in writing, of the proposed changes and provide the reasons for the changes.

"Site Operations: Residual Waste Handling and Disposal" Condition 4.(5)(b)(iii):

4.(5)(b)(iii) The Owner may use the equipment that comes in contact with the hazardous wastes to handle other wastes provided that prior to such use, the equipment has been cleaned, as confirmed by visual inspections, to ensure the removal of any hazardous waste residues and to prevent cross contamination.

"Closure of the Site" Conditions 18.(1) and 18.(2):

(1) A minimum of nine (9) months prior to closure of the Site, the Regions shall submit, for approval by the Director, a written Closure Plan for the Site. This Plan shall include, as a minimum, a description of the work that will be done to facilitate closure of the Site and a schedule for completion of that work.

(2) Within ten (10) days after closure of the Site, the Regions shall notify the Director and the District Manager, in writing, that the Site is closed and that the approved Closure Plan has been implemented.

4. "Covanta Durham York Renewable Energy Limited Partnership" is replaced with "TransRiver Canada Incorporated, as general partner for and on behalf of Covanta Durham York Renewable Energy Limited Partnership, the partnership under the laws of Nova Scotia more particularly described in the October 6, 2014 letter from Joanna Rosengarten to the Ministry of Environment and Climate Change and includes its successors and assignees", in the Environmental Compliance Approval dated June 28, 2011 and in the Notice of Amendment dated August 12, 2014.

5. The following documents are added to Schedule "A":

8. Application for Environmental Compliance Approval Application dated May 23, 2014, signed by Matthew R. Mulcahy, Covanta Durham York Renewable Energy Limited Partnership, Application for Environmental Compliance Approval Application dated May 23, 2014, signed by Cliff Curtis, The Regional Municipality of Durham and Application for Environmental Compliance Approval Application dated May 23, 2014, signed by Laura McDowell, The Regional Municipality of York, including the following attached supporting documentation:

(a) revised Section 8.0 "Ash Handling and Associated System" and revised Section 10.0 "Potable Process and Wastewater" dated May 2014, of the document entitled "Design and Operations Report", dated March 2011, prepared by Golder Associates Ltd.

(b) Drawing No. M-2530, entitled "Piping & Instrumentation Diagram Bottom Ash Lime Slurry System"

(c) Drawing No. 70258-1-ME-GA-SK-001, entitled "Covanta Durham York Hydrated Lime System for Boiler Bottom Ash"

9. E-mail dated September 10, 2014 (2:26 p.m.) from Leon Brasowski, Covanta Durham York Renewable Energy Limited Partnership, to Margaret Wojcik, Ontario Ministry of the Environment and Climate Change, providing additional supporting documentation on the proposal, including an attachment entitled "M-1500^0360 Highlighted for MOE.pdf".

10. E-mail dated October 13, 2014 (3:23 p.m.) from Leon Brasowski, Covanta Durham York Renewable Energy Limited Partnership, to Ricki Allum, Ontario Ministry of the Environment and Climate Change, providing additional supporting documentation on the legal name of the applicant,

including an attachment entitled "Partnership Legal Clarification.pdf".

The reasons for this amendment to the Approval are as follows:

to approve the proposed Bottom Ash Lime Conditioning System, to correct the typographical errors in the Notice of Amendment dated August 12, 2014, to clarify the intent of the Residual Waste equipment cleaning condition and to allow different bottom ash storage conditions during testing.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment 2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5

*** Further information on the Environmental Review Tribunal 's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-3717 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 24th day of October, 2014

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of
the *Environmental Protection Act*

MW/
c: District Manager, MOE York-Durham
Leon Brasowski, Covanta Energy Corporation

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Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 3
Issue Date: December 23, 2015

The Regional Municipality of Durham
605 Rossland Road Level 5
Whitby, Ontario
L1N 6A3

Site Location: Durham York Energy Centre
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment , as follows:

The following Conditions are revoked:

7. TESTING, MONITORING and AUDITING

Noise Monitoring - Acoustic Audit

(5) The Owner:

(a) shall carry out Acoustic Audit measurements on the actual noise emissions due to the operation of the Facility. The Acoustic Audit measurements shall be carried out in accordance with the procedures in *Publication NPC-103* and in accordance to the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director;

(b) shall submit an Acoustic Audit Report on the results of the Acoustic Audit, prepared by an Independent Acoustical Consultant, in accordance with the requirements of *Publication NPC-233* and the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director, to the District Manager and the Director, not later than three (3) months after the commencement of operation of the Facility.

(6) The Director:

(a) may not accept the results of the Acoustic Audit if the requirements of *Publication NPC-233* or the approved noise Monitoring and Reporting Plan were not followed;

(b) may require the Owner to repeat the Acoustic Audit if the results of the Acoustic Audit are found unacceptable to the Director.

All other Terms and Conditions remain the same.

The reason for this amendment to the Approval is to address the information provided in the following documents:

Acoustic Audit Report prepared by Valcoustics Canada Ltd., dated May 8, 2015 and signed by Kathryn Katsiroumpas, P.Eng.; and

Acoustic Audit Report prepared by Valcoustics Canada Ltd., dated November 23, 2015 and signed by Kathryn Katsiroumpas, P.Eng.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment and

M5G 1E5

Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 23rd day of December, 2015

Ian Greason, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

HM/
c: District Manager, MOECC York-Durham
Kathryn Katsiroumpas, Valcoustics Canada Ltd.

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Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 4
Issue Date: February 24, 2016

The Regional Municipality of Durham
605 Rossland Road East, Level 5
Whitby, Ontario
L1N 6A3

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

TransRiver Canada Incorporated operating as Covanta Durham York
Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
USA 07960

Site Location: Durham York Energy Centre
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for a Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment, , as follows:

The following Conditions are revoked:

7. **TESTING** , **MONITORING** and **AUDITING**

Noise Monitoring - Acoustic Audit

(5) The Owner:

(a) shall carry out Acoustic Audit measurements on the actual noise emissions due to the operation of the Facility. The Acoustic Audit measurements shall be carried out in accordance with the procedures in *Publication NPC-103* and in accordance to the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director;

(b) shall submit an Acoustic Audit Report on the results of the Acoustic Audit, prepared by an Independent Acoustical Consultant, in accordance with the requirements of *Publication NPC-233*

and the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director, to the District Manager and the Director, not later than three (3) months after the commencement of operation of the Facility.

(6) The Director:

(a) may not accept the results of the Acoustic Audit if the requirements of *Publication NPC-233* or the approved Noise Monitoring and Reporting Plan were not followed;

(b) may require the Owner to repeat the Acoustic Audit if the results of the Acoustic Audit are found unacceptable to the Director.

All other Terms and Conditions remain the same.

The reason for this amendment to the Approval is to address the information provided in the following documents:

Acoustic Audit Report prepared by Valcoustics Canada Ltd., dated May 8, 2015 and signed by Kathryn Katsiroumpas, P.Eng.; and

Acoustic Audit Report prepared by Valcoustics Canada Ltd., dated November 23, 2015 and signed by Kathryn Katsiroumpas, P.Eng.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment and Climate Change 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 24th day of February, 2016

Ian Greason, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

HM/
c: District Manager, MOECC York-Durham
Kathryn Katsiroumpas, Valcoustics Canada Ltd.

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Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 5
Issue Date: March 14, 2016

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3

and

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

and

TransRiver Canada Incorporated, as general partner for and on behalf of Covanta Durham York Renewable Energy Limited Partnership
445 South St
Morristown, New Jersey
USA 07960

Site Location: Durham York Energy Centre
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment , as follows:

I. The following conditions have been amended to read as follows:

2 . SERVICE AREA, APPROVED WASTE TYPES, RATES and STORAGE

(5) Storage Restrictions:

Solids:

(c) A maximum of approximately 77 tonnes or 106 cubic metres of the Residual Waste, limited to the recovered ferrous metals, shall be stored in one (1) dedicated bunker, located within the confines of the Residue Building, described in the Supporting Documentation. (d) A maximum of approximately 120 tonnes or 100 cubic metres of the Residual Waste, limited to the recovered non-ferrous metals,

shall be stored in one (1) dedicated bunker, located within the confines of the Residue Building, described in the Supporting Documentation.

(e) A maximum of 630 tonnes of the Residual Waste, limited to bottom ash shall be stored in two (2) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation.

(f) A maximum of 700 tonnes of the Residual Waste, limited to the fly ash shall be stored in seven (7) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation.

(j) A maximum of 65 cubic metres of cement for fly ash conditioning shall be stored in one (1) outdoor silo, located adjacent to the Residue Building.

(k) A maximum of 105 cubic metres of pozzolan for fly ash conditioning shall be stored in one (1) outdoor silo, located adjacent to the Residue Building.

Liquids: (l) (i) A maximum of 57 cubic metres of aqueous ammonia for the SNCR System shall be stored in one (1) outdoor tank, located adjacent to the Residue Building.

(8) (a) Waste received at the Site shall be processed within six (6) days from its receipt at the Site.

(b) Emergency storage of Waste requirements:

(i) On an emergency basis only, the storage duration of Waste inside the tipping pit may be extended beyond the limit set out in Condition 2.(8)(a), above, subject to compliance with the following requirements:

(A) prior to the start of the emergency storage of Waste, the Owner shall notify, in writing, the District Manager that the incoming Waste will be stored longer than six (6) days from its receipt;

(B) any additional information that the District Manager may require shall be submitted within a time period acceptable to the District Manager;

(C) the proposed preventative measures for emergency storage of Waste as identified in the Operations and Maintenance Manual shall be implemented upon commencement of the emergency storage of Waste and shall remain in effect for the entire duration of the emergency storage, unless otherwise advised by the District Manager; and

(D) the Owner shall notify, in writing, the District Manager when emergency storage is no longer required.

5. EQUIPMENT and SITE INSPECTIONS and MAINTENANCE

(p) all measures deemed necessary to prevent an occurrence of an adverse effect from the emergency storage of Waste.

II. The following section of Schedule "F" has been amended to read as follows:

PARAMETER:
Total Hydrocarbons

INSTALLATION:
The Total Hydrocarbons Monitor shall be installed at an accessible location where the measurements are representative of the concentrations of Organic Matter (as methane) in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler or at any other location that has been determined in consultation with the Ministry to be suitable/equivalent for the determination of Total Hydrocarbons leaving the combustion zone of each Boiler and has been approved by the Director. The Total Hydrocarbons Monitor shall meet the following installation specifications:

PARAMETERS SPECIFICATION

1. Detector Type: Flame Ionization
2. Oven Temperature: 160 o C minimum
3. Flame Temperature: 1800 o C minimum at the corona of the hydrogen flame
4. Range (parts per million, ppm): 0 to ³ 200 ppm
5. Calibration Gas: propane in air or nitrogen
6. Calibration Gas Ports: close to the sample point

PERFORMANCE:
The Continuous Total Hydrocarbons Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS SPECIFICATION

1. Span Value (nearest ppm equivalent): 2 times the average normal concentration of the source
2. Relative Accuracy: £ 10 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3. System Bias: £ 4 percent of the mean value of the reference method test data
4. Noise: £ 1 percent of span value on most sensitive range
5. Repeatability: £ 1 percent of span value
6. Linearity (response with propane in air): £ 3 percent of span value over all ranges
7. Calibration Error: £ 2 percent of actual concentration
8. Procedure for Zero and Span Calibration Check: all system components checked on all ranges
9. Zero Calibration Drift (24-hours): £ 2.5 percent of span value on all ranges
10. Span Calibration Drift (24-hours): £ 2.5 percent of span value
11. Response Time (90 percent response £ 60 seconds to a step change):
12. Operational Test Period: ³ 168 hours without corrective

maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better. Measurements of concentrations of organic matter (as methane) shall be kept as 10 minute average values for record keeping and reporting purposes.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter .

III. The following Item #4 in Schedule "A" has been amended to read as follows:

4. Letter dated October 31, 2013 from Mirka Januszkiewicz, The Regional Municipality of Durham to Ian Parrott, Ministry of the Environment and Climate Change, requesting approval of the Ash Sampling and Testing Protocol and the document entitled "Durham York Energy Centre, Ash Sampling and Testing Protocol", excluding a reference to the Loss-on-Ignition test method on page 6, prepared by Golder Associates and dated June 2014.

IV. The following document has been added to Schedule "A":

5. Letter dated February 29, 2016 from Leon Brasowski, TransRiver Canada Incorporated, to Dale Gable, Ministry of the Environment and Climate Change, requesting change to the total hydrocarbon monitor location as reviewed and accepted by the Ministry`s Standards Development Branch.

The reasons for this amendment to the Approval are as follows:

1. to remove the storage duration limits on storage of recovered ferrous and non-ferrous metals since such storage does not pose an environmental risk;

2. to increase the amounts of cement, pozzolan and aqueous ammonia approved for storage at the Site since the currently approved amounts result in partial filling of the tanks, necessitating more frequent deliveries resulting in increased truck traffic and a chance of interrupting fly ash and flue gas treatment;

3. to revise the protocol for an emergency storage of the incoming Waste so that the Owner is able to deal more effectively with emergency situations occurring at the Site while providing more flexibility to the Districting Manager to oversee management of such situations;

4. to remove a reference to an incorrect bottom ash testing method erroneously included within the text of the DYEC Ash Sampling and Testing Protocol included as Item #4 in Schedule "A" in order to ensure that only the approved testing method for compliance testing is referenced in the supporting documentation.

5. to approve the revised location of the Total Hydrocarbons Monitor following the Ministry's acceptance of the results of the test program in which two (2) Total Hydrocarbons Monitor monitors were operated in the existing and the proposed locations simultaneously.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 14th day of March, 2016

Dale Gable, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

MW/
c: District Manager, MOECC York-Durham

n/a, TransRiver Canada Incorporated operating as Covanta Durham York Renewable Energy Limited Partnership

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Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 1
Issue Date: April 22, 2020

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3
and
The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1
and
Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment , as follows:

Notwithstanding the existing conditions of this Environmental Compliance Approval, the following provisions of this Emergency Approval are in effect for the time durations set out as follows:

1. Until December 31, 2020, the Owner may temporarily increase the amount of Waste to be received and thermally treated at the Site up-to 160,000 tonnes per year.

2. From the date of this Approval to the date that corresponds to up-to ninety (90) days after the Ontario Government ends the current Declaration of Emergency to Protect the Public Health, unless an extension has been issued in writing by the District Manager, the following Conditions Nos. 3 through 10 are in effect.

3. The Owner shall provide a written notification to the District Manager when any of the following Conditions Nos. 4 through 9 are implemented.

4. All conditions that set out limitations on hours/days for shipping and receiving of materials including the Waste, the reagents and the Residual Waste are temporarily rescinded.

5. The Owner may temporarily increase the maximum tonnage amounts for the bottom and fly ash within the Residue Building up-to 80% of the total achievable storage capacity of the Residue Building.

6. The Owner may temporarily store the Residual Waste and the reagents in the outdoor locations at the Site and the storage shall be done as follows:

a. the storage shall be in covered and leak-proof trailers or bins or containers;

b. trailers or bins or containers shall be parked or located away from catchbasins, if possible; and

c. if trailers or bins or containers must be parked or be located near catchbasins, covers or booms shall be readily available to protect catchbasins in the event of a spill or leak.

7. All conditions that set out limitations on receipt and storage of reagents are temporarily rescinded.

8. The Owner may temporarily reduce the number of loads tipped on the tipping floor for a manual visual inspection and sorting of the incoming Waste from one load per hour to two loads per shift, unless instructed otherwise by the local Medical Officer of Health to cease inspections on the tipping floor.

9. Following commencement of the outdoor storage of the Residual Waste or the reagents at the Site, the Owner shall conduct daily inspections of any outdoor storage location for evidence of spills, odour, vermin/vectors, dust, litter and other nuisance impacts, and shall maintain a written or electronic log of these inspections. The log shall be kept at the Site for the duration acceptable to the District Manager and it shall contain the following information:

a. the date of the inspection;

b. the location of the inspection;

c. the name of person undertaking the inspection;

d. any impacts identified during the inspection; and

e. any remedial actions taken to address those impacts.

10. By the end of the ninety (90) day-period from the date when the Ontario Government ends the current Declaration of Emergency to Protect the Public Health,

the Owner shall provide to the District Manager a summary report of the expected timelines for the storage and the operational practices to return to normal operating levels/protocols as approved in this Approval.

The reasons for this amendment to the Approval are as follows:

to provide temporary additional thermal treatment capacity at the Site and the operational flexibility as requested in the letter dated March 20, 2020 signed and submitted by Gioseph Anello, M.Eng., P.Eng., PMP, Acting Director, Waste Management Services, The Regional Municipality of Durham and Laura McDowell, P.Eng., Director, Environmental Promotion and Protection, The Regional Municipality of York to respond to the current Declaration of Emergency to Protect the Public Health and to alleviate impacts and prevent any danger to the health and safety of the public and the environment.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 22nd day of April, 2020

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

MW/
c: District Manager, MECP York-Durham
Gioseph Anello, M.Eng., P.Eng., PMP, Acting Director, Waste Management Services, The Regional Municipality of Durham
Laura McDowell, P.Eng., Director, Environmental Promotion and Protection, The Regional Municipality of York

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Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 2
Issue Date: December 23, 2021

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3
and
The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1
and
Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment , as follows:

Notwithstanding the existing conditions of this Environmental Compliance Approval, the following provisions of this Emergency Approval are in effect for the time durations set out as follows:

1. Until December 31, 2021, the Owner may temporarily increase the amount of Waste to be received and thermally treated at the Site from 140,000 tonnes per year up-to 142,000 tonnes per year.

The reasons for this amendment to the Approval are as follows:

1. to provide temporary additional thermal treatment capacity at the Site as requested in the Environmental Compliance Approval Application dated November 23, 2021 signed and submitted by Gioseph Anello, M.Eng., P.Eng., PMP, Director Waste Management Services, the Regional Municipality of Durham (Durham Region) on behalf of York

Region, Durham Region and Covanta;

2. to effectively manage the increase in the quantities of waste being disposed of within the existing curbside programs and received at transfer stations within the approved service area due to work from home arrangements and behaviour change of residents resulting from the ongoing COVID-19 pandemic; and

3. to safely manage waste generated in the approved service area to prevent,

d. danger to the health or safety of any person;

e. impairment or immediate risk of impairment of the quality of the natural environment for any use that can be made of it; or

f. injury or damage or immediate risk of injury or damage to any property or to any plant or animal life environment and present potential hazard to the health and safety of neighbouring sites, wildlife and the public and prevent any danger to the health and safety of the public and the environment.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me and the Ontario Land Tribunal within 15 days after receipt of this notice, require a hearing by the Tribunal. Section 142 of the *Environmental Protection Act* provides that the notice requiring the hearing ("the Notice") shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the *Environmental Protection Act,* a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;

5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

Registrar*
Ontario Land Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5
OLT.Registrar@ontario.ca

and

The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or** www.oltt.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 23rd day of December, 2021

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

MW/
c: District Manager, MECP York-Durham
Gioseph Anello, M.Eng., P.Eng., PMP, Director, Waste Management Services, The Regional Municipality of Durham
Laura McDowell, P.Eng., Director, Environmental Promotion and Protection, The Regional Municipality of York
Andrew Evans, The Regional Municipality of Durham

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Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 1
Issue Date: April 22, 2020

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3
and
The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1
and
Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment, as follows:

Notwithstanding the existing conditions of this Environmental Compliance Approval, the following provisions of this Emergency Approval are in effect for the time durations set out as follows:

1. Until December 31, 2020, the Owner may temporarily increase the amount of Waste to be received and thermally treated at the Site up-to 160,000 tonnes per year.

2. From the date of this Approval to the date that corresponds to up-to ninety (90) days after the Ontario Government ends the current Declaration of Emergency to Protect the Public Health, unless an extension has been issued in writing by the District Manager, the following Conditions Nos. 3 through 10 are in effect.

3. The Owner shall provide a written notification to the District Manager when any of the following Conditions Nos. 4 through 9 are implemented.

4. All conditions that set out limitations on hours/days for shipping and receiving of materials including the Waste, the reagents and the Residual Waste are temporarily rescinded.

5. The Owner may temporarily increase the maximum tonnage amounts for the bottom and fly ash within the Residue Building up-to 80% of the total achievable storage capacity of the Residue Building.

6. The Owner may temporarily store the Residual Waste and the reagents in the outdoor locations at the Site and the storage shall be done as follows:

a. the storage shall be in covered and leak-proof trailers or bins or containers;

b. trailers or bins or containers shall be parked or located away from catchbasins, if possible; and

c. if trailers or bins or containers must be parked or be located near catchbasins, covers or booms shall be readily available to protect catchbasins in the event of a spill or leak.

7. All conditions that set out limitations on receipt and storage of reagents are temporarily rescinded.

8. The Owner may temporarily reduce the number of loads tipped on the tipping floor for a manual visual inspection and sorting of the incoming Waste from one load per hour to two loads per shift, unless instructed otherwise by the local Medical Officer of Health to cease inspections on the tipping floor.

9. Following commencement of the outdoor storage of the Residual Waste or the reagents at the Site, the Owner shall conduct daily inspections of any outdoor storage location for evidence of spills, odour, vermin/vectors, dust, litter and other nuisance impacts, and shall maintain a written or electronic log of these inspections. The log shall be kept at the Site for the duration acceptable to the District Manager and it shall contain the following information:

a. the date of the inspection;

b. the location of the inspection;

c. the name of person undertaking the inspection;

d. any impacts identified during the inspection; and

e. any remedial actions taken to address those impacts.

10. By the end of the ninety (90) day-period from the date when the Ontario Government ends the current Declaration of Emergency to Protect the Public Health,

the Owner shall provide to the District Manager a summary report of the expected timelines for the storage and the operational practices to return to normal operating levels/protocols as approved in this Approval.

The reasons for this amendment to the Approval are as follows:

to provide temporary additional thermal treatment capacity at the Site and the operational flexibility as requested in the letter dated March 20, 2020 signed and submitted by Gioseph Anello, M.Eng., P.Eng., PMP, Acting Director, Waste Management Services, The Regional Municipality of Durham and Laura McDowell, P.Eng., Director, Environmental Promotion and Protection, The Regional Municipality of York to respond to the current Declaration of Emergency to Protect the Public Health and to alleviate impacts and prevent any danger to the health and safety of the public and the environment.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 22nd day of April, 2020

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

MW/
c: District Manager, MECP York-Durham
Gioseph Anello, M.Eng., P.Eng., PMP, Acting Director, Waste Management Services, The Regional Municipality of Durham
Laura McDowell, P.Eng., Director, Environmental Promotion and Protection, The Regional Municipality of York

Content Copy Of Original

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 2
Issue Date: December 23, 2021

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3
and
The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1
and
Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment, as follows:

Notwithstanding the existing conditions of this Environmental Compliance Approval, the following provisions of this Emergency Approval are in effect for the time durations set out as follows:

1. Until December 31, 2021, the Owner may temporarily increase the amount of Waste to be received and thermally treated at the Site from 140,000 tonnes per year up-to 142,000 tonnes per year.

The reasons for this amendment to the Approval are as follows:

1. to provide temporary additional thermal treatment capacity at the Site as requested in the Environmental Compliance Approval Application dated November 23, 2021 signed and submitted by Gioseph Anello, M.Eng., P.Eng., PMP, Director Waste Management Services, the Regional Municipality of Durham (Durham Region) on behalf of York

Region, Durham Region and Covanta;

2. to effectively manage the increase in the quantities of waste being disposed of within the existing curbside programs and received at transfer stations within the approved service area due to work from home arrangements and behaviour change of residents resulting from the ongoing COVID-19 pandemic; and

3. to safely manage waste generated in the approved service area to prevent,

d. danger to the health or safety of any person;

e. impairment or immediate risk of impairment of the quality of the natural environment for any use that can be made of it; or

f. injury or damage or immediate risk of injury or damage to any property or to any plant or animal life environment and present potential hazard to the health and safety of neighbouring sites, wildlife and the public and prevent any danger to the health and safety of the public and the environment.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me and the Ontario Land Tribunal within 15 days after receipt of this notice, require a hearing by the Tribunal. Section 142 of the *Environmental Protection Act* provides that the notice requiring the hearing ("the Notice") shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;

b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

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The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;

5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

Registrar*
Ontario Land Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5
OLT.Registrar@ontario.ca

and

The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or** www.oltt.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 23rd day of December, 2021

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

MW/
c: District Manager, MECP York-Durham
Gioseph Anello, M.Eng., P.Eng., PMP, Director, Waste Management Services, The Regional Municipality of Durham
Laura McDowell, P.Eng., Director, Environmental Promotion and Protection, The Regional Municipality of York
Andrew Evans, The Regional Municipality of Durham

APPENDIX 4

Particulate and Metals Field Data Sheets
(30 pages)

ORTECH Consulting Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 1	Particulate/Metals
Test Date March 18, 2024	
Test Location	APC Outlet No. 1
Operator BP	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	TEAM 3
Impinger Box No.:	16

Pitot Factor	.843	
DGMCF	.986	
Barometric Pressure	29.44	"Hg
Static Pressure	-11.72	"H2O
Nozzle Size	0.2498	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	2.5	
Number of Ports	2	
Number of Points/Port	12	

Particulate Gain

Filter	3.3	mg
Probe	3.9	mg

Moisture Gain

CWTR	503.5	g
WCBDA	22.5	g

Combustion Gas Concentration

Oxygen	8.80	%
Carbon Dioxide	10.38	%
Carbon Monoxide	5.8	ppm

Measuring Device	MII Numbers
Probe / Pitot SP4	B04011
Trendicator	COE20043
Control Box	↓
Incline Manometer	↓
Comb.Gas.Analyzer	
Micromanometer	
Barometer	ENV CAN.
Calipers	CAN 22136

Nozzle Measurements #3	
1	.2495
2	.2500
3	.2506
4	.2495
Average:	.2498

Probe Liner (Glass) / Metal / Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union None / Metal / (Teflon) / Other_____

Pitot Leak Checked? (Yes) No

Site Diagram

Notes:

Field Data Sheet

Date: March 18, 2024	Plant: Covanta DYEC	Test No.: 1 Particulate/Metals	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	16.30	.87	.76	280	200	250	50	58	65	65	2.2	5
	2.5	18.28	.91	.78	280	250	254	45	207	65	65	22	5
	5	20.23	.87	.76	279	254	253	44	214	65	65	2.2	5
2	7.5	22.17	.88	.77	279	255	256	44	215	65	65	2.2	5
	10	24.16	.88	.77	279	251	255	43	215	65	66	2.2	5
	12.5	26.14	.88	.77	279	252	252	43	213	65	66	2.1	4.5
3	15	28.00	.84	.75	279	251	255	43	224	65	67	2.1	4.5
	17.5	29.89	.84	.75	279	254	255	44	227	65	67	2.1	5
	20	31.84	.86	.76	280	256	252	44	228	65	68	2.1	5
4	22.5	33.65	.82	.74	280	251	255	44	227	65	69	2.1	4.5
	25	35.61	.86	.76	281	257	254	45	230	66	69	2.1	5
	27.5	37.64	.81	.74	281	250	253	45	230	66	70	2.1	5
5	30	39.54	.75	.71	281	255	254	46	228	66	70	2.0	4.9
	32.5	41.25	.74	.71	281	253	256	46	228	67	70	1.9	4
	35	43.16	.74	.71	282	252	254	47	229	67	71	1.95	5
6	37.5	44.98	.66	.67	281	257	252	47	227	67	71	1.9	4.5
	40	46.67	.67	.67	281	250	256	47	227	67	72	1.7	4
	42.5	48.35	.65	.66	281	257	255	48	227	68	72	1.7	4
7	45	50.04	.74	.71	281	250	253	48	223	68	72	1.7	4
	47.5	51.85	.75	.71	281	253	253	48	224	68	73	1.9	4.5
	50	53.65	.75	.71	282	257	255	48	227	69	73	1.9	4.5

Traverse: 2	
Start Time: 10:09	Initial Leak Check: .003 cfm@ 15 "Hg
Finish Time:	Final Leak Check: cfm@ "Hg

Project No.: 22327

Operator: BP

Field Data Sheet

Date: March 18, 2024	Plant: Covanta DYEC	Test No.: 1 Particulate/Metals	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	55.46	.78	.73	281	250	255	47	228	69	73	1.9	4.5
	55	57.34	.79	.73	282	254	252	47	228	69	74	2	5
	57.5	59.18	.79	.73	282	256	254	47	227	70	74	2	5
9	60	61.04	.80	.74	282	250	257	47	229	70	74	2	5
	62.5	62.95	.79	.73	283	256	255	47	230	70	74	2	5
	65	64.85	.79	.73	283	250	252	47	229	70	74	2	5
10	67.5	66.74	.80	.74	283	250	254	47	228	71	75	2	5
	70	68.67	.81	.74	283	256	257	48	231	71	75	2	5
	72.5	70.47	.81	.74	283	253	256	48	230	71	75	1.95	4.5
11	75	72.36	.73	.71	283	250	253	48	230	71	75	2.1	5
	77.5	74.13	.74	.71	283	254	253	48	227	71	75	1.9	4.5
	80	75.89	.73	.71	282	257	256	48	229	72	75	1.9	4.9
12	82.5	77.75	.75	.72	283	251	254	48	230	72	76	1.9	5
	85	79.65	.75	.72	281	250	252	48	229	72	76	2	5
	87.5	81.47	.75	.72	281	257	256	48	229	72	76	1.9	4.9
	90	83.29											

Traverse: 2			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 11:39	Final Leak Check: 0.004	cfm@ 15	"Hg

Project No.: 22327

Operator: BP

Field Data Sheet

Date: March 18, 2024	Plant: Covanta DYEC	Test No.: 1 Particulate/Metals	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	83.80	1.00	.82	284	252	253	52	155	72	72	2.5	5
	2.5	85.84	1.05	.85	285	250	254	47	220	72	73	2.5	5
	5	87.95	.98	.82	285	254	253	46	228	72	73	2.6	5.5
2	7.5	90.02	.97	.81	285	257	255	45	230	72	74	2.5	5.5
	10	92.08	.96	.81	285	251	253	45	220	72	74	2.5	5.5
	12.5	94.17	.95	.81	284	250	253	44	218	72	74	2.5	5.5
3	15	96.22	.95	.81	285	254	256	44	221	72	75	2.4	5
	17.5	98.25	.91	.79	285	257	254	43	223	72	75	2.4	5
	20	100.24	.88	.78	285	251	252	43	223	72	75	2.3	5
4	22.5	102.21	.78	.73	285	252	256	43	225	72	76	2.2	5
	25	104.08	.79	.74	284	257	255	43	226	73	76	2.0	5
	27.5	105.94	.79	.74	284	250	252	43	224	73	76	2.0	5
5	30	107.80	.67	.68	284	256	255	43	224	73	76	2.0	5
	32.5	109.55	.69	.69	283	256	255	43	224	73	76	1.8	4.5
	35	111.31	.67	.68	282	252	253	42	223	73	76	1.8	4.5
6	37.5	113.04	.58	.63	282	257	255	42	223	73	77	1.8	4.5
	40	114.66	.57	.63	282	250	255	42	222	73	77	1.5	4
	42.5	116.27	.60	.64	282	255	252	42	221	73	77	1.5	4
7	45	117.93	.68	.68	282	254	255	42	223	73	77	1.6	4.5
	47.5	119.68	.69	.69	282	252	255	43	225	73	77	1.8	4.9
	50	121.44	.72	.71	282	257	253	43	224	74	77	1.8	4.9

Traverse: 1			
Start Time: 11:50	Initial Leak Check: .003	cfm@ 15	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

-11.72

Project No.: 22327

Operator: RP

Field Data Sheet

Date: March 15, 2024	Plant: Covanta DYEC	Test No.: 1 Particulate/Metals	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	123.25	.77	.73	282	250	255	43	224	74	78	1.9	5
	55	125.10	.77	.73	283	255	254	43	226	74	78	2.0	5
	57.5	126.95	.78	.73	284	255	252	43	226	74	78	2.0	5
9	60	128.80	.74	.71	284	250	255	43	226	74	78	2.0	5
	62.5	130.69	.76	.73	283	256	253	43	226	75	78	1.9	5
	65	132.58	.78	.74	283	253	254	43	226	75	78	2.0	5
10	67.5	134.44	.71	.70	283	250	255	43	226	75	78	2.0	5
	70	136.23	.74	.72	283	254	252	43	225	75	79	1.9	5
	72.5	138.04	.75	.71	283	257	255	43	226	75	78	2	5
11	75	139.86	.67	.68	281	250	254	44	226	75	78	2	5
	77.5	141.63	.68	.68	282	252	252	44	225	75	79	1.8	4.9
	80	143.36	.69	.69	281	257	255	44	225	75	79	1.8	4.9
12	82.5	145.12	.69	.69	281	250	253	43	226	75	79	1.8	4.9
	85	146.87	.68	.68	280	251	253	44	225	75	79	1.8	4.9
	87.5	148.60	.70	.69	280	255	255	44	226	75	79	1.8	4.9
	90	150.33											

Traverse:			
Start Time: ~~13:20~~	Initial Leak Check:	cfm@	"Hg
Finish Time: 13:20	Final Leak Check: 0.003	cfm@ 15.5	"Hg

Project No.: 22327

Operator: RP

ORTECH Consulting Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 2	Particulate/Metals
Test Date March 18, 2024	
Test Location	APC Outlet No. 1
Operator BP	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.: TEAM 3	
Impinger Box No.: 13	

Pitot Factor	.843	
DGMCF	.986	
Barometric Pressure	29.44	"Hg
Static Pressure	-11.72	"H2O
Nozzle Size	0.2498	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	2.5
Number of Ports	2
Number of Points/Port	12

Probe Liner (Glass) / Metal /Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union None /Metal / (Teflon) / Other_____

Pitot Leak Checked? (Yes) No

Particulate Gain

Filter	2.7	mg
Probe	1.1	mg

Moisture Gain

CWTR	476.0	g
WCBDA	22.3	g

Combustion Gas Concentration

Oxygen	8.87	%
Carbon Dioxide	10.28	%
Carbon Monoxide	4.4	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot SP4	BC4011
Trendicator	COE 2093
Control Box	↓
Incline Manometer	↓
Comb.Gas.Analyzer	
Micromanometer	
Barometer	EW CAN
Calipers	CAN 22136

Nozzle Measurements	
1	.2495
2	.2500
3	.2500
4	.2495
Average:	.2498

Notes:

Field Data Sheet

Date: March 15, 2024	Plant: Covanta DYEC	Test No.: 2 Particulate/Metals	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	51.00	.91	.78	281	254	260	60	143	72	72	2.3	5
	2.5	52.98	.96	.80	283	255	250	56	189	72	71	2.3	5
	5	55.00	.98	.81	283	249	256	54	205	72	71	2.4	5.5
2	7.5	56.98	.98	.81	283	253	251	52	216	72	72	2.4	5.5
	10	59.00	.99	.81	283	256	255	51	218	71	72	2.4	5.5
	12.5	61.02	.97	.80	284	250	252	50	220	71	73	2.4	5.5
3	15	63.08	.95	.80	284	251	255	50	221	72	73	2.4	6
	17.5	65.15	.95	.80	284	256	253	50	223	72	74	2.3	5.9
	20	67.11	.94	.79	284	249	255	50	223	72	75	2.3	5.5
4	22.5	69.09	.87	.76	284	256	255	51	224	72	75	2.3	5.5
	25	71.06	.85	.76	284	254	251	51	222	72	76	2.2	5.5
	27.5	73.00	.85	.76	284	254	257	51	226	73	76	2.15	5.5
5	30	74.93	.77	.72	284	253	254	51	226	73	77	2.15	5.5
	32.5	76.78	.77	.72	284	255	253	51	225	73	77	2	5
	35	78.64	.76	.72	284	253	256	51	227	73	77	2	5
6	37.5	80.46	.62	.65	284	255	252	51	226	74	78	2	5
	40	82.15	.61	.64	284	252	256	51	224	74	78	1.6	4.9
	42.5	83.80	.60	.64	283	257	257	51	226	74	78	1.6	4.5
7	45	85.43	.66	.67	283	252	252	51	224	74	78	1.6	4.5
	47.5	87.14	.66	.67	283	257	256	50	225	74	78	1.7	4.9
	50	88.85	.67	.67	283	251	256	50	227	74	79	1.7	4.9

Traverse: 1			
Start Time: 14:10	Initial Leak Check: .004	cfm@ 15	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator: BP

Field Data Sheet

Date: March 15, 2024	Plant: Covanta DYEC	Test No.: 2 Particulate/Metals	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	90.57	.68	.68	283	257	252	50	225	75	79	1.7	4.9
	55	92.34	.68	.68	282	250	254	50	226	75	79	1.8	5
	57.5	94.05	.67	.68	282	256	254	50	226	75	79	1.8	5
9	60	95.77	.70	.69	282	250	253	50	225	75	79	1.8	5
	62.5	97.54	.70	.69	281	256	257	50	227	76	79	1.85	5
	65	99.32	.71	.70	281	251	253	50	227	76	80	1.85	5
10	67.5	101.09	.70	.69	281	252	256	50	226	76	80	1.85	5
	70	102.86	.72	.70	281	257	254	50	228	76	80	1.85	5
	72.5	104.72	.74	.71	281	250	253	49	227	76	80	1.9	5
11	75	106.53	.75	.72	280	256	256	49	228	76	80	1.9	5
	77.5	108.35	.74	.71	281	253	252	49	227	76	80	2	5
	80	110.16	.74	.71	282	250	256	49	228	76	80	2	5
12	82.5	111.99	.76	.72	282	256	254	49	228	77	80	2	5
	85	113.82	.76	.72	282	256	254	49	227	77	80	2	5
	87.5	115.66	.77	.73	283	252	257	49	229	77	80	2	5
	90	117.49											

Traverse: 1				
Start Time:	Initial Leak Check:	cfm@		"Hg
Finish Time: 15:40	Final Leak Check: 0.003	cfm@	15	"Hg

Project No.: 22327

Operator : RP

Field Data Sheet

Date: March 18, 2024	Plant: Covanta DYEC	Test No.: 2	Particulate/Metals	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location:	APC Outlet No. 1	

Point	Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F *	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O *	Pump Vacuum "Hg Gauge *
1	0	118.17	.94	.80	282	252	257	50	176	77	77	2.4	6
	2.5	120.16	.97	.81	285	254	256	50	220	77	78	2.4	6
	5	122.21	.96	.81	286	256	256	49	230	77	79	2.4	6
2	7.5	124.27	.94	.80	286	250	252	49	229	77	79	2.4	6
	10	126.32	.95	.80	286	255	256	48	231	77	79	2.4	6
	12.5	128.37	.93	.80	286	252	253	48	230	77	80	2.4	6
3	15	130.40	.89	.78	286	252	255	49	230	77	80	2.3	6
	17.5	132.37	.89	.78	285	257	256	49	231	77	80	2.2	6
	20	134.33	.87	.77	285	251	252	49	230	77	80	2.2	5.9
4	22.5	136.28	.81	.74	285	257	257	49	230	77	80	2.2	5.9
	25	138.17	.83	.75	286	253	255	49	231	77	81	2.1	5.9
	27.5	140.09	.80	.74	286	253	255	49	228	77	81	2.1	5.5
5	30	141.96	.75	.72	285	255	255	49	229	78	81	2.0	5.5
	32.5	143.79	.76	.72	285	250	251	50	227	78	81	2	5.5
	35	145.64	.74	.71	284	257	255	50	228	78	81	2	5.5
6	37.5	147.43	.65	.67	284	251	252	50	227	78	81	2	5.5
	40	149.15	.64	.66	284	257	256	50	227	78	81	1.7	5
	42.5	150.86	.64	.66	283	254	253	50	227	78	81	1.7	5
7	45	152.54	.68	.68	283	254	255	50	226	78	81	1.7	5
	47.5	154.36	.69	.69	282	254	256	49	229	78	82	1.8	5
	50	156.12	.73	.71	282	253	252	49	227	78	82	1.8	5

Traverse: 2			
Start Time: 15:47	Initial Leak Check: 0.004	cfm@ 15	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator: BP

Field Data Sheet

Date: March 18, 2024	Plant: Covanta DYEC	Test No.: 2 Particulate/Metals	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	157.92	.76	.72	283	253	257	50	228	78	82	1.9	5
	55	159.73	.76	.72	283	256	255	50	229	78	82	2.0	5.5
	57.5	161.58	.78	.73	283	253	252	49	228	78	82	2.0	5.5
9	60	163.43	.81	.75	283	256	257	50	229	78	82	2	5.5
	62.5	165.34	.82	.75	283	253	254	50	230	79	82	2.1	5.9
	65	167.25	.83	.76	283	256	254	50	228	79	82	2.1	5.9
10	67.5	169.17	.86	.77	283	251	257	50	230	79	82	2.1	5.9
	70	171.14	.85	.77	284	257	252	50	230	79	82	2.2	6
	72.5	173.11	.83	.76	284	251	254	50	229	79	82	2.2	6
11	75	175.02	.72	.71	282	255	255	50	230	79	82	2.1	5.9
	77.5	176.84	.76	.72	283	251	251	51	227	79	82	1.9	5.5
	80	~~178.79~~ 178.69	.76	.72	283	254	257	51	229	79	82	2	5.5
12	82.5	180.53	.74	.71	282	256	255	51	230	79	82	2	5.5
	85	182.35	.77	.73	282	250	252	51	227	79	82	2	5.5
	87.5	184.22	.77	.73	282	255	256	51	230	79	82	2	5.5
	90	186.10											

Traverse: 2			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 17:17	Final Leak Check: .004	cfm@ 15.5	"Hg

Project No.: 22327

Operator: RP

ORTECH Consulting Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 3	Particulate/Metals
Test Date	March 19 2024
Test Location	APC Outlet No. 1
Operator	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	Team 4
Impinger Box No.:	

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.27	"Hg
Static Pressure	-11.9	"H2O
Nozzle Size	.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	2.5
Number of Ports	2
Number of Points/Port	12

Probe Liner (Glass) / Metal /Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union (None) /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter	5.9	mg
Probe	1.9	mg

Moisture Gain

CWTR	510.0	g
WCBDA	24.0	g

Combustion Gas Concentration

Oxygen	8.43	%
Carbon Dioxide	10.71	%
Carbon Monoxide	6.9	ppm

Measuring Device	MII Numbers
Probe / Pitot 15E	
Trendicator	COE 20090
Control Box	COE 20090
Incline Manometer	COE 20090
Comb.Gas.Analyzer	
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements	
1	.2585
2	.2590
3	.2600
4	.2570
Average:	.2586

Site Diagram

Notes:

Field Data Sheet

Date: March 19 2024	Plant: Covanta DYEC	Test No.: 3 Particulate/Metals	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F *	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O *	Pump Vacuum "Hg Gauge *
1	0	85.95	.84	.79	278	257	262	65	104	67	67	2.25	6
	2.5	87.83	.81	.77	278	253	265	60	214	67	67	2.2	6
	5	89.81	.81	.77	278	259	258	56	226	67	66	2.2	6
2	7.5	91.77	.79	.76	277	260	251	55	227	67	66	2.1	6
	10	93.68	.81	.77	278	256	245	54	226	67	67	2.15	6
	12.5	95.63	.83	.78	277	259	248	53	227	67	67	2.2	6
3	15	97.62	.83	.78	276	260	255	52	233	68	68	2.2	6
	17.5	99.59	.88	.81	278	257	254	52	235	68	69	2.3	6
	20	101.62	.88	.81	278	257	250	51	235	68	69	2.3	6
4	22.5	103.64	.86	.79	278	260	246	51	233	68	70	2.2	6
	25	105.62	.86	.79	277	254	250	51	234	68	70	2.2	6
	27.5	107.59	.80	.76	278	255	254	51	236	69	71	2.1	6
5	30	109.51	.85	.79	278	261	253	51	237	69	72	2.2	6
	32.5	111.48	.79	.76	278	261	250	51	236	69	72	2.1	6
	35	113.41	.77	.75	277	259	247	50	234	69	72	2.0	6
6	37.5	115.29	.73	.73	277	259	251	50	235	69	72	1.95	6
	40	117.15	.75	.74	277	256	255	50	238	69	73	2	6
	42.5	119.03	.78	.76	277	255	254	50	239	70	73	2.1	6
7	45	120.95	.68	.71	277	261	251	50	237	70	73	1.9	6
	47.5	122.79	.70	.72	277	255	246	50	234	70	74	1.9	6
	50	124.63	.73	.73	277	261	251	49	235	70	74	1.95	6

Traverse:	
Start Time: 15:26	Initial Leak Check: .007 cfm@ 15 "Hg
Finish Time:	Final Leak Check: cfm@ "Hg

Project No.: 22327

Operator : [illegible]

Field Data Sheet

Date: March 19 2024	Plant: Covanta DYEC	Test No.: 3 Particulate/Metals	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	126.48	.74	.74	278	255	255	49	239	70	74	2.0	6
	55	128.35	.76	.75	278	261	255	49	240	70	74	2.0	6
	57.5	130.25	.92	.82	279	259	251	49	238	70	74	2.4	6.5
9	60	132.28	.92	.82	279	255	247	49	237	70	74	2.4	6.5
	62.5	134.37	.94	.83	279	260	250	48	237	70	74	2.45	6.5
	65	136.47	.94	.83	280	261	255	48	241	70	74	2.45	6.5
10	67.5	138.59	.99	.85	280	261	255	48	242	70	74	2.6	7
	70	140.75	.97	.84	280	256	252	48	241	70	74	2.5	7
	72.5	142.88	.94	.83	280	260	248	49	239	71	74	2.45	7
11	75	144.98	.95	.83	281	257	248	49	238	70	74	2.45	7
	77.5	147.08	.95	.83	281	263	255	49	241	70	74	2.45	7
	80	149.17	.94	.83	280	263	255	49	243	71	74	2.45	7
12	82.5	151.27	.94	.83	280	260	253	49	242	71	74	2.45	7
	85	153.37	.96	.84	280	263	250	50	240	71	74	2.5	7
	87.5	155.49	.94	.83	280	261	247	50	238	71	74	2.45	7
	90	157.60											

Traverse:					
Start Time: –	Initial Leak Check:	–	cfm@	–	"Hg
Finish Time: 16:57	Final Leak Check:	.004	cfm@	18	"Hg

Project No.: 22327

Operator : TT

Field Data Sheet

Date: March 19 2024	Plant: Covanta DYEC	Test No.: 3 Particulate/Metals	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
										70			
1	0	158.11	.94	.83	279	256	255	54	170	~~171~~	74	2.45	6.5
	2.5	160.23	.99	.85	279	261	250	48	227	70	71	2.5	6.5
	5	162.35	1.0	.85	279	259	254	46	238	70	71	2.5	6.5
2	7.5	164.46	1.05	.87	279	256	254	45	242	70	72	2.7	7
	10	166.65	.99	.85	279	260	251	45	242	70	72	2.55	7
	12.5	168.79	1.0	.85	279	256	247	45	239	70	72	2.55	7
3	15	170.93	.96	.84	279	262	248	45	238	70	72	2.5	7
	17.5	173.04	.96	.84	278	263	255	45	242	70	72	2.5	7
	20	175.15	.96	.84	279	256	254	45	243	70	73	2.5	7
4	22.5	177.25	.91	.81	279	262	251	45	241	70	73	2.4	7
	25	179.31	.94	.83	279	256	247	45	239	70	73	2.45	7
	27.5	181.42	.94	.83	280	261	251	45	239	70	73	2.45	7
5	30	183.51	.86	.79	280	259	255	45	242	70	74	2.3	7
	32.5	185.55	.86	.79	280	260	254	45	243	70	74	2.3	7
	35	187.58	.87	.80	280	261	251	45	244	70	74	2.3	7
6	37.5	189.62	.70	.72	280	262	247	45	239	71	74	1.9	6.5
	40	191.46	.69	.71	280	263	252	44	238	71	74	1.9	6.5
	42.5	193.27	.71	.72	280	263	255	44	240	71	75	1.95	6.5
7	45	195.12	.71	.72	280	257	253	44	240	71	75	1.9	6.5
	47.5	196.95	.80	.77	280	258	250	44	238	71	75	2.1	6
	50	198.85	.80	.77	280	261	247	44	236	71	75	2.1	6

Traverse:	
Start Time: 17:05	Initial Leak Check: .006 cfm@ 18 "Hg
Finish Time:	Final Leak Check: cfm@ "Hg

Project No.: 22327

Operator : TY

Field Data Sheet

Date: March 19 2024	Plant: Covanta DYEC	Test No.: 3	Particulate/Metals	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location:	APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	200.74	.81	.77	280	257	252	44	237	71	75	2.1	6
	55	202.02	.81	.77	280	257	255	44	240	71	76	2.1	6
	57.5	204.52	.79	.76	280	262	253	44	239	71	76	2.1	6
9	60	206.42	.81	.77	279	262	249	45	238	72	76	2.15	6.5
	62.5	208.38	.81	.77	279	257	250	45	236	71	76	2.15	6.5
	65	210.32	.79	.76	278	261	254	45	239	72	76	2.15	6.5
10	67.5	212.26	.80	.77	278	258	256	45	240	72	76	2.15	6.5
	70	214.21	.80	.77	276	259	253	45	240	72	76	2.15	6.5
	72.5	216.15	.77	.75	276	262	249	45	245	72	76	2.1	6.5
11	75	218.05	.66	.70	276	258	248	45	235	72	76	1.8	6
	77.5	219.84	.66	.70	276	256	255	45	237	72	76	1.8	6
	80	221.60	.66	.70	276	260	255	45	239	72	77	1.8	6
12	82.5	223.35	.68	.71	276	256	252	45	237	72	77	1.9	6
	85	225.14	.68	.71	276	261	248	45	235	72	77	1.9	6
	87.5	226.90	.69	.71	276	260	249	45	234	72	77	1.9	6
	90	228.71											

Traverse:	
Start Time: —	Initial Leak Check: — cfm@ — "Hg
Finish Time: 18:35	Final Leak Check: .006 cfm@ 15 "Hg

Project No.: 22327

Operator : TT

ORTECH Consulting Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 1	Particulate/Metals
Test Date March 14, 2024	
Test Location	APC Outlet No. 2
Operator TC	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	TEAM 3
Impinger Box No.:	16

Pitot Factor	.843	
DGMCF	.986	
Barometric Pressure	29.41	"Hg
Static Pressure	-11.3	"H2O
Nozzle Size	.2498	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	2.5	
Number of Ports	2	
Number of Points/Port	12	

Probe Liner (Glass) / Metal / Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union None / Metal / (Teflon) / Other_____

Pitot Leak Checked? (Yes) No

Particulate Gain

Filter	2.9	mg
Probe	4.9	mg

Moisture Gain

CWTR	515.5	g
WCBDA	21.5	g

Combustion Gas Concentration

Oxygen	8.55	%
Carbon Dioxide	10.76	%
Carbon Monoxide	7.7	ppm

Measuring Device	MII Numbers
Probe / Pitot SP4	B04611
Trendicator	COE 20093
Control Box	↓
Incline Manometer	↓
Comb.Gas.Analyzer	
Micromanometer	
Barometer	ENV CAN
Calipers	CAN 22136

Nozzle Measurements	
1	.2495
2	.2500
3	.2500
4	~~.2498~~ .2495
Average:	.2498

Site Diagram

Notes:

Field Data Sheet

Date: March 19, 2024	Plant: Covanta DYEC	Test No.: 1 Particulate/Metals	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm 0.70	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	586.578	.76	~~0.64~~	281	255	252	58	72	65	65	1.9	4
	2.5	588.70	.77	~~0.64~~	282	257	252	46	230	66	66	1.91	4
	5	590.15	.77	0.70	282	255	256	45	233	66	66	1.94	4
2	7.5	591.95	.79	0.72	283	252	253	45	235	66	67	1.92	4
	10	593.76	.80	0.72	283	251	252	44	234	66	67	1.98	4
	12.5	595.60	.78	0.71	284	253	256	44	236	66	68	2.01	4
3	15	597.42	.76	0.70	284	253	254	45	236	66	68	1.97	4
	17.5	599.23	.77	0.71	284	254	252	45	235	66	69	1.92	4
	20	601.06	.81	0.73	284	255	256	45	235	67	69	1.95	4
4	22.5	602.91	.76	0.71	284	254	255	45	236	67	70	2.05	4
	25	604.74	0.76	0.71	285	257	252	45	236	67	70	1.93	4
	27.5	606.56	.80	0.74	286	252	253	45	235	67	70	1.93	4
5	30	608.44	.75	0.70	286	257	256	45	237	68	71	2.02	4
	32.5	610.285	.76	0.71	287	250	252	45	238	68	71	1.98	4
	35	612.1	.82	0.73	288	251	256	46	238	65	72	1.93	4
6	37.5	614.0	.78	0.72	289	253	255	46	238	68	72	2.05	4.5
	40	615.85	.77	0.71	289	257	254	46	238	69	72	1.98	4.2
	42.5	617.75	.73	0.69	290	253	253	46	237	69	72	1.95	4.2
7	45	619.47	.76	0.71	290	254	256	47	237	69	73	1.85	4.
	47.5	621.30	.78	0.72	290	257	253	47	237	70	73	1.95	4.
	50	623.13	.79	0.72	290	257	254	47	230	70	73.	1.98	4.2.

Traverse: 1			
Start Time: 18:12	Initial Leak Check: 0.007	cfm@ 14	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator :

Field Data Sheet

Date: March 19, 2024	Plant: Covanta DYEC	Test No.: (Particulate/Metals	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	624.95	.80	.73	290	256	256	47	237	70	73	2	4.2
	55	626.85	.83	.74	291	260	252	47	237	70	73	2.02	4.2
	57.5	628.73	.85	.75	291	256	256	48	237	70	74	2.1	4.5
9	60	630.65	.80	.73	292	257	253	48	237	71	74	2.13	4.5
	62.5	632.54	.75	.70	292	255	252	48	236	71	74	2.03	4.2
	65	634.385	.77	.71	291	257	257	47	236	71	74	1.93	4
10	67.5	636.23	.76	.71	291	251	253	47	236	71	74	1.95	4
	70	638.06	.76	.71	290	257	253	47	236	71	74	1.95	4
	72.5	639.89	.75	.70	290	253	255	47	236	71	74	1.94	4
11	75	641.72	.72	.69	289	253	252	47	235	71	74	1.92	4
	77.5	643.52	.73	.70	288	257	256	47	235	71	74	1.85	4
	80	645.32	.71	.69	288	254	253	47	235	71	75	1.88	4
12	82.5	647.11	.73	.70	287	255	255	47	235	72	75	1.83	4
	85	648.90	.73	.70	287	250	255	47	236	72	76	1.88	4
	87.5	650.71	.73	.70	287	252	252	47	235	72	75	1.88	4
	90	652.499											

Traverse: 1			
Start Time: 09:42	Initial Leak Check:	cfm@	"Hg
Finish Time:	Final Leak Check: <0.001	cfm@ 14.	"Hg

Project No.: 22327

Operator :

Field Data Sheet

Date: March 19, 2024	Plant: Covanta DYEC	Test No.: 1 Particulate/Metals	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	652.964	.88	0.77	283	255	254	54	137	72	72	2.1	4
	2.5	654.83	.83	.76	286	256	252	45	228	72	72.	2.1	4
	5	656.77	.88	.76	286	250	252	43	234	72	72	2.18	4.5
2	7.5	658.74	.87	.76	287	257	256	41	239	71	72	2.2	4.7
	10	660.7	.86.	.76	286	254	257	41	240	71	72	2.18	4.6.
	12.5	662.63	.89	.77	286	254	253	41	239	71	72.	2.15	4.5.
3	15	664.60	.85	.75	286	254	253	41	238	71	73	2.22	4.9
	17.5	666.52	.86	.76	286	257	256	41	239	71	73	2.1	4.5
	20	668.43	.86	.76	284	251	257	41	241	71	73	2.1	4.5.
4	22.5	670.35.	.78	.72	287	257	254	41	240	71	73	2.13	4.5
	25	672.195	.82	.74	287	256	251	41	237	71	73.	1.95	4.1
	27.5	674.08	.80	.73	287	253	257	41	240	71	74	2.03	4.3.
5	30	675.94	.72	.69	287	251	257	42	240	71	74	2.	4.2.
	32.5	677.73	.73	.70	286	256	254	42	239	71	74	1.87	4.
	35	679.51	.73	.70.	286	257	251	42	237	71	74	1.82	4
6	37.5	681.29	.61	.64	286	254	256	42	238	71	74	1.82	4
	40	682.95	.61	.64	286	257	256	42	239	71	74	1.82	4.
	42.5	684.58	.63	.65.	286	252	254	42	237	71	74	1.5	4.
7	45	686.22	.63	.65.	286	252	252	42	235	71	74	1.56	4
	47.5	687.86	.62	.64	286	257	256	42	237	72	74	1.56	4
	50	689.49	.63	.65.	285	253	256	42	237	72	74	1.52	4

Traverse: 2			
Start Time: 09:55	Initial Leak Check: 0.007	cfm@ 13.	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator :

Field Data Sheet

Date: March 19, 2024	Plant: Covanta DYEC	Test No.: 1 Particulate/Metals	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	691.12	.65	.66	285	250	252	42	236	72	75	1.54	4
	55	692.8	.67	.67	285	255	253	42	235	72	75	1.62	4
	57.5	694.5	.68	.67	285	254	256	42	237	72	75	1.65	4
9	60	696.21	.70	.68	285	251	255	43	237	72	75	1.7	4
	62.5	697.94	.70	.68	285	254	252	43	236	72	75	1.75	4
	65	699.66	.72	.69	285	255	254	43	235	72	75	1.75	4
10	67.5	701.40	.71	.69	282	254	255	43	237	72	75	1.8	4
	70	703.14	.71	.69	284	251	254	43	236	72	75	1.8	4
	72.5	704.87	.69	.68	284	257	252	43	235	72	75	1.8	4
11	75	706.60	.61	.66	228	251	255	43	237	72	74	1.75	4
	77.5	708.25	.60	.66	225	252	255	43	236	72	74	1.6	4
	80	709.90	.62	.67	225	250	251	43	234	72	74	1.6	4
12	82.5	711.56	.61	.67	224	256	255	43	236	72	74	1.67	4
	85	713.24	.64	.68	225	256	255	43	237	72	74	1.7	4
	87.5	714.95	.65	.69	226	256	252	43	235	72	74	1.75	4
	90	716.73											

Traverse: 2				
Start Time: 11:25	Initial Leak Check:		cfm@	"Hg
Finish Time: X	Final Leak Check:	.002	cfm@ 13	"Hg

Project No.: 22327

Operator : TC.

ORTECH Consulting Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 2	Particulate/Metals
Test Date March 19, 2024	
Test Location	APC Outlet No. 2
Operator TC	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	TEAM 3
Impinger Box No.:	13

Pitot Factor	.843	
DGMCF	.986	
Barometric Pressure	29.31	"Hg
Static Pressure	-11.3	"H2O
Nozzle Size	.2498	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	2.5	
Number of Ports	2	
Number of Points/Port	12	

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter	2.4	mg
Probe	3.9	mg

Moisture Gain

CWTR	461.1	g
WCBDA	18.0	g

Combustion Gas Concentration

Oxygen	8.20	%
Carbon Dioxide	11.08	%
Carbon Monoxide	13.5	ppm

Measuring Device	MII Numbers
Probe / Pitot SP4	B04011
Trendicator	COE20093
Control Box	↓
Incline Manometer	↓
Comb.Gas.Analyzer	↓
Micromanometer	↓
Barometer	Inv. CAN
Calipers	CAN 27136

Nozzle Measurements	
1	.2495
2	.2500
3	.2500
4	.2495
Average:	.2498

Site Diagram

Notes:

Field Data Sheet

Date: Mar. 19, 2024	Plant: Covanta DYEC	Test No.: 2 Particulate/Metals	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	717.1005	0.82	.75	286	251	250	58	205	69	69	2.0	5
	2.5	718.96	.84	.74	286	256	253	57	211	69	69	2.01	5.
	5	720.84	.83	.74	286	255	255	56	215	69	69	2.01	5.
2	7.5	722.7	.81	.73	285	256	250	55	217	69	69	2	5.
	10	724.55	.84	.74	285	256	256	55	221	69	70	1.98	5.
	12.5	726.41	.87	.76	285	256	252	55	222	69	70	2.03	5.
3	15	728.3	.83	.74	285	250	254	55	224	69	71	2.1	5.1
	17.5	730.18	.85	.75	286	254	253	55	224	69	71	2.01	5.
	20	732.07	.84	.74	286	252	254	55	226	69	71	2.03	5.
4	22.5	733.95	.75	.70	286	252	253	56	170	69	72	2.01	5.
	25	735.72	.77	.71	285	256	254	55	155	69	72	1.84	4.7
	27.5	737.50	.76	.71	285	250	254	54	155	70	73	1.88	4.9
5	30	739.29	.71	.69	285	250	255	54	155	70	73	1.85	4.7
	32.5	741.02	.70	.68	285	256	254	53	154	70	73	1.72	4.5
	35	742.74	.70	.68	285	254	254	53	154	70	74	1.71	4.5
6	37.5	744.46	.60	.63	285	256	254	53	154	70	74	1.71	4.5
	40	746.09	.62	.64	285	252	255	52	156	71	74	1.49	4.1
	42.5	747.72	.61	.64	286	254	256	52	154	71	75	1.52	4.3
7	45	744.35	.64	.65	285	252	255	52	154	71	75	1.5	4.3
	47.5	751.01	.61	.64	285	255	255	52	155	72	75	1.59	4.5
	50	752.61	.62	.64	285	250	255	52	155	72	76	1.53	4.2

Traverse: 2			
Start Time: 11:59	Initial Leak Check: .003	cfm@ 13	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator : TC

Field Data Sheet

Date: Mar. 19, 2024	Plant: Covanta DYEC	Test No.: 2 Particulate/Metals	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	754.23	.65	.66	285	256	253	52	154	72	76	1.57	4.4
	55	755.89	.66	.67	285	256	254	52	157	72	76	1.67	4.7
	57.5	757.57	.68	.67	286	257	255	52	155	72	76	1.65	4.8
9	60	759.29	.70	.68	285	256	253	53	156	72	76	1.7	4.9
	62.5	761.03	.71	.69	286	254	256	53	156	73	77	1.74	5.
	65	762.77	.72	.70	286	256	253	53	225	73	77	1.77	5.
10	67.5	764.54	.68	.68	285	251	257	53	227	73	77	1.8	5.
	70	766.26	.64	.66	284	251	254	53	228	73	77	1.71	4.9
	72.5	767.96	.63	.65	284	253	256	53	226	74	77	1.61	4.8
11	75	769.61	.54	.65	188	253	253	53	226	74	77	1.58	4.7
	77.5	771.24	.53	.64	181	249	257	53	226	74	77	1.55	4.4
	80	772.88	.56	.66	183	253	254	53	226	74	77	1.51	4.4
12	82.5	774.55	.55	.66	183	251	255	53	226	74	78	1.63	4.8
	85	776.20	.53	.64	182	252	254	54	227	74	78	1.59	4.7
	87.5	777.85	.54	.65	183	256	255	54	226	74	78	1.54	4.7
	90	779.538											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 13:29	Final Leak Check: .002	cfm@ 13	"Hg

Project No.: 22327

Operator :

Field Data Sheet

Date: Nov. 19, 2024	Plant: Covanta DYEC	Test No.: 2 Particulate/Metals	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O" *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F *	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O" *	Pump Vacuum "Hg Gauge *
1	0	779.90	.70	.69	283	256	257	61	177	75	76	1.8	5
	2.5	781.71	.71	.69	283	254	255	55	180	75	76	1.8	5
	5	783.48	.71	.69	282	256	254	52	226	75	76	1.8	5
2	7.5	785.25	.70	.69	282	250	256	51	233	75	76	1.8	5
	10	787.03	.69	.68	282	254	252	51	232	75	77	1.8	5
	12.5	788.76	.69	.68	282	257	256	51	233	75	77	1.75	5
3	15	790.51	.68	.68	281	250	253	51	232	75	77	1.75	5
	17.5	792.24	.69	.68	281	255	256	50	233	75	77	1.7	5
	20	793.98	.69	.68	281	252	252	50	232	75	77	1.7	5
4	22.5	795.71	.67	.68	281	252	256	50	233	75	78	1.7	5
	25	797.42	.66	.67	281	257	252	50	232	75	78	1.7	5
	27.5	799.14	.66	.67	281	250	256	50	233	75	78	1.7	5
5	30	800.84	.63	.65	281	256	252	50	232	75	78	1.7	5
	32.5	802.53	.63	.65	281	251	256	50	233	75	78	1.65	4.9
	35	804.21	.64	.66	281	256	252	50	232	75	78	1.6	4.9
6	37.5	805.89	.56	.62	281	257	255	51	233	75	79	1.62	4.9
	40	807.475	.55	.61	282	255	252	51	231	76	79	1.43	4.1
	42.5	809.04	.54	.61	282	256	255	51	232	76	79	1.39	4.0
7	45	810.59	.60	.64	282	252	253	51	230	76	79	1.35	4.0
	47.5	812.22	.60	.64	282	254	253	51	232	76	79	1.52	4.5
	50	813.85	.61	.65	281	249	251	51	231	76	79	1.52	4.5

Traverse: 1			
Start Time: 13:37	Initial Leak Check: .002	cfm@ 12	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator: TC / BP

Field Data Sheet

Date: Mar 19, 2024	Plant: Covanta DYEC	Test No.: 2 Particulate/Metals	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	815.49	.61	.64	282	257	256	51	231	76	79	1.55	4.7
	55	817.13	.64	.66	282	256	252	51	231	76	79	1.55	4.7
	57.5	818.83	.65	.67	282	256	255	52	232	76	80	1.63	4.9
9	60	820.52	.68	.68	283	253	253	52	232	77	80	1.63	4.9
	62.5	822.25	.66	.67	284	253	256	52	233	77	80	1.72	5.
	65	823.98	.69	.69	284	253	252	52	232	77	80	1.68	5.
10	67.5	825.73	.68.	.68	285	249	257	52	234	77	80	1.74	5.1
	70	827.47	.67	.68	285	251	252	52	233	77	80	1.71	5.1
	72.5	829.19	.68	.68	285	249	257	52	233	77	80	1.69	5
11	75	830.91	.62	.66	273	250	251	52	232	77	80	1.7	5.
	77.5	832.585	.62	.66	268	255	256	52	233	77	80	1.6	4.9
	80	834.25	.64	.67	267	256	251	52	232	77	80	1.6	4.9
12	82.5	836.61	.65.	.67	268	254	257	52	232	77	80	1.66	5.
	85	837.65	.64	.67	268	255	252	52	233	77	80	1.69	5.1
	87.5	839.34	.64	.67	268	251	257	52	232	77	80	1.65	4.9
	90	841.075											

Traverse: 1			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 15:07	Final Leak Check: .001	cfm@ 14	"Hg

Project No.: 22327

Operator : TC

ORTECH Consulting Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 3	Particulate/Metals
Test Date	March 19, 2024
Test Location	APC Outlet No. 2
Operator	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	TEAM 3
Impinger Box No.:	5

Pitot Factor	.843	
DGMCF	.986	
Barometric Pressure	29.27	"Hg
Static Pressure	-11.3	"H2O
Nozzle Size	.2498	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	2.5
Number of Ports	2
Number of Points/Port	12

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter	3.0	mg
Probe	2.7	mg

Moisture Gain

CWTR	511.8	g
WCBDA	21.8	g

Combustion Gas Concentration

Oxygen	8.14	%
Carbon Dioxide	11.03	%
Carbon Monoxide	8.1	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot SP4	B04011
Trendicator	CCE20093
Control Box	↓
Incline Manometer	↓
Comb.Gas.Analyzer	↓
Micromanometer	↓
Barometer	ENV. CAN
Calipers	CAN 22136

Nozzle Measurements	
1	.2495
2	.2500
3	.2500
4	.2495
Average:	.2498

Notes:

Field Data Sheet

Date: Mar 19, 2024	Plant: Covanta DYEC	Test No.: 3	Particulate/Metals	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location:	APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	841.502	.81	.74	287	248	259	68	227	75	75.	2.05	4.2.
	2.5	843.42	.80	.73	286	253	251	57	219	75	75	2.05	4.2
	5	845.29	.80	.73	286	254	256	56	226	75	75	1.99	4.
2	7.5	847.15	.80	.73	287	256	251	55	229	75	75	1.99	4.
	10	848.99	.80	.73	287	249	256	55	233	75	75.	1.99	4.
	12.5	850.85	.80	.73.	287	256	253	55	236	74	75	1.99	4
3	15	852.69	.83	.75.	287	253	256	55	239	74	76	1.97	4
	17.5	854.58	.81	.74	287	252	254	55	240	74	76.	2.05	4.2
	20	856.45	.81	.74	288	256	254	54	240	74	77	2.0	4.2.
4	22.5	858.32	.74	.71	288	250	253	54	241	75	77	2 0	4.2.
	25	860.12	.72	.70	288	257	254	54	241	75	77	1.84	3.9
	27.5	861.99	.71	.69	287	256	255	54	242	75	78	1.8	3.8
5	30	863.67	.66	.67	287	256	252	54	241	75	78	1.8	3.8
	32.5	865.37	.66	.67	286	250	255	55	242	75	78	1.67	3.5
	35	867.08	.56	.62	286	256	252	55	242	75	78	1.67	3.5.
6	37.5	868.67	.56	.62	286	252	256	56	242	75	79	1.4	3.2
	40	870.23	.57	.62	286	255	253	56	242	76	79	1.4	3.2
	42.5	871.82	.57	.62	286	255	254	56	242	76	79	1.43	3.4
7	45	873.4	.60	.64	286	257	254	57	242	76	79	1.42	3.3.
	47.5	875.01	.58	.63	286	250	254	55	240	76	79	1.52	3.4
	50	876.62	.59		285	253	254	55	242	76	80	1.45	3.2

Traverse: 2			
Start Time: 15:38.	Initial Leak Check: .002	cfm@ 13	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator: TC/BP

Field Data Sheet

Date: Mar. 19, 2024	Plant: Covanta DYEC	Test No.: 3	Particulate/Metals	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location:	APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	878.19	.63	.65	285	252	252	54	241	76	80	1.45	3.2
	55	879.84	.62	.65	286	250	255	53	243	76	80	1.59	3.5
	57.5	881.48	.64	.66	286	254	252	53	242	77	80	1.55	3.5
9	60	883.15	.67	.67	287	254	255	53	243	77	80	1.62	3.6
	62.5	884.85	.68	.68	287	251	253	53	243	77	80	1.7	3.8
	65	886.57	.68	.68	287	254	254	52	242	77	80	1.7	3.8
10	67.5	888.29	.66	.67	286	256	254	52	244	77	80	1.7	3.8
	70	889.999	.66	.67	286	251	252	52	241	77	80	1.65	3.7
	72.5	891.69	.69	.68	287	253	255	52	243	77	80	1.65	3.7
11	75	893.45	.72	.70	287	255	252	52	243	77	80	1.72	4
	77.5	895.22	.61	.68	210	253	255	52	243	77	80	1.79	4.1
	80	896.96	.58	.66	206	251	252	52	242	77	80	1.7	4.
12	82.5	898.66	.60	.68	206	253	255	52	242	77	80	1.61	3.9
	85	900.37	.59	.67	205	252	253	52	243	77	80	1.69	3.9
	87.5	902.04	.58	.66	206	252	254	52	242	77	80	1.65	3.9
	90	903.744											

Traverse: 2			
Start Time: [illegible]	Initial Leak Check: .001	cfm@ 12.	"Hg
Finish Time: 17:08	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator: TC/BP

Field Data Sheet

Date: March 9, 2021	Plant: Covanta DYEC	Test No.: 3 Particulate/Metals	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	904.18	.78	.73	287	255	252	58	178	77	78	2	4
	2.5	906.03	.80	.74	289	251	255	52	236	77	78	2	4
	5	907.90	.82	.74	289	256	252	50	233	77	78	2	4
2	7.5	909.79	.82	.74	288	252	255	48	239	77	79	2.1	4
	10	911.67	.81	.74	288	253	252	47	243	77	79	2.1	4
	12.5	913.57	.81	.74	288	257	255	47	241	77	79	2.1	4
3	15	915.47	.80	.74	288	250	252	47	241	77	79	2.1	4
	17.5	917.34	.79	.73	288	255	255	47	243	77	79	2.05	4
	20	919.23	.79	.73	288	250	252	47	243	77	79	2	4
4	22.5	921.10	.75	.71	288	257	255	47	243	77	80	2	4
	25	922.92	.75	.71	288	252	254	47	243	77	80	1.9	4
	27.5	924.74	.73	.70	288	257	255	47	242	77	80	1.9	4
5	30	926.55	.69	.68	288	254	253	47	242	77	80	1.9	4
	32.5	928.33	.68	.68	287	251	255	47	242	77	80	1.8	4
	35	930.09	.68	.68	286	257	254	47	242	77	80	1.8	4
6	37.5	931.83	.63	.65	286	250	253	47	241	77	80	1.75	4
	40	933.49	.63	.66	287	257	255	48	242	77	81	1.6	3.9
	42.5	935.15	.63	.66	287	253	253	48	241	77	81	1.6	3.9
7	45	936.82	.66	.67	287	251	255	48	242	78	81	1.6	3.9
	47.5	938.55	.65	.67	287	256	252	48	241	78	81	1.7	4
	50	940.27	.65	.67	286	250	255	48	242	78	81	1.7	4

Traverse: i			
Start Time: 17:16	Initial Leak Check: .002	cfm@ 15	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Project No.: 22327

Operator : BP

Field Data Sheet

Date: March 9, 2024	Plant: Covanta DYEC	Test No.: 3	Particulate/Metals	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location:	APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	52.5	941.96	.67	.68	286	257	252	48	241	78	81	1.65	4
	55	943.68	.66	.67	286	251	254	48	241	78	81	1.7	4
	57.5	945.40	.66	.67	286	257	252	48	241	78	81	1.7	4
9	60	947.11	.69	.69	285	251	254	48	241	78	81	1.7	4
	62.5	948.86	.72	.70	286	256	252	48	242	78	81	1.8	4
	65	950.67	.69	.69	286	251	254	48	241	78	82	1.9	4
10	67.5	952.43	.69	.69	282	257	254	48	242	78	82	1.8	4
	70	954.17	.66	.67	282	251	252	48	241	78	82	1.75	4
	72.5	955.85	.65	.67	280	256	255	48	242	78	82	1.7	4
11	75	957.56	.65	.67	280	251	251	48	241	78	82	1.7	4
	77.5	959.27	.67	.68	280	250	255	48	242	78	82	1.7	4
	80	960.98	.65	.67	280	257	252	48	242	79	82	1.7	4
12	82.5	962.67	.65	.67	280	249	254	49	241	79	82	1.7	4
	85	964.38	.67	.68	280	255	253	49	242	79	82	1.7	4
	87.5	966.10	.67	.68	280	253	253	49	240	79	82	1.7	4
	90	967.79											

Traverse: 1					
Start Time:	Initial Leak Check:		cfm@	15	"Hg
Finish Time: 18:46	Final Leak Check:	.003	cfm@	15	"Hg

Project No.: 22327

Operator : BP

APPENDIX 5

Particle Size Distribution Field Data Sheets
(12 pages)

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 1	Particle Size
Test Date	MARCH 19, 2024
Test Location	APC Outlet No. 1
Operator	DM

Project No.:	22327
Page	1 of 2
Probe No.:	A10/25
Meter Box No.:	T1
Impinger Box No.:	

Pitot Factor	.843	
DGMCF	0.987	
Barometric Pressure	29.43	"Hg
Static Pressure	-11.9	"H2O
Nozzle Size	.1776	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	0WELL	
Number of Ports	2	
Number of Points/Port	12	

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	138.5	g
WCBDA	9.0	g

Combustion Gas Concentration

Oxygen	8.75	%
Carbon Dioxide	10.41	%
Carbon Monoxide	8.0	ppm

Measuring Device	MII Numbers
Probe / Pitot	SEE
Trendicator	
Control Box	TEST 1
Incline Manometer	
Comb.Gas.Analyzer	UNIT 2
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements
1
2
3
4
Average:

Probe Liner Glass / Metal /Teflon / Other PFA

Nozzle Glass / Metal / Other_____

Union None / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: MAR 19/24	Plant: Covanta DYEC	Test No.: 1	Particle Size	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location:	APC Outlet No. 1	

Point	Clock Time *	Dry Gas Meter ft³ *	Pitot Δ P "H_2O *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F *	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O *	Pump Vacuum "Hg Gauge *
1	0	0.00	.92	.35	278	260	250	61	62	66	66	.38	3
2	10.8	3.86	.96		279	262	255	52	62	67	66	.38	3
3	21.1	7.59	.88		279	262	254	51	60	68	66	.38	3
4	31.5	11.17	.85		280	260	255	50	60	69	67	.38	3
5	41.8	14.85	.74		280	260	255	50	60	70	67	.38	3
6	51.2	18.16	.64		280	261	255	51	60	70	67	.38	3
	60.3	21.45											
1	0	21.45	.98		280	262	254	53	60	70	68	.38	3
2	10.7	25.17	1.0		278	262	255	54	60	71	68	.38	3
3	21.4	28.98	.90		279	262	255	54	60	71	68	.38	3
4	31.9	32.80	.78		279	260	255	53	60	71	68	.38	3
5	41.9	36.39	.70		279	262	254	55	60	71	69	.38	3
6	50.9	39.62	.69		280	261	255	54	60	71	69	.38	3
	59.7	42.80											

Traverse: 2 824			
Start Time: ~~835~~	Initial Leak Check: .002	cfm@ 12	"Hg
Finish Time: 924	Final Leak Check:	cfm@	"Hg

Traverse: 1			
Start Time: 926	Initial Leak Check:	cfm @	"Hg
Finish Time: 1026	Final Leak Check:	cfm @	"Hg

ready to test @ 8am WAIT

Project No.: 22327

Operator : [signature]

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 2	Particle Size
Test Date	MARCH 19 2024
Test Location	APC Outlet No. 1
Operator	DM

Project No.:	22327
Page	1 of 2
Probe No.:	PM10/2.5
Meter Box No.:	7
Impinger Box No.:	

Pitot Factor	0.843	
DGMCF	0.987	
Barometric Pressure	29.34	"Hg
Static Pressure	-11.9	"H2O
Nozzle Size	.1776	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	DWELL	
Number of Ports	2	
Number of Points/Port	12	

Probe Liner Glass / Metal / Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	164.3	g
WCBDA	8.5	g

Combustion Gas Concentration

Oxygen	9.12	%
Carbon Dioxide	10.21	%
Carbon Monoxide	7.9	ppm

Measuring Device	MII Numbers
Probe / Pitot	~~[illegible]~~
Trendicator	
Control Box	~~[illegible]~~
Incline Manometer	1
Comb.Gas.Analyzer	[illegible]
Micromanometer	
Barometer	2
Calipers	

Nozzle Measurements	
1	
2	
3	
4	
Average:	

Site Diagram

Notes:

Field Data Sheet

Date: MAR 19/24	Plant: Covanta DYEC	Test No.: 2 Particle Size	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	42.85	.97	.35	283	262	250	58	57	70	69	.38	4
2	10.5	46.77	.99		283	263	255	49	39	67	67	.38	4
3	21.3	50.55	.95		284	262	256	49	40	67	68	.38	4
4	31.5	54.24	.89		285	262	256	49	41	67	68	.38	4
5	41.6	58.05	.75		285	263	256	51	42	70	68	.38	4
6	51.1	61.65	.65		283	263	255	52	43	71	68	.38	4
	59.8	64.76	.92		~~284~~	~~264~~	~~254~~	~~56~~	~~45~~	~~71~~	~~69~~	~~.38~~	~~4~~
1	0	64.76	.97		281	264	254	56	45	71	69	.38	4
2	10.9	68.63	.97		282	263	255	57	60	72	70	.38	4
3	21.8	72.50	.85		281	263	256	57	59	73	70	.38	4
4	32.2	76.24	.85		282	263	255	56	55	73	70	.38	4
5	41.9	79.74	.78		284	263	255	56	55	73	70	.38	4
6	51.1	83.04	.61		284	263	255	55	55	73	70	.38	4
	60.2	86.31											

Traverse: 2		Traverse: 1	
Start Time: 11:02	Initial Leak Check: .002 cfm@ 15 "Hg	Start Time: 1204	Initial Leak Check: cfm @ "Hg
Finish Time: 12:02	Final Leak Check: cfm@ "Hg	Finish Time: 1304	Final Leak Check: cfm @ "Hg

Project No.: 22327

Operator : [illegible]

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 3	Particle Size
Test Date	MARCH 19, 2024
Test Location	APC Outlet No. 1
Operator	DM

Project No.:	22327
Page	1 of 2
Probe No.:	PM10/215
Meter Box No.:	T1
Impinger Box No.:	

Pitot Factor	.843	
DGMCF	0.987	
Barometric Pressure	29.28	"Hg
Static Pressure	-11.9	"H2O
Nozzle Size	.1776	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	DWELL
Number of Ports	2
Number of Points/Port	12

Probe Liner Glass / Metal / Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	147.1	g
WCBDA	8.5	g

Combustion Gas Concentration

Oxygen	8.73	%
Carbon Dioxide	10.34	%
Carbon Monoxide	6.3	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot	SEE
Trendicator	
Control Box	TEST
Incline Manometer	1
Comb.Gas.Analyzer	OMIT
Micromanometer	2
Barometer	
Calipers	

Nozzle Measurements	
1	
2	
3	
4	
Average:	

Notes:

Field Data Sheet

Date: MAR 19/24	Plant:	Covanta DYEC	Test No.: 3	Particle Size	Page 2 of 2
	Plant Location:	Courtice, Ontario	Test Location:	APC Outlet No. 1	

Point	Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O" *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O" *	Pump Vacuum "Hg Gauge *
1	0	87.27	.94	.35	280	262	254	64	70	73	72	.38	4
2	10.7	91.11	.85		278	264	256	48	60	73	72	.38	4
3	21.5	95.04	.86		278	263	256	48	55	73	72	.38	4
4	32.1	98.81	.85		278	262	255	49	55	73	72	.38	4
5	42.4	102.66	.72		278	261	255	48	54	73	72	.38	4
6	51.8	106.05	.62		278	263	257	47	53	75	73	.38	4
	60.6	109.34											
1	0	109.34	.97		278	263	254	51	50	76	74	.38	4
2	10.4	113.02	.95		277	263	255	49	50	76	74	.38	4
3	20.9	116.89	.88		277	263	256	52	51	76	74	.38	4
4	30.9	120.49	.75		277	262	257	50	51	76	74	.38	4
5	40.9	124.09	.67		277	263	256	54	52	76	74	.38	4
6	50.5	127.56	.66		278	263	255	55	53	77	75	.38	4
	59.4	130.83											

Traverse: 2		Traverse: 1	
Start Time: 1350	Initial Leak Check: .005 cfm@ "Hg	Start Time: 1454	Initial Leak Check: cfm @ "Hg
Finish Time: 1451	Final Leak Check: cfm@ "Hg	Finish Time: 1553	Final Leak Check: cfm @ "Hg

Project No.: 22327

Operator : [illegible]

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.:	1 Particle Size
Test Date	MARCH 18, 2024
Test Location	APC Outlet No. 2
Operator	RW

Project No.:	22327
Page	1 of 2
Probe No.:	PM10/2.5
Meter Box No.:	T1
Impinger Box No.:	

Pitot Factor	0.843	
DGMCF	0.987	
Barometric Pressure	29.44	"Hg
Static Pressure	-11.8	"H2O
Nozzle Size	.1776	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	DWELL
Number of Ports	2
Number of Points/Port	12

Probe Liner Glass / Metal / Teflon / Other PFA

Nozzle Glass / Metal / Other_____

Union None / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	173.1	g
WCBDA	8.5	g

Combustion Gas Concentration

Oxygen	8.57	%
Carbon Dioxide	10.75	%
Carbon Monoxide	7.6	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot	SEE PM10/2.5
Trendicator	
Control Box	FEST
Incline Manometer	COE2004
Comb.Gas.Analyzer	
Micromanometer	
Barometer	ENV.CAN
Calipers	BU3906

Nozzle Measurements	
1	
2	
3	
4	
Average:	

Notes:

Field Data Sheet

Date: MAR 18/24	Plant: Covanta DYEC	Test No.: 1	Particle Size	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location:	APC Outlet No. 2	

Point	Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O" *	Desired cfm .35	Stack Temp °F *	Probe Temp °F	Oven Temp °F *	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O" *	Pump Vacuum "Hg Gauge *
1	0	69.96	.75	.75	276	263	256	63	59	65	64	0.38	4
2	10.5	73.74	.71		280	263	255	56	59	66	65	.38	4
3	21.3	77.75	.68		280	263	255	53	59	67	66	.39	4
4	31.7	81.45	.71		283	261	255	50	55	68	67	.38	4
5	41.9	~~84~~ 85.06	.71		283	261	255	50	55	70	67	.39	4
6	51.5	88.45	.62		283	262	255	51	59	71	68	.38	4
	60.5	91.67											
1	0	91.67	.75		284	263	255	53	58	71	68	.39	4
2	10.9	95.52	.73		283	260	257	53	57	72	68	.38	4
3	21.6	99.24	.77		283	263	256	52	57	72	69	.38	4
4	31.6	102.76	.72		284	263	257	52	57	72	69	.38	4
5	41.2	106.12	.67		284	263	258	52	57	72	69	.38	4
6	50.6	109.46	.50		284	264	257	51	59	72	69	.38	4
	59.5	112.59		✓									

Traverse: 2		Traverse: 1	
Start Time: 10:27	Initial Leak Check: .002 cfm@ 16 "Hg	Start Time: 11:30	Initial Leak Check: cfm @ "Hg
Finish Time: 11:27	Final Leak Check: cfm@ "Hg	Finish Time: 12:30	Final Leak Check: cfm @ "Hg

ready to test @ 9:50 waiting on Process

Project No.: 22327

Operator : [illegible]

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 2	Particle Size
Test Date	MAR 18 / 24
Test Location	APC Outlet No. 2
Operator	RW

Project No.:	22327
Page	1 of 2
Probe No.:	AM 10/2.5
Meter Box No.:	71
Impinger Box No.:	9

Pitot Factor	.843	
DGMCF	0.981	
Barometric Pressure	29.44	"Hg
Static Pressure	-11.8	"H2O
Nozzle Size	.1776	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	RWELL
Number of Ports	2
Number of Points/Port	12

Probe Liner Glass / Metal /Teflon / Other PFA

Nozzle Glass / (Metal) / Other_____

Union None / (Metal) / Teflon / Other_____

Pitot Leak Checked? (Yes) No

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	1167.6	g
WCBDA	9.0	g

Combustion Gas Concentration

Oxygen	8.30	%
Carbon Dioxide	11.05	%
Carbon Monoxide	9.1	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot	AM 10/25
Trendicator	
Control Box	COE 2009
Incline Manometer	
Comb.Gas.Analyzer	
Micromanometer	
Barometer	ENVICAN
Calipers	203866

Nozzle Measurements	
1	.1775
2	.1775
3	.1780
4	.1775
Average:	

Notes:

Field Data Sheet

Date: MAR 18/24	Plant: Covanta DYEC	Test No.: 2 Particle Size	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F *	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O *	Pump Vacuum "Hg Gauge *
1	0	12.77	.95	.35	282	261	255	65	74	71	70	.38	4
2	10.2	16.42	.86		281	262	255	59	60	70	70	.38	4
3	20.3	20.00	.96		282	262	256	57	60	71	70	.38	4
4	30.2	23.57	.84		282	262	256	57	60	72	71	.38	4
5	40.3	27.19	.70		282	261	257	57	60	72	71	.38	4
6	50.4	30.82	.61		281	261	258	56	60	72	71	.38	4
	59.8	34.16											
1	0	34.16	.99		281	263	255	59	62	74	72	.38	4
2	10.4	37.88	.97		282	261	256	57	63	75	72	.38	4
3	20.6	41.51	.93		283	262	256	57	63	75	72	.38	4
4	31.1	45.23	.80		282	262	256	56	63	76	73	.38	4
5	41.3	48.85	.84		282	261	257	55	60	76	73	.38	4
6	51.1	52.33	.71		283	260	256	55	60	76	73	.38	4
	60.2	55.53											

Traverse: 2				Traverse: 1			
Start Time: 1421	Initial Leak Check: .002	cfm@ 15	"Hg	Start Time: 1524	Initial Leak Check:	cfm @	"Hg
Finish Time: 1521	Final Leak Check:	cfm@	"Hg	Finish Time: 1624	Final Leak Check:	cfm @	"Hg

ready to test @ 1310 total process is not good on @ 1421

Project No.: 22327

Operator : DM

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 3	Particle Size
Test Date	MARCH 18, 2024
Test Location	APC Outlet No. 2
Operator	[illegible]

Project No.:	22327
Page	1 of 2
Probe No.:	PM10/2.5
Meter Box No.:	7 1
Impinger Box No.:	10

Pitot Factor	0.843	
DGMCF	0.987	
Barometric Pressure	29.46	"Hg
Static Pressure	-1.8	"H2O
Nozzle Size	.1776	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	BWELL	
Number of Ports	2	
Number of Points/Port	12	

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	171.2	g
WCBDA	9.8	g

Combustion Gas Concentration

Oxygen	8.13	%
Carbon Dioxide	11.06	%
Carbon Monoxide	9.8	ppm

Measuring Device	MII Numbers
Probe / Pitot	SEE
Trendicator	
Control Box	TEST
Incline Manometer	
Comb.Gas.Analyzer	/
Micromanometer	/
Barometer	
Calipers	

Nozzle Measurements
1
2
3
4
Average:

Probe Liner Glass / Metal /Teflon / Other PFA

Nozzle Glass / Metal / Other_____

Union None / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: MAR 18/24	Plant:	Covanta DYEC	Test No.: 3	Particle Size	Page 2 of 2
	Plant Location:	Courtice, Ontario	Test Location:	APC Outlet No. 2	

Point	Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F *	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O *	Pump Vacuum "Hg Gauge *
1	0	55.63	.93	.35	281	262	258	65	66	75	74	.38	4
2	10.6	59.44	.91		281	262	257	55	62	74	73	.38	4
3	20.9	63.02	.86		280	262	257	55	62	75	73	.38	4
4	31.0	66.81	.79		280	262	257	52	63	75	73	.38	4
5	41.0	70.41	.71		280	262	257	52	62	75	73	.38	4
6	50.1	73.72	.64		280	262	257	52	62	75	73	.38	4
	58.6	76.76											
1	0	76.76	.76		280	263	256	54	62	75	73	.38	4
2	10.8	80.60	.75		279	263	257	52	62	76	74	.38	4
3	21.6	84.50	.73		280	263	257	52	62	76	74	.38	4
4	32.1	88.29	.70		280	263	257	52	62	76	74	.38	4
5	42.2	91.91	.68		280	263	257	52	60	77	74	.38	4
6	52.2	95.42	.56		281	263	257	52	61	77	74	.38	4
	61.4	98.76											

Traverse: 2			
Start Time: 1657	Initial Leak Check: .002 cfm@ 17 "Hg		
Finish Time: 1756	Final Leak Check: cfm@ "Hg		

Traverse: 1			
Start Time: 1758	Initial Leak Check: cfm @ "Hg		
Finish Time: 1859	Final Leak Check: cfm @ "Hg		

Project No.: 22327

Operator :

APPENDIX 6

SVOC Data Sheets
(30 pages)

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.:	Semi-Volatile Organic Compounds
Test Date	March 20 2024
Test Location	APC Outlet No. 1
Operator	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	
Impinger Box No.:	

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.29	"Hg
Static Pressure	-11.9	"H2O
Nozzle Size	.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5	
Number of Ports	2	
Number of Points/Port	12	

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	721.9	g
WCBDA	20.6	g

Combustion Gas Concentration

Oxygen	8.11	%
Carbon Dioxide	11.00	%
Carbon Monoxide	9.2	ppm

Measuring Device	MII Numbers
Probe / Pitot 15E	
Trendicator	COE 20090
Control Box	COE 20090
Incline Manometer	COE 20090
Comb.Gas.Analyzer	
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements
1
2
3
4
Average:

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: March 20 2024	Plant: Covanta DYEC	Test No.: 1 SVOC	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	29.72	.81	.78	285	252	236	95	82	82	82	2.2	7
	5	33.66	.84	.79	280	256	260	57	48	83	82	2.25	7.5
2	10	37.68	.85	.80	280	257	251	48	48	83	82	2.25	7.5
	15	41.70	.86	.80	280	261	260	48	49	83	83	2.25	8
3	20	45.74	.81	.78	280	261	250	49	49	83	83	2.2	8
	25	49.70	.84	.79	280	264	261	49	48	83	84	2.2	8
4	30	53.69	.76	.76	280	261	251	50	49	83	85	2.05	9
	35	57.48	.73	.74	281	261	261	51	48	84	86	2.0	7.5
5	40	61.23	.70	.73	280	259	255	53	47	84	86	1.95	8
	45	64.94	.70	.73	280	259	258	55	47	84	87	1.9	8
6	50	68.60	.69	.70	280	259	258	54	47	84	87	1.8	7.5
	55	72.21	.65	.70	280	265	252	54	47	84	87	1.8	7.5
7	60	75.73	.71	.73	280	259	261	66	49	85	88	1.9	7.5
	65	79.41	.71	.73	280	265	251	64	49	85	88	1.9	7.5
8	70	83.02	.74	.75	281	260	261	58	48	85	88	2.1	8
	75	86.83	.74	.75	281	265	254	53	48	85	88	2.1	8
9	80	90.66	.75	.75	281	258	260	54	48	85	88	2.1	8
	85	94.47	.76	.76	281	259	257	54	48	85	88	2.1	8
10	90	98.31	.76	.76	278	263	256	54	49	85	87	2.1	8
	95	102.14	.76	.76	277	260	259	54	50	85	87	2.1	8
11	100	105.95	.68	.72	277	264	252	55	51	85	87	1.9	8

Traverse:			
Start Time: 8:10	Initial Leak Check: .005	cfm@ 15	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TT

Field Data Sheet

Date: March 20 2024	Plant: Covanta DYEC	Test No.: 1 SVOC	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	109.64	.74	.75	277	261	260	56	52	85	87	2.0	8
12	110	113.39	.71	.74	277	261	251	56	54	85	87	1.9	8
	115	117.08	.76	.76	277	264	261	57	57	85	87	2.0	8
	120	120.85											

Traverse:					
Start Time:	—	Initial Leak Check:	—	cfm@ —	"Hg
Finish Time:	10:10	Final Leak Check:	.004	cfm@ This	"Hg

Traverse:					
Start Time:		Initial Leak Check:		cfm @	"Hg
Finish Time:		Final Leak Check:		cfm @	"Hg

Project No.: 22327

Operator : TT

Field Data Sheet

Date: March 20 2024	Plant: Covanta DYEC	Test No.: 1 SVOC	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	121.22	.81	.78	280	260	250	52	56	84	84	2.05	8.5
	5	125.12	.81	.78	281	261	259	56	60	83	84	2.15	8.5
2	10	129.05	.85	.80	280	262	254	44	53	83	84	2.2	9
	15	133.08	.83	.79	281	258	258	48	57	83	84	2.2	9
3	20	137.07	.85	.80	281	258	256	49	57	83	85	2.2	9
	25	141.07	.84	.79	282	259	253	56	59	83	85	2.2	9.2
4	30	145.05	.78	.77	282	261	257	56	59	83	85	2.0	9
	35	148.90	.76	.76	282	262	251	56	58	83	85	2	9
5	40	152.66	.71	.73	282	263	260	56	51	83	85	1.95	9
	45	156.38	.74	.75	282	263	250	58	52	83	86	1.95	9
6	50	160.08	.62	.68	283	261	261	58	51	83	86	1.8	8.5
	55	163.65	.61	.68	283	264	254	59	50	83	86	1.65	8.5
7	60	167.09	.67	.71	283	258	260	59	49	83	86	1.8	8.5
	65	170.66	.67	.71	283	260	256	60	54	83	86	1.8	8.5
8	70	174.25	.73	.74	283	263	255	60	52	83	86	1.9	9
	75	177.96	.75	.75	283	263	258	60	54	83	86	1.95	9
9	80	181.62	.75	.75	283	263	250	60	48	83	86	2.05	9
	85	185.39	.71	.73	283	258	260	60	50	83	86	2	9
10	90	189.15	.76	.76	279	262	250	58	50	83	85	2.05	9
	95	192.96	.76	.76	277	263	260	58	51	82	85	2.05	9
11	100	196.79	.63	.69	277	257	253	58	57	82	85	1.7	8

Traverse:			
Start Time: 10:23	Initial Leak Check: .003 cfm@ 17.5 "Hg		
Finish Time:	Final Leak Check: cfm@ "Hg		

Traverse:			
Start Time:	Initial Leak Check: cfm @ "Hg		
Finish Time:	Final Leak Check: cfm @ "Hg		

Project No.: 22327

Operator : TT

Field Data Sheet

Date: March 20 2014	Plant: Covanta DYEC	Test No.: 1 SVOC	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	200.25	.63	.69	277	258	257	60	51	82	84	1.7	8
12	110	203.72	.63	.69	276	262	256	60	54	82	85	1.7	8
	115	207.17	.64	.69	276	261	252	60	55	81	84	1.7	8
	120	210.63											

Traverse:					
Start Time: –	Initial Leak Check: –	cfm@ –	"Hg		
Finish Time:	Final Leak Check: .003	cfm@ 17	"Hg		

Traverse:			
Start Time: /	Initial Leak Check: /	cfm @ /	"Hg
Finish Time: /	Final Leak Check: /	cfm @ /	"Hg

Project No.: 22327

Operator :

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 2	Semi-Volatile Organic Compounds
Test Date	March 20 2024
Test Location	APC Outlet No. 1
Operator	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	
Impinger Box No.:	

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.39	"Hg
Static Pressure	-11.9	"H2O
Nozzle Size	.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5
Number of Ports	2
Number of Points/Port	12

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	768.3	g
WCBDA	16.0	g

Combustion Gas Concentration

Oxygen	8.15	%
Carbon Dioxide	10.87	%
Carbon Monoxide	7.6	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot	See
Trendicator	
Control Box	
Incline Manometer	Yes X
Comb.Gas.Analyzer	
Micromanometer	/
Barometer	
Calipers	

Nozzle Measurements	
1	
2	
3	
4	
Average:	

Notes:

Field Data Sheet

Date: March 20 2024	Plant: Covanta DYEC	Test No.: 2 SVOC	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H₂O	Pump Vacuum "Hg Gauge
1	0	11.14	.83	.79	278	258	259	79	53	80	80	2.15	7
	5	15.08	.83	.78	282	261	250	60	47	80	79	2.1	7
2	10	18.93	.85	.79	282	261	252	58	47	80	79	2.2	7
	15	22.85	.87	.80	283	257	256	58	49	80	80	2.25	8
3	20	26.87	.83	.78	283	264	253	57	49	80	81	2.2	7.5
	25	30.86	.83	.79	282	263	252	57	47	80	82	2.2	7.5
4	30	34.86	.78	.76	282	262	255	57	48	80	82	2.05	7.5
	35	38.70	.78	.76	281	260	252	57	47	80	83	2.05	7.5
5	40	42.52	.80	.77	282	259	252	57	48	81	84	2.1	7.5
	45	46.40	.80	.77	282	258	255	57	49	81	84	2.1	7.5
6	50	50.28	.68	.71	282	260	253	57	50	81	84	1.8	7
	55	53.88	.67	.71	282	264	252	57	52	81	85	1.8	7
7	60	57.46	.69	.72	282	257	257	56	48	81	85	1.85	7
	65	61.08	.69	.72	281	262	251	54	45	82	85	1.85	7
8	70	64.70	.70	.73	280	257	255	53	45	82	85	1.9	7
	75	68.36	.71	.73	280	264	255	52	46	81	85	1.9	7
9	80	72.01	.78	.77	281	261	251	52	48	82	85	2.05	7.5
	85	75.81	.78	.77	281	259	254	52	47	82	85	2.1	7.5
10	90	79.67	.78	.77	277	262	256	52	48	82	85	2.1	7.5
	95	83.56	.76	.76	276	260	252	52	48	82	85	2.0	7.5
11	100	87.37	.72	.74	276	261	252	52	49	82	85	1.9	7.5

Traverse:				
Start Time: 13:18	Initial Leak Check: .004	cfm@ 17	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TT

Field Data Sheet

Date: March 20 2024	Plant: Covanta DYEC	Test No.: 2 SVOC	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	91.05	.72	.74	277	262	255	53	49	82	85	1.95	7
12	110	94.76	.70	.73	276	257	255	52	50	82	85	1.9	7
	115	98.44	.74	.75	276	263	251	52	51	82	85	2	.7
	120	102.15											

Traverse:			
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: 15:18	Final Leak Check: .005	cfm@ 17	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TT

Field Data Sheet

Date: March 20 2024	Plant: Covanta DYEC	Test No.: 2 SVOC	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	102.62	.89	.81	278	256	254	70	58	80	81	2.3	8
	5	106.66	.90	.82	279	258	250	52	49	80	81	2.35	8
2	10	110.75	.90	.82	279	257	253	53	51	80	81	2.35	8
	15	114.98	.95	.84	280	264	254	54	53	80	81	2.4	8.5
3	20	119.19	.87	.80	280	262	253	54	51	80	82	2.25	8
	25	123.22	.83	.79	280	257	255	55	51	80	82	2.15	8
4	30	127.15	.83	.79	279	257	251	56	51	79	82	2.15	8
	35	131.08	.76	.75	278	261	251	56	49	79	82	2.0	7.5
5	40	134.84	.72	.73	278	260	254	58	49	79	82	1.9	7.5
	45	138.48	.75	.75	279	258	253	59	48	79	82	1.95	7.5
6	50	142.17	.61	.67	280	257	250	60	50	79	82	1.7	7.5
	55	145.67	.61	.67	280	258	255	57	48	79	82	1.7	7.5
7	60	149.12	.65	.70	279	257	253	54	48	79	82	1.75	7
	65	152.64	.64	.69	277	260	250	51	48	79	83	1.7	7
8	70	156.10	.64	.69	277	263	253	50	48	78	83	1.7	7
	75	159.60	.66	.70	276	261	254	49	50	78	83	1.75	7
9	80	163.08	.72	.73	276	259	253	49	50	78	83	1.9	7.5
	85	166.77	.72	.73	274	257	250	49	52	79	83	1.9	7.5
10	90	170.43	.74	.75	274	261	254	50	44	79	83	2	7.5
	95	174.21	.74	.75	274	261	255	50	44	79	83	2	8
11	100	178.01	.67	.71	274	261	250	50	44	79	83	2	8

Traverse:					
Start Time: 15:30	Initial Leak Check: .003	cfm@ 17	"Hg		
Finish Time: –	Final Leak Check: –	cfm@ –	"Hg		

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TT

Field Data Sheet

Date: March 20, 2024	Plant: Covanta DYEC	Test No.: 2 SVOC	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	181.65	.67	.71	274	257	253	51	51	74	83	1.9	8
12	110	185.23	.68	.71	274	258	255	51	52	74	83	1.9	8
	115	188.81	.67	.71	274	259	254	52	56	79	83	1.9	8
	120	192.40											

Traverse:					
Start Time:	Initial Leak Check:	~~.00~~	cfm@	~~17~~	"Hg
Finish Time: 17:30	Final Leak Check:	.002	cfm@	17	"Hg

Traverse:					
Start Time:	Initial Leak Check:		cfm @		"Hg
Finish Time:	Final Leak Check:		cfm @		"Hg

Project No.: 22327

Operator :

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 3	Semi-Volatile Organic Compounds
Test Date	March 21 2024
Test Location	APC Outlet No. 1
Operator	

Project No.:	22327
Page	1 of 5
Probe No.:	7 Series
Meter Box No.:	Team 4
Impinger Box No.:	8

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.91	"Hg
Static Pressure	-11.6	"H2O
Nozzle Size	.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5
Number of Ports	2
Number of Points/Port	12

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	754.5	g
WCBDA	19.4	g

Combustion Gas Concentration

Oxygen	8.19	%
Carbon Dioxide	10.91	%
Carbon Monoxide	7.0	ppm

Measuring Device	MII Numbers
Probe / Pitot ISE	
Trendicator	COE 20090
Control Box	COE 20090
Incline Manometer	COE 20090
Comb.Gas.Analyzer	
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements
1
2
3
4
Average:

Probe Liner (Glass) / Metal /Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union (None) /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: March 21 2024	Plant: Covanta DYEC	Test No.: 3 SVOC	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	94.45	.86	.80	278	250	230	73	53	77	76	2.2	8
	5	98.32	.85	.79	280	250	262	53	53	77	77	2.15	8
2	10	102.19	.85	.79	280	254	249	50	54	77	77	2.25	8
	15	106.16	.87	.80	280	256	254	50	56	78	78	2.25	8.5
3	20	110.13	.82	.78	281	250	256	49	55	78	79	2.2	9
	25	114.03	.80	.77	281	250	252	49	57	78	79	2.15	9
4	30	117.99	.75	.74	281	253	253	50	57	78	80	1.9	8
	35	121.65	.75	.74	281	256	250	51	55	78	81	1.95	8
5	40	125.29	.73	.74	281	253	253	51	55	79	81	1.95	8
	45	128.94	.73	.74	282	252	254	52	58	79	82	1.95	8
6	50	132.60	.62	.68	282	250	255	51	57	79	82	1.7	8
	55	136.03	.64	.69	282	255	254	51	54	79	82	1.7	8
7	60	139.47	.71	.73	282	253	251	51	52	79	83	1.9	8
	65	143.10	.69	.72	282	252	252	51	52	79	83	1.9	8
8	70	146.71	.72	.73	281	254	255	51	52	79	83	1.88	8.4
	75	150.37	.73	.74	282	254	255	50	48	79	83	1.95	8.4
9	80	154.09	.77	.76	281	249	251	51	43	79	83	2.0	8.4
	85	157.85	.78	.76	282	249	251	51	44	79	83	2.06	8.5
10	90	161.66	.81	.78	282	251	254	51	45	80	83	2.1	8.9
	95	165.59	.82	.78	280	250	255	52	45	80	83	2.2	9
11	100	169.57	.72	.73	280	249	254	52	45	79	82	2.22	9.1

Traverse:			
Start Time: 8:07	Initial Leak Check: .006 cfm@ 15 "Hg		
Finish Time:	Final Leak Check: cfm@ "Hg		

Traverse:			
Start Time:	Initial Leak Check: cfm @ "Hg		
Finish Time:	Final Leak Check: cfm @ "Hg		

Project No.: 22327

Operator : TT

Field Data Sheet

Date: March 21, 2024	Plant: Covanta DYEC	Test No.: 3 SVOC	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	173.33	.72	.73	280	254	255	53	45	79	82	2.0	8.5
12	110	177.03	.71	.73	280	254	251	54	45	79	82	1.98	8.5
	115	180.71	.70	.72	280	248	250	54	44	79	83	1.94	8.2
	120	184.365											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 10:07	Final Leak Check: .003	cfm@ 18	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator :

Field Data Sheet

Date: March 21 2014	Plant: Covanta DYEC	Test No.: 3 SVOC	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	184.735	.86	.80	280	251	255	59	43	79	80	2.27	9.3
	5	188.69	.85	.79	281	250	250	56	47	79	81	2.27	9.3
2	10	192.67	.81	.77	281	251	252	54	46	79	81	2.27	9.3
	15	196.6	.82	.78	280	250	254	55	45	79	81	2.19	9
3	20	200.53	.85	.79	280	251	253	56	46	79	81	2.2	9
	25	204.52	.85	.79	281	252	255	57	47	79	82	2.25	9.2
4	30	208.53	.78	.76	281	255	254	57	47	79	82	2.25	9.2
	35	212.41	.76	.75	281	254	251	57	46	79	82	2.12	9.1
5	40	216.18	.68	.71	281	250	253	57	47	79	82	1.85	8.9
	45	219.74	.69	.72	281	255	255	57	45	79	82	1.85	8.5
6	50	223.32	.68	.71	282	254	255	57	46	80	83	1.85	8.5
	55	226.89	.68	.71	282	252	250	57	45	80	83	1.85	8.5
7	60	230.46	.67	.71	281	252	254	57	45	80	84	1.85	8.5
	65	234.02	.65	.70	281	256	255	56	44	80	83	1.8	8.5
8	70	237.55	.66	.70	281	253	256	56	45	80	83	1.8	8.5
	75	241.1	.69	.72	280	256	251	57	45	80	83	1.85	8.5
9	80	244.69	.70	.72	280	251	254	57	46	80	83	1.9	8.5
	85	248.33	.72	.73	280	253	256	58	46	80	83	1.9	8.5
10	90	252.00	.71	.73	280	250	253	59	47	80	83	2.0	9
	95	255.69	.67	.71	280	250	252	60	47	80	83	2	9
11	100	259.28	.67	.71	280	256	255	60	47	80	83	1.85	8.7

Traverse:			
Start Time: 10:15	Initial Leak Check: .004	cfm@ 17	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TC

Field Data Sheet

Date: Mar 21, 2024	Plant: Covanta DYEC	Test No.: 3 SVOC	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	262.87	.68	.71	280	255	255	60	44	80	83	1.85	8.7
12	110	266.46	.63	.69	280	252	254	60	44	80	83	1.9	8.9
	115	269.95	.65	.70	280	255	251	60	44	80	83	1.75	8.5
	120	273.41											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 12:15	Final Leak Check: .003	cfm@ 17	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TC.

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 1	Semi-Volatile Organic Compounds
Test Date March 20, 2024	
Test Location	APC Outlet No. 2
Operator BP	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.: TEAM 3	
Impinger Box No.: 14	

Pitot Factor	.843	
DGMCF	.986	
Barometric Pressure	29.29	"Hg
Static Pressure	-11.71	"H2O
Nozzle Size	.2498	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5
Number of Ports	2
Number of Points/Port	12

Probe Liner (Glass) / Metal /Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union None /Metal / (Teflon) / Other_____

Pitot Leak Checked? (Yes) No

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	659.5	g
WCBDA	13.0	g

Combustion Gas Concentration

Oxygen	8.20	%
Carbon Dioxide	11.08	%
Carbon Monoxide	11.9	ppm

Measuring Device	MII Numbers
Probe / Pitot SP4	BC4011
Trendicator	COF 2093
Control Box	↓
Incline Manometer	↓
Comb.Gas.Analyzer	
Micromanometer	
Barometer	ENV CAN
Calipers	CAN22136

Nozzle Measurements	
1	.2495
2	.2500
3	.2500
4	.2495
Average:	.2498

Site Diagram

Notes:

Field Data Sheet

Date: March 20, 2024	Plant: Covanta DYEC	Test No.: 1 SVOC	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	68.18	.79	.74	282	247	255	80	45	84	84	2.1	5.0
	5	71.85	.82	.76	283	253	254	50	45	84	85	2.1	5
2	10	75.63	.80	.75	283	250	255	47	46	84	85	~~2.5~~ 2.2	5.9
	15	79.42	.79	.74	283	248	256	47	46	84	86	2.2	5.9
3	20	83.20	.75	.73	283	251	257	47	46	85	86	2.1	5.9
	25	86.74	.75	.73	283	252	252	47	44	85	87	2	5
4	30	90.36	.72	.71	283	254	252	48	46	85	88	2	5.5
	35	94.03	.73	.72	284	256	253	47	47	86	89	1.95	5.5
5	40	97.69	.65	.67	284	251	253	48	47	86	89	1.95	5.5
	45	101.10	.65	.68	284	249	253	48	46	87	90	1.7	5
6	50	104.39	.58	.64	285	249	254	50	46	87	90	1.8	5
	55	107.68	.60	.65	285	250	254	49	45	88	91	1.6	5
7	60	111.02	.60	.65	285	251	255	49	44	88	92	1.6	5
	65	114.36	.59	.65	285	255	253	49	44	89	92	1.6	5
8	70	117.77	.67	.67	285	255	252	50	45	89	92	1.6	5
	75	121.13	.63	.67	284	254	254	50	45	89	92	1.7	5
9	80	124.51	.65	.68	285	254	256	50	45	89	93	1.7	5
	85	127.96	.65	.68	285	254	255	50	47	90	93	1.8	5.5
10	90	131.45	.64	.68	285	255	254	50	47	90	93	1.8	5.5
	95	134.92	.62	.67	283	255	255	50	47	90	93	1.8	5.5
11	100	138.29	.51	.61	283	254	254	51	46	90	93	1.7	5

Traverse: 2			
Start Time: 8:13	Initial Leak Check: .004	cfm@ 15	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : KP

Field Data Sheet

Date: March 20, 2024	Plant: Covanta DYEC	Test No.: 1 SVOC	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	141.38	.51	.61	280	255	253	51	45	90	93	1.4	4.9
12	110	144.46	.52	.61	280	253	255	51	45	90	93	1.4	4.9
	115	147.54	.54	.62	280	250	254	51	46	90	93	1.4	4.9
	120	150.70											

Traverse: 2			
Start Time:	Initial Leak Check:	cfm@ 15	"Hg
Finish Time: 10:13	Final Leak Check: .003	cfm@ 15	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : BP

Field Data Sheet

Date: March 20, 2014	Plant: Covanta DYEC	Test No.: 1 SVOC	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	151.10	.76	.74	286	248	255	60	42	90	90	2	5.5
	5	154.80	.76	.74	285	254	252	51	43	90	90	2	5.5
2	10	158.50	.75	.73	285	254	253	48	43	89	90	2	5.5
	15	162.20	.76	.74	285	252	253	47	43	89	90	2	5.5
3	20	165.91	.77	.74	285	252	253	46	43	89	91	2	5.5
	25	169.61	.77	.74	286	250	252	46	43	89	91	2	5.5
4	30	173.33	.73	.72	286	254	254	46	43	89	91	2.1	6
	35	177.02	.73	.72	286	250	255	46	43	89	92	2.0	5.9
5	40	180.71	.67	.69	286	255	255	46	43	89	92	2.0	5.9
	45	184.20	.67	.69	286	244	254	47	42	89	92	1.8	5
6	50	187.71	.60	.65	286	253	256	47	42	89	92	1.8	5
	55	191.01	.60	.65	287	256	255	48	42	90	92	1.65	5
7	60	194.32	.65	.68	287	244	253	48	42	89	92	1.65	5
	65	197.81	.64	.68	286	255	252	48	42	90	92	1.8	5.
8	70	201.27	.64	.68.	286	256	252	48	42	90	92	1.7	5.
	75	204.70	.65	.68.	286	250	253	48	42	90	93	1.7	5
9	80	208.13	.67	.69	286	244	252	48	42	90	92	1.7	5
	85	211.63	.68	.70	287	251	252	48	42	90	93	1.8	5.5
10	90	215.14	.71	.71	287	253	251	48	42	90	92	1.8	5.5
	95	218.76	.70	.71	288	254	253	48	43	90	92	2	6
11	100	222.40	.72	.71	284	255	254	44	43	90	92	2	6

Traverse: 1			
Start Time: 10:28	Initial Leak Check: .003	cfm@ 15	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : BP

Field Data Sheet

Date: March 20, 2024	Plant: Covanta DYEC	Test No.: 1 SVOC	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	225.97	.69	.70	289	255	254	44	43	90	92	1.9	6
12	110	229.50	.65	~~.71~~ .68	289	250	252	44	43	90	91	1.9	6
	115	233.03	.62	.66	289	255	255	50	43	90	92	1.8	5.9
	120	236.42											

Traverse: 1			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 12:28	Final Leak Check: .003	cfm@ 15	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : BP

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 2	Semi-Volatile Organic Compounds
Test Date March 20, 2024	
Test Location	APC Outlet No. ~~3~~ 2
Operator BP	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	TEAM 3
Impinger Box No.:	

Pitot Factor	.843	
DGMCF	.986	
Barometric Pressure	29.39	"Hg
Static Pressure	-11.71	"H2O
Nozzle Size	.2498	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5	
Number of Ports	2	
Number of Points/Port	12	

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	714.9	g
WCBDA	14.3	g

Combustion Gas Concentration

Oxygen	8.01	%
Carbon Dioxide	11.20	%
Carbon Monoxide	7.7	ppm

Measuring Device	MII Numbers
Probe / Pitot SPM	B04011
Trendicator	COE20093
Control Box	↓
Incline Manometer	
Comb.Gas.Analyzer	
Micromanometer	
Barometer	ENV CAN
Calipers	CAN22136

Nozzle Measurements	
1	.2495
2	.2500
3	.2500
4	.2495
Average:	.2498

Probe Liner (Glass) / Metal /Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union None /Metal / (Teflon) / Other_____

Pitot Leak Checked? (Yes) No

Site Diagram

Notes:

Field Data Sheet

Date: March 20, 2024	Plant: Covanta DYEC	Test No.: 2 SVOC	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H₂O	Pump Vacuum "Hg Gauge
1	0	37.02	.89	.79	282	251	258	74	47	85	85	2.3	5
	5	40.98	.88	.78	288	255	252	62	47	85	85	2.3	5.5
2	10	44.96	.85	.77	288	251	252	57	47	85	85	2.3	5.9
	15	48.84	.87	.78	289	250	254	54	46	85	86	2.2	5.9
3	20	52.74	.84	.77	288	254	255	53	47	85	86	2.3	6
	25	56.73	.84	.77	288	251	255	53	47	85	86	2.2	6
4	30	60.60	.76	.73	287	254	253	53	46	85	87	2.2	6
	35	64.27	.76	.73	287	256	253	54	46	85	88	1.98	5.5
5	40	67.94	.70	.70	287	249	253	54	45	85	88	1.98	5.5
	45	71.47	.69	.70	287	250	254	55	44	86	88	1.81	5.1
6	50	74.98	.62	.66	287	249	253	55	45	86	89	1.77	5.0
	55	78.33	.60	.65	287	255	255	56	45	86	89	1.63	4.9
7	60	81.62	.68	.69	287	253	254	56	45	86	90	1.54	4.9
	65	85.13	.66	.68	287	253	253	56	46	87	90	1.75	5
8	70	88.59	.73	.72	287	252	254	56	43	87	90	1.71	5
	75	92.19	.76	.73	287	256	253	56	44	87	90	1.9	5
9	80	95.9	.77	.74	288	256	252	57	45	88	90	1.97	5.7
	85	99.63	.82	.76	289	256	252	57	45	88	90	1.99	5.8
10	90	103.46	.73	.72	288	255	252	58	46	88	90	2.11	5.9
	95	107.13	.74	.72	288	255	252	58	46	88	90	1.9	5.6
11	100	110.98	.64	.68	280	256	253	59	46	88	90	1.93	5.6

Traverse: 2		
Start Time: 13:13	Initial Leak Check: .010 cfm@ 15 "Hg	
Finish Time:	Final Leak Check: cfm@ "Hg	

Traverse:		
Start Time:	Initial Leak Check: cfm @ "Hg	
Finish Time:	Final Leak Check: cfm @ "Hg	

Project No.: 22327

Operator: BP / TC

Field Data Sheet

Date: March 20, 2024	Plant: Covanta DYEC	Test No.: 2 SVOC	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	114.23	.59	.62	280	256	252	60	45	88	90	1.69	5.
12	110	117.54	.55	.63	280	254	252	61	44	88	91	1.55	4.9
	115	120.75	.54	.62	280	250	252	61	44	88	91	1.46	4.8
	120	123.918										1.41	4.7

Traverse: 2			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 15:13	Final Leak Check: .004	cfm@ 15	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TC

Field Data Sheet

Date: March 20, 2024	Plant:	Covanta DYEC	Test No.: 2	SVOC	Page 4 of 5
	Plant Location:	Courtice, Ontario	Test Location:	APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
1	0	124.32	.83	.77	287	249	251	74	43	88	88	2.13	6.
	5	128.10	.86	.78	286	255	253	60	47	87	87	2.13	6.
2	10	132.03	.83	.76	286	254	254	58	47	87	87	2.2	6.2
	15	135.90	.81	.76	286	254	254	57	47	87	88	2.1	6.
3	20	139.73	.78	.74	285	256	254	57	47	87	88	2.09	6.
	25	143.52	.80	.75	284	253	254	58	47	86	88	2.01	5.9
4	30	147.25	.76	.73	284	252	255	58	47	86	88	2.05	5.9
	35	150.98	.79	.75	284	255	255	59	46	86	88	2.	5.9.
5	40	154.73	.68	.69	285	256	252	59	46	86	88	2.07	5.9
	45	158.21	.67	.69	285	250	252	58	44	86	88	1.75	5.1
6	50	161.67	.62	.66	284	256	254	58	45	86	88	1.75	5.0.
	55	165.06	.61	.66	284	253	255	59	44	86	88	1.62	5.0
7	60	168.39	.65.	.68.	283	249	255	59	45	86	88	1.6	5.0
	65	171.77	.64	.67	283	250	252	59	45	86	88	1.69	5.0
8	70	175.14	.65	.68	283	252	255	59	46	86	88	1.69	5.0.
	75	178.53	.67	.69	283	254	255	57	45	86	88	1.72	5.0
9	80	182.00	.67	.69	282	256	253	55	46	86	89	1.77	5.5.
	85	185.47	.70	.70	282	255	252	55	47	86	89	1.77	5.5.
10	90	188.99	.70	.70	283	253	255	55	49	86	90	1.83	6.
	95	192.55	.72	.71	283	249	256	55	48	86	89	1.84	6.
11	100	196.17	.66		280	252	252	55	49	86	89	1.89	6.2

Traverse: 1			
Start Time: 15:26	Initial Leak Check: .001	cfm@ 15.	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator: TC/RP

Field Data Sheet

Date: March 20, 2024	Plant: Covanta DYEC	Test No.: 2 SVOC	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	199.59	.71	.71	280	251	253	56	48	86	88	1.75	5.9
12	110	203.15	.77	.74	280	249	254	56	49	86	88	1.85	6.
	115	206.85	.60	.65.	280	253	256	57	51	86	88	2.0	6.2
	120	210.18.											

Traverse: 1			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 17:26.	Final Leak Check: .001	cfm@ 15.	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator :

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 3	Semi-Volatile Organic Compounds
Test Date March 21, 2024	
Test Location	APC Outlet No. 2
Operator BP	

Project No.:	22327
Page	1 of 5
Probe No.:	
Meter Box No.:	TEAM 3
Impinger Box No.:	

Pitot Factor	.843	
DGMCF	.986	
Barometric Pressure	29.92	"Hg
Static Pressure	-11.71	"H2O
Nozzle Size	.2498	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5	
Number of Ports	2	
Number of Points/Port	12	

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	653.0	g
WCBDA	15.4	g

Combustion Gas Concentration

Oxygen	8.45	%
Carbon Dioxide	11.03	%
Carbon Monoxide	8.9	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot SP4	R04011
Trendicator	GE2093
Control Box	↓
Incline Manometer	
Comb.Gas.Analyzer	
Micromanometer	
Barometer	EW CAN
Calipers	CAN 22136

Nozzle Measurements	
1	.2495
2	.2500
3	.2500
4	.2495
Average:	.2498

Notes:

Field Data Sheet

Date: March 21, 2014	Plant: Covanta DYEC	Test No.: 3 SVOC	Page 2 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H₂O	Pump Vacuum "Hg Gauge
1	0	92.71	.77	.73	280	255	250	71	51	79	79	2.0	6
	5	96.40	.79	.74	282	253	250	52	44	79	80	2	6.5
2	10	100.08	.81	.75	282	248	255	53	44	79	80	2	6.5
	15	103.87	.82	.75	283	254	253	52	45	80	81	2.1	7
3	20	107.65	.79	.74	284	256	256	52	45	80	82	2.1	7
	25	111.40	.83	.76	287	260	252	56	45	81	81	2.1	7
4	30	115.20	.75	.71	288	230	254	52	47	81	81	2.1	7
	35	118.73	.74	.71	288	264	254	52	45	81	82	1.9	6.9
5	40	~~112~~ 122.30	.70	.69	~~288~~	259	256	53	46	81	82	1.9	6.9
	45	125.86	.68	.68	288	250	253	53	46	81	83	1.9	6.9
6	50	129.38	.56	.67	288	260	252	54	46	81	84	1.8	6.9
	55	132.62	.56	.67	287	260	252	54	44	81	84	1.5	6
7	60	135.74	.60	.65	286	253	255	55	45	82	85	1.4	5.9
	65	139.01	.60	.65	286	260	258	55	45	82	85	1.6	6
8	70	142.32	.64	.67	285	252	251	55	45	83	86	1.6	6
	75	145.69	.63	.66	285	254	254	55	47	83	86	1.7	6.5
9	80	149.10	.62	.66	285	260	256	55	47	83	86	1.7	6.5
	85	~~153.50~~ 152.5	.64	.65	284	257	255	55	49	83	86	1.7	6.5
10	90	155.84	.60	.65	282	254	253	56	48	83	86	1.6	6
	95	159.08	.58	.64	281	260	252	56	47	84	86	1.5	6
11	100	162.33	.51	.60	281	256	252	57	45	84	86	1.6	6

Traverse: 2			
Start Time: 11:31	Initial Leak Check: .003	cfm@ 15.5	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator: RP

Paused at 11:53. - Asked to pause by control room.
Resumed at 12:08

Field Data Sheet

Date: March 21, 2024	Plant: Covanta DYEC	Test No.: 3 SVOC	Page 3 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	165.44	.53	.61	281	260	253	57	44	84	86	1.4	5.5
12	110	168.45	.52	.61	281	258	254	57	46	84	86	1.4	5.5
	115	171.55	.55	.62	281	260	253	57	45	84	87	1.4	5.5
	120	174.77											

Traverse: 2			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: ~~13:37~~ 13:46	Final Leak Check: .002	cfm@ 15	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : BP

Field Data Sheet

Date: March 21, 2024	Plant: Covanta DYEC	Test No.: 3 SVOC	Page 4 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	175.04	.70	.70	281	258	253	70	45	84	84	1.9	7
	5	178.68	.71	.70	284	260	254	57	46	84	85	1.9	7
2	10	182.23	.71	.70	285	258	254	54	47	84	85	1.85	6.9
	15	185.75	.73	.71	285	264	253	52	45	84	85	1.85	6.9
3	20	189.30	.76	.73	285	262	252	52	45	83	86	1.9	7
	25	193.03	.77	.73	285	251	253	52	47	83	86	2	7
4	30	196.75	.75	.72	285	263	252	52	46	84	86	2	7.5
	35	200.46	.73	.72	285	263	255	52	47	84	86	2	7.5
5	40	~~204.06~~ 204.06	.68	.69	285	264	256	52	47	84	86	1.9	7
	45	207.58	.67	.69	285	260	255	52	46	84	86	1.8	7
6	50	211.08	.60	.65	285	263	255	52	46	84	86	1.8	7
	55	214.38	.62	.66	285	261	255	53	45	84	86	1.6	6
7	60	217.75	.67	.69	286	261	252	53	46	84	87	1.7	6.5
	65	221.25	.65	.67	286	265	252	53	47	84	87	1.8	6.9
8	70	224.62	.64	.67	285	262	255	53	46	84	87	1.7	6.5
	75	228.03	.65	.68	285	262	257	53	46	84	87	1.7	6.5
9	80	231.48	.68	.69	285	256	257	54	48	84	87	1.75	6.9
	85	234.98	.68	.69	285	262	255	54	48	84	87	1.8	7
10	90	238.48	.68	.69	285	265	253	54	48	84	87	1.8	7
	95	241.97	.69	.70	285	264	254	54	50	84	87	1.8	7
11	100	245.46	.61	.65	286	258	255	53	44	84	87	1.85	7.5

Traverse: 1			
Start Time: 13:54	Initial Leak Check: .003 cfm@ 15 "Hg		
Finish Time:	Final Leak Check: cfm@ "Hg		

Traverse:			
Start Time:	Initial Leak Check: cfm @ "Hg		
Finish Time:	Final Leak Check: cfm @ "Hg		

Project No.: 22327

Operator: BP

Field Data Sheet

Date: March 21, 2024	Plant: Covanta DYEC	Test No.: 3 SVOC	Page 5 of 5
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	105	248.78	.61	.65	282	259	257	53	47	84	86	1.6	6.5
12	110	252.09	.61	.66	282	263	256	53	47	84	87	1.65	6.5
	115	255.42	.60	.65	282	263	253	53	47	84	87	1.65	6.5
	120	258.77											

Traverse: 1					
Start Time:	Initial Leak Check:		cfm@		"Hg
Finish Time: 15:54	Final Leak Check:	.001	cfm@	16	"Hg

Traverse:					
Start Time:	Initial Leak Check:		cfm @		"Hg
Finish Time:	Final Leak Check:		cfm @		"Hg

Project No.: 22327

Operator : BP

APPENDIX 7

Acid Gas Field Data Sheets
(12 pages)

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.:	M26A
Test Date	March 18 2024
Test Location	APC Outlet No. 1
Operator	TT

Project No.:	22327
Page	1 of 2
Probe No.:	
Meter Box No.:	Team 4
Impinger Box No.:	

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.45	"Hg
Static Pressure	-11.72	"H2O
Nozzle Size	.2586 ~~.2498~~	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5	
Number of Ports	1	
Number of Points/Port	1	

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	165.6	g
WCBDA	11.7	g

Combustion Gas Concentration

Oxygen	8.76	%
Carbon Dioxide	10.41	%
Carbon Monoxide	5.7	ppm

Measuring Device	MII Numbers
ISE	
Probe / Pitot ~~SP4~~	
Trendicator	CoE 20090
Control Box	CoE 20090
Incline Manometer	CoE 20090
Comb.Gas.Analyzer	
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements	
1	~~.2495~~ 2585
2	~~.2500~~ 2570
3	~~.2500~~ 2600
4	~~.2495~~ 2570
Average:	~~.2498~~ .2586

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: March 18 2024	Plant: Covanta DYEC	Test No.: 1 M26A	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	M26A Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/~~Trap~~ °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	713.43	.78	.74	275	254	250	62	98	62	62	2.0	5
	5	717.12	.80	.75	275	256	247	48	209	62	62	2.05	5
	10	720.87	.77	.74	275	259	249	46	212	62	62	2.0	5
	15	724.59	.76	.73	276	261	250	47	211	63	64	1.95	5
	20	728.25	.77	.74	277	261	247	48	210	63	65	2.05	5
	25	731.97	.77	.74	278	257	245	49	210	63	67	2.05	5
	30	735.70	.77	.74	278	261	248	49	210	63	68	2.05	5
	35	739.43	.73	.72	278	257	250	50	212	64	69	1.95	5
	40	743.08	.73	.72	278	258	250	51	210	64	70	1.95	5
	45	746.72	.73	.73	277	260	247	50	208	65	70	1.95	5
	50	750.34	.73	.73	278	260	245	49	211	65	71	1.95	5
	55	753.94	.75	.74	278	255	248	48	212	65	71	2.05	5
	60	757.71											

Traverse:			
Start Time: 10:10	Initial Leak Check: .008 cfm@ 15" "Hg		
Finish Time: 11:10	Final Leak Check: .007 cfm@ 15" "Hg		

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TT

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.:	2 M26A
Test Date	March 18 2024
Test Location	APC Outlet No. 1
Operator	

Project No.:	22327
Page	1 of 2
Probe No.:	
Meter Box No.:	
Impinger Box No.:	

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.44	"Hg
Static Pressure	-11.72	"H2O
Nozzle Size	.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5
Number of Ports	1
Number of Points/Port	1

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	175.7	g
WCBDA	12.5	g

Combustion Gas Concentration

Oxygen	8.84	%
Carbon Dioxide	10.37	%
Carbon Monoxide	6.2	ppm

Measuring Device	MII Numbers
Probe / Pitot	
Trendicator	
Control Box	
Incline Manometer	
Comb.Gas.Analyzer	
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements	
1	
2	
3	
4	
Average:	

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: March 18 2024	Plant: Covanta DYEC	Test No.: 2 M26A	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	M26A Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F *	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O *	Pump Vacuum "Hg Gauge *
1	0	758.1	.87	.78	280	257	246	61	122	65	64	2.25	6
	5	762.05	.87	.78	281	255	246	47	195	65	64	2.25	6
	10	766.02	.87	.78	281	261	248	46	195	65	64	2.25	6
	15	769.98	.82	.76	281	260	250	46	192	65	65	2.15	6
	20	773.88	.82	.76	281	256	251	47	182	65	66	2.1	6
	25	777.71	.77	.74	280	255	247	47	181	65	66	2.0	6
	30	781.45	.77	.74	279	260	247	47	181	65	67	2	6
	35	785.18	.77	.74	278	259	250	48	182	66	68	2	6
	40	788.92	.77	.74	278	255	252	48	182	66	69	2	6
	45	792.65	.84	.78	278	258	248	49	182	66	69	2.2	6
	50	796.55	.86	.79	279	255	246	49	182	67	70	2.25	6.5
	55	800.52	.84	.78	280	255	250	50	186	67	70	2.2	6.5
	60	804.52											

Traverse:			
Start Time: 11:54	Initial Leak Check: .008	cfm@ 19	"Hg
Finish Time: 12:54	Final Leak Check: .01	cfm@ 21	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

static – 11.72

Project No.: 22327

Operator : TT

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.:	3 M26A
Test Date	March 18 2024
Test Location	APC Outlet No. 1
Operator	TT

Project No.:	22327
Page	1 of 2
Probe No.:	
Meter Box No.:	
Impinger Box No.:	

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.43	"Hg
Static Pressure	-11.72	"H2O
Nozzle Size	.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5
Number of Ports	1
Number of Points/Port	1

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	184.0	g
WCBDA	13.8	g

Combustion Gas Concentration

Oxygen	8.80	%
Carbon Dioxide	10.27	%
Carbon Monoxide	5.3	ppm

Measuring Device	MII Numbers
Probe / Pitot	See
Trendicator	
Control Box	
Incline Manometer	
Comb.Gas.Analyzer	
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements
1
2
3
4
Average:

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: March 18 2024	Plant: Covanta DYEC	Test No.: 3 M26A	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 1	

Point	M26A Clock Time *	Dry Gas Meter ft^3 *	Pitot Δ P "H_2O" *	Desired cfm	Stack Temp °F *	Probe Temp °F	Oven Temp °F *	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F *	Meter Temp Inlet °F *	Meter Pressure Δ H "H_2O" *	Pump Vacuum "Hg Gauge *
1	0	805.22	.77	.74	280	259	250	67	79	67	67	2.0	5
	5	808.93	.77	.74	280	260	247	49	203	67	67	2.0	5
	10	812.67	.77	.74	280	257	248	47	205	67	68	2	5
	15	816.41	.84	.78	280	261	251	48	206	67	70	2.2	5.5
	20	820.34	.87	.79	280	260	252	49	207	67	71	2.25	5.5
	25	824.35	.82	.77	281	262	250	51	207	68	72	2.15	5.5
	30	828.25	.82	.77	280	255	247	53	206	68	73	2.15	5.5
	35	832.13	.82	.77	280	262	248	55	207	68	74	2.15	5.5
	40	836.00	.87	.80	281	262	251	55	207	69	74	2.3	6
	45	~~837~~ 840.01	.87	.80	281	258	252	56	208	69	74	2.3	6
	50	844.03	.87	.80	281	255	248	58	207	69	75	2.3	6
	55	848.09	.87	.80	281	256	248	59	208	69	75	2.3	6
	60	85-.08											

Traverse:					
Start Time: 13:32	Initial Leak Check: .008	cfm@	21	"Hg
Finish Time: 14:32	Final Leak Check: .014	cfm@	20	"Hg

Traverse:					
Start Time: /	Initial Leak Check: /	cfm @	/	"Hg
Finish Time: /	Final Leak Check: /	cfm @	/	"Hg

Project No.: 22327

Operator : TT

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 1	M26A
Test Date	March 19 2024
Test Location	APC Outlet No. 2
Operator	TT

Project No.:	22327
Page	1 of 2
Probe No.:	
Meter Box No.:	Team 4
Impinger Box No.:	

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.44	"Hg
Static Pressure	-11.3	"H2O
Nozzle Size	.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5	
Number of Ports	1	
Number of Points/Port	1	

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	197.8	g
WCBDA	10.0	g

Combustion Gas Concentration

Oxygen	8.63	%
Carbon Dioxide	10.72	%
Carbon Monoxide	6.6	ppm

Measuring Device	MII Numbers
Probe / Pitot 15E	
Trendicator	COE 20090
Control Box	COE 20090
Incline Manometer	COE 20090
Comb.Gas.Analyzer	
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements	
1	.2585
2	.2590
3	.2600
4	.2570
Average:	.2586

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: March 19 2024	Plant: Covanta DYEC	Test No.: 1 M26A	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	M26A Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	52.56	.65	.68	277	255	249	63	121	63	63	1.65	5
	5	55.97	.65	.68	278	260	249	47	213	63	62	1.65	5
	10	59.30	.67	.69	279	259	250	46	216	63	63	1.8	5
	15	62.77	.67	.69	280	258	249	46	216	63	64	1.75	5
	20	66.26	.70	.70	280	257	247	47	217	64	66	1.8	5.5
	25	69.81	.73	.72	281	260	246	47	217	64	67	1.9	5.5
	30	73.45	.73	.72	282	260	247	48	218	64	68	1.9	5.5
	35	77.03	.81	.76	284	261	249	49	216	65	69	2.1	6
	40	80.82	.81	.76	285	258	250	50	214	65	70	2.1	6
	45	84.67	.82	.76	286	259	251	51	214	65	70	2.1	6
	50	88.52	.82	.76	286	259	250	51	213	65	70	2.1	6
	55	92.38	.87	.79	287	260	249	52	213	66	71	2.2	6
	60	96.37											

Traverse:			
Start Time: 8:13	Initial Leak Check: .01	cfm@ 19	"Hg
Finish Time: 9:17	Final Leak Check: .01	cfm@ 17	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TT

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.:	2 M26A
Test Date	March 19 2024
Test Location	APC Outlet No. 2
Operator	

Project No.:	22327
Page	1 of 2
Probe No.:	
Meter Box No.:	
Impinger Box No.:	

Pitot Factor	.844	
DGMCF	1.018	
Barometric Pressure	29.42	"Hg
Static Pressure	-11.3	"H2O
Nozzle Size	0.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5
Number of Ports	1
Number of Points/Port	1

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	162.3	g
WCBDA	10.7	g

Combustion Gas Concentration

Oxygen	8.64	%
Carbon Dioxide	10.67	%
Carbon Monoxide	7.5	ppm

Measuring Device	MII Numbers
Probe / Pitot	See
Trendicator	
Control Box	
Incline Manometer	
Comb.Gas.Analyzer	X
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements
1
2
3
4
Average:

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: March 19 2024	Plant: Covanta DYEC	Test No.: 2 M26A	Page 2 of 2
	Plant Location: Courtice, Ontario	Test Location: APC Outlet No. 2	

Point	M26A Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	96.82	.72	.71	278	256	250	60	150	63	63	1.9	5
	5	100.48	.75	.72	282	261	248	47	224	63	63	2.0	5
	10	104.11	.75	.72	282	256	249	46	225	63	64	2.0	5
	15	107.74	.75	.72	282	260	248	47	227	63	67	2.0	5
	20	111.51	.75	.72	282	260	249	47	227	63	67	2	5
	25	115.11	.77	.74	283	259	250	47	227	63	68	2.05	5
	30	118.87	.77	.74	282	260	246	48	225	64	68	2.05	5.5
	35	122.65	.77	.74	282	258	248	48	227	64	69	2.0	5.5
	40	126.37	.77	.74	282	261	251	48	227	64	69	2.0	5.5
	45	130.08	.72	.71	282	258	249	49	226	64	69	1.9	5.5
	50	133.73	.73	.72	281	258	245	49	225	64	70	2	5.5
	55	137.46	.72	.72	281	256	248	52	227	64	70	1.9	5.5
	60	141.09											

Traverse:					
Start Time: 9:50	Initial Leak Check: .008	cfm@ 15	"Hg		
Finish Time: 10:56	Final Leak Check: .008	cfm@ 15	"Hg		

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22327

Operator : TT

ORTECH Consulting Alliance Inc.

Plant	Covanta DYEC
Plant Location	Courtice, Ontario
Test No.: 3	M26A
Test Date	March 19 2024
Test Location	APC Outlet No. 2
Operator	

Project No.:	22327
Page	1 of 2
Probe No.:	
Meter Box No.:	
Impinger Box No.:	

Pitot Factor	0.84	
DGMCF	1.018	
Barometric Pressure	29.36	"Hg
Static Pressure	-11.3	"H2O
Nozzle Size	0.2586	inches
Stack Diameter	4.5	feet
Length		feet
Width		feet
Port length:	11	inches

Reading Interval	5	
Number of Ports	1	
Number of Points/Port	1	

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	167.5	g
WCBDA	13.0	g

Combustion Gas Concentration

Oxygen	8.10	%
Carbon Dioxide	11.17	%
Carbon Monoxide	9.7	ppm

Measuring Device	MII Numbers
Probe / Pitot	
Trendicator	
Control Box	
Incline Manometer	
Comb.Gas.Analyzer	
Micromanometer	
Barometer	
Calipers	

Nozzle Measurements
1
2
3
4
Average:

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: March 19 2024	Plant:	Covanta DYEC	Test No.: 3 M26A	Page 2 of 2
	Plant Location:	Courtice, Ontario	Test Location:	APC Outlet No. 7

Point	M26A Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
1	0	46.45	.72	.71	278	257	244	60	137	63	63	1.9	5
	5	45.15	.77	.73	282	254	247	51	227	63	65	2.0	5
	10	48.84	.77	.74	282	259	250	49	230	63	66	2.0	5
	15	52.53	.77	.73	283	255	247	48	228	62	66	2.0	5
	20	56.24	.77	.74	284	257	246	49	230	63	68	2.0	5
	25	59.95	.72	.71	284	257	249	50	231	63	68	1.9	5
	30	63.58	.74	.72	283	260	251	51	229	63	69	1.95	5
	35	67.25	.76	.73	283	257	246	51	229	64	70	2	5
	40	70.96	.75	.73	283	261	248	52	230	64	71	2	5
	45	74.65	.75	.73	283	260	251	53	231	65	71	2	5
	50	78.36	.68	.70	283	258	249	55	230	65	72	1.8	5
	55	81.93	.71	.71	282	259	246	57	230	66	72	1.9	5
	60	85.57											

Traverse:					
Start Time: 11:07	Initial Leak Check:	.01	cfm@	18	"Hg
Finish Time: 12:07	Final Leak Check:	.014	cfm@	17	"Hg

Traverse:					
Start Time:		Initial Leak Check:		cfm @	"Hg
Finish Time:		Final Leak Check:		cfm @	"Hg

Project No.: 22327

Operator : TT

APPENDIX 8

VOST Field Data Sheets
(6 pages)

Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Volatile Organics Sampling Train
Sample Volume Corrections

Test No.	DGMCF	Initial DGM Reading (L)	Final DGM Reading (L)	Actual Vol. Sampled (L)	Barometric Pressure (in Hg)	Average DGM Pressure del H (in H2O)	Average DGM Temperature (°C)	Corrected Volume (L)*	Corrected Volume (Rm3)*
1	1.000	55.2	75.5	20.30	29.28	1.00	30.9	19.53	0.0195
2	1.000	75.8	97.4	21.60	29.28	1.00	33.0	20.64	0.0206
3	1.000	98.3	121.0	22.70	29.28	1.00	32.9	21.70	0.0217
4	1.000	122.0	144.0	22.00	29.28	1.00	33.0	21.02	0.0210

* Dry at 25°C and 1 atmosphere

Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Volatile Organics Sampling Train
Sample Volume Corrections

Test No.	DGMCF	Initial DGM Reading (L)	Final DGM Reading (L)	Actual Vol. Sampled (L)	Barometric Pressure (in Hg)	Average DGM Pressure del H (in H2O)	Average DGM Temperature (°C)	Corrected Volume (L)*	Corrected Volume (Rm3)*
1	0.985	34.4	56.3	21.90	29.28	0.50	31.4	20.69	0.0207
2	0.985	56.8	78.5	21.70	29.28	0.50	35.2	20.25	0.0202
3	0.985	78.7	99.7	21.00	29.28	0.50	35.1	19.60	0.0196
4	0.985	0.0	22.1	22.10	29.28	0.50	35.1	20.63	0.0206

* Dry at 25°C and 1 atmosphere

ORTECH Consulting Alliance Inc.

Vost Data Sheet

Plant: Covanta DYEC			Vost #1
Plant Location: Courtice, ON	Test Condition: Compliance		Control Box ID: M05498
Test location: APC Outlet No. 1	DGMCF: 1.000		Operator: JCT.
Date: MARCH 20, 2024	Barometric Pressure: 29.28 "Hg		Project No: 22327
~ 0.5 LPM for 40 minutes	NDL - No Dectectable Leak	Field Blank Pair ID: 5A/B	

Test 1 Start Time: 0757	Initial Leak Check NDL @ 20 "Hg		Sample ID: 1A, 1B.
Test 1 End Time: 0837	Final Leak Check NDL @ 20 "Hg		Lab ID: YIF062-01

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	56.20	139	138	5	29	1.0	4
5	58.00	139	138	4	29	1.0	4
10	60.9	139	138	4	31	1.0	4
15	63.4	139	138	4	31	1.0	4
20	66.6	139	138	4	31	1.0	4
25	69.2	139	138	4	31	1.0	4
30	71.5	138	138	4	32	1.0	4.0
35	73.0	138	138	4	32	1.0	4.0
40	75.5	138	138	4	32	1.0	4.0

Test 2 Start Time: 0843	Initial Leak Check NDL @ 20 "Hg		Sample ID: 2A, 2B.
Test 2 End Time: 0923	Final Leak Check NDL @ 20 "Hg		Lab ID: YIF063-01

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	76.8	138	138	5	32	1.0	4.0
5	79.0	138	138	4	32	1.0	4.0
10	81.6	138	138	4	32	1.0	5.0
15	84.5	138	138	4	33	1.0	5.0
20	86.9	138	138	4	34	1.0	5.0
25	89.5	138	139	4	33	1.0	5.0
30	92.2	138	138	4	34	1.0	5.0
35	94.7	138	139	4	33	1.0	5.0
40	97.4	138	138	4	34	1.0	5.0

ORTECH Consulting Alliance Inc.

Vost Data Sheet

Plant: Covanta DYEC			Vost #1
Plant Location: Courtice, ON	Test Condition: Compliance		Control Box ID: M05468
Test location: APC Outlet No. 1	DGMCF: 1.000		Operator: JC
Date: March 20, 2024	Barometric Pressure: 29.28 "Hg		Project No: 22327
~ 0.5 LPM for 40 minutes	NDL - No Dectectable Leak	Field Blank Pair ID: 5A/B	

Test 3 Start Time: 0929	Initial Leak Check NDL @ 20 "Hg	Sample ID: 3A 3B	
Test 3 End Time: 1009	Final Leak Check NDL @ 18 "Hg	Lab ID:	

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	98.3	138	138	6	32	1.0	5
5	101.3	138	138	4	32	1.0	5
10	105.4	138	138	4	33	1.0	5
15	107.6	138	138	4	33	1.0	5
20	110.6	139	139	4	33	1.0	5
25	113.35	138	139	4	33	1.0	5
30	116.00	138	139	4	33	1.0	5
35	118.60	138	139	4	33	1.0	5
40	121.0	138	139	4	32	1.0	5

Test 4 Start Time: 1015	Initial Leak Check NDL @ 18 "Hg	Sample ID: 4A 4B	
Test 4 End Time: 1055	Final Leak Check NDL @ 21 "Hg	Lab ID:	

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	122.0	138	138	4	33	1.0	5.0
5	124.7	138	138	4	33	1.0	5.0
10	127.6	139	139	4	33	1.0	5.0
15	130.2	138	138	4	33	1.0	5.0
20	133.0	139	138	4	33	1.0	5.0
25	135.8	139	138	4	33	1.0	5.0
30	138.5	139	138	4	33	1.0	5.0
35	141.10	138	138	4	33	1.0	5.0
40	144.0	138	138	4	33	1.0	5.0

ORTECH Consulting Alliance Inc.

Vost Data Sheet

Plant: Covanta DYEC			
Plant Location: Courtice, ON	Test Condition: Compliance		Control Box ID: 10573
Test location: APC Outlet No. 7	DGMCF: 0.985		Operator: RM
Date: MARCH 20, 2024	Barometric Pressure: 29.28 "Hg		Project No: 22327
~ 0.5 LPM for 40 minutes	NDL - No Dectectable Leak	Field Blank Pair ID: 16A/B	YIF697-01

Test 1 Start Time: 759	Initial Leak Check NDL @ 16 "Hg	Sample ID: 11A/11B	
Test 1 End Time: 839	Final Leak Check NDL @ 16 "Hg	Lab ID: YIF692-01	

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	34.4	132	137	10	28	.5	2
5	37.3	130	137	10	29	.5	2
10	40.0	130	137	10	30	.5	2
15	43.0	130	137	10	31	.5	2
20	45.6	130	137	10	32	.5	2
25	47.9	130	136	9	32	.5	3
30	50.2	130	137	9	33	.5	3
35	53.8	130	136	9	34	.5	3
40	56.3	130	136	9	34	.5	3

Test 2 Start Time: 848	Initial Leak Check NDL @ 16 "Hg	Sample ID: 12A/12B	
Test 2 End Time: 928	Final Leak Check NDL @ 12 "Hg	Lab ID: YIF693-01	

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	56.8	130	137	10	33	.5	3
5	59.3	130	136	10	34	.5	3.5
10	62.4	130	137	10	35	.5	3.5
15	64.9	130	137	11	36	.5	3.5
20	67.4	130	137	11	36	.5	3.5
25	69.9	130	137	11	36	.5	3.5
30	73.1	130	137	11	35	.5	3.5
35	75.8	130	137	11	36	.5	3.5
40	78.5	130	137	11	36	.5	3.5

ORTECH Consulting Alliance Inc.

Vost Data Sheet

Plant: Covanta DYEC			
Plant Location: Courtice, ON	Test Condition: Compliance		Control Box ID: V0573
Test location: APC Outlet No. 2	DGMCF: 0.985		Operator: RM
Date: MARCH 20 2024	Barometric Pressure: 29.28 "Hg		Project No: 22327
~ 0.5 LPM for 40 minutes	NDL - No Dectectable Leak		Field Blank Pair ID: 16A/B Y1F697-01

Test 3 Start Time: 939	Initial Leak Check NDL @ 12 "Hg		Sample ID: 13A/13B
Test 3 End Time: 1019	Final Leak Check NDL @ 13 "Hg		Lab ID: Y1F694-01

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	78.7	130	137	10	34	.5	2.5
5	81.0	130	137	10	34	.5	3
10	83.1	131	136	10	34	.5	3
15	85.3	130	137	10	34	.5	3.5
20	88.2	130	137	11	36	.5	3.5
25	90.5	131	136	11	36	.5	3.5
30	94.0	131	136	11	36	.5	3.5
35	96.5	131	136	11	36	.5	3.5
40	99.1	131	137	11	36	.5	3.5

Test 4 Start Time: 1032	Initial Leak Check NDL @ 13 "Hg		Sample ID: 14A/14B
Test 4 End Time: 1112	Final Leak Check NDL @ 13 "Hg		Lab ID: Y1F695-01

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	0.0	130	137	9	33	.5	2.5
5	2.7	130	136	10	34	.5	3
10	5.6	120	137	10	35	.5	3
15	8.1	130	137	10	35	.5	3.5
20	11.4	130	137	10	35	.5	3.5
25	13.9	130	137	10	36	.5	3.5
30	16.6	131	137	9	36	.5	3.5
35	19.5	132	137	9	36	.5	3.5
40	22.1	132	137	10	36	.5	3.5

APPENDIX 9

Aldehydes Field Data Sheets
(8 pages)

Covanta - Durham York Energy Centre
Boiler No. 1 BH Outlet
Aldehydes
Sample Volume Corrections

Test No.	DGMCF	Initial DGM Reading (L)	Final DGM Reading (L)	Actual Vol. Sampled (L)	Barometric Pressure (in Hg)	Average DGM Pressure del H (in H_2O)	Average DGM Temperature (°C)	Corrected Volume (L)*	Corrected Volume (Rm^3)*
1	0.980	145.00	268.80	123.80	29.31	4.00	31.4	117.53	0.1175
2	0.980	270.50	398.40	127.90	29.33	4.00	31.7	121.38	0.1214
3	0.980	0.65	128.17	127.52	29.37	4.00	32.1	121.03	0.1210

* Dry at 25°C and 1 atmosphere.

Covanta - Durham York Energy Centre
Boiler No. 2 BH Outlet
Aldehydes
Sample Volume Corrections

Test No.	DGMCF	Initial DGM Reading (L)	Final DGM Reading (L)	Actual Vol. Sampled (L)	Barometric Pressure (in Hg)	Average DGM Pressure del H (in H_2O)	Average DGM Temperature (°C)	Corrected Volume (L)*	Corrected Volume (Rm^3)*
1	0.985	22.00	49.80	27.80	29.31	0.50	33.5	26.12	0.0261
2	0.985	50.10	81.70	31.60	29.34	0.50	33.7	29.70	0.0297
3	0.985	82.00	113.50	31.50	29.37	0.50	33.9	29.62	0.0296

* Dry at 25°C and 1 atmosphere.

ORTECH Consulting Alliance Inc.
NCASI Method ISS/FP-A105.01

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test No.:	1
Test location:	APC Outlet No. 1
Date:	MARCH 20, 2022
Project No.:	22327

Measuring Device	MII Number
Control Module	Vosp #1 M05498
Barometer	Env Canada

Barometric Pressure: 29.31 "Hg

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Impinger Outlet °C	Meter Temp Average °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	146	138	138	14	31	4.0	3
5	151.3	140	139	12	30	4.0	3
10	162.1	140	139	10	30	4.0	3
15	172.2	140	140	9	31	4.0	3
20	182.3	140	140	8	31	4.0	3
25	192.3	141	141	6	32	4.0	3
30	203.1	140	140	5	31	4.0	3
35	214.2	140	140	5	32	4.0	3
40	225.1	140	140	~~25~~ 5	32	4.0	3
45	235.9	140	140	5	32	4.0	3
50	246.8	141	140	5	32	4.0	3
55	257.8	140	140	5	32	4.0	3
60	268.8	141	139	5	32	4.0	3

Start Time:	1130	
Finish Time:	1230	
Initial Leak Check:	<.01	Lpm @ 21 " Hg
Final Leak Check:	<.01	Lpm @ 21 " Hg

DGMCF:	0.980
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

: sample @ ~0.5 lpm for 60 minutes.

Operator: [signature]

ORTECH Consulting Alliance Inc.
NCASI Method ISS/FP-A105.01

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test No.:	2
Test location:	APC Outlet No. 1
Date:	March 20, 2024
Project No.:	22327

Vost #1

Measuring Device	MII Number
Control Module	M05498
Barometer	Env Canada

Barometric Pressure:	29.33	"Hg

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Impinger Outlet °C	Meter Temp Average °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	270.5	139	139	21	28	4.0	4.0
5	280.6	141	140	16	30	4.0	4.0
10	290.8	141	139	10	30	4.0	4.0
15	301.2	141	139	8	31	4.0	4.0
20	312.4	141	139	7	31	4.0	4.0
25	323.0	141	139	6	32	4.0	4.0
30	332.4	141	140	6	31	4.0	4.0
35	343.8	141	140	6	32	4.0	4.0
40	354.0	141	138	6	31	4.0	4.0
45	366.1	141	138	6	31	4.0	4.0
50	376.9	141	139	6	31	4.0	4.0
55	382.7	141	140	6	32	4.0	4.0
60	398.4	141	140	6	32	4.0	4.0

Start Time:	1247		
Finish Time:	1347		
Initial Leak Check:	<.01	Lpm @ 15	" Hg
Final Leak Check:	<.01	Lpm @ 15	" Hg

DGMCF:	6.980
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

: sample @ ~0.5 lpm for 60 minutes.

Operator:

ORTECH Consulting Alliance Inc.
NCASI Method ISS/FP-A105.01

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test No.:	3
Test location:	APC Outlet No. 1
Date:	MARCH 26, 2024
Project No.:	22327

Vocr #1

Measuring Device	MII Number
Control Module	Mo 5498
Barometer	Env Canada

Barometric Pressure: 29.37 "Hg

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Impinger Outlet °C	Meter Temp Average °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	.65	137	138	21	30	4.	4.
5	10.2	141	138	16	31	4	4
10	21.1	141	140	16	31	4	4
15	32.0	141	140	~~16~~ 8	31	4	4
20	42.5	140	139	6	30	4	4
25	53.6	141	137	6	32	4	4
30	64.2	141	138	6	31	4	4
35	74.8	141	138	6	31	4	4
40	85.6	141	138	6	32	4	4.
45	96.4	141	138	6	33	4	4
50	107.2	143	140	6	35	4	4
55	118.0	143	140	6	35	4	4
60	128.7	143.	140	6	35	4	4

Start Time:	14:05		
Finish Time:	15:05		
Initial Leak Check:	<.01	Lpm @ 15	" Hg
Final Leak Check:	<.01	Lpm @ 15	" Hg

DGMCF:	0.980
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

: sample @ ~0.5 lpm for 60 minutes.

Operator: [signature]

ORTECH Consulting Alliance Inc.
NCASI Method ISS/FP-A105.01

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test No.:	1
Test location:	APC Outlet No. 2
Date:	MAR 20/24
Project No.:	22327

Measuring Device	MII Number
Control Module	VOST 3
Barometer	Env Canada

Barometric Pressure:	29.31	"Hg

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Impinger Outlet °C	Meter Temp Average °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	22.0	132	133	9	31	.5	1
5	24.2	131	135	10	32	.5	1
10	26.5	130	135	10	33	.5	1
15	28.9	130	135	8	33	.5	1
20	31.1	130	136	8	34	.5	1
25	33.6	130	136	8	34	.5	1
30	35.2	130	136	8	34	.5	1
35	37.6	130	136	8	34	.5	1
40	40.8	130	136	8	34	.5	1
45	42.8	130	136	8	34	.5	1
50	45.0	130	136	9	34	.5	1
55	47.5	130	136	9	34	.5	1
60	49.8	130	136	9	34	.5	1
						.5	

Start Time:	12:00			
Finish Time:	13:00			
Initial Leak Check:	<.01	Lpm @	10	" Hg
Final Leak Check:	<.01	Lpm @	19	" Hg

DGMCF:	.985
Sample Volume:	27.8
Average DGM Temp:	33.5
Average DGM Δ H:	.5

Comments:

: sample @ ~0.5 lpm for 60 minutes.

Operator: [illegible]

ORTECH Consulting Alliance Inc.
NCASI Method ISS/FP-A105.01

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test No.:	2
Test location:	APC Outlet No. 2
Date:	MAR 20/24
Project No.:	22327

Measuring Device	MII Number
Control Module	V057 3
Barometer	Env Canada

Barometric Pressure:	29.34 "Hg

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Impinger Outlet °C	Meter Temp Average °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	50.1	130	136	8	31	0.5	1
5	52.6	130	135	8	32	.5	1
10	55.0	130	134	9	33	.5	1
15	57.5	130	134	8	34	.5	1
20	60.2	130	134	8	34	.5	1
25	63.2	130	134	8	34	.5	1
30	65.7	130	134	9	34	.5	1
35	68.5	130	134	9	34	.5	1
40	71.2	130	135	9	34	.5	1
45	73.9	130	135	9	34	.5	1
50	76.4	130	136	9	34	.5	1
55	79.2	130	136	9	35	.5	1
60	81.7	130	136	9	35	.5	1

Start Time:	13:17
Finish Time:	14:17
Initial Leak Check:	<.01 Lpm @ 10 " Hg
Final Leak Check:	<.01 Lpm @ 10 " Hg

DGMCF:	.995
Sample Volume:	31.6
Average DGM Temp:	33.7
Average DGM Δ H:	.5

Comments:

: sample @ ~0.5 lpm for 60 minutes.

Operator: [illegible]

ORTECH Consulting Alliance Inc.
NCASI Method ISS/FP-A105.01

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test No.:	3
Test location:	APC Outlet No. 2
Date:	MAR 20/24
Project No.:	22327

Measuring Device	MII Number
Control Module	V057 3
Barometer	Env Canada

Barometric Pressure:	29.37 "Hg

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Impinger Outlet °C	Meter Temp Average °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	82.0	130	134	8	32	.5	1
5	84.5	130	134	9	33	.5	1
10	87.3	130	134	9	33	.5	1
15	90.0	130	134	9	34	.5	1
20	92.5	131	135	9	34	.5	1
25	95.0	130	135	9	34	.5	1
30	97.5	131	135	9	34	.5	1
35	100.9	130	135	9	34	.5	1
40	103.5	130	135	9	34	.5	1
45	106.2	130	135	9	34	.5	1
50	108.7	130	135	9	34	.5	1
55	111.0	130	135	9	35	.5	1
60	113.50	131	135	9	35	.5	1

Start Time:	1436
Finish Time:	1536
Initial Leak Check:	<.01 Lpm @ 16 " Hg
Final Leak Check:	<.01 Lpm @ 16 " Hg

DGMCF:	0.985
Sample Volume:	31.5
Average DGM Temp:	33.8
Average DGM Δ H:	.5

Comments:

: sample @ ~0.5 lpm for 60 minutes.

Operator: [illegible]

APPENDIX 10

ORTECH Sample Log/Chain of Custody Forms
(9 pages)

ORTECH Consulting Inc. - Sample Log
Method 201A & Method 202
Covanta

Client: Covanta
Job/Report Number: 22327
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
Quote/ PO: 22327-J2964

ORTECH Sample ID 24-22327-M201A-	Date	Test No.	Location	Sample Description	Sample Media	Sample Analysis
1	MAR 19/24	1	# 1 APC Outlet	Nozzle & PM10 cyclone rinse	Acetone	Particulate
2				PM 2.5 cyclone Rinse	Acetone	Particulate
3				PM 2.5 exit & connectors	Acetone	Particulate
4				Back up filter	filter	Particulate
5				Impinger Soln & rinse	Water	Particulate
6				Secondary Filter	Filter	Particulate*
7				Impinger Rinse	Acetone & Hexane	Particulate
8	MAR 19/24	2	# 1 APC Outlet	Nozzle & PM10 cyclone rinse	Acetone	Particulate
9				PM 2.5 cyclone Rinse	Acetone	Particulate
10				PM 2.5 exit & connectors	Acetone	Particulate
11				Back up filter	filter	Particulate
12				Impinger Soln & rinse	Water	Particulate
13				Secondary Filter	Filter	Particulate*
14				Impinger Rinse	Acetone & Hexane	Particulate
15	MAR 19/24	3	# 1 APC Outlet	Nozzle & PM10 cyclone rinse	Acetone	Particulate
16				PM 2.5 cyclone Rinse	Acetone	Particulate
17				PM 2.5 exit & connectors	Acetone	Particulate
18				Back up filter	filter	Particulate
19				Impinger Soln & rinse	Water	Particulate
20				Secondary Filter	Filter	Particulate*
21				Impinger Rinse	Acetone & Hexane	Particulate
22	MAR 18/24	1	# 2 APC Outlet	Nozzle & PM10 cyclone rinse	Acetone	Particulate
23				PM 2.5 cyclone Rinse	Acetone	Particulate
24				PM 2.5 exit & connectors	Acetone	Particulate
25				Back up filter	filter	Particulate
26				Impinger Soln & rinse	Water	Particulate
27				Secondary Filter	Filter	Particulate*
28				Impinger Rinse	Acetone & Hexane	Particulate
29	MAR 18/24	2	# 2 APC Outlet	Nozzle & PM10 cyclone rinse	Acetone	Particulate
30				PM 2.5 cyclone Rinse	Acetone	Particulate
31				PM 2.5 exit & connectors	Acetone	Particulate
32				Back up filter	Filter	Particulate
33				Impinger Soln & rinse	Water	Particulate
34				Secondary Filter	Filter	Particulate*
35				Impinger Rinse	Acetone & Hexane	Particulate

ORTECH Consulting Inc. - Sample Log
Method 201A & Method 202
Covanta

Client: Covanta
Job/Report Number: 22327
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
Quote/ PO: 22327-J2964

ORTECH Sample ID 24-22327-M201A-	Date	Test No.	Location	Sample Description	Sample Media	Sample Analysis
36	MAR 18/24	3	# 2 APC Outlet	Nozzle & PM10 cyclone rinse	Acetone	Particulate
37				PM 2.5 cyclone Rinse	Acetone	Particulate
38				PM 2.5 exit & connectors	Acetone	Particulate
39				Back up filter	Filter	Particulate
40				Impinger Soln & rinse	Water	Particulate
41				Secondary Filter	Filter	Particulate*
42				Impinger Rinse	Acetone & Hexane	Particulate
43	MAR 19/24	Blank	# 1 APC Outlet	Nozzle & PM10 cyclone rinse	Acetone	Particulate
44				PM 2.5 cyclone Rinse	Acetone	Particulate
45				PM 2.5 exit & connectors	Acetone	Particulate
46				Back up filter	filter	Particulate
47				Impinger Soln & rinse	Water	Particulate
48				Secondary Filter	Filter	Particulate*
49				Impinger Rinse	Acetone & Hexane	Particulate
50	MAR 19/24	Blank	# 2 APC Outlet	Nozzle & PM10 cyclone rinse	Acetone	Particulate
51				PM 2.5 cyclone Rinse	Acetone	Particulate
52				PM 2.5 exit & connectors	Acetone	Particulate
53				Back up filter	Filter	Particulate
54				Impinger Soln & rinse	Water	Particulate
55				Secondary Filter	Filter	Particulate*
56				Impinger Rinse	Acetone & Hexane	Particulate

Note: *To be included in condensible particulate analysis as per US EPA Method 202.

Relinquished To: AARON BURTON Date: 20-MAR-2024 12:30 6.1°C

Relinquished By: CHRIS BELORE Date: MAR. 20/24

ORTECH Consulting Inc. - Sample Log

Acid Gases

Covanta

Client: Covanta
Job/Report Number: 22327
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
Quote / PO #: 22327-J2964

ORTECH Sample ID 24-22327-M26A-	Sample Date	Location	Sample Description	Media	Initial Volume(ml)	Final Volume(ml)	Sample Analysis
1	MAR18/24	APC Outlet # 1	Impinger Soln & rinse	0.1N H_2SO_4 + DH_2O	200	464	HCl, HF & Ammonia
2	↓	APC Outlet # 1	Impinger Soln & rinse	0.1N H_2SO_4 + DH_2O	200	470	HCl, HF & Ammonia
3	↓	APC Outlet # 1	Impinger Soln & rinse	0.1N H_2SO_4 + DH_2O	200	484	HCl, HF & Ammonia
4	MAR19/24	APC Outlet # 2	Impinger Soln & rinse	0.1N H_2SO_4 + DH_2O	200	492	HCl, HF & Ammonia
5	↓	APC Outlet # 2	Impinger Soln & rinse	0.1N H_2SO_4 + DH_2O	200	462	HCl, HF & Ammonia
6	↓	APC Outlet # 2	Impinger Soln & rinse	0.1N H_2SO_4 + DH_2O	200	466	HCl, HF & Ammonia
Blank 1	MAR18/24	APC # 1	Impinger Soln & rinse	0.1N H_2SO_4 + DH_2O	200	306	HCl, HF & Ammonia
Blank 2	MAR19/24	APC # 2	Impinger Soln & rinse	0.1N H_2SO_4 + DH_2O	200	300	HCl, HF & Ammonia

Analyze for HCl, HF and Ammonia

Relinquished By: CHRIS BELORE Date: MAR. 20 / 24

Relinquished To: AARON BURTON Date: 20-MAR-2024

12:30 6.1°C

ORTECH Consulting Inc. - Sample Log
Particulate and Metals Samples
Covanta

Client: Covanta
Project Number: 22327
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
QUOTE/PO: 22327-J2964

ORTECH Sample ID 24-22327-PM-	Sample Date	Location	Test No.	Sample Description	Sample Media	Sample Analysis
1	MAR 18/24	#1 APC Outlet	1	Probe Rinse Acetone	Acetone	Particulate & Metals
2				Probe Rinse Nitric	0.1N Nitric	Metals
3				Filter	Particulate	Particulate & Metals
4				Impinger 1-4 Solution	Nitric/Peroxide	Metals
5				Impinger 5-6 Solution	Acid. KMnO4	Mercury
6				Impinger 5-6 Rinse	8N HCl	Mercury
7	MAR 18/24	#1 APC Outlet	2	Probe Rinse Acetone	Acetone	Particulate & Metals
8				Probe Rinse Nitric	0.1N Nitric	Metals
9				Filter	Particulate	Particulate & Metals
10				Impinger 1-4 Solution	Nitric/Peroxide	Metals
11				Impinger 5-6 Solution	Acid. KMnO4	Mercury
12				Impinger 5-6 Rinse	8N HCl	Mercury
13	MAR 19/24	#1 APC Outlet	3	Probe Rinse Acetone	Acetone	Particulate & Metals
14				Probe Rinse Nitric	0.1N Nitric	Metals
15				Filter	Particulate	Particulate & Metals
16				Impinger 1-4 Solution	Nitric/Peroxide	Metals
17				Impinger 5-6 Solution	Acid. KMnO4	Mercury
18				Impinger 5-6 Rinse	8N HCl	Mercury
19	MAR 19/24	Blank 1	Blank 1	Probe Rinse Acetone	Acetone	Particulate & Metals
20				Probe Rinse Nitric	0.1N Nitric	Metals
21				Filter	Particulate	Particulate & Metals
22				Impinger 1-4 Solution	Nitric/Peroxide	Metals
23				Impinger 5-6 Solution	Acid. KMnO4	Mercury
24				Impinger 5-6 Rinse	8N HCl	Mercury

ORTECH Consulting Inc. - Sample Log
Particulate and Metals Samples
Covanta

Client: Covanta
Project Number: 22327
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
QUOTE/PO: 22327-J2964

ORTECH Sample ID 24-22327-PM-	Sample Date	Location	Test No.	Sample Description	Sample Media	Sample Analysis
25	MAR 19/24	#2 APC Outlet	1	Probe Rinse Acetone	Acetone	Particulate & Metals
26				Probe Rinse Nitric	0.1N Nitric	Metals
27				Filter	Particulate	Particulate & Metals
28				Impinger 1-4 Solution	Nitric/Peroxide	Metals
29				Impinger 5-6 Solution	Acid. KMnO4	Mercury
30				Impinger 5-6 Rinse	8N HCl	Mercury
31	MAR 19/24	#2 APC Outlet	2	Probe Rinse Acetone	Acetone	Particulate & Metals
32				Probe Rinse Nitric	0.1N Nitric	Metals
33				Filter	Particulate	Particulate & Metals
34				Impinger 1-4 Solution	Nitric/Peroxide	Metals
35				Impinger 5-6 Solution	Acid. KMnO4	Mercury
36				Impinger 5-6 Rinse	8N HCl	Mercury
37	MAR 19/24	#2 APC Outlet	3	Probe Rinse Acetone	Acetone	Particulate & Metals
38				Probe Rinse Nitric	0.1N Nitric	Metals
39				Filter	Particulate	Particulate & Metals
40				Impinger 1-4 Solution	Nitric/Peroxide	Metals
41				Impinger 5-6 Solution	Acid. KMnO4	Mercury
42				Impinger 5-6 Rinse	8N HCl	Mercury
43	MAR 19/24	Blank 2	Blank 2	Probe Rinse Acetone	Acetone	Particulate & Metals
44				Probe Rinse Nitric	0.1N Nitric	Metals
45				Filter	Particulate	Particulate & Metals
46				Impinger 1-4 Solution	Nitric/Peroxide	Metals
47				Impinger 5-6 Solution	Acid. KMnO4	Mercury
48				Impinger 5-6 Rinse	8N HCl	Mercury

Relinquished By: CHRIS BELORE Date: MAR. 20, 24

Relinquished To: AARON BULTON Date: 20-MAR-2024 12:30

6.1°C

ORTECH Consulting Inc. - Sample Log
Semi-Volatile Organics Samples
Covanta

Client: Covanta
Job/Report Number: 22327
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
Quote / PO: 22327-J2964

ORTECH Sample ID 24-22327-SVOC-	Date	Sample Description	Location	Sample Media	Sample Analysis
1	MAR 20/24	Test 1 Probe Rinse	# 1 APC Outlet	Hexane/Acetone	SVOC
2		Test 1 Filter		Particulate	SVOC
3		Test 1 XAD-II Trap		N.A.	SVOC
4		Test 1 Impinger Solution		Ethylene Glycol	SVOC
5		Test 1 Impinger Rinse		Hexane/Acetone	SVOC
6	MAR 20/24	Test 2 Probe Rinse	# 1 APC Outlet	Hexane/Acetone	SVOC
7		Test 2 Filter		Particulate	SVOC
8		Test 2 XAD-II Trap		N.A.	SVOC
9		Test 2 Impinger Solution		Ethylene Glycol	SVOC
10		Test 2 Impinger Rinse		Hexane/Acetone	SVOC
11	MAR 21/24	Test 3 Probe Rinse	# 1 APC Outlet	Hexane/Acetone	SVOC
12		Test 3 Filter		Particulate	SVOC
13		Test 3 XAD-II Trap		N.A.	SVOC
14		Test 3 Impinger Solution		Ethylene Glycol	SVOC
15		Test 3 Impinger Rinse		Hexane/Acetone	SVOC
16	MAR 20/24	Blank 1 Probe Rinse	Blank	Hexane/Acetone	SVOC
17		Blank 1 Filter		Particulate	SVOC
18		Blank 1 XAD-II Trap		N.A.	SVOC
19		Blank 1 Impinger Solution		Ethylene Glycol	SVOC
20		Blank 1 Impinger Rinse		Hexane/Acetone	SVOC

Refer to letter ~~dated August 03, 2023~~ for lists of analytes.

10:00 5.2°C

Relinquished To: Aaron Bolton Date: 22-MAR-2024

Relinquished By: Bryden Pacheco Date: 3/22/24

ORTECH Consulting Inc. - Sample Log
Semi-Volatile Organics Samples
Covanta

Client: Covanta
Job/Report Number: 22327
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
Quote / PO: 22327-J2964

ORTECH Sample ID 24-22327-SVOC-	Date	Sample Description	Location	Sample Media	Sample Analysis
21	MAR 20/24	Test 1 Probe Rinse	# 2 APC Outlet	Hexane/Acetone	SVOC
22		Test 1 Filter		Particulate	SVOC
23		Test 1 XAD-II Trap		N.A.	SVOC
24		Test 1 Impinger Solution		Ethylene Glycol	SVOC
25		Test 1 Impinger Rinse		Hexane/Acetone	SVOC
26	MAR 20/24	Test 2 Probe Rinse	# 2 APC Outlet	Hexane/Acetone	SVOC
27		Test 2 Filter		Particulate	SVOC
28		Test 2 XAD-II Trap		N.A.	SVOC
29		Test 2 Impinger Solution		Ethylene Glycol	SVOC
30		Test 2 Impinger Rinse		Hexane/Acetone	SVOC
31	MAR 21/24	Test 3 Probe Rinse	# 2 APC Outlet	Hexane/Acetone	SVOC
32		Test 3 Filter		Particulate	SVOC
33		Test 3 XAD-II Trap		N.A.	SVOC
34		Test 3 Impinger Solution		Ethylene Glycol	SVOC
35		Test 3 Impinger Rinse		Hexane/Acetone	SVOC
36	MAR 20/24	Blank 2 Probe Rinse	Blank	Hexane/Acetone	SVOC
37		Blank 2 Filter		Particulate	SVOC
38		Blank 2 XAD-II Trap		N.A.	SVOC
39		Blank 2 Impinger Solution		Ethylene Glycol	SVOC
40		Blank 2 Impinger Rinse		Hexane/Acetone	SVOC

Refer to letter ~~dated August 03, 2023~~ for lists of analytes.

10:00 5.2°C

Relinquished To: Aaron Burton Date: 3/22/24

Relinquished By: Brayden Pacheco Date: 3/22/24

ORTECH Consulting Alliance Inc. - Recovery & Sample Log
NCASI Method ISS/FP-A105.01

Client: Covanata DYEC
Job/Report Number: 22327
Received By: Chris Belore
How Received: Train Recovery
Job Assigned To: ALS
Quote / PO #: 22327-J2964

Test Number	Test Location	ORTECH Sample ID 24-22327-	Date Sampled	ID of BHA Sample Bottle	Empty Weight BHA Sample Bottle (g)	Initial Weight Sample Bottle + BHA (g)	Final Weight of BHA Sample Bottle (g)	Weight of Sample Bottle BHA & H2O (g)	Weight of Sample Bottle BHA & H2O & Hexane (g)
1	APC Outlet #1	ALD-1	MARCH 20, 2024	ALD-1	112.9	163.0	178.3	191.6	197.6
2	APC Outlet #1	ALD-2		ALD-2	113.1	163.3	179.7	190.6	195.9
3	APC Outlet #1	ALD-3		ALD-3	112.5	162.8	179.3	193.1	197.7
Blank 1	APC Outlet #1	Blank 1		ALD-4	112.9	163.6	163.6	172.8	181.4
1	APC Outlet #2	ALD-5		ALD-5	113.1	163.0	165.0	176.6	187.1
2	APC Outlet #2	ALD-6		ALD-6	111.6	161.7	164.8	176.1	186.0
3	APC Outlet #2	ALD-7		ALD-7	113.2	163.4	166.3	177.4	192.4
Blank 2	APC Outlet #2	Blank 2		ALD-8	112.2	162.2	162.2	174.8	187.2
	Field BHA&Spike		na	na	na	na	na	na	na
	BHA Blank		na	na	na	na	na	na	na

Analyze each sample for Acetaldehyde, Formaldehyde, Acrolein.

Relinquished by: Brayden Pushew Date: 3/22/24

Relinquished to: Aaron Burton Date: 3/22/24 10:00 5.2°C

ORTECH Consulting Inc. - Sample Log
VOCs

Client: Covanta
Project Number: 22327
Received By: C Belore
Job Assigned To: BV
Quote / PO : 22327-J2965

Test Location	Test Number	ORTECH Sample ID 24-22327-VOST-	Sample Date	Sample Description	Sample Analysis
# 1 APC Outlet	1	1 A,B		Tenax and Tenax/Charcoal	VOCs
	2	2 A,B		Tenax and Tenax/Charcoal	VOCs
	3	3 A,B		Tenax and Tenax/Charcoal	VOCs
	4	4 A,B		Tenax and Tenax/Charcoal	Archive
	Field Blank	5 A,B		Tenax and Tenax/Charcoal	VOCs
# 2 APC Outlet	1	11 A,B		Tenax and Tenax/Charcoal	VOCs
	2	12 A,B		Tenax and Tenax/Charcoal	VOCs
	3	13 A,B		Tenax and Tenax/Charcoal	VOCs
	4	14 A,B		Tenax and Tenax/Charcoal	Archive
	Field Blank	16 A,B		Tenax and Tenax/Charcoal	VOCs
	Trip Blank			Tenax and Tenax/Charcoal	VOCs

Refer to letter dated February 8, 2024 for lists of analytes.

Custody Relinquished by: [illegible] Date: MAR 21/24 3.3/3.4/4.1

Custody Received by: [illegible] Date: [illegible] 1440

APPENDIX 11

Particulate and Metals Train Recovery Data Sheets
(8 pages)

ORTECH Consulting Alliance Inc.
Particulate and Metals Train Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: MAR 16/24
Test No.: 1
Test Location: UNIT 1

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	284.0
After Act. Rinse:	387.0
Total TS1:	103.0

MARK FLUID LEVEL
SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	284.5
After 0.1N HNO_3 Rinse:	442.0
Total TS2:	157.5

MARK FLUID LEVEL
SEAL AND LABEL TS2

Filter

Filter ID: 22-10805

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

Seal and label container TS3

Impingers 1, 2, 3, and 4

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	622.6
Final Wt:	780.3
1 Gain:	157.7
Colour:	clear

Impinger #2 HNO_3/H_2O_2	
Empty Wt:	640.0
Initial Wt:	740.0
Final Wt:	945.0
2 Gain:	205.0
Colour:	clear

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	662.2
Initial Wt:	774.4
Final Wt:	879.4
3 Gain:	105.0
Colour:	clear

Impinger #4 Empty	
Empty Wt:	508.8
Final Wt:	521.8
4 Gain:	13.0
Colour:	clear

CONTAINER TS4 WEIGHTS	
Empty Wt:	409.0
w/ Imp. 1-4 Soln:	1091.3
After HNO_3 Rinse:	1202.0
Total TS4:	793.0

MARK FLUID LEVEL
SEAL AND LABEL TS4

Impinger 5 & 6

Impinger #5 $KMnO_4/H_2SO_4$	
Empty Wt:	622.8
Initial Wt:	732.7
Final Wt:	748.7
5 Gain:	16.0
Colour:	purple

Impinger # 6 $KMnO_4/H_2SO_4$	
Empty Wt:	662.7
Initial Wt:	775.7
Final Wt:	782.5
6 Gain:	6.8
Colour:	purple

Impinger 5 & 6

CONTAINER TS5-A & TS5-B

CONTAINER TS5-A	
Empty Wt:	410.0
With Imp. 5&6 Soln:	650.0
After $KMnO_4$ Rinse:	758.2
After100g H_2O Rinse:	857.0
Total TS5-A:	447.0

MARK FLUID LEVEL
SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	284.5
With 150 mL DI H_2O:	434.5
After HCl Rinse:	472.0
After DI H_2O Rinse:	598.5
Total TS5-B:	314.0

MARK FLUID LEVEL
SEAL & LABEL TS5-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	957.5
Final Wt:	980.0
7 Gain:	22.5

Impinger Box ID: 16

SAMPLE IDENTIFICATION	24-22327-PM-
TS1 (Probe Rinse-Acetone)	1
TS2 (Probe Rinse-0.1N HNO_3)	2
TS3 (Filter)	3
TS4 (Impinger 1-4 Sol'n-HNO_3)	4
TS5-A (Impinger 5,6 Sol'n-$KMnO_4$)	5
TS5-B (Impinger 5,6 Rinse-HCl)	6

TS1,TS2- 500 ml Glass Bottle
TS3- Petri Dish
TS4- 1000 ml Amber Glass Bottle
T55-A - 1000 ml Amber Glass Bottle
T55-B - 500 ml Amber Glass Bottle

CWTR = 1 to 6: 503.5

WCBDA= 7: 22.5

Train Loaded By:
Train Recovered By:

ORTECH Consulting Alliance Inc.
Particulate and Metals Train Recovery Data Sheet

Client:	Covanta DYEC
Project No.:	22327
Date:	Mar 18/24
Test No.:	2
Test Location:	UNIT 1

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	281.5
After Act. Rinse:	389.0
Total TS1:	107.5

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	282.5
After 0.1N HNO_3 Rinse:	472.5
Total TS2:	190.0

MARK FLUID LEVEL

SEAL AND LABEL TS2

Filter

Filter ID: QZ 10604

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

Seal and label container TS3

Impingers 1, 2, 3, and 4

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	576.1
Final Wt:	721.1
1 Gain:	145.0
Colour:	clear

Impinger #2 HNO_3/H_2O_2	
Empty Wt:	629.5
Initial Wt:	739.0
Final Wt:	946.0
2 Gain:	207.0
Colour:	clear

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	622.0
Initial Wt:	724.8
Final Wt:	818.8
3 Gain:	94.0
Colour:	clear

Impinger #4 Empty	
Empty Wt:	604.5
Final Wt:	620.5
4 Gain:	16.0
Colour:	clear

CONTAINER TS4 WEIGHTS	
Empty Wt:	409.5
w/ Imp. 1-4 Soln:	1088.5
After HNO_3 Rinse:	1201.5
Total TS4:	792.0

MARK FLUID LEVEL

SEAL AND LABEL TS4

Impinger 5 & 6

Impinger #5 $KMnO_4/H_2SO_4$	
Empty Wt:	677.8
Initial Wt:	793.2
Final Wt:	799.2
5 Gain:	6.0
Colour:	purple

Impinger # 6 $KMnO_4/H_2SO_4$	
Empty Wt:	623.3
Initial Wt:	727.0
Final Wt:	735.0
6 Gain:	8.0
Colour:	purple

Impinger 5 & 6

CONTAINER TS5-A & TS5-B

CONTAINER TS5-A	
Empty Wt:	409.5
With Imp. 5&6 Soln:	632.0
After $KMnO_4$ Rinse:	750.0
After100g H_2O Rinse:	851.5
Total TS5-A:	442.0

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	282.0
With 150 mL DI H_2O:	432.0
After HCl Rinse:	470.2
After DI H_2O Rinse:	599.5
Total TS5-B:	317.5

MARK FLUID LEVEL

SEAL & LABEL TS5-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	1035.2
Final Wt:	1057.5
7 Gain:	22.3

Impinger Box ID: 13

SAMPLE IDENTIFICATION	24-22327-PM-
TS1 (Probe Rinse-Acetone)	7
TS2 (Probe Rinse-0.1N HNO_3)	8
TS3 (Filter)	9
TS4 (Impinger 1-4 Sol'n-HNO_3)	10
TS5-A (Impinger 5,6 Sol'n-$KMnO_4$)	11
TS5-B (Impinger 5,6 Rinse-HCl)	12

TS1,TS2- 500 ml Glass Bottle
TS3- Petri Dish
TS4- 1000 ml Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle
TS5-B - 500 ml Amber Glass Bottle

CWTR = 1 to 6:	476.0
WCBDA= 7:	22.3

Train Loaded By:	
Train Recovered By:	DI

ORTECH Consulting Alliance Inc.
Particulate and Metals Train Recovery Data Sheet

Client:	Covanta DYEC
Project No.:	22327
Date:	MAR 19/24
Test No.:	3
Test Location:	UNIT 1

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	284.0
After Act. Rinse:	435.0
Total TS1:	151.0

MARK FLUID LEVEL
SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	284.0
After 0.1N HNO_3 Rinse:	494.0
Total TS2:	210.0

MARK FLUID LEVEL
SEAL AND LABEL TS2

Filter

Filter ID: QZ10815

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

Seal and label container TS3

Impingers 1, 2, 3, and 4

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	623.0
Final Wt:	840.5
1 Gain:	217.0
Colour:	clear

Impinger #2 HNO_3/H_2O_2	
Empty Wt:	671.0
Initial Wt:	746.0
Final Wt:	891.5
2 Gain:	145.5
Colour:	clear

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	663.0
Initial Wt:	771.5
Final Wt:	886.5
3 Gain:	115.0
Colour:	clear

Impinger #4 Empty	
Empty Wt:	509.0
Final Wt:	521.5
4 Gain:	12.5
Colour:	clear

CONTAINER TS4 WEIGHTS	
Empty Wt:	411.0
w/ Imp. 1-4 Soln:	1189.5
After HNO_3 Rinse:	1292.5
Total TS4:	881.5

MARK FLUID LEVEL
SEAL AND LABEL TS4

Impinger 5 & 6

Impinger #5 $KMnO_4/H_2SO_4$	
Empty Wt:	623.0
Initial Wt:	737.5
Final Wt:	752.0
5 Gain:	14.5
Colour:	Purple

Impinger # 6 $KMnO_4/H_2SO_4$	
Empty Wt:	663.5
Initial Wt:	772.5
Final Wt:	780.0
6 Gain:	7.5
Colour:	Purple

Impinger 5 & 6

CONTAINER TS5-A & TS5-B

CONTAINER TS5-A	
Empty Wt:	411.5
With Imp. 5&6 Soln:	652.0
After $KMnO_4$ Rinse:	762.5
After100g H_2O Rinse:	861.0
Total TS5-A:	449.5

MARK FLUID LEVEL
SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	284.5
With 150 mL DI H_2O:	434.5
After HCl Rinse:	470.0
After DI H_2O Rinse:	605.5
Total TS5-B:	321.0

MARK FLUID LEVEL
SEAL & LABEL TS5-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	980.0
Final Wt:	1004.0
7 Gain:	24.0

Impinger Box ID: 16

SAMPLE IDENTIFICATION	24-22327-PM-
TS1 (Probe Rinse-Acetone)	13
TS2 (Probe Rinse-0.1N HNO_3)	14
TS3 (Filter)	15
TS4 (Impinger 1-4 Sol'n-HNO_3)	16
TS5-A (Impinger 5,6 Sol'n-$KMnO_4$)	17
TS5-B (Impinger 5,6 Rinse-HCl)	18

TS1,TS2- 500 ml Glass Bottle
TS3- Petri Dish
TS4- 1000 ml Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle
TS5-B - 500 ml Amber Glass Bottle

CWTR = 1 to 6:	512.0
WCBDA= 7:	24.0

Train Loaded By:
Train Recovered By: BT

ORTECH Consulting Alliance Inc.
Particulate and Metals Train Recovery Data Sheet

Client:	Covanta DYEC
Project No.:	22327
Date:	Mar 19/24
Test No.:	
Test Location:	BLANK 1

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	283.5
After Act. Rinse:	434.5
Total TS1:	151.0

MARK FLUID LEVEL
SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	282.0
After 0.1N HNO_3 Rinse:	500.0
Total TS2:	218.0

MARK FLUID LEVEL
SEAL AND LABEL TS2

Filter

Filter ID: 27.10797

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

Seal and label container TS3

Impingers 1, 2, 3, and 4

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	
Final Wt:	
1 Gain:	
Colour:	

Impinger #2 HNO_3/H_2O_2	
Empty Wt:	
Initial Wt:	
Final Wt:	
2 Gain:	
Colour:	

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	
Initial Wt:	
Final Wt:	
3 Gain:	
Colour:	

Impinger #4 Empty	
Empty Wt:	
Final Wt:	
4 Gain:	
Colour:	

CONTAINER TS4 WEIGHTS	
Empty Wt:	409.0
w/ Imp. 1-4 Soln:	620.7
After HNO_3 Rinse:	722.0
Total TS4:	313.0

MARK FLUID LEVEL
SEAL AND LABEL TS4

Impinger 5 & 6

Impinger #5 $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
5 Gain:	
Colour:	

Impinger # 6 $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
6 Gain:	
Colour:	

Impinger 5 & 6

CONTAINER TS5-A & TS5-B

CONTAINER TS5-A	
Empty Wt:	409.5
With Imp. 5&6 Soln:	630.0
After $KMnO_4$ Rinse:	739.5
After100g H_2O Rinse:	840.0
Total TS5-A:	430.5

MARK FLUID LEVEL
SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	282.5
With 150 mL DI H_2O:	432.5
After HCl Rinse:	480.0
After DI H_2O Rinse:	580.0
Total TS5-B:	297.5

MARK FLUID LEVEL
SEAL & LABEL TS5-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	
Final Wt:	
7 Gain:	

Impinger Box ID:

SAMPLE IDENTIFICATION	24-22327-PM-
TS1 (Probe Rinse-Acetone)	19
TS2 (Probe Rinse-0.1N HNO_3)	20
TS3 (Filter)	21
TS4 (Impinger 1-4 Sol'n-HNO_3)	22
TS5-A (Impinger 5,6 Sol'n-$KMnO_4$)	23
TS5-B (Impinger 5,6 Rinse-HCl)	24

TS1,TS2- 500 ml Glass Bottle
TS3- Petri Dish
TS4- 1000 ml Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle
TS5-B - 500 ml Amber Glass Bottle

CWTR = 1 to 6:

WCBDA= 7:

Train Loaded By:
Train Recovered By:

ORTECH Consulting Alliance Inc.
Particulate and Metals Train Recovery Data Sheet

Client:	Covanta DYEC
Project No.:	22327
Date:	MAR 19/24
Test No.:	1
Test Location:	UNIT 2

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	285.0
After Act. Rinse:	355.5
Total TS1:	70.5

MARK FLUID LEVEL
SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	285.0
After 0.1N HNO_3 Rinse:	453.5
Total TS2:	168.5

MARK FLUID LEVEL
SEAL AND LABEL TS2

Filter

Filter ID: 02 1030

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

Seal and label container TS3

Impingers 1, 2, 3, and 4

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	623.5
Final Wt:	880.0
1 Gain:	256.5
Colour:	clear

Impinger #2 HNO_3/H_2O_2	
Empty Wt:	641.0
Initial Wt:	747.3
Final Wt:	948.8
2 Gain:	201.5
Colour:	clear

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	669.7
Initial Wt:	773.5
Final Wt:	817.0
3 Gain:	43.5
Colour:	clear

Impinger #4 Empty	
Empty Wt:	509.0
Final Wt:	514.0
4 Gain:	5.0
Colour:	clear

CONTAINER TS4 WEIGHTS	
Empty Wt:	409.5
w/ Imp. 1-4 Soln:	1124.5
After HNO_3 Rinse:	1227.0
Total TS4:	817.5

MARK FLUID LEVEL
SEAL AND LABEL TS4

Impinger 5 & 6

Impinger #5 $KMnO_4/H_2SO_4$	
Empty Wt:	623.5
Initial Wt:	745.5
Final Wt:	752.5
5 Gain:	7.0
Colour:	purple

Impinger # 6 $KMnO_4/H_2SO_4$	
Empty Wt:	667.5
Initial Wt:	761.5
Final Wt:	763.5
6 Gain:	2.0
Colour:	purple

Impinger 5 & 6

CONTAINER TS5-A & TS5-B

CONTAINER TS5-A	
Empty Wt:	410.0
With Imp. 5&6 Soln:	633.7
After $KMnO_4$ Rinse:	747.7
After100g H_2O Rinse:	847.5
Total TS5-A:	437.5

MARK FLUID LEVEL
SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	282.0
With 150 mL DI H_2O:	432.0
After HCl Rinse:	498.3
After DI H_2O Rinse:	617.5
Total TS5-B:	335.5

MARK FLUID LEVEL
SEAL & LABEL TS5-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	958.7
Final Wt:	980.2
7 Gain:	21.5

Impinger Box ID: 16

SAMPLE IDENTIFICATION	24-22327-PM-
TS1 (Probe Rinse-Acetone)	25
TS2 (Probe Rinse-0.1N HNO_3)	26
TS3 (Filter)	27
TS4 (Impinger 1-4 Sol'n-HNO_3)	28
TS5-A (Impinger 5,6 Sol'n-$KMnO_4$)	29
TS5-B (Impinger 5,6 Rinse-HCl)	30

TS1,TS2- 500 ml Glass Bottle
TS3- Petri Dish
TS4- 1000 ml Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle
TS5-B - 500 ml Amber Glass Bottle

CWTR = 1 to 6:	515.5
WCBDA= 7:	21.5

Train Loaded By:	DT
Train Recovered By:	

ORTECH Consulting Alliance Inc.
Particulate and Metals Train Recovery Data Sheet

Client:	Covanta DYEC
Project No.:	22327
Date:	MAR 19/24
Test No.:	2
Test Location:	UNIT 2

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	282.0
After Act. Rinse:	406.0
Total TS1:	124.0

MARK FLUID LEVEL
SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	282.5
After 0.1N HNO_3 Rinse:	549.0
Total TS2:	266.5

MARK FLUID LEVEL
SEAL AND LABEL TS2

Filter

Filter ID: 221079

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

Seal and label container TS3

Impingers 1, 2, 3, and 4

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	577.0
Final Wt:	728.5
1 Gain:	151.5
Colour:	clear

Impinger #2 HNO_3/H_2O_2	
Empty Wt:	629.7
Initial Wt:	729.9
Final Wt:	955.5
2 Gain:	225.6
Colour:	clear

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	622.5
Initial Wt:	733.0
Final Wt:	809.0
3 Gain:	76.0
Colour:	clear

Impinger #4 Empty	
Empty Wt:	604.8
Final Wt:	612.8
4 Gain:	8.0
Colour:	clear

CONTAINER TS4 WEIGHTS	
Empty Wt:	409.5
w/ Imp. 1-4 Soln:	1072.5
After HNO_3 Rinse:	1197.5
Total TS4:	788.0

MARK FLUID LEVEL
SEAL AND LABEL TS4

Impinger 5 & 6

Impinger #5 $KMnO_4/H_2SO_4$	
Empty Wt:	678.8
Initial Wt:	790.8
Final Wt:	788.3
5 Gain:	-2.5
Colour:	Purple

Impinger # 6 $KMnO_4/H_2SO_4$	
Empty Wt:	625.5
Initial Wt:	733.0
Final Wt:	735.5
6 Gain:	2.5
Colour:	purple

Impinger 5 & 6

CONTAINER TS5-A & TS5-B

CONTAINER TS5-A	
Empty Wt:	409.5
With Imp. 5&6 Soln:	637.5
After $KMnO_4$ Rinse:	745.5
After100g H_2O Rinse:	851.0
Total TS5-A:	441.5

MARK FLUID LEVEL
SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	283.5
With 150 mL DI H_2O:	433.5
After HCl Rinse:	483.5
After DI H_2O Rinse:	631.5
Total TS5-B:	348.0

MARK FLUID LEVEL
SEAL & LABEL TS5-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	1057.5
Final Wt:	1075.5
7 Gain:	18.0

Impinger Box ID: 13

SAMPLE IDENTIFICATION	24-22327-PM-
TS1 (Probe Rinse-Acetone)	31
TS2 (Probe Rinse-0.1N HNO_3)	32
TS3 (Filter)	33
TS4 (Impinger 1-4 Sol'n-HNO_3)	34
TS5-A (Impinger 5,6 Sol'n-$KMnO_4$)	35
TS5-B (Impinger 5,6 Rinse-HCl)	36

TS1,TS2- 500 ml Glass Bottle
TS3- Petri Dish
TS4- 1000 ml Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle
TS5-B - 500 ml Amber Glass Bottle

CWTR = 1 to 6:	461.1
WCBDA= 7:	18.0

Train Loaded By:
Train Recovered By:

ORTECH Consulting Alliance Inc.
Particulate and Metals Train Recovery Data Sheet

Client:	Covanta DYEC
Project No.:	22327
Date:	MAR 19/24
Test No.:	3
Test Location:	UNIT 2

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	284.5
After Act. Rinse:	396.5
Total TS1:	112.0

MARK FLUID LEVEL
SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	283.5
After 0.1N HNO_3 Rinse:	591.5
Total TS2:	308.0

MARK FLUID LEVEL
SEAL AND LABEL TS2

Filter

Filter ID: 8Z10903

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

Seal and label container TS3

Impingers 1, 2, 3, and 4

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	595.2
Final Wt:	755.5
1 Gain:	160.3
Colour:	clear

Impinger #2 HNO_3/H_2O_2	
Empty Wt:	561.2
Initial Wt:	671.7
Final Wt:	891.5
2 Gain:	219.8
Colour:	clear

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	658.8
Initial Wt:	761.0
Final Wt:	862.2
3 Gain:	101.2
Colour:	clear

Impinger #4 Empty	
Empty Wt:	605.7
Final Wt:	613.7
4 Gain:	8.0
Colour:	clear

CONTAINER TS4 WEIGHTS	
Empty Wt:	413.0
w/ Imp. 1-4 Soln:	1103.5
After HNO_3 Rinse:	1215.5
Total TS4:	802.5

MARK FLUID LEVEL
SEAL AND LABEL TS4

Impinger 5 & 6

Impinger #5 $KMnO_4/H_2SO_4$	
Empty Wt:	657.4
Initial Wt:	772.0
Final Wt:	784.5
5 Gain:	12.5
Colour:	purple

Impinger # 6 $KMnO_4/H_2SO_4$	
Empty Wt:	685.8
Initial Wt:	793.0
Final Wt:	803.0
6 Gain:	10.0
Colour:	purple

Impinger 5 & 6

CONTAINER TS5-A & TS5-B

CONTAINER TS5-A	
Empty Wt:	412.5
With Imp. 5&6 Soln:	647.3
After $KMnO_4$ Rinse:	757.3
After100g H_2O Rinse:	875.0
Total TS5-A:	462.5

MARK FLUID LEVEL
SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	235.0
With 150 mL DI H_2O:	435.0
After HCl Rinse:	485.0
After DI H_2O Rinse:	672.5
Total TS5-B:	387.5

MARK FLUID LEVEL
SEAL & LABEL TS5-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	941.0
Final Wt:	962.8
7 Gain:	21.8

Impinger Box ID: 5

SAMPLE IDENTIFICATION	24-22327-PM-
TS1 (Probe Rinse-Acetone)	37
TS2 (Probe Rinse-0.1N HNO_3)	38
TS3 (Filter)	39
TS4 (Impinger 1-4 Sol'n-HNO_3)	40
TS5-A (Impinger 5,6 Sol'n-$KMnO_4$)	41
TS5-B (Impinger 5,6 Rinse-HCl)	42

TS1,TS2- 500 ml Glass Bottle
TS3- Petri Dish
TS4- 1000 ml Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle
TS5-B - 500 ml Amber Glass Bottle

CWTR = 1 to 6:	511.8
WCBDA= 7:	21.8

Train Loaded By:	
Train Recovered By:	

ORTECH Consulting Alliance Inc.
Particulate and Metals Train Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: Mar 19/24
Test No.:
Test Location: BLANK 2

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	282.5
After Act. Rinse:	494.5
Total TS1:	212.0

MARK FLUID LEVEL
SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	283.5
After 0.1N HNO_3 Rinse:	563.5
Total TS2:	280.0

MARK FLUID LEVEL
SEAL AND LABEL TS2

Filter

Filter ID: QZ 10798

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

Seal and label container TS3

Impingers 1, 2, 3, and 4

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	
Final Wt:	
1 Gain:	
Colour:	

Impinger #2 HNO_3/H_2O_2	
Empty Wt:	
Initial Wt:	
Final Wt:	
2 Gain:	
Colour:	

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	
Initial Wt:	
Final Wt:	
3 Gain:	
Colour:	

Impinger #4 Empty	
Empty Wt:	
Final Wt:	
4 Gain:	
Colour:	

CONTAINER TS4 WEIGHTS	
Empty Wt:	410.0
w/ Imp. 1-4 Soln:	621.0
After HNO_3 Rinse:	726.0
Total TS4:	316.0

MARK FLUID LEVEL
SEAL AND LABEL TS4

Impinger 5 & 6

Impinger #5 $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
5 Gain:	
Colour:	

Impinger # 6 $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
6 Gain:	
Colour:	

Impinger 5 & 6

CONTAINER TS5-A & TS5-B

CONTAINER TS5-A	
Empty Wt:	409.5
With Imp. 5&6 Soln:	632.0
After $KMnO_4$ Rinse:	743.5
After100g H_2O Rinse:	845.0
Total TS5-A:	435.5

MARK FLUID LEVEL
SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	232.0
With 150 mL DI H_2O:	432.0
After HCl Rinse:	480.5
After DI H_2O Rinse:	532.5
Total TS5-B:	300.5

MARK FLUID LEVEL
SEAL & LABEL TS5-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	
Final Wt:	
7 Gain:	

Impinger Box ID:

SAMPLE IDENTIFICATION	24-22327-PM-
TS1 (Probe Rinse-Acetone)	43
TS2 (Probe Rinse-0.1N HNO_3)	44
TS3 (Filter)	45
TS4 (Impinger 1-4 Sol'n-HNO_3)	46
TS5-A (Impinger 5,6 Sol'n-$KMnO_4$)	47
TS5-B (Impinger 5,6 Rinse-HCl)	48

TS1,TS2- 500 ml Glass Bottle
TS3- Petri Dish
TS4- 1000 ml Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle
TS5-B - 500 ml Amber Glass Bottle

CWTR = 1 to 6:

WCBDA= 7:

Train Loaded By:
Train Recovered By:

APPENDIX 12

Inorganics Analytical Reports
(38 pages)

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2755021		Mississauga, ON L5J 2Y4
Date of Report	28-Mar-24		Canada
Date of Sample Receipt	20-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 COVANTA

COMMENTS:

Sample Particulate Analysis via Gravimetric USEPA Method 201A (GN 22-Mar-2024)
Sample Particulate Analysis via Gravimetric USEPA Method 202 (GN 22-Mar-2024)

REPORT FLAGS:

J - The value is uncertain and below what can be reliably identified as positive with a ≥99% confidence limit (i.e. below the laboratory determined MDL).

LCB = Laboratory Control Blank
CVS = Continuing Verification Standard Sample (limits: ±2 in the last decimal)
LOR = Limit of Reporting

Certified by: _____
Claire Kocharakkal
Project Manager

Results in this certificate relate only to the samples as submitted to the laboratory.
This report shall not be reproduced, except in full, without the written permission of ALS Canada Ltd.

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-M201A-1 TEST#1 APC OUTLET #1	24-22327-M201A-2 TEST#1 APC OUTLET #1	24-22327-M201A-3 TEST#1 APC OUTLET #1	24-22327-M201A-4 TEST#1 APC OUTLET #1	24-22327-M201A-(5-7) TEST#1 APC OUTLET #1
ALS Sample ID		L2755021-1	L2755021-2	L2755021-3	L2755021-4	L2755021-5
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
PM via Gravimetric Analysis	**LOR**					
Method 201A	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	-	-	-	0.2 J	-
Acetone Particulate Matter	0.4	0.2 J	0.1 J	0.6	-	-
	g	**g**	**g**	**g**	**g**	**g**
Acetone Mass	0.02	22.6	15.8	16.9	-	-
PM via Gravimetric Analysis	**LOR**					
Method 202	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Extractable Condensable Particulates	0.4	-	-	-	-	4.7
Non-Extractable Condensable Particulates	0.4	-	-	-	-	3.3
	g	**g**	**g**	**g**	**g**	**g**
Water Mass	0.02	-	-	-	-	205

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-M201A-8 TEST#2 APC OUTLET #1	24-22327-M201A-9 TEST#2 APC OUTLET #1	24-22327-M201A-10 TEST#2 APC OUTLET #1	24-22327-M201A-11 TEST#2 APC OUTLET #1	24-22327-M201A-(12-14) TEST#2 APC OUTLET #1
ALS Sample ID		L2755021-6	L2755021-7	L2755021-8	L2755021-9	L2755021-10
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
PM via Gravimetric Analysis Method 201A	**LOR mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	-	-	-	<	-
Acetone Particulate Matter	0.4	0.6	0.4 J	0.2 J	-	-
	g	**g**	**g**	**g**	**g**	**g**
Acetone Mass	0.02	31.1	21.9	20.8	-	-
PM via Gravimetric Analysis Method 202	**LOR mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Extractable Condensable Particulates	0.4	-	-	-	-	4.4
Non-Extractable Condensable Particulates	0.4	-	-	-	-	3.2
	g	**g**	**g**	**g**	**g**	**g**
Water Mass	0.02	-	-	-	-	251

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-M201A-15 TEST#3 APC OUTLET #1	24-22327-M201A-16 TEST#3 APC OUTLET #1	24-22327-M201A-17 TEST#3 APC OUTLET #1	24-22327-M201A-18 TEST#3 APC OUTLET #1	24-22327-M201A-(19-21) TEST#3 APC OUTLET #1
ALS Sample ID		L2755021-11	L2755021-12	L2755021-13	L2755021-14	L2755021-15
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
PM via Gravimetric Analysis	**LOR**					
Method 201A	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	-	-	-	<	-
Acetone Particulate Matter	0.4	0.6	0.3 J	1.0	-	-
	g	**g**	**g**	**g**	**g**	**g**
Acetone Mass	0.02	34.4	33.7	11.5	-	-
PM via Gravimetric Analysis	**LOR**					
Method 202	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Extractable Condensable Particulates	0.4	-	-	-	-	4.0
Non-Extractable Condensable Particulates	0.4	-	-	-	-	3.2
	g	**g**	**g**	**g**	**g**	**g**
Water Mass	0.02	-	-	-	-	259

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-M201A-43 BLANK APC OUTLET #1	24-22327-M201A-44 BLANK APC OUTLET #1	24-22327-M201A-45 BLANK APC OUTLET #1	24-22327-M201A-46 BLANK APC OUTLET #1	24-22327-M201A-(47-49) BLANK APC OUTLET #1
ALS Sample ID		L2755021-16	L2755021-17	L2755021-18	L2755021-19	L2755021-20
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
PM via Gravimetric Analysis	**LOR**					
Method 201A	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	-	-	-	<	-
Acetone Particulate Matter	0.4	0.2 J	0.3 J	0.3 J	-	-
	g	**g**	**g**	**g**	**g**	**g**
Acetone Mass	0.02	22.4	22.5	27.6	-	-
PM via Gravimetric Analysis	**LOR**					
Method 202	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Extractable Condensable Particulates	0.4	-	-	-	-	2.9
Non-Extractable Condensable Particulates	0.4	-	-	-	-	0.3 J
	g	**g**	**g**	**g**	**g**	**g**
Water Mass	0.02	-	-	-	-	199

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-M201A-22 TEST#1 APC OUTLET #2	24-22327-M201A-23 TEST#1 APC OUTLET #2	24-22327-M201A-24 TEST#1 APC OUTLET #2	24-22327-M201A-25 TEST#1 APC OUTLET #2	24-22327-M201A-(26-28) TEST#1 APC OUTLET #2
ALS Sample ID		L2755021-21	L2755021-22	L2755021-23	L2755021-24	L2755021-25
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
PM via Gravimetric Analysis	LOR					
Method 201A	mg	mg	mg	mg	mg	mg
Filter Particulate Matter	0.8	-	-	-	<	-
Acetone Particulate Matter	0.4	0.5	0.6	0.2 J	-	-
	g	g	g	g	g	g
Acetone Mass	0.02	34.6	30.5	12.4	-	-
PM via Gravimetric Analysis	LOR					
Method 202	mg	mg	mg	mg	mg	mg
Extractable Condensable Particulates	0.4	-	-	-	-	3.4
Non-Extractable Condensable Particulates	0.4	-	-	-	-	3.0
	g	g	g	g	g	g
Water Mass	0.02	-	-	-	-	260

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-M201A-29 TEST#2 APC OUTLET #2	24-22327-M201A-30 TEST#2 APC OUTLET #2	24-22327-M201A-31 TEST#2 APC OUTLET #2	24-22327-M201A-32 TEST#2 APC OUTLET #2	24-22327-M201A-(33-35) TEST#2 APC OUTLET #2
ALS Sample ID		L2755021-26	L2755021-27	L2755021-28	L2755021-29	L2755021-30
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
PM via Gravimetric Analysis	**LOR**					
Method 201A	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	-	-	-	<	-
Acetone Particulate Matter	0.4	0.4 J	0.1 J	0.9	-	-
	g	**g**	**g**	**g**	**g**	**g**
Acetone Mass	0.02	23.6	22.4	54.9	-	-
PM via Gravimetric Analysis	**LOR**					
Method 202	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Extractable Condensable Particulates	0.4	-	-	-	-	4.4
Non-Extractable Condensable Particulates	0.4	-	-	-	-	3.7
	g	**g**	**g**	**g**	**g**	**g**
Water Mass	0.02	-	-	-	-	232

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-M201A-36 TEST#3 APC OUTLET #2	24-22327-M201A-37 TEST#3 APC OUTLET #2	24-22327-M201A-38 TEST#3 APC OUTLET #2	24-22327-M201A-39 TEST#3 APC OUTLET #2	24-22327-M201A-(40-42) TEST#3 APC OUTLET #2
ALS Sample ID		L2755021-31	L2755021-32	L2755021-33	L2755021-34	L2755021-35
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
PM via Gravimetric Analysis	**LOR**					
Method 201A	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	-	-	-	<	-
Acetone Particulate Matter	0.4	0.5	0.3 J	<	-	-
	g	**g**	**g**	**g**	**g**	**g**
Acetone Mass	0.02	25.0	30.6	15.2	-	-
PM via Gravimetric Analysis	**LOR**					
Method 202	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Extractable Condensable Particulates	0.4	-	-	-	-	3.3
Non-Extractable Condensable Particulates	0.4	-	-	-	-	3.2
	g	**g**	**g**	**g**	**g**	**g**
Water Mass	0.02	-	-	-	-	272

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-M201A-50 BLANK APC OUTLET #2		24-22327-M201A-51 BLANK APC OUTLET #2		24-22327-M201A-52 BLANK APC OUTLET #2		24-22327-M201A-53 BLANK APC OUTLET #2		24-22327-M201A-(54-56) BLANK APC OUTLET #2	
ALS Sample ID		L2755021-36		L2755021-37		L2755021-38		L2755021-39		L2755021-40	
Matrix		Stack		Stack		Stack		Stack		Stack	
Analysis type		Sample		Sample		Sample		Sample		Sample	
Sampling Date/Time		19-Mar-24		19-Mar-24		19-Mar-24		19-Mar-24		19-Mar-24	
Date of Receipt		20-Mar-24		20-Mar-24		20-Mar-24		20-Mar-24		20-Mar-24	
PM via Gravimetric Analysis	LOR										
Method 201A	mg	mg		mg		mg		mg		mg	
Filter Particulate Matter	0.8	-		-		-		0.1	J	-	
Acetone Particulate Matter	0.4	0.3	J	0.2	J	0.2	J	-		-	
	g	g		g		g		g		g	
Acetone Mass	0.02	18.5		13.5		17.4		-		-	
PM via Gravimetric Analysis	LOR										
Method 202	mg	mg		mg		mg		mg		mg	
Extractable Condensable Particulates	0.4	-		-		-		-		3.5	
Non-Extractable Condensable Particulates	0.4	-		-		-		-		0.4	J
	g	g		g		g		g		g	
Water Mass	0.02	-		-		-		-		188	

ALS Environmental

Sample Analysis Summary Report

Sample Name		MB1		MB2	
ALS Sample ID		L2755021-MB		L2755021-MB	
Matrix		-		-	
Analysis type		Sample		Sample	
Sampling Date/Time		-		-	
Date of Receipt		-		-	
PM via Gravimetric Analysis	**LOR**				
Method 201A	**mg**	**mg**		**mg**	
Filter Particulate Matter	0.8	0.1	J	-	
Acetone Particulate Matter	0.4	<		0.1	J
	g	**g**		**g**	
Acetone Mass	0.02	31.9		31.9	
PM via Gravimetric Analysis	**LOR**				
Method 202	**mg**	**mg**		**mg**	
Extractable Condensable Particulates	0.4	<		-	
Non-Extractable Condensable Particulates	0.4	0.2	J	-	
	g	**g**		**g**	
Water Mass	0.02	104		-	

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	Ortech
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2755022		Mississauga, ON L5J 2Y4
Date of Report	27-Mar-24		Canada
Date of Sample Receipt	20-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS:

Sample Particulate Analysis via Gravimetric USEPA Method 5 (GN 22-Mar-2024)

REPORT FLAGS:

J - The value is uncertain and below what can be reliably identified as positive with a ≥99% confidence limit (i.e. below the laboratory determined MDL).

LCB = Laboratory Control Blank
CVS = Continuing Verification Standard Sample (limits: ±2 in the last decimal)
LOR = Limit of Reporting

Certified by: L. Wrona

Lynne Wrona
Project Manager

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(7 THRU 12) TEST#2 APC OUTLET #1	24-22327-PM-(13 THRU 18) TEST#3 APC OUTLET #1	24-22327-PM-(19 THRU 24) BLANK1 APC OUTLET #1	24-22327-PM-(25 THRU 30) TEST#1 APC OUTLET #2
ALS Sample ID		L2755022-1	L2755022-2	L2755022-3	L2755022-4	L2755022-5
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		18-Mar-24	18-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
PM via Gravimetric Analysis	**LOR**					
Method 5	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	3.3	2.7	5.9	3.9	2.9
Acetone Particulate Matter	0.4	3.9	1.1	1.9	0.2 J	4.9
	g	**g**	**g**	**g**	**g**	**g**
Acetone Mass	0.02	89.1	107	151	151	70.6

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-PM-(31 THRU 36) TEST#2 APC OUTLET #2	24-22327-PM-(37 THRU 42) TEST#3 APC OUTLET #2	24-22327-PM-(43 THRU 48) BLANK2 APC OUTLET #2	MB
ALS Sample ID		L2755022-6	L2755022-7	L2755022-8	L2755022-MB
Matrix		Stack	Stack	Stack	n/a
Analysis type		Sample	Sample	Sample	Sample
Sampling Date/Time		19-Mar-24	19-Mar-24	19-Mar-24	n/a
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	n/a
PM via Gravimetric Analysis	**LOR**				
Method 5	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	2.4	3.0	4.4	0.1 J
Acetone Particulate Matter	0.4	3.9	2.7	0.3 J	0.2 J
	g	**g**	**g**	**g**	**g**
Acetone Mass	0.02	121	111	211	31.8

CERTIFICATE OF ANALYSIS

Work Order	: **BU2400055**	Page	: 1 of 4
Client	: **ORTECH Environmental Inc.**	Laboratory	: ALS Environmental - Burlington
Contact	: Chris Belore	Account Manager	: Lynne Wrona
Address	: 804 Southdown Road Mississauga ON Canada L5J 2Y4	Address	: 1435 Norjohn Court, Unit 1 Burlington ON Canada L7L 0E6
Telephone	: 905 822 4120	Telephone	: +1 905 331 3111
Project	: 22327 Covanta	Date Samples Received	: 20-Mar-2024 12:30
PO	: 22327-J2964	Date Analysis Commenced	: 21-Mar-2024
C-O-C number	: ----	Issue Date	: 27-Mar-2024 14:59
Sampler	: Client		
Site	: ----		
Quote number	: Stack SOA		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gamini Nadu	Analyst	Inorganics, Burlington, Ontario
Milithza Silva	Manager - Inorganics	Inorganics, Burlington, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
L	litres
mg/L	milligrams per litre
mg/sample	milligrams per sample

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Stack Emissions**
(Matrix: **Air**)

				Client sample ID	24-22327-M26A -1 APC Outlet #1	24-22327-M26A -2 APC Outlet #1	24-22327-M26A -3 APC Outlet #1	24-22327-M26A -4 APC Outlet #2	24-22327-M26A -5 APC Outlet #2
				Client sampling date / time	18-Mar-2024 00:00	18-Mar-2024 00:00	18-Mar-2024 00:00	19-Mar-2024 00:00	19-Mar-2024 00:00
Analyte	CAS Number	Method/Lab	LOR	Unit	BU2400055-001	BU2400055-002	BU2400055-003	BU2400055-004	BU2400055-005
					Result	Result	Result	Result	Result
Physical Tests									
Volume, impinger	n/a	EF003.I/BU	0.0010	L	0.430	0.445	0.500	0.510	0.480
Inorganics									
Ammonia (as NH3)	8013-59-0	E253/BU	0.470	mg/L	1.73	2.56	1.92	1.15	1.01
Ammonia, total (as NH3)	7664-41-7	EC253/BU	0.020	mg/sample	0.744	1.14	0.960	0.586	0.485
Chloride, average	16887-00-6	E252/BU	0.47	mg/L	8.06	9.52	8.86	11.3	10.1
Chloride, replicate 1	16887-00-6	E252/BU	0.47	mg/L	8.06	9.51	8.85	11.3	10.1
Chloride, replicate 2	16887-00-6	E252/BU	0.47	mg/L	8.06	9.53	8.86	11.3	10.1
Fluoride, average	----	E252/BU	0.31	mg/L	<0.31	<0.31	<0.31	<0.31	<0.31
Fluoride, replicate 1	----	E252/BU	0.31	mg/L	<0.31	<0.31	<0.31	<0.31	<0.31
Fluoride, replicate 2	----	E252/BU	0.31	mg/L	<0.31	<0.31	<0.31	<0.31	<0.31
Hydrogen chloride, average	7647-01-0	EC252/BU	0.015	mg/sample	3.56	4.36	4.56	5.92	4.99
Hydrogen chloride, replicate 1	7647-01-0	EC252/BU	0.015	mg/sample	3.56	4.35	4.55	5.92	4.99
Hydrogen chloride, replicate 2	7647-01-0	EC252/BU	0.015	mg/sample	3.56	4.36	4.56	5.92	4.99
Hydrogen fluoride, average	7664-39-3	EC252/BU	0.0098	mg/sample	<0.142	<0.147	<0.165	<0.168	<0.158
Hydrogen fluoride, replicate 1	7664-39-3	EC252/BU	0.0098	mg/sample	<0.142	<0.147	<0.165	<0.168	<0.158
Hydrogen fluoride, replicate 2	7664-39-3	EC252/BU	0.0098	mg/sample	<0.142	<0.147	<0.165	<0.168	<0.158

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Stack Emissions**
(Matrix: **Air**)

				Client sample ID	24-22327-M26A -6 APC Outlet #2	24-22327-M26A -Blank1 APC Outlet #1	24-22327-M26A -Blank2 APC Outlet #2	----	----
				Client sampling date / time	19-Mar-2024 00:00	18-Mar-2024 00:00	19-Mar-2024 00:00	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	BU2400055-006	BU2400055-007	BU2400055-008	-------	-------
					Result	Result	Result	----	----
Physical Tests									
Volume, impinger	n/a	EF003.I/BU	0.0010	L	0.485	0.320	0.320	----	----
Inorganics									
Ammonia (as NH3)	8013-59-0	E253/BU	0.470	mg/L	0.954	<0.472	<0.472	----	----
Ammonia, total (as NH3)	7664-41-7	EC253/BU	0.020	mg/sample	0.463	<0.020	<0.020	----	----
Chloride, average	16887-00-6	E252/BU	0.47	mg/L	10.4	<0.47	<0.47	----	----
Chloride, replicate 1	16887-00-6	E252/BU	0.47	mg/L	10.5	<0.47	<0.47	----	----
Chloride, replicate 2	16887-00-6	E252/BU	0.47	mg/L	10.4	<0.47	<0.47	----	----
Fluoride, average	----	E252/BU	0.31	mg/L	<0.31	<0.31	<0.31	----	----
Fluoride, replicate 1	----	E252/BU	0.31	mg/L	<0.31	<0.31	<0.31	----	----
Fluoride, replicate 2	----	E252/BU	0.31	mg/L	<0.31	<0.31	<0.31	----	----
Hydrogen chloride, average	7647-01-0	EC252/BU	0.015	mg/sample	5.22	<0.154	<0.154	----	----
Hydrogen chloride, replicate 1	7647-01-0	EC252/BU	0.015	mg/sample	5.24	<0.154	<0.154	----	----
Hydrogen chloride, replicate 2	7647-01-0	EC252/BU	0.015	mg/sample	5.19	<0.154	<0.154	----	----
Hydrogen fluoride, average	7664-39-3	EC252/BU	0.0098	mg/sample	<0.160	<0.106	<0.106	----	----
Hydrogen fluoride, replicate 1	7664-39-3	EC252/BU	0.0098	mg/sample	<0.160	<0.106	<0.106	----	----
Hydrogen fluoride, replicate 2	7664-39-3	EC252/BU	0.0098	mg/sample	<0.160	<0.106	<0.106	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **BU2400055**	Page	: 1 of 7
Client	: **ORTECH Environmental Inc.**	Laboratory	: ALS Environmental - Burlington
Contact	: Chris Belore	Account Manager	: Lynne Wrona
Address	: 804 Southdown Road Mississauga ON Canada L5J 2Y4	Address	: 1435 Norjohn Court, Unit 1 Burlington, Ontario Canada L7L 0E6
Telephone	: 905 822 4120	Telephone	: +1 905 331 3111
Project	: 22327 Covanta	Date Samples Received	: 20-Mar-2024 12:30
PO	: 22327-J2964	Issue Date	: 27-Mar-2024 14:59
C-O-C number	: ----		
Sampler	: Client		
Site	: ----		
Quote number	: Stack SOA		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Air**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics : Ammonia by IC (CTM-027)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-4 APC Outlet #2	E253	19-Mar-2024	21-Mar-2024	14 days	3 days	✓	21-Mar-2024	14 days	3 days	✓
Inorganics : Ammonia by IC (CTM-027)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-5 APC Outlet #2	E253	19-Mar-2024	21-Mar-2024	14 days	3 days	✓	21-Mar-2024	14 days	3 days	✓
Inorganics : Ammonia by IC (CTM-027)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-6 APC Outlet #2	E253	19-Mar-2024	21-Mar-2024	14 days	3 days	✓	21-Mar-2024	14 days	3 days	✓
Inorganics : Ammonia by IC (CTM-027)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-Blank2 APC Outlet #2	E253	19-Mar-2024	21-Mar-2024	14 days	3 days	✓	21-Mar-2024	14 days	3 days	✓
Inorganics : Ammonia by IC (CTM-027)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-1 APC Outlet #1	E253	18-Mar-2024	21-Mar-2024	14 days	4 days	✓	21-Mar-2024	14 days	4 days	✓
Inorganics : Ammonia by IC (CTM-027)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-2 APC Outlet #1	E253	18-Mar-2024	21-Mar-2024	14 days	4 days	✓	21-Mar-2024	14 days	4 days	✓
Inorganics : Ammonia by IC (CTM-027)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-3 APC Outlet #1	E253	18-Mar-2024	21-Mar-2024	14 days	4 days	✓	21-Mar-2024	14 days	4 days	✓

Matrix: **Air**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics : Ammonia by IC (CTM-027)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-Blank1 APC Outlet #1	E253	18-Mar-2024	21-Mar-2024	14 days	4 days	✓	21-Mar-2024	14 days	4 days	✓
Inorganics : Ion Chromatography Analysis (M26/26A Anions)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-4 APC Outlet #2	E252	19-Mar-2024	21-Mar-2024	28 days	3 days	✓	21-Mar-2024	28 days	3 days	✓
Inorganics : Ion Chromatography Analysis (M26/26A Anions)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-5 APC Outlet #2	E252	19-Mar-2024	21-Mar-2024	28 days	3 days	✓	21-Mar-2024	28 days	3 days	✓
Inorganics : Ion Chromatography Analysis (M26/26A Anions)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-6 APC Outlet #2	E252	19-Mar-2024	21-Mar-2024	28 days	3 days	✓	21-Mar-2024	28 days	3 days	✓
Inorganics : Ion Chromatography Analysis (M26/26A Anions)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-Blank2 APC Outlet #2	E252	19-Mar-2024	21-Mar-2024	28 days	3 days	✓	21-Mar-2024	28 days	3 days	✓
Inorganics : Ion Chromatography Analysis (M26/26A Anions)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-1 APC Outlet #1	E252	18-Mar-2024	21-Mar-2024	28 days	4 days	✓	21-Mar-2024	28 days	4 days	✓
Inorganics : Ion Chromatography Analysis (M26/26A Anions)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-2 APC Outlet #1	E252	18-Mar-2024	21-Mar-2024	28 days	4 days	✓	21-Mar-2024	28 days	4 days	✓
Inorganics : Ion Chromatography Analysis (M26/26A Anions)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-3 APC Outlet #1	E252	18-Mar-2024	21-Mar-2024	28 days	4 days	✓	21-Mar-2024	28 days	4 days	✓
Inorganics : Ion Chromatography Analysis (M26/26A Anions)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-Blank1 APC Outlet #1	E252	18-Mar-2024	21-Mar-2024	28 days	4 days	✓	21-Mar-2024	28 days	4 days	✓

Matrix: **Air**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Physical Tests : Stack Emission Impinger volume (L)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-4 APC Outlet #2	EF003.I	19-Mar-2024	----	----	----		21-Mar-2024	----	2 days	
Physical Tests : Stack Emission Impinger volume (L)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-5 APC Outlet #2	EF003.I	19-Mar-2024	----	----	----		21-Mar-2024	----	2 days	
Physical Tests : Stack Emission Impinger volume (L)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-6 APC Outlet #2	EF003.I	19-Mar-2024	----	----	----		21-Mar-2024	----	2 days	
Physical Tests : Stack Emission Impinger volume (L)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-Blank2 APC Outlet #2	EF003.I	19-Mar-2024	----	----	----		21-Mar-2024	----	2 days	
Physical Tests : Stack Emission Impinger volume (L)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-1 APC Outlet #1	EF003.I	18-Mar-2024	----	----	----		21-Mar-2024	----	3 days	
Physical Tests : Stack Emission Impinger volume (L)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-2 APC Outlet #1	EF003.I	18-Mar-2024	----	----	----		21-Mar-2024	----	3 days	
Physical Tests : Stack Emission Impinger volume (L)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-3 APC Outlet #1	EF003.I	18-Mar-2024	----	----	----		21-Mar-2024	----	3 days	
Physical Tests : Stack Emission Impinger volume (L)										
M26/A: Amber Glass (0.1N H2SO4) 24-22327-M26A-Blank1 APC Outlet #1	EF003.I	18-Mar-2024	----	----	----		21-Mar-2024	----	3 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Air**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Ammonia by IC (CTM-027)	E253	1374915	1	8	12.5	5.0	✓
Ion Chromatography Analysis (M26/26A Anions)	E252	1374910	1	8	12.5	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by IC (CTM-027)	E253	1374915	1	8	12.5	5.0	✓
Ion Chromatography Analysis (M26/26A Anions)	E252	1374910	1	8	12.5	5.0	✓
Method Blanks (MB)							
Ammonia by IC (CTM-027)	E253	1374915	1	8	12.5	5.0	✓
Ion Chromatography Analysis (M26/26A Anions)	E252	1374910	1	8	12.5	5.0	✓
Matrix Spikes (MS)							
Ammonia by IC (CTM-027)	E253	1374915	1	8	12.5	5.0	✓
Ion Chromatography Analysis (M26/26A Anions)	E252	1374910	1	8	12.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Description
Ion Chromatography Analysis (M26/26A Anions)	E252 ALS Environmental - Burlington	Air	USEPA Methods 26 and 26A	Client supplied liquid samples are split and buffered (acidic media) then sub-sampled (or sub-sampled directly for basic media) for IC analysis. Results are reported as hydrogen halides (acidic media) or halogens (basic media).
Ammonia by IC (CTM-027)	E253 ALS Environmental - Burlington	Air	EPA Method CTM-027 (mod)	Client-supplied acidic samples are sub-sampled for analysis, after a total volume is determined. Analytical results are reported as Total Ammonia, from the quantified Ammonium (NH4+) ion.
Ion Chromatography Analysis (M26/26A Anions)	EC252 ALS Environmental - Burlington	Air	unit conversion	Convert mg/L to mg/sample
Ammonia by IC (Method CTM-027)	EC253 ALS Environmental - Burlington	Air	unit conversion	Conversion from mg/L to mg/sample
Stack Emission Impinger volume (L)	EF003.I ALS Environmental - Burlington	Air		Volume of impinger contents is measured in the laboratory for use in later calculations.

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QUALITY CONTROL REPORT

Work Order	: **BU2400055**	Page	: 1 of 4
Client	: ORTECH Environmental Inc.	Laboratory	: ALS Environmental - Burlington
Contact	: Chris Belore	Account Manager	: Lynne Wrona
Address	: 804 Southdown Road Mississauga ON Canada L5J 2Y4	Address	: 1435 Norjohn Court, Unit 1 Burlington, Ontario Canada L7L 0E6
Telephone	:	Telephone	: +1 905 331 3111
Project	: 22327 Covanta	Date Samples Received	: 20-Mar-2024 12:30
PO	: 22327-J2964	Date Analysis Commenced	: 21-Mar-2024
C-O-C number	: ----	Issue Date	: 27-Mar-2024 15:00
Sampler	: Client 905 822 4120		
Site	: ----		
Quote number	: Stack SOA		
No. of samples received	: 8		
No. of samples analysed	: 8		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gamini Nadu	Analyst	Burlington Inorganics, Burlington, Ontario
Milithza Silva	Manager - Inorganics	Burlington Inorganics, Burlington, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Air**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Inorganics (QC Lot: 1374910)											
BU2400055-001	24-22327-M26A-1 APC Outlet #1	Chloride, average	16887-00-6	E252	0.47	mg/L	8.06	7.94	1.44%	20%	---
		Chloride, replicate 1	16887-00-6	E252	0.47	mg/L	8.06	7.94	1.38%	20%	---
		Chloride, replicate 2	16887-00-6	E252	0.47	mg/L	8.06	7.95	1.39%	20%	---
		Fluoride, average	---	E252	0.31	mg/L	<0.31	<0.31	0	Diff <2x LOR	---
		Fluoride, replicate 1	---	E252	0.31	mg/L	<0.31	<0.31	0	Diff <2x LOR	---
		Fluoride, replicate 2	---	E252	0.31	mg/L	<0.31	<0.31	0	Diff <2x LOR	---
Inorganics (QC Lot: 1374915)											
BU2400055-001	24-22327-M26A-1 APC Outlet #1	Ammonia (as NH3)	8013-59-0	E253	0.472	mg/L	1.73	1.75	0.016	Diff <2x LOR	---

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Air**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Inorganics (QCLot: 1374910)						
Chloride, average	16887-00-6	E252	0.47	mg/L	<0.47	---
Chloride, replicate 1	16887-00-6	E252	0.47	mg/L	<0.47	---
Chloride, replicate 2	16887-00-6	E252	0.47	mg/L	<0.47	---
Fluoride, average	---	E252	0.31	mg/L	<0.31	---
Fluoride, replicate 1	---	E252	0.31	mg/L	<0.31	---
Fluoride, replicate 2	---	E252	0.31	mg/L	<0.31	---
Inorganics (QCLot: 1374915)						
Ammonia (as NH3)	8013-59-0	E253	0.47	mg/L	<0.470	---

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Air**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Inorganics (QCLot: 1374910)									
Chloride, average	16887-00-6	E252	0.47	mg/L	15 mg/L	101	90.0	110	---
Chloride, replicate 1	16887-00-6	E252	0.47	mg/L	15 mg/L	101	90.0	110	---
Chloride, replicate 2	16887-00-6	E252	0.47	mg/L	15 mg/L	101	90.0	110	---
Fluoride, average	---	E252	0.31	mg/L	10 mg/L	103	90.0	110	---
Fluoride, replicate 1	---	E252	0.31	mg/L	10 mg/L	103	90.0	110	---
Fluoride, replicate 2	---	E252	0.31	mg/L	10 mg/L	103	90.0	110	---
Inorganics (QCLot: 1374915)									
Ammonia (as NH3)	8013-59-0	E253	0.47	mg/L	9.441 mg/L	98.1	90.0	110	---

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Air**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Inorganics (QCLot: 1374910)										
BU2400055-001	24-22327-M26A-1 APC Outlet #1	Chloride, average	16887-00-6	E252	15.6 mg/L	15 mg/L	104	90.0	110	---
		Chloride, replicate 1	16887-00-6	E252	15.6 mg/L	15 mg/L	104	90.0	110	---
		Chloride, replicate 2	16887-00-6	E252	15.6 mg/L	15 mg/L	104	90.0	110	---
		Fluoride, average	---	E252	10.4 mg/L	10 mg/L	104	90.0	110	---
		Fluoride, replicate 1	---	E252	10.4 mg/L	10 mg/L	104	90.0	110	---
		Fluoride, replicate 2	---	E252	10.4 mg/L	10 mg/L	104	90.0	110	---
Inorganics (QCLot: 1374915)										
BU2400055-001	24-22327-M26A-1 APC Outlet #1	Ammonia (as NH3)	8013-59-0	E253	9.65 mg/L	9.441 mg/L	102	85.0	115	---

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	Ortech
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2755022		Mississauga, ON L5J 2Y4
Date of Report	10-Apr-24		Canada
Date of Sample Receipt	20-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS:
Metals analysed via ICP-MS Method USEPA 6020B (SA 08-Apr-24)
Sample Preparation via USEPA Method 29 (KC11 05-Apr-2024)

ANALYST COMMENTS:
Cr, Cu, Mo and Ni observed in the front half MB at a level significantly above its LOR. Sample data within a factor of 5X, may be biased high as a result of this background contribution. SA 9-Apr 2024

LCB = Laboratory Control Blank
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
LOR = Limit of Reporting

Certified by: L. Wrona
Lynne Wrona
Project Manager

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(7 THRU 12) TEST#2 APC OUTLET #1	24-22327-PM-(13 THRU 18) TEST#3 APC OUTLET #1	24-22327-PM-(19 THRU 24) BLANK1 APC OUTLET #1	24-22327-PM-(25 THRU 30) TEST#1 APC OUTLET #2	24-22327-PM-(31 THRU 36) TEST#2 APC OUTLET #2
ALS Sample ID		L2755022-1	L2755022-2	L2755022-3	L2755022-4	L2755022-5	L2755022-6
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type		Sample	Sample	Sample	Sample	Sample	Sample
Sampling Date		18-Mar-24	18-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
Multi-Metals via ICP-MS	**LOR**						
	ug	**ug**	**ug**	**ug**	**ug**	**ug**	**ug**
Front Half HF Fraction 1A							
Antimony	0.2	0.315	<	<	<	<	<
Arsenic	1	<	<	<	<	<	<
Barium	5	47.3	46.4	47.4	46.5	47.0	47.9
Beryllium	0.2	<	<	<	<	<	<
Cadmium	0.1	0.165	0.510	<	<	<	0.243
Chromium	1	3.59	3.32	3.03	4.80	3.42	3.26
Cobalt	0.2	<	<	<	<	<	<
Copper	1	4.56	3.89	2.89	3.02	4.24	3.75
Lead	0.5	1.26	0.747	0.534	<	0.714	0.624
Molybdenum	0.2	18.2	19.2	17.5	19.2	18.2	18.4
Nickel	0.2	1.90	1.91	1.29	2.27	1.64	1.96
Selenium	2	<	<	<	<	<	<
Silver	0.2	<	<	<	<	<	<
Thallium	0.2	<	<	<	<	<	<
Vanadium	1	<	<	<	<	<	<
Zinc	6	56.4	40.0	36.2	32.8	40.2	40.9
Back Half (HNO3 / H2O2) Fraction 2A							
Antimony	0.1	<	<	<	<	<	<
Arsenic	0.2	<	<	<	<	<	<
Barium	0.5	0.773	0.830	0.729	0.512	0.597	0.680
Beryllium	0.1	<	<	<	<	<	<
Cadmium	0.05	0.233	0.231	<	<	0.0630	<
Chromium	0.15	0.791	1.35	0.584	0.452	0.630	0.588
Cobalt	0.1	0.147	<	<	<	0.191	<
Copper	0.3	7.78	3.53	3.27	4.98	1.79	2.87
Lead	0.05	1.06	0.440	0.261	0.290	0.279	0.314
Molybdenum	0.1	<	<	<	<	<	<
Nickel	0.1	1.19	1.58	0.987	0.273	0.629	0.636
Selenium	1	<	<	<	<	<	<
Silver	0.1	<	0.134	<	<	<	<
Thallium	0.05	<	<	<	<	<	<
Vanadium	0.1	<	<	<	<	<	<
Zinc	3	8.54	6.55	6.40	<	4.60	6.65

ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-PM-(37 THRU 42) TEST#3 APC OUTLET #2	24-22327-PM-(43 THRU 48) BLANK2 APC OUTLET #2	MB
ALS Sample ID		L2755022-7	L2755022-8	L2755022-MB
Matrix		Stack	Stack	n/a
Analysis Type		Sample	Sample	Sample
Sampling Date		19-Mar-24	19-Mar-24	n/a
Date of Receipt		20-Mar-24	20-Mar-24	n/a
Multi-Metals via ICP-MS	**LOR**			
	ug	**ug**	**ug**	**ug**
Front Half HF Fraction 1A				
Antimony	0.2	<	<	<
Arsenic	1	<	<	<
Barium	5	50.2	46.8	<
Beryllium	0.2	<	<	<
Cadmium	0.1	0.336	<	<
Chromium	1	3.49	4.85	2.14
Cobalt	0.2	<	<	<
Copper	1	2.13	2.85	5.76
Lead	0.5	0.756	<	<
Molybdenum	0.2	18.1	21.2	33.9
Nickel	0.2	1.95	2.30	1.29
Selenium	2	<	<	<
Silver	0.2	<	<	<
Thallium	0.2	<	<	<
Vanadium	1	<	<	<
Zinc	6	39.5	33.3	<
Back Half (HNO3 / H2O2) Fraction 2A				
Antimony	0.1	<	<	-
Arsenic	0.2	<	<	-
Barium	0.5	0.981	0.521	-
Beryllium	0.1	<	<	-
Cadmium	0.05	0.111	<	-
Chromium	0.15	0.696	0.449	-
Cobalt	0.1	<	<	-
Copper	0.3	2.87	2.37	-
Lead	0.05	0.708	0.183	-
Molybdenum	0.1	<	<	-
Nickel	0.1	0.635	0.303	-
Selenium	1	<	<	-
Silver	0.1	<	<	-
Thallium	0.05	<	<	-
Vanadium	0.1	<	<	-
Zinc	3	5.02	<	-

ALS Environmental

Sample QC Summary Report

Sample Name		RB	LCS	LCS	LCSD	LCSD
ALS Sample ID		RB	LCS	LCS	LCSD	LCSD
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis Type		Blank	LCS	LCS	LCS	LCS
Sampling Date		n/a	n/a	n/a	n/a	n/a
Date of Receipt		n/a	n/a	n/a	n/a	n/a
Multi-Metals via ICP-MS	**LOR**					
	ug	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HF Fraction 1A						
Antimony	0.2	<	11.9	99	11.8	98
Arsenic	1	<	62.3	103	61.0	101
Barium	5	<	61.2	102	59.9	100
Beryllium	0.2	<	61.2	102	60.0	100
Cadmium	0.1	<	29.8	99	29.0	97
Chromium	1	<	59.0	98	59.9	100
Cobalt	0.2	<	60.0	100	59.5	99
Copper	1	<	60.2	100	59.9	100
Lead	0.5	<	57.3	95	56.3	94
Molybdenum	0.2	<	30.0	100	29.8	99
Nickel	0.2	<	60.9	101	58.5	97
Selenium	2	<	59.0	98	57.9	97
Silver	0.2	<	30.3	101	30.2	101
Thallium	0.2	<	57.0	95	55.4	92
Vanadium	1	<	60.9	102	59.3	99
Zinc	6	<	118	98	118	98
Back Half (HNO3 / H2O2) Fraction 2A						
Antimony	0.1	<	5.81	97	5.53	92
Arsenic	0.2	<	29.4	98	29.1	97
Barium	0.5	<	28.8	96	29.6	99
Beryllium	0.1	<	27.9	93	28.5	95
Cadmium	0.05	<	14.5	97	14.6	97
Chromium	0.15	<	29.3	97	28.7	95
Cobalt	0.1	<	29.4	98	28.7	96
Copper	0.3	<	29.6	98	29.0	97
Lead	0.05	<	28.0	93	26.6	89
Molybdenum	0.1	<	14.8	99	13.9	92
Nickel	0.1	<	29.0	96	28.6	95
Selenium	1	<	28.5	95	28.5	95
Silver	0.1	<	15.0	100	14.1	94
Thallium	0.05	<	28.2	94	26.5	88
Vanadium	0.1	<	29.1	97	29.1	97
Zinc	3	<	57.6	96	54.5	91

ALS Environmental

Sample QC Summary Report

Sample Name		24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1
ALS Sample ID		L2755022-1	L2755022-1	MS	MS	MSD	MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date		18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
Multi-Metals via ICP-MS	**LOR**						
	ug	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HF Fraction 1A							
Antimony	0.2	0.315	0.306	24.2	99	26.1	107
Arsenic	1	<	<	124	103	125	104
Barium	5	47.3	46.6	172	104	171	103
Beryllium	0.2	<	<	120	100	121	101
Cadmium	0.1	0.165	0.195	61.0	101	63.4	105
Chromium	1	3.59	3.74	122	98	125	101
Cobalt	0.2	<	<	119	99	121	101
Copper	1	4.56	4.51	125	100	128	103
Lead	0.5	1.26	1.23	117	97	118	98
Molybdenum	0.2	18.2	17.7	76.3	97	80.4	104
Nickel	0.2	1.90	1.97	123	101	123	101
Selenium	2	<	<	118	98	123	103
Silver	0.2	<	<	60.5	101	63.7	106
Thallium	0.2	<	<	115	96	119	99
Vanadium	1	<	<	121	101	121	101
Zinc	6	56.4	56.6	297	100	307	104
Back Half (HNO3 / H2O2) Fraction 2A							
Antimony	0.1	<	<	11.3	94	11.6	97
Arsenic	0.2	<	<	60.6	101	59.4	99
Barium	0.5	0.773	0.776	62.4	103	60.7	100
Beryllium	0.1	<	<	58.5	97	57.8	96
Cadmium	0.05	0.233	0.216	29.3	97	30.1	100
Chromium	0.15	0.791	0.707	61.7	102	59.9	99
Cobalt	0.1	0.147	0.147	61.6	102	60.1	100
Copper	0.3	7.78	7.75	68.0	100	68.6	101
Lead	0.05	1.06	1.18	58.1	95	57.7	94
Molybdenum	0.1	<	<	29.1	97	29.0	97
Nickel	0.1	1.19	1.15	62.2	102	61.1	100
Selenium	1	<	<	57.3	95	55.3	92
Silver	0.1	<	<	29.1	97	30.0	100
Thallium	0.05	<	<	57.2	95	55.1	92
Vanadium	0.1	<	<	61.7	103	59.2	99
Zinc	3	8.54	8.51	128	99	124	97

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	Ortech
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road Mississauga, ON L5J 2Y4 Canada
ALS WO#:	L2755022		
Date of Report	10-Apr-24		
Date of Sample Receipt	20-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS:

Sample Preparation via USEPA Method 29 (KC11 05-Apr-2024)
Mercury Analysis via CVAA using Method USEPA 7470A (KC11 09-Apr-2024)

LOR = Limit of Reporting
LCB = Laboratory Control Blank (limits: <LOR)
LCS = Laboratory Control Sample (limits: hivol, solids: 85-115%, stack: 90-110%)
MS = Matrix Spike Sample (limits: 75-125%)
RPD = Relative Percent Difference (limits: <20%)
CCV/CVS = Calibration Verification Standard (limits: 85-115%)

Certified by: L. Wrona
Lynne Wrona
Project Manager

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Environmental

Sample Analysis Summary Report

Sample Name		24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(7 THRU 12) TEST#2 APC OUTLET #1	24-22327-PM-(13 THRU 18) TEST#3 APC OUTLET #1	24-22327-PM-(19 THRU 24) BLANK1 APC OUTLET #1	24-22327-PM-(25 THRU 30) TEST#1 APC OUTLET #2
ALS Sample ID		L2755022-1	L2755022-2	L2755022-3	L2755022-4	L2755022-5
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		18-Mar-24	18-Mar-24	19-Mar-24	19-Mar-24	19-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
Mercury via CVAA	LOR					
Method 29	**ug**	**ug**	**ug**	**ug**	**ug**	**ug**
Analytical Fraction 1B	0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Analytical Fraction 2B	0.050	<0.39	<0.39	0.574	<0.15	0.491
Analytical Fraction 3B	0.025	<0.0225	<0.0225	<0.0225	<0.0225	<0.0225
Analytical Fraction 3C	0.25	<0.225	0.302	1.07	<0.225	1.48

ALS Environmental

Sample Analysis Summary Report

Sample Name			24-22327-PM-(31 THRU 36) TEST#2 APC OUTLET #2	24-22327-PM-(37 THRU 42) TEST#3 APC OUTLET #2	24-22327-PM-(43 THRU 48) BLANK2 APC OUTLET #2
ALS Sample ID			L2755022-6	L2755022-7	L2755022-8
Matrix			Stack	Stack	Stack
Analysis type			Sample	Sample	Sample
Sampling Date/Time			19-Mar-24	19-Mar-24	19-Mar-24
Date of Receipt			20-Mar-24	20-Mar-24	20-Mar-24
Mercury via CVAA		**LOR**			
	Method 29	**ug**	**ug**	**ug**	**ug**
	Analytical Fraction 1B	0.015	<0.015	<0.015	<0.015
	Analytical Fraction 2B	0.050	0.860	<0.395	<0.15
	Analytical Fraction 3B	0.025	0.0482	<0.0225	<0.0225
	Analytical Fraction 3C	0.25	4.41	<0.225	<0.225

ALS Environmental

Sample QC Summary Report

Sample Name		LCB	LCS	LCS	LCSD	LCSD
ALS Sample ID		LCB	LCS	LCS	LCSD	LCSD
Analysis type		Method Blank	Blank Spike	Blank Spike	Blank Spike Dup	Blank Spike Dup
Sampling Date/Time		N/A	N/A	N/A	N/A	N/A
Date of Receipt		N/A	N/A	N/A	N/A	N/A
Mercury via CVAA	LOR					
Method 29	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Analytical Fraction 1B	0.015	<0.015	0.274	91%	0.284	94%
Analytical Fraction 2B	0.050	<0.05	0.957	96%	0.960	96%
Analytical Fraction 3B	0.025	<0.025	0.470	94%	0.473	95%
Analytical Fraction 3C	0.25	<0.25	4.65	93%	4.71	94%

ALS Environmental

Sample QC Summary Report

Sample Name		24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1	24-22327-PM-(1 THRU 6) TEST#1 APC OUTLET #1
ALS Sample ID		L2755022-1	L2755022-1DUP	L2755022-1MS	L2755022-1MS	L2755022-1MSD	L2755022-1MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date/Time		18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24	18-Mar-24
Date of Receipt		20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
Mercury via CVAA	LOR						
Method 29	**ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Analytical Fraction 1B	0.015	<0.015	<0.015	0.285	95%	0.283	94%
Analytical Fraction 2B	0.050	<0.39	<0.39	7.64	97%	7.64	97%
Analytical Fraction 3B	0.025	<0.0225	<0.0225	0.405	90%	0.393	87%
Analytical Fraction 3C	0.250	<0.225	<0.225	4.38	93%	4.31	91%

APPENDIX 13

Particle Size Distribution Train Recovery Data Sheets
(8 pages)

ORTECH Consulting Alliance Inc.

PM_{10} , $PM_{2.5}$ & Condensate Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: Mar 19/24

Test No.: 1
Test Location: UNIT 1

Nozzle, PM 10 Cyclone walls, collection cup, outside of exit stem	PM 10 Turnaround cup, exit stem, connecting tubing from, PM 10 head to PM 2.5 cyclone. PM 2.5 Cyclone walls, collection cup, and outside of exit stem	Exit Stem, and Connecting Tubing to Filter, and Filter Top	Back-Up Filter
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4
Mark Fluid Level and Seal and label container TS1	Mark Fluid Level and Seal and label container TS2	Mark Fluid Level and Seal and label container TS3	Filter ID: 0210830 Colour: WHITE Seal and label container TS4

SAMPLE IDENTIFICATION	24-22327-M201A-
TS1 (Part. > 10)	1
TS2 (Part. > 2.5)	2
TS3 (Part. < 2.5)	3
TS4 (Back Up Filter, <2.5)	4
TS5 (Imp 2 H_2O and rinse)	5
TS6 (Secondary Filter)	6
TS7 (Acetone / Hexane rinse)	7

Train Loaded By: DJ/DT
Train Recovered By: DJ/DM

Impingers 1, 2, 3, 4

	Impinger #1 Knock Out	
	Empty Wt:	491.0
	Final Wt:	633.0
1	Gain:	142
	Colour:	CLEAR

	Impinger #2 Empty	
	Empty Wt:	620.5
	Final Wt:	620.5
2	Gain:	Ø
	Colour:	—

Secondary Filter

	Impinger #3 H_2O	
	Empty Wt:	642.8
	Initial Wt:	732.4
	Final Wt:	728.9
3	Gain:	-3.5
	Colour:	CLEAR

	Impinger #4 Silica Gel	
	Initial Wt:	928.5
	Final Wt:	937.5
4	Gain:	9.0
	% Spent:	

CONTAINER TS5 & TS6

Perform nitrogen purge of imp 1 transfered to Impaction stem impinger (14 lpm for 1 hr)
** if there is no goin purge is not required.*

Purge On:	10:50
Purge Off:	11:50

Rinse all glassware from filter to front half 2nd filter with di H2O into TS5

CONTAINER TS5
Mark Fluid Level and Seal and Label Container

CONTAINER TS6
Secondary Filter

Seal and label container TS6

CONTAINER TS7

Rinse all glassware from filter to front half 2nd filter with Acetone & Hexane into TS7

Acetone/Hexane Rinse

Mark Fluid Level and Seal and Label Container

CWTR=1+2+3:	138.5
WCBDA=4:	9.0

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ORTECH Consulting Alliance Inc.

PM_{10}, $PM_{2.5}$ & Condensate Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: Mar 19/24

Test No.: 2
Test Location: UNIT 1

Nozzle, PM 10 Cyclone walls, collection cup, outside of exit stem

PM 10 Turnaround cup, exit stem, connecting tubing from, PM 10 head to PM 2.5 cyclone. PM 2.5 Cyclone walls, collection cup, and outside of exit stem

Exit Stem, and Connecting Tubing to Filter, and Filter Top

Back-Up Filter

Impingers 1, 2, 3, 4

CONTAINER TS5 & TS6

CONTAINER TS7

CONTAINER TS1

CONTAINER TS2

CONTAINER TS3

CONTAINER TS4

Filter ID: 8210873
Colour: WHITE

Mark Fluid Level and Seal and label container TS1

Mark Fluid Level and Seal and label container TS2

Mark Fluid Level and Seal and label container TS3

Seal and label container TS4

	Impinger #1 Knock Out
Empty Wt:	526.0
Final Wt:	691.5
1 Gain:	165.5
Colour:	clear

	Impinger #2 Empty
Empty Wt:	655.5
Final Wt:	655.5
2 Gain:	0
Colour:	—

Secondary Filter

	Impinger #3 H_2O
Empty Wt:	567.3
Initial Wt:	671.3
Final Wt:	670.1
3 Gain:	-1.2
Colour:	clear

	Impinger #4 Silica Gel
Initial Wt:	981.0
Final Wt:	989.5
4 Gain:	8.5
% Spent:	

Perform nitrogen purge of imp 1 transfered to Impaction stem impinger (14 lpm for 1 hr)
** if there is no gain purge is not required.*

Purge On:	13:30
Purge Off:	14:30

Rinse all glassware from filter to front half 2nd filter with di H2O into TS5

CONTAINER TS5
Mark Fluid Level and Seal and Label Container

CONTAINER TS6
Secondary Filter

Seal and label container TS6

Rinse all glassware from filter to front half 2nd filter with Acetone & Hexane into TS7

Acetone/Hexane Rinse

Mark Fluid Level and Seal and Label Container

CWTR=1+2+3:	164.3
WCBDA=4:	8.5

SAMPLE IDENTIFICATION	24-22327-M201A-
TS1 (Part. > 10)	8
TS2 (Part. > 2.5)	9
TS3 (Part. < 2.5)	10
TS4 (Back Up Filter, <2.5)	11
TS5 (Imp 2 H_2O and rinse)	12
TS6 (Secondary Filter)	13
TS7 (Acetone / Hexane rinse)	14

Train Loaded By: BT/BH
Train Recovered By:

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ORTECH Consulting Alliance Inc.

PM_{10} , $PM_{2.5}$ & Condensate Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: MAR 19/24

Test No.: 3
Test Location: UNIT 1

Nozzle, PM 10 Cyclone walls, collection cup, outside of exit stem

PM 10 Turnaround cup, exit stem, connecting tubing from, PM 10 head to PM 2.5 cyclone. PM 2.5 Cyclone walls, collection cup, and outside of exit stem

Exit Stem, and Connecting Tubing to Filter, and Filter Top

Back-Up Filter

Impingers 1, 2, 3, 4

CONTAINER TS5 & TS6

CONTAINER TS7

CONTAINER TS1

CONTAINER TS2

CONTAINER TS3

CONTAINER TS4

Filter ID: Q210834
Colour: WHITE

Mark Fluid Level and Seal and label container TS1

Mark Fluid Level and Seal and label container TS2

Mark Fluid Level and Seal and label container TS3

Seal and label container TS4

	Impinger #1 Knock Out	
	Empty Wt:	491.0
	Final Wt:	640.0
1	Gain:	149.0
	Colour:	clear

	Impinger #2 Empty	
	Empty Wt:	620.5
	Final Wt:	620.5
2	Gain:	Ø
	Colour:	—

Secondary Filter

	Impinger #3 H_2O	
	Empty Wt:	842.8
	Initial Wt:	728.9
	Final Wt:	727.0
3	Gain:	-1.9
	Colour:	clear

	Impinger #4 Silica Gel	
	Initial Wt:	937.5
	Final Wt:	946.0
4	Gain:	8.5
	% Spent:	

Perform nitrogen purge of imp 1 transfered to Impaction stem impinger (14 lpm for 1 hr)
** if there is no gain purge is not required.*

Purge On: 16:20
Purge Off: 17:20

Rinse all glassware from filter to front half 2nd filter with di H2O into TS5

CONTAINER TS5
Mark Fluid Level and Seal and Label Container

CONTAINER TS6
Secondary Filter

Seal and label container TS6

Rinse all glassware from filter to front half 2nd filter with Acetone & Hexane into TS7

Acetone/Hexane Rinse

Mark Fluid Level and Seal and Label Container

SAMPLE IDENTIFICATION	24-22327-M201A-
TS1 (Part. > 10)	15
TS2 (Part. > 2.5)	16
TS3 (Part. < 2.5)	17
TS4 (Back Up Filter, <2.5)	18
TS5 (Imp 2 H_20 and rinse)	19
TS6 (Secondary Filter)	20
TS7 (Acetone / Hexane rinse)	21

Train Loaded By: DT/DU
Train Recovered By:

CWTR=1+2+3:	147.1
WCBDA=4:	8.5

ORTECH Consulting Alliance Inc.

PM_{10}, $PM_{2.5}$ & Condensate Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: MAR 18/24

Test No.: 1
Test Location: UNIT 2

Nozzle, PM 10 Cyclone walls, collection cup, outside of exit stem

PM 10 Turnaround cup, exit stem, connecting tubing from, PM 10 head to PM 2.5 cyclone. PM 2.5 Cyclone walls, collection cup, and outside of exit stem

Exit Stem, and Connecting Tubing to Filter, and Filter Top

Back-Up Filter

Impingers 1, 2, 3, 4

CONTAINER TS5 & TS6

CONTAINER TS7

CONTAINER TS1

CONTAINER TS2

CONTAINER TS3

CONTAINER TS4

Filter ID: QZ1087
Colour: WHITE

Mark Fluid Level and Seal and label container TS1

Mark Fluid Level and Seal and label container TS2

Mark Fluid Level and Seal and label container TS3

Seal and label container TS4

	Impinger #1 Knock Out	
	Empty Wt:	525.9
	Final Wt:	700.0
1	Gain:	174.1
	Colour:	CLEAR

	Impinger #2 Empty	
	Empty Wt:	655.7
	Final Wt:	655.7
2	Gain:	Ø
	Colour:	—

Secondary Filter

	Impinger #3 H_2O	
	Empty Wt:	569.2
	Initial Wt:	673.8
	Final Wt:	672.8
3	Gain:	-1.0
	Colour:	CLEAR

	Impinger #4 Silica Gel	
	Initial Wt:	962.7
	Final Wt:	971.2
4	Gain:	8.5
	% Spent:	

Perform nitrogen purge of imp 1 transfered to Impaction stem impinger (14 lpm for 1 hr)
** if there is no goin purge is not required.*

Purge On: 12:45
Purge Off: 13:45

Rinse all glassware from filter to front half 2nd filter with di H2O into TS5

CONTAINER TS5
Mark Fluid Level and Seal and Label Container

CONTAINER TS6
Secondary Filter

Seal and label container TS6

Rinse all glassware from filter to front half 2nd filter with Acetone & Hexane into TS7

Acetone/Hexane Rinse

Mark Fluid Level and Seal and Label Container

SAMPLE IDENTIFICATION	24-22327-M201A-
TS1 (Part. > 10)	22
TS2 (Part. > 2.5)	23
TS3 (Part. < 2.5)	24
TS4 (Back Up Filter, <2.5)	25
TS5 (Imp 2 H_20 and rinse)	26
TS6 (Secondary Filter)	27
TS7 (Acetone / Hexane rinse)	28

CWTR=1+2+3:	173.1
WCBDA=4:	8.5

Train Loaded By: DU
Train Recovered By: DU/DT

10

ORTECH Consulting Alliance Inc.

PM_{10} , $PM_{2.5}$ & Condensate Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: MAR 18/24

Test No.: 2
Test Location: UNIT 2

Nozzle, PM 10 Cyclone walls, collection cup, outside of exit stem	PM 10 Turnaround cup, exit stem, connecting tubing from, PM 10 head to PM 2.5 cyclone. PM 2.5 Cyclone walls, collection cup, and outside of exit stem	Exit Stem, and Connecting Tubing to Filter, and Filter Top	Back-Up Filter
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4
			Filter ID: Q2 10828
			Colour: WHITE
Mark Fluid Level and Seal and label container TS1	Mark Fluid Level and Seal and label container TS2	Mark Fluid Level and Seal and label container TS3	Seal and label container TS4

Impingers 1, 2, 3, 4

	Impinger #1 Knock Out
	Empty Wt: 491.2
	Final Wt: 659.3
1	Gain: 168.1
	Colour: CLEAR

	Impinger #2 Empty
	Empty Wt: 620.5
	Final Wt: 620.5
2	Gain: Ø
	Colour: —

Secondary Filter

	Impinger #3 H_2O
	Empty Wt: 642.8
	Initial Wt: 732.9
	Final Wt: 732.4
3	Gain: -0.5
	Colour: CLEAR

	Impinger #4 Silica Gel
	Initial Wt: 919.5
	Final Wt: 928.5
4	Gain: 9.0
	% Spent: —

CONTAINER TS5 & TS6

Perform nitrogen purge of imp 1 transfered to Impaction stem impinger (14 lpm for 1 hr)
** if there is no gain purge is not required.*

Purge On:	16:45
Purge Off:	17:45

Rinse all glassware from filter to front half 2nd filter with di H2O into TS5

CONTAINER TS5
Mark Fluid Level and Seal and Label Container

CONTAINER TS6
Secondary Filter

Seal and label container TS6

CONTAINER TS7

Rinse all glassware from filter to front half 2nd filter with Acetone & Hexane into TS7

Acetone/Hexane Rinse

Mark Fluid Level and Seal and Label Container

SAMPLE IDENTIFICATION	24-22327-M201A-
TS1 (Part. > 10)	29
TS2 (Part. > 2.5)	30
TS3 (Part. < 2.5)	31
TS4 (Back Up Filter, <2.5)	32
TS5 (Imp 2 H_2O and rinse)	33
TS6 (Secondary Filter)	34
TS7 (Acetone / Hexane rinse)	35

CWTR=1+2+3:	167.6
WCBDA=4:	9.0

Train Loaded By: DU
Train Recovered By: DU/DT

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ORTECH Consulting Alliance Inc.

PM_{10} , $PM_{2.5}$ & Condensate Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: MAR 18/24

Test No.: 3
Test Location: UN, P2

Nozzle, PM 10 Cyclone walls, collection cup, outside of exit stem	PM 10 Turnaround cup, exit stem, connecting tubing from, PM 10 head to PM 2.S cyclone. PM 2.5 Cyclone walls, collection cup, and outside of exit stem	Exit Stem, and Connecting Tubing to Filter, and Filter Top	Back-Up Filter
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4
Mark Fluid Level and Seal and label container TS1	Mark Fluid Level and Seal and label container TS2	Mark Fluid Level and Seal and label container TS3	Filter ID: 22 10829 Colour: WHITE Seal and label container TS4

SAMPLE IDENTIFICATION	24-22327-M201A-
TS1 (Part. > 10)	36
TS2 (Part. > 2.5)	37
TS3 (Part. < 2.5)	38
TS4 (Back Up Filter, <2.5)	39
TS5 (Imp 2 H_2O and rinse)	40
TS6 (Secondary Filter)	41
TS7 (Acetone / Hexane rinse)	42

Train Loaded By: DU/DT
Train Recovered By: DT/DU

Impingers 1, 2, 3, 4

	Impinger #1 Knock Out	
	Empty Wt:	526.0
	Final Wt:	698.7
1	Gain:	172.7
	Colour:	CLEAR

	Impinger #2 Empty	
	Empty Wt:	655.5
	Final Wt:	655.5
2	Gain:	Ø
	Colour:	—

Secondary Filter

	Impinger #3 H_2O	
	Empty Wt:	569.3
	Initial Wt:	672.8
	Final Wt:	671.3
3	Gain:	-1.5
	Colour:	CLEAR

	Impinger #4 Silica Gel	
	Initial Wt:	971.2
	Final Wt:	981.0
4	Gain:	9.8
	% Spent:	

CONTAINER TS5 & TS6

Perform nitrogen purge of imp 1 transfered to Impaction stem impinger (14 lpm for 1 hr)
** if there is no gain purge is not required.*

Purge On:	19:00
Purge Off:	20:00

Rinse all glassware from filter to front half 2nd filter with di H2O into TS5

CONTAINER TS5
Mark Fluid Level and Seal and Label Container

CONTAINER TS6
Secondary Filter

Seal and label container TS6

CONTAINER TS7

Rinse all glassware from filter to front half 2nd filter with Acetone & Hexane into TS7

Acetone/Hexane Rinse

Mark Fluid Level and Seal and Label Container

CWTR=1+2+3:	171.2
WCBDA=4:	9.8

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ORTECH Consulting Alliance Inc.

PM_{10} , $PM_{2.5}$ & Condensate Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: mar 19/24

Test No.: BLANK 1
Test Location:

Nozzle, PM 10 Cyclone walls, collection cup, outside of exit stem	PM 10 Turnaround cup, exit stem, connecting tubing from, PM 10 head to PM 2.5 cyclone. PM 2.5 Cyclone walls, collection cup, and outside of exit stem	Exit Stem, and Connecting Tubing to Filter, and Filter Top	Back-Up Filter
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4
			Filter ID: 22-10831
			Colour: WHITE
Mark Fluid Level and Seal and label container TS1	Mark Fluid Level and Seal and label container TS2	Mark Fluid Level and Seal and label container TS3	Seal and label container TS4

SAMPLE IDENTIFICATION	24-22327-M201A-
TS1 (Part. > 10)	43
TS2 (Part. > 2.5)	44
TS3 (Part. < 2.5)	45
TS4 (Back Up Filter, <2.5)	46
TS5 (Imp 2 H_20 and rinse)	47
TS6 (Secondary Filter)	48
TS7 (Acetone / Hexane rinse)	49

Train Loaded By: BJ
Train Recovered By:

Impingers 1, 2, 3, 4

	Impinger #1 Knock Out
	Empty Wt:
	Final Wt:
1	Gain:
	Colour:

	Impinger #2 Empty
	Empty Wt:
	Final Wt:
2	Gain:
	Colour:

Secondary Filter

	Impinger #3 H_2O
	Empty Wt:
	Initial Wt:
	Final Wt:
3	Gain:
	Colour:

	Impinger #4 Silica Gel
	Initial Wt:
	Final Wt:
4	Gain:
	% Spent:

CONTAINER TS5 & TS6

Perform nitrogen purge of imp 1 transfered to Impaction stem impinger (14 lpm for 1 hr)
** if there is no goin purge is not required.*

Purge On:	
Purge Off:	

Rinse all glassware from filter to front half 2nd filter with di H2O into TS5

CONTAINER TS5
Mark Fluid Level and Seal and Label Container

CONTAINER TS6
Secondary Filter

Seal and label container TS6

CONTAINER TS7

Rinse all glassware from filter to front half 2nd filter with Acetone & Hexane into TS7

Acetone/Hexane Rinse

Mark Fluid Level and Seal and Label Container

CWTR=1+2+3:	
WCBDA=4:	

ORTECH Consulting Alliance Inc.

PM_{10} , $PM_{2.5}$ & Condensate Recovery Data Sheet

Client: Covanta DYEC
Project No.: 22327
Date: mark 19/24

Test No.: BLANK 2
Test Location:

Nozzle, PM 10 Cyclone walls, collection cup, outside of exit stem	PM 10 Turnaround cup, exit stem, connecting tubing from, PM 10 head to PM 2.5 cyclone. PM 2.5 Cyclone walls, collection cup, and outside of exit stem	Exit Stem, and Connecting Tubing to Filter, and Filter Top	Back-Up Filter
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4
			Filter ID: QZ 10832
			Colour: white / TE
Mark Fluid Level and Seal and label container TS1	Mark Fluid Level and Seal and label container TS2	Mark Fluid Level and Seal and label container TS3	Seal and label container TS4

Impingers 1, 2, 3, 4	
Impinger #1 Knock Out	
Empty Wt:	
Final Wt:	
1 Gain:	
Colour:	
Impinger #2 Empty	
Empty Wt:	
Final Wt:	
2 Gain:	
Colour:	
Secondary Filter	
Impinger #3 H_2O	
Empty Wt:	
Initial Wt:	
Final Wt:	
3 Gain:	
Colour:	
Impinger #4 Silica Gel	
Initial Wt:	
Final Wt:	
4 Gain:	
% Spent:	

CONTAINER TS5 & TS6
Perform nitrogen purge of imp 1 transfered to Impaction stem impinger (14 lpm for 1 hr)
** if there is no gain purge is not required.*
Purge On:
Purge Off:
Rinse all glassware from filter to front half 2nd filter with di H2O into TS5
CONTAINER TS5
Mark Fluid Level and Seal and Label Container
CONTAINER TS6
Secondary Filter
Seal and label container TS6

CONTAINER TS7
Rinse all glassware from filter to front half 2nd filter with Acetone & Hexane into TS7
Acetone/Hexane Rinse
Mark Fluid Level and Seal and Label Container
CWTR=1+2+3:
WCBDA=4:

SAMPLE IDENTIFICATION	24-22327-M201A-
TS1 (Part. > 10)	50
TS2 (Part. > 2.5)	51
TS3 (Part. < 2.5)	52
TS4 (Back Up Filter, <2.5)	53
TS5 (Imp 2 H_20 and rinse)	54
TS6 (Secondary Filter)	55
TS7 (Acetone / Hexane rinse)	56

Train Loaded By: DT
Train Recovered By:

APPENDIX 14

SVOC Train Recovery Data Sheets
(8 pages)

ORTECH Consulting Alliance Inc.
Semi-Volatile Organics Train Recovery Data Sheet

Client : Covanta DYEC
22327
Sample Batch No.: 24-22327-SVOC-

Test No.: 1
Test Date: MAR 20/24
Test Location: UNIT 1

Sample ID 1	Sample ID 2	Sample ID 3	Sample ID 4	Sample ID 5
Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5

Empty Wt:	282.0
After Acetone/ Hexane Rinse:	526.4
Total TS1:	244.4

MARK FLUID LEVEL
SEAL AND LABEL CONTAINER TS1

Colour:	WHITE

FOLD IN FOIL

SEAL AND LABEL CONTAINER TS2

Initial Wt:	412.8	
Final Wt:	418.0	
1 Gain:	5.2	
Colour:	WHITE	

SEAL TRAP

WRAP IN FOIL

LABEL AS CONTAINER TS3

Impinger #1 Empty

Empty Wt:	650.2
Final Wt:	976.5
2 Gain:	326.3
Colour:	CLEAR

Impinger #2 Ethylene Glycol

Empty Wt:	653.7
Initial Wt:	765.1
Final Wt:	963.3
3 Gain:	198.2
Colour:	Clear

Impinger #3 Empty

Empty Wt:	475.2
Final Wt:	667.4
4 Gain:	192.2
Colour:	clear

Container TS4 Weights

Empty Wt:	414.0
With Imp Soln:	1229.5
After ~100g H_2O Rinse:	1346.0
Total TS4:	932.0

Empty Wt:	412.0
After Acetone/ Hexane Rinse:	598.0
Total TS5:	186.0

Impinger 4 Silica Gel — CONTAINER TS6 (Impinger)

Initial Wt:	944.4
Final Wt:	965.0
5 Gain:	20.6
% Spent:	

Impinger Box ID: 12

CWTR = 1 + 2 + 3 + 4:	721.9
WCBDA=5:	20.6

Train & Proofing Identification

Glassware Train Proofing Provided By:	ALS
Trap ID:	50
H2O Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By: DU
Train Recovered By: DT

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

ORTECH Consulting Alliance Inc.
Semi-Volatile Organics Train Recovery Data Sheet

Client : Covanta DYEC
22327
Sample Batch No.: 24-22327-SVOC-

Test No.: 2
Test Date: MAR 20/24
Test Location: UNIT 1

Sample ID	6	7	8	9	10
	Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers
			49		
	CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5
Empty Wt:	282.0	Colour: WHITE	Initial Wt: 381.6	Impinger #1 Empty	Empty Wt: 404.5
After Acetone/ Hexane Rinse:	546.6	FOLD IN FOIL	1 Final Wt: 386.8	Empty Wt: 559.6	After Acetone/ Hexane Rinse: 608.0
Total TS1:	264.6	SEAL AND LABEL CONTAINER TS2	Gain: 5.2	2 Final Wt: 1103.7	5 Total TS5: 203.5
	MARK FLUID LEVEL		Colour: WHITE	Gain: 544.1	
	SEAL AND LABEL CONTAINER TS1		SEAL TRAP	Colour: clear	
			WRAP IN FOIL	Impinger #2 Ethylene Glycol	
			LABEL AS CONTAINER TS3	Empty Wt: 660.8	
				Initial Wt: 753.3	
				Final Wt: 972.3	
				3 Gain: 219.0	
				Colour: clear	
				Impinger #3 Empty	
				Empty Wt: 533.8	
				Final Wt: 533.8	
				4 Gain: 0	
				Colour: clear	
				Container TS4 Weights	
				Empty Wt: 403.5	
				With Imp Soln: 1251.0	
				After ~100g H_2O Rinse: 1374.0	
				Total TS4: 970.5	

Sample ID	11
	Impinger 4 Silica Gel
	CONTAINER TS6 (Impinger)
Initial Wt:	892.8
Final Wt:	908.8
Gain:	16.0
% Spent:	

Impinger Box ID: 6

CWTR = 1 + 2 + 3 + 4: 768.3

WCBDA=5: 16.0

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	
H2O Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By: DT
Train Recovered By:

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

ORTECH Consulting Alliance Inc.
Semi-Volatile Organics Train Recovery Data Sheet

Client : Covanta DYEC
22327
Sample Batch No.: 24-22327-SVOC-

Test No.: 3
Test Date: MAR 21/24
Test Location: UNIT 1

Sample ID	11	12	13	14	15
	Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers
			46 393.4		
	CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5

CONTAINER TS1

Empty Wt:	284.0
After Acetone/ Hexane Rinse:	490.4
Total TS1:	206.4

MARK FLUID LEVEL
SEAL AND LABEL CONTAINER TS1

CONTAINER TS2

Colour: WHITE

FOLD IN FOIL

SEAL AND LABEL CONTAINER TS2

CONTAINER TS3

Initial Wt:	~~405.3~~
Final Wt:	407.6
1 Gain:	7.2
Colour:	WHITE

SEAL TRAP

WRAP IN FOIL

LABEL AS CONTAINER TS3

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	602.5
Final Wt:	1124.7
2 Gain:	522.2
Colour:	clear

Impinger #2 Ethylene Glycol	
Empty Wt:	657.6
Initial Wt:	759.6
Final Wt:	984.0
3 Gain:	224.4
Colour:	clear

Impinger #3 Empty	
Empty Wt:	644.8
Final Wt:	645.5
4 Gain:	0.7
Colour:	clear

Container TS4 Weights	
Empty Wt:	404.0
With Imp Soln:	1241.5
After ~100g H_2O Rinse:	1363.0
Total TS4:	959.0

CONTAINER TS5

Empty Wt:	410.0
After Acetone/ Hexane Rinse:	592.4
5 Total TS5:	182.4

Impinger 4 Silica Gel

CONTAINER TS6 (Impinger)

Initial Wt:	919.6
Final Wt:	939.0
Gain:	19.4
% Spent:	

Impinger Box ID: 8

CWTR = 1 + 2 + 3 + 4:	754.5
WCBDA=5:	19.4

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	~~SP~~ 46
H2O Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By:
Train Recovered By:

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

ORTECH Consulting Alliance Inc.
Semi-Volatile Organics Train Recovery Data Sheet

Client : Covanta DYEC
22327
Sample Batch No.: 24-22327-SVOC-

Test No.: BLANK 1
Test Date: MAR 20/24
Test Location:

Sample ID	16

Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser

CONTAINER TS1

Empty Wt:	281.5
After Acetone/ Hexane Rinse:	411.5
Total TS1:	130.0

MARK FLUID LEVEL
SEAL AND LABEL CONTAINER TS1

Sample ID	17

Filter

CONTAINER TS2

Colour: WHITE

FOLD IN FOIL

SEAL AND LABEL CONTAINER TS2

Sample ID	18

XAD-II Trap

47

CONTAINER TS3

Initial Wt:	405.3
Final Wt:	405.3
1 Gain:	—
Colour:	WHITE

SEAL TRAP

WRAP IN FOIL

LABEL AS CONTAINER TS3

Sample ID	19

Impingers 1, 2 & 3

CONTAINER TS4

Impinger #1 Empty	
Empty Wt:	494.0
Final Wt:	494.0
2 Gain:	—
Colour:	—

Impinger #2 Ethylene Glycol	
Empty Wt:	460.5
Initial Wt:	562.0
Final Wt:	562.0
3 Gain:	—
Colour:	—

Impinger #3 Empty	
Empty Wt:	570.0
Final Wt:	570.0
4 Gain:	—
Colour:	—

Container TS4 Weights	
Empty Wt:	412.2
With Imp Soln:	520.0
After ~100g H_2O Rinse:	625.0
Total TS4:	212.8

Sample ID	20

Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers

CONTAINER TS5

Empty Wt:	413.6
After Acetone/ Hexane Rinse:	632.0
5 Total TS5:	218.4

Impinger 4 Silica Gel

CONTAINER TS6 (Impinger)

Initial Wt:	
Final Wt:	
Gain:	
% Spent:	

Impinger Box ID:

CWTR = 1 + 2 + 3 + 4:	
WCBDA=5:	

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	
H2O Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By:
Train Recovered By:

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

ORTECH Consulting Alliance Inc.
Semi-Volatile Organics Train Recovery Data Sheet

Client : Covanta DYEC
22327
Sample Batch No.: 24-22327-SVOC-

Test No.: 1
Test Date: MAR 20/24
Test Location: UNIT 2

Sample ID 21	Sample ID 22	Sample ID 23	Sample ID 24	Sample ID 25	
Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers	Impinger 4 Silica Gel
CONTAINER TS1	CONTAINER TS2	53 CONTAINER TS3	CONTAINER TS4	CONTAINER TS5	CONTAINER TS6 (Impinger)
Empty Wt: 282.0	Colour: WHITE	Initial Wt: 389.7	Impinger #1 Empty	Empty Wt: 413.5	Initial Wt: 950.8
After Acetone/ Hexane Rinse: 465.0	FOLD IN FOIL	1 Final Wt: 393.9	Empty Wt: 619.1	After Acetone/ Hexane Rinse: 611.0	Final Wt: 963.8
Total TS1: 183.0	SEAL AND LABEL CONTAINER TS2	Gain: 4.2	Final Wt: 1134.5	5 Total TS5: 197.5	5 Gain: 13.0
MARK FLUID LEVEL		Colour: WHITE	2 Gain: 515.4		% Spent:
SEAL AND LABEL CONTAINER TS1		SEAL TRAP	Colour: clear		
		WRAP IN FOIL	Impinger #2 Ethylene Glycol		
		LABEL AS CONTAINER TS3	Empty Wt: 530.9		
			Initial Wt: 654.6		
			Final Wt: 794.2		
			3 Gain: 139.6		
			Colour: clear		
			Impinger #3 Empty		
			Empty Wt: 626.9		
			Final Wt: 627.2		
			4 Gain: 0.3		
			Colour: clear		
			Container TS4 Weights		
			Empty Wt: 412.5		
			With Imp Soln: 1181.5		
			After ~100g H_2O Rinse: 1332.0		
			Total TS4: 919.5		

Impinger Box ID: 14

CWTR = 1 + 2 + 3 + 4: 659.5

WCBDA=5: 13.0

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	
H2O Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By: DU
Train Recovered By: DT

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

ORTECH Consulting Alliance Inc.
Semi-Volatile Organics Train Recovery Data Sheet

Client : Covanta DYEC
22327
Sample Batch No.: 24-22327-SVOC-

Test No.: 2
Test Date: MAR 20/24
Test Location: UNIT 2

Sample ID	26	27	28	29	30
	Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers
	CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5
Empty Wt:	252.0	Colour: WHITE	Initial Wt: 330.0	Impinger #1 Empty	Empty Wt: 410.0
After Acetone/ Hexane Rinse:	523.4	FOLD IN FOIL	1 Final Wt: 336.2	Empty Wt: 444.0	After Acetone/ Hexane Rinse: 641.0
Total TS1:	241.4	SEAL AND LABEL CONTAINER TS2	Gain: 6.2	Final Wt: ~~718.7~~ 1144.5	5 Total TS5: 231.0
	MARK FLUID LEVEL		Colour: WHITE	2 Gain: 700.5	
	SEAL AND LABEL CONTAINER TS1		SEAL TRAP	Colour: clear	
			WRAP IN FOIL	Impinger #2 Ethylene Glycol	
			LABEL AS CONTAINER TS3	Empty Wt: 562.2	
				Initial Wt: 718.7	
				Final Wt: 926.9	
				3 Gain: 208.2	
				Colour: clear	
				Impinger #3 Empty	
				Empty Wt: 627.7	
				Final Wt: 627.7	
				4 Gain: Ø	
				Colour: —	
				Container TS4 Weights	
				Empty Wt: 408.5	
				With Imp Soln: 1267.0	
				After ~100g H_2O Rinse: 1406.5	
				Total TS4:	

Sample ID	31
	Impinger 4 Silica Gel
	CONTAINER TS6 (Impinger)
Initial Wt:	938.5
Final Wt:	952.8
5 Gain:	14.3
% Spent:	

Impinger Box ID: 15

CWTR = 1 + 2 + 3 + 4: 714.9

WCBDA=5: 14.3

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	45
H2O Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By: DM
Train Recovered By: DT

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

ORTECH Consulting Alliance Inc.
Semi-Volatile Organics Train Recovery Data Sheet

Client : Covanta DYEC
22327
Sample Batch No.: 24-22327-SVOC-

Test No.: 3
Test Date: MAR 21/24
Test Location: UNIT 2

Sample ID	31	Sample ID	32	Sample ID	33	Sample ID	34	Sample ID	35
Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser		Filter		XAD-II Trap		Impingers 1, 2 & 3		Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers	Impinger 4 Silica Gel
				43					
CONTAINER TS1		CONTAINER TS2		CONTAINER TS3		CONTAINER TS4		CONTAINER TS5	CONTAINER TS6 (Impinger)
Empty Wt:	281.5	Colour:	WHITE	Initial Wt:	391.2	Impinger #1 Empty		Empty Wt:	410.0
After Acetone/ Hexane Rinse:	514.0	FOLD IN FOIL		1 Final Wt:	398.2	Empty Wt:	612.0	After Acetone/ Hexane Rinse:	628.2
Total TS1:	232.5	SEAL AND LABEL CONTAINER TS2		1 Gain:	7.0	Final Wt:	1147.8	5 Total TS5:	218.0
				Colour:	WHITE	2 Gain:	535.8		5 Initial Wt: 917.2
						Colour:	Clear		5 Final Wt: 932.6
				SEAL TRAP					5 Gain: 15.4
						Impinger #2 Ethylene Glycol			5 % Spent:
MARK FLUID LEVEL				WRAP IN FOIL		Empty Wt:	~~687~~ 585.0		
SEAL AND LABEL CONTAINER TS1						Initial Wt:	687.0		
				LABEL AS CONTAINER TS3		Final Wt:	796.5		
						3 Gain:	109.5		
						Colour:	Clear		
						Impinger #3 Empty			
						Empty Wt:	~~525.0~~ 525.0		
						Final Wt:	525.7		
						4 Gain:	0.7		
						Colour:	Clear		
						Container TS4 Weights			
						Empty Wt:	409.0		
						With Imp Soln:	1146.0		
						After ~100g H_2O Rinse:	1238.5		
						Total TS4:	829.5		

Impinger Box ID: 6

CWTR = 1 + 2 + 3 + 4: 653.0

WCBDA=5: 15.4

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	
H2O Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By: DI
Train Recovered By:

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

ORTECH Consulting Alliance Inc.
Semi-Volatile Organics Train Recovery Data Sheet

Client : Covanta DYEC
22327
Sample Batch No.: 24-22327-SVOC-

Test No.: BLANK 2
Test Date: MAR 20/24
Test Location:

Sample ID 36	Sample ID 37	Sample ID 38	Sample ID 39	Sample ID 40
Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers
		48		
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5
Empty Wt: 285.0	Colour: WHITE	Initial Wt: 353.6	Impinger #1 Empty	Empty Wt: 411.7
After Acetone/ Hexane Rinse: 510.0	FOLD IN FOIL	1 Final Wt: 353.6	Empty Wt: 602.0	After Acetone/ Hexane Rinse: 571.2
Total TS1: 225.0		Gain: —	Final Wt: 602.0	5 Total TS5: 159.5
	SEAL AND LABEL CONTAINER TS2	Colour: WHITE	2 Gain: —	
		SEAL TRAP	Colour: —	
MARK FLUID LEVEL		WRAP IN FOIL	Impinger #2 Ethylene Glycol	
SEAL AND LABEL CONTAINER TS1		LABEL AS CONTAINER TS3	Empty Wt: 652.0	
			Initial Wt: 756.6	
			Final Wt: 756.6	
			3 Gain: —	
			Colour: —	
			Impinger #3 Empty	
			Empty Wt: 643.8	
			Final Wt: 643.8	
			4 Gain: —	
			Colour: —	
			Container TS4 Weights	
			Empty Wt: 412.0	
			With Imp Soln: 515.6	
			After ~100g H_2O Rinse: 618.0	
			Total TS4: 204.0	

Impinger 4 Silica Gel
CONTAINER TS6 (Impinger)
Initial Wt:
Final Wt:
5 Gain:
% Spent:

Impinger Box ID:

CWTR = 1 + 2 + 3 + 4:

WCBDA=5:

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	
H2O Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By:
Train Recovered By:

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

APPENDIX 15

SVOC Analytical Report
(70 pages)

1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6
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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2755049		Mississauga, ON
Date of Report	11-Apr-24		L5J 2Y4
Date of Sample Receipt	22-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **PCDD/F by EPA M23**

For the sample 24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1, the recovery of 13C12-1,2,3,6,7,8-HxCDF standard was marginally above the method control limits. Target analytes, calculated via isotope dilutions are not expected to be biased. In addition, the recoveries of some of the labelled field standards were marginally below the method control limits.

Certified by: _____
Sabrina Jin
Technical Specialist

Results in this certificate relate only to the samples as submitted to the laboratory.
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Sample Analysis summary Report

Sample Name	24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1	24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1	24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1	24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1	24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2	24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2
ALS Sample ID	L2755049-1	L2755049-2	L2755049-3	L2755049-4	L2755049-5	L2755049-6
Sample Size	1	1	1	1	1	1
Sample size units	sample	sample	sample	sample	sample	sample
Percent Moisture	n/a	n/a	n/a	n/a	n/a	n/a
Sample Matrix	Stack	Stack	Stack	Stack	Stack	Stack
Sampling Date	20-Mar-24	20-Mar-24	21-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
Extraction Date	3-Apr-24	3-Apr-24	3-Apr-24	3-Apr-24	3-Apr-24	3-Apr-24
Target Analytes	**pg**	**pg**	**pg**	**pg**	**pg**	**pg**
2,3,7,8-TCDD	<1.5	<1.3	<1.1	<0.61	<1.0	<0.72
1,2,3,7,8-PeCDD	3.90	4.25	4.45	<1.1	2.96	<2.0
1,2,3,4,7,8-HxCDD	5.90	5.60	5.06	<1.1	4.47	<4.3
1,2,3,6,7,8-HxCDD	<12	14.3	<11	<1.0	<9.8	13.5
1,2,3,7,8,9-HxCDD	8.36	7.86	6.82	<0.99	5.74	6.28
1,2,3,4,6,7,8-HpCDD	96.7	114	93.7	4.42	78.1	108
OCDD	115	151	110	8.95	81.9	132
2,3,7,8-TCDF	<1.8	10.2	2.40	<0.51	<1.2	<3.1
1,2,3,7,8-PeCDF	4.87	<6.5	<4.4	2.95	<4.1	<4.2
2,3,4,7,8-PeCDF	<6.4	15.3	<6.6	<0.85	<6.3	8.27
1,2,3,4,7,8-HxCDF	<3.6	6.93	<3.0	<0.53	<2.5	<3.6
1,2,3,6,7,8-HxCDF	5.61	8.36	4.93	<0.52	3.64	5.47
2,3,4,6,7,8-HxCDF	6.74	10.8	7.33	<0.54	6.63	<7.4
1,2,3,7,8,9-HxCDF	<2.4	<6.1	<2.2	<0.65	<2.0	3.24
1,2,3,4,6,7,8-HpCDF	17.2	26.8	<17	<0.79	12.0	20.6
1,2,3,4,7,8,9-HpCDF	<3.7	6.71	3.01	<0.98	2.44	<4.4
OCDF	16.7	<22	16.2	<2.7	<9.1	20.3
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	97	96	77	104	103	100
13C12-1,2,3,4,7,8-HxCDD	87	85	65	98	89	81
13C12-2,3,4,7,8-PeCDF	94	94	65	106	98	81
13C12-1,2,3,4,7,8-HxCDF	81	80	61	95	85	74
13C12-1,2,3,4,7,8,9-HpCDF	87	83	65	95	87	82
Extraction Standards						
13C12-2,3,7,8-TCDD	75	81	95	77	77	82
13C12-1,2,3,7,8-PeCDD	78	83	92	73	84	80
13C12-1,2,3,6,7,8-HxCDD	91	94	123	99	94	113
13C12-1,2,3,4,6,7,8-HpCDD	82	87	104	82	89	98
13C12-OCDD	68	74	83	63	78	78
13C12-2,3,7,8-TCDF	82	86	111	90	81	101
13C12-1,2,3,7,8-PeCDF	70	78	88	71	78	75
13C12-1,2,3,6,7,8-HxCDF	98	100	136	106	98	122
13C12-1,2,3,4,6,7,8-HpCDF	84	89	111	87	90	103
Cleanup Standard						
13C12-1,2,3,7,8,9-HxCDF	101	97	118	107	94	110
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**	**pg**	**pg**
Total-TCDD	82.8	91.2	96.5	<0.61	86.6	69.5
Total-PeCDD	153	95.2	92.3	<1.1	152	153
Total-HxCDD	265	247	262	<1.1	215	239
Total-HpCDD	203	235	198	4.42	156	218
Total-TCDF	38.9	268	44.9	0.574	16.6	31.4
Total-PeCDF	32.3	84.3	15.4	2.95	15.6	40.9
Total-HxCDF	42.2	69.0	26.4	<0.65	32.9	45.0
Total-HpCDF	17.2	33.5	9.48	<0.98	14.4	28.0
Toxic Equivalency - (WHO 2005)						
Lower Bound PCDD/F TEQ (WHO 2005)	7.89	16.8	8.11	0.135	5.96	6.66
Mid Point PCDD/F TEQ (WHO 2005)	13.3	18.2	13.1	1.42	10.5	11.0
Upper Bound PCDD/F TEQ (WHO 2005)	13.3	18.9	13.1	2.70	10.5	11.4

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Sample Analysis summary Report

Sample Name	24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2	24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2
ALS Sample ID	L2755049-7	L2755049-8
Sample Size	1	1
Sample size units	sample	sample
Percent Moisture	n/a	n/a
Sample Matrix	Stack	Stack
Sampling Date	21-Mar-24	20-Mar-24
Extraction Date	3-Apr-24	3-Apr-24
Target Analytes	**pg**	**pg**
2,3,7,8-TCDD	<0.85	<0.78
1,2,3,7,8-PeCDD	<2.4	<0.97
1,2,3,4,7,8-HxCDD	4.33	<0.96
1,2,3,6,7,8-HxCDD	11.2	<0.93
1,2,3,7,8,9-HxCDD	6.67	<0.91
1,2,3,4,6,7,8-HpCDD	100	2.37
OCDD	123	4.89
2,3,7,8-TCDF	2.36	<0.47
1,2,3,7,8-PeCDF	<2.7	2.19
2,3,4,7,8-PeCDF	5.32	<0.67
1,2,3,4,7,8-HxCDF	3.30	<0.48
1,2,3,6,7,8-HxCDF	4.84	<0.47
2,3,4,6,7,8-HxCDF	8.50	<0.48
1,2,3,7,8,9-HxCDF	<2.9	<0.59
1,2,3,4,6,7,8-HpCDF	16.9	<0.53
1,2,3,4,7,8,9-HpCDF	<3.2	<0.65
OCDF	18.2	2.49
Field Spike Standards	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	104	109
13C12-1,2,3,4,7,8-HxCDD	96	100
13C12-2,3,4,7,8-PeCDF	101	112
13C12-1,2,3,4,7,8-HxCDF	90	95
13C12-1,2,3,4,7,8,9-HpCDF	98	103
Extraction Standards		
13C12-2,3,7,8-TCDD	83	69
13C12-1,2,3,7,8-PeCDD	81	69
13C12-1,2,3,6,7,8-HxCDD	101	100
13C12-1,2,3,4,6,7,8-HpCDD	92	93
13C12-OCDD	76	81
13C12-2,3,7,8-TCDF	94	84
13C12-1,2,3,7,8-PeCDF	77	64
13C12-1,2,3,6,7,8-HxCDF	110	106
13C12-1,2,3,4,6,7,8-HpCDF	93	93
Cleanup Standard		
13C12-1,2,3,7,8,9-HxCDF	107	101
Homologue Group Totals	**pg**	**pg**
Total-TCDD	86.3	<0.78
Total-PeCDD	44.6	<0.97
Total-HxCDD	266	<0.96
Total-HpCDD	194	2.37
Total-TCDF	32.3	<0.47
Total-PeCDF	25.6	2.19
Total-HxCDF	28.1	<0.59
Total-HpCDF	30.0	<0.65
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	6.93	0.0916
Mid Point PCDD/F TEQ (WHO 2005)	10.2	1.34
Upper Bound PCDD/F TEQ (WHO 2005)	10.6	2.58

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Quality Control Summary Report

Sample Name	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3788861-1	WG3788861-2
Sample Size	1	1
Sample size units	sample	n/a
Percent Moisture	n/a	n/a
Sample Matrix	MEDIA	MEDIA
Sampling Date	n/a	n/a
Extraction Date	3-Apr-24	3-Apr-24
Target Analytes	**pg**	**% Rec**
2,3,7,8-TCDD	<0.61	96
1,2,3,7,8-PeCDD	<0.85	107
1,2,3,4,7,8-HxCDD	<0.92	95
1,2,3,6,7,8-HxCDD	<0.89	93
1,2,3,7,8,9-HxCDD	<0.87	96
1,2,3,4,6,7,8-HpCDD	3.09	101
OCDD	6.93	99
2,3,7,8-TCDF	<0.53	95
1,2,3,7,8-PeCDF	<2.3	113
2,3,4,7,8-PeCDF	<0.70	104
1,2,3,4,7,8-HxCDF	<0.69	88
1,2,3,6,7,8-HxCDF	<0.47	99
2,3,4,6,7,8-HxCDF	<1.2	88
1,2,3,7,8,9-HxCDF	<1.2	95
1,2,3,4,6,7,8-HpCDF	3.88	102
1,2,3,4,7,8,9-HpCDF	<0.69	95
OCDF	<3.9	105
Field Spike Standards	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	NS	NS
13C12-1,2,3,4,7,8-HxCDD	NS	NS
13C12-2,3,4,7,8-PeCDF	NS	NS
13C12-1,2,3,4,7,8-HxCDF	NS	NS
13C12-1,2,3,4,7,8,9-HpCDF	NS	NS
Extraction Standards		
13C12-2,3,7,8-TCDD	85	72
13C12-1,2,3,7,8-PeCDD	87	75
13C12-1,2,3,6,7,8-HxCDD	106	102
13C12-1,2,3,4,6,7,8-HpCDD	99	87
13C12-OCDD	85	73
13C12-2,3,7,8-TCDF	95	86
13C12-1,2,3,7,8-PeCDF	77	67
13C12-1,2,3,6,7,8-HxCDF	113	109
13C12-1,2,3,4,6,7,8-HpCDF	100	91
Cleanup Standard		
13C12-1,2,3,7,8,9-HxCDF	106	106
Homologue Group Totals	**pg**	
Total-TCDD	<0.61	
Total-PeCDD	<0.74	
Total-HxCDD	<0.92	
Total-HpCDD	3.09	
Total-TCDF	<0.53	
Total-PeCDF	<0.74	
Total-HxCDF	<0.52	
Total-HpCDF	3.88	
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.0718	
Mid Point PCDD/F TEQ (WHO 2005)	1.92	
Upper Bound PCDD/F TEQ (WHO 2005)	2.50	

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1**	Sampling Date	20-Mar-24		Approved:
ALS Sample ID	L2755049-1	Extraction Date	3-Apr-24		*K.NGUYEN*
Analysis Method	EPA M23	Sample Size	1	sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		10-Apr-2024
Sample Matrix	Stack	Split Ratio	6		

Run Information	**Run 1**
Filename	7-240409A09
Run Date	09-Apr-24 14:12
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	28.42	<1.5	0.84	J,R	1.5	30
1,2,3,7,8-PeCDD	1	31.47	3.90	1.0	J		150
1,2,3,4,7,8-HxCDD	0.1	33.65	5.90	1.9	J		150
1,2,3,6,7,8-HxCDD	0.1	33.72	<12	1.9	J,R	12	150
1,2,3,7,8,9-HxCDD	0.1	33.91	8.36	1.8	J		150
1,2,3,4,6,7,8-HpCDD	0.01	36.16	96.7	1.2	J		150
OCDD	0.0003	39.01	115	2.8	J		300
2,3,7,8-TCDF	0.1	27.85	<1.8	1.5	M,J,R	1.8	30
1,2,3,7,8-PeCDF	0.03	30.74	4.87	1.1	M,J		150
2,3,4,7,8-PeCDF	0.3	31.37	<6.4	1.0	J,R	6.4	150
1,2,3,4,7,8-HxCDF	0.1	33.08	<3.6	0.86	J,R	3.6	150
1,2,3,6,7,8-HxCDF	0.1	33.17	5.61	0.84	J		150
2,3,4,6,7,8-HxCDF	0.1	33.59	6.74	0.87	J		150
1,2,3,7,8,9-HxCDF	0.1	34.30	<2.4	1.1	J,R	2.4	150
1,2,3,4,6,7,8-HpCDF	0.01	35.23	17.2	0.60	J,B		150
1,2,3,4,7,8,9-HpCDF	0.01	36.81	<3.7	0.74	M,J,R	3.7	150
OCDF	0.0003	39.36	16.7	2.2	M,J		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1200	28.40	97	70-130
13C12-1,2,3,4,7,8-HxCDD	12000	33.62	87	70-130
13C12-2,3,4,7,8-PeCDF	12000	31.35	94	70-130
13C12-1,2,3,4,7,8-HxCDF	12000	33.07	81	70-130
13C12-1,2,3,4,7,8,9-HpCDF	12000	36.80	87	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	12000	28.39	75	40-130
13C12-1,2,3,7,8-PeCDD	12000	31.46	78	40-130
13C12-1,2,3,6,7,8-HxCDD	12000	33.71	91	40-130
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.15	82	25-130
13C12-OCDD	24000	39.00	68	25-130
13C12-2,3,7,8-TCDF	12000	27.84	82	40-130
13C12-1,2,3,7,8-PeCDF	12000	30.73	70	40-130
13C12-1,2,3,6,7,8-HxCDF	12000	33.16	98	40-130
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.22	84	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	18000	34.27	101	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	3	82.8	0.84	30
Total-PeCDD	7	153	1.0	150
Total-HxCDD	5	265	1.9	150
Total-HpCDD	2	203	1.2	150
Total-TCDF	6	38.9	1.5	30
Total-PeCDF	4	32.3	1.1	150
Total-HxCDF	8	42.2	1.1	150
Total-HpCDF	1	17.2	0.74	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	7.89
Mid Point PCDD/F TEQ (WHO 2005)	13.3
Upper Bound PCDD/F TEQ (WHO 2005)	13.3

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1**	Sampling Date	20-Mar-24		Approved:
ALS Sample ID	L2755049-2	Extraction Date	3-Apr-24		*K.NGUYEN*
Analysis Method	EPA M23	Sample Size	1	sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		10-Apr-2024
Sample Matrix	Stack	Split Ratio	6		

Run Information	**Run 1**
Filename	7-240409A10
Run Date	09-Apr-24 14:56
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.3	1.3	U		30
1,2,3,7,8-PeCDD	1	31.47	4.25	1.1	M,J		150
1,2,3,4,7,8-HxCDD	0.1	33.64	5.60	0.78	J		150
1,2,3,6,7,8-HxCDD	0.1	33.71	14.3	0.76	J		150
1,2,3,7,8,9-HxCDD	0.1	33.91	7.86	0.74	J		150
1,2,3,4,6,7,8-HpCDD	0.01	36.16	114	1.5	J		150
OCDD	0.0003	39.01	151	3.0	J		300
2,3,7,8-TCDF	0.1	27.84	10.2	1.4	J		30
1,2,3,7,8-PeCDF	0.03	30.74	<6.5	0.82	J,R	6.5	150
2,3,4,7,8-PeCDF	0.3	31.36	15.3	0.77	J		150
1,2,3,4,7,8-HxCDF	0.1	33.08	6.93	0.71	J		150
1,2,3,6,7,8-HxCDF	0.1	33.17	8.36	0.69	J		150
2,3,4,6,7,8-HxCDF	0.1	33.59	10.8	0.72	J		150
1,2,3,7,8,9-HxCDF	0.1	34.30	<6.1	0.87	J,R	6.1	150
1,2,3,4,6,7,8-HpCDF	0.01	35.23	26.8	1.1	J,B		150
1,2,3,4,7,8,9-HpCDF	0.01	36.81	6.71	1.3	J		150
OCDF	0.0003	39.37	<22	2.7	M,J,R	22	300
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1200	28.41	96	70-130			
13C12-1,2,3,4,7,8-HxCDD	12000	33.63	85	70-130			
13C12-2,3,4,7,8-PeCDF	12000	31.35	94	70-130			
13C12-1,2,3,4,7,8-HxCDF	12000	33.07	80	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	12000	36.79	83	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	12000	28.38	81	40-130			
13C12-1,2,3,7,8-PeCDD	12000	31.45	83	40-130			
13C12-1,2,3,6,7,8-HxCDD	12000	33.70	94	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.15	87	25-130			
13C12-OCDD	24000	39.00	74	25-130			
13C12-2,3,7,8-TCDF	12000	27.83	86	40-130			
13C12-1,2,3,7,8-PeCDF	12000	30.74	78	40-130			
13C12-1,2,3,6,7,8-HxCDF	12000	33.16	100	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.22	89	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	18000	34.28	97	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	6	91.2	1.3	30
Total-PeCDD	4	95.2	1.1	150
Total-HxCDD	5	247	0.78	150
Total-HpCDD	2	235	1.5	150
Total-TCDF	16	268	1.4	30
Total-PeCDF	7	84.3	0.82	150
Total-HxCDF	8	69.0	0.87	150
Total-HpCDF	2	33.5	1.3	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	16.8
Mid Point PCDD/F TEQ (WHO 2005)	18.2
Upper Bound PCDD/F TEQ (WHO 2005)	18.9

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1**	Sampling Date	21-Mar-24		
ALS Sample ID	L2755049-3	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA M23	Sample Size	1	sample	*K.NGUYEN*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	7-240409A11
Run Date	09-Apr-24 15:41
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	28.42	<1.1	0.92	M,J,R	1.1	30
1,2,3,7,8-PeCDD	1	31.48	4.45	0.85	J		150
1,2,3,4,7,8-HxCDD	0.1	33.65	5.06	0.70	J		150
1,2,3,6,7,8-HxCDD	0.1	33.72	<11	0.68	M,J,R	11	150
1,2,3,7,8,9-HxCDD	0.1	33.92	6.82	0.66	J		150
1,2,3,4,6,7,8-HpCDD	0.01	36.17	93.7	1.1	J		150
OCDD	0.0003	39.02	110	2.4	J		300
2,3,7,8-TCDF	0.1	27.86	2.40	1.6	M,J		30
1,2,3,7,8-PeCDF	0.03	30.76	<4.4	1.0	J,R	4.4	150
2,3,4,7,8-PeCDF	0.3	31.37	<6.6	0.97	J,R	6.6	150
1,2,3,4,7,8-HxCDF	0.1	33.09	<3.0	0.45	J,R	3.0	150
1,2,3,6,7,8-HxCDF	0.1	33.18	4.93	0.44	J		150
2,3,4,6,7,8-HxCDF	0.1	33.60	7.33	0.46	J		150
1,2,3,7,8,9-HxCDF	0.1	34.30	<2.2	0.56	M,J,R	2.2	150
1,2,3,4,6,7,8-HpCDF	0.01	35.24	<17	1.0	M,J,R	17	150
1,2,3,4,7,8,9-HpCDF	0.01	36.81	3.01	1.3	M,J		150
OCDF	0.0003	39.39	16.2	1.6	J		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1200	28.42	77	70-130
13C12-1,2,3,4,7,8-HxCDD	12000	33.64	65	70-130
13C12-2,3,4,7,8-PeCDF	12000	31.36	65	70-130
13C12-1,2,3,4,7,8-HxCDF	12000	33.07	61	70-130
13C12-1,2,3,4,7,8,9-HpCDF	12000	36.81	65	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	12000	28.40	95	40-130
13C12-1,2,3,7,8-PeCDD	12000	31.47	92	40-130
13C12-1,2,3,6,7,8-HxCDD	12000	33.72	123	40-130
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.16	104	25-130
13C12-OCDD	24000	39.01	83	25-130
13C12-2,3,7,8-TCDF	12000	27.84	111	40-130
13C12-1,2,3,7,8-PeCDF	12000	30.74	88	40-130
13C12-1,2,3,6,7,8-HxCDF	12000	33.17	136	40-130
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.23	111	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	18000	34.28	118	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	4	96.5	0.92	30
Total-PeCDD	4	92.3	0.85	150
Total-HxCDD	5	262	0.70	150
Total-HpCDD	2	198	1.1	150
Total-TCDF	8	44.9	1.6	30
Total-PeCDF	2	15.4	1.0	150
Total-HxCDF	4	26.4	0.56	150
Total-HpCDF	2	9.48	1.3	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	8.11
Mid Point PCDD/F TEQ (WHO 2005)	13.1
Upper Bound PCDD/F TEQ (WHO 2005)	13.1

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1**	Sampling Date	20-Mar-24		
ALS Sample ID	L2755049-4	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA M23	Sample Size	1	sample	*K.NGUYEN*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	7-240409A12
Run Date	09-Apr-24 16:25
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.61	0.61	U		30
1,2,3,7,8-PeCDD	1	NotFnd	<1.1	1.1	U		150
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.1	1.1	U		150
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<1.0	1.0	U		150
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.99	0.99	U		150
1,2,3,4,6,7,8-HpCDD	0.01	36.18	4.42	1.4	M,J,B		150
OCDD	0.0003	39.02	8.95	3.6	M,J,B		300
2,3,7,8-TCDF	0.1	NotFnd	<0.51	0.51	U		30
1,2,3,7,8-PeCDF	0.03	30.76	2.95	0.90	M,J		150
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.85	0.85	U		150
1,2,3,4,7,8-HxCDF	0.1	33.08	<0.53	0.53	U	0.45	150
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.52	0.52	U		150
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.54	0.54	U		150
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.65	0.65	U		150
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.79	0.79	U		150
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.98	0.98	U		150
OCDF	0.0003	NotFnd	<2.7	2.7	U		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1200	28.42	104	70-130
13C12-1,2,3,4,7,8-HxCDD	12000	33.64	98	70-130
13C12-2,3,4,7,8-PeCDF	12000	31.36	106	70-130
13C12-1,2,3,4,7,8-HxCDF	12000	33.07	95	70-130
13C12-1,2,3,4,7,8,9-HpCDF	12000	36.81	95	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	12000	28.40	77	40-130
13C12-1,2,3,7,8-PeCDD	12000	31.47	73	40-130
13C12-1,2,3,6,7,8-HxCDD	12000	33.72	99	40-130
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.16	82	25-130
13C12-OCDD	24000	39.00	63	25-130
13C12-2,3,7,8-TCDF	12000	27.84	90	40-130
13C12-1,2,3,7,8-PeCDF	12000	30.74	71	40-130
13C12-1,2,3,6,7,8-HxCDF	12000	33.17	106	40-130
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.23	87	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	18000	34.28	107	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<0.61	0.61	U	30
Total-PeCDD	0	<1.1	1.1	U	150
Total-HxCDD	0	<1.1	1.1	U	150
Total-HpCDD	1	4.42	1.4		150
Total-TCDF	1	0.574	0.51		30
Total-PeCDF	1	2.95	0.90		150
Total-HxCDF	0	<0.65	0.65	U	150
Total-HpCDF	0	<0.98	0.98	U	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.135
Mid Point PCDD/F TEQ (WHO 2005)	1.42
Upper Bound PCDD/F TEQ (WHO 2005)	2.70

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor — TEQ: Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	indicates that a target analyte was detected below the calibrated range.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2**	Sampling Date	20-Mar-24		
ALS Sample ID	L2755049-5	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA M23	Sample Size	1	sample	*K.NGUYEN*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	7-240409A13
Run Date	09-Apr-24 17:09
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 Z8-DX-1161297

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	28.40	<1.0	0.71	M,J,R	1.0	30
1,2,3,7,8-PeCDD	1	31.46	2.96	0.86	J		150
1,2,3,4,7,8-HxCDD	0.1	33.64	4.47	0.89	J		150
1,2,3,6,7,8-HxCDD	0.1	33.71	<9.8	0.86	J,R	9.8	150
1,2,3,7,8,9-HxCDD	0.1	33.91	5.74	0.84	J		150
1,2,3,4,6,7,8-HpCDD	0.01	36.16	78.1	0.93	J		150
OCDD	0.0003	39.00	81.9	2.0	J		300
2,3,7,8-TCDF	0.1	27.87	<1.2	1.1	M,J,R	1.2	30
1,2,3,7,8-PeCDF	0.03	30.74	<4.1	1.1	J,R	4.1	150
2,3,4,7,8-PeCDF	0.3	31.36	<6.3	1.0	J,R	6.3	150
1,2,3,4,7,8-HxCDF	0.1	33.07	<2.5	0.48	J,R	2.5	150
1,2,3,6,7,8-HxCDF	0.1	33.17	3.64	0.47	J		150
2,3,4,6,7,8-HxCDF	0.1	33.59	6.63	0.49	J		150
1,2,3,7,8,9-HxCDF	0.1	34.28	<2.0	0.59	J,R	2.0	150
1,2,3,4,6,7,8-HpCDF	0.01	35.23	12.0	0.50	J,B		150
1,2,3,4,7,8,9-HpCDF	0.01	36.80	2.44	0.62	M,J		150
OCDF	0.0003	39.36	<9.1	1.5	M,J,R	9.1	300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1200	28.40	103	70-130
13C12-1,2,3,4,7,8-HxCDD	12000	33.62	89	70-130
13C12-2,3,4,7,8-PeCDF	12000	31.35	98	70-130
13C12-1,2,3,4,7,8-HxCDF	12000	33.06	85	70-130
13C12-1,2,3,4,7,8,9-HpCDF	12000	36.80	87	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	12000	28.39	77	40-130
13C12-1,2,3,7,8-PeCDD	12000	31.46	84	40-130
13C12-1,2,3,6,7,8-HxCDD	12000	33.71	94	40-130
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.15	89	25-130
13C12-OCDD	24000	38.99	78	25-130
13C12-2,3,7,8-TCDF	12000	27.82	81	40-130
13C12-1,2,3,7,8-PeCDF	12000	30.73	78	40-130
13C12-1,2,3,6,7,8-HxCDF	12000	33.16	98	40-130
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.22	90	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	18000	34.27	94	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	5	86.6	0.71	30
Total-PeCDD	8	152	0.86	150
Total-HxCDD	4	215	0.89	150
Total-HpCDD	2	156	0.93	150
Total-TCDF	7	16.6	1.1	30
Total-PeCDF	3	15.6	1.1	150
Total-HxCDF	6	32.9	0.59	150
Total-HpCDF	2	14.4	0.62	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	5.96
Mid Point PCDD/F TEQ (WHO 2005)	10.5
Upper Bound PCDD/F TEQ (WHO 2005)	10.5

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2**	Sampling Date	20-Mar-24		
ALS Sample ID	L2755049-6	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA M23	Sample Size	1	sample	*K.NGUYEN*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	7-240409A14
Run Date	09-Apr-24 17:53
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.72	0.72	U		30
1,2,3,7,8-PeCDD	1	31.46	<2.0	1.1	M,J,R	2.0	150
1,2,3,4,7,8-HxCDD	0.1	33.64	<4.3	1.1	J,R	4.3	150
1,2,3,6,7,8-HxCDD	0.1	33.71	13.5	1.1	J		150
1,2,3,7,8,9-HxCDD	0.1	33.90	6.28	1.1	J		150
1,2,3,4,6,7,8-HpCDD	0.01	36.16	108	0.93	J		150
OCDD	0.0003	39.00	132	2.4	J		300
2,3,7,8-TCDF	0.1	27.85	<3.1	0.86	J,R	3.1	30
1,2,3,7,8-PeCDF	0.03	30.73	<4.2	1.1	J,R	4.2	150
2,3,4,7,8-PeCDF	0.3	31.36	8.27	1.1	M,J		150
1,2,3,4,7,8-HxCDF	0.1	33.07	<3.6	0.83	J,R	3.6	150
1,2,3,6,7,8-HxCDF	0.1	33.16	5.47	0.81	J		150
2,3,4,6,7,8-HxCDF	0.1	33.58	<7.4	0.84	J,R	7.4	150
1,2,3,7,8,9-HxCDF	0.1	34.29	3.24	1.0	J		150
1,2,3,4,6,7,8-HpCDF	0.01	35.23	20.6	0.96	J,B		150
1,2,3,4,7,8,9-HpCDF	0.01	36.81	<4.4	1.2	M,J,R	4.4	150
OCDF	0.0003	39.35	20.3	1.9	M,J		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1200	28.40	100	70-130
13C12-1,2,3,4,7,8-HxCDD	12000	33.62	81	70-130
13C12-2,3,4,7,8-PeCDF	12000	31.35	81	70-130
13C12-1,2,3,4,7,8-HxCDF	12000	33.06	74	70-130
13C12-1,2,3,4,7,8,9-HpCDF	12000	36.78	82	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	12000	28.39	82	40-130
13C12-1,2,3,7,8-PeCDD	12000	31.45	80	40-130
13C12-1,2,3,6,7,8-HxCDD	12000	33.70	113	40-130
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.15	98	25-130
13C12-OCDD	24000	38.99	78	25-130
13C12-2,3,7,8-TCDF	12000	27.82	101	40-130
13C12-1,2,3,7,8-PeCDF	12000	30.72	75	40-130
13C12-1,2,3,6,7,8-HxCDF	12000	33.15	122	40-130
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.22	103	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	18000	34.26	110	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	3	69.5	0.72	30
Total-PeCDD	4	153	1.1	150
Total-HxCDD	4	239	1.1	150
Total-HpCDD	2	218	0.93	150
Total-TCDF	7	31.4	0.86	30
Total-PeCDF	6	40.9	1.1	150
Total-HxCDF	11	45.0	1.0	150
Total-HpCDF	2	28.0	1.2	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	6.66
Mid Point PCDD/F TEQ (WHO 2005)	11.0
Upper Bound PCDD/F TEQ (WHO 2005)	11.4

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2**	Sampling Date	21-Mar-24		
ALS Sample ID	L2755049-7	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA M23	Sample Size	1	sample	*K.NGUYEN*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	7-240409A15
Run Date	09-Apr-24 18:38
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.85	0.85	U		30
1,2,3,7,8-PeCDD	1	31.46	<2.4	1.6	J,R	2.4	150
1,2,3,4,7,8-HxCDD	0.1	33.64	4.33	0.95	J		150
1,2,3,6,7,8-HxCDD	0.1	33.71	11.2	0.92	J		150
1,2,3,7,8,9-HxCDD	0.1	33.91	6.67	0.89	J		150
1,2,3,4,6,7,8-HpCDD	0.01	36.16	100	1.4	J		150
OCDD	0.0003	39.00	123	2.4	J		300
2,3,7,8-TCDF	0.1	27.85	2.36	1.1	J		30
1,2,3,7,8-PeCDF	0.03	30.74	<2.7	1.2	J,R	2.7	150
2,3,4,7,8-PeCDF	0.3	31.36	5.32	1.1	J		150
1,2,3,4,7,8-HxCDF	0.1	33.08	3.30	0.85	J		150
1,2,3,6,7,8-HxCDF	0.1	33.17	4.84	0.83	J		150
2,3,4,6,7,8-HxCDF	0.1	33.59	8.50	0.86	J		150
1,2,3,7,8,9-HxCDF	0.1	34.30	<2.9	1.0	J,R	2.9	150
1,2,3,4,6,7,8-HpCDF	0.01	35.23	16.9	0.71	J,B		150
1,2,3,4,7,8,9-HpCDF	0.01	36.80	<3.2	0.88	J,R	3.2	150
OCDF	0.0003	39.37	18.2	2.0	M,J		300

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1200	28.40	104	70-130
13C12-1,2,3,4,7,8-HxCDD	12000	33.62	96	70-130
13C12-2,3,4,7,8-PeCDF	12000	31.35	101	70-130
13C12-1,2,3,4,7,8-HxCDF	12000	33.07	90	70-130
13C12-1,2,3,4,7,8,9-HpCDF	12000	36.80	98	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	12000	28.39	83	40-130
13C12-1,2,3,7,8-PeCDD	12000	31.46	81	40-130
13C12-1,2,3,6,7,8-HxCDD	12000	33.71	101	40-130
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.15	92	25-130
13C12-OCDD	24000	38.99	76	25-130
13C12-2,3,7,8-TCDF	12000	27.84	94	40-130
13C12-1,2,3,7,8-PeCDF	12000	30.73	77	40-130
13C12-1,2,3,6,7,8-HxCDF	12000	33.16	110	40-130
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.22	93	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	18000	34.27	107	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**	
Total-TCDD	6	86.3	0.85	30
Total-PeCDD	1	44.6	1.6	150
Total-HxCDD	6	266	0.95	150
Total-HpCDD	2	194	1.4	150
Total-TCDF	7	32.3	1.1	30
Total-PeCDF	5	25.6	1.2	150
Total-HxCDF	5	28.1	1.0	150
Total-HpCDF	3	30.0	0.88	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	6.93
Mid Point PCDD/F TEQ (WHO 2005)	10.2
Upper Bound PCDD/F TEQ (WHO 2005)	10.6

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2**	Sampling Date	20-Mar-24		
ALS Sample ID	L2755049-8	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA M23	Sample Size	1	sample	*K.NGUYEN*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	7-240409A16
Run Date	09-Apr-24 19:22
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**TEF (WHO 200S)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.78	0.78	U		30
1,2,3,7,8-PeCDD	1	NotFnd	<0.97	0.97	U		150
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.96	0.96	U		150
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.93	0.93	U		150
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.91	0.91	U		150
1,2,3,4,6,7,8-HpCDD	0.01	36.17	2.37	0.77	M,J,B		150
OCDD	0.0003	38.99	4.89	2.2	M,J,B		300
2,3,7,8-TCDF	0.1	NotFnd	<0.47	0.47	U		30
1,2,3,7,8-PeCDF	0.03	30.74	2.19	0.72	J		150
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.67	0.67	U		150
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.48	0.48	U		150
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.47	0.47	U		150
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.48	0.48	U		150
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.59	0.59	U		150
1,2,3,4,6,7,8-HpCDF	0.01	35.23	<0.53	0.53	U	0.45	150
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.65	0.65	U		150
OCDF	0.0003	39.36	2.49	1.5	M,J		300
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1200	28.40	109	70-130			
13C12-1,2,3,4,7,8-HxCDD	12000	33.62	100	70-130			
13C12-2,3,4,7,8-PeCDF	12000	31.35	112	70-130			
13C12-1,2,3,4,7,8-HxCDF	12000	33.06	95	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	12000	36.78	103	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	12000	28.39	69	40-130			
13C12-1,2,3,7,8-PeCDD	12000	31.45	69	40-130			
13C12-1,2,3,6,7,8-HxCDD	12000	33.70	100	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.15	93	25-130			
13C12-OCDD	24000	38.99	81	25-130			
13C12-2,3,7,8-TCDF	12000	27.82	84	40-130			
13C12-1,2,3,7,8-PeCDF	12000	30.73	64	40-130			
13C12-1,2,3,6,7,8-HxCDF	12000	33.16	106	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.22	93	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	18000	34.27	101	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<0.78	0.78	U	30
Total-PeCDD	0	<0.97	0.97	U	150
Total-HxCDD	0	<0.96	0.96	U	150
Total-HpCDD	1	2.37	0.77		150
Total-TCDF	0	<0.47	0.47	U	30
Total-PeCDF	1	2.19	0.72		150
Total-HxCDF	0	<0.59	0.59	U	150
Total-HpCDF	0	<0.65	0.65	U	150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0916
Mid Point PCDD/F TEQ (WHO 2005)	1.34
Upper Bound PCDD/F TEQ (WHO 2005)	2.58

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		Approved:
ALS Sample ID	WG3788861-1	Extraction Date	3-Apr-24		*K.NGUYEN*
Analysis Method	EPA M23	Sample Size	1	sample	--e-signature--
Analysis Type	Blank	Percent Moisture	n/a		10-Apr-2024
Sample Matrix	MEDIA	Split Ratio	6		

Run Information	**Run 1**
Filename	7-240409A07
Run Date	09-Apr-24 12:44
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.61	0.61	U		30
1,2,3,7,8-PeCDD	1	31.48	<0.85	0.74	J,R	0.85	150
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.92	0.92	U		150
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.89	0.89	U		150
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.87	0.87	U		150
1,2,3,4,6,7,8-HpCDD	0.01	36.17	3.09	0.72	J		150
OCDD	0.0003	39.01	6.93	2.5	M,J		300
2,3,7,8-TCDF	0.1	NotFnd	<0.53	0.53	U		30
1,2,3,7,8-PeCDF	0.03	30.74	<2.3	0.74	J,R	2.3	150
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.70	0.70	U		150
1,2,3,4,7,8-HxCDF	0.1	33.08	<0.69	0.43	J,R	0.69	150
1,2,3,6,7,8-HxCDF	0.1	33.17	<0.47	0.42	J,R	0.47	150
2,3,4,6,7,8-HxCDF	0.1	33.59	<1.2	0.43	M,J,R	1.2	150
1,2,3,7,8,9-HxCDF	0.1	34.28	<1.2	0.52	M,J,R	1.2	150
1,2,3,4,6,7,8-HpCDF	0.01	35.24	3.88	0.55	J		150
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.69	0.69	U		150
OCDF	0.0003	39.37	<3.9	1.6	M,J,R	3.9	300

Field Spike Standards	**pg**	**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	0	NS	
13C12-1,2,3,4,7,8-HxCDD	0	NS	
13C12-2,3,4,7,8-PeCDF	0	NS	
13C12-1,2,3,4,7,8-HxCDF	0	NS	
13C12-1,2,3,4,7,8,9-HpCDF	0	NS	

Extraction Standards				
13C12-2,3,7,8-TCDD	12000	28.39	85	40-130
13C12-1,2,3,7,8-PeCDD	12000	31.46	87	40-130
13C12-1,2,3,6,7,8-HxCDD	12000	33.71	106	40-130
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.15	99	25-130
13C12-OCDD	24000	38.99	85	25-130
13C12-2,3,7,8-TCDF	12000	27.84	95	40-130
13C12-1,2,3,7,8-PeCDF	12000	30.73	77	40-130
13C12-1,2,3,6,7,8-HxCDF	12000	33.16	113	40-130
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.23	100	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	18000	34.27	106	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<0.61	0.61	U	30
Total-PeCDD	0	<0.74	0.74	U	150
Total-HxCDD	0	<0.92	0.92	U	150
Total-HpCDD	1	3.09	0.72		150
Total-TCDF	0	<0.53	0.53	U	30
Total-PeCDF	0	<0.74	0.74	U	150
Total-HxCDF	0	<0.52	0.52	U	150
Total-HpCDF	1	3.88	0.69		150

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0718
Mid Point PCDD/F TEQ (WHO 2005)	1.92
Upper Bound PCDD/F TEQ (WHO 2005)	2.50

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor — TEQ Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
NS	Indicates that this compound was not spiked.
J	indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		
ALS Sample ID	WG3788861-2	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA M23	Sample Size	1	n/a	*K.NGUYEN*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	MEDIA	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	7-240409A02
Run Date	09-Apr-24 10:34
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS 7 ZB-DX-1161297

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	1200	28.42	96	70-130	
1,2,3,7,8-PeCDD	6000	31.48	107	70-130	
1,2,3,4,7,8-HxCDD	6000	33.65	95	70-130	
1,2,3,6,7,8-HxCDD	6000	33.72	93	70-130	
1,2,3,7,8,9-HxCDD	6000	33.91	96	70-130	
1,2,3,4,6,7,8-HpCDD	6000	36.17	101	70-130	
OCDD	12000	39.01	99	70-130	
2,3,7,8-TCDF	1200	27.85	95	70-130	
1,2,3,7,8-PeCDF	6000	30.74	113	70-130	
2,3,4,7,8-PeCDF	6000	31.37	104	70-130	
1,2,3,4,7,8-HxCDF	6000	33.08	88	70-130	
1,2,3,6,7,8-HxCDF	6000	33.18	99	70-130	
2,3,4,6,7,8-HxCDF	6000	33.59	88	70-130	
1,2,3,7,8,9-HxCDF	6000	34.29	95	70-130	
1,2,3,4,6,7,8-HpCDF	6000	35.24	102	70-130	
1,2,3,4,7,8,9-HpCDF	6000	36.81	95	70-130	
OCDF	12000	39.37	105	70-130	
Field Spike Standards	**pg**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	0		NS		
13C12-1,2,3,4,7,8-HxCDD	0		NS		
13C12-2,3,4,7,8-PeCDF	0		NS		
13C12-1,2,3,4,7,8-HxCDF	0		NS		
13C12-1,2,3,4,7,8,9-HpCDF	0		NS		
Extraction Standards					
13C12-2,3,7,8-TCDD	12000	28.40	72	40-130	
13C12-1,2,3,7,8-PeCDD	12000	31.46	75	40-130	
13C12-1,2,3,6,7,8-HxCDD	12000	33.71	102	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	12000	36.16	87	25-130	
13C12-OCDD	24000	39.00	73	25-130	
13C12-2,3,7,8-TCDF	12000	27.84	86	40-130	
13C12-1,2,3,7,8-PeCDF	12000	30.74	67	40-130	
13C12-1,2,3,6,7,8-HxCDF	12000	33.17	109	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	12000	35.23	91	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	18000	34.28	106	40-130	

NS Indicates that this compound was not spiked.

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2755049		Mississauga, ON
Date of Report	11-Apr-24		L5J 2Y4
Date of Sample Receipt	22-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **PCB Congeners by EPA 1668C**

PCB Congener Group Totals and Total PCB are a sum of detected values, including EMPC values, consistent with USEPA CLP SOW CBC1.2

For the laboratory control sample (LCS), the recoveries of many of the labelled extraction standards were marginally below the method control limits. However, the recoveries of the target analytes are all well in control. No bias to sample data is expected.

Certified by: _____
Sabrina Jin
Technical Specialist

Results in this certificate relate only to the samples as submitted to the laboratory.
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Sample Analysis Summary Report

Sample Name	24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1	24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1	24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1	24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1	24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2	24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2
ALS Sample ID	L2755049-1	L2755049-2	L2755049-3	L2755049-4	L2755049-5	L2755049-6
Sample Size	1	1	1	1	1	1
Sample size units	Sample	Sample	Sample	Sample	Sample	Sample
Percent Moisture	n/a	n/a	n/a	n/a	n/a	n/a
Sample Matrix	Stack	Stack	Stack	Stack	Stack	Stack
Sampling Date	20-Mar-24	20-Mar-24	21-Mar-24	20-Mar-24	20-Mar-24	20-Mar-24
Extraction Date	3-Apr-24	3-Apr-24	3-Apr-24	3-Apr-24	3-Apr-24	3-Apr-24
Target Analytes	**pg**	**pg**	**pg**	**pg**	**pg**	**pg**
PCB-081	<8.3	20.6	<11	<3.9	<6.0	49.9
PCB-077	277	345	364	<6.4	49.3	1300
PCB-123	56.6	207	153	<4.3	<15	624
PCB-118	2930	11600	11300	<30	1200	46300
PCB-114	77.2	302	281	<4.2	33.2	1150
PCB-105	905	3780	3080	16.3	364	11900
PCB-126	<5.5	26.6	<11	<4.1	<6.8	30.1
PCB-167	27.4	104	72.7	<2.6	13.4	278
PCB-156/157	84.1	311	176	6.89	<30	626
PCB-169	<6.5	8.41	7.22	<2.6	<3.7	<8.7
PCB-189	<2.9	<2.4	<2.5	<2.0	<1.5	<3.4
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-PCB-081	52	51	52	47	51	56
13C12-PCB-077	53	51	53	46	51	57
13C12-PCB-123	55	50	52	45	51	56
13C12-PCB-118	56	53	54	46	53	65
13C12-PCB-114	53	49	52	44	50	56
13C12-PCB-105	55	52	54	47	54	57
13C12-PCB-126	55	52	54	48	54	58
13C12-PCB-167	56	54	55	48	55	59
13C12-PCB-156/157	57	54	57	48	55	60
13C12-PCB-169	59	57	59	51	58	62
13C12-PCB-189	51	48	51	45	50	54
Field Spike Standards						
13C12-PCB-031	104	102	102	102	104	105
13C12-PCB-095	71	73	72	72	71	73
13C12-PCB-153	98	96	94	94	93	90
Cleanup Standards						
13C12-PCB-028	52	47	42	45	45	49
13C12-PCB-111	58	51	50	52	51	57
13C12-PCB-178	61	55	53	53	54	59
Toxic Equivalency - (WHO 2005)	**pg**	**pg**	**pg**	**pg**	**pg**	**pg**
Lower Bound PCB TEQ	0.150	3.44	0.705	0.000696	0.0532	4.98
Mid Point PCB TEQ	0.896	3.44	1.81	0.247	0.791	5.24
Upper Bound PCB TEQ	0.898	3.44	1.81	0.492	0.847	5.24

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Sample Analysis Summary Report

Sample Name	24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2	24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2
ALS Sample ID	L2755049-7	L2755049-8
Sample Size	1	1
Sample size units	Sample	Sample
Percent Moisture	n/a	n/a
Sample Matrix	Stack	Stack
Sampling Date	21-Mar-24	20-Mar-24
Extraction Date	3-Apr-24	3-Apr-24
Target Analytes	**pg**	**pg**
PCB-081	<10	<4.7
PCB-077	162	<4.8
PCB-123	78.9	<5.2
PCB-118	6020	<16
PCB-114	168	<5.3
PCB-105	2050	<5.5
PCB-126	<9.6	<5.2
PCB-167	60.6	<3.1
PCB-156/157	183	<4.5
PCB-169	<4.3	<3.2
PCB-189	3.37	<2.5
Extraction Standards	**% Rec**	**% Rec**
13C12-PCB-081	42	39
13C12-PCB-077	42	38
13C12-PCB-123	42	37
13C12-PCB-118	43	38
13C12-PCB-114	40	37
13C12-PCB-105	42	39
13C12-PCB-126	43	39
13C12-PCB-167	44	39
13C12-PCB-156/157	44	40
13C12-PCB-169	47	43
13C12-PCB-189	41	38
Field Spike Standards		
13C12-PCB-031	104	101
13C12-PCB-095	74	73
13C12-PCB-153	95	96
Cleanup Standards		
13C12-PCB-028	39	37
13C12-PCB-111	45	39
13C12-PCB-178	48	39
Toxic Equivalency - (WHO 2005)	**pg**	**pg**
Lower Bound PCB TEQ	0.273	0.00
Mid Point PCB TEQ	1.30	0.310
Upper Bound PCB TEQ	1.37	0.619

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Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3788861-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	MEDIA
Sampling Date	n/a
Extraction Date	3-Apr-24

Target Analytes	pg
PCB-081	<5.8
PCB-077	<5.8
PCB-123	<6.8
PCB-118	<6.3
PCB-114	<6.8
PCB-105	<6.2
PCB-126	<6.4
PCB-167	<5.3
PCB-156/157	<7.5
PCB-169	<5.2
PCB-189	<3.0
Extraction Standards	**% Rec**
13C12-PCB-081	30
13C12-PCB-077	29
13C12-PCB-123	29
13C12-PCB-118	30
13C12-PCB-114	28
13C12-PCB-105	30
13C12-PCB-126	32
13C12-PCB-167	32
13C12-PCB-156/157	33
13C12-PCB-169	36
13C12-PCB-189	32
Field Spike Standards	
13C12-PCB-031	NS
13C12-PCB-095	NS
13C12-PCB-153	NS
Cleanup Standards	
13C12-PCB-028	27
13C12-PCB-111	29
13C12-PCB-178	31

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.400
Upper Bound PCB TEQ	0.800

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Sample Analysis Summary Report

Sample Name	Laboratory Control Sample
ALS Sample ID	WG3788861-2
Sample Size	1
Sample size units	n/a
Percent Moisture	n/a
Sample Matrix	MEDIA
Sampling Date	n/a
Extraction Date	3-Apr-24

Target Analytes	% Rec
PCB-081	95
PCB-077	93
PCB-123	96
PCB-118	95
PCB-114	102
PCB-105	91
PCB-126	95
PCB-167	100
PCB-156/157	97
PCB-169	101
PCB-189	92
Extraction Standards	**% Rec**
13C12-PCB-081	32
13C12-PCB-077	32
13C12-PCB-123	33
13C12-PCB-118	33
13C12-PCB-114	32
13C12-PCB-105	35
13C12-PCB-126	36
13C12-PCB-167	36
13C12-PCB-156/157	37
13C12-PCB-169	40
13C12-PCB-189	36
Field Spike Standards	
13C12-PCB-031	NS
13C12-PCB-095	NS
13C12-PCB-153	NS
Cleanup Standards	
13C12-PCB-028	29
13C12-PCB-111	34
13C12-PCB-178	36

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1**	Sampling Date	20-Mar-24		Approved:
ALS Sample ID	L2755049-1	Extraction Date	3-Apr-24		*E. Sabljic*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		10-Apr-2024
Sample Matrix	Stack	Split Ratio	6		

Run Information	**Run 1**
Filename	5-240406A24
Run Date	07-Apr-24 08:46
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL-283299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<8.3	8.3	U		150
PCB-077	0.0001	22.10	277	7.6			150
PCB-123	0.00003	23.05	56.6	5.3	M,J		150
PCB-118	0.00003	23.24	2930	4.8			150
PCB-114	0.00003	23.55	77.2	5.5	J		150
PCB-105	0.00003	23.91	905	5.1			150
PCB-126	0.1	25.49	<5.5	5.5	J,R	5.5	150
PCB-167	0.00003	26.36	27.4	4.3	J		150
PCB-156/157	0.00003	26.99	84.1	6.2	J		300
PCB-169	0.03	28.63	<6.5	4.6	M,J,R	6.5	150
PCB-189	0.00003	NotFnd	<2.9	2.9	U		150

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.78	52	10-145
13C12-PCB-077	12000	22.09	53	10-145
13C12-PCB-123	12000	23.06	55	10-145
13C12-PCB-118	12000	23.23	56	10-145
13C12-PCB-114	12000	23.53	53	10-145
13C12-PCB-105	12000	23.90	55	10-145
13C12-PCB-126	12000	25.47	55	10-145
13C12-PCB-167	12000	26.35	56	10-145
13C12-PCB-156/157	24000	27.00	57	10-145
13C12-PCB-169	12000	28.63	59	10-145
13C12-PCB-189	12000	29.90	51	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.82	104	70-130
13C12-PCB-095	12000	19.13	71	70-130
13C12-PCB-153	12000	24.14	98	70-130
Cleanup Standards				
13C12-PCB-028	18000	15.99	52	5-145
13C12-PCB-111	18000	21.99	58	10-145
13C12-PCB-178	18000	25.03	61	10-145

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	0.150
Mid Point PCB TEQ	0.896
Upper Bound PCB TEQ	0.898

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1**	Sampling Date	20-Mar-24		
ALS Sample ID	L2755049-2	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA 1668C	Sample Size	1	Sample	*E. Sabljic*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	5-240406A25
Run Date	07-Apr-24 09:28
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL-283299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	21.79	20.6	8.0	M,J		150
PCB-077	0.0001	22.10	345	7.9			150
PCB-123	0.00003	23.06	207	6.8	M		150
PCB-118	0.00003	23.26	11600	6.0			150
PCB-114	0.00003	23.56	302	6.7			150
PCB-105	0.00003	23.92	3780	6.4			150
PCB-126	0.1	25.49	26.6	6.8	M,J		150
PCB-167	0.00003	26.37	104	4.5	J		150
PCB-156/157	0.00003	27.00	311	6.6			300
PCB-169	0.03	28.65	8.41	4.7	M,J		150
PCB-189	0.00003	NotFnd	<2.4	2.4	U		150

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.79	51	10-145
13C12-PCB-077	12000	22.09	51	10-145
13C12-PCB-123	12000	23.07	50	10-145
13C12-PCB-118	12000	23.24	53	10-145
13C12-PCB-114	12000	23.55	49	10-145
13C12-PCB-105	12000	23.91	52	10-145
13C12-PCB-126	12000	25.48	52	10-145
13C12-PCB-167	12000	26.36	54	10-145
13C12-PCB-156/157	24000	27.00	54	10-145
13C12-PCB-169	12000	28.65	57	10-145
13C12-PCB-189	12000	29.92	48	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.82	102	70-130
13C12-PCB-095	12000	19.14	73	70-130
13C12-PCB-153	12000	24.15	96	70-130
Cleanup Standards				
13C12-PCB-028	18000	15.99	47	5-145
13C12-PCB-111	18000	21.99	51	10-145
13C12-PCB-178	18000	25.04	55	10-145

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	3.44
Mid Point PCB TEQ	3.44
Upper Bound PCB TEQ	3.44

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(11 THRU 1S) TEST#3 APC OUTLET #1**	Sampling Date	21-Mar-24		
ALS Sample ID	L2755049-3	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA 1668C	Sample Size	1	Sample	*E. Sabljic*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	5-240406A26
Run Date	07-Apr-24 10:10
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL-283299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	21.80	<11	7.5	M,J,R	11	150
PCB-077	0.0001	22.10	364	7.3			150
PCB-123	0.00003	23.07	153	5.9	M		150
PCB-118	0.00003	23.26	11300	5.2			150
PCB-114	0.00003	23.56	281	5.8			150
PCB-105	0.00003	23.92	3080	5.6			150
PCB-126	0.1	25.49	<11	5.8	M,J,R	11	150
PCB-167	0.00003	26.37	72.7	3.9	J		150
PCB-156/157	0.00003	27.00	176	5.5	J		300
PCB-169	0.03	28.65	7.22	4.0	M,J		150
PCB-189	0.00003	29.92	<2.5	2.4	M,J,R	2.5	150

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.79	52	10-145
13C12-PCB-077	12000	22.09	53	10-145
13C12-PCB-123	12000	23.07	52	10-145
13C12-PCB-118	12000	23.24	54	10-145
13C12-PCB-114	12000	23.55	52	10-145
13C12-PCB-105	12000	23.91	54	10-145
13C12-PCB-126	12000	25.48	54	10-145
13C12-PCB-167	12000	26.36	55	10-145
13C12-PCB-156/157	24000	27.00	57	10-145
13C12-PCB-169	12000	28.65	59	10-145
13C12-PCB-189	12000	29.92	51	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.83	102	70-130
13C12-PCB-095	12000	19.14	72	70-130
13C12-PCB-153	12000	24.15	94	70-130
Cleanup Standards				
13C12-PCB-028	18000	16.00	42	5-145
13C12-PCB-111	18000	22.00	50	10-145
13C12-PCB-178	18000	25.04	53	10-145

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	0.705
Mid Point PCB TEQ	1.81
Upper Bound PCB TEQ	1.81

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1**	Sampling Date	20-Mar-24		
ALS Sample ID	L2755049-4	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA 1668C	Sample Size	1	Sample	*E. Sabljic*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	5-240406A22
Run Date	07-Apr-24 07:21
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL-2B3299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<3.9	3.9	U		150
PCB-077	0.0001	22.10	<6.4	4.0	J,R	6.4	150
PCB-123	0.00003	NotFnd	<4.3	4.3	U		150
PCB-118	0.00003	23.23	<30	3.9	J,R	30	150
PCB-114	0.00003	NotFnd	<4.2	4.2	U		150
PCB-105	0.00003	23.91	16.3	3.9	J		150
PCB-126	0.1	NotFnd	<4.1	4.1	U		150
PCB-167	0.00003	NotFnd	<2.6	2.6	U		150
PCB-156/157	0.00003	26.99	6.89	3.7	M,J		300
PCB-169	0.03	28.62	<2.6	2.6	M,U	2.0	150
PCB-189	0.00003	NotFnd	<2.0	2.0	U		150

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.78	47	10-145
13C12-PCB-077	12000	22.09	46	10-145
13C12-PCB-123	12000	23.06	45	10-145
13C12-PCB-118	12000	23.23	46	10-145
13C12-PCB-114	12000	23.53	44	10-145
13C12-PCB-105	12000	23.90	47	10-145
13C12-PCB-126	12000	25.47	48	10-145
13C12-PCB-167	12000	26.35	48	10-145
13C12-PCB-156/157	24000	26.99	48	10-145
13C12-PCB-169	12000	28.63	51	10-145
13C12-PCB-189	12000	29.90	45	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.81	102	70-130
13C12-PCB-095	12000	19.12	72	70-130
13C12-PCB-153	12000	24.14	94	70-130
Cleanup Standards				
13C12-PCB-028	18000	15.98	45	5-145
13C12-PCB-111	18000	21.98	52	10-145
13C12-PCB-178	18000	25.03	53	10-145

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	0.000696
Mid Point PCB TEQ	0.247
Upper Bound PCB TEQ	0.492

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2**	Sampling Date	20-Mar-24		Approved:
ALS Sample ID	L2755049-5	Extraction Date	3-Apr-24		*E. Sabljic*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		10-Apr-2024
Sample Matrix	Stack	Split Ratio	6		

Run Information	**Run 1**
Filename	5-240406A27
Run Date	07-Apr-24 10:52
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL-283299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<6.0	6.0	U		150
PCB-077	0.0001	22.12	49.3	5.5	J		150
PCB-123	0.00003	23.07	<15	5.8	M,J,R	15	150
PCB-118	0.00003	23.26	1200	5.2			150
PCB-114	0.00003	23.56	33.2	5.9	J		150
PCB-105	0.00003	23.92	364	5.3			150
PCB-126	0.1	25.49	<6.8	5.6	M,J,R	6.8	150
PCB-167	0.00003	26.36	13.4	3.6	M,J		150
PCB-156/157	0.00003	27.01	<30	5.2	J,R	30	300
PCB-169	0.03	28.66	<3.7	3.7	M,U	2.8	150
PCB-189	0.00003	NotFnd	<1.5	1.5	U		150

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.80	51	10-145
13C12-PCB-077	12000	22.10	51	10-145
13C12-PCB-123	12000	23.07	51	10-145
13C12-PCB-118	12000	23.24	53	10-145
13C12-PCB-114	12000	23.55	50	10-145
13C12-PCB-105	12000	23.91	54	10-145
13C12-PCB-126	12000	25.48	54	10-145
13C12-PCB-167	12000	26.36	55	10-145
13C12-PCB-156/157	24000	27.01	55	10-145
13C12-PCB-169	12000	28.65	58	10-145
13C12-PCB-189	12000	29.92	50	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.83	104	70-130
13C12-PCB-095	12000	19.14	71	70-130
13C12-PCB-153	12000	24.15	93	70-130
Cleanup Standards				
13C12-PCB-028	18000	15.99	45	5-145
13C12-PCB-111	18000	22.00	51	10-145
13C12-PCB-178	18000	25.04	54	10-145

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	0.0532
Mid Point PCB TEQ	0.791
Upper Bound PCB TEQ	0.847

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2**	Sampling Date	20-Mar-24	
ALS Sample ID	L2755049-6	Extraction Date	3-Apr-24	Approved:
Analysis Method	EPA 1668C	Sample Size	1 Sample	*E. Sabljic*
Analysis Type	Sample	Percent Moisture	n/a	--e-signature--
Sample Matrix	Stack	Split Ratio	6	10-Apr-2024

Run Information	**Run 1**	**Run 2**
Filename	5-240406A28	5-240409A13
Run Date	07-Apr-24 11:34	09-Apr-24 22:36
Final Volume	25 ul	25 uL
Dilution Factor	1	10
Analysis Units	pg	pg
Instrument - Column	HRMS-5 SP8OCTYL-283299-05	HRMS-5 SP8OCTYL-283299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	21.79	49.9	10	M,J		150						
PCB-077	0.0001	22.10	1300	10			150						
PCB-123	0.00003	23.06	624	8.7	M		150						
PCB-118	0.00003							23.23	46300	51			1500
PCB-114	0.00003	23.55	1150	8.8			150						
PCB-105	0.00003	23.91	11900	8.4			150						
PCB-126	0.1	25.49	30.1	8.7	J		150						
PCB-167	0.00003	26.36	278	4.0			150						
PCB-156/157	0.00003	26.99	626	5.9			300						
PCB-169	0.03	28.63	<8.7	4.4	M,J,R	8.7	150						
PCB-189	0.00003	29.93	<3.4	2.3	J,R	3.4	150						

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.78	56	10-145			
13C12-PCB-077	12000	22.09	57	10-145			
13C12-PCB-123	12000	23.06	56	10-145			
13C12-PCB-118	12000				23.22	65	10-145
13C12-PCB-114	12000	23.53	56	10-145			
13C12-PCB-105	12000	23.90	57	10-145			
13C12-PCB-126	12000	25.47	58	10-145			
13C12-PCB-167	12000	26.35	59	10-145			
13C12-PCB-156/157	24000	26.99	60	10-145			
13C12-PCB-169	12000	28.63	62	10-145			
13C12-PCB-189	12000	29.90	54	10-145			
Field Spike Standards							
13C12-PCB-031	12000	15.81	105	70-130			
13C12-PCB-095	12000	19.13	73	70-130			
13C12-PCB-153	12000	24.15	90	70-130			
Cleanup Standards							
13C12-PCB-028	18000	15.98	49	5-145			
13C12-PCB-111	18000	21.98	57	10-145			
13C12-PCB-178	18000	25.03	59	10-145			

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	4.98
Mid Point PCB TEQ	5.24
Upper Bound PCB TEQ	5.24

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2**	Sampling Date	21-Mar-24		
ALS Sample ID	L2755049-7	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA 1668C	Sample Size	1	Sample	*E. Sabljic*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	5-240406A29
Run Date	07-Apr-24 12:17
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL-283299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<10	10	U		150
PCB-077	0.0001	22.10	162	9.9			150
PCB-123	0.00003	23.07	78.9	6.9	M,J		150
PCB-118	0.00003	23.26	6020	6.3			150
PCB-114	0.00003	23.56	168	7.2			150
PCB-105	0.00003	23.92	2050	6.6			150
PCB-126	0.1	25.50	<9.6	6.9	M,J,R	9.6	150
PCB-167	0.00003	26.36	60.6	4.3	J		150
PCB-156/157	0.00003	26.99	183	6.2	J		300
PCB-169	0.03	NotFnd	<4.3	4.3	U		150
PCB-189	0.00003	29.93	3.37	2.8	M,J		150

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.79	42	10-145
13C12-PCB-077	12000	22.09	42	10-145
13C12-PCB-123	12000	23.07	42	10-145
13C12-PCB-118	12000	23.24	43	10-145
13C12-PCB-114	12000	23.55	40	10-145
13C12-PCB-105	12000	23.91	42	10-145
13C12-PCB-126	12000	25.48	43	10-145
13C12-PCB-167	12000	26.36	44	10-145
13C12-PCB-156/157	24000	27.00	44	10-145
13C12-PCB-169	12000	28.65	47	10-145
13C12-PCB-189	12000	29.92	41	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.82	104	70-130
13C12-PCB-095	12000	19.13	74	70-130
13C12-PCB-153	12000	24.15	95	70-130
Cleanup Standards				
13C12-PCB-028	18000	15.99	39	5-145
13C12-PCB-111	18000	21.99	45	10-145
13C12-PCB-178	18000	25.04	48	10-145

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	0.273
Mid Point PCB TEQ	1.30
Upper Bound PCB TEQ	1.37

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2**	Sampling Date	20-Mar-24		
ALS Sample ID	L2755049-8	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA 1668C	Sample Size	1	Sample	*E. Sabljic*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	6		10-Apr-2024

Run Information	**Run 1**
Filename	5-240406A23
Run Date	07-Apr-24 08:03
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL-283299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<4.7	4.7	U		150
PCB-077	0.0001	NotFnd	<4.8	4.8	U		150
PCB-123	0.00003	NotFnd	<5.2	5.2	U		150
PCB-118	0.00003	23.26	<16	4.6	J,R	16	150
PCB-114	0.00003	NotFnd	<5.3	5.3	U		150
PCB-105	0.00003	23.92	<5.5	4.7	J,R	5.5	150
PCB-126	0.1	NotFnd	<5.2	5.2	U		150
PCB-167	0.00003	NotFnd	<3.1	3.1	U		150
PCB-156/157	0.00003	NotFnd	<4.5	4.5	U		300
PCB-169	0.03	NotFnd	<3.2	3.2	U		150
PCB-189	0.00003	NotFnd	<2.5	2.5	U		150

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.79	39	10-145
13C12-PCB-077	12000	22.09	38	10-145
13C12-PCB-123	12000	23.06	37	10-145
13C12-PCB-118	12000	23.23	38	10-145
13C12-PCB-114	12000	23.53	37	10-145
13C12-PCB-105	12000	23.90	39	10-145
13C12-PCB-126	12000	25.47	39	10-145
13C12-PCB-167	12000	26.35	39	10-145
13C12-PCB-156/157	24000	27.00	40	10-145
13C12-PCB-169	12000	28.63	43	10-145
13C12-PCB-189	12000	29.90	38	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.82	101	70-130
13C12-PCB-095	12000	19.13	73	70-130
13C12-PCB-153	12000	24.15	96	70-130
Cleanup Standards				
13C12-PCB-028	18000	15.98	37	5-145
13C12-PCB-111	18000	21.99	39	10-145
13C12-PCB-178	18000	25.03	39	10-145

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.310
Upper Bound PCB TEQ	0.619

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		Approved:
ALS Sample ID	WG378B861-1	Extraction Date	3-Apr-24		*E. Sabijic*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Blank	Percent Moisture	n/a		10-Apr-2024
Sample Matrix	MEDIA	Split Ratio	6		

Run Information	**Run 1**
Filename	5-240406A20
Run Date	07-Apr-24 05:57
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL-283299-05

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<5.8	5.8	U		150
PCB-077	0.0001	NotFnd	<5.8	5.8	U		150
PCB-123	0.00003	NotFnd	<6.8	6.8	U		150
PCB-118	0.00003	23.27	<6.3	6.1	M,J,R	6.3	150
PCB-114	0.00003	NotFnd	<6.8	6.8	U		150
PCB-105	0.00003	NotFnd	<6.2	6.2	U		150
PCB-126	0.1	NotFnd	<6.4	6.4	U		150
PCB-167	0.00003	NotFnd	<5.3	5.3	U		150
PCB-156/157	0.00003	NotFnd	<7.5	7.5	U		300
PCB-169	0.03	NotFnd	<5.2	5.2	U		150
PCB-189	0.00003	NotFnd	<3.0	3.0	U		150

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	12000	21.79	30	10-145
13C12-PCB-077	12000	22.09	29	10-145
13C12-PCB-123	12000	23.06	29	10-145
13C12-PCB-118	12000	23.23	30	10-145
13C12-PCB-114	12000	23.55	28	10-145
13C12-PCB-105	12000	23.90	30	10-145
13C12-PCB-126	12000	25.48	32	10-145
13C12-PCB-167	12000	26.35	32	10-145
13C12-PCB-156/157	24000	27.00	33	10-145
13C12-PCB-169	12000	28.65	36	10-145
13C12-PCB-189	12000	29.90	32	10-145
Field Spike Standards				
13C12-PCB-031	0		NS	
13C12-PCB-095	0		NS	
13C12-PCB-153	0		NS	
Cleanup Standards				
13C12-PCB-028	18000	15.99	27	5-145
13C12-PCB-111	18000	21.99	29	10-145
13C12-PCB-178	18000	25.04	31	10-145

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.400
Upper Bound PCB TEQ	0.800

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
NS	Indicates that this compound was not spiked.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		
ALS Sample ID	WG3788861-2	Extraction Date	3-Apr-24		Approved:
Analysis Method	EPA 1668C	Sample Size	1	n/a	*E. Sabljic*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	MEDIA	Split Ratio	1		10-Apr-2024

Run Information	**Run 1**
Filename	5-240406A18
Run Date	07-Apr-24 04:33
Final Volume	25 ul
Dilution Factor	1
Analysis Units	% Rec
Instrument - Column	HRMS-5 SPBOCTYL-283299-05

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
PCB-081	6000	21.81	95	60-135	
PCB-077	6000	22.11	93	60-135	
PCB-123	6000	23.09	96	60-135	
PCB-118	6000	23.26	95	60-135	
PCB-114	6000	23.56	102	60-135	
PCB-105	6000	23.92	91	60-135	
PCB-126	6000	25.49	95	60-135	
PCB-167	6000	26.37	100	60-135	
PCB-156/157	12000	27.03	97	60-135	
PCB-169	6000	28.66	101	60-135	
PCB-189	6000	29.93	92	60-135	
Extraction Standards		**Time**	**% Rec**	**Limits**	
13C12-PCB-081	12000	21.80	32	40-145	
13C12-PCB-077	12000	22.10	32	40-145	
13C12-PCB-123	12000	23.07	33	40-145	
13C12-PCB-118	12000	23.24	33	40-145	
13C12-PCB-114	12000	23.55	32	40-145	
13C12-PCB-105	12000	23.91	35	40-145	
13C12-PCB-126	12000	25.48	36	40-145	
13C12-PCB-167	12000	26.36	36	40-145	
13C12-PCB-156/157	24000	27.01	37	40-145	
13C12-PCB-169	12000	28.65	40	40-145	
13C12-PCB-189	12000	29.92	36	40-145	
Field Spike Standards					
13C12-PCB-031	0		NS		
13C12-PCB-095	0		NS		
13C12-PCB-153	0		NS		
Cleanup Standards					
13C12-PCB-028	18000	16.00	29	15-145	
13C12-PCB-111	18000	22.00	34	40-145	
13C12-PCB-178	18000	25.04	36	40-145	

NS Indicates that this compound was not spiked.

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Rd.
ALS WO#:	L2755049		Mississauga, ON L5J 2Y4
Date of Report	16-Apr-24		Canada
Date of Sample Receipt	22-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **CB by HRGC/SRM QQQ - Isotope dilution**

Certified by: _____
Sabrina Jin
Technical Specialist

Results in this certificate relate only to the samples as submitted to the laboratory.
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Sample Analysis Summary Report

Sample Name	Method Blank		24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1		24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1		24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1		24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1	
ALS Sample ID	WG3788861-1		L2755049-1		L2755049-2		L2755049-3		L2755049-4	
Sample Size	1		1		1		1		1	
Sample units	sample		sample		sample		sample		sample	
Moisture Content	n/a		n/a		n/a		n/a		n/a	
Matrix	QC		Stack		Stack		Stack		Stack	
Sampling Date	n/a		20-Mar-24		20-Mar-24		21-Mar-24		20-Mar-24	
Extraction Date	3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24	
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**	
Chlorobenzene	<12	U	516		418		572		<12	U
1,3-Dichlorobenzene	<12	U	55.8		58.2		80.8		<12	U
1,4-Dichlorobenzene	13.3		50.5		60.0		56.3		17.7	B
1,2-Dichlorobenzene	<12	U	30.6		32.7		37.5		<12	U
1,3,5-Trichlorobenzene	<12	U	<12	U	<12	U	<12	U	<12	U
1,2,4-Trichlorobenzene	<12	U	<12	U	<12	U	15		<12	U
1,2,3-Trichlorobenzene	<12	U	<12	U	<12	U	16.4		<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzene	<12	U	<12		<12		<12		<12	U
1,2,3,4-Tetrachlorobenzene	<12	U	<12	U	<12	U	<12	U	<12	U
Pentachlorobenzene	<12	U	<12	U	<12	U	<12	U	<12	U
Hexachlorobenzene	<12	U	<12	U	<12	U	<12	U	<12	U
Extraction Standards	**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**	
13C6-Chlorobenzene	30		30		22		28		27	
13C6-1,4-Dichlorobenzene	38		38		30		37		35	
13C6-1,2,3-Trichlorobenzene	38		38		30		38		35	
13C6-1,2,3,4-Tetrachlorobenzene	35		38		30		40		35	
13C6-Pentachlorobenzene	37		39		30		37		35	
13C6-Hexachlorobenzene	34		36		28		37		33	

U Indicates that this compound was not detected above the LOD.

B Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2		24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2		24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2		24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2		Laboratory Control Sample	Laboratory Control Sample
ALS Sample ID	L2755049-5		L2755049-6		L2755049-7		L2755049-8		WG3788861-2	WG3788861-5
Sample Size	1		1		1		1		1	1
Sample units	sample		sample		sample		sample		n/a	n/a
Moisture Content	n/a		n/a		n/a		n/a		n/a	n/a
Matrix	Stack		Stack		Stack		Stack		QC	QC
Sampling Date	20-Mar-24		20-Mar-24		21-Mar-24		20-Mar-24		n/a	n/a
Extraction Date	3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24	3-Apr-24
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**% Recovery**	**% Recovery**
Chlorobenzene	649		197		621		<12	U	NS	NS
1,3-Dichlorobenzene	67.4		32.2		70.9		<12	U	100	110
1,4-Dichlorobenzene	54.8		30.4		48.7		22.6		96	128
1,2-Dichlorobenzene	45.5		18.4		45.8		<12	U	102	105
1,3,5-Trichlorobenzene	<12	U	<12	U	<12	U	<12	U	87	132
1,2,4-Trichlorobenzene	<12	U	<12	U	17.6		<12	U	89	109
1,2,3-Trichlorobenzene	<12	U	<12	U	<12	U	<12	U	94	116
1,2,3,5/1,2,4,5-Tetrachlorobenzene	<12	U	<12	U	<12	U	<12	U	108	125
1,2,3,4-Tetrachlorobenzene	<12	U	<12	U	<12	U	<12	U	108	114
Pentachlorobenzene	<12	U	<12	U	<12	U	<12	U	104	124
Hexachlorobenzene	<12	U	<12	U	<12	U	<12	U	115	125
Extraction Standards	**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**	**%Rec**
13C6-Chlorobenzene	23		61		26		21		27	31
13C6-1,4-Dichlorobenzene	31		80		37		28		35	39
13C6-1,2,3-Trichlorobenzene	32		82		39		28		41	42
13C6-1,2,3,4-Tetrachlorobenzene	31		74		38		26		34	38
13C6-Pentachlorobenzene	31		74		43		26		36	41
13C6-Hexachlorobenzene	27		67		40		27		33	39

U Indicates that this compound was not detected above the LOD.
NS Indicates that this compound was not spiked.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3788861-1	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Blank		
Sample Matrix	QC		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041014.D
Run Date	4/10/2024 19:03
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		3.86	<12	U
1,3-Dichlorobenzene		6.22	<12	U
1,4-Dichlorobenzene		6.22	13.3	
1,2-Dichlorobenzene		6.22	<12	U
1,3,5-Trichlorobenzene			<12	U
1,2,4-Trichlorobenzene			<12	U
1,2,3-Trichlorobenzene			<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen			<12	U
1,2,3,4-Tetrachlorobenzene			<12	U
Pentachlorobenzene		11.26	<12	U
Hexachlorobenzene		13.53	<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.99	30	
13C6-1,4-Dichlorobenzene	300	6.22	38	
13C6-1,2,3-Trichlorobenzene	300	8.62	38	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	35	
13C6-Pentachlorobenzene	300	11.64	37	
13C6-Hexachlorobenzene	300	13.27	34	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-1	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041020.D
Run Date	4/10/2024 21:06
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		3.99	516	
1,3-Dichlorobenzene		6.13	55.8	
1,4-Dichlorobenzene		6.22	50.5	
1,2-Dichlorobenzene		6.51	30.6	
1,3,5-Trichlorobenzene		7.70	<12	U
1,2,4-Trichlorobenzene		8.20	<12	U
1,2,3-Trichlorobenzene		8.61	<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen		9.56	<12	
1,2,3,4-Tetrachlorobenzene			<12	U
Pentachlorobenzene		11.41	<12	U
Hexachlorobenzene		13.40	<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.99	30	
13C6-1,4-Dichlorobenzene	300	6.22	38	
13C6-1,2,3-Trichlorobenzene	300	8.61	38	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	38	
13C6-Pentachlorobenzene	300	11.64	39	
13C6-Hexachlorobenzene	300	13.26	36	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-2	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041021.D
Run Date	4/10/2024 21:27
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		3.99	418	
1,3-Dichlorobenzene		6.13	58.2	
1,4-Dichlorobenzene		6.22	60	
1,2-Dichlorobenzene		6.51	32.7	
1,3,5-Trichlorobenzene		7.69	<12	U
1,2,4-Trichlorobenzene		7.83	<12	U
1,2,3-Trichlorobenzene		8.20	<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen			<12	
1,2,3,4-Tetrachlorobenzene			<12	U
Pentachlorobenzene		11.88	<12	U
Hexachlorobenzene		13.27	<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.98	22	
13C6-1,4-Dichlorobenzene	300	6.22	30	
13C6-1,2,3-Trichlorobenzene	300	8.62	30	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	30	
13C6-Pentachlorobenzene	300	11.64	30	
13C6-Hexachlorobenzene	300	13.26	28	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1**	Sampling Date	21-Mar-24
ALS Sample ID	L2755049-3	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041022.D
Run Date	4/10/2024 21:47
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		3.99	572	
1,3-Dichlorobenzene		6.13	80.8	
1,4-Dichlorobenzene		6.22	56.3	
1,2-Dichlorobenzene		6.51	37.5	
1,3,5-Trichlorobenzene		7.70	<12	U
1,2,4-Trichlorobenzene		8.21	15	
1,2,3-Trichlorobenzene		8.62	16.4	
1,2,3,5/1,2,4,5-Tetrachlorobenzen		9.83	<12	
1,2,3,4-Tetrachlorobenzene			<12	U
Pentachlorobenzene		11.26	<12	U
Hexachlorobenzene		13.09	<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.99	28	
13C6-1,4-Dichlorobenzene	300	6.22	37	
13C6-1,2,3-Trichlorobenzene	300	8.61	38	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	40	
13C6-Pentachlorobenzene	300	11.64	37	
13C6-Hexachlorobenzene	300	13.26	37	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-4	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041018.D
Run Date	4/10/2024 20:25
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		4.20	<12	U
1,3-Dichlorobenzene		6.13	<12	U
1,4-Dichlorobenzene		6.22	17.7	B
1,2-Dichlorobenzene		6.22	<12	U
1,3,5-Trichlorobenzene		7.72	<12	U
1,2,4-Trichlorobenzene			<12	U
1,2,3-Trichlorobenzene			<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen			<12	U
1,2,3,4-Tetrachlorobenzene			<12	U
Pentachlorobenzene		11.65	<12	U
Hexachlorobenzene			<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.99	27	
13C6-1,4-Dichlorobenzene	300	6.22	35	
13C6-1,2,3-Trichlorobenzene	300	8.62	35	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	35	
13C6-Pentachlorobenzene	300	11.64	35	
13C6-Hexachlorobenzene	300	13.26	33	

U Indicates that this compound was not detected above the MDL.
B Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-5	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041023.D
Run Date	4/10/2024 22:08
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		3.99	649	
1,3-Dichlorobenzene		6.13	67.4	
1,4-Dichlorobenzene		6.22	54.8	
1,2-Dichlorobenzene		6.52	45.5	
1,3,5-Trichlorobenzene		7.69	<12	U
1,2,4-Trichlorobenzene		8.20	<12	U
1,2,3-Trichlorobenzene		8.20	<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen		9.82	<12	U
1,2,3,4-Tetrachlorobenzene			<12	U
Pentachlorobenzene		11.64	<12	U
Hexachlorobenzene		13.26	<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	11.64	23	
13C6-1,4-Dichlorobenzene	300	13.26	31	
13C6-1,2,3-Trichlorobenzene	300	3.99	32	
13C6-1,2,3,4-Tetrachlorobenzene	300	6.22	31	
13C6-Pentachlorobenzene	300	8.61	31	
13C6-Hexachlorobenzene	300	10.31	27	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-6	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041024.D
Run Date	4/10/2024 22:28
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		3.99	197	
1,3-Dichlorobenzene		6.13	32.2	
1,4-Dichlorobenzene		6.22	30.4	
1,2-Dichlorobenzene		6.52	18.4	
1,3,5-Trichlorobenzene		7.69	<12	U
1,2,4-Trichlorobenzene		8.20	<12	U
1,2,3-Trichlorobenzene		8.61	<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen		9.83	<12	U
1,2,3,4-Tetrachlorobenzene		10.30	<12	U
Pentachlorobenzene		11.64	<12	U
Hexachlorobenzene		13.10	<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.99	61	
13C6-1,4-Dichlorobenzene	300	6.22	80	
13C6-1,2,3-Trichlorobenzene	300	8.61	82	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	74	
13C6-Pentachlorobenzene	300	11.64	74	
13C6-Hexachlorobenzene	300	13.26	67	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2**	Sampling Date	21-Mar-24
ALS Sample ID	L2755049-7	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041025.D
Run Date	4/10/2024 22:49
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		3.99	621	
1,3-Dichlorobenzene		6.13	70.9	
1,4-Dichlorobenzene		6.22	48.7	
1,2-Dichlorobenzene		6.51	45.8	
1,3,5-Trichlorobenzene		7.71	<12	U
1,2,4-Trichlorobenzene		8.21	17.6	
1,2,3-Trichlorobenzene		8.62	<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen		9.80	<12	U
1,2,3,4-Tetrachlorobenzene			<12	U
Pentachlorobenzene		11.65	<12	U
Hexachlorobenzene			<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.98	26	
13C6-1,4-Dichlorobenzene	300	6.22	37	
13C6-1,2,3-Trichlorobenzene	300	8.61	39	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	38	
13C6-Pentachlorobenzene	300	11.64	43	
13C6-Hexachlorobenzene	300	13.26	40	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-8	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041019.D
Run Date	4/10/2024 20:46
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
Chlorobenzene		4.20	<12	U
1,3-Dichlorobenzene		6.13	<12	U
1,4-Dichlorobenzene		6.22	22.6	
1,2-Dichlorobenzene		6.40	<12	U
1,3,5-Trichlorobenzene		7.72	<12	U
1,2,4-Trichlorobenzene		8.63	<12	U
1,2,3-Trichlorobenzene		8.69	<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen		9.56	<12	U
1,2,3,4-Tetrachlorobenzene			<12	U
Pentachlorobenzene		11.77	<12	U
Hexachlorobenzene			<12	U
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.99	21	
13C6-1,4-Dichlorobenzene	300	6.22	28	
13C6-1,2,3-Trichlorobenzene	300	8.62	28	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	26	
13C6-Pentachlorobenzene	300	11.64	26	
13C6-Hexachlorobenzene	300	13.26	27	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3788861-2	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041012.D
Run Date	4/10/2024 18:22
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes	**ug spiked**	**Ret. Time**	**% Recovery**	**Flags**
Chlorobenzene	0		NS	
1,3-Dichlorobenzene	300	6.13	100	
1,4-Dichlorobenzene	300	6.22	96	
1,2-Dichlorobenzene	300	6.51	102	
1,3,5-Trichlorobenzene	300	7.69	87	
1,2,4-Trichlorobenzene	300	8.21	89	
1,2,3-Trichlorobenzene	300	8.62	94	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	600	9.83	108	
1,2,3,4-Tetrachlorobenzene	300	10.31	108	
Pentachlorobenzene	300	11.64	104	
Hexachlorobenzene	300	13.27	115	
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.99	27	
13C6-1,4-Dichlorobenzene	300	6.22	35	
13C6-1,2,3-Trichlorobenzene	300	8.62	41	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	34	
13C6-Pentachlorobenzene	300	11.64	36	
13C6-Hexachlorobenzene	300	13.26	33	

NS Indicates that this compound was not spiked.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3788861-5	Extraction Date	3-Apr-24
Analysis Method	CB by 8270		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	6		

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041011.D
Run Date	4/10/2024 18:01
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS US0587231

Target Analytes	**ug spiked**	**Ret. Time**	**% Recovery**	**Flags**
Chlorobenzene	0		NS	
1,3-Dichlorobenzene	45	6.14	110	
1,4-Dichlorobenzene	45	6.22	128	
1,2-Dichlorobenzene	45	6.52	105	
1,3,5-Trichlorobenzene	45	7.69	132	
1,2,4-Trichlorobenzene	45	8.21	109	
1,2,3-Trichlorobenzene	45	8.62	116	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	90	9.83	125	
1,2,3,4-Tetrachlorobenzene	45	10.32	114	
Pentachlorobenzene	45	11.64	124	
Hexachlorobenzene	45	13.27	125	
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	300	3.99	31	
13C6-1,4-Dichlorobenzene	300	6.22	39	
13C6-1,2,3-Trichlorobenzene	300	8.62	42	
13C6-1,2,3,4-Tetrachlorobenzene	300	10.31	38	
13C6-Pentachlorobenzene	300	11.64	41	
13C6-Hexachlorobenzene	300	13.27	39	

NS Indicates that this compound was not spiked.

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Rd.
ALS WO#:	L2755049		Mississauga, ON L5J 2Y4
Date of Report	26-Apr-24		Canada
Date of Sample Receipt	22-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **Chlorophenols by modifed EPA 8270E - isotope dilution**

Revised extraction scheme designed for improved monochlorobenzene recoveries removed the acidied/extraction step that enhanced chlorophenol recoveries. Therefore chlorophenol recoveries were in some cases very low.
Re-analysis using another fraction of the extract (on extracts where chlorobenzene fracton that showed good recoveries of the chlorobenzenes) did not provide improved data but showed similar recoveries.
Reporting limits were raised for very low recoveries corresponding to observable levels after correction for recoveries..
LCS target recoveries confirmed that in general targets by isotope dilution technique still provided estimates of chlorophenols even in the presence of poor ES recoveries.
Selected samples with very low monochlorophenol ES recovies had insufficient responses to provide even estimates on the monochlorophenol targets.

Certified by: _____
Ron McLeod, Ph.D.
Technical Director

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Media Blank		24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1		24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1		24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1		24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1	
ALS Sample ID	WG3788861-1		L2755049-1		L2755049-2		L2755049-3		L2755049-4	
Sample Size	1		1		1		1		1	
Sample units	sample		sample		sample		sample		sample	
Moisture Content	n/a		n/a		n/a		n/a		n/a	
Matrix	QC		Stack		Stack		Stack		Stack	
Sampling Date	n/a		20-Mar-24		20-Mar-24		21-Mar-24		20-Mar-24	
Extraction Date	3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24	
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**	
2-Chlorophenol	<60	U	<300	U	<1000	U	N/A		N/A	
3/4-Chlorophenol	<60	U	<300	U	<1000	U	N/A		N/A	
2,4/2,5-Dichlorophenol	<60	U	<300	U	<1000	U	<1000	U	<500	U
2,3-Dichlorophenol	<200	U	<300	U	<1000	U	<1000	U	<500	U
2,6-Dichlorophenol	<200	U	<300	U	<1000	U	<1000	U	<500	U
3,5-Dichlorophenol	<200	U	<300	U	<1000	U	<1000	U	1210	
3,4-Dichlorophenol	<200	U	787	M	3980		2570		1930	
2,3,5-Trichlorophenol	<60	U	<60	U	<60	U	<60	U	<60	U
2,4,6-Trichlorophenol	<60	U	<60	U	<60	U	<60	U	<60	U
2,4,5-Trichlorophenol	<60	U	<60	U	<60	U	<60	U	82.6	
2,3,4-Trichlorophenol	<60	U	<60	U	<60	U	<60	U	<60	U
2,3,6-Trichlorophenol	<60	U	<60	U	<60	U	<60	U	<60	U
3,4,5-Trichlorophenol	<60	U	<60	U	<60	U	<60	U	249	
2,3,5,6-Tetrachlorophenol	<60	U	<60	U	83.1		114		60.4	
2,3,4,5/2,3,4,6-Tetrachlorophenol	<60	U	119	M	160	M	205		146	M
Pentachlorophenol	<60	U	278	M	1400		273		215	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
13C6-4-Chlorophenol (ES)	20.9		2.9	M	1.0	M	0.2	M	0.3	
13C6-2,4-Dichlorophenol (ES)	5.0		6.3		0.7		1.1		2.0	
13C6-2,4,5-Trichlorophenol (ES)	34.3		40.9		16.4		3.3		30.7	
13C6-2,3,4,5-Tetrachlorophenol (ES)	58.1		86.8		53.1	M	31.5		76.0	
13C6-Pentachlorophenol (ES)	22.3		27.4		6.3	M	18.6		33.7	

U Indicates that this compound was not detected above the LOD.

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2		24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2		24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2		24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2		Laboratory Control Sample	Laboratory Control Sample	
ALS Sample ID	L2755049-5		L2755049-6		L2755049-7		L2755049-8		WG3788861-2	WG3788861-5	
Sample Size	1		1		1		1		1	1	
Sample units	sample		sample		sample		sample		n/a	n/a	
Moisture Content	n/a		n/a		n/a		n/a		n/a	n/a	
Matrix	Stack		Stack		Stack		Stack		QC	QC	
Sampling Date	20-Mar-24		20-Mar-24		21-Mar-24		20-Mar-24		n/a	n/a	
Extraction Date	3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24	3-Apr-24	
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**% Recovery**	**% Recovery**	
2-Chlorophenol	N/A		N/A		<1000	U	<500	U	121	64	
3/4-Chlorophenol	N/A		N/A		<1000	U	<500	U			
2,4/2,5-Dichlorophenol	<1000	U	<1000	U	<1000	U	<500	U	60	62	
2,3-Dichlorophenol	<1000	U	<1000	U	<1000	U	<500	U			
2,6-Dichlorophenol	<1000	U	<1000	U	<1000	U	<500	U	68	58	
3,5-Dichlorophenol	<1000	U	<1000	U	<1000	U	856				
3,4-Dichlorophenol	2940		1400		1790		1270	M			
2,3,5-Trichlorophenol	<60	U	<60	U	<60	U	<60	U			
2,4,6-Trichlorophenol	<60	U	<60	U	<60	U	<60	U	18	53	
2,4,5-Trichlorophenol	<60	U	<60	U	<60	U	86.4		113	174	
2,3,4-Trichlorophenol	<60	U	<60	U	<60	U	<60	U			
2,3,6-Trichlorophenol	<60	U	<60	U	<60	U	<60	U			
3,4,5-Trichlorophenol	1110	M	<60	U	<60	U	251				
2,3,5,6-Tetrachlorophenol	72.6		60.7	M	73.1		64.9		99	46	
2,3,4,5/2,3,4,6-Tetrachlorophenol	162		164	M	173	M	124	M	80	61	M
Pentachlorophenol	1070		90.3	M	107		247		130	119	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	**% Rec**	
13C6-4-Chlorophenol (ES)	0.2	M	0.2	M	0.9	M	1.4	M	75.3	2.2	M
13C6-2,4-Dichlorophenol (ES)	0.4	M	1.5		1.6	M	3.6	M	49.7	1.3	
13C6-2,4,5-Trichlorophenol (ES)	4.2		3.1		2.5	M	39.8	M	71.0	4.1	
13C6-2,3,4,5-Tetrachlorophenol (ES)	38.0		38.8		35.1	M	95.3	M	101.1	21	
13C6-Pentachlorophenol (ES)	4.4		51		37.2	M	33.8		54.9	8.2	

U Indicates that this compound was not detected above the LOD.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Media Blank**	Sampling Date	n/a
ALS Sample ID	WG3788861-1	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	Blank		
Sample Matrix	QC		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041116.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.02	<60	U
3/4-Chlorophenol	8.34	<60	U
2,4/2,5-Dichlorophenol	8.14	<60	U
2,3-Dichlorophenol	8.29	<200	U
2,6-Dichlorophenol	8.53	<200	U
3,5-Dichlorophenol	10.33	<200	U
3,4-Dichlorophenol	10.62	<200	U
2,3,5-Trichlorophenol	9.89	<60	U
2,4,6-Trichlorophenol	10.06	<60	U
2,4,5-Trichlorophenol	10.13	<60	U
2,3,4-Trichlorophenol	10.23	<60	U
2,3,6-Trichlorophenol	10.37	<60	U
3,4,5-Trichlorophenol	12.50	<60	U
2,3,5,6-Tetrachlorophenol	11.86	<60	U
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.94	<60	U
Pentachlorophenol	13.63	<60	U

Extraction Standards				**Limits**
13C6-4-Chlorophenol (ES)	1200	8.39	20.9	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.13	5	50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.13	34.3	50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.91	58.1	50-150
13C6-Pentachlorophenol (ES)	1200	13.62	22.3	50-150

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-1	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041120.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.05	<300	U
3/4-Chlorophenol	8.31	<300	U
2,4/2,5-Dichlorophenol	8.11	<300	U
2,3-Dichlorophenol	8.11	<300	U
2,6-Dichlorophenol	8.50	<300	U
3,5-Dichlorophenol	10.31	<300	U
3,4-Dichlorophenol	10.57	787	M
2,3,5-Trichlorophenol	9.87	<60	U
2,4,6-Trichlorophenol	10.02	<60	U
2,4,5-Trichlorophenol	10.10	<60	U
2,3,4-Trichlorophenol	10.10	<60	U
2,3,6-Trichlorophenol	10.34	<60	U
3,4,5-Trichlorophenol	12.41	<60	U
2,3,5,6-Tetrachlorophenol	11.83	<60	U
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.88	119	M
Pentachlorophenol	13.59	278	M

Extraction Standards			**% Rec**		**Limits**
13C6-4-Chlorophenol (ES)	1200	8.38	2.9	M	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.11	6.3		50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.10	40.9		50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.88	86.8		50-150
13C6-Pentachlorophenol (ES)	1200	13.59	27.4		50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-2	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041121.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.02	<1000	U
3/4-Chlorophenol	8.31	<1000	U
2,4/2,5-Dichlorophenol	8.10	<1000	U
2,3-Dichlorophenol	8.10	<1000	U
2,6-Dichlorophenol	8.10	<1000	U
3,5-Dichlorophenol	10.31	<1000	U
3,4-Dichlorophenol	10.56	3980	
2,3,5-Trichlorophenol	9.61	<60	U
2,4,6-Trichlorophenol	10.06	<60	U
2,4,5-Trichlorophenol	10.10	<60	U
2,3,4-Trichlorophenol	10.10	<60	U
2,3,6-Trichlorophenol	10.34	<60	U
3,4,5-Trichlorophenol	12.37	<60	U
2,3,5,6-Tetrachlorophenol	11.83	83.1	
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.88	160	M
Pentachlorophenol	13.59	1400	

Extraction Standards			**% Rec**		**Limits**
13C6-4-Chlorophenol (ES)	1200	8.36	1	M	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.10	0.7		50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.10	16.4		50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.87	53.1	M	50-150
13C6-Pentachlorophenol (ES)	1200	13.59	6.3	M	50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1**	Sampling Date	21-Mar-24
ALS Sample ID	L2755049-3	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041122.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.02	N/A	
3/4-Chlorophenol	8.36	N/A	
2,4/2,5-Dichlorophenol	7.85	<1000	U
2,3-Dichlorophenol	7.85	<1000	U
2,6-Dichlorophenol	9.06	<1000	U
3,5-Dichlorophenol	10.31	<1000	U
3,4-Dichlorophenol	10.57	2570	
2,3,5-Trichlorophenol	10.10	<60	U
2,4,6-Trichlorophenol	10.10	<60	U
2,4,5-Trichlorophenol	10.10	<60	U
2,3,4-Trichlorophenol	10.26	<60	U
2,3,6-Trichlorophenol	10.26	<60	U
3,4,5-Trichlorophenol	12.37	<60	U
2,3,5,6-Tetrachlorophenol	11.82	114	
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.88	205	
Pentachlorophenol	13.59	273	

Extraction Standards			**% Rec**	**Limits**
13C6-4-Chlorophenol (ES)	1200	8.38	0.2 M	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.11	1.1	50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.09	3.3	50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.87	31.5	50-150
13C6-Pentachlorophenol (ES)	1200	13.58	18.6	50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-4	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041118.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.01	N/A	
3/4-Chlorophenol	8.31	N/A	
2,4/2,5-Dichlorophenol	8.13	<500	U
2,3-Dichlorophenol	8.26	<500	U
2,6-Dichlorophenol	8.50	<500	U
3,5-Dichlorophenol	10.30	1210	
3,4-Dichlorophenol	10.56	1930	
2,3,5-Trichlorophenol	9.85	<60	U
2,4,6-Trichlorophenol	10.02	<60	U
2,4,5-Trichlorophenol	10.09	82.6	
2,3,4-Trichlorophenol	10.20	<60	U
2,3,6-Trichlorophenol	10.20	<60	U
3,4,5-Trichlorophenol	12.41	249	
2,3,5,6-Tetrachlorophenol	11.82	60.4	
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.87	146	M
Pentachlorophenol	13.58	215	

Extraction Standards			**% Rec**	**Limits**
13C6-4-Chlorophenol (ES)	1200	8.32	0.3	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.10	2	50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.09	30.7	50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.87	76	50-150
13C6-Pentachlorophenol (ES)	1200	13.58	33.7	50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-5	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041123.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS USR123112H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.02	N/A	
3/4-Chlorophenol	8.31	N/A	
2,4/2,5-Dichlorophenol	8.10	<1000	U
2,3-Dichlorophenol	8.26	<1000	U
2,6-Dichlorophenol	8.50	<1000	U
3,5-Dichlorophenol	10.31	<1000	U
3,4-Dichlorophenol	10.57	2940	
2,3,5-Trichlorophenol	9.86	<60	U
2,4,6-Trichlorophenol	10.03	<60	U
2,4,5-Trichlorophenol	10.10	<60	U
2,3,4-Trichlorophenol	10.10	<60	U
2,3,6-Trichlorophenol	10.31	<60	U
3,4,5-Trichlorophenol	12.43	1110	M
2,3,5,6-Tetrachlorophenol	11.83	72.6	
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.88	162	
Pentachlorophenol	13.58	1070	

Extraction Standards			**% Rec**		**Limits**
13C6-4-Chlorophenol (ES)	1200	8.35	0.2	M	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.11	0.4	M	50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.10	4.2		50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.87	38		50-150
13C6-Pentachlorophenol (ES)	1200	13.58	4.4		50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-6	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041124.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS USR123112H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.02	N/A	
3/4-Chlorophenol	8.31	N/A	
2,4/2,5-Dichlorophenol	8.15	<1000	U
2,3-Dichlorophenol	8.15	<1000	U
2,6-Dichlorophenol	8.50	<1000	U
3,5-Dichlorophenol	10.32	<1000	U
3,4-Dichlorophenol	10.57	1400	
2,3,5-Trichlorophenol	9.61	<60	U
2,4,6-Trichlorophenol	10.11	<60	U
2,4,5-Trichlorophenol	10.31	<60	U
2,3,4-Trichlorophenol	10.31	<60	U
2,3,6-Trichlorophenol	10.31	<60	U
3,4,5-Trichlorophenol	12.37	<60	U
2,3,5,6-Tetrachlorophenol	11.83	60.7	M
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.89	164	M
Pentachlorophenol	13.59	90.3	M

Extraction Standards			**% Rec**		**Limits**
13C6-4-Chlorophenol (ES)	1200	8.34	0.2	M	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.12	1.5		50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.10	3.1		50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.88	38.8		50-150
13C6-Pentachlorophenol (ES)	1200	13.59	51		50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2**	Sampling Date	21-Mar-24
ALS Sample ID	L2755049-7	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041125.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS USR123112H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.02	<1000	U
3/4-Chlorophenol	8.31	<1000	U
2,4/2,5-Dichlorophenol	8.15	<1000	U
2,3-Dichlorophenol	8.15	<1000	U
2,6-Dichlorophenol	8.50	<1000	U
3,5-Dichlorophenol	10.06	<1000	U
3,4-Dichlorophenol	10.58	1790	
2,3,5-Trichlorophenol	9.86	<60	U
2,4,6-Trichlorophenol	10.10	<60	U
2,4,5-Trichlorophenol	10.10	<60	U
2,3,4-Trichlorophenol	10.26	<60	U
2,3,6-Trichlorophenol	10.26	<60	U
3,4,5-Trichlorophenol	12.40	<60	U
2,3,5,6-Tetrachlorophenol	11.83	73.1	
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.88	173	M
Pentachlorophenol	13.59	107	

Extraction Standards			**% Rec**		**Limits**
13C6-4-Chlorophenol (ES)	1200	8.33	0.9	M	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.12	1.6	M	50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.10	2.5	M	50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.88	35.1	M	50-150
13C6-Pentachlorophenol (ES)	1200	13.59	37.2	M	50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-8	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041119.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS USR123112H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2-Chlorophenol	6.03	<100	U
3/4-Chlorophenol	8.33	<100	U
2,4/2,5-Dichlorophenol	8.12	<500	U
2,3-Dichlorophenol	8.21	<500	U
2,6-Dichlorophenol	8.50	<500	U
3,5-Dichlorophenol	10.31	856	
3,4-Dichlorophenol	10.56	1270	M
2,3,5-Trichlorophenol	9.86	<60	U
2,4,6-Trichlorophenol	10.02	<60	U
2,4,5-Trichlorophenol	10.10	86.4	
2,3,4-Trichlorophenol	10.22	<60	U
2,3,6-Trichlorophenol	10.34	<60	U
3,4,5-Trichlorophenol	12.41	251	
2,3,5,6-Tetrachlorophenol	11.83	64.9	
2,3,4,5/2,3,4,6-Tetrachlorophenol	11.87	124	M
Pentachlorophenol	13.58	247	

Extraction Standards			**% Rec**		**Limits**
13C6-4-Chlorophenol (ES)	1200	8.37	1.4	M	50-150
13C6-2,4-Dichlorophenol (ES)	1200	8.11	3.6	M	50-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.10	39.8	M	50-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.87	95.3	M	50-150
13C6-Pentachlorophenol (ES)	1200	13.58	33.8		50-150

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

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3788861-2	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041113.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS USR123112H

Target Analytes	**ug spiked**	**Ret. Time**	**% Recovery**	**Flags**	**Limits**
2-Chlorophenol	1000	6.10	121		50-150
2,4/2,5-Dichlorophenol	2000	8.10	60		50-150
2,6-Dichlorophenol	1000	8.48	68		50-150
2,4,6-Trichlorophenol	1000	10.02	18		50-150
2,4,5-Trichlorophenol	1000	10.07	113		50-150
2,3,5,6-Tetrachlorophenol	1000	11.82	99		50-150
2,3,4,5/2,3,4,6-Tetrachlorophenol	2000	11.86	80		50-150
Pentachlorophenol	1000	13.58	130		50-150
Extraction Standards			**% Rec**		**Limits**
13C6-4-Chlorophenol (ES)	1200	8.34	75.3		30-150
13C6-2,4-Dichlorophenol (ES)	1200	8.09	49.7		30-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.07	71		30-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.86	101.1		30-150
13C6-Pentachlorophenol (ES)	1200	13.58	54.9		30-150

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3788861-5	Extraction Date	3-Apr-24
Analysis Method	Chlorophenols by 8270E		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
19-Apr-2024

Run Information	**Run 1**
Filename	45394
Run Date	24041112.D
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS USR123112H

Target Analytes	**ug spiked**	**Ret. Time**	**% Recovery**	**Flags**	**Limits**
2-Chlorophenol	1000	6.01	64		50-150
2,4/2,5-Dichlorophenol	2000	8.11	62		50-150
2,6-Dichlorophenol	1000	8.48	58		50-150
2,4,6-Trichlorophenol	1000	10.02	53		50-150
2,4,5-Trichlorophenol	1000	10.09	174		50-150
2,3,5,6-Tetrachlorophenol	1000	11.82	46		50-150
2,3,4,5/2,3,4,6-Tetrachlorophenol	2000	11.87	61	M	50-150
Pentachlorophenol	1000	13.58	119		50-150
Extraction Standards			**% Rec**		**Limits**
13C6-4-Chlorophenol (ES)	1200	8.35	2.2	M	30-150
13C6-2,4-Dichlorophenol (ES)	1200	8.10	1.3		30-150
13C6-2,4,5-Trichlorophenol (ES)	1200	10.08	4.1		30-150
13C6-2,3,4,5-Tetrachlorophenol (ES)	1200	11.86	21		30-150
13C6-Pentachlorophenol (ES)	1200	13.58	8.2		30-150

M Indicates that a peak has been manually integrated.

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Rd.
ALS WO#:	L2755049		Mississauga, ON L5J2Y4
Date of Report	26-Apr-24		Canada
Date of Sample Receipt	22-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

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

Certified by:

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

Results in this certificate relate only to the samples as submitted to the laboratory.
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Sample Analysis Summary Report

Sample Name	Method Blank		24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1		24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1		24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1		24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1		24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2	
ALS Sample ID	WG3788861-1		L2755049-1		L2755049-2		L2755049-3		L2755049-4		L2755049-5	
Sample Size	1		1		1		1		1		1	
Sample units	Sample		Sample		Sample		Sample		Sample		Sample	
Moisture Content	n/a		n/a		n/a		n/a		n/a		n/a	
Matrix	QC		Stack		Stack		Stack		Stack		Stack	
Sampling Date	n/a		20-Mar-24		20-Mar-24		21-Mar-24		20-Mar-24		20-Mar-24	
Extraction Date	3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24	
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**	
Naphthalene	74.5		102	B	308	B	172	B	63.2	B	71.0	B
2-Methylnaphthalene	<12	U	38.3		123		96.5		14.6		22.1	
1-Methylnaphthalene	<12	U	26.8		71.3		54.8		<12	U	12.4	U
Acenaphthylene	<12	U	<12	U	15.8		<12	U	<12	U	<12	U
Acenaphthene	<12	U	<12	U	21.2		12.1		<12	U	<12	U
Fluorene	<12	U	39.1		60.2		55.1		<12	U	<12	U
Phenanthrene	<12	U	444		766		644		26.5		72.0	
Anthracene	<12	U	<12	U	17.3	M	<12	U	<12	U	<12	U
Fluoranthene	<12	U	71.8		153		88.3		<12	U	19.4	U
Pyrene	<12	U	98.4		150		75.8		<12	U	26.3	U
Benzo(a)Anthracene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
Chrysene/Triphenlyene	<12	U	<12	U	177		<12	U	<12	U	<12	U
Benzo(b)Fluoranthene	<12	U	<12	U	32.3	M	<12	U	<12	U	<12	U
Benzo(k)Fluoranthene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
Benzo(e)Pyrene	<12	U	<12	U	25.8		20.4	M	<12	U	<12	U
Benzo(a)Pyrene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
Perylene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
Indeno(1,2,3-cd)Pyrene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
Dibenzo(a,h/a,c)Anthracene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
Benzo(g,h,i)Perylene	<12	U	<12	U	<12	U	15.7	M	<12	U	34.7	U
Additional Analytes												
Tetralin	20.3		41.5	B	32.8	B	42.0	B	19.1	B	17.9	B
2-Chloronaphthalene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
Biphenyl	<12	U	41.2		89.6		458		<12	U	14.9	U
o-Terphenyl	<12	U	<12	U	12.0		17.5		<12	U	<12	U
1-Methylphenanthrene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
9-Methylphenanthrene	<12	U	27.7		67.7		42.0		<12	U	<12	U
2-methylanthracene	<12	U	<12	U	23.1		15.1		<12	U	<12	U
9,10-dimethylanthracene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
m-terphenyl	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
p-terphenyl	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
Benzo(a)fluorene	<12	U	<12	U	16.4	M	<12	U	<12	U	<12	U
Benzo(b)fluorene	<12	U	<12	U	<12	U	<12	U	<12	U	<12	U
7,12-Dimethylbenzo(a)anthracene	<12	U	<12	U	60.0		<12	U	<12	U	<12	U
3-Methylcholanthrene	<60	U	<60	U	<60	U	<60	U	<60	U	<60	U
Picene	<60	U	<60	U	<60	U	<60	U	<60	U	<60	U
Dibenzo(a,e)pyrene	<60	U	<60	U	<60	U	<60	U	<60	U	<60	U
Coronene	<60	U	<60	U	<60	U	<60	U	<60	U	<60	U
Field Sampling Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	NS		102.7		100.6		100.9		102		93.1	
Fluorene D10	NS		105.7		100.2		104.6		110.5		105.1	
Terphenyl D14(Surr.)	NS		89.5		109.4	M	99.3		116.8	M	91.6	M
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Naphthalene D8	53.9		80.8		78.4		73.2		50.7		66.2	
2-Methylnaphthalene-D10	42		83.8		82.6		76.7		50.5		74.5	
Acenaphthylene D8	36.9		84.3		79.9		75.3		38.3		63	
Phenanthrene D10	38.5		96.7		94.5		88.9		52.1		85.4	
Anthracene-D10	32.2		62.1		71.5		59.4		39.4	M	49.8	M
Fluoranthene D10	38.2		90.1		96		88.1		51.6		78.6	
Benz(a)Anthracene-D12	22.7		40.1		55.3		46.4		19.5		36.7	
Chrysene D12	23.5		59.6		69.2		61.5		36	M	56.9	M
Benzo(b)Fluoranthene-D12	37		52.7		60.4		49.8		35.3		46.1	
Benzo(k)Fluoranthene-D12	25.7		50.1		56.6		45.1		35.9	M	41.2	M
Benzo(a)Pyrene D12	32.6		58.3		61.9		57.1		59.2	M	57	M
Perylene D12	31.4		52.1		52.5		42.2		30.7		39.8	
Indeno(1,2,3,cd)Pyrene-D12	25.5		33.5		37.3		31.5		31.4	M	33.2	M
Dibenz(a,h)Anthracene-D14	19.7	M	27.3	M	40.5	M	30.9	M	27.9	M	30.6	M
Benzo(g,h,i)Perylene D12	25.2		50.2		53.4		46.2		33.6		46.5	

U	Indicates that this compound was not detected above the LOD.
M	Indicates that a peak has been manually integrated.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.
NS	Indicates that this compound was not spiked.

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2		24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2		24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2		Laboratory Control Sample	
ALS Sample ID	L2755049-6		L2755049-7		L2755049-8		WG3788861-2	
Sample Size	1		1		1		1	
Sample units	Sample		Sample		Sample		n/a	
Moisture Content	n/a		n/a		n/a		n/a	
Matrix	Stack		Stack		Stack		QC	
Sampling Date	20-Mar-24		21-Mar-24		20-Mar-24		n/a	
Extraction Date	3-Apr-24		3-Apr-24		3-Apr-24		3-Apr-24	
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**%**	
Naphthalene	117	B	79.2	B	43.7	B	92.2	
2-Methylnaphthalene	56.4		25.6		<12	U	92.5	
1-Methylnaphthalene	35.2		15.2		<12	U	97.8	
Acenaphthylene	16.0		<12	U	<12	U	101.8	
Acenaphthene	17.8		<12	U	<12	U	136.6	M
Fluorene	39.1		<12	U	<12	U	114.3	
Phenanthrene	656		118		<12	U	105.6	
Anthracene	13.1	M	<12	U	<12	U	103.7	
Fluoranthene	134		41.9		<12	U	108.8	
Pyrene	86.9		33.6		<12	U	116.3	
Benzo(a)Anthracene	<12	U	<12	U	<12	U	118.3	
Chrysene	49.3		19.5		<12	U	102.2	M
Benzo(b)Fluoranthene	34.0	M	18.7	M	<12	U	107	
Benzo(k)Fluoranthene	20.7	M	<12	U	<12	U	113.5	
Benzo(e)Pyrene	<12	U	<12	U	<12	U	115.3	
Benzo(a)Pyrene	<12	U	<12	U	<12	U	96.7	
Perylene	<12	U	<12	U	<12	U	106.4	
Indeno(1,2,3-cd)Pyrene	<12	U	<12	U	<12	U	102.5	
Dibenzo(a,h)Anthracene	<12	U	<12	U	<12	U	84.9	M
Benzo(g,h,i)Perylene	<12	U	<12	U	<12	U	112	
Additional Analytes								
Tetralin	79.9	B	61.6	B	15.6	B	NS	
2-Chloronaphthalene	<12	U	<12	U	<12	U	NS	
Biphenyl	59.8		33.8		<12	U	NS	
o-Terphenyl	15.5	M	<12	U	<12	U	NS	
1-Methylphenanthrene	<12	U	<12	U	<12	U	NS	
9-Methylphenanthrene	55.6		<12	U	<12	U	NS	
2-methylanthracene	18.7		<12	U	<12	U	NS	
9,10-dimethylanthracene	<12	U	<12	U	<12	U	NS	
m-terphenyl	<12	U	<12	U	<12	U	NS	
p-terphenyl	<12	U	<12	U	<12	U	NS	
Benzo(a)fluorene	<12	U	<12	U	<12	U	NS	
Benzo(b)fluorene	<12	U	<12	U	<12	U	NS	
7,12-Dimethylbenzo(a)anthracene	<12	U	<12	U	<12	U	NS	
3-Methylcholanthrene	<60	U	<60	U	<60	U	NS	
Picene	<60	U	<60	U	<60	U	NS	
Dibenzo(a,e)pyrene	<60	U	<60	U	<60	U	NS	
Coronene	<60	U	<60	U	<60	U	NS	
Field Sampling Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	97.6		96.3		101.5		NS	
Fluorene D10	93.6		96.4		123.8		NS	
Terphenyl D14(Surr.)	99.6		106		107.2	M	NS	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Naphthalene D8	86.2		62.9		75.5		91.7	
2-Methylnaphthalene-D10	89.2		69.9		84.1		87.5	
Acenaphthylene D8	88		65.7		76		74.3	
Phenanthrene D10	90.3		85		98.2		88.3	
Anthracene-D10	64.2		53.5		68.5	M	57.8	
Fluoranthene D10	100		93		84.3		83.1	
Benz(a)Anthracene-D12	65.9		68.5		30.4		42.9	M
Chrysene D12	72.8		77.7		50.4		68.1	
Benzo(b)Fluoranthene-D12	77.8		79.8		57.8		58.6	
Benzo(k)Fluoranthene-D12	71.9		72.7		51.4		63.4	
Benzo(a)Pyrene D12	60		66.9		49.5		60.3	
Perylene D12	45.2		57.6		46.5		64.6	
Indeno(1,2,3,cd)Pyrene-D12	46.8		66.9		42.1	M	51.9	
Dibenz(a,h)Anthracene-D14	39.8	M	52.2	M	42.8	M	46.5	M
Benzo(g,h,i)Perylene D12	62.1		66		56		72.5	

U	Indicates that this compound was not detected above the LOD.
M	Indicates that a peak has been manually integrated.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.
NS	Indicates that this compound was not spiked.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3788861-1	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24041211.D
Run Date	4/12/2024 21:30
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.87	74.5	
2-Methylnaphthalene	3.38	<12	U
1-Methylnaphthalene	3.50	<12	U
Acenaphthylene	4.43	<12	U
Acenaphthene	4.74	<12	U
Fluorene	5.56	<12	U
Phenanthrene	7.64	<12	U
Anthracene	7.76	<12	U
Fluoranthene	10.94	<12	U
Pyrene	11.57	<12	U
Benzo(a)Anthracene	15.47	<12	U
Chrysene	15.56	<12	U
Benzo(b)Fluoranthene	18.77	<12	U
Benzo(k)Fluoranthene	18.84	<12	U
Benzo(e)Pyrene	19.49	<12	U
Benzo(a)Pyrene	19.58	<12	U
Perylene	19.86	<12	U
Indeno(1,2,3-cd)Pyrene	23.00	<12	U
Dibenzo(a,h)Anthracene	23.20	<12	U
Benzo(g,h,i)Perylene	23.84	<12	U
Additional Analytes			
Tetralin	2.74	20.3	
2-Chloronaphthalene	3.89	<12	U
Biphenyl	3.87	<12	U
o-Terphenyl	8.89	<12	U
1-Methylphenanthrene	9.14	<12	U
9-Methylphenanthrene	9.26	<12	U
2-methylanthracene	9.32	<12	U
9,10-dimethylanthracene	11.81	<12	U
m-terphenyl	12.00	<12	U
p-terphenyl	12.47	<12	U
Benzo(a)fluorene	12.75	<12	U
Benzo(b)fluorene	12.95	<12	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<12	U
3-Methylcholanthrene	20.81	<60	U
Picene	22.83	<60	U
Dibenzo(a,e)pyrene	27.90	<60	U
Coronene	28.65	<60	U

Field Sampling Standards	**ng spiked**	**% Rec**
1-Methylnaphthalene-D10	0	NS
Fluorene D10	0	NS
Terphenyl D14(Surr.)	0	NS

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.85	53.9	50-150
2-Methylnaphthalene-D10	600	3.36	42.0	50-150
Acenaphthylene D8	600	4.41	36.9	50-150
Phenanthrene D10	600	7.59	38.5	50-150
Anthracene-D10	600	7.71	32.2	50-150
Fluoranthene D10	600	10.89	38.2	50-150
Benz(a)Anthracene-D12	600	15.39	22.7	50-150
Chrysene D12	600	15.50	23.5	50-150
Benzo(b)Fluoranthene-D12	600	18.71	37.0	50-150
Benzo(k)Fluoranthene-D12	600	18.80	25.7	50-150
Benzo(a)Pyrene D12	600	19.59	32.6	50-150
Perylene D12	600	19.82	31.4	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	22.91	25.5	50-150
Dibenz(a,h)Anthracene-D14	600	23.17	19.7 M	50-150
Benzo(g,h,i)Perylene D12	600	23.71	25.2	50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(1 THRU 5) TEST#1 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-1	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040910.D
Run Date	4/9/2024 18:16
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.89	102	B
2-Methylnaphthalene	3.42	38.3	
1-Methylnaphthalene	3.52	26.8	
Acenaphthylene	4.45	<12	U
Acenaphthene	4.72	<12	U
Fluorene	5.58	39.1	
Phenanthrene	7.67	444	
Anthracene	7.78	<12	U
Fluoranthene	10.98	71.8	
Pyrene	11.61	98.4	
Benzo(a)Anthracene	15.49	<12	U
Chrysene	15.60	<12	U
Benzo(b)Fluoranthene	18.79	<12	U
Benzo(k)Fluoranthene	18.88	<12	U
Benzo(e)Pyrene	19.55	<12	U
Benzo(a)Pyrene	19.68	<12	U
Perylene	20.00	<12	U
Indeno(1,2,3-cd)Pyrene	22.99	<12	U
Dibenzo(a,h)Anthracene	23.26	<12	U
Benzo(g,h,i)Perylene	23.86	<12	U
Additional Analytes			
Tetralin	2.77	41.5	B
2-Chloronaphthalene	3.93	<12	U
Biphenyl	3.90	41.2	
o-Terphenyl	8.92	<12	U
1-Methylphenanthrene	NotFnd	<12	U
9-Methylphenanthrene	9.29	27.7	
2-methylanthracene	9.35	<12	U
9,10-dimethylanthracene	11.84	<12	U
m-terphenyl	12.03	<12	U
p-terphenyl	12.51	<12	U
Benzo(a)fluorene	12.73	<12	U
Benzo(b)fluorene	12.99	<12	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<12	U
3-Methylcholanthrene	20.84	<60	U
Picene	23.49	<60	U
Dibenzo(a,e)pyrene	27.94	<60	U
Coronene	28.69	<60	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	600	3.49	102.7
Fluorene D10	600	5.53	105.7
Terphenyl D14(Surr.)	600	12.45	109.4

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.88	80.8	50-150
2-Methylnaphthalene-D10	600	3.39	83.8	50-150
Acenaphthylene D8	600	4.44	84.3	50-150
Phenanthrene D10	600	7.62	96.7	50-150
Anthracene-D10	600	7.74	62.1	50-150
Fluoranthene D10	600	10.93	90.1	50-150
Benz(a)Anthracene-D12	600	15.43	40.1	50-150
Chrysene D12	600	15.55	59.6	50-150
Benzo(b)Fluoranthene-D12	600	18.75	52.7	50-150
Benzo(k)Fluoranthene-D12	600	18.85	50.1	50-150
Benzo(a)Pyrene D12	600	19.63	58.3	50-150
Perylene D12	600	19.86	52.1	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	22.95	33.5	50-150
Dibenz(a,h)Anthracene-D14	600	23.23	27.3 M	50-150
Benzo(g,h,i)Perylene D12	600	23.78	50.2	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(6 THRU 10) TEST#2 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-2	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040911.D
Run Date	4/9/2024 18:58
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.88	308	B
2-Methylnaphthalene	3.42	123	
1-Methylnaphthalene	3.52	71.3	
Acenaphthylene	4.45	15.8	
Acenaphthene	4.72	21.2	
Fluorene	5.58	60.2	
Phenanthrene	7.67	766	
Anthracene	7.78	17.3	M
Fluoranthene	10.98	153	
Pyrene	11.61	150	
Benzo(a)Anthracene	15.49	<12	U
Chrysene	15.59	177	
Benzo(b)Fluoranthene	18.82	32.3	M
Benzo(k)Fluoranthene	18.89	<12	U
Benzo(e)Pyrene	19.55	25.8	
Benzo(a)Pyrene	NotFnd	<12	U
Perylene	NotFnd	<12	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<12	U
Dibenzo(a,h)Anthracene	NotFnd	<12	U
Benzo(g,h,i)Perylene	23.85	<12	U
Additional Analytes			
Tetralin	2.75	32.8	B
2-Chloronaphthalene	3.92	<12	U
Biphenyl	3.90	89.6	
o-Terphenyl	8.92	12.0	
1-Methylphenanthrene	NotFnd	<12	U
9-Methylphenanthrene	9.29	67.7	
2-methylanthracene	9.35	23.1	
9,10-dimethylanthracene	11.84	<12	U
m-terphenyl	12.03	<12	U
p-terphenyl	12.51	<12	U
Benzo(a)fluorene	12.73	16.4	M
Benzo(b)fluorene	13.06	<12	U
7,12-Dimethylbenzo(a)anthracene	18.82	60.0	
3-Methylcholanthrene	20.82	<60	U
Picene	23.17	<60	U
Dibenzo(a,e)pyrene	27.88	<60	U
Coronene	28.71	<60	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	600	3.49	100.6
Fluorene D10	600	5.53	100.2
Terphenyl D14(Surr.)	600	12.46	99.3 M

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.88	78.4	50-150
2-Methylnaphthalene-D10	600	3.39	82.6	50-150
Acenaphthylene D8	600	4.44	79.9	50-150
Phenanthrene D10	600	7.62	94.5	50-150
Anthracene-D10	600	7.74	71.5	50-150
Fluoranthene D10	600	10.93	96.0	50-150
Benz(a)Anthracene-D12	600	15.43	55.3	50-150
Chrysene D12	600	15.55	69.2	50-150
Benzo(b)Fluoranthene-D12	600	18.75	60.4	50-150
Benzo(k)Fluoranthene-D12	600	18.85	56.6	50-150
Benzo(a)Pyrene D12	600	19.63	61.9	50-150
Perylene D12	600	19.86	52.5	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	22.95	37.3	50-150
Dibenz(a,h)Anthracene-D14	600	23.33	40.5 M	50-150
Benzo(g,h,i)Perylene D12	600	23.78	53.4	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(11 THRU 15) TEST#3 APC OUTLET #1**	Sampling Date	21-Mar-24
ALS Sample ID	L2755049-3	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040912.D
Run Date	4/9/2024 19:40
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.88	172	B
2-Methylnaphthalene	3.42	96.5	
1-Methylnaphthalene	3.52	54.8	
Acenaphthylene	4.45	<12	U
Acenaphthene	4.72	12.1	
Fluorene	5.58	55.1	
Phenanthrene	7.67	644	
Anthracene	7.78	<12	U
Fluoranthene	10.98	88.3	
Pyrene	11.61	75.8	
Benzo(a)Anthracene	15.49	<12	U
Chrysene	15.60	<12	U
Benzo(b)Fluoranthene	18.81	<12	U
Benzo(k)Fluoranthene	18.81	<12	U
Benzo(e)Pyrene	19.55	20.4	M
Benzo(a)Pyrene	NotFnd	<12	U
Perylene	NotFnd	<12	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<12	U
Dibenzo(a,h)Anthracene	NotFnd	<12	U
Benzo(g,h,i)Perylene	23.85	15.7	M
Additional Analytes			
Tetralin	2.75	42.0	B
2-Chloronaphthalene	3.92	<12	U
Biphenyl	3.90	458	
o-Terphenyl	8.92	17.5	
1-Methylphenanthrene	NotFnd	<12	U
9-Methylphenanthrene	9.29	42.0	
2-methylanthracene	9.35	15.1	
9,10-dimethylanthracene	11.84	<12	U
m-terphenyl	12.03	<12	U
p-terphenyl	12.51	<12	U
Benzo(a)fluorene	12.73	<12	U
Benzo(b)fluorene	12.98	<12	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<12	U
3-Methylcholanthrene	20.83	<60	U
Picene	23.18	<60	U
Dibenzo(a,e)pyrene	27.91	<60	U
Coronene	28.72	<60	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	600	3.49	100.9
Fluorene D10	600	5.53	104.6
Terphenyl D14(Surr.)	600	12.45	116.8

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.88	73.2	50-150
2-Methylnaphthalene-D10	600	3.39	76.7	50-150
Acenaphthylene D8	600	4.44	75.3	50-150
Phenanthrene D10	600	7.62	88.9	50-150
Anthracene-D10	600	7.74	59.4	50-150
Fluoranthene D10	600	10.93	88.1	50-150
Benz(a)Anthracene-D12	600	15.43	46.4	50-150
Chrysene D12	600	15.55	61.5	50-150
Benzo(b)Fluoranthene-D12	600	18.75	49.8	50-150
Benzo(k)Fluoranthene-D12	600	18.85	45.1	50-150
Benzo(a)Pyrene D12	600	19.63	57.1	50-150
Perylene D12	600	19.86	42.2	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	22.95	31.5	50-150
Dibenz(a,h)Anthracene-D14	600	23.27	30.9 M	50-150
Benzo(g,h,i)Perylene D12	600	23.78	46.2	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(16 THRU 20) BLANK APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-4	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040908.D
Run Date	4/9/2024 16:52
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.88	63.2	B
2-Methylnaphthalene	3.42	14.6	
1-Methylnaphthalene	3.52	<12	U
Acenaphthylene	4.46	<12	U
Acenaphthene	4.73	<12	U
Fluorene	5.59	<12	U
Phenanthrene	7.68	26.5	
Anthracene	7.79	<12	U
Fluoranthene	10.99	<12	U
Pyrene	11.61	<12	U
Benzo(a)Anthracene	15.50	<12	U
Chrysene	15.62	<12	U
Benzo(b)Fluoranthene	18.87	<12	U
Benzo(k)Fluoranthene	18.88	<12	U
Benzo(e)Pyrene	19.47	<12	U
Benzo(a)Pyrene	19.65	<12	U
Perylene	19.93	<12	U
Indeno(1,2,3-cd)Pyrene	23.07	<12	U
Dibenzo(a,h)Anthracene	23.26	<12	U
Benzo(g,h,i)Perylene	23.89	<12	U
Additional Analytes			
Tetralin	2.76	19.1	B
2-Chloronaphthalene	3.88	<12	U
Biphenyl	3.91	<12	U
o-Terphenyl	8.93	<12	U
1-Methylphenanthrene	NotFnd	<12	U
9-Methylphenanthrene	9.29	<12	U
2-methylanthracene	9.36	<12	U
9,10-dimethylanthracene	NotFnd	<12	U
m-terphenyl	12.06	<12	U
p-terphenyl	12.51	<12	U
Benzo(a)fluorene	12.75	<12	U
Benzo(b)fluorene	13.01	<12	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<12	U
3-Methylcholanthrene	NotFnd	<60	U
Picene	NotFnd	<60	U
Dibenzo(a,e)pyrene	27.96	<60	U
Coronene	28.72	<60	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	600	3.49	102
Fluorene D10	600	5.54	110.5
Terphenyl D14(Surr.)	600	12.52	91.6 M

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.88	50.7	50-150
2-Methylnaphthalene-D10	600	3.39	50.5	50-150
Acenaphthylene D8	600	4.44	38.3	50-150
Phenanthrene D10	600	7.63	52.1	50-150
Anthracene-D10	600	7.76	39.4 M	50-150
Fluoranthene D10	600	10.94	51.6	50-150
Benz(a)Anthracene-D12	600	15.45	19.5	50-150
Chrysene D12	600	15.58	36.0 M	50-150
Benzo(b)Fluoranthene-D12	600	18.76	35.3	50-150
Benzo(k)Fluoranthene-D12	600	18.88	35.9 M	50-150
Benzo(a)Pyrene D12	600	19.64	59.2 M	50-150
Perylene D12	600	19.87	30.7	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	23.07	31.4 M	50-150
Dibenz(a,h)Anthracene-D14	600	23.81	27.9 M	50-150
Benzo(g,h,i)Perylene D12	600	23.80	33.6	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(21 THRU 25) TEST#1 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-5	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040913.D
Run Date	4/9/2024 20:22
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.88	71.0	B
2-Methylnaphthalene	3.42	22.1	
1-Methylnaphthalene	3.52	12.4	
Acenaphthylene	4.45	<12	U
Acenaphthene	4.73	<12	U
Fluorene	5.59	<12	U
Phenanthrene	7.67	72.0	
Anthracene	7.78	<12	U
Fluoranthene	10.98	19.4	
Pyrene	11.61	26.3	
Benzo(a)Anthracene	15.49	<12	U
Chrysene	15.60	<12	U
Benzo(b)Fluoranthene	18.81	<12	U
Benzo(k)Fluoranthene	18.87	<12	U
Benzo(e)Pyrene	19.55	<12	U
Benzo(a)Pyrene	NotFnd	<12	U
Perylene	NotFnd	<12	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<12	U
Dibenzo(a,h)Anthracene	NotFnd	<12	U
Benzo(g,h,i)Perylene	23.85	34.7	M
Additional Analytes			
Tetralin	2.75	17.9	B
2-Chloronaphthalene	3.92	<12	U
Biphenyl	3.90	14.9	M
o-Terphenyl	8.92	<12	U
1-Methylphenanthrene	NotFnd	<12	U
9-Methylphenanthrene	9.29	<12	U
2-methylanthracene	9.35	<12	U
9,10-dimethylanthracene	NotFnd	<12	U
m-terphenyl	12.04	<12	U
p-terphenyl	12.51	<12	U
Benzo(a)fluorene	12.71	<12	U
Benzo(b)fluorene	13.00	<12	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<12	U
3-Methylcholanthrene	NotFnd	<60	U
Picene	23.19	<60	U
Dibenzo(a,e)pyrene	27.90	<60	U
Coronene	28.70	<60	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	600	3.49	93.1
Fluorene D10	600	5.54	105.1
Terphenyl D14(Surr.)	600	12.46	99.6

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.88	66.2	50-150
2-Methylnaphthalene-D10	600	3.39	74.5	50-150
Acenaphthylene D8	600	4.44	63.0	50-150
Phenanthrene D10	600	7.62	85.4	50-150
Anthracene-D10	600	7.74	49.8	50-150
Fluoranthene D10	600	10.94	78.6	50-150
Benz(a)Anthracene-D12	600	15.43	36.7	50-150
Chrysene D12	600	15.55	56.9	50-150
Benzo(b)Fluoranthene-D12	600	18.75	46.1	50-150
Benzo(k)Fluoranthene-D12	600	18.85	41.2	50-150
Benzo(a)Pyrene D12	600	19.63	57.0	50-150
Perylene D12	600	19.86	39.8	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	22.95	33.2	50-150
Dibenz(a,h)Anthracene-D14	600	23.24	30.6 M	50-150
Benzo(g,h,i)Perylene D12	600	23.78	46.5	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(26 THRU 30) TEST#2 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-6	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040914.D
Run Date	4/9/2024 21:03
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.88	117	B
2-Methylnaphthalene	3.41	56.4	
1-Methylnaphthalene	3.51	35.2	
Acenaphthylene	4.45	16.0	
Acenaphthene	4.70	17.8	
Fluorene	5.58	39.1	
Phenanthrene	7.67	656	
Anthracene	7.78	13.1	M
Fluoranthene	10.98	134	
Pyrene	11.61	86.9	
Benzo(a)Anthracene	15.49	<12	U
Chrysene	15.60	49.3	
Benzo(b)Fluoranthene	18.81	34.0	M
Benzo(k)Fluoranthene	18.89	20.7	M
Benzo(e)Pyrene	19.54	<12	U
Benzo(a)Pyrene	NotFnd	<12	U
Perylene	NotFnd	<12	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<12	U
Dibenzo(a,h)Anthracene	NotFnd	<12	U
Benzo(g,h,i)Perylene	23.83	<12	U
Additional Analytes			
Tetralin	2.77	79.9	B
2-Chloronaphthalene	3.92	<12	U
Biphenyl	3.90	59.8	
o-Terphenyl	8.92	15.5	M
1-Methylphenanthrene	NotFnd	<12	U
9-Methylphenanthrene	9.29	55.6	
2-methylanthracene	9.35	18.7	
9,10-dimethylanthracene	11.85	<12	U
m-terphenyl	12.03	<12	U
p-terphenyl	12.51	<12	U
Benzo(a)fluorene	12.73	<12	U
Benzo(b)fluorene	NotFnd	<12	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<12	U
3-Methylcholanthrene	20.77	<60	U
Picene	23.17	<60	U
Dibenzo(a,e)pyrene	27.89	<60	U
Coronene	28.64	<60	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	600	3.48	97.6
Fluorene D10	600	5.53	93.6
Terphenyl D14(Surr.)	600	12.44	106

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.87	86.2	50-150
2-Methylnaphthalene-D10	600	3.39	89.2	50-150
Acenaphthylene D8	600	4.44	88.0	50-150
Phenanthrene D10	600	7.62	90.3	50-150
Anthracene-D10	600	7.74	64.2	50-150
Fluoranthene D10	600	10.93	100.0	50-150
Benz(a)Anthracene-D12	600	15.43	65.9	50-150
Chrysene D12	600	15.54	72.8	50-150
Benzo(b)Fluoranthene-D12	600	18.74	77.8	50-150
Benzo(k)Fluoranthene-D12	600	18.84	71.9	50-150
Benzo(a)Pyrene D12	600	19.63	60.0	50-150
Perylene D12	600	19.86	45.2	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	22.95	46.8	50-150
Dibenz(a,h)Anthracene-D14	600	23.19	39.8 M	50-150
Benzo(g,h,i)Perylene D12	600	23.77	62.1	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(31 THRU 35) TEST#3 APC OUTLET #2**	Sampling Date	21-Mar-24
ALS Sample ID	L2755049-7	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040915.D
Run Date	4/9/2024 21:45
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.89	79.2	B
2-Methylnaphthalene	3.42	25.6	
1-Methylnaphthalene	3.52	15.2	
Acenaphthylene	4.46	<12	U
Acenaphthene	4.73	<12	U
Fluorene	5.59	<12	U
Phenanthrene	7.67	118	
Anthracene	7.78	<12	U
Fluoranthene	10.98	41.9	
Pyrene	11.61	33.6	
Benzo(a)Anthracene	15.49	<12	U
Chrysene	15.60	19.5	
Benzo(b)Fluoranthene	18.81	18.7	M
Benzo(k)Fluoranthene	18.88	<12	U
Benzo(e)Pyrene	19.54	<12	U
Benzo(a)Pyrene	19.77	<12	U
Perylene	19.84	<12	U
Indeno(1,2,3-cd)Pyrene	22.97	<12	U
Dibenzo(a,h)Anthracene	23.27	<12	U
Benzo(g,h,i)Perylene	23.82	<12	U
Additional Analytes			
Tetralin	2.77	61.6	B
2-Chloronaphthalene	3.93	<12	U
Biphenyl	3.90	33.8	
o-Terphenyl	8.92	<12	U
1-Methylphenanthrene	NotFnd	<12	U
9-Methylphenanthrene	9.29	<12	U
2-methylanthracene	9.35	<12	U
9,10-dimethylanthracene	11.84	<12	U
m-terphenyl	12.03	<12	U
p-terphenyl	12.51	<12	U
Benzo(a)fluorene	12.73	<12	U
Benzo(b)fluorene	12.98	<12	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<12	U
3-Methylcholanthrene	NotFnd	<60	U
Picene	23.13	<60	U
Dibenzo(a,e)pyrene	27.92	<60	U
Coronene	28.70	<60	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	600	3.49	96.3
Fluorene D10	600	5.53	96.4
Terphenyl D14(Surr.)	600	12.45	107.2

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.88	62.9	50-150
2-Methylnaphthalene-D10	600	3.39	69.9	50-150
Acenaphthylene D8	600	4.44	65.7	50-150
Phenanthrene D10	600	7.62	85.0	50-150
Anthracene-D10	600	7.74	53.5	50-150
Fluoranthene D10	600	10.93	93.0	50-150
Benz(a)Anthracene-D12	600	15.43	68.5	50-150
Chrysene D12	600	15.54	77.7	50-150
Benzo(b)Fluoranthene-D12	600	18.74	79.8	50-150
Benzo(k)Fluoranthene-D12	600	18.84	72.7	50-150
Benzo(a)Pyrene D12	600	19.63	66.9	50-150
Perylene D12	600	19.86	57.6	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	22.96	66.9	50-150
Dibenz(a,h)Anthracene-D14	600	23.23	52.2 M	50-150
Benzo(g,h,i)Perylene D12	600	23.77	66.0	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-SVOC-(36 THRU 40) BLANK APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755049-8	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040909.D
Run Date	4/9/2024 17:34
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.89	43.7	B
2-Methylnaphthalene	3.42	<12	U
1-Methylnaphthalene	3.52	<12	U
Acenaphthylene	4.46	<12	U
Acenaphthene	4.73	<12	U
Fluorene	5.59	<12	U
Phenanthrene	7.68	<12	U
Anthracene	7.79	<12	U
Fluoranthene	10.98	<12	U
Pyrene	11.61	<12	U
Benzo(a)Anthracene	15.52	<12	U
Chrysene	15.62	<12	U
Benzo(b)Fluoranthene	18.81	<12	U
Benzo(k)Fluoranthene	18.90	<12	U
Benzo(e)Pyrene	19.55	<12	U
Benzo(a)Pyrene	19.69	<12	U
Perylene	19.84	<12	U
Indeno(1,2,3-cd)Pyrene	23.01	<12	U
Dibenzo(a,h)Anthracene	23.28	<12	U
Benzo(g,h,i)Perylene	23.86	<12	U
Additional Analytes			
Tetralin	2.75	15.6	B
2-Chloronaphthalene	NotFnd	<12	U
Biphenyl	3.91	<12	U
o-Terphenyl	8.92	<12	U
1-Methylphenanthrene	9.17	<12	U
9-Methylphenanthrene	9.29	<12	U
2-methylanthracene	9.36	<12	U
9,10-dimethylanthracene	NotFnd	<12	U
m-terphenyl	12.00	<12	U
p-terphenyl	12.51	<12	U
Benzo(a)fluorene	12.80	<12	U
Benzo(b)fluorene	13.01	<12	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<12	U
3-Methylcholanthrene	20.92	<60	U
Picene	NotFnd	<60	U
Dibenzo(a,e)pyrene	27.90	<60	U
Coronene	28.73	<60	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	600	3.49	101.5
Fluorene D10	600	5.54	123.8
Terphenyl D14(Surr.)	600	12.52	NS M

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	600	2.88	75.5	50-150
2-Methylnaphthalene-D10	600	3.39	84.1	50-150
Acenaphthylene D8	600	4.44	76.0	50-150
Phenanthrene D10	600	7.62	98.2	50-150
Anthracene-D10	600	7.75	68.5 M	50-150
Fluoranthene D10	600	10.94	84.3	50-150
Benz(a)Anthracene-D12	600	15.45	30.4	50-150
Chrysene D12	600	15.57	50.4	50-150
Benzo(b)Fluoranthene-D12	600	18.75	57.8	50-150
Benzo(k)Fluoranthene-D12	600	18.86	51.4	50-150
Benzo(a)Pyrene D12	600	19.64	49.5	50-150
Perylene D12	600	19.87	46.5	50-150
Indeno(1,2,3,cd)Pyrene-D12	600	23.02	42.1 M	50-150
Dibenz(a,h)Anthracene-D14	600	23.61	42.8 M	50-150
Benzo(g,h,i)Perylene D12	600	23.80	56.0	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3788861-2	Extraction Date	3-Apr-24
Analysis Method	PAH by CARB 429		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	6	Workgroup	WG3788861

Approved:
Nick Schrobilgen
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	24040904.D
Run Date	4/9/2024 14:04
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS US0587231H

Target Analytes	**ug spiked**	**Ret. Time**	**%**	**Flags**	**Limits**
Naphthalene	600	2.88	92.2		50-150
2-Methylnaphthalene	600	3.42	92.5		50-150
1-Methylnaphthalene	600	3.52	97.8		50-150
Acenaphthylene	600	4.45	101.8		50-150
Acenaphthene	600	4.72	136.6	M	50-150
Fluorene	600	5.59	114.3		50-150
Phenanthrene	600	7.67	105.6		50-150
Anthracene	600	7.79	103.7		50-150
Fluoranthene	600	10.98	108.8		50-150
Pyrene	600	11.61	116.3		50-150
Benzo(a)Anthracene	600	15.51	118.3		50-150
Chrysene	600	15.63	102.2	M	50-150
Benzo(b)Fluoranthene	600	18.81	107		50-150
Benzo(k)Fluoranthene	600	18.91	113.5		50-150
Benzo(e)Pyrene	600	19.55	115.3		50-150
Benzo(a)Pyrene	600	19.69	96.7		50-150
Perylene	600	19.93	106.4		50-150
Indeno(1,2,3-cd)Pyrene	600	23.06	102.5		50-150
Dibenzo(a,h)Anthracene	600	23.38	84.9	M	50-150
Benzo(g,h,i)Perylene	600	23.87	112		50-150
Additional Analytes					
Tetralin	0		NS		
2-Chloronaphthalene	0		NS		
Biphenyl	0		NS		
o-Terphenyl	0		NS		
1-Methylphenanthrene	0		NS		
9-Methylphenanthrene	0		NS		
2-methylanthracene	0		NS		
9,10-dimethylanthracene	0		NS		
m-terphenyl	0		NS		
p-terphenyl	0		NS		
Benzo(a)fluorene	0		NS		
Benzo(b)fluorene	0		NS		
7,12-Dimethylbenzo(a)anthracene	0		NS		
3-Methylcholanthrene	0		NS		
Picene	0		NS		
Dibenzo(a,e)pyrene	0		NS		
Coronene	0		NS		
Field Sampling Standards	**ng spiked**		**% Rec**		
1-Methylnaphthalene-D10	0		NS		
Fluorene D10	0		NS		
Terphenyl D14(Surr.)	0		NS		
Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	600	2.87	91.7		30-150
2-Methylnaphthalene-D10	600	3.39	87.5		30-150
Acenaphthylene D8	600	4.44	74.3		30-150
Phenanthrene D10	600	7.62	88.3		50-150
Anthracene-D10	600	7.74	57.8		50-150
Fluoranthene D10	600	10.94	83.1		50-150
Benz(a)Anthracene-D12	600	15.44	42.9	M	50-150
Chrysene D12	600	15.55	68.1		50-150
Benzo(b)Fluoranthene-D12	600	18.75	58.6		50-150
Benzo(k)Fluoranthene-D12	600	18.85	63.4		50-150
Benzo(a)Pyrene D12	600	19.64	60.3		30-150
Perylene D12	600	19.87	64.6		50-150
Indeno(1,2,3,cd)Pyrene-D12	600	22.97	51.9		50-150
Dibenz(a,h)Anthracene-D14	600	23.40	46.5	M	50-150
Benzo(g,h,i)Perylene D12	600	23.78	72.5		50-150

M	Indicates that a peak has been manually integrated.
NS	Indicates that this compound was not spiked.

APPENDIX 16

Acid Gas Recovery Data Sheets
(8 pages)

ORTECH Consulting Alliance Inc.
Method 26A Recovery Sheet

Client : Covanta DYEC
Project No.: 22327
Date: MAR 18/24
Test No.: 1
Test Location: UNIT 1

Filter is used but not recovered as sample

QZ 108011

Impingers 1, 2, 3

Impinger #1 0.1 N H_2SO_4	
Empty Wt:	619.0
Initial Wt:	720.0
Final Wt:	853.8
1 Gain:	133.8
Colour:	clear

Impinger #2 0.1 N H_2SO_4	
Empty Wt:	640.0
Initial Wt:	740.0
Final Wt:	768.8
2 Gain:	28.8
Colour:	clear

Impinger #3 EMPTY	
Empty Wt:	607.5
Final Wt:	610.5
3 Gain:	3.0
Colour:	clear

CONTAINER TS3 WEIGHTS	
Empty Wt:	284.0
With Imp. 1,2,3 Soln:	648.0
After Rinse:	748.0
Total TS3:	464.0

Impinger 4

Impinger #4 Silica Gel	
Initial Wt:	951.3
Final Wt:	963.0
4 Gain:	11.7

Box ID:

CWTR = 1+2+3: 165.6

WCBDA= 4: 11.7

SAMPLE ID: 24-22327-M26A- 1

Train Loaded By:
Train Recovered By: DT

ORTECH Consulting Alliance Inc.
Method 26A Recovery Sheet

Client :	Covanta DYEC
Project No.:	22327
Date:	MAR 18/24
Test No.:	2
Test Location:	UNIT 1

Filter is used but not recovered as sample

Impingers 1, 2, 3

	Impinger #1 0.1 N H_2SO_4	
	Empty Wt:	694.8
	Initial Wt:	744.5
	Final Wt:	886.0
1	Gain:	141.5
	Colour:	CLEAR

	Impinger #2 0.1 N H_2SO_4	
	Empty Wt:	654.5
	Initial Wt:	756.0
	Final Wt:	785.2
2	Gain:	29.2
	Colour:	

	Impinger #3 EMPTY	
	Empty Wt:	595.7
	Final Wt:	600.7
3	Gain:	5.0
	Colour:	CLEAR

CONTAINER TS3 WEIGHTS	
Empty Wt:	284.0
With Imp. 1,2,3 Soln:	657.0
After Rinse:	714.0
Total TS3:	430.0

Impinger 4

	Impinger #4 Silica Gel	
	Initial Wt:	976.0
	Final Wt:	988.5
4	Gain:	12.5

Box ID:

CWTR = 1+2+3:	175.7
WCBDA= 4:	12.5

SAMPLE ID: 24-22327-M26A- 2

Train Loaded By: DJ

Train Recovered By: DJ

ORTECH Consulting Alliance Inc.
Method 26A Recovery Sheet

Client : Covanta DYEC
Project No.: 22327
Date: MAR 18/24
Test No.: 3
Test Location: UNIT 1

Filter is used but not recovered as sample

Impingers 1, 2, 3

Impinger #1 0.1 N H_2SO_4	
Empty Wt:	619.0
Initial Wt:	719.5
Final Wt:	864.0
1 Gain:	144.5
Colour:	clear

Impinger #2 0.1 N H_2SO_4	
Empty Wt:	640.0
Initial Wt:	743.0
Final Wt:	776.0
2 Gain:	33.0
Colour:	clear

Impinger #3 EMPTY	
Empty Wt:	607.5
Final Wt:	614.0
3 Gain:	6.5
Colour:	clear

CONTAINER TS3 WEIGHTS	
Empty Wt:	284.5
With Imp. 1,2,3 Soln:	668.0
After Rinse:	768.0
Total TS3:	483.5

Impinger 4

Impinger #4 Silica Gel	
Initial Wt:	963.0
Final Wt:	976.8
4 Gain:	13.8

Box ID:

CWTR = 1+2+3: 184.0

WCBDA= 4: 13.8

SAMPLE ID: 24-22327-M26A- 3

Train Loaded By:
Train Recovered By:

ORTECH Consulting Alliance Inc.
Method 26A Recovery Sheet

Client : Covanta DYEC
Project No.: 22327
Date: MAR 18/24
Test No.: BLANK 1
Test Location:

Filter is used but not recovered as sample

Impingers 1, 2, 3

Impinger #1 0.1 N H_2SO_4	
Empty Wt:	
Initial Wt:	
Final Wt:	
1 Gain:	
Colour:	

Impinger #2 0.1 N H_2SO_4	
Empty Wt:	
Initial Wt:	
Final Wt:	
2 Gain:	
Colour:	

Impinger #3 EMPTY	
Empty Wt:	
Final Wt:	
3 Gain:	
Colour:	

CONTAINER TS3 WEIGHTS	
Empty Wt:	284.4
With Imp. 1,2,3 Soln:	486.7
After Rinse:	~~59~~ 590.8
Total TS3:	306.4

Impinger 4

Impinger #4 Silica Gel	
Initial Wt:	
Final Wt:	
4 Gain:	

Box ID:

CWTR = 1+2+3:	
WCBDA= 4:	

SAMPLE ID: 24-22327-M26A- BLANK 1

Train Loaded By: DT
Train Recovered By:

ORTECH Consulting Alliance Inc.
Method 26A Recovery Sheet

Client :	Covanta DYEC
Project No.:	22327
Date:	MAR 19/24
Test No.:	1
Test Location:	UNIT 2

Filter is used but not recovered as sample

Impingers 1, 2, 3

	Impinger #1 0.1 N H_2SO_4	
	Empty Wt:	645.0
	Initial Wt:	745.5
	Final Wt:	906.6
1	Gain:	161.1
	Colour:	Clear

	Impinger #2 0.1 N H_2SO_4	
	Empty Wt:	654.0
	Initial Wt:	755.0
	Final Wt:	787.7
2	Gain:	32.7
	Colour:	Clear

	Impinger #3 EMPTY	
	Empty Wt:	596.0
	Final Wt:	600.0
3	Gain:	4.0
	Colour:	Clear

CONTAINER TS3 WEIGHTS	
Empty Wt:	284.0
With Imp. 1,2,3 Soln:	679.0
After Rinse:	776.0
Total TS3:	492.0

Impinger 4

	Impinger #4 Silica Gel	
	Initial Wt:	988.5
	Final Wt:	998.5
4	Gain:	10.0

Box ID:

CWTR = 1+2+3:	197.8
WCBDA= 4:	10.0

SAMPLE ID: 24-22327-M26A- 4

Train Loaded By:

Train Recovered By:

ORTECH Consulting Alliance Inc.
Method 26A Recovery Sheet

Client :	Covanta DYEC
Project No.:	22327
Date:	MAR 19/24
Test No.:	2
Test Location:	UNIT 2

Filter is used but not recovered as sample

Impingers 1, 2, 3

	Impinger #1 0.1 N H_2SO_4	
	Empty Wt:	619.0
	Initial Wt:	719.5
	Final Wt:	853.5
1	Gain:	134.0
	Colour:	Clear

	Impinger #2 0.1 N H_2SO_4	
	Empty Wt:	640.0
	Initial Wt:	740.5
	Final Wt:	765.5
2	Gain:	25.0
	Colour:	Clear

	Impinger #3 EMPTY	
	Empty Wt:	606.7
	Final Wt:	610.0
3	Gain:	3.3
	Colour:	Clear

CONTAINER TS3 WEIGHTS	
Empty Wt:	285.5
With Imp. 1,2,3 Soln:	644.5
After Rinse:	748.0
Total TS3:	462.5

Impinger 4

	Impinger #4 Silica Gel	
	Initial Wt:	976.8
	Final Wt:	987.5
4	Gain:	10.7

Box ID:

CWTR = 1+2+3:	162.3
WCBDA= 4:	10.7

SAMPLE ID: 24-22327-M26A- 5

Train Loaded By: DT

Train Recovered By:

ORTECH Consulting Alliance Inc.
Method 26A Recovery Sheet

Client :	Covanta DYEC
Project No.:	22327
Date:	MAR 19/24
Test No.:	3
Test Location:	UNIT 2

Filter is used but not recovered as sample

Impingers 1, 2, 3

	Impinger #1 0.1 N H_2SO_4	
	Empty Wt:	644.8
	Initial Wt:	746.5
	Final Wt:	882.0
1	Gain:	134.5
	Colour:	clear

	Impinger #2 0.1 N H_2SO_4	
	Empty Wt:	653.5
	Initial Wt:	753.5
	Final Wt:	782.0
2	Gain:	28.5
	Colour:	clear

	Impinger #3 EMPTY	
	Empty Wt:	596.0
	Final Wt:	599.5
3	Gain:	3.5
	Colour:	clear

CONTAINER TS3 WEIGHTS	
Empty Wt:	284.0
With Imp. 1,2,3 Soln:	647.8
After Rinse:	750.5
Total TS3:	466.5

Impinger 4

	Impinger #4 Silica Gel	
	Initial Wt:	928.3
	Final Wt:	941.3
4	Gain:	13.0

Box ID:

CWTR = 1+2+3:	167.5
WCBDA= 4:	13.0

SAMPLE ID: 24-22327-M26A- 6

Train Loaded By:

Train Recovered By: DT

ORTECH Consulting Alliance Inc.
Method 26A Recovery Sheet

Client : Covanta DYEC
Project No.: 22327
Date: MAR 19/24
Test No.:
Test Location: BLANK 2

Filter is used but not recovered as sample

Impingers 1, 2, 3

Impinger #1 0.1 N H_2SO_4	
Empty Wt:	
Initial Wt:	
Final Wt:	
1 Gain:	
Colour:	

Impinger #2 0.1 N H_2SO_4	
Empty Wt:	
Initial Wt:	
Final Wt:	
2 Gain:	
Colour:	

Impinger #3 EMPTY	
Empty Wt:	
Final Wt:	
3 Gain:	
Colour:	

CONTAINER TS3 WEIGHTS	
Empty Wt:	282.0
With Imp. 1,2,3 Soln:	482.0
After Rinse:	582.0
Total TS3:	300.0

Impinger 4

Impinger #4 Silica Gel	
Initial Wt:	
Final Wt:	
4 Gain:	

Box ID:

CWTR = 1+2+3:

WCBDA= 4:

SAMPLE ID: 24-22327-M26A- BLANK2

Train Loaded By:
Train Recovered By: DT

APPENDIX 17

VOST Analytical Report
(21 pages)

Your P.O. #: 22327-J2965
Your Project #: 22327
Site Location: COVANTA

Attention: CHRIS BELORE

ORTECH Environmental
804 Southdown Road
Mississauga, ON
CANADA L5J 2Y4

Report Date: 2024/04/03
Report #: R8091609
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C485503
Received: 2024/03/21, 14:40

Sample Matrix: Stack Sampling Train
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
VOST EPA5041A, 8260D for 0030, 0031	9	N/A	2024/03/27	BRL SOP-00302	EPA5041A, 8260D

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Your P.O. #: 22327-J2965
Your Project #: 22327
Site Location: COVANTA

Attention: CHRIS BELORE

ORTECH Environmental
804 Southdown Road
Mississauga, ON
CANADA L5J 2Y4

Report Date: 2024/04/03
Report #: R8091609
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C485503
Received: 2024/03/21, 14:40

Encryption Key

Julian Tong
Project Manager Assistant
03 Apr 2024 16:24:03

Please direct all questions regarding this Certificate of Analysis to:
Julian Tong, Project Manager Assistant
Email: Julian.Tong@bureauveritas.com
Phone# (905) 817-5700

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Bureau Veritas ID		YRV186	YRV187	YRV188			
Sampling Date		2024/03/20	2024/03/20	2024/03/20			
	UNITS	**23-22327-#1-5A/B FIELD BLK**	**23-22327-#1- 1A/B-T1**	**23-22327-#1- 2A/B -T2**	**RDL**	**MDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug	<0.050	<0.050	<0.050	0.050	0.020	9299664
Vinyl Chloride	ug	<0.050	<0.050	<0.050	0.050	0.013	9299664
Bromomethane	ug	<0.050	<0.050	<0.050	0.050	0.015	9299664
Trichlorofluoromethane (FREON 11)	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Acetone (2-Propanone)	ug	<0.050	0.087	0.075	0.050	0.025	9299664
1,1-Dichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Methylene Chloride(Dichloromethane)	ug	<0.050	0.100	0.119	0.050	0.020	9299664
trans-1,2-Dichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Chloroform	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
1,2-Dichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.0070	9299664
Methyl Ethyl Ketone (2-Butanone)	ug	<0.050	<0.050	<0.050	0.050	0.036	9299664
1,1,1-Trichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
Carbon Tetrachloride	ug	<0.050	<0.050	<0.050	0.050	0.016	9299664
Benzene	ug	<0.050	<0.050	<0.050	0.050	0.0010	9299664
1,1,2-Trichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.016	9299664
1,2-Dichloropropane	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Trichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Bromodichloromethane	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Dibromochloromethane	ug	<0.050	<0.050	<0.050	0.050	0.0090	9299664
Toluene	ug	0.769	1.37	0.070	0.050	0.014	9299664
Ethylene Dibromide	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Tetrachloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.018	9299664
Chlorobenzene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Ethylbenzene	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
m / p-Xylene	ug	<0.10	<0.10	<0.10	0.10	0.015	9299664
Styrene	ug	<0.050	<0.050	<0.050	0.050	0.012	9299664
o-Xylene	ug	<0.050	<0.050	<0.050	0.050	0.015	9299664
Bromoform	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
Surrogate Recovery (%)							
Bromofluorobenzene	%	98	101	101	N/A	N/A	9299664
D10-Ethylbenzene (FS)	%	112	112	102	N/A	N/A	9299664
D4-1,2-Dichloroethane	%	103	102	102	N/A	N/A	9299664
D8-Toluene	%	100	99	98	N/A	N/A	9299664

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Bureau Veritas ID		YRV189	YRV193	YRV194			
Sampling Date		2024/03/20	2024/03/20	2024/03/20			
	UNITS	**23-22327-#1- 3A/B-T3**	**23-22327-#2- 11A/B-T1**	**23-22327-#2- 12A/B-T2**	**RDL**	**MDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug	<0.050	<0.050	<0.050	0.050	0.020	9299664
Vinyl Chloride	ug	<0.050	<0.050	<0.050	0.050	0.013	9299664
Bromomethane	ug	<0.050	<0.050	<0.050	0.050	0.015	9299664
Trichlorofluoromethane (FREON 11)	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Acetone (2-Propanone)	ug	0.078	0.108	0.087	0.050	0.025	9299664
1,1-Dichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Methylene Chloride(Dichloromethane)	ug	0.097	0.051	<0.050	0.050	0.020	9299664
trans-1,2-Dichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Chloroform	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
1,2-Dichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.0070	9299664
Methyl Ethyl Ketone (2-Butanone)	ug	<0.050	<0.050	<0.050	0.050	0.036	9299664
1,1,1-Trichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
Carbon Tetrachloride	ug	<0.050	<0.050	<0.050	0.050	0.016	9299664
Benzene	ug	<0.050	<0.050	<0.050	0.050	0.0010	9299664
1,1,2-Trichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.016	9299664
1,2-Dichloropropane	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Trichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Bromodichloromethane	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Dibromochloromethane	ug	<0.050	<0.050	<0.050	0.050	0.0090	9299664
Toluene	ug	0.484	7.39	5.70	0.050	0.014	9299664
Ethylene Dibromide	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Tetrachloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.018	9299664
Chlorobenzene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Ethylbenzene	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
m / p-Xylene	ug	<0.10	0.11	<0.10	0.10	0.015	9299664
Styrene	ug	<0.050	<0.050	<0.050	0.050	0.012	9299664
o-Xylene	ug	<0.050	<0.050	<0.050	0.050	0.015	9299664
Bromoform	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
Surrogate Recovery (%)							
Bromofluorobenzene	%	99	101	103	N/A	N/A	9299664
D10-Ethylbenzene (FS)	%	105	100	112	N/A	N/A	9299664
D4-1,2-Dichloroethane	%	103	98	102	N/A	N/A	9299664
D8-Toluene	%	99	95	95	N/A	N/A	9299664

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Bureau Veritas ID		YRV195	YRY656	YRY657			
Sampling Date		2024/03/20	2024/03/20				
	UNITS	**23-22327-#2- 13A/B-T3**	**23-22327-#2-16A/B FIELD BLK**	**23-22327-#2-15A/B TRIP BLANK**	**RDL**	**MDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug	<0.050	<0.050	<0.050	0.050	0.020	9299664
Vinyl Chloride	ug	<0.050	<0.050	<0.050	0.050	0.013	9299664
Bromomethane	ug	<0.050	<0.050	<0.050	0.050	0.015	9299664
Trichlorofluoromethane (FREON 11)	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Acetone (2-Propanone)	ug	<0.050	<0.050	<0.050	0.050	0.025	9299664
1,1-Dichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Methylene Chloride(Dichloromethane)	ug	<0.050	<0.050	<0.050	0.050	0.020	9299664
trans-1,2-Dichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Chloroform	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
1,2-Dichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.0070	9299664
Methyl Ethyl Ketone (2-Butanone)	ug	<0.050	<0.050	<0.050	0.050	0.036	9299664
1,1,1-Trichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
Carbon Tetrachloride	ug	<0.050	<0.050	<0.050	0.050	0.016	9299664
Benzene	ug	<0.050	<0.050	<0.050	0.050	0.0010	9299664
1,1,2-Trichloroethane	ug	<0.050	<0.050	<0.050	0.050	0.016	9299664
1,2-Dichloropropane	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Trichloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Bromodichloromethane	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Dibromochloromethane	ug	<0.050	<0.050	<0.050	0.050	0.0090	9299664
Toluene	ug	4.19	<0.050	<0.050	0.050	0.014	9299664
Ethylene Dibromide	ug	<0.050	<0.050	<0.050	0.050	0.010	9299664
Tetrachloroethylene	ug	<0.050	<0.050	<0.050	0.050	0.018	9299664
Chlorobenzene	ug	<0.050	<0.050	<0.050	0.050	0.011	9299664
Ethylbenzene	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
m / p-Xylene	ug	<0.10	<0.10	<0.10	0.10	0.015	9299664
Styrene	ug	<0.050	<0.050	<0.050	0.050	0.012	9299664
o-Xylene	ug	<0.050	<0.050	<0.050	0.050	0.015	9299664
Bromoform	ug	<0.050	<0.050	<0.050	0.050	0.014	9299664
Surrogate Recovery (%)							
Bromofluorobenzene	%	98	96	89	N/A	N/A	9299664
D10-Ethylbenzene (FS)	%	106	118	99	N/A	N/A	9299664
D4-1,2-Dichloroethane	%	103	104	104	N/A	N/A	9299664
D8-Toluene	%	97	99	100	N/A	N/A	9299664

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

TEST SUMMARY

Bureau Veritas ID: YRV186
Sample ID: 23-22327-#1-5A/B FIELD BLK
Matrix: Stack Sampling Train
Collected: 2024/03/20
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

Bureau Veritas ID: YRV187
Sample ID: 23-22327-#1- 1A/B- T1
Matrix: Stack Sampling Train
Collected: 2024/03/20
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

Bureau Veritas ID: YRV188
Sample ID: 23-22327-#1- 2A/B -T2
Matrix: Stack Sampling Train
Collected: 2024/03/20
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

Bureau Veritas ID: YRV189
Sample ID: 23-22327-#1- 3A/B- T3
Matrix: Stack Sampling Train
Collected: 2024/03/20
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

Bureau Veritas ID: YRV193
Sample ID: 23-22327-#2- 11A/B- T1
Matrix: Stack Sampling Train
Collected: 2024/03/20
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

Bureau Veritas ID: YRV194
Sample ID: 23-22327-#2- 12A/B- T2
Matrix: Stack Sampling Train
Collected: 2024/03/20
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

Bureau Veritas ID: YRV195
Sample ID: 23-22327-#2- 13A/B- T3
Matrix: Stack Sampling Train
Collected: 2024/03/20
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

TEST SUMMARY

Bureau Veritas ID: YRY656
Sample ID: 23-22327-#2-16A/B FIELD BLK
Matrix: Stack Sampling Train

Collected: 2024/03/20
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

Bureau Veritas ID: YRY657
Sample ID: 23-22327-#2-15A/B TRIP BLANK
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2024/03/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9299664	N/A	2024/03/27	Yujie Yan

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

GENERAL COMMENTS

In the continuing calibration standard 2-butanone exceeded the acceptance limit of 40%.

Sample YRV187 [23-22327-#1- 1A/B- T1] : Toluene is over the calibration range. Data should be considered an estimate only.

Sample YRV193 [23-22327-#2- 11A/B- T1] : Toluene is over the calibration range. Data should be considered an estimate only.

Sample YRV194 [23-22327-#2- 12A/B- T2] : Toluene is over the calibration range. Data should be considered an estimate only.

Sample YRV195 [23-22327-#2- 13A/B- T3] : Toluene is over the calibration range. Data should be considered an estimate only.

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
9299664	YYA	Spiked Blank	Bromofluorobenzene	2024/03/27		100	%	43 - 131
			D10-Ethylbenzene (FS)	2024/03/27		107	%	47 - 157
			D4-1,2-Dichloroethane	2024/03/27		99	%	64 - 133
			D8-Toluene	2024/03/27		99	%	68 - 121
			Dichlorodifluoromethane (FREON 12)	2024/03/27		96	%	50 - 150
			Vinyl Chloride	2024/03/27		110	%	50 - 150
			Bromomethane	2024/03/27		120	%	50 - 150
			Trichlorofluoromethane (FREON 11)	2024/03/27		101	%	50 - 150
			Acetone (2-Propanone)	2024/03/27		112	%	50 - 150
			1,1-Dichloroethylene	2024/03/27		117	%	50 - 150
			Methylene Chloride(Dichloromethane)	2024/03/27		108	%	50 - 150
			trans-1,2-Dichloroethylene	2024/03/27		109	%	50 - 150
			Chloroform	2024/03/27		110	%	50 - 150
			1,2-Dichloroethane	2024/03/27		108	%	50 - 150
			Methyl Ethyl Ketone (2-Butanone)	2024/03/27		104	%	50 - 150
			1,1,1-Trichloroethane	2024/03/27		107	%	50 - 150
			Carbon Tetrachloride	2024/03/27		111	%	50 - 150
			Benzene	2024/03/27		109	%	50 - 150
			1,1,2-Trichloroethane	2024/03/27		105	%	50 - 150
			1,2-Dichloropropane	2024/03/27		108	%	50 - 150
			Trichloroethylene	2024/03/27		107	%	50 - 150
			Bromodichloromethane	2024/03/27		108	%	50 - 150
			Dibromochloromethane	2024/03/27		113	%	50 - 150
			Toluene	2024/03/27		106	%	50 - 150
			Ethylene Dibromide	2024/03/27		107	%	50 - 150
			Tetrachloroethylene	2024/03/27		107	%	50 - 150
			Chlorobenzene	2024/03/27		105	%	50 - 150
			Ethylbenzene	2024/03/27		107	%	50 - 150
			m / p-Xylene	2024/03/27		107	%	50 - 150
			Styrene	2024/03/27		108	%	50 - 150
			o-Xylene	2024/03/27		106	%	50 - 150
			Bromoform	2024/03/27		109	%	50 - 150
9299664	YYA	Method Blank	Bromofluorobenzene	2024/03/27		98	%	43 - 131
			D10-Ethylbenzene (FS)	2024/03/27		103	%	47 - 157
			D4-1,2-Dichloroethane	2024/03/27		103	%	64 - 133
			D8-Toluene	2024/03/27		100	%	68 - 121
			Dichlorodifluoromethane (FREON 12)	2024/03/27	<0.050		ug	
			Vinyl Chloride	2024/03/27	<0.050		ug	
			Bromomethane	2024/03/27	<0.050		ug	
			Trichlorofluoromethane (FREON 11)	2024/03/27	<0.050		ug	
			Acetone (2-Propanone)	2024/03/27	<0.050		ug	
			1,1-Dichloroethylene	2024/03/27	<0.050		ug	
			Methylene Chloride(Dichloromethane)	2024/03/27	<0.050		ug	
			trans-1,2-Dichloroethylene	2024/03/27	<0.050		ug	
			Chloroform	2024/03/27	<0.050		ug	
			1,2-Dichloroethane	2024/03/27	<0.050		ug	
			Methyl Ethyl Ketone (2-Butanone)	2024/03/27	<0.050		ug	
			1,1,1-Trichloroethane	2024/03/27	<0.050		ug	
			Carbon Tetrachloride	2024/03/27	<0.050		ug	
			Benzene	2024/03/27	<0.050		ug	
			1,1,2-Trichloroethane	2024/03/27	<0.050		ug	

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2-Dichloropropane	2024/03/27	<0.050		ug	
			Trichloroethylene	2024/03/27	<0.050		ug	
			Bromodichloromethane	2024/03/27	<0.050		ug	
			Dibromochloromethane	2024/03/27	<0.050		ug	
			Toluene	2024/03/27	<0.050		ug	
			Ethylene Dibromide	2024/03/27	<0.050		ug	
			Tetrachloroethylene	2024/03/27	<0.050		ug	
			Chlorobenzene	2024/03/27	<0.050		ug	
			Ethylbenzene	2024/03/27	<0.050		ug	
			m / p-Xylene	2024/03/27	<0.10		ug	
			Styrene	2024/03/27	<0.050		ug	
			o-Xylene	2024/03/27	<0.050		ug	
			Bromoform	2024/03/27	<0.050		ug	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C485503
Report Date: 2024/04/03

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anke Macfarlane, Laboratory Manager, VOC

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: Method Blank

Field ID#: Method Blank

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRV186

Field ID#: 23-22327-#1-5A/B FIELD BLANK

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRV187

Field ID#: 23-22327-#1-1A/B T1

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRV188

Field ID#: 23-22327-#1-2A/B T2

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRV189

Field ID#: 23-22327-#1-3A/B T3

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRV193

Field ID#: 23-22327-#2-11A/B T1

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRV194

Field ID#: 23-22327-#2-12A/B T2

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRV195

Field ID#: 23-22327-#2-13A/B T3

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRY656

Field ID#: 23-22327-#2-16A/B FIELD BLANK

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: YRY657

Field ID#: 23-22327-#2-15A/B TRIP BLANK

Number of TICs found:_____NA_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.05ug			
2.		Cumene < 0.05ug			
3.		1,3,5-Trimethylbenzene < 0.05 ug			
4.		Trichlorotrifluoroethane < 0.05ug			

APPENDIX 18

Aldehydes Recovery Data Sheet
(1 page)

ORTECH Consulting Alliance Inc. - Recovery & Sample Log
NCASI Method ISS/FP-A105.01

Client: Covanata DYEC
Job/Report Number: 22327
Received By: Chris Belore
How Received: Train Recovery
Job Assigned To: ALS
Quote / PO #: 22327-J2964

L2755050-COFC

Test Number	Test Location	ORTECH Sample ID 24-22327-	Date Sampled	ID of BHA Sample Bottle	Empty Weight BHA Sample Bottle (g)	Initial Weight Sample Bottle + BHA (g)	Final Weight of BHA Sample Bottle (g)	Weight of Sample Bottle BHA & H2O (g)	Weight of Sample Bottle BHA & H2O & Hexane (g)
1	APC Outlet #1	ALD-1	March 20, 2024	ALD-1	112.9	163.0	178.3	191.6	197.6
2	APC Outlet #1	ALD-2		ALD-2	113.1	163.3	179.7	190.6	195.9
3	APC Outlet #1	ALD-3		ALD-3	112.5	162.8	179.3	193.1	197.7
Blank 1	APC Outlet #1	Blank 1		ALD-4	112.9	163.6	163.6	172.8	181.4
1	APC Outlet #2	ALD-5		ALD-5	113.1	163.0	165.0	176.6	187.1
2	APC Outlet #2	ALD-6		ALD-6	111.6	161.7	164.8	176.1	186.0
3	APC Outlet #2	ALD-7		ALD-7	113.2	163.4	166.3	177.4	192.4
Blank 2	APC Outlet #2	Blank 2		ALD-8	112.2	162.2	162.2	174.8	187.2
	Field BHA&Spike		na	na	na	na	na	na	na
	BHA Blank		na	na	na	na	na	na	na

Analyze each sample for Acetaldehyde, Formaldehyde, Acrolein.

Relinquished by: Brayden Pashew Date: 3/22/24

Relinquished to: Aaron Burton Date: 3/22/24 10:00 5.2°C

APPENDIX 19

Aldehydes Analytical Report
(15 pages)

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2755050		Mississauga, ON L5J 2Y4
Date of Report	23-Apr-24		Canada
Date of Sample Receipt	22-Mar-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **Aldehydes as benzyloxime derivatives by SIM GC/MS**

The laboratory method and field blanks all showed levels of formaldehyde similar to the levels in the samples. Therefore formaldehyde levels in the field samples are suspect to be false positives and represent maximum possible levels.

Acetaldehyde and acrolein in the laboratory method blank was much higher than in any of the samples. Clearly this method blank shows significant contamination and for acetaldehyde and acrolein not representive of the field samples.
The second field blank showed low levels of acetaldehyde at levels similar to the field samples. Therefore acetaldyhde levels in the field samples are suspected to be false postives and represent maximum possible values.

Low acrolein recoveries on the field spike indicates significant losses of this target on transportation of lab to field and return.

Certified by: _____
Ron McLeod, PhD
Laboratory Manager and Technical Director

Results in this certificate relate only to the samples as submitted to the laboratory.
This report shall not be reproduced, except in full, without the written permission of ALS Canada Ltd.

ALS Environmental

Sample Analysis Summary Report

Sample Name	Method Blank		24-22327-ALD-1 TEST#1 APC OUTLET #1		24-22327-ALD-2 TEST#2 APC OUTLET #1		24-22327-ALD-3 TEST#3 APC OUTLET #1		24-22327-ALD-BLANK1 APC OUTLET #1		24-22327-ALD-5 TEST#1 APC OUTLET #2	
ALS Sample ID	WG3788859-1		L2755050-1		L2755050-2		L2755050-3		L2755050-4		L2755050-5	
Sample Size	1		1		1		1		1		1	
Sample units	Sample		Train		Train		Train		Train		Train	
Moisture Content	n/a		n/a		n/a		n/a		n/a		n/a	
Matrix	QC		Stack		Stack		Stack		Stack		Stack	
Sampling Date	n/a		20-Mar-24		20-Mar-24		20-Mar-24		20-Mar-24		20-Mar-24	
Extraction Date	2-Apr-24		2-Apr-24		2-Apr-24		2-Apr-24		2-Apr-24		2-Apr-24	
Target Analytes	**ug/Train**		**ug/Train**		**ug/Train**		**ug/Train**		**ug/Train**		**ug/Train**	
Formaldehyde	5.44	B	12	B	1.88	B	7.72	B	8.92	B	6.54	B
Acetaldehyde	12.63		0.37	B	0.44	B	0.33	B	<0.1	U	0.44	B
Acrolein	0.21		<0.1	U	<0.1	U	<0.1		<0.1	U	<0.1	U

U Indicates that this compound was not detected above the LOD.

B Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Environmental

Sample Analysis Summary Report

Sample Name	24-22327-ALD-6 TEST#2 APC OUTLET #2		24-22327-ALD-7 TEST#3 APC OUTLET #2		24-22327-ALD-BLANK2 APC OUTLET #2		FIELD BHA+SPIKE	BHA BLANK		Laboratory Control Sample (10ug)
ALS Sample ID	L2755050-6		L2755050-7		L2755050-8		L2755050-9	L2755050-10		WG3788859-2
Sample Size	1		1		1		1	1		1
Sample units	Train		Train		Train		Train	Train		n/a
Moisture Content	n/a		n/a		n/a		n/a	n/a		n/a
Matrix	Stack		Stack		Stack		Stack	Stack		QC
Sampling Date	20-Mar-24		20-Mar-24		20-Mar-24		n/a	n/a		n/a
Extraction Date	2-Apr-24		2-Apr-24		2-Apr-24		2-Apr-24	2-Apr-24		2-Apr-24
Target Analytes	**ug/Train**		**ug/Train**		**ug/Train**		**% Rec**	**ug/Train**		**% Rec**
Formaldehyde	6.81	B	7.23	B	10.2	B	130	5.28	B	51
Acetaldehyde	0.34	B	0.34	B	0.38	B	124	<0.1	U	146
Acrolein	<0.1	U	<0.1	U	<0.1	U	5	<0.1	U	81

U Indicates that this compound was not detected above the LOD.

B Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3788859-1	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	Blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 01:22:27
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.86	5.44	M	
Acetaldehyde (B)	13.76	6.06	M	
Acetaldehyde (A)	14.11	6.57		
Acrolein (A)	18.29	<0.1	U	
Acrolein (B)	19.38	0.21		

Total Aldehydes	**ug/Train**
Formaldehyde	5.44
Acetaldehyde	12.6
Acrolein	0.21

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-ALD-1 TEST#1 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-1	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 05:32:20
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.84	12	M B	
Acetaldehyde (B)	13.58	<0.1	U	
Acetaldehyde (A)	14.44	0.37	B	
Acrolein (A)	NotFnd	<0.1	U	
Acrolein (B)	NotFnd	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	12
Acetaldehyde	0.37
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-ALD-2 TEST#2 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-2	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 06:13:59
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.72	1.88	M B	
Acetaldehyde (B)	13.58	<0.1	U	
Acetaldehyde (A)	14.44	0.44	B	
Acrolein (A)	18.27	<0.1	U	
Acrolein (B)	19.37	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	1.88
Acetaldehyde	0.44
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-ALD-3 TEST#3 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-3	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 06:55:39
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.80	7.72	M	B
Acetaldehyde (B)	13.58	<0.1	U	
Acetaldehyde (A)	14.44	0.33		B
Acrolein (A)	18.27	<0.1	U	
Acrolein (B)	19.37	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	7.72
Acetaldehyde	0.33
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-ALD-BLANK1 APC OUTLET #1**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-4	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	Sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 04:09:00
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.82	8.92	M	B
Acetaldehyde (B)	13.55	<0.1	U	
Acetaldehyde (A)	14.55	<0.1	U	
Acrolein (A)	NotFnd	<0.1	U	
Acrolein (B)	NotFnd	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	8.92
Acetaldehyde	<0.1
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-ALD-5 TEST#1 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-5	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 07:37:19
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.82	6.54	M	B
Acetaldehyde (B)	13.53	<0.1	U	
Acetaldehyde (A)	14.44	0.44		B
Acrolein (A)	18.27	<0.1	U	
Acrolein (B)	19.36	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	6.54
Acetaldehyde	0.44
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-ALD-6 TEST#2 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-6	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 08:18:57
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.82	6.81	M	B
Acetaldehyde (B)	13.59	<0.1	U	
Acetaldehyde (A)	14.44	0.34		B
Acrolein (A)	18.28	<0.1	U	
Acrolein (B)	19.37	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	6.81
Acetaldehyde	0.34
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-ALD-7 TEST#3 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-7	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 09:00:37
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.82	7.23	M	B
Acetaldehyde (B)	13.58	<0.1	U	
Acetaldehyde (A)	14.44	0.34		B
Acrolein (A)	18.28	<0.1	U	
Acrolein (B)	19.37	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	7.23
Acetaldehyde	0.34
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**24-22327-ALD-BLANK2 APC OUTLET #2**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-8	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type			
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 04:50:40
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.82	10.2	M	B
Acetaldehyde (B)	13.56	<0.1	U	
Acetaldehyde (A)	14.44	0.38		B
Acrolein (A)	NotFnd	<0.1	U	
Acrolein (B)	NotFnd	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	10.2
Acetaldehyde	0.38
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**FIELD BHA+SPIKE**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-9	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 02:04:06
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**ug spiked**	**Ret. Time**	**% Rec**	**Flags**	**Limits**
Formaldehyde	10	8.83	130	M B	
Acetaldehyde (B)	10	13.80	60	M B	
Acetaldehyde (A)	10	14.15	64	B	
Acrolein (A)	10	18.30	1	B	
Acrolein (B)	10	19.39	4	B	
Total Aldehydes					
Formaldehyde			130		50-150
Acetaldehyde			124		50-150
Acrolein			5		50-150

M Indicates that a peak has been manually integrated.

B Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**BHA BLANK**	Sampling Date	20-Mar-24
ALS Sample ID	L2755050-10	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	12-Apr-24 03:27:22
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**Ret. Time**	**Concentration ug/Train**	**Flags**	**Limits**
Formaldehyde	8.86	5.28	M	B
Acetaldehyde (B)	NotFnd	<0.1	U	
Acetaldehyde (A)	13.62	<0.1	U	
Acrolein (A)	NotFnd	<0.1	U	
Acrolein (B)	19.82	<0.1	U	

Total Aldehydes	**ug/Train**
Formaldehyde	5.28
Acetaldehyde	<0.1
Acrolein	<0.1

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

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Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3788859-2	Extraction Date	2-Apr-24
Analysis Method	SIM GC/MS/MS		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 Train		
Percent Moisture	n/a		
Split Ratio	5		

Approved:
Andrew Reid
--e-signature--
15-Apr-2024

Run Information	**Run 1**
Filename	
Run Date	11-Apr-24 23:17:35
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ug/Train
Instrument	TSQ-1
Column	Rtx-200 1610862

Target Analytes	**ug spiked**	**Ret. Time**	**% Rec**	**Flags**	**Limits**
Formaldehyde	10	8.82	51	M	
Acetaldehyde (B)	10	13.74	74	M	
Acetaldehyde (A)	10	14.09	72		
Acrolein (A)	10	18.26	48		
Acrolein (B)	10	19.36	33		
Total Aldehydes					
Formaldehyde			51		50-150
Acetaldehyde			146		50-150
Acrolein			81		50-150

M Indicates that a peak has been manually integrated.

APPENDIX 20

SVOC, Aldehydes and VOST Proof Data
(20 pages)

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2754554		Mississauga, ON L5J 2Y4
Date of Report	18-Mar-24		Canada
Date of Sample Receipt	9-Feb-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **PCB Congeners by EPA 1668C**

PCB Congener Group Totals and Total PCB are a sum of detected values, including EMPC values, consistent with USEPA CLP SOW CBC1.2

Glassware is approved for PCB analysis.
RM 2024-Mar-18

Certified by: _____
Sabrina Jin
Technical Specialist

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Sample Analysis Summary Report

Sample Name	**GLASSWARE PROOF**
ALS Sample ID	L2754554-40
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	16-Feb-24

Target Analytes	**pg**
PCB-081	<6.5
PCB-077	15.0
PCB-123	<4.8
PCB-118	287
PCB-114	<5.2
PCB-105	88.0
PCB-126	<5.2
PCB-167	<3.2
PCB-156/157	<4.6
PCB-169	<4.0
PCB-189	<3.5

Extraction Standards	**% Rec**
13C12-PCB-081	102
13C12-PCB-077	105
13C12-PCB-123	110
13C12-PCB-118	109
13C12-PCB-114	96
13C12-PCB-105	99
13C12-PCB-126	103
13C12-PCB-167	116
13C12-PCB-156/157	103
13C12-PCB-169	108
13C12-PCB-189	74

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCB TEQ	0.0128
Mid Point PCB TEQ	0.334
Upper Bound PCB TEQ	0.655

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3788443-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	16-Feb-24

Target Analytes	pg
PCB-081	<1.9
PCB-077	<1.9
PCB-123	<1.8
PCB-118	<1.7
PCB-114	<1.8
PCB-105	<1.7
PCB-126	<1.8
PCB-167	<1.2
PCB-156/157	<1.6
PCB-169	<1.4
PCB-189	<1.3
Extraction Standards	**% Rec**
13C12-PCB-081	107
13C12-PCB-077	108
13C12-PCB-123	112
13C12-PCB-118	113
13C12-PCB-114	109
13C12-PCB-105	116
13C12-PCB-126	117
13C12-PCB-167	99
13C12-PCB-156/157	95
13C12-PCB-169	100
13C12-PCB-189	83

Toxic Equivalency - (WHO 2005)	pg
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.112
Upper Bound PCB TEQ	0.223

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Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2754554		Mississauga, ON L5J 2Y4
Date of Report	28-Feb-24		Canada
Date of Sample Receipt	9-Feb-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **PCDD/F by EPA M23**

Glassware is approved for DX analysis.

Certified by: _____
Sabrina Jin
Technical Specialist

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ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank	GLASSWARE PROOF
ALS Sample ID	WG3788443-1	L2754554-40
Sample Size	1	1
Sample size units	sample	sample
Percent Moisture	n/a	n/a
Sample Matrix	QC	Media prep
Sampling Date	n/a	n/a
Extraction Date	21-Feb-24	21-Feb-24
Target Analytes	**pg**	**pg**
2,3,7,8-TCDD	<0.084	<0.34
1,2,3,7,8-PeCDD	<0.19	<0.61
1,2,3,4,7,8-HxCDD	<0.37	<0.81
1,2,3,6,7,8-HxCDD	<0.35	<0.76
1,2,3,7,8,9-HxCDD	<0.29	<0.81
1,2,3,4,6,7,8-HpCDD	<0.36	<1.0
OCDD	<0.76	<2.6
2,3,7,8-TCDF	<0.11	<0.25
1,2,3,7,8-PeCDF	0.187	<0.78
2,3,4,7,8-PeCDF	<0.10	<0.69
1,2,3,4,7,8-HxCDF	<0.21	<0.34
1,2,3,6,7,8-HxCDF	<0.22	<0.38
2,3,4,6,7,8-HxCDF	<0.22	<0.38
1,2,3,7,8,9-HxCDF	<0.26	<0.38
1,2,3,4,6,7,8-HpCDF	<0.25	<0.49
1,2,3,4,7,8,9-HpCDF	<0.16	<0.31
OCDF	<0.49	<0.86
Extraction Standards		
13C12-2,3,7,8-TCDD	88	85
13C12-1,2,3,7,8-PeCDD	98	85
13C12-1,2,3,6,7,8-HxCDD	88	73
13C12-1,2,3,4,6,7,8-HpCDD	93	84
13C12-OCDD	82	64
13C12-2,3,7,8-TCDF	90	82
13C12-1,2,3,7,8-PeCDF	97	92
13C12-1,2,3,6,7,8-HxCDF	84	80
13C12-1,2,3,4,6,7,8-HpCDF	72	76
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.00561	0.00
Mid Point PCDD/F TEQ (WHO 2005)	0.263	0.805
Upper Bound PCDD/F TEQ (WHO 2005)	0.521	1.61

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Rd.
ALS WO#:	L2754554		Mississauga, ON L5J 2Y4
Date of Report	18-Mar-24		Canada
Date of Sample Receipt	9-Feb-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

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

Glassware is approved for PAH analysis.
RM 2024-Mar-18

Certified by: _____
Sabrina Jin
Technical Specialist

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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3788443-1		L2754554-40	
Sample Size	1		1	
Sample units	sample		sample	
Moisture Content	n/a		n/a	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	21-Feb-24		21-Feb-24	
Target Analytes	**ng/sample**		**ng/sample**	
Naphthalene	<12	U	18.7	
2-Methylnaphthalene	<12	U	<12	U
1-Methylnaphthalene	<12	U	<12	U
Acenaphthylene	<12	U	<12	U
Acenaphthene	<12	U	<12	U
Fluorene	<12	U	<12	U
Phenanthrene	<12	U	18.7	M
Anthracene	<12	U	<12	U
Fluoranthene	<12	U	<12	U
Pyrene	<12	U	<12	U
Benzo(a)Anthracene	<12	U	<12	U
Chrysene/Triphenlyene	<12	U	<12	U
Benzo(b)Fluoranthene	<12	U	<12	U
Benzo(k)Fluoranthene	<12	U	<12	U
Benzo(e)Pyrene	<12	U	<12	U
Benzo(a)Pyrene	<12	U	<12	U
Perylene	<12	U	<12	U
Indeno(1,2,3-cd)Pyrene	<12	U	<12	U
Dibenzo(a,h/a,c)Anthracene	<12	U	<12	U
Benzo(g,h,i)Perylene	<12	U	<12	U
Additional Analytes				
Tetralin	35.9	M	40.6	
2-Chloronaphthalene	<12	U	<12	U
Biphenyl	<12	U	<12	U
o-Terphenyl	<12	U	<12	U
1-Methylphenanthrene	<12	U	<12	U
9-Methylphenanthrene	<12	U	<12	U
2-methylanthracene	<12	U	<12	U
9,10-dimethylanthracene	<12	U	<12	U
m-terphenyl	<12	U	<12	U
p-terphenyl	<12	U	<12	U
Benzo(a)fluorene	<12	U	<12	U
Benzo(b)fluorene	<12	U	<12	U
7,12-Dimethylbenzo(a)anthracene	<12	U	<12	U
3-Methylcholanthrene	<60	U	<60	U
Picene	<60	U	<60	U
Dibenzo(a,e)pyrene	<60	U	<60	U
Coronene	<60	U	<60	U
Extraction Standards	**% Rec**		**% Rec**	
Naphthalene D8	98.4		82.3	
2-Methylnaphthalene-D10	96.1		84.8	
Acenaphthylene D8	82.5		85.8	
Phenanthrene D10	123.6		99.4	
Anthracene-D10	103.7		101.1	
Fluoranthene D10	105.4		101.2	
Benz(a)Anthracene-D12	64.4		107.6	
Chrysene D12	83.5		86.2	
Benzo(b)Fluoranthene-D12	93.7		125.5	
Benzo(k)Fluoranthene-D12	81.9		106.5	
Benzo(a)Pyrene D12	69.9		91.7	
Perylene D12	62.4		99	
Indeno(1,2,3,cd)Pyrene-D12	80.6		121.1	
Dibenz(a,h)Anthracene-D14	82		111.1	
Benzo(g,h,i)Perylene D12	95.9		122.2	

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

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Rd.
ALS WO#:	L2754554		Mississauga, ON L5J 2Y4
Date of Report	18-Mar-24		Canada
Date of Sample Receipt	9-Feb-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **Chlorophenols by modifed EPA 8270E**

Certified by: _____
Ron McLeod, Ph.D.
Technical Director

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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3788443-1		L2754554-40	
Sample Size	1		1	
Sample units	sample		sample	
Moisture Content	n/a		n/a	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	21-Feb-24		21-Feb-24	
Target Analytes	**ng/sample**		**ng/sample**	
2-Chlorophenol	<60	U	<60	U
3/4-Chlorophenol	<60	U	<60	U
2,4/2,5-Dichlorophenol	<60	U	<60	U
2,3-Dichlorophenol	<60	U	<60	U
2,6-Dichlorophenol	<60	U	<60	U
3,5-Dichlorophenol	<60	U	<60	U
3,4-Dichlorophenol	<60	U	<60	U
2,3,5-Trichlorophenol	<60	U	<60	U
2,4,6-Trichlorophenol	<60	U	<60	U
2,4,5-Trichlorophenol	<60	U	<60	U
2,3,4-Trichlorophenol	<60	U	<60	U
2,3,6-Trichlorophenol	<60	U	<60	U
3,4,5-Trichlorophenol	<60	U	<60	U
2,3,5,6-Tetrachlorophenol	<60	U	<60	U
2,3,4,5/2,3,4,6-Tetrachlorophenol	<60	U	<60	U
Pentachlorophenol	<60	U	<60	U
Extraction Standards	**% Rec**		**% Rec**	
13C6-4-Chlorophenol (ES)	85.0		83.3	
13C6-2,4-Dichlorophenol (ES)	85.4		77.8	
13C6-2,4,5-Trichlorophenol (ES)	85.0		83.0	
13C6-2,3,4,5-Tetrachlorophenol (ES)	64.4		67.1	
13C6-Pentachlorophenol (ES)	27.7		28.0	M

U Indicates that this compound was not detected above the LOD.

M Indicates that a peak has been manually integrated.

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Rd.
ALS WO#:	L2754554		Mississauga, ON L5J 2Y4
Date of Report	18-Mar-24		Canada
Date of Sample Receipt	9-Feb-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **CB by HRGC/SRM QQQ - Isotope dilution**

Glassware is approved for CB analysis.

Certified by: _____
Sabrina Jin
Technical Specialist

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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3788443-1		L2754554-40	
Sample Size	1		1	
Sample units	sample		sample	
Moisture Content	n/a		n/a	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	21-Feb-24		21-Feb-24	
Target Analytes	**ng/sample**		**ng/sample**	
Chlorobenzene	<12	U	<12	U
1,3-Dichlorobenzene	<12	U	<12	U
1,4-Dichlorobenzene	<12	U	<12	U
1,2-Dichlorobenzene	<12	U	<12	U
1,3,5-Trichlorobenzene	<12	U	<12	U
1,2,4-Trichlorobenzene	<12	U	<12	U
1,2,3-Trichlorobenzene	<12	U	<12	U
1,2,3,5/1,2,4,5-Tetrachlorobenzene	<12	U	<12	U
1,2,3,4-Tetrachlorobenzene	<12	U	<12	U
Pentachlorobenzene	<12	U	<12	U
Hexachlorobenzene	<12	U	<12	U
Extraction Standards	**%Rec**		**%Rec**	
13C6-Chlorobenzene	61		56	
13C6-1,4-Dichlorobenzene	84		78	
13C6-1,2,3-Trichlorobenzene	85		83	
13C6-1,2,3,4-Tetrachlorobenzene	84		84	
13C6-Pentachlorobenzene	90		93	
13C6-Hexachlorobenzene	90		96	

U Indicates that this compound was not detected above the LOD.

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2754554		Mississauga, ON L5J 2Y4
Date of Report	19-Mar-24		Canada
Date of Sample Receipt	9-Feb-24	**Client Contact:**	Chris Belore
		Client Project ID:	22327 Covanta

COMMENTS: **Aldehydes as benzyloxime derivatives by SIM GC/MS**

Target analytes were not detcted in the proof. Reagent approved for the collection of samples for analysis of the reported targets

Certified by:

Steve Kennedy
Technical Supervisor

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ALS Environmental

Sample Analysis Summary Report

Sample Name	Method Blank		BHA PROOF	
ALS Sample ID	WG3788791-1		L2754554-59	
Sample Size	1		1	
Sample units	n/a		Train	
Moisture Content	n/a		n/a	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	18-Mar-24		18-Mar-24	
Target Analytes	**ug/sample**		**ug/sample**	
Formaldehyde	<0.01	U	<0.01	U
Acetaldehyde	<0.01	U	<0.01	U
Acrolein	<0.01	U	<0.01	U

U Indicates that this compound was not detected above the LOD.

Your P.O. #: 22327-J2965
Your Project #: 22327
Site#: MEDIA PREP
Site Location: COVANTA

Attention: Chris Belore

ORTECH Environmental
804 Southdown Road
Mississauga, ON
CANADA L5J 2Y4

Report Date: 2024/03/13
Report #: R8064080
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C439106
Received: 2024/02/08, 14:36

Sample Matrix: Air Sampling Media
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
VOST EPA5041A, 8260D for 0030, 0031	1	N/A	2024/03/12	BRL SOP-00302	EPA5041A, 8260D

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Your P.O. #: 22327-J2965
Your Project #: 22327
Site#: MEDIA PREP
Site Location: COVANTA

Attention: Chris Belore

ORTECH Environmental
804 Southdown Road
Mississauga, ON
CANADA L5J 2Y4

Report Date: 2024/03/13
Report #: R8064080
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C439106
Received: 2024/02/08, 14:36

Encryption Key

Julian Tong
Project Manager Assistant
13 Mar 2024 11:56:06

Please direct all questions regarding this Certificate of Analysis to:
Julian Tong, Project Manager Assistant
Email: Julian.Tong@bureauveritas.com
Phone# (905) 817-5700

==========

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Bureau Veritas Job #: C439106
Report Date: 2024/03/13

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Bureau Veritas ID		YIF061			
Sampling Date		2024/02/08 15:10			
	UNITS	VOST PROOF 1-16	RDL	MDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ug	<0.050	0.050	0.020	9268820
Chloromethane	ug	<0.050	0.050	0.015	9268820
Vinyl Chloride	ug	<0.050	0.050	0.013	9268820
Bromomethane	ug	<0.050	0.050	0.015	9268820
Chloroethane	ug	<0.050	0.050	0.0090	9268820
Trichlorofluoromethane (FREON 11)	ug	<0.050	0.050	0.010	9268820
Acetone (2-Propanone)	ug	<0.050	0.050	0.025	9268820
1,1-Dichloroethylene	ug	<0.050	0.050	0.011	9268820
Iodomethane	ug	<0.050	0.050	0.015	9268820
Carbon Disulfide	ug	<0.050	0.050	0.026	9268820
Methylene Chloride(Dichloromethane)	ug	<0.050	0.050	0.020	9268820
1,1-Dichloroethane	ug	<0.050	0.050	0.012	9268820
trans-1,2-Dichloroethylene	ug	<0.050	0.050	0.010	9268820
cis-1,2-Dichloroethylene	ug	<0.050	0.050	0.010	9268820
Chloroform	ug	<0.050	0.050	0.011	9268820
1,2-Dichloroethane	ug	<0.050	0.050	0.0070	9268820
Methyl Ethyl Ketone (2-Butanone)	ug	<0.050	0.050	0.036	9268820
1,1,1-Trichloroethane	ug	<0.050	0.050	0.014	9268820
Carbon Tetrachloride	ug	<0.050	0.050	0.016	9268820
Benzene	ug	<0.050	0.050	0.0010	9268820
1,1,2-Trichloroethane	ug	<0.050	0.050	0.016	9268820
1,2-Dichloropropane	ug	<0.050	0.050	0.011	9268820
Trichloroethylene	ug	<0.050	0.050	0.011	9268820
Dibromomethane	ug	<0.050	0.050	0.010	9268820
Bromodichloromethane	ug	<0.050	0.050	0.011	9268820
cis-1,3-Dichloropropene	ug	<0.050	0.050	0.010	9268820
trans-1,3-Dichloropropene	ug	<0.050	0.050	0.0070	9268820
Dibromochloromethane	ug	<0.050	0.050	0.0090	9268820
Methyl Isobutyl Ketone	ug	<0.050	0.050	0.019	9268820
Methyl Butyl Ketone (2-Hexanone)	ug	<0.050	0.050	0.031	9268820
Toluene	ug	<0.050	0.050	0.014	9268820
Ethylene Dibromide	ug	<0.050	0.050	0.010	9268820
Tetrachloroethylene	ug	<0.050	0.050	0.018	9268820
Chlorobenzene	ug	<0.050	0.050	0.011	9268820

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C439106
Report Date: 2024/03/13

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Bureau Veritas ID		YIF061			
Sampling Date		2024/02/08 15:10			
	UNITS	**VOST PROOF 1-16**	**RDL**	**MDL**	**QC Batch**
1,1,1,2-Tetrachloroethane	ug	<0.050	0.050	0.010	9268820
Ethylbenzene	ug	<0.050	0.050	0.014	9268820
m / p-Xylene	ug	<0.10	0.10	0.015	9268820
Styrene	ug	<0.050	0.050	0.012	9268820
o-Xylene	ug	<0.050	0.050	0.015	9268820
Bromoform	ug	<0.050	0.050	0.014	9268820
1,1,2,2-Tetrachloroethane	ug	<0.050	0.050	0.014	9268820
1,2,3-Trichloropropane	ug	<0.050	0.050	0.015	9268820
1,3-Dichlorobenzene	ug	<0.050	0.050	0.020	9268820
1,4-Dichlorobenzene	ug	<0.050	0.050	0.020	9268820
1,2-Dichlorobenzene	ug	<0.050	0.050	0.020	9268820
Surrogate Recovery (%)					
Bromofluorobenzene	%	88	N/A	N/A	9268820
D10-Ethylbenzene (FS)	%	98	N/A	N/A	9268820
D4-1,2-Dichloroethane	%	100	N/A	N/A	9268820
D8-Toluene	%	99	N/A	N/A	9268820

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Bureau Veritas Job #: C439106
Report Date: 2024/03/13

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

TEST SUMMARY

Bureau Veritas ID: YIF061
Sample ID: VOST PROOF 1-16
Matrix: Air Sampling Media

Collected: 2024/02/08
Shipped:
Received: 2024/02/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260D for 0030, 0031	GC/MS	9268820	N/A	2024/03/12	Yujie Yan

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Bureau Veritas Job #: C439106
Report Date: 2024/03/13

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

GENERAL COMMENTS

Results relate only to the items tested.

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Bureau Veritas Job #: C439106
Report Date: 2024/03/13

ORTECH Environmental
Client Project #: 22327
Site Location: COVANTA
Your P.O. #: 22327-J2965

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anke Macfarlane, Laboratory Manager, VOC

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

APPENDIX 21

ORTECH Equipment Calibration Data
(28 pages)

ORTECH Consulting Inc.
Pitot Tube Calibration

Date	January 25, 2024
Probe/Pitot ID	15E
MII Number	COE 20113
Calibrated Against	B02911
Cp standard	0.99777
Calibration Procedure	03-SOP-007

Calibration Facility	ORTECH Consulting Inc.
Calibrated By	Dan Turton
Signature	
Reviewed/Accepted By	

$$Cp = Cpstd * \sqrt{\frac{Pstd}{Ps}}$$

Configuration	Wind Tunnel Velocity m/s	Velocity Head Standard Pitot in. H_2O Pstd	Velocity Head S-Type Pitot in. H_2O Ps	S-Type Pitot Coefficient Cp_s	Deviation From The Mean
With Nozzle	7.88	0.150	0.210	0.845	0.0007
(0.25")	9.86	0.235	0.330	0.843	0.0006
	11.50	0.320	0.450	0.843	0.0012
	13.79	0.460	0.640	0.847	0.0033
	16.52	0.660	0.930	0.842	0.0021
			Mean	0.844	0.0016
Without Nozzle	8.01	0.155	0.220	0.839	0.0041
	9.75	0.230	0.320	0.847	0.0043
	11.14	0.300	0.420	0.845	0.0016
	13.94	0.470	0.660	0.843	0.0004
	16.14	0.630	0.890	0.841	0.0022
			Mean	0.843	0.0025

Note: Pitots must always be used in the orientation that they are calibrated in (marked F for front and B for back).

Acceptance Criteria:
The Cp of Standard Pitots must be in the range of 0.99 ±0.01.
For Stausscheibe (S-Type) Pitots refer to the measurement criteria as specified in Method 2 of the Ontario Source Testing Code. If the pitot meets these measurement requirements it is assigned a Cp of 0.84. Otherwise, calculate the absolute differences between the average pitot tube coefficient and the coefficient obtained for each of the wind tunnel settings. The average of these differences must not exceed 0.01. Otherwise, the calibration must be repeated.
(Environment Canada Reference Method EPS 1/RM/8, Section 6).

ORTECH Consulting Inc.
Pitot Tube Calibration

Date	January 25, 2024
Probe/Pitot ID	SP4
MII Number	B04011
Calibrated Against	B02911
Cp standard	0.99777
Calibration Procedure	03-SOP-007

Calibration Facility	ORTECH Consulting Inc.
Calibrated By	Dan Turton
Signature	
Reviewed/Accepted By	

$$Cp = Cpstd * \sqrt{\frac{Pstd}{Ps}}$$

Configuration	Wind Tunnel Velocity m/s	Velocity Head Standard Pitot in. H_2O Pstd	Velocity Head S-Type Pitot in. H_2O Ps	S-Type Pitot Coefficient Cp_s	Deviation From The Mean
With Nozzle	8.01	0.155	0.220	0.839	0.0036
(0.25")	9.75	0.230	0.320	0.847	0.0048
	11.50	0.320	0.450	0.843	0.0003
	13.79	0.460	0.650	0.841	0.0017
	16.27	0.640	0.900	0.843	0.0003
			Mean	0.843	0.0021
Without Nozzle	7.88	0.150	0.210	0.845	0.0023
	9.86	0.235	0.330	0.843	0.0011
	11.50	0.320	0.450	0.843	0.0005
	13.64	0.450	0.640	0.838	0.0043
	16.27	0.640	0.900	0.843	0.0005
			Mean	0.842	0.0017

Note: Pitots must always be used in the orientation that they are calibrated in (marked F for front and B for back).

Acceptance Criteria:
The Cp of Standard Pitots must be in the range of 0.99 ±0.01.
For Stausscheibe (S-Type) Pitots refer to the measurement criteria as specified in Method 2 of the Ontario Source Testing Code. If the pitot meets these measurement requirements it is assigned a Cp of 0.84. Otherwise, calculate the absolute differences between the average pitot tube coefficient and the coefficient obtained for each of the wind tunnel settings. The average of these differences must not exceed 0.01. Otherwise, the calibration must be repeated. (Environment Canada Reference Method EPS 1/RM/8, Section 6).

ORTECH Consulting Inc.
Pitot Tube Calibration

Date	January 26, 2024
Probe/Pitot ID	PM 10 2.5
MII Number	COE 20132
Calibrated Against	B02911
Cp standard	0.99777
Calibration Procedure	03-SOP-007

Calibration Facility	ORTECH Consulting Inc.
Calibrated By	Dan Turton
Signature	
Reviewed/Accepted By	

$$Cp = Cpstd * \sqrt{\frac{Pstd}{Ps}}$$

Nozzle Size inches	Wind Tunnel Velocity m/s	Velocity Head Standard Pitot in. H_2O Pstd	Velocity Head S-Type Pitot in. H_2O Ps	S-Type Pitot Coefficient Cp_s	Deviation From The Mean
NA	7.88	0.150	0.210	0.845	0.0015
	9.54	0.220	0.310	0.842	0.0013
	11.14	0.300	0.420	0.845	0.0015
	13.49	0.440	0.620	0.842	0.0013
	16.27	0.640	0.900	0.843	0.0004
			Mean	0.843	0.0012

Note: Pitots must always be used in the orientation that they are calibrated in.

Acceptance Criteria:
The Cp of Standard Pitots must be in the range of 0.99 ±0.01.
For Stausscheibe (S-Type) Pitots refer to the measurement criteria as specified in Method 2 of the Ontario Source Testing Code. If the pitot meets these measurement requirements it is assigned a Cp of 0.84. Otherwise, calculate the absolute differences between the average pitot tube coefficient and the coefficient obtained for each of the wind tunnel settings. The average of these differences must not exceed 0.01. Otherwise, the calibration must be repeated. (Environment Canada Reference Method EPS 1/RM/8, Section 6).

ORTECH

Dry Gas Meter Calibration Using Calibrated Critical Orifice

Meter Console Information	
Meter Number	Team 1
Meter MII Number	COE 20094
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.62	in Hg
Theoretical Critical Vacuum	14.0	in Hg
System Leak Check	.002 @ 27	
Calibration Date	March 12, 2024	
Calibration Technician	D Turton	
Reviewed and Accepted By		

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice DH	Volume Initial	Volume Final	Avg. DGM Temp Initial	Avg. DGM Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Q)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F			°F	°F	in Hg
10.0	0.29	48.680	51.780	69.0	69.0	UR-40	0.2352	69.8	69.8	23.5
10.0	0.58	51.780	56.120	69.0	69.0	UR-48	0.3308	69.8	69.8	22.8
10.0	1.15	56.120	62.057	69.0	69.0	UR-55	0.4520	69.8	69.8	21.0
10.0	2.00	62.057	69.796	69.0	69.5	UR-63	0.5874	69.8	69.8	19.5
10.0	3.75	38.060	48.680	69.0	69.0	UR-73	0.8107	69.8	69.8	16.5

Results								
Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	DH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(DY)	($Q_{m(std)(corr)}$)	(DH@)	(DDH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
3.065	0.307	3.027	0.303	0.987	0.000	0.303	1.781	-0.085
4.295	0.429	4.257	0.426	0.991	0.004	0.426	1.800	-0.065
5.883	0.588	5.817	0.582	0.989	0.001	0.582	1.912	0.046
7.681	0.768	7.559	0.756	0.984	-0.003	0.756	1.969	0.103
10.591	1.059	10.433	1.043	0.985	-0.002	1.043	1.938	0.073
			DGMCF	0.987			1.865	DH@ Average

Individual values of DGM calibration factor (Y) must be within ± 1.5% of the average value.
If not the calibration must be repeated. Also, the DGMCF average value (Y) must be 1.00 ± 0.05,
otherwise the meter must be repaired and/or adjusted as necessary and recalibrated prior to use.
(Environment Canada Reference Method EPS 1/RM/8, Section 6)

ORTECH
Trendicator Calibration

Calibration Procedure	03 - J005
Trendicator Type	Omega DP118
MII	COE 20094
Date	March 11, 2024
Calibrated By	D Turton
Reviewed and Accepted By	DJUS

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference
	Before Adjustment (°F)	After Adjustment (°F)	(%)
32	32	NA	0.0
70	70		0.0
100	100		0.0
200	201		-0.5
250	252		-0.8
300	302		-0.7
400	401		-0.3
500	500		0.0
600	602		-0.3
700	701		-0.1
800	801		-0.1
900	902		-0.2
1000	1002		-0.2
1100	1102		-0.2
1200	1202		-0.2
1250	1252		-0.2

$$\% \text{ Difference} = \frac{(\text{calibrator - after adjustment reading})}{\text{calibrator}} \times 100$$

Acceptance Criteria:

'Trendicator display must read within ± 1.5%, and ± 3 degrees F of the standard value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use.

(Ontario Source Testing Code, June 2010, Part C: Method ON-2, 7.5 Appendix 2E)

ORTECH

Manometer Calibration Data

Date	March 11, 2024	Calibrated By	D Turton
Manometer Number	Team 1	Signature	[illegible]
Manometer MII Number	COE 20094	Reviewed/Accepted By	[illegible]
Calibrated Against	Dual 3		
MII Number	COE 20008		
Calibration Procedure	03 - J010		

Front Leg

Manometer Scale "H_2O	Manometer Reading "H_2O		Reference Manometer Reading "H_2O	Percent Difference %
	Before Adjustment	After Adjustment		
	0.850	NA	0.850	0.0
0-1.0	0.540		0.540	0.0
	0.175		0.180	2.8
	8.25		8.21	-0.5
1.0-10.0	4.30		4.27	-0.7
	1.75		1.72	-1.7

$$\text{Percent Difference} = \frac{(\text{Ref. Manometer} - \text{Instrument Reading})}{\text{Ref. Manometer}} \times 100$$

Acceptance Criteria:
The manometer being calibrated must be within ± 5.0% of the Standard value at each reading. Otherwise, the manometer must be repaired and/or adjusted as necessary and recalibrated prior to use. Manometers must be capable of measuring velocity pressure to within 0.005 "H_2O on the 0 to 1 inch scale, and 0.05 "H_2O on the 1 to 10 inch scales.
(Environment Canada Reference Method 1/RM/8, Section 2)

ORTECH

Dry Gas Meter Calibration Using Calibrated Critical Orifice

Meter Console Information	
Meter Number	Team # 3
Meter MII Number	COE 20093
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.56	in Hg
Theoretical Critical Vacuum	14.0	in Hg
System Leak Check	.002 @ 26.5	
Calibration Date	March 12, 2024	
Calibration Technician	D Turton	
Reviewed and Accepted By		

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice DH	Volume Initial	Volume Final	Avg. DGM Temp Initial	Avg. DGM Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Q)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F			°F	°F	in Hg
9.8	0.22	31.735	34.788	70.0	71.0	UR-40	0.2352	70.7	70.7	23.5
10.0	0.61	39.260	43.614	70.0	70.0	UR-48	0.3308	70.7	70.7	22.0
10.0	1.20	43.614	49.578	70.0	71.0	UR-55	0.4520	70.7	70.7	20.8
10.0	2.10	49.578	57.330	71.0	71.5	UR-63	0.5874	70.7	70.7	19.2
10.0	3.90	57.330	67.982	71.5	72.5	UR-73	0.8107	70.7	70.7	16.2

Results								
Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	DH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(DY)	($Q_{m(std)(corr)}$)	(DH@)	(DDH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
3.004	0.306	2.958	0.302	0.985	-0.002	0.302	1.359	-0.479
4.292	0.429	4.245	0.424	0.989	0.003	0.424	1.904	0.067
5.882	0.588	5.800	0.580	0.986	0.000	0.580	2.007	0.169
7.652	0.765	7.537	0.754	0.985	-0.001	0.754	2.079	0.242
10.546	1.055	10.403	1.040	0.986	0.000	1.040	2.027	0.190
			DGMCF	0.986			1.837	DH@ Average

Individual values of DGM calibration factor (Y) must be within ± 1.5% of the average value.
If not the calibration must be repeated. Also, the DGMCF average value (Y) must be 1.00 ± 0.05,
otherwise the meter must be repaired and/or adjusted as necessary and recalibrated prior to use.
(Environment Canada Reference Method EPS 1/RM/8, Section 6)

ORTECH
Trendicator Calibration

Calibration Procedure	03 - J005
Trendicator Type	Omega DP116
MII	A12007
Date	March 12, 2024
Calibrated By	D Turton
Reviewed and Accepted By	[illegible]

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference (%)
	Before Adjustment (°F)	After Adjustment (°F)	
32	32	N/A	0.0
70	70		0.0
100	100		0.0
200	201		-0.5
250	251		-0.4
300	301		-0.3
400	399		0.3
500	498		0.4
600	600		0.0
700	701		-0.1
800	801		-0.1
900	901		-0.1
1000	1001		-0.1
1100	1102		-0.2
1200	1202		-0.2
1250	1251		-0.1

$$\% \text{ Difference} = \frac{(\text{calibrator - after adjustment reading})}{\text{calibrator}} \times 100$$

Acceptance Criteria:

'Trendicator display must read within ± 1.5%, and ± 3 degrees F of the standard value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use.

(Ontario Source Testing Code, June 2010, Part C: Method ON-2, 7.5 Appendix 2E)

ORTECH Environmental
Manometer Calibration Data

Date	3/12/2024	Calibrated By	D Turton
Manometer Number	Team 3	Signature	
Manometer MII Numbe	COE 20093	Reviewed/Accepted By	
Calibrated Against	Omega HHP		
MII Number	B02679		
Calibration Procedure	03 - J010		

Back Leg

Manometer Scale "H_2O	Manometer Reading "H_2O Before Adjustment	Manometer Reading "H_2O After Adjustment	Reference Manometer Reading "H_2O	Percent Difference %
	0.820	N/A	0.820	0.0
0-1.0	0.480		0.480	0.0
	0.180		0.180	0.0
	8.60		8.49	-1.3
1.0-10.0	3.90		3.84	-1.6
	2.05		2.01	-2.0

$$\text{Percent Difference} = \frac{(\text{Ref. Manometer} - \text{Instrument Reading})}{\text{Ref. Manometer}} \times 100$$

Acceptance Criteria:
The manometer being calibrated must be within ± 5.0% of the Standard value at each reading. Otherwise, the manometer must be repaired and/or adjusted as necessary and recalibrated prior to use. Manometers must be capable of measuring velocity pressure to within 0.005 "H_2O on the 0 to 1 inch scale, and 0.05 "H_2O on the 1 to 10 inch scales.
(Environment Canada Reference Method 1/RM/8, Section 2)

ORTECH

Dry Gas Meter Calibration Using Calibrated Critical Orifice

Meter Console Information	
Meter Number	Team 4
Meter MII Number	COE 20090
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.65	in Hg
Theoretical Critical Vacuum	14.0	in Hg
System Leak Check	0.002 @ 29	
Calibration Date	March 11, 2024	
Calibration Technician	D Turton	
Reviewed and Accepted By	D Sills	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice DH	Volume Initial	Volume Final	Avg. DGM Temp Initial	Avg. DGM Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Q)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F			°F	°F	in Hg
10.0	0.29	99.030	101.990	58.0	64.5	UR-40	0.2352	69.8	69.8	26.3
10.5	0.58	1.990	6.393	64.5	66.5	UR-48	0.3308	69.8	69.8	26.0
10.0	1.10	6.510	12.240	67.0	67.5	UR-55	0.4520	69.8	69.8	24.5
10.0	1.90	12.240	19.766	68.0	69.0	UR-63	0.5874	69.8	69.8	22.5
10.0	3.55	19.976	30.260	69.0	70.5	UR-73	0.8107	69.8	69.8	19.7

Results								
Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	DH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(DY)	($Q_{m(std)(corr)}$)	(DH@)	(DDH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
2.973	0.297	3.030	0.303	1.019	0.001	0.303	1.777	-0.039
4.390	0.418	4.474	0.426	1.019	0.001	0.426	1.797	-0.020
5.702	0.570	5.822	0.582	1.021	0.003	0.582	1.825	0.009
7.486	0.749	7.567	0.757	1.011	-0.007	0.757	1.867	0.050
10.247	1.025	10.443	1.044	1.019	0.001	1.044	1.831	0.015
			DGMCF	1.018			1.816	DH@ Average

Individual values of DGM calibration factor (Y) must be within ± 1.5% of the average value.
If not the calibration must be repeated. Also, the DGMCF average value (Y) must be 1.00 ± 0.05,
otherwise the meter must be repaired and/or adjusted as necessary and recalibrated prior to use.
(Environment Canada Reference Method EPS 1/RM/8, Section 6)

ORTECH
Trendicator Calibration

Calibration Procedure	03 - J005
Trendicator Type	Omega DP118
MII	COE 20094
Date	March 11, 2024
Calibrated By	D Turton
Reviewed and Accepted By	D. Ous

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference
	Before Adjustment (°F)	After Adjustment (°F)	(%)
32	32	NA	0.0
70	69		1.4
100	99		1.0
200	200		0.0
250	250		0.0
300	300		0.0
400	398		0.5
500	497		0.6
600	599		0.2
700	700		0.0
800	799		0.1
900	899		0.1
1000	1000		0.0
1100	1100		0.0
1200	1200		0.0
1250	1249		0.1

$$\% \text{ Difference} = \frac{(\text{calibrator - after adjustment reading})}{\text{calibrator}} \times 100$$

Acceptance Criteria:

'Trendicator display must read within ± 1.5%, and ± 3 degrees F of the standard value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use.

(Ontario Source Testing Code, June 2010, Part C: Method ON-2, 7.5 Appendix 2E)

ORTECH

Manometer Calibration Data

Date	March 11, 2024	Calibrated By	D Turton
Manometer Number	Team 1	Signature	
Manometer MII Number	COE 20094	Reviewed/Accepted By	
Calibrated Against	Dual 3		
MII Number	COE 20008		
Calibration Procedure	03 - J010		

Front Leg

Manometer Scale "H_2O	Manometer Reading "H_2O		Reference Manometer Reading "H_2O	Percent Difference %
	Before Adjustment	After Adjustment		
	0.880		0.880	0.0
0-1.0	0.710		0.710	0.0
	0.275		0.280	1.8
	9.00		9.00	0.0
1.0-10.0	4.95		4.98	0.6
	1.87		1.87	0.0

$$\text{Percent Difference} = \frac{(\text{Ref. Manometer} - \text{Instrument Reading})}{\text{Ref. Manometer}} \times 100$$

Acceptance Criteria:
The manometer being calibrated must be within ± 5.0% of the Standard value at each reading. Otherwise, the manometer must be repaired and/or adjusted as necessary and recalibrated prior to use. Manometers must be capable of measuring velocity pressure to within 0.005 "H_2O on the 0 to 1 inch scale, and 0.05 "H_2O on the 1 to 10 inch scales.
(Environment Canada Reference Method 1/RM/8, Section 2)

ORTECH

Dry Gas Meter Calibration Data

Calibration Procedure	03-J004
Meter Number	Vost 3
Date	Feb. 29, 2024
Barometric Pressure	30.03
System Leak Check	NDL @ " Hg 16

MII NUMBERS	
DGM	A12010
Gasometer	A01463
Barometer	COE 20028

Calibrated By	Tyler Curtis
Reviewed and Accepted By	

ft^3= cm* 1.332 litres per cm/28.3168 litres per ft^3

$$DGMCF = \frac{Vstd\ ft^3}{Vdgm\ ft^3} \quad \frac{Tdgm\ {}^\circ F+460}{Tstd\ {}^\circ F+460} \quad \frac{Pbar\ (in.\ Hg)}{(Pbar\ in.\ Hg+DGMPressure/13.6)}$$

Gasometer Reading cm			Gasometer Volume	Gasometer Temperature	DGM Reading L		DGM Volume	DGM Average Temperature	DGM Pressure	DGM Outlet	DGM Calibration	Time	Flow Rate
Initial	Final	cm	ft^3	°C	Initial	Final	ft^3	°C	in. H_2O	°C	Factor	min.	lpm
83.60	61.00	22.60	1.063	20.0	187.23	217.95	1.085	24.0	2.0	18.0	0.988	15	2.0
60.90	39.60	21.30	1.002	20.0	217.95	246.71	1.016	26.0	2.0	24.0	1.002	15	1.9
83.60	61.80	21.80	1.025	20.0	246.71	276.49	1.052	27.0	2.0	25.0	0.993	15	2.0
		0.00	0.000				0.000				#DIV/0!		#DIV/0!
		0.00	0.000				0.000				#DIV/0!		#DIV/0!
		0.00	0.000				0.000				#DIV/0!		#DIV/0!
83.70	75.80	7.90	0.372	20.0	305.56	316.55	0.388	26.0	0.5	24.0	0.976	20	0.5
75.80	67.70	8.10	0.381	20.0	316.550	327.750	0.396	27.0	0.5	25.0	0.985	20.5	0.5
67.60	59.50	8.10	0.381	20.0	327.750	338.870	0.393	28.0	0.5	27.0	0.995	20	0.6

Acceptance Criteria:
Individual values of DGM calibration factor must be within ± 1.5% of the average value.
If not the calibration must be repeated. Also, the DGMCF average value must be 1.00 ± 0.05, otherwise the meter must be repaired and/or adjusted as necessary and recalibrated prior to use.
(Environment Canada Reference Method EPS 1/RM/8, Section 6)

DGMCF AVERAGE

2Lpm	0.995
1Lpm	#DIV/0!
0.5Lpm	0.985

Revision June 5, 2007

ORTECH
Trendicator Calibration

Calibration Procedure	**03-J005**
Trendicator Type	**Nutech**
MII	**A12010**
Date	**Feb. 29, 2024**
Calibrated By	**Tyler Curtis**
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°C)	**Tredicator Display Value**		**Percent Difference**
	Before Adjustment (°C)	**After Adjustment (°C)**	**(%)**
0	0		0.0
20	20		0.0
50	50		0.0
100	100		0.0
150	150		0.0
200	200		0.0
300	300		0.0
400	400		0.0
500	500		0.0
600	600		0.0

$$\% \text{ Difference} = \frac{(\text{micromite - after adjustment reading})}{\text{micromite}} \times 100$$

Acceptance Criteria:
Trendicator display must read within ± 1.5% of the micromite value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use. (MOE Source Testing Code, Version #2, Method 5)

ORTECH Environmental

Dry Gas Meter Calibration Data

Calibration Procedure	03-J004
Meter Number	M05498
Date	October 30, 2023
Barometric Pressure	29.56
System Leak Check	NDL @ 20 " Hg

MII NUMBERS	
DGM	M05498
Gasometer	A01463
Barometer	COE 20028

Calibrated By	J. Grollman
Signature	
Reviewed and Accepted By	

ft^3= cm* 1.332 litres per cm/28.3168 litres per ft^3

$$DGMCF = \frac{Vstd\ ft^3}{Vdgm\ ft^3} \quad \frac{Tdgm\ {}^oF+460}{Tstd\ {}^oF+460} \quad \frac{Pbar\ (\text{"Hg})}{(Pbar\ \text{"Hg}+DGMPressure/13.6)}$$

Gasometer Reading cm			Gasometer Volume	Gasometer Temperature	DGM Reading L		DGM Volume	DGM Average Temperature	DGM Pressure	DGM Outlet	DGM Calibration	Time	Flow Rate
Initial	Final	cm	ft^3	°C	Initial	Final	ft^3	°C	in. H_2O	°C	Factor	min.	lpm
46.80	16.20	30.60	1.439	22.0	938.63	979.71	1.451	23.0	3.8	22.0	0.986	21	2.0
46.80	20.70	26.10	1.228	22.0	979.71	1015.25	1.255	24.5	3.8	23.0	0.977	18	2.0
47.60	20.10	27.50	1.294	22.0	1015.25	1052.93	1.331	26.0	3.8	25.0	0.976	19	2.0
72.90	67.55	5.35	0.252	23.0	16.60	23.75	0.252	25.0	1.0	25.0	1.001	15	0.5
67.55	62.20	5.35	0.252	23.0	23.75	30.90	0.252	26.0	1.0	26.0	1.004	15	0.5
62.20	56.75	5.45	0.256	23.0	30.90	38.27	0.260	27.0	1.0	27.0	0.996	15.5	0.5

Acceptance Criteria:

Individual values of DGM calibration factor must be within ± 1.5% of the average value.
If not the calibration must be repeated. Also, the DGMCF average value must be 1.00 ± 0.05,
otherwise the meter must be repaired and/or adjusted as necessary and recalibrated prior to use.
(Environment Canada Reference Method EPS 1/RM/8, Section 6)

DGMCF AVERAGE

2Lpm	0.980
0.5 Lpm	1.000

ORTECH Environmental
Trendicator Calibration

Calibration Procedure	03-J005
Trendicator Type	Nutech
MII	M05498
Date	October 30, 2023
Calibrated By	J. Grollman
Signature	
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°C)	Tredicator Display Value		Percent Difference (%)
	Before Adjustment (°C)	After Adjustment (°C)	
0	2	0	0.0
20		20	0.0
50		50	0.0
100		101	-1.0
150		151	-0.7
200		199	0.5
300		298	0.7
400		396	1.0
500		496	0.8
600		596	0.7

$$\% \text{ Difference} = \frac{(\text{micromite - after adjustment reading})}{\text{micromite}} \times 100$$

Acceptance Criteria:
Trendicator display must read within ± 1.5% of the micromite value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use. (MOE Source Testing Code, Version #2, Method 5)

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 1 - Quench Inlet	Test	1

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	53.5	B4		53.0	D4	0.9	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	31	30.9	0.1

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	60		60
Run 2	60		60
Run 3	60		60
Average	**60**		**60**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 1 - Quench Inlet	Test	2

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	53.5	B4		53.0	D4	0.9	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	30.9	31.0	-0.1

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	60		60
Run 2	60		60
Run 3	60		60
Average	**60**		**60**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 1 - Quench Inlet	Test	3

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	53.5	B4		53.0	D4	0.9	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	31	30.0	1.0

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	60		60
Run 2	60		60
Run 3	60		60
Average	**60**		**60**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 1 - APC OUTLET	Test	1

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	52.9	B4		53.0	D4	-0.2	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	31	30.5	0.5

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	60		60
Run 2	60		60
Run 3	60		60
Average	**60**		**60**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 1 - APC OUTLET	Test	2

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	52.9	B4		53.0	D4	-0.2	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	30.5	30.5	0.0

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	60		60
Run 2	60		60
Run 3	60		60
Average	**60**		**60**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 1 - APC OUTLET	Test	3

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	52.9	B4		53.0	D4	-0.2	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	30.5	30.0	0.5

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	60		60
Run 2	60		60
Run 3	60		60
Average	**60**		**60**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 2 - Quench INLET	Test	1

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	53.25	B4		53.0	D4	0.4	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	31	31.0	0.0

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	30		30
Run 2	30		30
Run 3	30		30
Average	**30**		**30**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 2 - Quench INLET	Test	2

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	53.25	B4		53.0	D4	0.4	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	31	30.0	1.0

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	30		30
Run 2	30		30
Run 3	30		30
Average	**30**		**30**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 2 - Quench INLET	Test	3

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	0.995				
High	91.5	A2	91	B2	C				
Mid	53.31	A4	53.25	B4		53.0	D4	0.4	E4
Low	31.2	A3	31	B3		31.0	D3	-0.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	30	30.0	0.0

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	30		30
Run 2	30		30
Run 3	30		30
Average	**30**		**30**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 2 - APC Outlet	Test	1

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	1.001				
High	91.5	A2	91.6	B2	C				
Mid	53.31	A4	53.5	B4		53.4	D4	0.2	E4
Low	31.2	A3	30.5	B3		31.2	D3	-2.4	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	30.5	30.5	0.0

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	30		30
Run 2	30		30
Run 3	30		30
Average	**30**		**30**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 2 - APC Outlet	Test	2

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	1.001				
High	91.5	A2	91.6	B2	C				
Mid	53.31	A4	53.5	B4		53.4	D4	0.2	E4
Low	31.2	A3	30.5	B3		31.2	D3	-2.4	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	30.5	31.0	-0.5

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	30		30
Run 2	30		30
Run 3	30		30
Average	**30**		**30**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22327	Date:	March 19, 2024
Company:	COVANTA	Operator:	J. Grollman
Location:	DYEC	Analyzer ID	VIG
Test Location:	Unit 2 - APC Outlet	Test	3

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	1.001				
High	91.5	A2	91.6	B2	C				
Mid	53.31	A4	53.5	B4		53.4	D4	0.2	E4
Low	31.2	A3	30.5	B3		31.2	D3	-2.4	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	31	30.0	1.0

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	30		30
Run 2	30		30
Run 3	30		30
Average	**30**		**30**

APPENDIX 22

Particulate and Metals Test Emission Calculations
(24 pages)

ORTECH Environmental

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 1
Test No.:	1 - Partculate & Metals
Date:	March 18, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843	
DGM CORRECTION FACTOR	0.986	
NOZZLE DIAMETER	6.34	mm
DRY REF GAS VOLUME SAMPLED	3.721	m^3
AVGERGE ISOKINETICITY	101.3	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	139.0	^oC
AVERAGE GAS MOISTURE BY VOLUME	16.1	%
AVERAGE GAS VELOCITY	18.56	m/s
BAROMETRIC PRESSURE (Station)	99.695	Kpa
STATIC PRESSURE	-2.918	Kpa
ABSOLUTE GAS PRESSURE	96.777	Kpa
OXYGEN CONCENTRATION	8.8	%
CARBON DIOXIDE CONCENTRATION	10.38	%
CARBON MONOXIDE CONCENTRATION	5.8	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	27.42	m^3/s
DRY REF GAS FLOWRATE	15.89	Rm^3/s
DRY ADJ GAS FLOWRATE	19.42	Rm^3/s
WET REF GAS FLOWRATE	18.95	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	3.9	mg
	-FILTER	3.3	mg
	-TOTAL	7.2	mg
DRY REF GAS VOLUME SAMPLED		3.721	m^3
PARTICULATE CONC. - ACTUAL		1.121	mg/m^3
PARTICULATE CONC. - DRY REF		1.935	mg/m^3
PARTICULATE CONC. - DRY ADJ		1.583	mg/m^3
PARTICULATE CONC. - WET REF		1.623	mg/m^3
PARTICULATE EMISSION RATE		0.030746	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	3.3		
DGMCF	0.986	**Probe (mg)**	3.9		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	503.5		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	22.5		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.51 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.8
CO2%	10.38
COppm	5.8

Measured H2O
16.1 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	16.30	0.87	280	50	65	65	2.2	5.0		19.61	
	2.5	18.28	0.91	280	45	65	65	2.2	5.0		20.05	**103.5**
	5	20.23	0.87	279	44	65	65	2.2	5.0		19.59	**99.7**
2	7.5	22.17	0.88	279	44	65	65	2.2	5.0		19.71	**101.4**
	10	24.16	0.88	279	43	65	66	2.2	5.0		19.71	**103.4**
	12.5	26.14	0.88	279	43	65	66	2.1	4.5		19.71	**102.8**
3	15	28.00	0.84	279	43	65	67	2.1	4.5		19.25	**96.5**
	17.5	29.89	0.84	279	44	65	67	2.1	5.0		19.25	**100.3**
	20	31.84	0.86	280	44	65	68	2.1	5.0		19.49	**103.5**
4	22.5	33.65	0.82	280	44	65	69	2.1	4.5		19.04	**94.9**
	25	35.61	0.86	281	45	66	69	2.1	5.0		19.51	**105.1**
	27.5	37.64	0.81	281	45	66	70	2.1	5.0		18.93	**106.3**
5	30	39.54	0.75	281	46	66	70	2	4.9		18.22	**102.4**
	32.5	41.25	0.74	281	46	67	70	1.9	4.0		18.10	**95.8**
	35	43.16	0.74	282	47	67	71	1.95	5.0		18.11	**107.5**
6	37.5	44.98	0.66	281	47	67	71	1.9	4.5		17.09	**102.5**
	40	46.67	0.67	281	47	67	72	1.7	4.0		17.22	**100.7**
	42.5	48.35	0.65	281	48	68	72	1.7	4.0		16.96	**99.2**
7	45	50.04	0.74	281	48	68	72	1.7	4.0		18.10	**101.2**
	47.5	51.85	0.75	281	48	68	73	1.9	4.5		18.22	**101.6**
	50	53.65	0.75	282	48	69	73	1.9	4.5		18.23	**100.3**
8	52.5	55.46	0.78	281	47	69	73	1.9	4.5		18.58	**100.8**
	55	57.34	0.79	282	47	69	74	2	5.0		18.71	**102.6**
	57.5	59.18	0.79	282	47	70	74	2	5.0		18.71	**99.8**
9	60	61.04	0.8	282	47	70	74	2	5.0		18.83	**100.8**
	62.5	62.95	0.79	283	47	70	74	2	5.0		18.72	**102.8**
	65	64.85	0.79	283	47	70	74	2	5.0		18.72	**103.0**
10	67.5	66.74	0.8	283	47	71	75	2	5.0		18.84	**102.5**
	70	68.67	0.81	283	48	71	75	2	5.0		18.96	**103.8**
	72.5	70.47	0.81	283	48	71	75	1.95	4.5		18.96	**96.2**
11	75	72.36	0.73	283	48	71	75	2.1	5.0		18.00	**101.0**
	77.5	74.13	0.74	283	48	71	75	1.9	4.5		18.12	**99.7**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	3.3		
DGMCF	0.986	**Probe (mg)**	3.9		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	503.5		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	22.5		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.51 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.8
CO2%	10.38
COppm	5.8

Measured H2O
16.1 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	80	75.89	0.73	282	48	72	75	1.9	4.9		17.98	**98.4**
12	82.5	77.75	0.75	283	48	72	76	1.9	5.0		18.24	**104.5**
	85	79.65	0.75	281	48	72	76	2	5.0		18.22	**105.3**
	87.5	81.47	0.75	281	48	72	76	1.9	4.9		18.22	**100.8**
	90	83.29								0.51		**100.7**
1	0	83.80	1	284	52	72	72	2.5	5.0		21.08	
	2.5	85.84	1.05	285	47	72	73	2.5	5.0		21.61	**98.5**
	5	87.95	0.98	285	46	72	75	2.6	5.5		20.88	**99.4**
2	7.5	90.02	0.97	285	45	72	74	2.5	5.5		20.77	**100.8**
	10	92.08	0.96	285	45	72	74	2.5	5.5		20.67	**100.9**
	12.5	94.17	0.95	284	44	72	74	2.5	5.5		20.54	**102.9**
3	15	96.22	0.95	285	44	72	75	2.4	5.0		20.56	**101.4**
	17.5	98.25	0.91	285	43	72	75	2.4	5.0		20.12	**100.3**
	20	100.24	0.88	285	43	72	75	2.3	5.0		19.79	**100.5**
4	22.5	102.21	0.78	285	43	72	76	2.2	5.0		18.63	**101.1**
	25	104.08	0.79	284	43	73	76	2	5.0		18.73	**101.9**
	27.5	105.94	0.79	284	43	73	76	2	5.0		18.73	**100.5**
5	30	107.80	0.67	284	43	73	76	2	5.0		17.25	**100.5**
	32.5	109.55	0.69	283	43	73	76	1.8	4.5		17.50	**102.6**
	35	111.31	0.67	282	42	73	76	1.8	4.5		17.23	**101.6**
6	37.5	113.04	0.58	282	42	73	77	1.8	4.5		16.03	**101.3**
	40	114.66	0.57	282	42	73	77	1.5	4.0		15.89	**101.8**
	42.5	116.27	0.6	282	42	73	77	1.5	4.0		16.30	**102.0**
7	45	117.93	0.68	282	42	73	77	1.6	4.5		17.36	**102.5**
	47.5	119.68	0.69	282	43	73	77	1.8	4.9		17.49	**101.5**
	50	121.44	0.72	282	43	74	77	1.8	4.9		17.86	**101.4**
8	52.5	123.25	0.77	282	43	74	78	1.9	5.0		18.47	**102.0**
	55	125.10	0.77	283	43	74	78	2	5.0		18.48	**100.8**
	57.5	126.95	0.78	284	43	74	78	2	5.0		18.62	**100.8**
9	60	128.80	0.74	284	43	74	78	2	5.0		18.13	**100.3**
	62.5	130.69	0.76	283	43	75	78	1.9	5.0		18.36	**105.2**
	65	132.58	0.78	283	43	75	78	2	5.0		18.60	**103.6**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	3.3		
DGMCF	0.986	**Probe (mg)**	3.9		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	503.5		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	22.5		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.51 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.8
CO2%	10.38
COppm	5.8

Measured H2O
16.1 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
10	67.5	134.44	0.71	283	43	75	78	2	5.0		17.75	**100.6**
	70	136.23	0.74	283	43	75	79	1.9	5.0		18.12	**101.5**
	72.5	138.04	0.75	283	43	75	78	2	5.0		18.24	**100.4**
11	75	139.86	0.67	281	44	75	78	2	5.0		17.22	**100.4**
	77.5	141.63	0.68	282	44	75	79	1.8	4.9		17.36	**103.2**
	80	143.36	0.69	281	44	75	79	1.8	4.9		17.47	**100.1**
12	82.5	145.12	0.69	281	43	75	79	1.8	4.9		17.47	**101.0**
	85	146.87	0.68	280	44	75	79	1.8	4.9		17.33	**100.4**
	87.5	148.60	0.7	280	44	75	79	1.8	4.9		17.59	**99.9**
	90	150.33										**98.5**

ORTECH Environmental

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 1
Test No.:	2 - Partculate & Metals
Date:	March 18, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843	
DGM CORRECTION FACTOR	0.986	
NOZZLE DIAMETER	6.34	mm
DRY REF GAS VOLUME SAMPLED	3.712	m^3
AVGERGE ISOKINETICITY	99.7	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	139.6	°C
AVERAGE GAS MOISTURE BY VOLUME	15.4	%
AVERAGE GAS VELOCITY	18.68	m/s
BAROMETRIC PRESSURE (Station)	99.695	Kpa
STATIC PRESSURE	-2.918	Kpa
ABSOLUTE GAS PRESSURE	96.777	Kpa
OXYGEN CONCENTRATION	8.87	%
CARBON DIOXIDE CONCENTRATION	10.28	%
CARBON MONOXIDE CONCENTRATION	4.4	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	27.61	m^3/s
DRY REF GAS FLOWRATE	16.10	Rm^3/s
DRY ADJ GAS FLOWRATE	19.57	Rm^3/s
WET REF GAS FLOWRATE	19.05	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	1.1	mg
	-FILTER	2.7	mg
	-TOTAL	3.8	mg
DRY REF GAS VOLUME SAMPLED		3.712	m^3
PARTICULATE CONC. - ACTUAL		0.597	mg/m^3
PARTICULATE CONC. - DRY REF		1.024	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.842	mg/m^3
PARTICULATE CONC. - WET REF		0.866	mg/m^3
PARTICULATE EMISSION RATE		0.016485	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	2.7		
DGMCF	0.986	**Probe (mg)**	1.1		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	476		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	22.3		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.63 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.87
CO2%	10.28
COppm	4.4

Measured H2O
15.4 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	51.00	0.91	281	60	72	72	2.3	5.0		20.04	
	2.5	52.98	0.96	283	56	72	71	2.3	5.0		20.61	**99.3**
	5	55.00	0.98	283	54	72	71	2.4	5.5		20.83	**98.8**
2	7.5	56.98	0.98	283	52	72	72	2.4	5.5		20.83	**95.9**
	10	59.00	0.99	283	51	71	72	2.4	5.5		20.93	**97.8**
	12.5	61.02	0.97	284	50	71	73	2.4	5.5		20.73	**97.4**
3	15	63.08	0.95	284	50	72	73	2.4	6.0		20.52	**100.3**
	17.5	65.15	0.95	284	50	72	74	2.3	5.9		20.52	**101.7**
	20	67.11	0.94	284	50	72	75	2.3	5.5		20.41	**96.2**
4	22.5	69.09	0.87	284	51	72	75	2.3	5.5		19.63	**97.6**
	25	71.06	0.85	284	51	72	76	2.2	5.5		19.41	**101.0**
	27.5	73.00	0.85	284	51	73	76	2.15	5.5		19.41	**100.5**
5	30	74.93	0.77	284	51	73	77	2.15	5.5		18.47	**99.8**
	32.5	76.78	0.77	284	51	73	77	2	5.0		18.47	**100.5**
	35	78.64	0.76	284	51	73	77	2	5.0		18.35	**101.0**
6	37.5	80.46	0.62	284	51	74	78	2	5.0		16.58	**99.4**
	40	82.15	0.61	284	51	74	78	1.6	4.9		16.44	**102.0**
	42.5	83.80	0.6	283	51	74	78	1.6	4.5		16.29	**100.3**
7	45	85.43	0.66	283	51	74	78	1.6	4.5		17.09	**99.9**
	47.5	87.14	0.66	283	50	74	78	1.7	4.9		17.09	**99.9**
	50	88.85	0.67	283	50	74	79	1.7	4.9		17.22	**99.9**
8	52.5	90.57	0.68	283	50	75	79	1.7	4.9		17.35	**99.7**
	55	92.34	0.68	282	50	75	79	1.8	5.0		17.34	**101.7**
	57.5	94.05	0.67	282	50	75	79	1.8	5.0		17.21	**98.2**
9	60	95.77	0.7	282	50	75	79	1.8	5.0		17.59	**99.5**
	62.5	97.54	0.7	281	50	76	79	1.85	5.0		17.58	**100.2**
	65	99.32	0.71	281	50	76	80	1.85	5.0		17.70	**100.6**
10	67.5	101.09	0.7	281	50	76	80	1.85	5.0		17.58	**99.3**
	70	102.86	0.72	281	50	76	80	1.85	5.0		17.83	**100.0**
	72.5	104.72	0.74	281	49	76	80	1.9	5.0		18.07	**103.6**
11	75	106.53	0.75	280	49	76	80	1.9	5.0		18.18	**99.4**
	77.5	108.35	0.74	281	49	76	80	2	5.0		18.07	**99.2**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	2.7		
DGMCF	0.986	**Probe (mg)**	1.1		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	476		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	22.3		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.63 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.87
CO2%	10.28
COppm	4.4

Measured H2O
15.4 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	80	110.16	0.74	282	49	76	80	2	5.0		18.08	**99.5**
12	82.5	111.99	0.76	282	49	77	80	2	5.0		18.33	**100.6**
	85	113.82	0.76	282	49	77	80	2	5.0		18.33	**99.2**
	87.5	115.66	0.77	283	49	77	80	2	5.0		18.46	**99.7**
	90	117.49								0.63		**98.6**
1	0	118.12	0.94	282	50	77	77	2.4	6.0		20.38	
	2.5	120.16	0.97	285	50	77	78	2.4	6.0		20.75	**99.8**
	5	122.21	0.96	286	49	77	79	2.4	6.0		20.65	**98.8**
2	7.5	124.27	0.94	286	49	77	79	2.4	6.0		20.44	**99.8**
	10	126.32	0.95	286	48	77	79	2.4	6.0		20.55	**100.4**
	12.5	128.37	0.93	286	48	77	80	2.4	6.0		20.33	**99.8**
3	15	130.40	0.89	286	49	77	80	2.3	6.0		19.89	**99.8**
	17.5	132.37	0.89	285	49	77	80	2.2	6.0		19.87	**99.0**
	20	134.33	0.87	285	49	77	80	2.2	5.9		19.65	**98.4**
4	22.5	136.28	0.81	285	49	77	80	2.2	5.9		18.96	**99.0**
	25	138.17	0.83	286	49	77	81	2.1	5.9		19.20	**99.5**
	27.5	140.09	0.8	286	49	77	81	2.1	5.5		18.85	**99.8**
5	30	141.96	0.75	285	49	78	81	2	5.5		18.24	**99.0**
	32.5	143.79	0.76	285	50	78	81	2	5.5		18.36	**99.9**
	35	145.64	0.74	284	50	78	81	2	5.5		18.11	**100.3**
6	37.5	147.43	0.65	284	50	78	81	2	5.5		16.97	**98.3**
	40	149.15	0.64	284	50	78	81	1.7	5.0		16.84	**100.8**
	42.5	150.86	0.64	283	50	78	81	1.7	5.0		16.83	**100.9**
7	45	152.54	0.68	283	50	78	81	1.7	5.0		17.35	**99.0**
	47.5	154.36	0.69	282	49	78	82	1.8	5.0		17.46	**104.1**
	50	156.12	0.73	282	49	78	82	1.8	5.0		17.96	**99.8**
8	52.5	157.92	0.76	283	50	78	82	1.9	5.0		18.34	**99.2**
	55	159.73	0.76	283	50	78	82	2	5.5		18.34	**97.9**
	57.5	161.58	0.78	283	49	78	82	2	5.5		18.58	**100.1**
9	60	163.43	0.81	283	50	78	82	2	5.5		18.93	**98.8**
	62.5	165.34	0.82	283	50	79	82	2.1	5.9		19.05	**100.1**
	65	167.25	0.83	283	50	79	82	2.1	5.9		19.17	**99.4**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	2.7		
DGMCF	0.986	**Probe (mg)**	1.1		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	476		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	22.3		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.63 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.87
CO2%	10.28
COppm	4.4

Measured H2O
15.4 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
10	67.5	169.17	0.86	283	50	79	82	2.1	5.9		19.51	**99.3**
	70	171.14	0.85	284	50	79	82	2.2	6.0		19.41	**100.1**
	72.5	173.11	0.83	284	50	79	82	2.2	6.0		19.18	**100.8**
11	75	175.02	0.72	282	50	79	82	2.1	5.9		17.84	**98.9**
	77.5	176.84	0.76	283	51	79	82	1.9	5.5		18.34	**101.0**
	80	178.69	0.76	283	51	79	82	2	5.5		18.34	**100.0**
12	82.5	180.53	0.74	282	51	79	82	2	5.5		18.08	**99.4**
	85	182.35	0.77	282	51	79	82	2	5.5		18.45	**99.6**
	87.5	184.22	0.77	282	51	79	82	2	5.5		18.45	**100.3**
	90	186.10										**100.9**

ORTECH Environmental

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 1
Test No.:	3 - Partculate & Metals
Date:	March 19, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	4.078	m^3
AVGERGE ISOKINETICITY	98.9	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	136.9	°C
AVERAGE GAS MOISTURE BY VOLUME	15.2	%
AVERAGE GAS VELOCITY	19.24	m/s
BAROMETRIC PRESSURE (Station)	99.120	Kpa
STATIC PRESSURE	-2.963	Kpa
ABSOLUTE GAS PRESSURE	96.156	Kpa
OXYGEN CONCENTRATION	8.43	%
CARBON DIOXIDE CONCENTRATION	10.71	%
CARBON MONOXIDE CONCENTRATION	6.9	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	28.43	m^3/s
DRY REF GAS FLOWRATE	16.64	Rm^3/s
DRY ADJ GAS FLOWRATE	20.96	Rm^3/s
WET REF GAS FLOWRATE	19.62	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	1.9	mg
	-FILTER	5.9	mg
	-TOTAL	7.8	mg
DRY REF GAS VOLUME SAMPLED		4.078	m^3
PARTICULATE CONC. - ACTUAL		1.119	mg/m^3
PARTICULATE CONC. - DRY REF		1.913	mg/m^3
PARTICULATE CONC. - DRY ADJ		1.519	mg/m^3
PARTICULATE CONC. - WET REF		1.623	mg/m^3
PARTICULATE EMISSION RATE		0.031823	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 19, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	5.9		
DGMCF	1.018	**Probe (mg)**	1.9		
Barometric Pressure	29.27 "Hg	**CWTR (g)**	512		
Static Pressure	-11.900 "H_2O	**WCBDA (g)**	24		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.51 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.43
CO2%	10.71
COppm	6.9

Measured H2O
15.2 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	85.95	0.845	278	65	67	67	2.25	6.0		19.33	
	2.5	87.83	0.81	278	60	67	67	2.2	6.0		18.93	**94.4**
	5	89.81	0.81	278	56	67	66	2.2	6.0		18.93	**101.5**
2	7.5	91.77	0.79	277	55	67	66	2.1	6.0		18.68	**100.6**
	10	93.68	0.81	278	54	67	67	2.15	6.0		18.93	**99.2**
	12.5	95.63	0.83	277	53	67	67	2.2	6.0		19.15	**100.0**
3	15	97.62	0.83	276	52	68	68	2.2	6.0		19.13	**100.8**
	17.5	99.59	0.88	278	52	68	69	2.3	6.0		19.73	**99.5**
	20	101.62	0.88	278	51	68	69	2.3	6.0		19.73	**99.6**
4	22.5	103.64	0.86	278	51	68	70	2.2	6.0		19.50	**99.1**
	25	105.62	0.86	277	51	68	70	2.2	6.0		19.49	**98.2**
	27.5	107.59	0.8	278	51	69	71	2.1	6.0		18.81	**97.6**
5	30	109.51	0.85	278	51	69	72	2.2	6.0		19.39	**98.5**
	32.5	111.48	0.79	278	51	69	72	2.1	6.0		18.69	**98.0**
	35	113.41	0.77	277	50	69	72	2	6.0		18.44	**99.5**
6	37.5	115.29	0.73	277	50	69	72	1.95	6.0		17.96	**98.1**
	40	117.15	0.75	277	50	69	73	2	6.0		18.20	**99.7**
	42.5	119.03	0.78	277	50	70	73	2.1	6.0		18.56	**99.3**
7	45	120.95	0.68	277	50	70	73	1.9	6.0		17.33	**99.4**
	47.5	122.79	0.7	277	50	70	74	1.9	6.0		17.58	**102.0**
	50	124.63	0.73	277	49	70	74	1.95	6.0		17.96	**100.4**
8	52.5	126.48	0.74	278	49	70	74	2	6.0		18.09	**98.9**
	55	128.35	0.76	278	49	70	74	2	6.0		18.33	**99.3**
	57.5	130.25	0.92	279	49	70	74	2.4	6.5		20.18	**99.6**
9	60	132.28	0.92	279	49	70	74	2.4	6.5		20.18	**96.9**
	62.5	134.37	0.94	279	48	70	74	2.45	6.5		20.40	**99.7**
	65	136.47	0.94	280	48	70	74	2.45	6.5		20.42	**99.2**
10	67.5	138.59	0.99	280	48	70	74	2.6	7.0		20.95	**100.2**
	70	140.75	0.97	280	48	70	74	2.5	7.0		20.74	**99.5**
	72.5	142.88	0.94	280	49	71	74	2.45	7.0		20.42	**99.1**
11	75	144.98	0.95	281	49	70	74	2.45	7.0		20.54	**99.1**
	77.5	147.08	0.95	281	49	70	74	2.45	7.0		20.54	**98.8**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 19, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	5.9		
DGMCF	1.018	**Probe (mg)**	1.9		
Barometric Pressure	29.27 "Hg	**CWTR (g)**	512		
Static Pressure	-11.900 "H_2O	**WCBDA (g)**	24		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.51 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.43
CO2%	10.71
COppm	6.9

Measured H2O
15.2 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	80	149.17	0.94	280	49	71	74	2.45	7.0		20.42	**98.3**
12	82.5	151.27	0.94	280	49	71	74	2.45	7.0		20.42	**99.1**
	85	153.37	0.96	280	50	71	74	2.5	7.0		20.63	**99.1**
	87.5	155.49	0.94	280	50	71	74	2.45	7.0		20.42	**99.0**
	90	157.60								0.51		**99.6**
1	0	158.11	0.94	280	54	70	74	2.45	6.5		20.42	
	2.5	160.23	0.99	279	48	70	71	2.5	6.5		20.94	**100.2**
	5	162.35	1	279	46	70	71	2.5	6.5		21.04	**97.8**
2	7.5	164.46	1.05	279	45	70	72	2.7	7.0		21.56	**96.9**
	10	166.65	0.99	279	45	70	72	2.55	7.0		20.94	**98.1**
	12.5	168.79	1	279	45	70	72	2.55	7.0		21.04	**98.7**
3	15	170.93	0.96	279	45	70	72	2.5	7.0		20.62	**98.2**
	17.5	173.04	0.96	278	45	70	72	2.5	7.0		20.60	**98.8**
	20	175.15	0.96	279	45	70	73	2.5	7.0		20.62	**98.7**
4	22.5	177.25	0.91	279	45	70	73	2.4	7.0		20.07	**98.2**
	25	179.31	0.94	279	45	70	73	2.45	7.0		20.40	**98.9**
	27.5	181.42	0.94	280	45	70	73	2.45	7.0		20.42	**99.7**
5	30	183.51	0.86	280	45	70	74	2.3	7.0		19.53	**98.9**
	32.5	185.55	0.86	280	45	70	74	2.3	7.0		19.53	**100.7**
	35	187.58	0.87	280	45	70	74	2.3	7.0		19.64	**100.2**
6	37.5	189.62	0.7	280	45	71	74	1.9	6.5		17.62	**100.2**
	40	191.46	0.69	280	44	71	74	1.9	6.5		17.49	**100.5**
	42.5	193.27	0.71	280	44	71	75	1.95	6.5		17.74	**99.6**
7	45	195.12	0.71	280	44	71	75	1.9	6.5		17.74	**100.3**
	47.5	196.95	0.8	280	44	71	75	2.1	6.0		18.84	**99.2**
	50	198.85	0.8	280	44	71	75	2.1	6.0		18.84	**97.1**
8	52.5	200.74	0.81	280	44	71	75	2.1	6.0		18.95	**96.5**
	55	202.62	0.81	280	44	71	76	2.1	6.0		18.95	**95.4**
	57.5	204.52	0.79	280	44	71	76	2.1	6.0		18.72	**96.4**
9	60	206.42	0.81	279	45	72	76	2.15	6.5		18.94	**97.6**
	62.5	208.38	0.81	279	45	71	76	2.15	6.5		18.94	**99.3**
	65	210.32	0.79	278	45	72	76	2.15	6.5		18.69	**98.3**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - Partculate & Metals	**Test Location:**	APC Outlet No. 1
Date:	March 19, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	5.9		
DGMCF	1.018	**Probe (mg)**	1.9		
Barometric Pressure	29.27 "Hg	**CWTR (g)**	512		
Static Pressure	-11.900 "H_2O	**WCBDA (g)**	24		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.51 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.43
CO2%	10.71
COppm	6.9

Measured H2O
15.2 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
10	67.5	212.26	0.8	278	45	72	76	2.15	6.5		18.81	**99.4**
	70	214.21	0.8	276	45	72	76	2.15	6.5		18.78	**99.3**
	72.5	216.15	0.77	276	45	72	76	2.1	6.5		18.43	**98.7**
11	75	218.05	0.66	276	45	72	76	1.8	6.0		17.06	**98.5**
	77.5	219.84	0.66	276	45	72	76	1.8	6.0		17.06	**100.1**
	80	221.60	0.66	276	45	72	77	1.8	6.0		17.06	**98.5**
12	82.5	223.35	0.68	276	45	72	77	1.9	6.0		17.32	**97.8**
	85	225.14	0.68	276	45	72	77	1.9	6.0		17.32	**98.6**
	87.5	226.90	0.69	276	45	72	77	1.9	6.0		17.45	**96.9**
	90	228.71										**99.0**

ORTECH Environmental

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 2
Test No.:	1 - Partculate & Metals
Date:	March 19, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843	
DGM CORRECTION FACTOR	0.986	
NOZZLE DIAMETER	6.34	mm
DRY REF GAS VOLUME SAMPLED	3.616	m^3
AVGERGE ISOKINETICITY	101.2	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	138.3	°C
AVERAGE GAS MOISTURE BY VOLUME	16.8	%
AVERAGE GAS VELOCITY	18.17	m/s
BAROMETRIC PRESSURE (Station)	99.594	Kpa
STATIC PRESSURE	-2.814	Kpa
ABSOLUTE GAS PRESSURE	96.780	Kpa
OXYGEN CONCENTRATION	8.55	%
CARBON DIOXIDE CONCENTRATION	10.76	%
CARBON MONOXIDE CONCENTRATION	7.7	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	26.84	m^3/s
DRY REF GAS FLOWRATE	15.45	Rm^3/s
DRY ADJ GAS FLOWRATE	19.28	Rm^3/s
WET REF GAS FLOWRATE	18.58	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	4.9	mg
	-FILTER	2.9	mg
	-TOTAL	7.8	mg
DRY REF GAS VOLUME SAMPLED		3.616	m^3
PARTICULATE CONC. - ACTUAL		1.242	mg/m^3
PARTICULATE CONC. - DRY REF		2.157	mg/m^3
PARTICULATE CONC. - DRY ADJ		1.729	mg/m^3
PARTICULATE CONC. - WET REF		1.795	mg/m^3
PARTICULATE EMISSION RATE		0.033336	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	2.9		
DGMCF	0.986	**Probe (mg)**	4.9		
Barometric Pressure	29.41 "Hg	**CWTR (g)**	515.5		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	21.5		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.465 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.55
CO2%	10.76
COppm	7.7

Measured H2O
16.8 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	586.58	0.76	281	60	64	64	1.9	4.0		18.35	
	2.5	588.70	0.77	282	46	66	66	1.9	4.0		18.48	**119.7**
	5	590.15	0.75	282	45	66	66	1.92	4.0		18.24	**81.0**
2	7.5	591.95	0.79	283	45	66	67	1.92	4.0		18.73	**101.9**
	10	593.76	0.8	283	44	66	67	1.98	4.0		18.85	**99.8**
	12.5	595.60	0.78	284	44	66	68	2.01	4.0		18.63	**100.8**
3	15	597.42	0.76	284	45	66	68	1.97	4.0		18.39	**101.0**
	17.5	599.23	0.77	284	45	66	69	1.92	4.0		18.51	**101.7**
	20	601.06	0.81	284	45	67	69	1.95	4.0		18.98	**102.1**
4	22.5	602.91	0.76	284	45	67	70	2.05	4.0		18.39	**100.5**
	25	604.74	0.76	285	45	67	70	1.93	4.0		18.40	**102.6**
	27.5	606.56	0.8	252	45	67	70	1.93	4.0		18.46	**102.0**
5	30	608.44	0.75	286	45	68	71	2.02	4.0		18.29	**100.4**
	32.5	610.29	0.76	287	45	68	71	1.98	4.0		18.43	**104.0**
	35	612.10	0.82	288	46	68	72	1.93	4.0		19.15	**101.7**
6	37.5	614.00	0.78	289	46	68	72	2.05	4.5		18.69	**102.5**
	40	615.85	0.77	289	46	69	72	1.98	4.2		18.57	**102.4**
	42.5	617.75	0.73	290	46	69	72	1.95	4.2		18.09	**105.7**
7	45	619.47	0.76	290	47	69	73	1.85	4.0		18.46	**98.4**
	47.5	621.30	0.78	290	47	70	73	1.95	4.0		18.70	**102.4**
	50	623.13	0.79	290	47	70	73	1.98	4.2		18.82	**101.1**
8	52.5	624.95	0.8	290	47	70	73	2	4.2		18.94	**99.9**
	55	626.85	0.83	291	47	70	73	2.02	4.2		19.31	**103.6**
	57.5	628.73	0.85	291	48	70	74	2.09	4.5		19.54	**100.7**
9	60	630.65	0.8	292	48	71	74	2.13	4.5		18.97	**101.6**
	62.5	632.54	0.75	292	48	71	74	2.03	4.2		18.36	**103.0**
	65	634.39	0.77	291	47	71	74	1.93	4.0		18.60	**103.9**
10	67.5	636.23	0.76	291	47	71	74	1.95	4.0		18.47	**102.4**
	70	638.06	0.76	290	47	71	74	1.95	4.0		18.46	**102.3**
	72.5	639.89	0.75	290	47	71	74	1.95	4.0		18.34	**102.2**
11	75	641.72	0.72	289	47	71	74	1.92	4.0		17.96	**102.9**
	77.5	643.52	0.73	288	47	71	74	1.85	4.0		18.07	**103.2**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	2.9		
DGMCF	0.986	**Probe (mg)**	4.9		
Barometric Pressure	29.41 "Hg	**CWTR (g)**	515.5		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	21.5		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.465 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.55
CO2%	10.76
COppm	7.7

Measured H2O
16.8 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	80	645.32	0.71	288	47	71	75	1.88	4.0		17.82	**102.4**
12	82.5	647.11	0.73	287	47	72	75	1.83	4.0		18.06	**103.2**
	85	648.90	0.73	287	47	72	76	1.88	4.0		18.06	**101.6**
	87.5	650.71	0.73	287	47	72	75	1.88	4.0		18.06	**102.6**
	90	652.50						1.88	4.0	0.465		**101.5**
1	0	652.96	0.88	283	54	72	72	2.1	4.0		19.77	
	2.5	654.83	0.86	286	45	72	72	2.1	4.0		19.59	**96.5**
	5	656.77	0.88	286	43	72	72	2.18	4.5		19.81	**101.7**
2	7.5	658.74	0.87	287	41	71	72	2.2	4.7		19.71	**102.1**
	10	660.70	0.86	286	41	71	72	2.18	4.6		19.59	**102.3**
	12.5	662.63	0.89	286	41	71	72	2.15	4.5		19.93	**101.3**
3	15	664.60	0.85	286	41	71	73	2.22	4.9		19.47	**101.6**
	17.5	666.52	0.86	286	41	71	73	2.1	4.5		19.59	**101.3**
	20	668.43	0.86	286	41	71	73	2.1	4.5		19.59	**100.1**
4	22.5	670.35	0.78	287	41	71	73	2.13	4.5		18.67	**100.6**
	25	672.20	0.82	287	41	71	73	1.95	4.1		19.14	**101.6**
	27.5	674.08	0.8	287	41	71	74	2.03	4.3		18.90	**101.2**
5	30	675.94	0.72	287	42	71	74	2	4.2		17.93	**101.0**
	32.5	677.73	0.73	286	42	71	74	1.82	4.0		18.05	**102.5**
	35	679.51	0.73	286	42	71	74	1.82	4.0		18.05	**101.1**
6	37.5	681.29	0.61	286	42	71	74	1.82	4.0		16.50	**101.1**
	40	682.95	0.61	286	42	71	74	1.52	4.0		16.50	**103.2**
	42.5	684.58	0.63	286	42	71	74	1.5	4.0		16.76	**101.2**
7	45	686.22	0.63	286	42	71	74	1.56	4.0		16.76	**100.2**
	47.5	687.86	0.62	286	42	72	74	1.56	4.0		16.63	**100.2**
	50	689.49	0.63	285	42	72	74	1.52	4.0		16.75	**100.3**
8	52.5	691.12	0.65	285	42	72	75	1.54	4.0		17.02	**99.4**
	55	692.80	0.67	285	42	72	75	1.62	4.0		17.28	**100.8**
	57.5	694.50	0.68	285	42	72	75	1.65	4.0		17.41	**100.5**
9	60	696.21	0.7	285	43	72	75	1.7	4.0		17.66	**100.3**
	62.5	697.94	0.7	285	43	72	75	1.75	4.0		17.66	**100.1**
	65	699.66	0.72	285	43	72	75	1.75	4.0		17.91	**99.5**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	BP

Pitot Factor	0.843	**Filter (mg)**	2.9		
DGMCF	0.986	**Probe (mg)**	4.9		
Barometric Pressure	29.41 "Hg	**CWTR (g)**	515.5		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	21.5		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.465 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.55
CO2%	10.76
COppm	7.7

Measured H2O
16.8 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
10	67.5	701.40	0.71	282	43	72	75	1.8	4.0		17.75	**99.3**
	70	703.14	0.71	284	43	72	75	1.8	4.0		17.77	**99.8**
	72.5	704.87	0.69	284	43	72	75	1.8	4.0		17.52	**99.3**
11	75	706.60	0.61	228	43	72	74	1.78	4.0		15.84	**100.8**
	77.5	708.25	0.6	225	43	72	74	1.6	4.0		15.68	**98.4**
	80	709.90	0.62	225	43	72	74	1.6	4.0		15.94	**98.9**
12	82.5	711.56	0.61	224	43	72	74	1.67	4.0		15.80	**97.9**
	85	713.24	0.64	225	43	72	74	1.7	4.0		16.19	**99.8**
	87.5	714.94	0.65	226	43	72	74	1.75	4.0		16.33	**98.7**
	90	716.73						1.78	4.0			**103.2**

ORTECH Environmental

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 2
Test No.:	2 - Partculate & Metals
Date:	March 19, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843	
DGM CORRECTION FACTOR	0.986	
NOZZLE DIAMETER	6.34	mm
DRY REF GAS VOLUME SAMPLED	3.411	m^3
AVGERGE ISOKINETICITY	99.8	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	134.5	°C
AVERAGE GAS MOISTURE BY VOLUME	16.0	%
AVERAGE GAS VELOCITY	17.13	m/s
BAROMETRIC PRESSURE (Station)	99.255	Kpa
STATIC PRESSURE	-2.814	Kpa
ABSOLUTE GAS PRESSURE	96.441	Kpa
OXYGEN CONCENTRATION	8.2	%
CARBON DIOXIDE CONCENTRATION	11.08	%
CARBON MONOXIDE CONCENTRATION	13.5	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	25.31	m^3/s
DRY REF GAS FLOWRATE	14.79	Rm^3/s
DRY ADJ GAS FLOWRATE	18.98	Rm^3/s
WET REF GAS FLOWRATE	17.63	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	3.9	mg
	-FILTER	2.4	mg
	-TOTAL	6.3	mg
DRY REF GAS VOLUME SAMPLED		3.411	m^3
PARTICULATE CONC. - ACTUAL		1.079	mg/m^3
PARTICULATE CONC. - DRY REF		1.847	mg/m^3
PARTICULATE CONC. - DRY ADJ		1.440	mg/m^3
PARTICULATE CONC. - WET REF		1.551	mg/m^3
PARTICULATE EMISSION RATE		0.027325	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TC

Pitot Factor	0.843	**Filter (mg)**	2.4		
DGMCF	0.986	**Probe (mg)**	3.9		
Barometric Pressure	29.31 "Hg	**CWTR (g)**	461.1		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	18		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.362 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.2
CO2%	11.08
COppm	13.5

Measured H2O
16.0 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	717.10	0.82	286	60	69	69	2.1	5.0		19.12	
	2.5	718.96	0.84	286	57	69	69	2.01	5.0		19.35	**99.5**
	5	720.84	0.83	286	56	69	69	2.01	5.0		19.23	**99.4**
2	7.5	722.70	0.81	285	55	69	69	2	5.0		18.99	**98.9**
	10	724.55	0.84	285	55	69	70	1.98	5.0		19.34	**99.5**
	12.5	726.41	0.87	285	55	69	70	2.03	5.0		19.68	**98.2**
3	15	728.30	0.83	285	55	69	70	2.1	5.1		19.22	**98.0**
	17.5	730.18	0.85	286	55	69	71	2.01	5.0		19.46	**99.9**
	20	732.07	0.84	286	55	69	71	2.04	5.0		19.35	**99.2**
4	22.5	733.95	0.75	286	56	69	72	2.01	5.0		18.28	**99.2**
	25	735.72	0.77	285	55	69	72	1.84	4.7		18.51	**98.8**
	27.5	737.50	0.76	285	54	70	73	1.88	4.9		18.39	**97.9**
5	30	739.29	0.71	285	54	70	73	1.85	4.7		17.78	**98.9**
	32.5	741.02	0.7	285	53	70	73	1.72	4.5		17.65	**98.9**
	35	742.74	0.7	285	53	70	74	1.71	4.5		17.65	**99.0**
6	37.5	744.46	0.6	285	53	70	74	1.71	4.5		16.34	**98.9**
	40	746.09	0.62	285	52	71	74	1.49	4.1		16.61	**101.3**
	42.5	747.72	0.61	286	52	71	75	1.52	4.3		16.49	**99.5**
7	45	749.35	0.64	285	52	71	75	1.5	4.3		16.88	**100.3**
	47.5	751.01	0.61	285	52	72	75	1.59	4.5		16.48	**99.6**
	50	752.61	0.62	285	52	72	76	1.52	4.2		16.61	**98.3**
8	52.5	754.23	0.65	285	52	72	76	1.57	4.4		17.01	**98.6**
	55	755.89	0.66	285	52	72	76	1.62	4.7		17.14	**98.7**
	57.5	757.57	0.68	286	52	72	76	1.65	4.8		17.41	**99.1**
9	60	759.29	0.7	285	53	72	76	1.7	4.9		17.65	**100.0**
	62.5	761.03	0.71	286	53	73	77	1.74	5.0		17.79	**99.7**
	65	762.77	0.72	286	53	73	77	1.77	5.0		17.91	**98.9**
10	67.5	764.54	0.68	285	53	73	77	1.8	5.0		17.40	**99.9**
	70	766.26	0.64	284	53	73	77	1.71	4.9		16.87	**99.8**
	72.5	767.96	0.63	284	53	74	77	1.61	4.8		16.73	**101.6**
11	75	769.61	0.54	188	53	74	77	1.58	4.7		14.46	**99.3**
	77.5	771.24	0.53	181	53	74	77	1.55	4.4		14.25	**98.9**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TC

Pitot Factor	0.843	**Filter (mg)**	2.4		
DGMCF	0.986	**Probe (mg)**	3.9		
Barometric Pressure	29.31 "Hg	**CWTR (g)**	461.1		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	18		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.362 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.2
CO2%	11.08
COppm	13.5

Measured H2O
16.0 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	80	772.88	0.56	183	53	74	77	1.51	4.4		14.67	**99.8**
12	82.5	774.55	0.55	183	53	74	78	1.63	4.8		14.54	**99.1**
	85	776.20	0.53	182	54	74	78	1.59	4.7		14.26	**98.7**
	87.5	777.85	0.54	183	54	74	78	1.54	4.7		14.40	**100.5**
	90	779.54								0.362		**101.9**
1	0	779.90	0.7	283	61	75	76	1.8	5.0		17.63	
	2.5	781.71	0.71	283	55	75	76	1.8	5.0		17.75	**103.3**
	5	783.48	0.71	282	52	75	76	1.8	5.0		17.74	**100.3**
2	7.5	785.25	0.7	282	51	75	76	1.8	5.0		17.62	**100.2**
	10	787.03	0.69	282	51	75	77	1.8	5.0		17.49	**101.5**
	12.5	788.76	0.69	282	51	75	77	1.75	5.0		17.49	**99.3**
3	15	790.51	0.68	281	51	75	77	1.75	5.0		17.35	**100.4**
	17.5	792.24	0.69	281	50	75	77	1.7	5.0		17.48	**99.9**
	20	793.98	0.69	281	50	75	77	1.7	5.0		17.48	**99.8**
4	22.5	795.71	0.67	281	50	75	78	1.7	5.0		17.22	**99.2**
	25	797.42	0.66	281	50	75	78	1.7	5.0		17.09	**99.4**
	27.5	799.14	0.66	281	50	75	78	1.7	5.0		17.09	**100.7**
5	30	800.84	0.63	281	50	75	78	1.7	5.0		16.70	**99.6**
	32.5	802.53	0.63	281	50	75	78	1.65	4.9		16.70	**101.3**
	35	804.21	0.64	281	50	75	78	1.6	4.9		16.83	**100.7**
6	37.5	805.89	0.56	281	50	75	79	1.62	4.9		15.75	**99.9**
	40	807.48	0.55	282	51	76	79	1.43	4.1		15.61	**100.7**
	42.5	809.04	0.54	282	51	76	79	1.39	4.0		15.47	**100.2**
7	45	810.59	0.6	282	51	76	79	1.35	4.0		16.31	**100.2**
	47.5	812.22	0.6	282	51	76	79	1.52	4.5		16.31	**99.9**
	50	813.85	0.61	281	51	76	79	1.52	4.5		16.43	**100.0**
8	52.5	815.49	0.61	282	51	76	79	1.55	4.7		16.44	**99.7**
	55	817.13	0.64	282	51	76	79	1.55	4.7		16.84	**99.8**
	57.5	818.83	0.65	282	52	76	80	1.63	4.9		16.97	**101.0**
9	60	820.52	0.68	283	52	77	80	1.63	4.9		17.37	**99.5**
	62.5	822.25	0.66	284	52	77	80	1.72	5.0		17.13	**99.6**
	65	823.98	0.69	284	52	77	80	1.68	5.0		17.51	**101.2**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TC

Pitot Factor	0.843	**Filter (mg)**	2.4		
DGMCF	0.986	**Probe (mg)**	3.9		
Barometric Pressure	29.31 "Hg	**CWTR (g)**	461.1		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	18		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.362 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.2
CO2%	11.08
COppm	13.5

Measured H2O
16.0 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
10	67.5	825.73	0.68	285	52	77	80	1.74	5.1		17.40	**100.1**
	70	827.47	0.67	285	52	77	80	1.71	5.1		17.27	**100.3**
	72.5	829.19	0.68	285	52	77	80	1.69	5.0		17.40	**99.9**
11	75	830.91	0.62	273	52	77	80	1.7	5.0		16.48	**99.2**
	77.5	832.59	0.62	268	52	77	80	1.6	4.9		16.42	**100.3**
	80	834.25	0.64	267	52	77	80	1.6	4.9		16.67	**99.3**
12	82.5	836.01	0.65	268	52	77	80	1.66	5.0		16.81	**103.3**
	85	837.65	0.64	268	52	77	80	1.69	5.1		16.68	**95.6**
	87.5	839.34	0.64	268	52	77	80	1.65	4.9		16.68	**99.3**
	90	841.08										**101.9**

ORTECH Environmental

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 2
Test No.:	3 - Partculate & Metals
Date:	March 19, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843	
DGM CORRECTION FACTOR	0.986	
NOZZLE DIAMETER	6.34	mm
DRY REF GAS VOLUME SAMPLED	3.448	m^3
AVGERGE ISOKINETICITY	101.1	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	138.0	°C
AVERAGE GAS MOISTURE BY VOLUME	17.4	%
AVERAGE GAS VELOCITY	17.53	m/s
BAROMETRIC PRESSURE (Station)	99.120	Kpa
STATIC PRESSURE	-2.814	Kpa
ABSOLUTE GAS PRESSURE	96.306	Kpa
OXYGEN CONCENTRATION	8.14	%
CARBON DIOXIDE CONCENTRATION	11.03	%
CARBON MONOXIDE CONCENTRATION	8.1	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	25.90	m^3/s
DRY REF GAS FLOWRATE	14.75	Rm^3/s
DRY ADJ GAS FLOWRATE	19.01	Rm^3/s
WET REF GAS FLOWRATE	17.86	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	2.7	mg
	-FILTER	3	mg
	-TOTAL	5.7	mg
DRY REF GAS VOLUME SAMPLED		3.448	m^3
PARTICULATE CONC. - ACTUAL		0.941	mg/m^3
PARTICULATE CONC. - DRY REF		1.653	mg/m^3
PARTICULATE CONC. - DRY ADJ		1.282	mg/m^3
PARTICULATE CONC. - WET REF		1.366	mg/m^3
PARTICULATE EMISSION RATE		0.024376	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TC/BP

Pitot Factor	0.843	**Filter (mg)**	3		
DGMCF	0.986	**Probe (mg)**	2.7		
Barometric Pressure	29.27 "Hg	**CWTR (g)**	511.8		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	21.8		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.436 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.14
CO2%	11.03
COppm	8.1

Measured H2O
17.4 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	841.50	0.81	282	68	75	75	2.05	4.2		19.02	
	2.5	843.42	0.8	286	57	75	75	2.05	4.2		18.95	**103.1**
	5	845.29	0.8	286	56	75	75	1.99	4.0		18.95	**101.4**
2	7.5	847.15	0.8	287	55	75	75	1.99	4.0		18.97	**100.9**
	10	848.99	0.8	287	55	75	75	1.99	4.0		18.97	**99.9**
	12.5	850.85	0.8	287	55	74	75	1.99	4.0		18.97	**101.0**
3	15	852.69	0.83	287	55	74	76	1.97	4.0		19.32	**100.0**
	17.5	854.58	0.81	287	55	74	76	2.05	4.2		19.08	**100.7**
	20	856.45	0.81	288	54	74	77	2	4.2		19.10	**100.9**
4	22.5	858.32	0.74	288	54	75	77	2	4.2		18.25	**100.8**
	25	860.12	0.72	288	54	75	77	1.84	3.9		18.01	**101.5**
	27.5	861.99	0.71	287	54	75	78	1.8	3.8		17.87	**106.8**
5	30	863.67	0.66	287	54	75	78	1.8	3.8		17.23	**96.5**
	32.5	865.37	0.66	286	55	75	78	1.67	3.5		17.22	**101.3**
	35	867.08	0.56	286	55	75	78	1.67	3.5		15.86	**101.7**
6	37.5	868.67	0.56	286	56	75	79	1.4	3.2		15.86	**102.7**
	40	870.23	0.57	286	56	76	79	1.4	3.2		16.00	**100.6**
	42.5	871.82	0.57	286	56	76	79	1.43	3.4		16.00	**101.5**
7	45	873.40	0.6	286	57	76	79	1.42	3.3		16.41	**100.9**
	47.5	875.01	0.58	286	55	76	79	1.52	3.4		16.14	**100.2**
	50	876.62	0.58	285	55	76	80	1.45	3.2		16.13	**102.0**
8	52.5	878.19	0.63	285	54	76	80	1.45	3.2		16.81	**99.3**
	55	879.84	0.62	286	53	76	80	1.59	3.5		16.69	**100.1**
	57.5	881.48	0.64	286	53	77	80	1.55	3.5		16.95	**100.4**
9	60	883.15	0.67	287	53	77	80	1.62	3.6		17.36	**100.5**
	62.5	884.85	0.68	287	53	77	80	1.7	3.8		17.49	**100.1**
	65	886.57	0.68	287	52	77	80	1.7	3.8		17.49	**100.5**
10	67.5	888.29	0.66	286	52	77	80	1.7	3.8		17.22	**100.5**
	70	890.00	0.66	286	52	77	80	1.65	3.7		17.22	**101.3**
	72.5	891.69	0.69	287	52	77	80	1.65	3.7		17.61	**100.2**
11	75	893.45	0.72	287	52	77	80	1.72	4.0		17.99	**102.1**
	77.5	895.22	0.61	210	52	77	80	1.79	4.1		15.68	**100.5**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TC/BP

Pitot Factor	0.843	**Filter (mg)**	3		
DGMCF	0.986	**Probe (mg)**	2.7		
Barometric Pressure	29.27 "Hg	**CWTR (g)**	511.8		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	21.8		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.436 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.14
CO2%	11.03
COppm	8.1

Measured H2O
17.4 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	80	896.96	0.58	206	52	77	80	1.7	4.0		15.25	**101.7**
12	82.5	898.66	0.6	206	52	77	80	1.61	3.9		15.51	**101.6**
	85	900.37	0.59	205	52	77	80	1.69	3.9		15.37	**100.4**
	87.5	902.04	0.58	206	52	77	80	1.65	3.9		15.25	**98.9**
	90	903.74								0.436		**101.8**
1	0	904.18	0.78	287	58	77	78	2	4.0		18.73	
	2.5	906.03	0.8	289	52	77	78	2	4.0		18.99	**101.2**
	5	907.90	0.82	289	50	77	78	2	4.0		19.23	**101.2**
2	7.5	909.79	0.82	288	48	77	79	2.1	4.0		19.22	**101.0**
	10	911.67	0.81	288	47	77	79	2.1	4.0		19.10	**100.3**
	12.5	913.57	0.81	288	47	77	79	2.1	4.0		19.10	**102.0**
3	15	915.47	0.8	288	47	77	79	2.1	4.0		18.98	**102.0**
	17.5	917.34	0.79	288	47	77	79	2.05	4.0		18.86	**101.0**
	20	919.23	0.79	288	47	77	79	2	4.0		18.86	**102.7**
4	22.5	921.10	0.75	288	47	77	80	2	4.0		18.38	**101.6**
	25	922.92	0.75	288	47	77	80	1.9	4.0		18.38	**101.4**
	27.5	924.74	0.73	288	47	77	80	1.9	4.0		18.13	**101.4**
5	30	926.55	0.69	288	47	77	80	1.9	4.0		17.63	**102.2**
	32.5	928.33	0.68	287	47	77	80	1.8	4.0		17.49	**103.4**
	35	930.09	0.68	286	47	77	80	1.8	4.0		17.47	**102.9**
6	37.5	931.83	0.63	286	47	77	80	1.75	4.0		16.82	**101.7**
	40	933.49	0.63	287	48	77	81	1.6	3.9		16.83	**100.7**
	42.5	935.15	0.63	287	48	77	81	1.6	3.9		16.83	**100.7**
7	45	936.82	0.66	287	48	78	81	1.6	3.9		17.23	**101.3**
	47.5	938.55	0.65	287	48	78	81	1.7	4.0		17.10	**102.4**
	50	940.27	0.65	286	48	78	81	1.7	4.0		17.08	**102.6**
8	52.5	941.96	0.67	286	48	78	81	1.65	4.0		17.35	**100.8**
	55	943.68	0.66	286	48	78	81	1.7	4.0		17.22	**101.0**
	57.5	945.40	0.66	286	48	78	81	1.7	4.0		17.22	**101.8**
9	60	947.11	0.69	285	48	78	81	1.7	4.0		17.59	**101.2**
	62.5	948.86	0.72	286	48	78	81	1.8	4.0		17.98	**101.2**
	65	950.67	0.69	286	48	78	82	1.9	4.0		17.60	**102.6**

ORTECH Environmental

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - Partculate & Metals	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TC/BP

Pitot Factor	0.843	**Filter (mg)**	3		
DGMCF	0.986	**Probe (mg)**	2.7		
Barometric Pressure	29.27 "Hg	**CWTR (g)**	511.8		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	21.8		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.436 ft^3	
Length	0.000 ft	**Reading Interval**		2.5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.14
CO2%	11.03
COppm	8.1

Measured H2O
17.4 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
10	67.5	952.43	0.69	282	48	78	82	1.8	4.0		17.56	**101.8**
	70	954.17	0.66	282	48	78	82	1.75	4.0		17.17	**100.4**
	72.5	955.85	0.65	280	48	78	82	1.7	4.0		17.02	**99.1**
11	75	957.56	0.65	280	48	78	82	1.7	4.0		17.02	**101.5**
	77.5	959.27	0.67	280	48	78	82	1.7	4.0		17.28	**101.5**
	80	960.98	0.65	280	48	79	82	1.7	4.0		17.02	**99.9**
12	82.5	962.67	0.65	280	49	79	82	1.7	4.0		17.02	**100.2**
	85	964.38	0.67	280	49	79	82	1.7	4.0		17.28	**101.4**
	87.5	966.10	0.67	280	49	79	82	1.7	4.0		17.28	**100.4**
	90	967.79										**98.7**

APPENDIX 23

Particle Size Distribution Test Emission Calculations
(12 pages)

EPA Draft Method - $PM_{10/2.5}$ Calculations

Date:	March 19, 2024
Client:	Covanta
Plant:	DYEC
Location:	Courtice, Ontario
Test No.:	1
Test Location:	APC Outlet No. 1

Project No.: 22327
Operator: DU

Stack Diameter (m)	1.37
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	1.48
No. of Traverses	2
No. of Points Per Traverse	6
Data Readings Per Point	1
DGMCF	0.987
Pitot Factor	0.843
Barometric Pressure (" Hg)	29.43
Static Pressure ("H_2O)	-11.90
Oxygen Content (%)	8.75
Carbon Dioxide Content (%)	10.41
Carbon Monoxide Content (PPM)	8
Assumed Moisture (%)	
Nozzle Diameter (inches)	0.1776

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.35 Rft^3/min*	10.0 l/min*
Cyclone Qs_{actual}	0.59 ft^3/min	16.8 l/min
Stack Gas Sampling Parameters		
V_{ms}	42.3 Rft^3*	1.197 Rm^3*
Average Cyclone I Cut Diameter		10.18 µm
Average Cyclone IV Cut Diameter		2.34 µm
Average Isokineticity		91.2 %
Stack Gas Physical Parameters		
B_{ws}	14.3 % v/v	
Average m	220.2 (dimensionless)	
M_d	30.02 lbs/lbs mole	
M_w	28.29 lbs/lbs mole	
Average T_s	279 °F	137 °C
Average U_s	62.8 ft/s	19.1 m/s
Stack Area	15.9 ft^2	1.48 m^2
Actual Q_s	60022 ACFM	28.3 m^3/s
Wet Reference Q_s	41612 SCFM*	19.6 Rm^3/s*
Dry Reference Q_s	35642 SCFM*	16.8 Rm^3/s*

Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part. (a)	0.92 mg/Rm^3*	0.0155 g/s
Total Part. (b)	7.60 mg/Rm^3*	0.128 g/s
PM_{10} Part. (b)	7.43 mg/Rm^3*	0.125 g/s
$PM_{2.5}$ Part. (b)	7.35 mg/Rm^3*	0.124 g/s
Cond. Part.	6.68 mg/Rm^3*	0.112 g/s

(a) does not include condensibles
(b) includes condensibles

Impinger Recovery	**Impinger 1**	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**
initial volume or weight (ml or mg)	491.0	620.5	732.4	928.5	
final volume or weight (ml or mg)	633.0	620.5	728.9	937.5	
gain in volume or weight (ml or mg)	142.0	0.0	-3.5	9.0	0.0
				TOTAL	**147.5**

Particulate Weight Gains	**>10mm**	**<10mm, >2.5mm**	**<2.5mm**	**back-up filter**	**cond. part.**
particulate weight gains (mg)	0.2	0.1	0.6	0.2	8.0

***Reference conditions: 77°F, 29.92 in. Hg or 25°C, 101.3 KPa**

Test Data Page Calculations

Date: March 19, 2024	**Plant:** DYEC	**Test No.:** 1	**Project No.:** 22327
Client: Covanta	**Location:** Courtice, Ontario	**Test location:** APC Outlet No. 1	**Operator:** DU

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	Delta P ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
2	1	0.00	10.8	0.00	0.92	0.35	278	66	66	0.38	3.0	66.0	10.11	2.31	87.8
	2	10.8	10.4	3.86	0.96	0.35	279	67	66	0.38	3.0	67.4	10.10	2.31	86.1
	3	21.1	10.4	7.59	0.88	0.35	279	68	66	0.38	3.0	64.6	10.41	2.43	86.3
	4	31.5	10.2	11.17	0.85	0.35	280	69	67	0.38	3.0	63.5	10.13	2.32	91.3
	5	41.8	9.4	14.85	0.74	0.35	280	70	67	0.38	3.0	59.2	10.29	2.39	95.7
	6	51.2	9.1	18.16	0.64	0.35	280	70	67	0.38	3.0	55.1	10.11	2.31	105.6
		60.3		21.45											
1	1	0.00	10.7	21.45	0.98	0.35	280	70	68	0.38	3.0	68.2	10.38	2.42	82.1
	2	10.7	10.7	25.17	1.00	0.35	278	71	68	0.38	3.0	68.8	10.21	2.35	83.1
	3	21.4	10.5	28.98	0.90	0.35	279	71	68	0.38	3.0	65.3	10.06	2.29	89.5
	4	31.9	10.0	32.80	0.78	0.35	279	71	68	0.38	3.0	60.8	10.14	2.32	95.1
	5	41.9	9.0	36.39	0.70	0.35	279	71	69	0.38	3.0	57.6	10.14	2.32	100.4
	6	50.9	8.8	39.62	0.69	0.35	280	71	69	0.38	3.0	57.2	10.13	2.32	101.4
		59.7		42.80											
Averages					**0.84**		**279**	**68**		**0.38**		**62.8**	**10.18**	**2.34**	**91.2**

EPA Draft Method - $PM_{10/2.5}$ Calculations

Date:	March 19, 2024
Client:	Covanta
Plant:	DYEC
Location:	Courtice, Ontario
Test No.:	2
Test Location:	APC Outlet No. 1

Project No.: 22327
Operator: DU

Stack Diameter (m)	1.37
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	1.48
No. of Traverses	2
No. of Points Per Traverse	6
Data Readings Per Point	1
DGMCF	0.987
Pitot Factor	0.843
Barometric Pressure (" Hg)	29.34
Static Pressure ("H_2O)	-11.90
Oxygen Content (%)	9.12
Carbon Dioxide Content (%)	10.21
Carbon Monoxide Content (PPM)	7.9
Assumed Moisture (%)	
Nozzle Diameter (inches)	0.1776

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.36 Rft^3/min*	10.1 l/min*
Cyclone Qs_{actual}	0.62 ft^3/min	17.5 l/min
Stack Gas Sampling Parameters		
V_{ms}	42.7 Rft^3*	1.209 Rm^3*
Average Cyclone I Cut Diameter		9.93 µm
Average Cyclone IV Cut Diameter		2.25 µm
Average Isokineticity		93.3 %
Stack Gas Physical Parameters		
B_{ws}	16.3 % v/v	
Average m	220.0 (dimensionless)	
M_d	30.00 lbs/lbs mole	
M_w	28.05 lbs/lbs mole	
Average T_s	283 °F	139 °C
Average U_s	63.8 ft/s	19.5 m/s
Stack Area	15.9 ft^2	1.48 m^2
Actual Q_s	61010 ACFM	28.8 m^3/s
Wet Reference Q_s	41946 SCFM*	19.8 Rm^3/s*
Dry Reference Q_s	35122 SCFM*	16.6 Rm^3/s*

Summary of Particulate Emission Rates	**Dry Ref. Conc.**	**Emission Rate**
Total Part. (a)	1.65 mg/Rm^3*	0.0274 g/s
Total Part. (b)	7.94 mg/Rm^3*	0.132 g/s
PM_{10} Part. (b)	7.44 mg/Rm^3*	0.123 g/s
$PM_{2.5}$ Part. (b)	7.11 mg/Rm^3*	0.118 g/s
Cond. Part.	6.29 mg/Rm^3*	0.104 g/s

(a) does not include condensibles
(b) includes condensibles

Impinger Recovery	**Impinger 1**	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**
initial volume or weight (ml or mg)	526.0	655.5	671.3	981.0	
final volume or weight (ml or mg)	691.5	655.5	670.1	989.5	
gain in volume or weight (ml or mg)	165.5	0.0	-1.2	8.5	0.0
				TOTAL	**172.8**

Particulate Weight Gains	**>10mm**	**<10mm, >2.5mm**	**<2.5mm**	**back-up filter**	**cond. part.**
particulate weight gains (mg)	0.6	0.4	0.2	<0.8	7.6

***Reference conditions: 77°F, 29.92 in. Hg or 25°C, 101.3 KPa**

Test Data Page Calculations

Date: March 19, 2024	**Plant:** DYEC	**Test No.:** 2	**Project No.:** 22327
Client: Covanta	**Location:** Courtice, Ontario	**Test location:** APC Outlet No. 1	**Operator:** DU

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	Delta P ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
2	1	0.00	10.5	42.85	0.97	0.35	283	70	69	0.38	4.0	68.4	9.72	2.17	90.2
	2	10.5	10.7	46.77	0.99	0.35	283	67	67	0.38	4.0	69.1	10.09	2.32	84.7
	3	21.3	10.3	50.55	0.95	0.35	284	67	68	0.38	4.0	67.7	9.96	2.27	88.1
	4	31.5	10.1	54.24	0.89	0.35	285	67	68	0.38	4.0	65.6	9.62	2.13	95.7
	5	41.6	9.4	58.05	0.75	0.35	285	70	68	0.38	4.0	60.2	9.55	2.11	105.3
	6	51.1	8.8	61.65	0.65	0.35	283	71	68	0.38	4.0	56.0	10.07	2.31	104.8
		59.8		64.76											
1	1	0.00	10.9	64.76	0.92	0.35	281	71	69	0.38	4.0	66.5	10.03	2.29	88.4
	2	10.9	11.0	68.63	0.92	0.35	282	72	70	0.38	4.0	66.5	10.12	2.33	87.4
	3	21.8	10.4	72.50	0.85	0.35	281	73	70	0.38	4.0	63.9	9.99	2.28	92.4
	4	32.2	9.7	76.24	0.85	0.35	282	73	70	0.38	4.0	64.0	9.96	2.26	93.0
	5	41.9	9.2	79.74	0.78	0.35	284	73	70	0.38	4.0	61.3	9.99	2.28	96.8
	6	51.1	9.1	83.04	0.67	0.35	284	73	70	0.38	4.0	56.9	10.01	2.28	104.2
		60.2		86.31											
Averages					**0.85**		**283**	**70**		**0.38**		**63.8**	**9.93**	**2.25**	**93.3**

EPA Draft Method - $PM_{10/2.5}$ Calculations

Date:	March 19, 2024
Client:	Covanta
Plant:	DYEC
Location:	Courtice, Ontario
Test No.:	3
Test Location:	APC Outlet No. 1

Project No.: 22327
Operator: DU

Stack Diameter (m)	1.37
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	1.48
No. of Traverses	2
No. of Points Per Traverse	6
Data Readings Per Point	1
DGMCF	0.987
Pitot Factor	0.843
Barometric Pressure (" Hg)	29.28
Static Pressure ("H_2O)	-11.90
Oxygen Content (%)	8.73
Carbon Dioxide Content (%)	10.34
Carbon Monoxide Content (PPM)	6.3
Assumed Moisture (%)	
Nozzle Diameter (inches)	0.1776

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.35 Rft^3/min*	10.0 l/min*
Cyclone Qs_{actual}	0.60 ft^3/min	17.0 l/min
Stack Gas Sampling Parameters		
V_{ms}	42.4 Rft^3*	1.200 Rm^3*
Average Cyclone I Cut Diameter		10.07 µm
Average Cyclone IV Cut Diameter		2.30 µm
Average Isokineticity		93.6 %
Stack Gas Physical Parameters		
B_{ws}	15.0 % v/v	
Average m	219.3 (dimensionless)	
M_d	30.00 lbs/lbs mole	
M_w	28.20 lbs/lbs mole	
Average T_s	278 °F	137 °C
Average U_s	62.0 ft/s	18.9 m/s
Stack Area	15.9 ft^2	1.48 m^2
Actual Q_s	59244 ACFM	28.0 m^3/s
Wet Reference Q_s	40935 SCFM*	19.3 Rm^3/s*
Dry Reference Q_s	34800 SCFM*	16.4 Rm^3/s*

Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part. (a)	2.25 mg/Rm^3*	0.0370 g/s
Total Part. (b)	8.25 mg/Rm^3*	0.136 g/s
PM_{10} Part. (b)	7.75 mg/Rm^3*	0.127 g/s
$PM_{2.5}$ Part. (b)	7.50 mg/Rm^3*	0.123 g/s
Cond. Part.	6.00 mg/Rm^3*	0.099 g/s

(a) does not include condensibles
(b) includes condensibles

Impinger Recovery	**Impinger 1**	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**
initial volume or weight (ml or mg)	491.0	620.5	728.9	937.5	
final volume or weight (ml or mg)	640.0	620.5	727.0	946.0	
gain in volume or weight (ml or mg)	149.0	0.0	-1.9	8.5	0.0
				TOTAL	**155.6**

Particulate Weight Gains	**>10mm**	**<10mm, >2.5mm**	**<2.5mm**	**back-up filter**	**cond. part.**
particulate weight gains (mg)	0.6	0.3	1.0	<0.8	7.2

***Reference conditions: 77°F, 29.92 in. Hg or 25°C, 101.3 KPa**

Test Data Page Calculations

Date: March 19, 2024	**Plant:** DYEC	**Test No.:** 3	**Project No.:** 22327
Client: Covanta	**Location:** Courtice, Ontario	**Test location:** APC Outlet No. 1	**Operator:** DU

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	Delta P ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
2	1	0.00	10.7	87.27	0.94	0.35	280	73	72	0.38	4.0	67.0	10.15	2.33	86.2
	2	10.7	10.8	91.11	0.85	0.35	278	73	72	0.38	4.0	63.7	10.05	2.29	91.8
	3	21.5	10.6	95.04	0.86	0.35	278	73	72	0.38	4.0	64.0	10.09	2.31	90.7
	4	32.1	10.3	98.87	0.85	0.35	278	73	72	0.38	4.0	63.7	9.93	2.25	93.3
	5	42.4	9.4	102.66	0.72	0.35	278	73	72	0.38	4.0	58.6	10.12	2.32	98.8
	6	51.8	8.8	106.05	0.62	0.35	278	75	73	0.38	4.0	54.4	9.84	2.21	110.7
		60.6		109.34											
1	1	0.00	10.4	109.34	0.97	0.35	278	76	74	0.38	4.0	68.0	10.30	2.39	83.0
	2	10.4	10.4	113.02	0.95	0.35	277	76	74	0.38	4.0	67.3	9.93	2.25	88.2
	3	20.9	10.0	116.89	0.88	0.35	277	76	74	0.38	4.0	64.7	10.17	2.34	88.7
	4	30.9	10.0	120.49	0.75	0.35	277	76	74	0.38	4.0	59.8	10.17	2.34	96.0
	5	40.9	9.6	124.09	0.67	0.35	277	76	74	0.38	4.0	56.5	10.12	2.32	102.3
	6	50.5	8.9	127.56	0.66	0.35	278	77	75	0.38	4.0	56.1	10.02	2.28	104.6
		59.4		130.83											
Averages					**0.81**		**278**	**74**		**0.38**		**62.0**	**10.07**	**2.30**	**93.6**

EPA Draft Method - $PM_{10/2.5}$ Calculations

Date:	March 18, 2024
Client:	Covanta
Plant:	DYEC
Location:	Courtice, Ontario
Test No.:	1
Test Location:	APC Outlet No. 2

Project No.: 22327
Operator: DU

Stack Diameter (m)	1.37
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	1.48
No. of Traverses	2
No. of Points Per Traverse	6
Data Readings Per Point	1
DGMCF	0.987
Pitot Factor	0.843
Barometric Pressure (" Hg)	29.44
Static Pressure ("H_2O)	-11.80
Oxygen Content (%)	8.57
Carbon Dioxide Content (%)	10.75
Carbon Monoxide Content (PPM)	7.6
Assumed Moisture (%)	
Nozzle Diameter (inches)	0.1776

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.35 Rft^3/min*	9.9 l/min*
Cyclone Qs_{actual}	0.61 ft^3/min	17.4 l/min
Stack Gas Sampling Parameters		
V_{ms}	42.1 Rft^3*	1.192 Rm^3*
Average Cyclone I Cut Diameter		9.94 µm
Average Cyclone IV Cut Diameter		2.25 µm
Average Isokineticity		101.9 %
Stack Gas Physical Parameters		
B_{ws}	17.2 % v/v	
Average m	218.8 (dimensionless)	
M_d	30.06 lbs/lbs mole	
M_w	27.99 lbs/lbs mole	
Average T_s	282 °F	139 °C
Average U_s	57.9 ft/s	17.6 m/s
Stack Area	15.9 ft^2	1.48 m^2
Actual Q_s	55324 ACFM	26.1 m^3/s
Wet Reference Q_s	38223 SCFM*	18.0 Rm^3/s*
Dry Reference Q_s	31667 SCFM*	14.9 Rm^3/s*

Summary of Particulate Emission Rates	**Dry Ref. Conc.**	**Emission Rate**
Total Part. (a)	1.76 mg/Rm^3*	0.0263 g/s
Total Part. (b)	7.13 mg/Rm^3*	0.107 g/s
PM_{10} Part. (b)	6.71 mg/Rm^3*	0.100 g/s
$PM_{2.5}$ Part. (b)	6.21 mg/Rm^3*	0.093 g/s
Cond. Part.	5.37 mg/Rm^3*	0.080 g/s

(a) does not include condensibles
(b) includes condensibles

Impinger Recovery	**Impinger 1**	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**
initial volume or weight (ml or mg)	525.9	655.7	673.8	962.7	
final volume or weight (ml or mg)	700.0	655.7	672.8	971.2	
gain in volume or weight (ml or mg)	174.1	0.0	-1.0	8.5	0.0
				TOTAL	**181.6**

Particulate Weight Gains	**>10mm**	**<10mm, >2.5mm**	**<2.5mm**	**back-up filter**	**cond. part.**
particulate weight gains (mg)	0.5	0.6	0.2	<0.8	6.4

***Reference conditions: 77°F, 29.92 in. Hg or 25°C, 101.3 KPa**

Test Data Page Calculations

Date: March 18, 2024	**Plant:** DYEC	**Test No.:** 1	**Project No.:** 22327
Client: Covanta	**Location:** Courtice, Ontario	**Test location:** APC Outlet No. 2	**Operator:** DU

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	Delta P ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
1	1	0.00	10.5	69.96	0.73	0.35	276	65	64	0.38	4.0	59.0	9.79	2.19	101.7
	2	10.5	10.8	73.74	0.71	0.35	280	66	65	0.38	4.0	58.3	9.56	2.10	107.2
	3	21.3	10.4	77.75	0.68	0.35	280	67	66	0.38	4.0	57.1	9.90	2.24	104.2
	4	31.7	10.2	81.45	0.71	0.35	283	68	67	0.38	4.0	58.4	9.93	2.25	101.9
	5	41.9	9.7	85.06	0.71	0.35	283	70	67	0.38	4.0	58.4	10.03	2.29	100.4
	6	51.5	9.0	88.45	0.62	0.35	283	71	68	0.38	4.0	54.6	9.91	2.24	109.3
		60.5		91.67											
2	1	0.00	10.9	91.67	0.75	0.35	284	71	68	0.38	4.0	60.1	9.97	2.27	98.6
	2	10.9	10.8	95.52	0.73	0.35	283	72	69	0.38	4.0	59.2	10.15	2.34	97.3
	3	21.6	9.9	99.24	0.77	0.35	283	72	69	0.38	4.0	60.9	9.97	2.27	97.2
	4	31.6	9.6	102.76	0.72	0.35	284	72	69	0.38	4.0	58.9	10.08	2.31	99.1
	5	41.2	9.4	106.12	0.67	0.35	284	72	69	0.38	4.0	56.8	9.97	2.27	104.3
	6	50.6	8.9	109.46	0.58	0.35	284	72	69	0.38	4.0	52.8	10.02	2.29	111.4
		59.5		112.59											
Averages					**0.70**		**282**	**69**		**0.38**		**57.9**	**9.94**	**2.25**	**101.9**

EPA Draft Method - $PM_{10/2.5}$ Calculations

Date:	March 18, 2024
Client:	Covanta
Plant:	DYEC
Location:	Courtice, Ontario
Test No.:	2
Test Location:	APC Outlet No. 2

Project No.: 22327
Operator: DU

Stack Diameter (m)	1.37
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	1.48
No. of Traverses	2
No. of Points Per Traverse	6
Data Readings Per Point	1
DGMCF	0.987
Pitot Factor	0.843
Barometric Pressure (" Hg)	29.44
Static Pressure ("H_2O)	-11.80
Oxygen Content (%)	8.30
Carbon Dioxide Content (%)	11.05
Carbon Monoxide Content (PPM)	9.1
Assumed Moisture (%)	
Nozzle Diameter (inches)	0.1776

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.35 Rft^3/min*	9.9 l/min*
Cyclone Qs_{actual}	0.61 ft^3/min	17.2 l/min
Stack Gas Sampling Parameters		
V_{ms}	41.9 Rft^3*	1.188 Rm^3*
Average Cyclone I Cut Diameter		9.99 µm
Average Cyclone IV Cut Diameter		2.27 µm
Average Isokineticity		92.7 %
Stack Gas Physical Parameters		
B_{ws}	16.8 % v/v	
Average m	218.9 (dimensionless)	
M_d	30.10 lbs/lbs mole	
M_w	28.07 lbs/lbs mole	
Average T_s	282 °F	139 °C
Average U_s	63.5 ft/s	19.3 m/s
Stack Area	15.9 ft^2	1.48 m^2
Actual Q_s	60668 ACFM	28.6 m^3/s
Wet Reference Q_s	41933 SCFM*	19.8 Rm^3/s*
Dry Reference Q_s	34883 SCFM*	16.5 Rm^3/s*

Summary of Particulate Emission Rates	**Dry Ref. Conc.**	**Emission Rate**
Total Part. (a)	1.85 mg/Rm^3*	0.0305 g/s
Total Part. (b)	8.67 mg/Rm^3*	0.143 g/s
PM_{10} Part. (b)	8.34 mg/Rm^3*	0.137 g/s
$PM_{2.5}$ Part. (b)	8.25 mg/Rm^3*	0.136 g/s
Cond. Part.	6.82 mg/Rm^3*	0.112 g/s

(a) does not include condensibles
(b) includes condensibles

Impinger Recovery	**Impinger 1**	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**
initial volume or weight (ml or mg)	491.2	620.5	732.9	919.5	
final volume or weight (ml or mg)	659.3	620.5	732.4	928.5	
gain in volume or weight (ml or mg)	168.1	0.0	-0.5	9.0	0.0
				TOTAL	**176.6**

Particulate Weight Gains	**>10mm**	**<10mm, >2.5mm**	**<2.5mm**	**back-up filter**	**cond. part.**
particulate weight gains (mg)	0.4	0.1	0.9	<0.8	8.1

***Reference conditions: 77°F, 29.92 in. Hg or 25°C, 101.3 KPa**

Test Data Page Calculations

Date: March 18, 2024	**Plant:** DYEC	**Test No.:** 2	**Project No.:** 22327
Client: Covanta	**Location:** Courtice, Ontario	**Test location:** APC Outlet No. 2	**Operator:** DU

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	Delta P ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
2	1	0.00	10.2	12.77	0.95	0.35	282	71	70	0.38	4.0	67.5	9.96	2.26	87.7
	2	10.2	10.1	16.42	0.88	0.35	281	70	70	0.38	4.0	64.9	9.99	2.27	90.6
	3	20.3	9.9	20.00	0.86	0.35	282	71	70	0.38	4.0	64.2	9.86	2.22	93.4
	4	30.2	10.1	23.57	0.84	0.35	282	72	71	0.38	4.0	63.4	9.93	2.25	93.6
	5	40.3	10.1	27.19	0.70	0.35	282	72	71	0.38	4.0	57.9	9.91	2.24	102.8
	6	50.4	9.4	30.82	0.61	0.35	281	72	71	0.38	4.0	54.0	10.02	2.28	108.4
		59.8		34.16											
1	1	0.00	10.4	34.16	0.99	0.35	281	74	72	0.38	4.0	68.8	9.95	2.26	85.9
	2	10.4	10.2	37.88	0.97	0.35	282	75	72	0.38	4.0	68.2	10.04	2.29	85.8
	3	20.6	10.5	41.51	0.93	0.35	283	75	72	0.38	4.0	66.8	10.05	2.30	87.5
	4	31.1	10.2	45.23	0.86	0.35	282	76	73	0.38	4.0	64.2	10.02	2.29	91.3
	5	41.3	9.8	48.85	0.84	0.35	282	76	73	0.38	4.0	63.4	10.05	2.29	92.1
	6	51.1	9.1	52.33	0.71	0.35	283	76	73	0.38	4.0	58.4	10.13	2.33	99.1
		60.2		55.53											
Averages					**0.85**		**282**	**72**		**0.38**		**63.5**	**9.99**	**2.27**	**92.7**

EPA Draft Method - $PM_{10/2.5}$ Calculations

Date:	March 18, 2024
Client:	Covanta
Plant:	DYEC
Location:	Courtice, Ontario
Test No.:	3
Test Location:	APC Outlet No. 2

Project No.: 22327
Operator: DU

Stack Diameter (m)	1.37
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	1.48
No. of Traverses	2
No. of Points Per Traverse	6
Data Readings Per Point	1
DGMCF	0.987
Pitot Factor	0.843
Barometric Pressure (" Hg)	29.46
Static Pressure ("H_2O)	-11.80
Oxygen Content (%)	8.13
Carbon Dioxide Content (%)	11.06
Carbon Monoxide Content (PPM)	9.8
Assumed Moisture (%)	
Nozzle Diameter (inches)	0.1776

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.35 Rft^3/min*	9.9 l/min*
Cyclone Qs_{actual}	0.61 ft^3/min	17.3 l/min
Stack Gas Sampling Parameters		
V_{ms}	42.2 Rft^3*	1.194 Rm^3*
Average Cyclone I Cut Diameter		9.92 µm
Average Cyclone IV Cut Diameter		2.25 µm
Average Isokineticity		98.0 %
Stack Gas Physical Parameters		
B_{ws}	17.1 % v/v	
Average m	218.1 (dimensionless)	
M_d	30.09 lbs/lbs mole	
M_w	28.03 lbs/lbs mole	
Average T_s	280 °F	138 °C
Average U_s	59.8 ft/s	18.2 m/s
Stack Area	15.9 ft^2	1.48 m^2
Actual Q_s	57167 ACFM	27.0 m^3/s
Wet Reference Q_s	39635 SCFM*	18.7 Rm^3/s*
Dry Reference Q_s	32862 SCFM*	15.5 Rm^3/s*

Summary of Particulate Emission Rates	**Dry Ref. Conc.**	**Emission Rate**
Total Part. (a)	1.68 mg/Rm^3*	0.0260 g/s
Total Part. (b)	7.12 mg/Rm^3*	0.110 g/s
PM_{10} Part. (b)	6.70 mg/Rm^3*	0.104 g/s
$PM_{2.5}$ Part. (b)	6.45 mg/Rm^3*	0.100 g/s
Cond. Part.	5.45 mg/Rm^3*	0.084 g/s

(a) does not include condensibles
(b) includes condensibles

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5
initial volume or weight (ml or mg)	526.0	655.5	672.8	971.2	
final volume or weight (ml or mg)	698.7	655.5	671.3	981.0	
gain in volume or weight (ml or mg)	172.7	0.0	-1.5	9.8	0.0
				TOTAL	**181.0**

Particulate Weight Gains	>10mm	<10mm, >2.5mm	<2.5mm	back-up filter	cond. part.
particulate weight gains (mg)	0.5	0.3	<0.4	<0.8	6.5

***Reference conditions: 77°F, 29.92 in. Hg or 25°C, 101.3 KPa**

Test Data Page Calculations

Date: March 18, 2024	**Plant:** DYEC	**Test No.:** 3	**Project No.:** 22327
Client: Covanta	**Location:** Courtice, Ontario	**Test location:** APC Outlet No. 2	**Operator:** DU

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	Delta P ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
2	1	0.00	10.6	55.63	0.93	0.35	281	75	74	0.38	4.0	66.7	9.94	2.25	88.6
	2	10.6	10.2	59.44	0.91	0.35	281	74	75	0.38	4.0	66.0	9.92	2.24	89.9
	3	20.9	10.1	63.12	0.86	0.35	280	75	73	0.38	4.0	64.1	9.81	2.20	93.8
	4	31.0	10.0	66.81	0.79	0.35	280	75	73	0.38	4.0	61.5	9.90	2.24	96.6
	5	41.0	9.1	70.41	0.71	0.35	280	75	73	0.38	4.0	58.3	9.85	2.22	102.7
	6	50.1	8.5	73.72	0.64	0.35	280	75	73	0.38	4.0	55.3	9.96	2.26	106.4
		58.6		76.76											
1	1	0.00	10.8	76.76	0.76	0.35	280	75	73	0.38	4.0	60.3	10.02	2.29	96.8
	2	10.8	10.7	80.60	0.75	0.35	279	76	74	0.38	4.0	59.8	9.85	2.22	99.7
	3	21.6	10.5	84.50	0.73	0.35	280	76	74	0.38	4.0	59.1	9.93	2.25	100.1
	4	32.1	10.1	88.28	0.70	0.35	280	76	74	0.38	4.0	57.8	9.94	2.25	102.1
	5	42.2	10.0	91.91	0.68	0.35	280	77	74	0.38	4.0	57.0	10.10	2.32	101.3
	6	52.2	9.2	95.42	0.56	0.35	281	77	74	0.38	4.0	51.8	9.86	2.22	115.6
		61.4		98.76											
Averages					**0.75**		**280**	**75**		**0.38**		**59.8**	**9.92**	**2.25**	**98.0**

APPENDIX 24

Acid Gases Test Emission Calculations
(12 pages)

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test Location:	APC Outlet No. 1
Test No.:	1 - M26A
Date:	March 18, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	1.292	m^3
AVGERGE ISOKINETICITY	98.8	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	136.1	°C
AVERAGE GAS MOISTURE BY VOLUME	15.7	%
AVERAGE GAS VELOCITY	18.26	m/s
BAROMETRIC PRESSURE (Station)	99.729	Kpa
STATIC PRESSURE	-2.918	Kpa
ABSOLUTE GAS PRESSURE	96.811	Kpa
OXYGEN CONCENTRATION	8.76	%
CARBON DIOXIDE CONCENTRATION	10.41	%
CARBON MONOXIDE CONCENTRATION	5.7	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	26.98	m^3/s
DRY REF GAS FLOWRATE	15.82	Rm^3/s
DRY ADJ GAS FLOWRATE	19.40	Rm^3/s
WET REF GAS FLOWRATE	18.78	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		1.292	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, Ontario
Test No.:	1 - M26A	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.45 "Hg	**CWTR (g)**	165.6		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	11.7		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		1	
		Number of points / Port		1	

Combustion Gases	
O2%	8.76
CO2%	10.41
COppm	5.7

Measured H2O
15.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	0	713.43	0.78	275	62	62	62	2	5.0		18.50	
	5	717.12	0.8	275	48	62	62	2.05	5.0		18.74	**97.8**
	10	720.87	0.77	275	46	62	62	2	5.0		18.39	**98.2**
	15	724.59	0.76	276	47	63	64	1.95	5.0		18.28	**99.3**
	20	728.25	0.77	277	48	63	65	2.05	5.0		18.41	**98.1**
	25	731.97	0.77	278	49	63	67	2.05	5.0		18.42	**99.0**
	30	735.70	0.77	278	49	63	68	2.05	5.0		18.42	**99.2**
	35	739.43	0.73	278	50	64	69	1.95	5.0		17.94	**99.1**
	40	743.08	0.73	278	51	64	70	1.95	5.0		17.94	**99.4**
	45	746.72	0.73	277	50	65	70	1.95	5.0		17.93	**99.0**
	50	750.34	0.73	278	49	65	71	1.95	5.0		17.94	**98.3**
	55	753.94	0.75	278	48	65	71	2.05	5.0		18.18	**97.7**
	60	757.71										**101.0**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test Location:	APC Outlet No. 1
Test No.:	2 - M26A
Date:	March 18, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	1.352	m^3
AVGERGE ISOKINETICITY	99.6	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	137.5	°C
AVERAGE GAS MOISTURE BY VOLUME	15.9	%
AVERAGE GAS VELOCITY	19.07	m/s
BAROMETRIC PRESSURE (Station)	99.695	Kpa
STATIC PRESSURE	-2.918	Kpa
ABSOLUTE GAS PRESSURE	96.777	Kpa
OXYGEN CONCENTRATION	8.84	%
CARBON DIOXIDE CONCENTRATION	10.37	%
CARBON MONOXIDE CONCENTRATION	6.2	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	28.17	m^3/s
DRY REF GAS FLOWRATE	16.42	Rm^3/s
DRY ADJ GAS FLOWRATE	20.01	Rm^3/s
WET REF GAS FLOWRATE	19.54	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		1.352	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, Ontario
Test No.:	2 - M26A	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	175.7		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	12.5		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		1	
		Number of points / Port		1	

Combustion Gases	
O2%	8.84
CO2%	10.37
COppm	6.2

Measured H2O
15.9 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	0	758.10	0.87	280	61	65	64	2.25	6.0		19.62	
	5	762.05	0.87	280	47	65	64	2.25	6.0		19.62	**99.3**
	10	766.02	0.87	281	46	65	64	2.25	6.0		19.64	**99.8**
	15	769.98	0.82	281	46	65	65	2.15	6.0		19.06	**99.6**
	20	773.88	0.82	281	47	65	66	2.1	6.0		19.06	**100.9**
	25	777.71	0.77	280	47	65	66	2	6.0		18.46	**99.0**
	30	781.45	0.77	279	47	65	67	2	6.0		18.45	**99.7**
	35	785.18	0.77	278	48	66	68	2	6.0		18.43	**99.2**
	40	788.92	0.77	278	48	66	69	2	6.0		18.43	**99.2**
	45	792.65	0.84	278	49	66	69	2.2	6.0		19.25	**98.9**
	50	796.55	0.86	279	49	67	70	2.25	6.5		19.50	**99.0**
	55	800.52	0.84	280	50	67	70	2.2	6.5		19.28	**99.5**
	60	804.52										**101.5**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test Location:	APC Outlet No. 1
Test No.:	3 - M26A
Date:	March 18, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	1.355	m^3
AVGERGE ISOKINETICITY	100.1	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	138.0	°C
AVERAGE GAS MOISTURE BY VOLUME	16.6	%
AVERAGE GAS VELOCITY	19.20	m/s
BAROMETRIC PRESSURE (Station)	99.661	Kpa
STATIC PRESSURE	-2.918	Kpa
ABSOLUTE GAS PRESSURE	96.743	Kpa
OXYGEN CONCENTRATION	8.8	%
CARBON DIOXIDE CONCENTRATION	10.27	%
CARBON MONOXIDE CONCENTRATION	5.3	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	28.37	m^3/s
DRY REF GAS FLOWRATE	16.39	Rm^3/s
DRY ADJ GAS FLOWRATE	20.03	Rm^3/s
WET REF GAS FLOWRATE	19.65	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		1.355	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, Ontario
Test No.:	3 - M26A	**Test Location:**	APC Outlet No. 1
Date:	March 18, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.43 "Hg	**CWTR (g)**	184		
Static Pressure	-11.720 "H_2O	**WCBDA (g)**	13.8		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		1	
		Number of points / Port		1	

Combustion Gases	
O2%	8.8
CO2%	10.27
COppm	5.3

Measured H2O
16.6 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	0	805.22	0.77	280	67	67	67	2	5.0		18.49	
	5	808.93	0.77	280	49	67	67	2	5.0		18.49	**99.2**
	10	812.67	0.77	280	47	67	68	2	5.0		18.49	**100.0**
	15	816.41	0.84	280	48	67	70	2.2	5.5		19.32	**99.9**
	20	820.34	0.87	280	49	67	71	2.25	5.5		19.66	**100.3**
	25	824.35	0.82	281	51	68	72	2.15	5.5		19.10	**100.5**
	30	828.25	0.82	280	53	68	73	2.15	5.5		19.08	**100.5**
	35	832.13	0.82	280	55	68	74	2.15	5.5		19.08	**99.9**
	40	836.00	0.87	281	55	69	74	2.3	6.0		19.67	**99.5**
	45	840.01	0.87	281	56	69	74	2.3	6.0		19.67	**100.1**
	50	844.03	0.87	281	58	69	75	2.3	6.0		19.67	**100.4**
	55	848.09	0.87	281	59	69	75	2.3	6.0		19.67	**101.3**
	60	852.08										**99.5**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test Location:	APC Outlet No. 2
Test No.:	1 - M26A
Date:	March 19, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	1.277	m^3
AVGERGE ISOKINETICITY	101.4	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	138.9	°C
AVERAGE GAS MOISTURE BY VOLUME	18.1	%
AVERAGE GAS VELOCITY	18.22	m/s
BAROMETRIC PRESSURE (Station)	99.695	Kpa
STATIC PRESSURE	-2.814	Kpa
ABSOLUTE GAS PRESSURE	96.882	Kpa
OXYGEN CONCENTRATION	8.63	%
CARBON DIOXIDE CONCENTRATION	10.72	%
CARBON MONOXIDE CONCENTRATION	6.6	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	26.92	m^3/s
DRY REF GAS FLOWRATE	15.24	Rm^3/s
DRY ADJ GAS FLOWRATE	18.89	Rm^3/s
WET REF GAS FLOWRATE	18.62	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		1.277	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, Ontario
Test No.:	1 - M26A	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	197.8		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	10		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		1	
		Number of points / Port		1	

Combustion Gases	
O2%	8.63
CO2%	10.72
COppm	6.6

Measured H2O
18.1 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	0	52.56	0.65	277	63	63	63	1.65	5.0		16.99	
	5	55.97	0.65	278	47	63	62	1.65	5.0		17.00	**101.3**
	10	59.30	0.67	279	46	63	63	1.8	5.0		17.27	**99.1**
	15	62.77	0.67	280	46	63	64	1.75	5.0		17.28	**101.7**
	20	66.26	0.7	280	47	64	66	1.8	5.5		17.66	**102.2**
	25	69.81	0.73	281	47	64	67	1.9	5.5		18.05	**101.5**
	30	73.45	0.73	282	48	64	68	1.9	5.5		18.06	**101.9**
	35	77.03	0.81	284	49	65	69	2.1	6.0		19.05	**100.2**
	40	80.82	0.81	285	50	65	70	2.1	6.0		19.06	**100.7**
	45	84.67	0.82	286	51	65	70	2.1	6.0		19.19	**102.2**
	50	88.52	0.82	286	51	65	70	2.1	6.0		19.19	**101.7**
	55	92.38	0.87	287	52	66	71	2.2	6.0		19.78	**101.9**
	60	96.37										**102.2**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test Location:	APC Outlet No. 2
Test No.:	2 - M26A
Date:	March 19, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	1.290	m^3
AVGERGE ISOKINETICITY	99.4	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	138.7	°C
AVERAGE GAS MOISTURE BY VOLUME	15.4	%
AVERAGE GAS VELOCITY	18.17	m/s
BAROMETRIC PRESSURE (Station)	99.628	Kpa
STATIC PRESSURE	-2.814	Kpa
ABSOLUTE GAS PRESSURE	96.814	Kpa
OXYGEN CONCENTRATION	8.64	%
CARBON DIOXIDE CONCENTRATION	10.67	%
CARBON MONOXIDE CONCENTRATION	7.5	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	26.85	m^3/s
DRY REF GAS FLOWRATE	15.71	Rm^3/s
DRY ADJ GAS FLOWRATE	19.45	Rm^3/s
WET REF GAS FLOWRATE	18.58	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		1.290	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, Ontario
Test No.:	2 - M26A	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.42 "Hg	**CWTR (g)**	162.3		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	10.7		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		1	
		Number of points / Port		1	

Combustion Gases	
O2%	8.64
CO2%	10.67
COppm	7.5

Measured H2O
15.4 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	0	96.82	0.72	278	60	63	63	1.9	5.0		17.79	
	5	100.48	0.75	282	47	63	63	2	5.0		18.21	**100.7**
	10	104.11	0.75	282	46	63	64	2	5.0		18.21	**98.1**
	15	107.74	0.75	282	47	63	67	2	5.0		18.21	**98.0**
	20	111.51	0.75	282	47	63	67	2	5.0		18.21	**101.5**
	25	115.11	0.77	283	47	63	68	2.05	5.0		18.46	**96.9**
	30	118.87	0.77	282	48	64	68	2.05	5.5		18.45	**99.9**
	35	122.65	0.77	282	48	64	69	2	5.5		18.45	**100.3**
	40	126.37	0.77	282	48	64	69	2	5.5		18.45	**98.6**
	45	130.08	0.72	282	49	64	69	1.9	5.5		17.84	**98.3**
	50	133.73	0.73	281	49	64	70	2	5.5		17.95	**100.0**
	55	137.46	0.72	281	52	64	70	1.9	5.5		17.83	**101.3**
	60	141.09										**99.3**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, Ontario
Test Location:	APC Outlet No. 2
Test No.:	3 - M26A
Date:	March 19, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	1.281	m^3
AVGERGE ISOKINETICITY	100.0	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	139.2	°C
AVERAGE GAS MOISTURE BY VOLUME	16.1	%
AVERAGE GAS VELOCITY	18.15	m/s
BAROMETRIC PRESSURE (Station)	99.424	Kpa
STATIC PRESSURE	-2.814	Kpa
ABSOLUTE GAS PRESSURE	96.611	Kpa
OXYGEN CONCENTRATION	8.1	%
CARBON DIOXIDE CONCENTRATION	11.17	%
CARBON MONOXIDE CONCENTRATION	9.7	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	26.82	m^3/s
DRY REF GAS FLOWRATE	15.51	Rm^3/s
DRY ADJ GAS FLOWRATE	20.06	Rm^3/s
WET REF GAS FLOWRATE	18.49	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		1.281	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, Ontario
Test No.:	3 - M26A	**Test Location:**	APC Outlet No. 2
Date:	March 19, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.36 "Hg	**CWTR (g)**	167.5		
Static Pressure	-11.300 "H_2O	**WCBDA (g)**	13		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		1	
		Number of points / Port		1	

Combustion Gases	
O2%	8.1
CO2%	11.17
COppm	9.7

Measured H2O
16.1 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	0	41.45	0.72	278	60	63	63	1.9	5.0		17.82	
	5	45.15	0.77	282	51	63	65	2	5.0		18.48	**102.4**
	10	48.84	0.77	282	49	63	66	2	5.0		18.48	**98.8**
	15	52.53	0.77	283	48	62	66	2	5.0		18.49	**98.8**
	20	56.24	0.77	284	49	63	68	2	5.0		18.50	**99.5**
	25	59.95	0.72	284	50	63	68	1.9	5.0		17.89	**99.2**
	30	63.58	0.74	283	51	63	69	1.95	5.0		18.13	**100.4**
	35	67.25	0.76	283	51	64	70	2	5.0		18.37	**100.0**
	40	70.96	0.75	283	52	64	71	2	5.0		18.25	**99.5**
	45	74.65	0.75	283	53	65	71	2	5.0		18.25	**99.6**
	50	78.36	0.68	283	55	65	72	1.8	5.0		17.38	**100.0**
	55	81.93	0.71	282	57	66	72	1.9	5.0		17.75	**100.9**
	60	85.57										**100.6**

APPENDIX 25

SVOC Test Emission Calculations
(18 pages)

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 1
Test No.:	1 - SVOC
Date:	March 20, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	5.053	m^3
AVGERGE ISOKINETICITY	99.3	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	137.9	°C
AVERAGE GAS MOISTURE BY VOLUME	16.7	%
AVERAGE GAS VELOCITY	18.15	m/s
BAROMETRIC PRESSURE (Station)	99.187	Kpa
STATIC PRESSURE	-2.963	Kpa
ABSOLUTE GAS PRESSURE	96.224	Kpa
OXYGEN CONCENTRATION	8.11	%
CARBON DIOXIDE CONCENTRATION	11.00	%
CARBON MONOXIDE CONCENTRATION	9.2	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	26.82	m^3/s
DRY REF GAS FLOWRATE	15.39	Rm^3/s
DRY ADJ GAS FLOWRATE	19.89	Rm^3/s
WET REF GAS FLOWRATE	18.48	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		5.053	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - SVOC	**Test Location:**	APC Outlet No. 1
Date:	March 20, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.29 "Hg	**CWTR (g)**	721.9		
Static Pressure	-11.900 "H_2O	**WCBDA (g)**	20.6		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.37 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.11
CO2%	11.00
COppm	9.2

Measured H2O
16.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	29.72	0.81	285	95	82	82	2.2	7.0		19.06	
	5	33.66	0.84	280	57	83	82	2.25	7.5		19.35	**100.2**
2	10	37.68	0.85	280	48	83	82	2.25	7.5		19.46	**100.0**
	15	41.70	0.86	280	48	83	83	2.25	8.0		19.57	**99.4**
3	20	45.74	0.81	280	49	83	83	2.2	8.0		19.00	**99.2**
	25	49.70	0.84	280	49	83	84	2.2	8.0		19.35	**100.2**
4	30	53.69	0.76	280	50	83	85	2.05	8.0		18.40	**99.1**
	35	57.48	0.73	281	51	84	86	2	7.5		18.05	**98.8**
5	40	61.23	0.7	280	53	84	86	1.95	8.0		17.66	**99.6**
	45	64.94	0.7	280	55	84	87	1.9	8.0		17.66	**100.6**
6	50	68.60	0.65	280	54	84	87	1.8	7.5		17.02	**99.1**
	55	72.21	0.65	280	54	84	87	1.8	7.5		17.02	**101.4**
7	60	75.73	0.71	280	66	85	88	1.9	7.5		17.79	**98.9**
	65	79.41	0.71	280	64	85	88	1.9	7.5		17.79	**98.8**
8	70	83.02	0.74	281	58	85	88	2.1	8.0		18.17	**96.9**
	75	86.83	0.74	281	53	85	88	2.1	8.0		18.17	**100.3**
9	80	90.66	0.75	281	54	85	88	2.1	8.0		18.29	**100.8**
	85	94.47	0.76	281	54	85	88	2.1	8.0		18.41	**99.6**
10	90	98.31	0.76	278	54	85	87	2.1	8.0		18.38	**99.7**
	95	102.14	0.76	277	54	85	87	2.1	8.0		18.36	**99.3**
11	100	105.95	0.68	277	55	85	87	1.9	8.0		17.37	**98.8**
	105	109.64	0.74	277	56	85	87	2	8.0		18.12	**101.1**
12	110	113.39	0.71	277	56	85	87	1.9	8.0		17.75	**98.5**
	115	117.08	0.76	277	57	85	87	2	8.0		18.36	**98.9**
	120	120.85								0.37		**97.7**
1	0	121.22	0.81	280	52	84	84	2.15	8.5		19.00	
	5	125.12	0.81	281	56	83	84	2.15	8.5		19.01	**98.5**
2	10	129.05	0.85	280	44	83	84	2.2	9.0		19.46	**99.4**
	15	133.08	0.83	281	48	83	84	2.2	9.0		19.24	**99.5**
3	20	137.07	0.85	281	49	83	85	2.2	9.0		19.47	**99.7**
	25	141.07	0.84	282	56	83	85	2.2	9.2		19.37	**98.7**

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - SVOC	**Test Location:**	APC Outlet No. 1
Date:	March 20, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.29 "Hg	**CWTR (g)**	721.9		
Static Pressure	-11.900 "H_2O	**WCBDA (g)**	20.6		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.37 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.11
CO2%	11.00
COppm	9.2

Measured H2O
16.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	30	145.05	0.78	282	56	83	85	2	9.0		18.67	**98.9**
	35	148.90	0.76	282	56	83	85	2	9.0		18.43	**99.2**
5	40	152.66	0.71	282	56	83	85	1.95	9.0		17.81	**98.1**
	45	156.38	0.74	282	58	83	86	1.95	9.0		18.18	**100.4**
6	50	160.08	0.62	283	58	83	86	1.8	8.5		16.65	**97.8**
	55	163.65	0.61	283	59	83	86	1.65	8.5		16.52	**103.1**
7	60	167.09	0.67	283	59	83	86	1.8	8.5		17.31	**100.1**
	65	170.66	0.67	283	60	83	86	1.8	8.5		17.31	**99.2**
8	70	174.25	0.73	283	60	83	86	1.9	9.0		18.07	**99.7**
	75	177.96	0.75	283	60	83	86	1.95	9.0		18.32	**98.7**
9	80	181.62	0.75	283	60	83	86	2.05	9.0		18.32	**96.1**
	85	185.39	0.71	283	60	83	86	2	9.0		17.82	**99.0**
10	90	189.15	0.76	279	58	83	85	2.05	9.0		18.39	**101.5**
	95	192.96	0.76	277	58	82	85	2.05	9.0		18.36	**99.2**
11	100	196.79	0.63	277	58	82	85	1.7	8.0		16.72	**99.7**
	105	200.25	0.63	277	60	82	84	1.7	8.0		16.72	**98.9**
12	110	203.72	0.63	276	60	82	85	1.7	8.0		16.71	**99.2**
	115	207.17	0.64	276	60	81	84	1.7	8.0		16.84	**98.5**
	120	210.63										**98.2**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 1
Test No.:	2 - SVOC
Date:	March 20, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	5.106	m^3
AVGERGE ISOKINETICITY	99.9	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	137.0	°C
AVERAGE GAS MOISTURE BY VOLUME	17.3	%
AVERAGE GAS VELOCITY	18.27	m/s
BAROMETRIC PRESSURE (Station)	99.526	Kpa
STATIC PRESSURE	-2.963	Kpa
ABSOLUTE GAS PRESSURE	96.563	Kpa
OXYGEN CONCENTRATION	8.15	%
CARBON DIOXIDE CONCENTRATION	10.87	%
CARBON MONOXIDE CONCENTRATION	7.6	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	27.00	m^3/s
DRY REF GAS FLOWRATE	15.47	Rm^3/s
DRY ADJ GAS FLOWRATE	19.92	Rm^3/s
WET REF GAS FLOWRATE	18.70	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		5.106	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - SVOC	**Test Location:**	APC Outlet No. 1
Date:	March 20, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.39 "Hg	**CWTR (g)**	768.3		
Static Pressure	-11.900 "H_2O	**WCBDA (g)**	16		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.47 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.15
CO2%	10.87
COppm	7.6

Measured H2O
17.3 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	11.14	0.83	278	79	80	80	2.15	7.0		19.20	
	5	15.08	0.83	282	60	80	79	2.1	7.0		19.25	**99.6**
2	10	18.93	0.85	282	58	80	79	2.2	7.0		19.48	**97.7**
	15	22.85	0.87	283	58	80	80	2.25	8.0		19.73	**98.3**
3	20	26.87	0.83	283	57	80	81	2.2	7.5		19.27	**99.7**
	25	30.86	0.83	282	57	80	82	2.2	7.5		19.25	**101.2**
4	30	34.86	0.78	282	57	80	82	2.05	7.5		18.67	**101.3**
	35	38.70	0.78	281	57	80	83	2.05	7.5		18.65	**100.2**
5	40	42.52	0.8	282	57	81	84	2.1	7.5		18.90	**99.6**
	45	46.40	0.8	282	57	81	84	2.1	7.5		18.90	**99.7**
6	50	50.28	0.68	282	57	81	84	1.8	7.0		17.43	**99.7**
	55	53.88	0.67	282	57	81	85	1.8	7.0		17.30	**100.3**
7	60	57.46	0.69	282	56	81	85	1.85	7.0		17.56	**100.4**
	65	61.08	0.69	281	54	82	85	1.85	7.0		17.54	**100.1**
8	70	64.70	0.7	280	53	82	85	1.9	7.0		17.66	**99.9**
	75	68.36	0.71	280	52	81	85	1.9	7.0		17.78	**100.2**
9	80	72.01	0.78	281	52	82	85	2.05	7.5		18.65	**99.3**
	85	75.81	0.78	281	52	82	85	2.1	7.5		18.65	**98.7**
10	90	79.67	0.78	277	52	82	85	2.1	7.5		18.60	**100.2**
	95	83.56	0.76	276	52	82	85	2	7.5		18.35	**100.7**
11	100	87.37	0.72	276	52	82	85	1.9	7.5		17.86	**99.9**
	105	91.05	0.72	277	53	82	85	1.95	7.0		17.87	**99.1**
12	110	94.76	0.7	276	52	82	85	1.9	7.0		17.61	**100.0**
	115	98.44	0.74	276	52	82	85	2	7.0		18.11	**100.5**
	120	102.15								0.47		**98.6**
1	0	102.62	0.89	278	70	80	81	2.3	8.0		19.88	
	5	106.66	0.9	279	52	80	81	2.35	8.0		20.01	**98.6**
2	10	110.75	0.9	279	53	80	81	2.35	8.0		20.01	**99.4**
	15	114.98	0.95	280	54	80	81	2.4	8.5		20.57	**102.8**
3	20	119.19	0.87	280	54	80	82	2.25	8.0		19.69	**99.6**
	25	123.22	0.83	280	55	80	82	2.15	8.0		19.23	**99.5**

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - SVOC	**Test Location:**	APC Outlet No. 1
Date:	March 20, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.39 "Hg	**CWTR (g)**	768.3		
Static Pressure	-11.900 "H_2O	**WCBDA (g)**	16		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.47 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.15
CO2%	10.87
COppm	7.6

Measured H2O
17.3 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	30	127.15	0.83	279	56	79	82	2.15	8.0		19.22	**99.3**
	35	131.08	0.76	278	56	79	82	2	7.5		18.37	**99.4**
5	40	134.84	0.72	278	58	79	82	1.9	7.5		17.88	**99.2**
	45	138.48	0.75	279	59	79	82	1.95	7.5		18.27	**98.7**
6	50	142.17	0.61	280	60	79	82	1.7	7.5		16.48	**98.1**
	55	145.67	0.61	280	57	79	82	1.7	7.5		16.48	**103.2**
7	60	149.12	0.65	279	54	79	82	1.75	7.0		17.00	**101.7**
	65	152.64	0.64	277	51	79	83	1.7	7.0		16.85	**100.5**
8	70	156.10	0.64	277	50	78	83	1.7	7.0		16.85	**99.3**
	75	159.60	0.66	276	49	78	83	1.75	7.0		17.10	**100.5**
9	80	163.08	0.72	276	49	78	83	1.9	7.5		17.86	**98.4**
	85	166.77	0.72	274	49	79	83	1.9	7.5		17.84	**99.9**
10	90	170.43	0.74	274	50	79	83	2	7.5		18.08	**98.9**
	95	174.21	0.74	274	50	79	83	2	8.0		18.08	**100.7**
11	100	178.01	0.67	274	50	79	83	2	8.0		17.21	**101.3**
	105	181.65	0.67	274	51	79	83	1.9	8.0		17.21	**102.0**
12	110	185.23	0.68	274	51	79	83	1.9	8.0		17.33	**100.2**
	115	188.81	0.67	274	52	79	83	1.9	8.0		17.21	**99.5**
	120	192.40										**100.5**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 1
Test No.:	3 - SVOC
Date:	March 21, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.844	
DGM CORRECTION FACTOR	1.018	
NOZZLE DIAMETER	6.57	mm
DRY REF GAS VOLUME SAMPLED	5.142	m^3
AVGERGE ISOKINETICITY	100.3	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	138.2	°C
AVERAGE GAS MOISTURE BY VOLUME	17.0	%
AVERAGE GAS VELOCITY	17.97	m/s
BAROMETRIC PRESSURE (Station)	101.287	Kpa
STATIC PRESSURE	-2.888	Kpa
ABSOLUTE GAS PRESSURE	98.398	Kpa
OXYGEN CONCENTRATION	8.19	%
CARBON DIOXIDE CONCENTRATION	10.91	%
CARBON MONOXIDE CONCENTRATION	7.0	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	26.55	m^3/s
DRY REF GAS FLOWRATE	15.51	Rm^3/s
DRY ADJ GAS FLOWRATE	19.91	Rm^3/s
WET REF GAS FLOWRATE	18.69	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		5.142	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - SVOC	**Test Location:**	APC Outlet No. 1
Date:	March 21, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.91 "Hg	**CWTR (g)**	754.5		
Static Pressure	-11.600 "H_2O	**WCBDA (g)**	19.4		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.37 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.19
CO2%	10.91
COppm	7.0

Measured H2O
17.0 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	94.45	0.86	278	73	77	76	2.2	8.0		19.35	
	5	98.32	0.85	280	53	77	77	2.15	8.0		19.26	**97.3**
2	10	102.19	0.85	280	50	77	77	2.25	8.0		19.26	**97.9**
	15	106.16	0.87	280	50	78	78	2.25	8.5		19.49	**100.5**
3	20	110.13	0.82	281	49	78	79	2.2	9.0		18.93	**99.1**
	25	114.03	0.8	281	49	78	79	2.15	9.0		18.70	**100.2**
4	30	117.99	0.75	281	50	78	80	1.9	8.0		18.11	**103.0**
	35	121.65	0.75	281	51	78	81	1.95	8.0		18.11	**98.2**
5	40	125.29	0.73	281	51	79	81	1.95	8.0		17.86	**97.6**
	45	128.94	0.73	282	52	79	82	1.95	8.0		17.87	**99.1**
6	50	132.60	0.62	282	51	79	82	1.7	8.0		16.47	**99.3**
	55	136.03	0.64	282	51	79	82	1.7	8.0		16.74	**101.0**
7	60	139.47	0.71	282	51	79	83	1.9	8.0		17.63	**99.7**
	65	143.10	0.69	282	51	79	83	1.9	8.0		17.38	**99.8**
8	70	146.71	0.72	281	51	79	83	1.88	8.4		17.74	**100.7**
	75	150.37	0.73	282	50	79	83	1.95	8.4		17.87	**99.9**
9	80	154.09	0.77	282	51	79	83	2	8.4		18.36	**100.9**
	85	157.85	0.78	282	51	79	83	2.06	8.5		18.48	**99.3**
10	90	161.66	0.81	282	51	80	83	2.1	8.9		18.83	**100.0**
	95	165.59	0.82	280	52	80	83	2.2	9.0		18.92	**101.1**
11	100	169.57	0.72	280	52	79	82	2.22	9.1		17.73	**101.7**
	105	173.33	0.72	280	53	79	82	2	8.5		17.73	**102.7**
12	110	177.03	0.71	280	54	79	82	1.98	8.5		17.60	**101.0**
	115	180.71	0.7	280	54	79	83	1.94	8.2		17.48	**101.2**
	120	184.37								0.37		**101.1**
1	0	184.74	0.86	280	59	79	80	2.27	9.3		19.37	
	5	188.69	0.85	282	56	79	81	2.27	9.3		19.29	**99.0**
2	10	192.67	0.81	281	54	79	81	2.27	9.3		18.82	**100.3**
	15	196.60	0.82	280	55	79	81	2.19	9.0		18.92	**101.4**
3	20	200.53	0.85	280	56	79	81	2.2	9.0		19.26	**100.7**
	25	204.52	0.85	281	57	79	82	2.25	9.2		19.27	**100.4**

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - SVOC	**Test Location:**	APC Outlet No. 1
Date:	March 21, 2024	**Operator:**	TT

Pitot Factor	0.844	**Filter (mg)**	0		
DGMCF	1.018	**Probe (mg)**	0		
Barometric Pressure	29.91 "Hg	**CWTR (g)**	754.5		
Static Pressure	-11.600 "H_2O	**WCBDA (g)**	19.4		
Nozzle	0.2586 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.37 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.19
CO2%	10.91
COppm	7.0

Measured H2O
17.0 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	30	208.53	0.78	281	57	79	82	2.25	9.2		18.46	**100.9**
	35	212.41	0.76	281	57	79	82	2.12	9.1		18.23	**101.9**
5	40	216.18	0.68	282	57	79	82	1.85	8.9		17.25	**100.3**
	45	219.74	0.69	281	57	79	82	1.85	8.5		17.37	**100.1**
6	50	223.32	0.68	282	57	80	83	1.85	8.5		17.25	**99.9**
	55	226.89	0.68	282	57	80	83	1.85	8.5		17.25	**100.2**
7	60	230.46	0.67	281	57	80	84	1.85	8.5		17.11	**100.2**
	65	234.02	0.65	281	56	80	83	1.8	8.5		16.86	**100.5**
8	70	237.55	0.66	281	56	80	83	1.8	8.5		16.98	**101.3**
	75	241.10	0.69	280	57	80	83	1.85	8.5		17.35	**101.1**
9	80	244.69	0.7	280	57	80	83	1.9	8.5		17.48	**99.9**
	85	248.33	0.72	280	58	80	83	1.9	8.5		17.73	**100.6**
10	90	252.00	0.71	280	59	80	83	2	9.0		17.60	**100.0**
	95	255.69	0.67	280	60	80	83	2	9.0		17.10	**101.3**
11	100	259.28	0.67	280	60	80	83	1.85	8.7		17.10	**101.4**
	105	262.87	0.68	280	60	80	83	1.85	8.7		17.23	**101.4**
12	110	266.46	0.63	280	60	80	83	1.9	8.9		16.58	**100.6**
	115	269.95	0.65	280	60	80	83	1.75	8.5		16.84	**101.6**
	120	273.41										**99.2**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 2
Test No.:	1 - SVOC
Date:	March 20, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843	
DGM CORRECTION FACTOR	0.986	
NOZZLE DIAMETER	6.34	mm
DRY REF GAS VOLUME SAMPLED	4.506	m^3
AVGERGE ISOKINETICITY	100.4	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	140.5	°C
AVERAGE GAS MOISTURE BY VOLUME	16.9	%
AVERAGE GAS VELOCITY	17.32	m/s
BAROMETRIC PRESSURE (Station)	99.187	Kpa
STATIC PRESSURE	-2.916	Kpa
ABSOLUTE GAS PRESSURE	96.272	Kpa
OXYGEN CONCENTRATION	8.2	%
CARBON DIOXIDE CONCENTRATION	11.08	%
CARBON MONOXIDE CONCENTRATION	11.9	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	25.59	m^3/s
DRY REF GAS FLOWRATE	14.56	Rm^3/s
DRY ADJ GAS FLOWRATE	18.68	Rm^3/s
WET REF GAS FLOWRATE	17.53	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		4.506	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - SVOC	**Test Location:**	APC Outlet No. 2
Date:	March 20, 2024	**Operator:**	bp

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	0.986	**Probe (mg)**	0		
Barometric Pressure	29.29 "Hg	**CWTR (g)**	659.5		
Static Pressure	-11.710 "H_2O	**WCBDA (g)**	13		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.4 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.2
CO2%	11.08
COppm	11.9

Measured H2O
16.9 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	68.18	0.79	282	80	84	84	2.1	5.0		18.76	
	5	71.85	0.82	283	50	84	85	2.1	5.0		19.13	**97.9**
2	10	75.63	0.8	283	47	84	85	2.2	5.9		18.90	**98.9**
	15	79.42	0.79	283	47	84	86	2.2	5.9		18.78	**100.4**
3	20	83.20	0.75	283	47	85	86	2.1	5.9		18.30	**100.7**
	25	86.74	0.75	283	47	85	87	2	5.0		18.30	**96.7**
4	30	90.36	0.72	283	48	85	88	2	5.5		17.93	**98.8**
	35	94.03	0.73	284	47	86	89	1.95	5.5		18.06	**102.1**
5	40	97.69	0.65	284	48	86	79	1.95	5.5		17.04	**101.0**
	45	101.10	0.65	284	48	87	90	1.7	5.0		17.04	**100.6**
6	50	104.39	0.58	285	50	87	90	1.8	5.0		16.11	**96.0**
	55	107.68	0.6	285	49	88	91	1.6	5.0		16.39	**101.7**
7	60	111.02	0.6	285	49	88	92	1.6	5.0		16.39	**101.3**
	65	114.36	0.59	285	49	89	92	1.6	5.0		16.25	**101.2**
8	70	117.77	0.62	285	50	89	92	1.6	5.0		16.66	**104.1**
	75	121.13	0.63	284	50	89	92	1.7	5.0		16.78	**100.0**
9	80	124.51	0.65	285	50	89	93	1.7	5.0		17.05	**99.8**
	85	127.96	0.65	285	50	90	93	1.8	5.5		17.05	**100.2**
10	90	131.45	0.64	285	50	90	93	1.8	5.5		16.92	**101.3**
	95	134.92	0.62	283	50	90	93	1.8	5.5		16.63	**101.5**
11	100	138.29	0.51	283	51	90	93	1.7	5.0		15.09	**100.1**
	105	141.38	0.51	280	51	90	93	1.4	4.9		15.06	**101.1**
12	110	144.46	0.52	280	51	90	93	1.4	4.9		15.20	**100.5**
	115	147.54	0.54	280	51	90	93	1.4	4.9		15.49	**99.5**
	120	150.70								0.4		**100.2**
1	0	151.10	0.76	286	60	90	90	2	5.5		18.45	
	5	154.80	0.76	285	51	90	90	2	5.5		18.44	**99.7**
2	10	158.50	0.75	285	48	87	90	2	5.5		18.32	**99.7**
	15	162.20	0.76	285	47	89	90	2	5.5		18.44	**100.6**
3	20	165.91	0.77	285	46	89	91	2	5.5		18.56	**100.0**
	25	169.61	0.77	286	46	89	91	2	5.5		18.57	**99.0**

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	1 - SVOC	**Test Location:**	APC Outlet No. 2
Date:	March 20, 2024	**Operator:**	bp

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	0.986	**Probe (mg)**	0		
Barometric Pressure	29.29 "Hg	**CWTR (g)**	659.5		
Static Pressure	-11.710 "H_2O	**WCBDA (g)**	13		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.4 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.2
CO2%	11.08
COppm	11.9

Measured H2O
16.9 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	30	173.33	0.73	286	46	89	91	2.1	6.0		18.09	**99.6**
	35	177.02	0.73	286	46	89	92	2	5.9		18.09	**101.5**
5	40	180.71	0.67	286	46	89	92	2	5.9		17.33	**101.4**
	45	184.20	0.67	286	47	89	92	1.8	5.0		17.33	**100.1**
6	50	187.71	0.6	286	47	89	92	1.8	5.0		16.40	**100.6**
	55	191.01	0.6	287	48	90	92	1.65	5.0		16.41	**100.0**
7	60	194.32	0.65	287	48	89	92	1.65	5.0		17.08	**100.2**
	65	197.81	0.64	286	48	90	92	1.8	5.0		16.93	**101.6**
8	70	201.27	0.64	286	48	90	92	1.7	5.0		16.93	**101.4**
	75	204.70	0.65	286	48	90	93	1.7	5.0		17.07	**100.5**
9	80	208.13	0.67	286	48	90	92	1.7	5.0		17.33	**99.6**
	85	211.63	0.68	287	48	90	93	1.8	5.5		17.47	**100.2**
10	90	215.14	0.71	287	48	90	92	1.8	5.5		17.85	**99.8**
	95	218.76	0.7	288	48	90	92	2	6.0		17.73	**100.8**
11	100	222.40	0.7	284	49	90	92	2	6.0		17.69	**102.2**
	105	225.97	0.69	289	49	90	92	1.9	6.0		17.62	**100.0**
12	110	229.50	0.65	289	49	90	91	1.9	6.0		17.10	**99.9**
	115	233.03	0.62	289	50	90	92	1.8	5.9		16.70	**103.0**
	120	236.42										**101.1**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 2
Test No.:	2 - SVOC
Date:	March 20, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843	
DGM CORRECTION FACTOR	0.986	
NOZZLE DIAMETER	6.34	mm
DRY REF GAS VOLUME SAMPLED	4.674	m^3
AVGERGE ISOKINETICITY	100.9	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	140.4	°C
AVERAGE GAS MOISTURE BY VOLUME	17.5	%
AVERAGE GAS VELOCITY	17.93	m/s
BAROMETRIC PRESSURE (Station)	99.526	Kpa
STATIC PRESSURE	-2.916	Kpa
ABSOLUTE GAS PRESSURE	96.610	Kpa
OXYGEN CONCENTRATION	8.01	%
CARBON DIOXIDE CONCENTRATION	11.20	%
CARBON MONOXIDE CONCENTRATION	7.7	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	26.50	m^3/s
DRY REF GAS FLOWRATE	15.03	Rm^3/s
DRY ADJ GAS FLOWRATE	19.57	Rm^3/s
WET REF GAS FLOWRATE	18.22	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		4.674	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - SVOC	**Test Location:**	APC Outlet No. 2
Date:	March 20, 2024	**Operator:**	bp

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	0.986	**Probe (mg)**	0		
Barometric Pressure	29.39 "Hg	**CWTR (g)**	714.9		
Static Pressure	-11.710 "H_2O	**WCBDA (g)**	14.3		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.402 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.01
CO2%	11.20
COppm	7.7

Measured H2O
17.5 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	37.02	0.89	282	74	85	85	2.1	5.0		19.91	
	5	40.98	0.88	288	62	85	85	2.3	5.5		19.87	**100.1**
2	10	44.93	0.85	288	57	85	85	2.3	5.9		19.53	**100.9**
	15	48.84	0.87	289	54	85	86	2.2	5.9		19.77	**101.6**
3	20	52.79	0.84	288	53	85	86	2.3	6.0		19.42	**101.4**
	25	56.73	0.84	288	53	85	86	2.2	6.0		19.42	**102.9**
4	30	60.60	0.76	287	53	85	87	2.2	6.0		18.46	**101.0**
	35	64.27	0.76	287	54	85	88	1.98	5.5		18.46	**100.6**
5	40	67.94	0.7	287	54	85	88	1.98	5.5		17.71	**100.4**
	45	71.47	0.69	287	55	86	88	1.81	5.1		17.59	**100.7**
6	50	74.98	0.62	287	55	86	88	1.77	5.0		16.67	**100.7**
	55	78.33	0.6	287	56	86	89	1.63	4.9		16.40	**101.4**
7	60	81.62	0.68	287	56	86	90	1.54	4.9		17.46	**101.1**
	65	85.13	0.66	287	56	87	90	1.75	5.0		17.20	**101.2**
8	70	88.59	0.73	287	56	87	90	1.71	5.0		18.09	**101.2**
	75	92.19	0.76	287	56	87	90	1.9	5.0		18.46	**100.1**
9	80	95.90	0.77	288	57	88	90	1.97	5.7		18.59	**101.1**
	85	99.63	0.82	289	57	88	90	1.99	5.8		19.20	**101.0**
10	90	103.46	0.73	288	58	88	90	2.11	5.9		18.10	**100.6**
	95	107.13	0.74	288	58	88	90	1.9	5.6		18.22	**102.1**
11	100	110.90	0.64	280	59	88	90	1.93	5.6		16.86	**104.1**
	105	114.23	0.59	280	60	88	90	1.69	5.0		16.18	**98.4**
12	110	117.54	0.55	280	61	88	91	1.55	4.9		15.63	**101.8**
	115	120.75	0.54	280	61	88	91	1.46	4.8		15.48	**102.1**
	120	123.92								0.402		**101.7**
1	0	124.32	0.83	282	74	88	88	2.13	6.0		19.22	
	5	128.10	0.86	287	60	87	87	2.13	6.0		19.63	**98.4**
2	10	132.03	0.83	286	58	87	87	2.2	6.2		19.27	**101.0**
	15	135.90	0.81	286	57	87	88	2.1	6.0		19.04	**101.2**
3	20	139.73	0.78	285	57	87	88	2.09	6.0		18.67	**101.3**
	25	143.52	0.8	284	58	86	88	2.01	5.9		18.90	**102.1**

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	2 - SVOC	**Test Location:**	APC Outlet No. 2
Date:	March 20, 2024	**Operator:**	bp

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	0.986	**Probe (mg)**	0		
Barometric Pressure	29.39 "Hg	**CWTR (g)**	714.9		
Static Pressure	-11.710 "H_2O	**WCBDA (g)**	14.3		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.402 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.01
CO2%	11.20
COppm	7.7

Measured H2O
17.5 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	30	147.25	0.76	284	58	86	88	2.05	5.9		18.42	**99.2**
	35	150.98	0.79	284	59	86	88	2	5.9		18.78	**101.8**
5	40	154.73	0.68	285	59	86	88	2.07	5.9		17.43	**100.4**
	45	158.21	0.67	285	58	86	88	1.75	5.1		17.31	**100.5**
6	50	161.67	0.62	284	58	86	88	1.75	5.0		16.64	**100.6**
	55	165.06	0.61	284	59	86	88	1.62	5.0		16.50	**102.4**
7	60	168.39	0.65	283	59	86	88	1.6	5.0		17.02	**101.3**
	65	171.77	0.64	283	59	86	88	1.69	5.0		16.89	**99.6**
8	70	175.14	0.65	283	59	86	88	1.69	5.0		17.02	**100.1**
	75	178.53	0.67	283	57	86	88	1.72	5.0		17.28	**99.9**
9	80	182.00	0.67	282	55	86	89	1.77	5.5		17.27	**100.7**
	85	185.47	0.7	282	55	86	89	1.77	5.5		17.65	**100.6**
10	90	188.99	0.7	283	55	86	90	1.83	6.0		17.67	**99.8**
	95	192.55	0.72	283	55	86	89	1.84	6.0		17.92	**100.9**
11	100	196.17	0.66	280	55	86	89	1.89	6.2		17.12	**101.3**
	105	199.59	0.71	280	56	86	88	1.75	5.9		17.75	**99.8**
12	110	203.15	0.77	280	56	86	88	1.85	6.0		18.49	**100.2**
	115	206.85	0.6	280	57	86	88	2	6.2		16.32	**100.0**
	120	210.18										**102.0**

ORTECH Consulting Inc.

Plant:	Covanta DYEC
Plant Location:	Courtice, ON
Test Location:	APC Outlet No. 2
Test No.:	3 - SVOC
Date:	March 21, 2024

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843	
DGM CORRECTION FACTOR	0.986	
NOZZLE DIAMETER	6.34	mm
DRY REF GAS VOLUME SAMPLED	4.592	m^3
AVGERGE ISOKINETICITY	101.3	%
STACK DIAMETER	1.37	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.48	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	140.2	°C
AVERAGE GAS MOISTURE BY VOLUME	16.5	%
AVERAGE GAS VELOCITY	17.02	m/s
BAROMETRIC PRESSURE (Station)	101.321	Kpa
STATIC PRESSURE	-2.916	Kpa
ABSOLUTE GAS PRESSURE	98.405	Kpa
OXYGEN CONCENTRATION	8.45	%
CARBON DIOXIDE CONCENTRATION	11.03	%
CARBON MONOXIDE CONCENTRATION	8.9	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	25.15	m^3/s
DRY REF GAS FLOWRATE	14.70	Rm^3/s
DRY ADJ GAS FLOWRATE	18.49	Rm^3/s
WET REF GAS FLOWRATE	17.62	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		4.592	m^3
PARTICULATE CONC. - ACTUAL		0.000	mg/m^3
PARTICULATE CONC. - DRY REF		0.000	mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000	mg/m^3
PARTICULATE CONC. - WET REF		0.000	mg/m^3
PARTICULATE EMISSION RATE		0.000000	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - SVOC	**Test Location:**	APC Outlet No. 2
Date:	March 21, 2024	**Operator:**	bp

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	0.986	**Probe (mg)**	0		
Barometric Pressure	29.92 "Hg	**CWTR (g)**	653		
Static Pressure	-11.710 "H_2O	**WCBDA (g)**	15.4		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.32 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.45
CO2%	11.03
COppm	8.9

Measured H2O
16.5 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	92.71	0.77	280	71	79	79	2	6.0		18.28	
	5	96.40	0.79	282	57	79	80	2	6.5		18.55	**101.1**
2	10	100.08	0.81	282	53	79	80	2	6.5		18.78	**99.6**
	15	103.87	0.82	283	52	80	81	2.1	7.0		18.91	**101.3**
3	20	107.65	0.79	284	52	80	82	2.1	7.0		18.57	**100.3**
	25	111.40	0.83	287	56	81	81	2.1	7.0		19.07	**101.4**
4	30	115.20	0.73	288	52	81	81	2.1	7.0		17.90	**100.4**
	35	118.73	0.74	288	52	81	82	1.9	6.9		18.02	**99.5**
5	40	122.30	0.7	288	53	81	82	1.9	6.9		17.53	**99.8**
	45	125.86	0.68	288	53	81	83	1.9	6.9		17.28	**102.4**
6	50	129.38	0.56	288	54	81	84	1.8	6.9		15.68	**102.6**
	55	132.62	0.56	287	54	81	84	1.5	6.0		15.67	**103.9**
7	60	135.74	0.6	286	55	82	85	1.4	5.9		16.21	**100.0**
	65	139.01	0.6	286	55	82	85	1.6	6.0		16.21	**100.9**
8	70	142.32	0.64	285	55	83	86	1.6	6.0		16.73	**102.2**
	75	145.69	0.63	285	55	83	86	1.7	6.5		16.59	**100.5**
9	80	149.10	0.62	285	55	83	86	1.7	6.5		16.46	**102.5**
	85	152.50	0.6	284	55	83	86	1.7	6.5		16.18	**103.1**
10	90	155.84	0.6	282	56	83	86	1.6	6.0		16.16	**102.8**
	95	159.08	0.58	281	56	84	86	1.5	6.0		15.88	**99.6**
11	100	162.33	0.51	281	57	84	86	1.6	6.0		14.89	**101.4**
	105	165.44	0.53	281	57	84	86	1.4	5.5		15.18	**103.5**
12	110	168.45	0.52	281	57	84	86	1.4	5.5		15.04	**98.3**
	115	171.55	0.55	281	57	84	87	1.4	5.5		15.46	**102.2**
	120	174.77								0.32		**103.1**
1	0	175.09	0.7	281	70	84	84	1.9	7.0		17.45	
	5	178.68	0.71	284	57	84	85	1.9	7.0		17.60	**102.3**
2	10	182.23	0.71	285	54	84	85	1.85	6.9		17.62	**100.5**
	15	185.75	0.73	285	52	84	85	1.85	6.9		17.86	**99.7**
3	20	189.30	0.76	285	52	83	86	1.9	7.0		18.23	**99.2**
	25	193.03	0.77	285	52	83	86	2	7.0		18.35	**102.2**

ORTECH Consulting Inc.

Plant:	Covanta DYEC	**Plant Location:**	Courtice, ON
Test No.:	3 - SVOC	**Test Location:**	APC Outlet No. 2
Date:	March 21, 2024	**Operator:**	bp

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	0.986	**Probe (mg)**	0		
Barometric Pressure	29.92 "Hg	**CWTR (g)**	653		
Static Pressure	-11.710 "H_2O	**WCBDA (g)**	15.4		
Nozzle	0.2498 inches				
Stack Diameter	4.500 ft	**Leak Check Volume**		0.32 ft^3	
Length	0.000 ft	**Reading Interval**		5 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		12	

Combustion Gases	
O2%	8.45
CO2%	11.03
COppm	8.9

Measured H2O
16.5 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
4	30	196.75	0.75	285	52	84	86	2	7.5		18.11	**101.3**
	35	200.46	0.73	285	52	84	86	2	7.5		17.86	**102.2**
5	40	204.06	0.68	285	52	84	86	1.9	7.0		17.24	**100.5**
	45	207.58	0.67	285	52	84	86	1.8	7.0		17.11	**101.8**
6	50	211.08	0.6	285	52	84	86	1.8	7.0		16.19	**102.0**
	55	214.38	0.62	285	53	84	86	1.6	6.0		16.46	**101.6**
7	60	217.75	0.67	286	53	84	87	1.7	6.5		17.12	**102.0**
	65	221.25	0.65	286	53	84	87	1.8	6.9		16.87	**101.9**
8	70	224.62	0.64	285	53	84	87	1.7	6.5		16.73	**99.7**
	75	228.03	0.65	285	53	84	87	1.7	6.5		16.86	**101.5**
9	80	231.48	0.68	285	54	84	87	1.75	6.9		17.24	**101.9**
	85	234.98	0.68	285	54	84	87	1.8	7.0		17.24	**101.1**
10	90	238.48	0.68	285	54	84	87	1.8	7.0		17.24	**101.1**
	95	241.97	0.69	285	54	84	87	1.8	7.0		17.37	**100.8**
11	100	245.46	0.61	286	53	84	87	1.85	7.0		16.34	**100.1**
	105	248.78	0.61	282	53	84	86	1.6	6.5		16.30	**101.4**
12	110	252.09	0.61	282	53	84	87	1.65	6.5		16.30	**100.8**
	115	255.42	0.6	282	53	84	87	1.65	6.5		16.16	**101.4**
	120	258.77										**102.8**

APPENDIX 26

ORTECH Total Hydrocarbon CEM Data
(4 pages)

Covanta - Durham York Energy Centre

Total Hydrocarbon Sampling at the Boiler No. 1 Quench Inlet

Test No. 1 March 19, 2024			Test No. 2 March 19, 2024			Test No. 3 March 19, 2024		
Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry	Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry	Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry
12:40	0.0		13:50	0.0		15:00	0.0	
12:41	0.0		13:51	0.0		15:01	0.0	
12:42	0.8		13:52	0.0		15:02	0.0	
12:43	0.8		13:53	0.0		15:03	0.0	
12:44	0.7		13:54	0.0		15:04	0.0	
12:45	0.7		13:55	0.0		15:05	0.0	
12:46	0.5		13:56	0.0		15:06	0.0	
12:47	0.4		13:57	0.0		15:07	0.0	
12:48	0.3		13:58	0.0		15:08	0.0	
12:49	0.1	0.4	13:59	0.0	0.0	15:09	0.0	0.0
12:50	0.0	0.4	14:00	0.0	0.0	15:10	0.0	0.0
12:51	0.0	0.4	14:01	0.0	0.0	15:11	0.0	0.0
12:52	0.0	0.3	14:02	0.6	0.1	15:12	0.0	0.0
12:53	0.0	0.3	14:03	0.4	0.1	15:13	0.0	0.0
12:54	0.0	0.2	14:04	0.3	0.1	15:14	0.0	0.0
12:55	0.0	0.1	14:05	0.3	0.2	15:15	0.0	0.0
12:56	0.0	0.1	14:06	0.3	0.2	15:16	0.0	0.0
12:57	0.0	0.0	14:07	0.2	0.2	15:17	0.0	0.0
12:58	0.0	0.0	14:08	0.2	0.2	15:18	0.0	0.0
12:59	0.0	0.0	14:09	0.2	0.2	15:19	0.0	0.0
13:00	0.0	0.0	14:10	0.2	0.3	15:20	0.0	0.0
13:01	0.0	0.0	14:11	0.2	0.3	15:21	0.0	0.0
13:02	0.0	0.0	14:12	0.4	0.3	15:22	0.0	0.0
13:03	0.0	0.0	14:13	0.3	0.3	15:23	0.0	0.0
13:04	0.0	0.0	14:14	0.4	0.3	15:24	0.0	0.0
13:05	0.0	0.0	14:15	0.4	0.3	15:25	0.0	0.0
13:06	0.0	0.0	14:16	0.4	0.3	15:26	0.0	0.0
13:07	0.0	0.0	14:17	0.4	0.3	15:27	0.0	0.0
13:08	0.0	0.0	14:18	0.5	0.3	15:28	0.0	0.0
13:09	0.0	0.0	14:19	0.5	0.4	15:29	0.0	0.0
13:10	0.0	0.0	14:20	0.4	0.4	15:30	0.0	0.0
13:11	0.0	0.0	14:21	0.3	0.4	15:31	0.0	0.0
13:12	0.0	0.0	14:22	0.2	0.4	15:32	0.0	0.0
13:13	0.0	0.0	14:23	0.1	0.4	15:33	0.0	0.0
13:14	0.0	0.0	14:24	0.1	0.3	15:34	0.0	0.0
13:15	0.0	0.0	14:25	0.0	0.3	15:35	0.0	0.0
13:16	0.0	0.0	14:26	0.0	0.2	15:36	0.0	0.0
13:17	0.0	0.0	14:27	0.0	0.2	15:37	0.0	0.0
13:18	0.0	0.0	14:28	0.0	0.2	15:38	0.0	0.0
13:19	0.0	0.0	14:29	0.0	0.1	15:39	0.0	0.0
13:20	0.0	0.0	14:30	0.0	0.1	15:40	0.0	0.0
13:21	0.0	0.0	14:31	0.0	0.0	15:41	0.0	0.0
13:22	0.0	0.0	14:32	0.0	0.0	15:42	0.0	0.0
13:23	0.0	0.0	14:33	0.0	0.0	15:43	0.0	0.0
13:24	0.0	0.0	14:34	0.0	0.0	15:44	0.0	0.0
13:25	0.0	0.0	14:35	0.0	0.0	15:45	0.0	0.0
13:26	0.0	0.0	14:36	0.0	0.0	15:46	0.0	0.0
13:27	0.0	0.0	14:37	0.0	0.0	15:47	0.0	0.0
13:28	0.0	0.0	14:38	0.0	0.0	15:48	0.0	0.0
13:29	0.0	0.0	14:39	0.0	0.0	15:49	0.0	0.0
13:30	0.0	0.0	14:40	0.0	0.0	15:50	0.0	0.0
13:31	0.0	0.0	14:41	0.0	0.0	15:51	0.0	0.0
13:32	0.0	0.0	14:42	0.0	0.0	15:52	0.0	0.0
13:33	0.0	0.0	14:43	0.0	0.0	15:53	0.0	0.0
13:34	0.0	0.0	14:44	0.0	0.0	15:54	0.0	0.0
13:35	0.0	0.0	14:45	0.0	0.0	15:55	0.0	0.0
13:36	0.0	0.0	14:46	0.0	0.0	15:56	0.0	0.0
13:37	0.0	0.0	14:47	0.0	0.0	15:57	0.0	0.0
13:38	0.0	0.0	14:48	0.0	0.0	15:58	0.0	0.0
13:39	0.0	0.0	14:49	0.0	0.0	15:59	0.0	0.0
13:40	0.0	0.0	14:50	0.0	0.0	16:00	0.0	0.0
Min	0.0	0.0	Min	0.0	0.0	Min	0.0	0.0
Max	0.8	0.4	Max	0.6	0.4	Max	0.0	0.0
Avg	0.1	0.0	Avg	0.1	0.1	Avg	0.0	0.0

Covanta - Durham York Energy Centre

Total Hydrocarbon Sampling at the Boiler No. 1 APC Outlet

Test No. 1			Test No. 2			Test No. 3		
March 19, 2024			March 19, 2024			March 19, 2024		
Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry	Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry	Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry
12:40	0.0		13:50	0.0		15:00	0.0	
12:41	0.0		13:51	0.0		15:01	0.0	
12:42	0.0		13:52	0.0		15:02	0.0	
12:43	0.0		13:53	0.0		15:03	0.0	
12:44	0.0		13:54	0.0		15:04	0.0	
12:45	0.0		13:55	0.0		15:05	0.0	
12:46	0.0		13:56	0.0		15:06	0.0	
12:47	0.0		13:57	0.0		15:07	0.0	
12:48	0.0		13:58	0.0		15:08	0.0	
12:49	0.0	0.0	13:59	0.0	0.0	15:09	0.0	0.0
12:50	0.0	0.0	14:00	0.0	0.0	15:10	0.0	0.0
12:51	0.0	0.0	14:01	0.0	0.0	15:11	0.0	0.0
12:52	0.0	0.0	14:02	0.0	0.0	15:12	0.0	0.0
12:53	0.0	0.0	14:03	0.0	0.0	15:13	0.0	0.0
12:54	0.0	0.0	14:04	0.0	0.0	15:14	0.0	0.0
12:55	0.0	0.0	14:05	0.0	0.0	15:15	0.0	0.0
12:56	0.0	0.0	14:06	0.0	0.0	15:16	0.0	0.0
12:57	0.0	0.0	14:07	0.0	0.0	15:17	0.0	0.0
12:58	0.0	0.0	14:08	0.0	0.0	15:18	0.0	0.0
12:59	0.0	0.0	14:09	0.0	0.0	15:19	0.0	0.0
13:00	0.0	0.0	14:10	0.0	0.0	15:20	0.0	0.0
13:01	0.0	0.0	14:11	0.0	0.0	15:21	0.0	0.0
13:02	0.0	0.0	14:12	0.0	0.0	15:22	0.0	0.0
13:03	0.0	0.0	14:13	0.0	0.0	15:23	0.0	0.0
13:04	0.0	0.0	14:14	0.0	0.0	15:24	0.0	0.0
13:05	0.0	0.0	14:15	0.0	0.0	15:25	0.0	0.0
13:06	0.0	0.0	14:16	0.0	0.0	15:26	0.0	0.0
13:07	0.0	0.0	14:17	0.0	0.0	15:27	0.0	0.0
13:08	0.0	0.0	14:18	0.0	0.0	15:28	0.0	0.0
13:09	0.0	0.0	14:19	0.0	0.0	15:29	0.0	0.0
13:10	0.0	0.0	14:20	0.0	0.0	15:30	0.0	0.0
13:11	0.0	0.0	14:21	0.0	0.0	15:31	0.0	0.0
13:12	0.0	0.0	14:22	0.0	0.0	15:32	0.0	0.0
13:13	0.0	0.0	14:23	0.0	0.0	15:33	0.0	0.0
13:14	0.0	0.0	14:24	0.0	0.0	15:34	0.0	0.0
13:15	0.0	0.0	14:25	0.0	0.0	15:35	0.0	0.0
13:16	0.0	0.0	14:26	0.0	0.0	15:36	0.0	0.0
13:17	0.0	0.0	14:27	0.0	0.0	15:37	0.0	0.0
13:18	0.0	0.0	14:28	0.0	0.0	15:38	0.0	0.0
13:19	0.0	0.0	14:29	0.0	0.0	15:39	0.0	0.0
13:20	0.0	0.0	14:30	0.0	0.0	15:40	0.0	0.0
13:21	0.0	0.0	14:31	0.0	0.0	15:41	0.0	0.0
13:22	0.0	0.0	14:32	0.0	0.0	15:42	0.0	0.0
13:23	0.0	0.0	14:33	0.0	0.0	15:43	0.0	0.0
13:24	0.0	0.0	14:34	0.0	0.0	15:44	0.0	0.0
13:25	0.0	0.0	14:35	0.0	0.0	15:45	0.0	0.0
13:26	0.0	0.0	14:36	0.0	0.0	15:46	0.0	0.0
13:27	0.0	0.0	14:37	0.0	0.0	15:47	0.0	0.0
13:28	0.0	0.0	14:38	0.0	0.0	15:48	0.0	0.0
13:29	0.0	0.0	14:39	0.0	0.0	15:49	0.0	0.0
13:30	0.0	0.0	14:40	0.0	0.0	15:50	0.0	0.0
13:31	0.0	0.0	14:41	0.0	0.0	15:51	0.0	0.0
13:32	0.0	0.0	14:42	0.0	0.0	15:52	0.0	0.0
13:33	0.0	0.0	14:43	0.0	0.0	15:53	0.0	0.0
13:34	0.0	0.0	14:44	0.0	0.0	15:54	0.0	0.0
13:35	0.0	0.0	14:45	0.0	0.0	15:55	0.0	0.0
13:36	0.0	0.0	14:46	0.0	0.0	15:56	0.0	0.0
13:37	0.0	0.0	14:47	0.0	0.0	15:57	0.0	0.0
13:38	0.0	0.0	14:48	0.0	0.0	15:58	0.0	0.0
13:39	0.0	0.0	14:49	0.0	0.0	15:59	0.0	0.0
13:40	0.0	0.0	14:50	0.0	0.0	16:00	0.0	0.0
Min	0.0	0.0	Min	0.0	0.0	Min	0.0	0.0
Max	0.0	0.0	Max	0.0	0.0	Max	0.0	0.0
Avg	0.0	0.0	Avg	0.0	0.0	Avg	0.0	0.0

Covanta - Durham York Energy Centre

Total Hydrocarbon Sampling at the Boiler No. 2 Quench Inlet

Test No. 1			Test No. 2			Test No. 3		
March 19, 2024			March 19, 2024			March 19, 2024		
Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry	Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry	Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry
08:12	1.1		09:20	0.0		10:30	0.0	
08:13	1.0		09:21	0.0		10:31	0.0	
08:14	1.2		09:22	0.0		10:32	0.0	
08:15	1.0		09:23	0.0		10:33	0.0	
08:16	1.1		09:24	0.0		10:34	0.0	
08:17	1.1		09:25	0.0		10:35	0.0	
08:18	1.1		09:26	0.0		10:36	0.0	
08:19	1.2		09:27	0.0		10:37	0.0	
08:20	1.7		09:28	0.0		10:38	0.0	
08:21	0.9	1.1	09:29	0.0	0.0	10:39	0.0	0.0
08:22	0.8	1.1	09:30	0.0	0.0	10:40	0.0	0.0
08:23	0.8	1.1	09:31	0.0	0.0	10:41	0.0	0.0
08:24	0.8	1.0	09:32	0.0	0.0	10:42	0.0	0.0
08:25	0.8	1.0	09:33	0.0	0.0	10:43	0.0	0.0
08:26	0.8	1.0	09:34	0.0	0.0	10:44	0.0	0.0
08:27	0.8	1.0	09:35	0.0	0.0	10:45	0.0	0.0
08:28	0.7	0.9	09:36	0.0	0.0	10:46	0.0	0.0
08:29	0.7	0.9	09:37	0.0	0.0	10:47	0.0	0.0
08:30	0.8	0.8	09:38	0.0	0.0	10:48	0.0	0.0
08:31	0.8	0.8	09:39	0.0	0.0	10:49	0.0	0.0
08:32	0.7	0.8	09:40	0.0	0.0	10:50	0.0	0.0
08:33	0.8	0.8	09:41	0.0	0.0	10:51	0.0	0.0
08:34	0.8	0.8	09:42	0.0	0.0	10:52	0.0	0.0
08:35	0.8	0.8	09:43	0.0	0.0	10:53	0.0	0.0
08:36	1.0	0.8	09:44	0.0	0.0	10:54	0.0	0.0
08:37	0.0	0.7	09:45	0.0	0.0	10:55	0.0	0.0
08:38	0.0	0.6	09:46	0.0	0.0	10:56	0.0	0.0
08:39	0.0	0.6	09:47	0.0	0.0	10:57	0.0	0.0
08:40	0.0	0.5	09:48	0.0	0.0	10:58	0.0	0.0
08:41	0.0	0.4	09:49	0.0	0.0	10:59	0.0	0.0
08:42	0.0	0.3	09:50	0.0	0.0	11:00	0.0	0.0
08:43	0.0	0.3	09:51	0.0	0.0	11:01	0.0	0.0
08:44	0.0	0.2	09:52	0.0	0.0	11:02	0.0	0.0
08:45	0.0	0.1	09:53	0.0	0.0	11:03	0.0	0.0
08:46	0.0	0.0	09:54	0.0	0.0	11:04	0.0	0.0
08:47	0.0	0.0	09:55	0.0	0.0	11:05	0.0	0.0
08:48	0.0	0.0	09:56	0.0	0.0	11:06	0.0	0.0
08:49	0.0	0.0	09:57	0.0	0.0	11:07	0.0	0.0
08:50	0.0	0.0	09:58	0.0	0.0	11:08	0.0	0.0
08:51	0.0	0.0	09:59	0.0	0.0	11:09	0.0	0.0
08:52	0.0	0.0	10:00	0.0	0.0	11:10	0.0	0.0
08:53	0.0	0.0	10:01	0.0	0.0	11:11	0.0	0.0
08:54	0.1	0.0	10:02	0.0	0.0	11:12	0.0	0.0
08:55	0.3	0.0	10:03	0.0	0.0	11:13	0.0	0.0
08:56	0.3	0.1	10:04	0.0	0.0	11:14	0.0	0.0
08:57	0.5	0.1	10:05	0.0	0.0	11:15	0.0	0.0
08:58	0.5	0.2	10:06	0.0	0.0	11:16	0.0	0.0
08:59	0.5	0.2	10:07	0.0	0.0	11:17	0.0	0.0
09:00	0.6	0.3	10:08	0.0	0.0	11:18	0.0	0.0
09:01	0.5	0.3	10:09	0.0	0.0	11:19	0.0	0.0
09:02	0.7	0.4	10:10	0.1	0.0	11:20	0.0	0.0
09:03	0.9	0.5	10:11	0.0	0.0	11:21	0.0	0.0
09:04	1.2	0.6	10:12	0.0	0.0	11:22	0.0	0.0
09:05	1.3	0.7	10:13	0.0	0.0	11:23	0.0	0.0
09:06	1.7	0.8	10:14	0.0	0.0	11:24	0.0	0.0
09:07	1.8	1.0	10:15	2.0	0.2	11:25	0.0	0.0
09:08	1.8	1.1	10:16	2.1	0.4	11:26	0.0	0.0
09:09	1.8	1.2	10:17	1.7	0.6	11:27	0.0	0.0
09:10	0.6	1.2	10:18	0.0	0.6	11:28	0.0	0.0
09:11	0.2	1.2	10:19	0.0	0.6	11:29	0.0	0.0
09:12	0.0	1.1	10:20	0.0	0.6	11:30	0.0	0.0
Min	0.0	0.0	Min	0.0	0.0	Min	0.0	0.0
Max	1.8	1.2	Max	2.1	0.6	Max	0.0	0.0
Avg	0.6	0.6	Avg	0.1	0.1	Avg	0.0	0.0

Covanta - Durham York Energy Centre

Total Hydrocarbon Sampling at the Boiler No. 2 APC Outlet

Test No. 1			Test No. 2			Test No. 3		
March 19, 2024			March 19, 2024			March 19, 2024		
Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry	Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry	Time	THC - 1 min ppm, dry	THC - 10 min Avg ppm, dry
08:12	0.7		09:20	0.1		10:30	1.0	
08:13	0.7		09:21	0.2		10:31	1.1	
08:14	0.7		09:22	0.8		10:32	0.2	
08:15	0.8		09:23	0.2		10:33	0.6	
08:16	0.8		09:24	0.2		10:34	0.1	
08:17	0.8		09:25	0.1		10:35	0.1	
08:18	0.8		09:26	0.0		10:36	0.0	
08:19	0.8		09:27	4.7		10:37	0.1	
08:20	0.9		09:28	0.0		10:38	0.0	
08:21	0.8	0.8	09:29	0.2	0.6	10:39	0.0	0.3
08:22	0.9	0.8	09:30	0.3	0.7	10:40	0.0	0.2
08:23	0.9	0.8	09:31	0.0	0.6	10:41	0.0	0.1
08:24	0.9	0.8	09:32	0.1	0.6	10:42	0.0	0.1
08:25	0.9	0.8	09:33	0.1	0.6	10:43	0.0	0.0
08:26	0.9	0.9	09:34	0.1	0.6	10:44	0.0	0.0
08:27	0.9	0.9	09:35	0.2	0.6	10:45	0.0	0.0
08:28	0.9	0.9	09:36	0.3	0.6	10:46	0.0	0.0
08:29	1.2	0.9	09:37	0.1	0.1	10:47	0.0	0.0
08:30	1.0	0.9	09:38	0.2	0.2	10:48	0.0	0.0
08:31	1.1	1.0	09:39	0.1	0.2	10:49	0.0	0.0
08:32	1.0	1.0	09:40	0.1	0.1	10:50	0.0	0.0
08:33	1.0	1.0	09:41	0.3	0.2	10:51	0.0	0.0
08:34	1.1	1.0	09:42	0.1	0.2	10:52	0.0	0.0
08:35	0.9	1.0	09:43	0.4	0.2	10:53	0.0	0.0
08:36	0.4	1.0	09:44	0.0	0.2	10:54	0.0	0.0
08:37	0.5	0.9	09:45	0.2	0.2	10:55	0.0	0.0
08:38	0.6	0.9	09:46	0.0	0.2	10:56	0.0	0.0
08:39	0.4	0.8	09:47	0.0	0.2	10:57	0.0	0.0
08:40	0.5	0.8	09:48	0.0	0.1	10:58	0.0	0.0
08:41	0.6	0.7	09:49	0.1	0.1	10:59	0.0	0.0
08:42	0.6	0.7	09:50	0.1	0.1	11:00	0.0	0.0
08:43	1.1	0.7	09:51	0.2	0.1	11:01	0.0	0.0
08:44	1.2	0.7	09:52	0.2	0.1	11:02	0.0	0.0
08:45	1.2	0.7	09:53	0.1	0.1	11:03	0.0	0.0
08:46	0.9	0.8	09:54	0.1	0.1	11:04	0.0	0.0
08:47	0.3	0.7	09:55	0.0	0.1	11:05	0.0	0.0
08:48	0.3	0.7	09:56	0.2	0.1	11:06	0.0	0.0
08:49	0.3	0.7	09:57	0.0	0.1	11:07	0.0	0.0
08:50	0.3	0.7	09:58	0.0	0.1	11:08	0.0	0.0
08:51	0.6	0.7	09:59	0.1	0.1	11:09	0.0	0.0
08:52	0.4	0.7	10:00	0.8	0.2	11:10	0.0	0.0
08:53	0.3	0.6	10:01	0.6	0.2	11:11	0.0	0.0
08:54	0.3	0.5	10:02	0.1	0.2	11:12	0.0	0.0
08:55	0.3	0.4	10:03	0.0	0.2	11:13	0.0	0.0
08:56	0.3	0.3	10:04	0.2	0.2	11:14	0.0	0.0
08:57	0.5	0.4	10:05	0.0	0.2	11:15	0.0	0.0
08:58	0.2	0.3	10:06	0.0	0.2	11:16	0.0	0.0
08:59	0.4	0.4	10:07	0.0	0.2	11:17	0.0	0.0
09:00	0.2	0.3	10:08	0.0	0.2	11:18	0.0	0.0
09:01	0.4	0.3	10:09	0.0	0.2	11:19	0.0	0.0
09:02	0.2	0.3	10:10	0.0	0.1	11:20	0.0	0.0
09:03	0.2	0.3	10:11	0.0	0.0	11:21	0.0	0.0
09:04	0.2	0.3	10:12	0.0	0.0	11:22	0.0	0.0
09:05	0.2	0.3	10:13	0.0	0.0	11:23	0.0	0.0
09:06	0.2	0.3	10:14	0.0	0.0	11:24	0.0	0.0
09:07	0.2	0.2	10:15	0.0	0.0	11:25	0.0	0.0
09:08	0.2	0.2	10:16	0.0	0.0	11:26	0.0	0.0
09:09	0.2	0.2	10:17	0.0	0.0	11:27	0.0	0.0
09:10	0.3	0.2	10:18	0.0	0.0	11:28	0.0	0.0
09:11	0.2	0.2	10:19	0.0	0.0	11:29	0.0	0.0
09:12	0.2	0.2	10:20	0.0	0.0	11:30	0.0	0.0
Min	0.2	0.2	Min	0.0	0.0	Min	0.0	0.0
Max	1.2	1.0	Max	4.7	0.7	Max	1.1	0.3
Avg	0.6	0.6	Avg	0.2	0.2	Avg	0.1	0.0

APPENDIX 27

Dispersion Modelling Results
for the March 2024 Testing Program
(15 pages)

TECHNICAL MEMORANDUM

DATE June 17, 2024 **Project No.** CA0034428.5376

TO Supreet Kaur
Covanta Durham York Renewable Energy LP

CC Poornitha Suresh

FROM Katie Armstrong **EMAIL katherine.armstrong@wsp.com**

CALPUFF MODELLING FOR MARCH 2024 COMPLIANCE SOURCE TESTING AT DURHAM YORK ENERGY CENTRE

1.0 INTRODUCTION

Covanta Durham York Renewable Energy LP (Covanta) operates the Durham York Energy Centre (DYEC) under the multi-media Environmental Compliance Approval (ECA) 7306-8FDKNX, as amended. The 2011 ECA application was supported with an Emission Summary and Dispersion Modelling (ESDM) Report prepared by WSP Canada Inc. (WSP), using the CALPUFF dispersion model version 6.263, with results compared to Ministry of Environment, Conservation and Parks (MECP) Point of Impingement (POI) standards listed in Schedule 3 of Ontario Regulation (O.Reg.) 419/05 as of 2011.

In 2020, MECP requested that the CALPUFF modelling for DYEC be updated to use more recent meteorological data and an updated version of the CALPUFF dispersion model. Following consultation with MECP, including their provisional review and approval of the new meteorological files and updated CALPUFF modelling input files, formal approval was requested in August 2021 under Sections 7 (1) and 13 (1) of O.Reg. 419/05 for use of a specified dispersion model (CALPUFF version 7.2.1) and site-specific meteorological data for the 2014-2018 data period. Formal approval was received in December 2021.

Condition 7, Testing, Monitoring and Auditing, of the ECA requires annual source testing to be completed at the DYEC for over 100 contaminants as well as assessing the impact of the contaminants. According to the ECA Schedule "E" Source Testing Procedures, a source testing report is required that includes the following:

> *8. (7) the results of dispersion calculations in accordance with the O.Reg. 419/05, indicating the maximum concentration of the test contaminants, at the point of impingement.*
>
> *8. (8) an updated site wide emission source inventory to assess the aggregate point of impingement concentrations of the test contaminants.*

This memorandum summarizes the dispersion calculations/modelling results for the Compliance March 2024 source testing program with the aid of the updated CALPUFF model and other input data sets as used in the 2011 ESDM Report and 2007 Environmental Assessment (EA) and compares the results to O.Reg. 419/05 Schedule 3 limits as last updated April 2023.

2.0 EMISSION RATES

Compliance source testing was completed by Ortech Environmental in March 2024 for each of the two combustion train units and results were provided to WSP on a mass per time basis. Three tests were completed for each unit and averaged. The average emission rates for each unit were then summed together to provide the total stack emission rate of each contaminant to be modelled. Where source testing results indicated that the measured concentration was below the detection limit, the full detection limit was used as the emission rate for conservatism.

Emission rates for which source testing data was available were converted to grams per second (g/s) and are provided in an updated Site-wide Emission Inventory included in Appendix A. This emission inventory includes emissions from silo filling and diesel generator testing taken from the ESDM report, in addition to source test emissions from the main stack.

In response to clarifications provided by the MECP of December 9, 2016, two different emission rates were calculated for Total Particulate Matter:

1. Filterable fraction emission rate only; and
2. Total Particulate Matter (Sum of condensable and filterable fractions).

As source testing for the condensable fraction of total particulate matter is not required pursuant to Schedule “D”: of the ECA, the condensable content of $PM_{2.5}$ was used.

3.0 MODELLING

In response to an MECP request in 2020, the CALPUFF modelling software and CALMET meteorological data have been updated. The MECP reviewed and approved the meteorological data and modelling input files in May 2021, prior to model execution. The following models and pre- and post-processors were used in the assessment:

- CALMET diagnostic meteorological model (v. 6.5.0, level 150223);
- CALPUFF dispersion model (v. 7.2.1, level 150618);
- CALPOST post processor (v. 7.1.0, Level 141010);
- BPIP building downwash pre-processor (v. 04274);
- POSTUTIL post processor (v.7.0.0, Level 150207).

These model versions are updates from those used in the original 2011 ESDM report. Formal approval for their use was requested and approved under s7(1) and s13(1) of O.Reg. 419/05. Dispersion Modelling inputs are described in the following subsections.

3.1 Model Domain

The Model domain used in this assessment was modified slightly from the 2007 Environmental Assessment (EA) and ESDM Report. It extends 40 km by 40 km and is centred approximately 5 km north of the Site. This domain covers more than the air quality study area but will ensure that plumes are tracked beyond the furthest receptor locations to ensure the worst-case ground level concentrations are considered at all receptors.

3.2 Meteorology, Land Use and Terrain Data

The meteorology and terrain data used in this assessment were updated from those used in the 2007 Environmental Assessment (EA) and 2011 ESDM Report.

Meteorological data was updated using observation data from surface stations and large-scale mesoscale meteorological data from the Weather Research and Forecasting (WRF) model between 2014 – 2018, inclusive. The CALMET output files were submitted to MECP for review and approval prior to use in the modelling.

Terrain data was downloaded from the MECP's database of regional terrain data for modelling (MECP, 2017b) and processed using the CALPUFF pre-processor, TERREL.

3.3 Receptors

The receptors used in this assessment are similar to the receptors used in the 2011 ESDM Report but receptors at the edge of the domain were modified slightly to reflect the change in domain size. They include gridded ground level receptors to meet the requirements of O.Reg. 419/05 in addition to 400 discrete receptors to represent locations of interest, which were reviewed and updated in 2022. They include hospitals, nursing homes, schools, daycares, Senior citizen centres, the nearest residential receptors, specific watersheds and water bodies and parks.

3.4 Building Downwash

The buildings used in this assessment to represent building downwash are the same as the buildings used in the ESDM Report. Building wake effects were considered in this assessment using the U.S. EPA's Building Profile Input Program (BPIP-ISC). The inputs into this pre-processor include the coordinates and heights of the buildings and stacks. The output data from BPIP is used in the building wake effect calculations. No changes were made to the BPIP input or output file for this assessment.

3.5 Deposition

CALPUFF has the capability to account for wet and dry deposition of substances that would reduce ground level concentrations at POIs. However, the deposition algorithm has not been implemented for conservatism and to maintain consistency with the ESDM report and the previous EA for maximum POI predictions.

3.6 Thermal Internal Boundary Layer

CALPUFF contains an option to account for sub-grid coastal influences on plume dispersion such as the development of a thermal internal boundary layer (TIBL). Given the proximity of the proposed Facility to Lake Ontario (approximately 500 m) and the grid size (250 m), variations in coastline location within the grid cells near the proposed facility were accounted for in the dispersion modelling. To achieve this, a digitized sub-grid coastline, extending to the boundaries of the air quality study area was included as an additional input. This is consistent with the approach used in the ESDM report.

3.7 Averaging Times and Conversions

CALPUFF can predict 1-hour average values. Many of the relevant Schedule 3 standards are based on a 24-hour averaging time, which is also provided by CALPUFF. Several of the modelled contaminants have averaging periods less than 1 hour. For these contaminants, the 1-hour average concentration was converted using the conversion factors listed in Table 4-1 of Air Dispersion Modelling Guidance for Ontario (ADMGO). For example, the hourly concentrations can be converted to a 10-min average by multiplying the hour value by 1.65. This is consistent with the approach used in the ESDM report.

In 2016, a number of O.Reg 419/05 standards were updated or modified to include annual average Point of Impingement (POI) limits. CALPUFF can predict annual average values, therefore the CALPOST input file was modified to provide this output in addition to outputs for the 1 hour, 24 hour and 30-day averaging periods already provided.

3.8 Chemical Transformation

For the purposes of assessing project contributions to Secondary Particulate Matter (SPM) formation, chemical transformation was considered in the CALPUFF modelling of particulate matter. To model the chemical transformation of emitted NO, NO_2 and SO_2 into HNO_3, NO_3 and SO_4, CALPUFFs RIVAD/ARM3 mechanism was used. Monthly background ozone concentrations are required to generate SPM as well as setting the MCHEM Flag to 3 for particulate matter model runs. The monthly background ozone data used are consistent with the 2007 EA, as requested by MECP, and is summarised below in Table 1.

Table 1: Background Ozone Concentrations used for Chemical Transformation Modelling(1)

Month	Ozone Concentrations (ppb)
January	13.70
February	18.50
March	24.22
April	11.09
May	32.29
June	33.63
July	16.32
August	21.33
September	12.63
October	15.39
November	17.10
December	20.91

1 – Ozone levels from Courtice Road Station (2007-2008)

Chemical transformations were only modelled to calculate additional concentrations of particulate matter that is created as part of secondary transformations. Reported concentrations of NO_2 and SO_2 do not include the effects of depletion due to chemical transformation. The flag MCHEM is set to 0 for model runs used to produce concentrations of all other contaminants. This is consistent with the approach used in the 2011 ESDM report.

3.9 Dispersion Modelling Options

The options used in the CALPUFF dispersion model are summarized in the Table 2. The model options used were reviewed in consultation with MECP but are generally consistent with those used in the ESDM Report. In the ESDM report, Exhibit 9 indicated that Puff splitting was used, however this was a typographical error and this option was not actually used in the modelling. To maintain consistency with the ESDM report, puff splitting was not modelled for this assessment.

Table 2: CALPUFF Options and Flags

Flag	Value used in 2011 ESDM Report	Value Used in this Assessment	Comments
MGAUSS	1	1	Vertical distribution used in the near field
MCTADJ	3	3	Terrain adjustment method (3 used for partial plume path adjustment)
MCTSG	0	0	Subgrid-Scale complex terrain flag
MSLUG	0	0	Near-field puffs modelled as elongated
MTRANS	1	1	Transitional Plume Rise modelled
MTIP	1	1	Stack-tip downwash
MBDW	2	2	Method used to simulate building downwash 1 = ISC method; 2 = PRIME method
MSHEAR	0	0	Vertical wind shear modelled above stack top
MSPLIT	0*	0	Puff splitting allowed 0 = No; 1 = Yes ** NB: Value of "1" reported in ESDM Report but value of "0" actually used in ESDM Report modelling*
MCHEM	3 (For SPM, PM_{10} and $PM_{2.5}$) 0 (All other Contaminants)	3 (For SPM, PM_{10} and $PM_{2.5}$) 0 (All other Contaminants)	Chemical Transformation Scheme 0 = chemical transformation not modeled 3 = transformation rates computed internally (RIVAD/ARM3 Scheme)
MAQCHEM	0	0	Aqueous phase transformation flag (only used if MCHEM =1 or 3)
MWET	0	0	Wet removal modelled 0 = NO; 1 = Yes

Flag	Value used in 2011 ESDM Report	Value Used in this Assessment	Comments
MDRY	0	0	Dry deposition modelled 0 = NO; 1 = Yes
MTILT	0	0	Gravitational settling (plume tilt) modelled
MDISP	2	2	Methods used to compute dispersion coefficients 2 = (dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
MTURBVW	3	3	Sigma measurements used (Used only if MDISP = 1or 5)
MDISP2	3	3	Back-up method used to compute dispersion when measured turbulence data are missing (Used only if MDISP=1 or 5)
MTAULY	0	0	Method used for Lagrangian timescale for Sigma-y (used only if MDISP=1,2 or MSIDP2=1,2)
MTAUADV	0	0	Method used for Advective-Decay timescale for Turbulence (used only if MDISP=2 or MDISP2=2)
MCTURB	1	1	Method used to compute turbulence sigma-v & sigma-w using micrometeorological variables (Used only if MDISP = 2 or MDISP2 = 2)
MROUGH	0	0	PG sigma y,z adjusted for roughness
MPARTL	1	1	Partial plume penetration of elevated inversion
MTINV	0	0	Strength of temp inversion provided in PROFILE.DAT extended records
MPDF	1	1	Probability Distribution Function used for dispersion under convective conditions 0 = NO; 1 = Yes
MSGTIBL	1	1	Sub-grid TIBL module used for shoreline
MBCON	0	0	Boundary conditions (concentration) modeled
MFOG	0	0	Configure for FOG Model output
MREG	0	0	Test options specified to see if they conform to regulatory values

3.10 Source Parameters

Stack exhaust temperature and flow rate were updated to match the stack characteristics at the time of source testing. All other source parameters are consistent with those used in the ESDM Report. The source parameters modelled are provided in Table 3, below:

Table 3: Modelled Source Parameters

Source ID	Stack Height [m]	Stack Diameter [m]	Flow Rate [m³/s]	Exit Velocity [m/s]	Exhaust Temperature [K]
STCK1	87.6 (No Change)	1.7 (No Change)	53.98 (UPDATED)	23.78 (UPDATED)	411.5 (UPDATED)

The ESDM Report includes an additional modelling scenario which include emissions from silo loading and the standby generator (Scenario H). The predominant contaminants from these sources are particulate from the silo loading and nitrogen oxides from the generator. These two contaminants were assessed and it was determined that, since the Main Stack emissions presented in this report are less than those in the ESDM Report, dispersion modelling would show a decrease in the point of impingement concentration for these two contaminants. As a result, additional dispersion modelling for Scenario H was not conducted.

4.0 MODELLING RESULTS

Modelling was completed for emissions from the main stack only, using a unit emission rate to generate dispersion factors in µg/m³ per g/s for 10-minute, ½ - hour, 1-hour, 24-hour, 30-day and annual averaging periods. In Ontario, MECP guidance allows for the removal of meteorological anomalies to account for extreme, rare and transient conditions that may be present in the datasets and considered outliers. As such, for air quality assessments that require 24-hour average concentrations, the highest predicted 24-hr concentration in each year of meteorological data may be removed. Similarly, for assessments that use shorter 1-hour average concentrations, the eight highest predicted concentrations in each year may be removed, as per the MECP guidance listed in ADMGO. No predicted results are removed for assessment against annual averaging periods. Elimination of these anomalies is optional but both methodologies are considered acceptable for the demonstration of compliance with Ontario Regulation 419/05 standards. Previously, maximums with anomalies were presented.

The resulting dispersion factors are presented in Table 4, below for both the with and without meteorological anomaly removal:

Table 4: Modelling Dispersion Factors

Averaging Period	10-min	½- hr	1-hr	24-hr	30-day	Annual
Dispersion Factor without meteorological anomaly removal [µg/m³ per g/s]	**45.73**	**33.26**	**27.72**	**1.23**	**0.17**	**0.06**
Dispersion Factor with meteorological anomaly removal [µg/m³ per g/s]	17.35	12.62	10.52	1.17	0.17	0.06

The average emission rate for each contaminant presented in Appendix A was multiplied by the applicable dispersion factor above to calculate the maximum point of impingement concentration for emissions from the main stack. The modelled POI concentrations were compared to the 2018 Schedule 3 standards listed in O.Reg. 419/05 and in the case of $PM_{2.5}$ and PM_{10}, the Ontario Ambient Air Quality Criteria (AAQC).

The MECP updated the list of standards and guidelines for facilities to assess their emissions against, namely the Air Contaminants Benchmark (ACB) List, dated April 2023, which includes standards and guidelines (Benchmark 1) and screening levels (Benchmark 2). The ACB List is required to be used to assess point of impingement (POI) concentrations of contaminants released into the air.

Contaminants released by the Facility that do not have Benchmark 1 standards or guidelines in the ACB List are considered to be 'Contaminants with No MECP POI Limits'. Where applicable, predicted POI concentrations of Contaminants with No MECP POI Limits were screened against the Benchmark 2 screening levels in the ACB List or the de minimus limit.

The modelled concentrations of all compounds assessed were below their relevant MECP standards. The Emission Summary Table has been updated and is included in Appendix B. It has been modified to include reference to the new ACB List and to meet the requirements of the updated MECP guidance document "Procedure for preparing an Emission Summary and Dispersion Modelling Report" (PIBs 3614e04.1, March 2018). Results are presented both with and without meteorological anomaly removal but only the results with meteorological anomaly removal are presented as a percentage of the relevant limit.

The contaminant with the highest predicted concentration relative to O.Reg. 419/05 standard is Nitrogen Oxides at 11% of the relevant limit.

5.0 SUMMARY OF MODELLING UPDATES

The dispersion modelling for the DYEC was updated to reflect data obtained from Compliance March 2024 source testing. A summary of the changes made to the modelling are provided in Table 5, below.

Table 5: ECA Concordance Table

Modelling Inputs	Changes from 2011 ESDM Report
Emission Rates	Updated to use March 2024 Source Testing Data. List of contaminants assessed expanded to include all contaminants for which source testing data was performed.
Model and Model Version	Updated model versions in consultation with MECP (See section 3.0)
Meteorology and Terrain data	Updated meteorological and terrain data prepared in consultation with MECP (See Section 3.2)
Receptors	Minor modifications made to receptors located on outskirts of modelling grid to reflect updated domain (See Section 3.3)
Building Downwash	No Change
Deposition	No Change
Chemical Transformations	No Change
Thermal Internal Boundary Layer	No Change
Averaging Times and Conversions	CALPOST input file was modified to generate annual averaging to account for new O.Reg. 419/05 standards introduced in 2016 that include annual averaging periods.
Dispersion Modelling Options	No Change
Background Air Quality Concentrations	Ozone background data used in secondary particulate modelling consistent with the EA.
Emission Summary Table	Updated to include 2023 O.Reg. 419/05 standards introduced after the ECA was approved and contaminants that were not included in the ESDM report but for which source testing data was available.

6.0 CONCLUSIONS

This assessment was completed to document compliance with Condition 8(7) and 8(8) of Schedule E of the ECA for the DYEC. The results of this assessment demonstrate that the Facility is operating in compliance with the POI limits listed in s.20 of O. Reg. 419/05.

7.0 CLOSURE

We trust this memorandum meets your needs at this time. Should you have any questions please contact the undersigned.

WSP Canada Inc.

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PS/KSA/ng

https://wsponline.sharepoint.com/sites/ca-ca00344285376/shared documents/05. technical/spring 2024/report/ca0034428.5376-tm-rev0 covanta updated modelling memo 7june2024 copy.docx

APPENDIX A

Site-Wide Emission Inventory

Appendix A
Site-Wide Emission Inventory

Source Identifier	Source Description	Source Parameters					Emission Data						
		Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
1A	Main Stack - Spring 2024 Source Testing Conditions	53.98	138.35	1.7	87.6	(680538, 4860346)	1 – methylnaphthalene	90-12-0	2.22E-07	1,24, annual	ST	Above-Average	100%
							1,1,2-Trichloroethane	79-00-5	7.36E-05	1,24, annual	ST	Above-Average	100%
							1,2,3,4-tetrachlorobenzene	634-66-2	7.50E-08	1,24, annual	ST	Above-Average	100%
							1,2,3-trichlorobenzene	87-61-6	7.94E-08	1,24, annual	ST	Above-Average	100%
							1,2,4 – Trichlorobenzene	120-82-1	8.40E-08	1,24, annual	ST	Above-Average	100%
							1,2,4,5-Tetrachlorobenzene	95-94-3	7.50E-08	1,24, annual	ST	Above-Average	100%
							1,2-Dichlorobenzene	95-50-1	2.20E-07	1,24, annual	ST	Above-Average	100%
							1,2-Dichloroethane	107-06-2	7.36E-05	1,24, annual	ST	Above-Average	100%
							1,2-Dichloropropane	78-87-5	7.36E-05	1,24, annual	ST	Above-Average	100%
							1,3,5-trichlorobenzene	108-70-3	7.50E-08	1,24, annual	ST	Above-Average	100%
							1,3-Butadiene	106-99-0	7.36E-05	1,24, annual	ST	Above-Average	100%
							1,3-Dichlorobenzene	541-73-1	3.80E-07	1,24, annual	ST	Above-Average	100%
							1,4-Dichlorobenzene	106-46-7	3.12E-07	1,24, annual	ST	Above-Average	100%
							1-Methylphenanthrene	832-69-9	7.50E-08	1,24, annual	ST	Above-Average	100%
							2 – methylnaphthalene	91-57-6	3.72E-07	1,24, annual	ST	Above-Average	100%
							2,3,4,5-tetrachlorophenol	4901-51-3	4.81E-07	1,24, annual	ST	Above-Average	100%
							2,3,4,6-Tetrachlorophenol	58-90-2	1.02E-06	1,24, annual	ST	Above-Average	100%
							2,3,4-trichlorophenol	15950-66-0	3.75E-07	1,24, annual	ST	Above-Average	100%
							2,3,5,6-tetrachlorophenol	935-95-5	1.02E-06	1,24, annual	ST	Above-Average	100%
							2,3,5-trichlorophenol	933-78-8	3.75E-07	1,24, annual	ST	Above-Average	100%
							2,3,6-trichlorophenol	933-75-5	3.75E-07	1,24, annual	ST	Above-Average	100%
							2,3-dichlorophenol	576-24-9	5.54E-06	1,24, annual	ST	Above-Average	100%
							2,4,5-trichlorophenol	95-95-4	3.75E-07	1,24, annual	ST	Above-Average	100%
							2,4,6-Trichlorophenol	88-06-2	3.75E-07	1,24, annual	ST	Above-Average	100%
							2,4-Dichlorophenol	120-83-2	5.54E-06	1,24, annual	ST	Above-Average	100%
							2,6-dichlorophenol	87-65-0	5.54E-06	1,24, annual	ST	Above-Average	100%
							2-Butanone	78-93-3	7.36E-05	1,24, annual	ST	Above-Average	100%
							2-Chloronaphthalene	91-58-7	7.50E-08	1,24, annual	ST	Above-Average	100%
							2-Methylanthracene	613-12-7	9.65E-08	1,24, annual	ST	Above-Average	100%
							2-monochlorophenol	95-57-8	5.18E-06	1,24, annual	ST	Above-Average	100%
							3,4,5-trichlorophenol	609-19-8	1.51E-06	1,24, annual	ST	Above-Average	100%
							3,4-dichlorophenol	95-77-2	1.40E-05	1,24, annual	ST	Above-Average	100%
							3,5-dichlorophenol	591-35-5	5.54E-06	1,24, annual	ST	Above-Average	100%
							3-Methylcholanthrene	56-49-5	3.75E-07	1,24, annual	ST	Above-Average	100%
							3-monochlorophenol	108-43-0	5.18E-06	1,24, annual	ST	Above-Average	100%
							4-monochlorophenol	106-48-9	5.18E-06	1,24, annual	ST	Above-Average	100%
							7,12-Dimethylbenzo(a)anthracene	57-97-6	1.24E-07	1,24, annual	ST	Above-Average	100%
							9,10-Dimethylanthracene	781-43-1	7.50E-08	1,24, annual	ST	Above-Average	100%
							9-Methylphenanthrene	883-20-5	2.24E-07	1,24, annual	ST	Above-Average	100%
							Acenaphthene	83-32-9	9.06E-08	1,24, annual	ST	Above-Average	6%
							Acenaphthylene	208-96-8	8.31E-08	1,24, annual	ST	Above-Average	3%
							Acetaldehyde	75-07-0	2.49E-04	1,24, annual	ST	Above-Average	97%
							Acetone	67-64-1	1.19E-04	1,24, annual	ST	Above-Average	100%
							Acrolein	107-02-8	6.50E-05	1,24, annual	ST	Above-Average	96%
							Ammonia	7664-41-7	1.74E-02	1,24, annual	ST	Above-Average	100%
							Anthracene	120-12-7	8.15E-08	1,24, annual	ST	Above-Average	17%
							Antimony	7440-36-0	1.87E-06	1,24, annual	ST	Above-Average	100%
							Arsenic	7440-38-2	1.71E-06	1,24, annual	ST	Above-Average	100%
							Barium	7440-39-3	4.14E-04	1,24, annual	ST	Above-Average	100%
							Benzene	71-43-2	7.36E-05	1,24, annual	ST	Above-Average	22%
							Benzo(a)anthracene	56-55-3	7.50E-08	1,24, annual	ST	Above-Average	27%
							Benzo(a)fluorene	238-84-6	7.94E-08	1,24, annual	ST	Above-Average	100%
							Benzo(a)pyrene	50-32-8	7.50E-08	1,24, annual	ST	Above-Average	47%
							Benzo(b)fluoranthene	205-99-2	1.26E-07	1,24, annual	ST	Above-Average	26%
							Benzo(b)fluorene	243-17-4	7.50E-08	1,24, annual	ST	Above-Average	100%
							Benzo(e)pyrene	192-97-2	9.74E-08	1,24, annual	ST	Above-Average	100%
							Benzo(g,h,i)perylene	191-24-2	1.03E-07	1,24, annual	ST	Above-Average	100%
							Benzo(k)fluoranthene	207-08-9	8.43E-08	1,24, annual	ST	Above-Average	54%
							Beryllium	7440-41-7	1.71E-06	1,24, annual	ST	Above-Average	100%
							Biphenyl	92-51-3	7.09E-07	1,24, annual	ST	Above-Average	100%
							Bromodichloromethane	75-27-4	7.36E-05	1,24, annual	ST	Above-Average	100%
							Bromoform	75-25-2	7.36E-05	1,24, annual	ST	Above-Average	100%
							Bromomethane	74-83-9	7.36E-05	1,24, annual	ST	Above-Average	100%
							Cadmium	7440-43-9	2.85E-06	1,24, annual	ST	Above-Average	100%
							Carbon Monoxide	630-08-0	2.74E-01	1,24, annual	ST	Above-Average	52%
							Carbon tetrachloride	56-23-5	7.36E-05	1,24, annual	ST	Above-Average	100%
							Chlorobenzene	108-90-7	3.10E-06	1,24, annual	ST	Above-Average	100%
							Chloroform	67-66-3	7.36E-05	1,24, annual	ST	Above-Average	100%
							Chromium (hexavalent)	18540-29-9	3.52E-05	1,24, annual	ST	Above-Average	100%
							Chrysene	218-01-9	2.90E-07	1,24, annual	ST	Above-Average	37%
							Cobalt	7440-48-4	1.33E-06	1,24, annual	ST	Above-Average	100%
							Copper	7440-50-8	6.20E-05	1,24, annual	ST	Above-Average	100%
							Coronene	191-07-1	3.75E-07	1,24, annual	ST	Above-Average	100%
							Cumene (Isopropylbenzene)	98-82-8	7.36E-05	1,24, annual	ST	Above-Average	100%
							Dibenzo(a,c)anthracene	215-58-7	7.50E-08	1,24, annual	ST	Above-Average	100%
							Dibenzo(a,e)pyrene	192-65-4	3.75E-07	1,24, annual	ST	Above-Average	100%
							Dibenzo(a,h)anthracene	53-70-3	7.50E-08	1,24, annual	ST	Above-Average	40%
							Dibromochloromethane	124-48-1	7.36E-05	1,24, annual	ST	Above-Average	100%
							Dichlorodifluoromethane	75-71-8	7.36E-05	1,24, annual	ST	Above-Average	100%
							Dichloroethene, 1,1 -	75-34-3	7.36E-05	1,24, annual	ST	Above-Average	100%
							Dichloromethane	75-09-2	1.15E-04	1,24, annual	ST	Above-Average	100%
							Dioxins, Furans and Dioxin- like PCBs	N/A	0.00008 µg TEQ/s	1,24, annual	ST	Above-Average	100%
							Ethylbenzene	100-41-4	7.36E-05	1,24, annual	ST	Above-Average	100%
							Ethylene Dibromide	106-93-4	7.36E-05	1,24, annual	ST	Above-Average	100%
							Fluoranthene	206-44-0	5.25E-07	1,24, annual	ST	Above-Average	28%
							Fluorides	7664-39-3	3.72E-03	1,24, annual	ST	Above-Average	100%
							Fluorene	86-73-7	2.24E-07	1,24, annual	ST	Above-Average	5%
							Formaldehyde	50-00-0	4.52E-03	1,24, annual	ST	Above-Average	99%
							Hexachlorobenzene	118-74-1	7.50E-08	1,24, annual	ST	Above-Average	100%
							Hydrogen Chloride	7647-01-0	1.13E-01	1,24, annual	ST	Above-Average	100%
							Indeno(1,2,3 – cd)pyrene	193-39-5	7.50E-08	1,24, annual	ST	Above-Average	36%
							Lead	7439-92-1	1.10E-05	1,24, annual	ST	Above-Average	100%
							M&P-Xylene	179601-23-1	1.50E-04	1,24, annual	ST	Above-Average	100%
							Mercury	7439-97-6	1.44E-05	1,24, annual	ST	Above-Average	100%
							Mesitylene (1,3,5-Trimethylbenzene)	108-67-8	7.36E-05	1,24, annual	ST	Above-Average	100%
							Molybdenum	7439-98-7	1.56E-04	1,24, annual	ST	Above-Average	100%
							m-Terphenyl	92-06-8	7.50E-08	1,24, annual	ST	Above-Average	100%
							Naphthalene	91-20-3	8.74E-07	1,24, annual	ST	Above-Average	2%
							Nickel	7440-02-0	2.32E-05	1,24, annual	ST	Above-Average	100%
							Nitrogen Oxides	10102-44-0	4.31E+00	1,24, annual	ST	Above-Average	44%
							Nitrogen Oxides	10102-44-0	4.31E+00	1,24, annual	ST	Above-Average	44%
							O-terphenyl	84-15-1	8.43E-08	1,24, annual	ST	Above-Average	100%
							O-Xylene	95-47-6	7.36E-05	1,24, annual	ST	Above-Average	100%
							Pentachlorobenzene	608-93-5	7.50E-08	1,24, annual	ST	Above-Average	100%
							Pentachlorophenol	87-86-5	3.34E-06	1,24, annual	ST	Above-Average	100%
							Perylene	198-55-0	7.50E-08	1,24, annual	ST	Above-Average	100%
							Phenanthrene	85-01-8	2.78E-06	1,24, annual	ST	Above-Average	17%
							Picene	213-46-7	3.75E-07	1,24, annual	ST	Above-Average	100%
							PM_{10} (Condensable and Filterable)	N/A	2.39E-01	1,24, annual	ST	Above-Average	80%
							PM_{10} (Filterable Only)	N/A	4.17E-02	1,24, annual	ST	Above-Average	100%
							$PM_{2.5}$ (Condensable and Filterable)	N/A	2.31E-01	1,24, annual	ST	Above-Average	79%
							$PM_{2.5}$ (Filterable Only)	N/A	3.37E-02	1,24, annual	ST	Above-Average	100%
							Polychlorinated Biphenyls (PCB)	N/A	8.07E-05	1,24, annual	ST	Above-Average	100%
							p-Terphenyl	92-94-4	7.50E-08	1,24, annual	ST	Above-Average	100%
							Pyrene	129-00-0	4.85E-07	1,24, annual	ST	Above-Average	29%

Source Identifier	Source Description	Source Parameters: Stack Volumetric Flow Rate [Am³/s]	Stack Exit Gas Temperature [°C]	Stack Inner Diameter [m]	Stack Height Above Grade [m]	Stack Location [x, y]	Emission Data: Contaminant	CAS No.	Maximum Emission Rate [g/s]	Averaging Period [hours]	Emission Estimating Technique	Emissions Data Quality	Percentage of Overall Emissions [%]
							Selenium	7782-49-2	8.53E-06	1,24, annual	ST	Above-Average	100%
							Silver	7440-22-4	1.71E-06	1,24, annual	ST	Above-Average	100%
							Styrene	100-42-5	7.36E-05	1,24, annual	ST	Above-Average	100%
							Sulphur Dioxide	7446-09-5	2.95E-02	1,24, annual	ST	Above-Average	61%
							Tetrachloroethene	127-18-4	7.36E-05	1,24, annual	ST	Above-Average	100%
							Tetralin	119-64-2	2.88E-07	1,24, annual	ST	Above-Average	100%
							Thallium	7440-28-0	1.71E-06	1,24, annual	ST	Above-Average	100%
							Toluene	108-88-3	4.64E-03	1,24, annual	ST	Above-Average	98%
							Total Chromium (and compounds)	7440-47-3	3.52E-05	1,24, annual	ST	Above-Average	100%
							Total Particulate Matter (Condensable and Filterable)	N/A	2.52E-01	1,24, annual	ST	Above-Average	77%
							Total Particulate Matter (Filterable Only)	N/A	5.47E-02	1,24, annual	ST	Above-Average	73%
							trans,1,2-Dichloroethene	156-60-5	7.36E-05	1,24, annual	ST	Above-Average	100%
							Trichloroethane, 1,1,1 -	71-55-6	7.36E-05	1,24, annual	ST	Above-Average	100%
							Trichloroethene	79-01-6	7.36E-05	1,24, annual	ST	Above-Average	100%
							Trichloroethylene, 1,1,2 -	79-01-6	7.36E-05	1,24, annual	ST	Above-Average	100%
							Trichlorofluoromethane	75-69-4	7.36E-05	1,24, annual	ST	Above-Average	100%
							Trichlorotrifluoroethane	76-13-1	7.36E-05	1,24, annual	ST	Above-Average	100%
							Vanadium	7440-62-2	8.53E-07	1,24, annual	ST	Above-Average	100%
							Vinyl chloride	75-01-4	7.36E-05	1,24, annual	ST	Above-Average	100%
							Xylenes, m-, p- and o-	1330-20-7	2.23E-04	1,24, annual	ST	Above-Average	78%
							Zinc	7440-66-6	4.14E-04	1,24, annual	ST	Above-Average	100%
2	Silo Filling	0.31	Ambient	0.10	5.4864	(680551,4860359)	Total Particulate Matter	N/A	1.07E-02	1	EC	Above-Average	3%
							PM_{10}	N/A	1.07E-02	1	EC	Above-Average	4%
							$PM_{2.5}$	N/A	1.07E-02	1	EC	Above-Average	4%
		0.31	Ambient	0.10	4.8768	(680513,4860332)	Total Particulate Matter	N/A	1.07E-02	1	EC	Above-Average	3%
							PM_{10}	N/A	1.07E-02	1	EC	Above-Average	4%
							$PM_{2.5}$	N/A	1.07E-02	1	EC	Above-Average	4%
		0.31	Ambient	0.10	3.9624	(680517,4860333)	Total Particulate Matter	N/A	1.07E-02	1	EC	Above-Average	3%
							PM_{10}	N/A	1.07E-02	1	EC	Above-Average	4%
							$PM_{2.5}$	N/A	1.07E-02	1	EC	Above-Average	4%
		0.31	Ambient	0.10	12.4	(680537,4860391)	Total Particulate Matter	N/A	1.07E-02	1	EC	Above-Average	3%
							PM_{10}	N/A	1.07E-02	1	EC	Above-Average	4%
							$PM_{2.5}$	N/A	1.07E-02	1	EC	Above-Average	4%
3	Stand-by generator	1.16	265.85	0.2	3	(680475,4860419)	Carbon Monoxide	630-08-0	2.56E-01	½	EF	Marginal	48%
							Nitrogen Oxides	10102-44-0	1.12E+00	½	EF	Marginal	11%
							Sulphur Dioxide	7446-09-5	1.88E-02	½	EF	Above-Average	39%
							Total Particulate Matter	N/A	3.25E-02	½	EF	Above-Average	10%
							Filterable TSP	N/A	2.03E-02	½	EF	Above-Average	27%
							PM_{10}	N/A	1.88E-02	½	EF	Above-Average	6%
							$PM_{2.5}$	N/A	1.88E-02	½	EF	Above-Average	6%
							Sulphuric Acid	7664-93-9	2.88E-04	½	EC	Above-Average	100%
							Benzene	71-43-2	2.54E-04	½	EF	Marginal	78%
							Toluene	108-88-3	9.21E-05	½	EF	Marginal	2%
							Xylenes, m-, p- and o-	1330-20-7	6.32E-05	½	EF	Marginal	22%
							Propylene	115-07-1	9.14E-04	½	EF	Marginal	100%
							Formaldehyde	50-00-0	2.58E-05	½	EF	Marginal	<1%
							Acetaldehyde	75-07-0	8.26E-06	½	EF	Marginal	3%
							Acrolein	107-02-8	2.58E-06	½	EF	Marginal	4%
							Naphthalene	91-20-3	4.26E-05	½	EF	Marginal	98%
							Acenaphthylene	208-96-8	3.02E-06	½	EF	Marginal	97%
							Acenaphthene	83-32-9	1.53E-06	½	EF	Marginal	94%
							Fluorene	86-73-7	4.19E-06	½	EF	Marginal	95%
							Phenanthrene	85-01-8	1.34E-05	½	EF	Marginal	83%
							Anthracene	120-12-7	4.03E-07	½	EF	Marginal	83%
							Fluoranthene	206-44-0	1.32E-06	½	EF	Marginal	72%
							Pyrene	129-00-0	1.22E-06	½	EF	Marginal	71%
							Benzo(a)anthracene	56-55-3	2.04E-07	½	EF	Marginal	73%
							Chrysene	218-01-9	5.01E-07	½	EF	Marginal	63%
							Benzo(b)fluoranthene	205-99-2	3.64E-07	½	EF	Marginal	74%
							Benzo(k)fluoranthene	207-08-9	7.14E-08	½	EF	Marginal	46%
							Benzo(a)pyrene	50-32-8	8.42E-08	½	EF	Marginal	53%
							Indeno(1,2,3 – cd)pyrene	193-39-5	1.36E-07	½	EF	Marginal	64%
							Dibenzo(a,h)anthracene	53-70-3	1.13E-07	½	EF	Marginal	60%
							Benzo(ghi)perylene	191-24-2	1.82E-07	½	EF	Marginal	100%

APPENDIX B

Emission Summary Table

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration Before Meteorological Anomaly Removal [µg/m³]	Maximum POI Concentration After Meteorological Anomaly Removal [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes	Version Date of ACB List (i.e. Version 2.0 - April 2018)
1 – methylnaphthalene	90-12-0	2.22E-07	CALPUFF	2.73E-07	2.59E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
1,2,4 – Trichlorobenzene	120-82-1	8.40E-08	CALPUFF	1.03E-07	9.83E-08	24-hour	400	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
1,2,4,5-Tetrachlorobenzene	95-94-3	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
1,2-Dichlorobenzene	95-50-1	2.20E-07	CALPUFF	6.09E-06	2.31E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
2 – methylnaphthalene	91-57-6	3.72E-07	CALPUFF	4.57E-07	4.35E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
2,3,4,6-Tetrachlorophenol	58-90-2	1.02E-06	CALPUFF	1.26E-06	1.20E-06	24-hour	0.75	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
2,4,6-Trichlorophenol	88-06-2	3.75E-07	CALPUFF	4.61E-07	4.39E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
2,4-Dichlorophenol	120-83-2	5.54E-06	CALPUFF	6.81E-06	6.48E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
3-Methylcholanthrene	56-49-5	3.75E-07	CALPUFF	4.61E-07	4.39E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
7,12-Dimethylbenzo(a)anthracene	57-97-6	1.24E-07	CALPUFF	1.52E-07	1.45E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Acenaphthene	83-32-9	9.06E-08	CALPUFF	1.11E-07	1.06E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Acenaphthylene	208-96-8	8.31E-08	CALPUFF	1.02E-07	9.72E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Acetaldehyde	75-07-0	2.49E-04	CALPUFF	3.06E-04	2.91E-04	24-hour	500	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4	Version 3.0 April 2023
Acetaldehyde	75-07-0	2.49E-04	CALPUFF	3.06E-04	2.91E-04	24-hour	5000	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Acrolein	107-02-8	6.50E-05	CALPUFF	8.00E-05	7.61E-05	24-hour	0.4	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4	Version 3.0 April 2023
Acrolein	107-02-8	6.50E-05	CALPUFF	1.80E-03	6.84E-04	1-hour	4.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4	Version 3.0 April 2023
Ammonia	7664-41-7	1.74E-02	CALPUFF	2.14E-02	2.03E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Ammonia	7664-41-7	1.74E-02	CALPUFF	2.14E-02	2.03E-02	24-hour	1000	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Anthracene	120-12-7	8.15E-08	CALPUFF	1.00E-07	9.54E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Antimony	7440-36-0	1.87E-06	CALPUFF	2.30E-06	2.19E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Arsenic	7440-38-2	1.71E-06	CALPUFF	2.10E-06	2.00E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Barium	7440-39-3	4.14E-04	CALPUFF	5.09E-04	4.84E-04	24-hour	10	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Benzene	71-43-2	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	0.45	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4	Version 3.0 April 2023
Benzene	71-43-2	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	100	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Benzene	71-43-2	7.36E-05	CALPUFF	4.42E-06	4.42E-06	Annual	4.5	—	—	AAV	—	0%		Version 3.0 April 2023
Benzo(a)anthracene	56-55-3	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Benzo(a)fluorene	238-84-6	7.94E-08	CALPUFF	9.77E-08	9.30E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Benzo(a)pyrene	50-32-8	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.00001	Health	Sch. 3	Standard	B1	<1%	Notes 6, 7, Table 2, 3 URT - Note 8, Table 4	Version 3.0 April 2023
Benzo(a)pyrene	50-32-8	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.005	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Benzo(a)pyrene	50-32-8	7.50E-08	CALPUFF	4.50E-09	4.50E-09	Annual	0.0001	—	—	AAV	—	0%		Version 3.0 April 2023
Benzo(b)fluoranthene	205-99-2	1.26E-07	CALPUFF	1.55E-07	1.48E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Benzo(b)fluorene	243-17-4	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Benzo(e)pyrene	192-97-2	9.74E-08	CALPUFF	1.20E-07	1.14E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Benzo(g,h,i)perylene	191-24-2	1.03E-07	CALPUFF	1.27E-07	1.21E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Benzo(k)fluoranthene	207-08-9	8.43E-08	CALPUFF	1.04E-07	9.86E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Beryllium	7440-41-7	1.71E-06	CALPUFF	2.10E-06	2.00E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Biphenyl	92-51-3	7.09E-07	CALPUFF	8.72E-07	8.29E-07	24-hour	170	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
Bromodichloromethane	75-27-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	350	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
Bromoform	75-25-2	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	55	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Bromomethane	74-83-9	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Cadmium	7440-43-9	2.85E-06	CALPUFF	3.51E-06	3.34E-06	24-hour	0.025	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Cadmium	7440-43-9	2.85E-06	CALPUFF	3.51E-06	3.34E-06	24-hour	0.25	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Carbon Monoxide	630-08-0	2.74E-01	CALPUFF	9.13E+00	3.46E+00	½-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 17	Version 3.0 April 2023
Carbon tetrachloride	56-23-5	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Carbon tetrachloride	56-23-5	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	24	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Chlorobenzene	108-90-7	3.10E-06	CALPUFF	8.58E-05	3.26E-05	1-hour	3500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11	Version 3.0 April 2023
Chlorobenzene	108-90-7	3.10E-06	CALPUFF	1.42E-04	5.37E-05	10-minute	4,500	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11	Version 3.0 April 2023
Chloroform	67-66-3	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Chloroform	67-66-3	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	100	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Chromium (hexavalent)	18540-29-9	3.52E-05	CALPUFF	2.11E-06	2.11E-06	Annual	0.00014	Health	Sch. 3	Standard	B1	2%	Notes 7, 29, Tables 2, 3 URT - Note 8, Table 4	Version 3.0 April 2023
Chromium (hexavalent)	18540-29-9	3.52E-05	CALPUFF	4.33E-05	4.12E-05	24-hour	0.07	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Chromium (hexavalent)	18540-29-9	3.52E-05	CALPUFF	2.11E-06	2.11E-06	Annual	0.0014	—	—	AAV	—	0%		Version 3.0 April 2023
Chrysene	218-01-9	2.90E-07	CALPUFF	3.57E-07	3.39E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Cobalt	7440-48-4	1.33E-06	CALPUFF	1.64E-06	1.56E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Copper	7440-50-8	6.20E-05	CALPUFF	7.63E-05	7.25E-05	24-hour	50	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Dibenzo(a,c)anthracene	215-58-7	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Dibenzo(a,h)anthracene	53-70-3	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Dichlorodifluoromethane	75-71-8	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 15	Version 3.0 April 2023
Dichloroethene, 1,1 -	75-34-3	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	165	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Dichloroethene, 1,1 -	75-34-3	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	1650	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Dichloromethane	75-09-2	1.15E-04	CALPUFF	1.42E-04	1.35E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Dichloromethane	75-09-2	1.15E-04	CALPUFF	1.42E-04	1.35E-04	24-hour	22000	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Dioxins, Furans and Dioxin- like PCBs	N/A	0.00008 µg TEQ/s	CALPUFF	0.0001 pg TEQ/m³	0.00009 pg TEQ/m³	24-hour	0.1 pg TEQ/m³	—	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Ethylbenzene	100-41-4	7.36E-05	CALPUFF	3.37E-03	1.28E-03	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11	Version 3.0 April 2023
Ethylbenzene	100-41-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4	Version 3.0 April 2023
Ethylbenzene	100-41-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	10000	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Ethylene Dibromide	106-93-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	3	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Fluoranthene	206-44-0	5.25E-07	CALPUFF	6.46E-07	6.15E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Fluorene	86-73-7	2.24E-07	CALPUFF	2.75E-07	2.62E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Fluorides	7664-39-3	3.72E-03	CALPUFF	4.58E-03	4.35E-03	24-hour	0.86	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24	Version 3.0 April 2023
Fluorides	7664-39-3	3.72E-03	CALPUFF	6.32E-04	6.32E-04	30-day	0.34	Vegetation	Sch. 3	Standard	B1	<1%	Notes 10, 24	Version 3.0 April 2023
Formaldehyde	50-00-0	4.52E-03	CALPUFF	5.56E-03	5.29E-03	24-hour	65	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Hexachlorobenzene	118-74-1	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
Hexachlorobenzene	118-74-1	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.01	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Hydrogen Chloride	7647-01-0	1.13E-01	CALPUFF	1.39E-01	1.33E-01	24-hour	20	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Hydrogen Chloride	7647-01-0	1.13E-01	CALPUFF	1.39E-01	1.33E-01	24-hour	200	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Indeno(1,2,3 – cd)pyrene	193-39-5	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Lead	7439-92-1	1.10E-05	CALPUFF	1.35E-05	1.28E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4	Version 3.0 April 2023
Lead	7439-92-1	1.10E-05	CALPUFF	1.86E-06	1.86E-06	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 10 URT - Note 8, Table 4	Version 3.0 April 2023
Lead	7439-92-1	1.10E-05	CALPUFF	1.35E-05	1.28E-05	24-hour	2	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Mercury	7439-97-6	1.44E-05	CALPUFF	1.77E-05	1.68E-05	24-hour	2	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Mercury	7439-97-6	1.44E-05	CALPUFF	1.77E-05	1.68E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Molybdenum	7439-98-7	1.56E-04	CALPUFF	1.92E-04	1.82E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Naphthalene	91-20-3	8.74E-07	CALPUFF	1.08E-06	1.02E-06	24-hour	22.5	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11	Version 3.0 April 2023
Naphthalene	91-20-3	8.74E-07	CALPUFF	4.00E-05	1.52E-05	10-minute	50	Health Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11	Version 3.0 April 2023
Nickel	7440-02-0	2.32E-05	CALPUFF	1.39E-06	1.39E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 7, Table 2, 3 URT - Note 8, Table 4	Version 3.0 April 2023
Nickel	7440-02-0	2.32E-05	CALPUFF	2.86E-05	2.72E-05	24-hour	2	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Nickel	7440-02-0	2.32E-05	CALPUFF	1.39E-06	1.39E-06	Annual	0.4	—	—	AAV	—	0%		Version 3.0 April 2023
Nitrogen Oxides	10102-44-0	4.31E+00	CALPUFF	5.30E+00	5.04E+00	24-hour	200	Health	Sch. 3	Standard	B1	3%	Notes 10, 28	Version 3.0 April 2023
Nitrogen Oxides	10102-44-0	4.31E+00	CALPUFF	1.19E+02	4.53E+01	1-hour	400	Health	Sch. 3	Standard	B1	11%	Notes 10, 28	Version 3.0 April 2023
O-terphenyl	84-15-1	8.43E-08	CALPUFF	1.04E-07	9.86E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Pentachlorobenzene	608-93-5	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
Pentachlorophenol	87-86-5	3.34E-06	CALPUFF	4.11E-06	3.91E-06	24-hour	20	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Perylene	198-55-0	7.50E-08	CALPUFF	9.22E-08	8.77E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Phenanthrene	85-01-8	2.78E-06	CALPUFF	3.42E-06	3.25E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
PM_{10} (Condensable and Filterable)	N/A	2.39E-01	CALPUFF	3.17E-01	3.04E-01	24-hour	50	Particulate	—	AAQC	—	<1%		Version 3.0 April 2023
PM_{10} (Filterable Only)	N/A	4.17E-02	CALPUFF	1.35E-01	9.47E-02	24-hour	50	Particulate	—	AAQC	—	<1%		Version 3.0 April 2023
$PM_{2.5}$ (Condensable and Filterable)	N/A	2.31E-01	CALPUFF	3.07E-01	2.94E-01	24-hour	27	Particulate	—	AAQC	—	1%		Version 3.0 April 2023
$PM_{2.5}$ (Filterable Only)	N/A	3.37E-02	CALPUFF	1.30E-01	9.33E-02	24-hour	27	Particulate	—	AAQC	—	<1%		Version 3.0 April 2023
Pyrene	129-00-0	4.85E-07	CALPUFF	5.97E-07	5.68E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Version 3.0 April 2023
Selenium	7782-49-2	8.53E-06	CALPUFF	1.05E-05	9.98E-06	24-hour	10	Health	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Silver	7440-22-4	1.71E-06	CALPUFF	2.10E-06	2.00E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Sulphur Dioxide	7446-09-5	2.95E-02	CALPUFF	8.17E-01	3.10E-01	1-hour	100	Health & Vegetation	Sch. 3	Standard	B1	<1%	Effective date - July 1, 2023 Note 10 URT - Note 8, Table 4	Version 3.0 April 2023
Sulphur Dioxide	7446-09-5	2.95E-02	CALPUFF	1.77E-03	1.77E-03	annual	10	Health & Vegetation	Sch. 3	Standard	B1	<1%	Effective date - July 1, 2023 Note 10 URT - Note 8, Table 4	Version 3.0 April 2023
Sulphur Dioxide	7446-09-5	2.95E-02	CALPUFF	8.17E-01	3.10E-01	1-hour	690	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Tetrachloroethene	127-18-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Tetrachloroethene	127-18-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	3600	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Tetralin	119-64-2	2.88E-07	CALPUFF	3.54E-07	3.37E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
Thallium	7440-28-0	1.71E-06	CALPUFF	2.10E-06	2.00E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below B2		Version 3.0 April 2023
Toluene	108-88-3	4.64E-03	CALPUFF	5.71E-03	5.43E-03	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	To be updated - Note 13	Version 3.0 April 2023
Total Chromium (and compounds)	7440-47-3	3.52E-05	CALPUFF	4.33E-05	4.12E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 22 URT - Note 8, Table 4	Version 3.0 April 2023
Total Chromium (and compounds)	7440-47-3	3.52E-05	CALPUFF	4.33E-05	4.12E-05	24-hour	5	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Total Particulate Matter (Condensable and Filterable)	N/A	2.52E-01	CALPUFF	3.33E-01	3.19E-01	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Total Particulate Matter (Filterable only)	N/A	5.47E-02	CALPUFF	1.43E-01	9.96E-02	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%		Version 3.0 April 2023
Trichloroethane, 1,1,1 -	71-55-6	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	115000	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Trichloroethene	79-01-6	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Trichloroethene	79-01-6	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	1200	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Trichloroethylene, 1,1,2 -	79-01-6	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Trichloroethylene, 1,1,2 -	79-01-6	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	1200	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Trichlorofluoromethane	75-69-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 15	Version 3.0 April 2023
Vanadium	7440-62-2	8.53E-07	CALPUFF	1.05E-06	9.98E-07	24-hour	2	Health	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023
Vinyl chloride	75-01-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 8, Table 4	Version 3.0 April 2023
Vinyl chloride	75-01-4	7.36E-05	CALPUFF	9.05E-05	8.61E-05	24-hour	100	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Xylenes, m-, p- and o-	1330-20-7	2.23E-04	CALPUFF	1.02E-02	3.87E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	Notes 10, 11, 19	Version 3.0 April 2023
Xylenes, m-, p- and o-	1330-20-7	2.23E-04	CALPUFF	2.74E-04	2.61E-04	24-hour	730	Health	Sch. 3	Standard	B1	<1%	Notes 10, 19 URT - Note 8, Table 4	Version 3.0 April 2023
Xylenes, m-, p- and o-	1330-20-7	2.23E-04	CALPUFF	2.74E-04	2.61E-04	24-hour	7300	—	Sch. 6	URT	—	Below URT		Version 3.0 April 2023
Zinc	7440-66-6	4.14E-04	CALPUFF	5.09E-04	4.84E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%		Version 3.0 April 2023

APPENDIX 28

DYEC CEMS 1-Hour Average Data
(4 pages)

Covanta - Durham York Energy Centre
Boiler No. 1 CEMS

		BH Outlet										Scrubber Inlet
		O_2	CO		SO_2		NOx		HCl		THC	O_2
		%	mg/m³ @ 11% O_2		mg/m³ @ 11% O_2		mg/m³ @ 11% O_2		mg/m³ @ 11% O_2		mg/m³ @ 11% O_2	%
Date	Time	1-hr	1-hr	Rolling 4-hr	1-hr	Rolling 24-hr	1-hr	Rolling 24-hr	1-hr	Rolling 24-hr	1-hr	1-hr
18-Mar-24	8:00	9.17	7		8		120		1		0	8
18-Mar-24	9:00	8.95	8		0		111		1		0	8
18-Mar-24	10:00	8.68	6		0		93		0		0	8
18-Mar-24	11:00	9.09	5	6.5	0		117		0		0	8
18-Mar-24	12:00	8.80	6	6.3	0		101		0		0	8
18-Mar-24	13:00	8.79	5	5.5	0		111		0		0	8
18-Mar-24	14:00	8.65	5	5.3	0		107		0		0	8
18-Mar-24	15:00	8.83	4	5.0	0		105		1		0	8
18-Mar-24	16:00	8.87	4	4.5	0		119		1		0	8
18-Mar-24	17:00	9.01	3	4.0	0		116		0		0	8
18-Mar-24	18:00	8.58	5	4.0	0		105		0		0	8
18-Mar-24	19:00	8.84	4	4.0	0		109		0		0	8
18-Mar-24	20:00	8.66	6	4.5	0		105		1		0	8
18-Mar-24	21:00	8.80	6	5.3	1		117		1		0	8
18-Mar-24	22:00	8.70	4	5.0	0		108		0		0	8
18-Mar-24	23:00	8.58	4	5.0	0		111		0		0	8
19-Mar-24	0:00	8.73	4	4.5	0		107		0		0	8
19-Mar-24	1:00	8.68	5	4.3	0		111		0		0	8
19-Mar-24	2:00	9.02	6	4.8	0		98		1		0	8
19-Mar-24	3:00	8.84	4	4.8	0		122		0		0	8
19-Mar-24	4:00	8.87	5	5.0	0		131		0		0	8
19-Mar-24	5:00	8.59	4	4.8	0		112		0		0	8
19-Mar-24	6:00	8.96	5	4.5	0		140		1		0	8
19-Mar-24	7:00	8.43	11	6.3	0	0.4	109	112	1	0.4	0	8
19-Mar-24	8:00	8.69	7	6.8	0	0.0	109	111	0	0.3	0	8
19-Mar-24	9:00	8.80	8	7.8	0	0.0	102	111	0	0.3	0	8
19-Mar-24	10:00	8.67	8	8.5	0	0.0	96	111	0	0.3	0	8
19-Mar-24	11:00	8.81	6	7.3	0	0.0	123	111	1	0.3	0	8
19-Mar-24	12:00	9.33	9	7.8	0	0.0	111	112	1	0.4	0	9
19-Mar-24	13:00	8.90	6	7.3	4	0.2	116	112	1	0.4	0	8
19-Mar-24	14:00	8.97	7	7.0	0	0.2	107	112	1	0.5	0	8
19-Mar-24	15:00	8.50	5	6.8	0	0.2	109	112	0	0.4	0	8
19-Mar-24	16:00	8.26	6	6.0	0	0.2	110	112	0	0.4	0	7
19-Mar-24	17:00	8.31	6	6.0	0	0.2	104	111	0	0.4	0	8
19-Mar-24	18:00	8.72	9	6.5	0	0.2	109	112	0	0.4	0	8
19-Mar-24	19:00											8
19-Mar-24	20:00											8
19-Mar-24	21:00											7
19-Mar-24	22:00											8
19-Mar-24	23:00	8.30	4		0		125		1		0	8
20-Mar-24	0:00	8.63	5		0		99		1		0	8
20-Mar-24	1:00	8.43	6		0		115		1		0	8
20-Mar-24	2:00	8.11	7	5.5	0		113		0		0	7
20-Mar-24	3:00	8.21	6	6.0	0		117		0		0	7
20-Mar-24	4:00	8.14	5	6.0	0		128		0		0	7
20-Mar-24	5:00	8.34	9	6.8	0		93		2		0	8
20-Mar-24	6:00	8.46	11	7.8	1		137		2		0	8
20-Mar-24	7:00	8.28	7	8.0	0		109		1		0	7
20-Mar-24	8:00	7.93	8	8.8	0		105		1		0	7
20-Mar-24	9:00	8.18	12	9.5	0		100		1		0	7
20-Mar-24	10:00	7.97	8	8.8	0		100		1		0	7
20-Mar-24	11:00	8.10	5	8.3	0		109		1		0	7
20-Mar-24	12:00	8.22	6	7.8	0		115		0		0	7
20-Mar-24	13:00	8.02	5	6.0	0		109		0		0	7
20-Mar-24	14:00	7.82	6	5.5	0		106		0		0	7
20-Mar-24	15:00	8.37	7	6.0	0		111		0		0	7
20-Mar-24	16:00	8.06	7	6.3	0		118		0		0	7
20-Mar-24	17:00	8.30	8	7.0	0		102		0		0	7
20-Mar-24	18:00	8.45	5	6.8	0		113		0		0	7
20-Mar-24	19:00	8.35	4	6.0	0		118		0		0	7
20-Mar-24	20:00	8.50	6	5.8	0		102		1		0	8
20-Mar-24	21:00	8.59	6	5.3	0		98		0		0	8
20-Mar-24	22:00	8.64	6	5.5	0	0.0	109	110	0	0.5	0	8
20-Mar-24	23:00	8.58	4	5.5	0	0.0	115	110	0	0.5	0	7
21-Mar-24	0:00	8.25	5	5.3	0	0.0	108	110	0	0.5	0	7
21-Mar-24	1:00	8.27	5	5.0	0	0.0	111	110	0	0.4	0	7
21-Mar-24	2:00	8.16	5	4.8	0	0.0	98	110	0	0.4	0	7
21-Mar-24	3:00	8.43	6	5.3	0	0.0	125	110	0	0.4	0	7
21-Mar-24	4:00	8.08	14	7.5	0	0.0	124	110	0	0.4	0	7
21-Mar-24	5:00	8.97	5	7.5	0	0.0	108	110	0	0.3	0	8
21-Mar-24	6:00	8.05	5	7.5	0	0.0	141	111	0	0.3	0	7
21-Mar-24	7:00	8.15	4	7.0	0	0.0	113	111	0	0.2	1	7

Note: All times are Eastern Standard Time

Covanta - Durham York Energy Centre
Boiler No. 1 CEMS

		BH Outlet										Scrubber Inlet
		O_2	CO		SO_2		NOx		HCl		THC	O_2
		%	mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2	%
Date	Time	1-hr	1-hr	Rolling 4-hr	1-hr	Rolling 24-hr	1-hr	Rolling 24-hr	1-hr	Rolling 24-hr	1-hr	1-hr
21-Mar-24	8:00	8.05	6	5.0	0	0.0	108	111	0	0.2	1	7
21-Mar-24	9:00	8.13	6	5.3	0	0.0	111	111	1	0.2	0	7
21-Mar-24	10:00	8.19	8	6.0	0	0.0	110	112	1	0.2	0	7
21-Mar-24	11:00	8.17	5	6.3	0	0.0	110	112	1	0.2	0	7
21-Mar-24	12:00	8.26	6	6.3	0	0.0	113	112	1	0.2	0	7
21-Mar-24	13:00	8.27	5	6.0	0	0.0	121	112	1	0.3	0	7
21-Mar-24	14:00	8.48	5	5.3	2	0.1	115	113	1	0.3	0	8
21-Mar-24	15:00	8.77	8	6.0	40	1.8	83	111	1	0.3	0	8
21-Mar-24	16:00	9.20	6	6.1	0	1.6	103	111	0	0.3	0	9
	Min	7.82	3	4.0	0	0	83	110	0	0.2	0	7
	Max	9.33	14	9.5	40	1.75	141	113	2	0.5	1	9
	Avg	8.52	6	6.1	0.73	0.18	111	111	0	0.3	0	8
	Std Dev	0.34	2.0	1.3	4.7	0.4	10.14	0.8	0.5	0.1	0	0.5

Note: All times are Eastern Standard Time

Covanta - Durham York Energy Centre
Boiler No. 2 CEMS

		BH Outlet										Scrubber Inlet
		O_2	CO		SO_2		NOx		HCl		THC	O_2
		%	mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2	%
Date	Time	1-hr	1-hr	Rolling 4-hr	1-hr	Rolling 24-hr	1-hr	Rolling 24-hr	1-hr	Rolling 24-hr	1-hr	1-hr
18-Mar-24	8:00	8.91	10		29		108		2		0	8
18-Mar-24	9:00	8.32	19		9		112		3		0	7
18-Mar-24	10:00	8.59	11		0		109		2		0	7
18-Mar-24	11:00	8.85	7	11.8	0		111		2		0	7
18-Mar-24	12:00	8.39	6	10.8	0		108		2		0	7
18-Mar-24	13:00	8.28	7	7.8	0		112		2		0	7
18-Mar-24	14:00	8.77	8	7.0	0		100		2		0	7
18-Mar-24	15:00	8.37	8	7.3	0		111		2		0	7
18-Mar-24	16:00	8.24	7	7.5	0		109		2		0	7
18-Mar-24	17:00	8.36	7	7.5	0		108		2		0	7
18-Mar-24	18:00	8.09	10	8.0	0		113		2		0	7
18-Mar-24	19:00	8.63	8	8.0	0		111		2		0	7
18-Mar-24	20:00	8.54	7	8.0	0		108		2		0	7
18-Mar-24	21:00	8.36	7	8.0	13		110		3		0	7
18-Mar-24	22:00	8.33	8	7.5	0		108		3		0	7
18-Mar-24	23:00	8.43	8	7.5	7		109		2		0	7
19-Mar-24	0:00	8.26	9	8.0	0		105		3		0	7
19-Mar-24	1:00	8.38	7	8.0	0		107		2		0	7
19-Mar-24	2:00	8.38	8	8.0	0		107		2		0	7
19-Mar-24	3:00	8.47	6	7.5	0		108		2		0	7
19-Mar-24	4:00	8.29	8	7.3	0		116		2		0	7
19-Mar-24	5:00	7.87	7	7.3	0		97		3		0	7
19-Mar-24	6:00	8.28	6	6.8	0		117		3		0	7
19-Mar-24	7:00	7.97	7	7.0	0	2.4	109	109	2	2.3	0	7
19-Mar-24	8:00	8.63	5	6.3	0	1.2	113	109	2	2.3	0	7
19-Mar-24	9:00	8.79	6	6.0	0	0.8	111	109	2	2.2	0	8
19-Mar-24	10:00	8.57	8	6.5	0	0.8	104	109	2	2.2	0	7
19-Mar-24	11:00	8.33	9	7.0	0	0.8	102	108	2	2.2	0	7
19-Mar-24	12:00	8.27	13	9.0	0	0.8	111	109	3	2.3	0	7
19-Mar-24	13:00	8.18	16	11.5	1	0.9	111	109	3	2.3	0	7
19-Mar-24	14:00	8.05	7	11.3	0	0.9	103	109	3	2.3	0	7
19-Mar-24	15:00	8.22	9	11.3	0	0.9	113	109	3	2.4	0	7
19-Mar-24	16:00	8.27	7	9.8	0	0.9	107	109	3	2.4	0	7
19-Mar-24	17:00	8.10	6	7.3	0	0.9	108	109	2	2.4	0	7
19-Mar-24	18:00	8.11	7	7.3	0	0.9	109	109	2	2.4	0	7
19-Mar-24	19:00											7
19-Mar-24	20:00											7
19-Mar-24	21:00											7
19-Mar-24	22:00											7
19-Mar-24	23:00	8.46	6		0		116		3		0	7
20-Mar-24	0:00	7.92	5		0		113		3		0	7
20-Mar-24	1:00	8.18	5		0		112		3		0	7
20-Mar-24	2:00	8.13	6	5.5	0		100		2		0	7
20-Mar-24	3:00	8.10	9	6.3	0		114		2		0	7
20-Mar-24	4:00	8.14	7	6.8	0		113		2		0	7
20-Mar-24	5:00	8.04	8	7.5	0		92		3		0	7
20-Mar-24	6:00	8.11	8	8.0	0		109		3		0	7
20-Mar-24	7:00	8.06	8	7.8	0		108		2		0	7
20-Mar-24	8:00	8.43	8	8.0	0		111		2		0	7
20-Mar-24	9:00	7.94	14	9.5	0		98		2		0	7
20-Mar-24	10:00	8.60	9	9.8	0		98		2		0	8
20-Mar-24	11:00	8.00	13	11.0	0		76		2		0	7
20-Mar-24	12:00	8.30	4	10.0	0		119		3		0	7
20-Mar-24	13:00	8.41	5	7.8	0		107		3		0	7
20-Mar-24	14:00	8.51	6	7.0	0		109		2		0	7
20-Mar-24	15:00	8.02	7	5.5	0		108		2		0	7
20-Mar-24	16:00	7.48	7	6.3	0		105		2		0	6
20-Mar-24	17:00	7.98	9	7.3	0		110		2		0	7
20-Mar-24	18:00	8.13	8	7.8	0		112		2		0	7
20-Mar-24	19:00	8.49	8	8.0	0		112		2		0	7
20-Mar-24	20:00	8.67	7	8.0	0		107		2		0	7
20-Mar-24	21:00	8.34	7	7.5	0		111		2		0	7
20-Mar-24	22:00	8.26	7	7.3	0	0.0	111	107	2	2.3	0	7
20-Mar-24	23:00	8.31	8	7.3	0	0.0	108	107	2	2.3	0	7
21-Mar-24	0:00	8.65	6	7.0	0	0.0	109	107	3	2.3	0	8
21-Mar-24	1:00	9.59	9	7.5	0	0.0	108	106	3	2.3	0	9
21-Mar-24	2:00	8.35	7	7.5	0	0.0	101	107	2	2.3	0	7
21-Mar-24	3:00	8.14	5	6.8	0	0.0	112	106	1	2.2	0	7
21-Mar-24	4:00	8.79	7	7.0	0	0.0	114	106	2	2.2	0	8
21-Mar-24	5:00	8.19	10	7.3	0	0.0	87	106	3	2.2	0	7
21-Mar-24	6:00	8.60	8	7.5	0	0.0	113	106	2	2.2	0	8
21-Mar-24	7:00	8.41	8	8.3	0	0.0	104	106	2	2.2	0	7

Note: All times are Eastern Standard Time

Covanta - Durham York Energy Centre
Boiler No. 2 CEMS

		BH Outlet										Scrubber Inlet
		O_2	CO		SO_2		NOx		HCl		THC	O_2
		%	mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2		mg/m^3 @ 11% O_2	%
Date	Time	1-hr	1-hr	Rolling 4-hr	1-hr	Rolling 24-hr	1-hr	Rolling 24-hr	1-hr	Rolling 24-hr	1-hr	1-hr
21-Mar-24	8:00	8.32	9	8.8	0	0.0	108	106	2	2.2	0	7
21-Mar-24	9:00	8.64	7	8.0	0	0.0	114	107	2	2.2	0	8
21-Mar-24	10:00	9.57	12	9.0	0	0.0	114	107	2	2.2	0	9
21-Mar-24	11:00	8.71	7	8.8	0	0.0	104	109	2	2.2	0	8
21-Mar-24	12:00	8.38	8	8.5	0	0.0	110	108	2	2.1	0	7
21-Mar-24	13:00	8.38	7	8.5	0	0.0	118	109	2	2.1	0	7
21-Mar-24	14:00	8.62	7	7.3	0	0.0	99	108	2	2.1	0	7
21-Mar-24	15:00	8.59	13	8.8	0	0.0	110	108	2	2.1	0	8
21-Mar-24	16:00	8.97	33	12.4	0	0.0	105	108	2	2.1	0	8
	Min	7.48	4	5.5	0	0	76	106	1	2.1	0	6
	Max	9.59	33	12.4	29	2.4	119	109	3	2.4	0	9
	Avg	8.37	8	8.0	0.77	0.39	108	108	2	2.2	0	7
	Std Dev	0.33	3.8	1.5	3.8	0.6	6.65	1.1	0.5	0.1	0	0.5

Note: All times are Eastern Standard Time

APPENDIX C

Current ECA

Ontario

Ministry of the Environment
Ministère de l'Environnement

CERTIFICATE OF APPROVAL

MULTI-MEDIA
Number 7306-8FDKNX
Issue Date: June 28, 2011

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3

and

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

and

Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
72 Osbourne Road
Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham

You have applied in accordance with Sections 9 and 27 of the Environmental Protection Act and Section 53 of the Ontario Water Resources Act for approval of:

A thermal treatment facility to be used for the receipt and manual and/or mechanical sorting of solid non-hazardous post-diversion municipal waste (Waste), temporary storage and thermal treatment of the Waste, abatement of the emissions from the processes and activities undertaken at the Site, handling, screening, sorting and/or conditioning of the residual wastes and management of the wastewater and the non-contact stormwater generated at the Site. The Facility's maximum Waste thermal treatment rate is 140,000 tonnes per year of Waste, the nominal electricity generation rate is 20 Megawatts and the nominal steam generation rate 72,000 kilograms per hour of steam.

The facility consists of the following major processes and support units:

(1) two (2) identical combustion trains, each having a nominal capacity of 218 tonnes of Waste per day venting into the atmosphere via a common exhaust stack, having an exit diameter of 1.71 metres, extending 87.6 metres above grade.

Each combustion train is an independent process train and it consists of the following main components:

(a) a stoker grate steam Boiler, having a design heat input of 118 Gigajoules per hour, equipped with a natural gas fired auxiliary Low NOx burner, having a nominal heat input of 59.5 Gigajoules per hour; and

(b) the following air pollution control equipment:

(i) a Selective Non Catalytic Reduction System (SNCR System) with ammonia injection for NOx control;
(ii) an activated carbon injection system, to reduce mercury and dioxins in flue gas;
(iii) a dry recirculation lime injection scrubber to control acid gases;
(iv) a pulse jet type baghouse to control particulate emissions;

(2) one (1) steam turbine generator set having a rated capacity of 20 Megawatts;

(3) waste and reagent storage as described in Condition 2.:

(4) fly ash conditioning system including two (2) surge bins, two (2) pugmills and seven (7) curing/storage bunkers;

(5) bottom ash sorting system including conveyors, screens, a rotary drum magnet and an eddy separator;

(6) one (1) emergency diesel generator, rated at 250 Kilowatts;

(7) natural gas-fired combustion equipment for comfort heating;

(8) a wastewater management system for collection, recirculation and reuse of the process water; and

(9) a stormwater management facility for collection, transmission and discharge of non-contact runoff at the Site, as described in the attached Schedule "G",

Note: Use of the site for any other type of waste is not approved under this Certificate, and requires obtaining a separate approval amending this Certificate.

For the purpose of this Provisional Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"***Acoustic Assessment Report***" means the report, prepared in accordance with *Publication NPC-233* by Paul Niejadlik / Golder Associates Ltd. and dated March 2011 submitted in support of the application, that documents all sources of noise emissions and Noise Control Measures present at the Facility;

"**Acoustic Assessment Summary Table**" means a table summarizing the results of the Acoustic Assessment Report;

"**Acoustic Audit**" means an investigative procedure consisting of measurements of all noise emissions due to the operation of the Facility, assessed in comparison to the Performance Limits for the Facility regarding noise emissions, completed in accordance with the procedures set in the Ministry's *Publication NPC-103* and reported in accordance with the Ministry's *Publication NPC-233;*

"**Acoustic Audit Report**" means a report presenting the results of an Acoustic Audit, prepared in accordance with the Ministry's *Publication NPC-233;*

"**Acoustical Consultant**" means a person currently active in the field of environmental acoustics and noise/vibration control, who is familiar with Ministry noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from a Facility;

"**Air Standards Manager**" means the Manager, Human Toxicology and Air Standards Section, Standards Development Branch, or any other person who represents and carries out the duties of the Manager, Human Toxicology and Air Standards Section, Standards Development Branch, as those duties relate to the conditions of this Certificate;

"**APC Building**" means the building at the Site where the APC Equipment and the reagent indoor storage tanks are located;

"**APC Equipment**" means all the air pollution control equipment at the Facility, including the SNCR System, the activated carbon injection system, the dry recirculation lime injection scrubber and the pulse jet type baghouse to control emissions from the combustion chamber of the Boilers, the dust collectors to control emissions from the Residue Building and the dust collectors to control emissions from the reagent storage silos;

"**Boiler Building**" means the building at the Site where the Boilers, turbine generator and the air cooled condenser(s) are located;

"**Boilers**" means the two (2) steam boilers firing the approved Waste described in this Certificate;

"**Bulky Unprocessable Items**" means the incoming Waste received at the Site that cannot be processed in the Equipment;

"**CEM Systems**" means the continuous monitoring and recording systems used to measure and record the temperature and the emissions from the Boilers as specified in the attached Schedule "F";

"**Certificate**" means this entire provisional Certificate of Approval, issued in accordance with Sections 39 and 9 of the *EPA* and Section 53 of the *OWRA,* and includes any schedules attached to it, the application and the supporting documentation listed in the attached Schedule "A;

"***40 CFR 60***" means title 40, part 60 under the Code of Federal Regulations (Air Programs, U.S. Environmental Protection Agency), revised as of July 1, 1990, published by the Office of the Federal Register, National Archives and Records, Administration in the United States of America;

"**Complaint**" means a complaint received either by the Owner or the District Manager that has been confirmed by staff of the Ministry and the cause of which is attributed to the Owner's activities at the Facility;

"**Commencement Date of Operation**" means the date when the approved Waste is first received at the Site;

"**Compound of Concern**" means a contaminant that, based on generally available information, may be emitted to the atmosphere in a quantity from any source at the Facility that is significant either in comparison to the relevant Ministry Point of Impingement Limit or if a Ministry Point of Impingement Limit is not available for the compound then, based on generally available toxicological information, the compound has the potential to cause an adverse effect as defined by the *EPA* at a Point of Impingement;

"**Controlled Shutdown**" means an immediate cut-off of all waste into the Boilers, while maintaining the operation of the combustion chamber and the APC Equipment within the Performance Requirements;

"**Description Section**" means the section on page one of the Certificate describing the Owner's operations and the Equipment located at the Facility and specifying the Facility Production Limit for the Facility;

"**Dioxins and Furans**" means polychlorinated dibenzo-dioxins and polychlorinated dibenzofurans;

"**Director**" means any person appointed in writing by the Minister of the Environment pursuant to section 5 of the *EPA* and pursuant to section 5 of the *OWRA* as a Director for the purposes of Part V of the *EPA,* section 9 of the *EPA* and section 53 of the *OWRA;*

"**District Manager**" means the District Manager of the York Durham District Office of the Ministry;

"**Emergency Shutdown**" means an immediate cut-off of all waste feed into the Boilers, followed by an accelerated extinction of all combustion in the Boilers, while maintaining the combustion temperature within the Performance Requirements, except when unreasonable;

"**Emission Summary Table**" means the table prepared in accordance with *O. Reg. 419/05* and the Procedure Document listing the appropriate Point of Impingement concentrations of each Compound of Concern from the Facility and providing comparison to the corresponding Ministry Point of Impingement Limit;

"***EAA***" means the Environmental Assessment Act, R.S.O. 1990, c. E.18, as amended;

"**EA Approval**" means the Notice of Approval to Proceed with the Undertaking signed by the Minister of the Environment on November 3, 2010, EA File No. 04-EA-02-08;

"***EPA***" means the Environmental Protection Act, R.S.O. 1990, c. E.19, as amended;

"**Equipment**" means equipment or processes associated with the thermal treatment of the approved Waste described in this Certificate and in the Supporting Documentation referred to herein and any other equipment or processes handling wastes and reagents;

"**ESDM Report**" means the Emission Summary and Dispersion Modelling Report prepared in accordance with the Procedure Document by Golder Associates and dated March 2011 submitted in support of the application, and includes any amendments to the ESDM Report listed in the attached Schedule "A" and all subsequent up-dated ESDM Reports as applicable;

"**Facility**" means the entire operation associated with thermal treatment of Waste located on the property where the Equipment is located;

"**Facility Production Limit**" means the production limit placed on the main product(s) or raw materials used by the Facility that represents the design capacity of the Facility and assists in the definition of the operations approved by the Director;

"**Grizzly Building**" means the building at the Site where the bottom ash is screened and where the oversized constituents of the bottom ash (grizzly overs) are temporarily stored prior to transport for subsequent storage in the Residue Building;

"**Independent Acoustical Consultant**" means an Acoustical Consultant who is not representing the Owner and was not involved in preparing the Acoustic Assessment Report or the design/implementation of Noise Control Measures for the Facility and/or Equipment. The Independent Acoustical Consultant shall not be retained by the Acoustical Consultant involved in the noise impact assessment or the design/implementation of Noise Control Measures for the Facility and/or Equipment;

"**I-TEF**" means International Toxic Equivalency Factor derived for each dioxin and furan congener by comparing its toxicity to the toxicity of 2,3,7,8 tetrachloro dibenzo-p-dioxin, as recommended by the North Atlantic Treaty Organization Committee on Challenges to Modern Society (NATO CCMS) in 1989 and adopted by Canada in 1990;

"**I-TEQ**" means International Toxic Equivalent of dioxins and furans calculated using the I-TEFs, as recommended by the NATO CCMS in 1989 and adopted by Canada in 1990;

"**Manager**" means the Manager, Technology Standards Section, Standards Development Branch, who has been appointed under Section 5 of the *EPA* for the purposes of Section 11(1)2 of the *O. Reg. 419/05,* or any other person who represents and carries out the duties of the Manager,

Technology Standards Section, Standards Development Branch, as those duties relate to the conditions of this Certificate;

"**Ministry**" means the ministry of the government of Ontario responsible for the *EPA* and the *OWRA* and includes all officials, employees or other persons acting on its behalf or the Ontario Ministry of the Environment;

"**Municipality**" means the Municipality of Clarington;

"***NMA***" means the *Nutrient Management Act*, 2002, S.O. 2002, c. 4, as amended;

"**Noise Control Measures**" means measures to reduce the noise emission from the Facility and/or Equipment including, but not limited to silencers, acoustic louvers, enclosures, absorptive treatment, plenums and barriers;

"**LDR**" means the Lands Disposal Restrictions referred to in sections 74 through 85 of the *O. Reg. 347,* which prohibit the disposal of hazardous wastes on land until they have been treated to meet the treatment standards under the *O. Reg. 347;*

"**Leachate Toxicity Criteria**" means the concentrations of any of the contaminants listed in Schedule 4 at a concentration equal to or in excess of the concentration specified for that contaminant in Schedule 4 using the Toxicity Characteristic Leaching Procedure, defined in the *O. Reg. 347*;

"***O. Reg. 419/05***" means the *Ontario Regulation 419/05,* Air Pollution – Local Air Quality enacted under the *EPA,* as amended;

*"**O. Reg. 347**"* means the *Ontario Regulation 347,* R.R.O 1990 (General –Waste Management) enacted under the *EPA,* as amended;

"***OWRA***" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40, as amended;

"**Owner**" means any person that is responsible for the establishment and operation of the Site being approved by this Certificate, and it includes The Regional Municipality of Durham, The Regional Municipality of York, and Covanta Durham York Renewable Energy Limited Partnership (operator), their successors and assignees;

"***PA***" means the *Pesticides Act*, R.S.O. 1990, c.P. 11, as amended;

"**Performance Requirements**" means the performance requirements and emission limits specified in the section of this Certificate entitled "Performance Requirements";

"**Point of Impingement**" means any point outside the Facility in the natural environment and as defined by s.2 of the *O. Reg. 419/05;*

"**Point of Reception**" means the Point of Reception as defined by *Publication NPC-205* and/or *Publication NPC-232*, as applicable;

"**Pre-test Information**" means the information outlined in Section 1.1 of the Source Testing Code;

"**Procedure Document**" means the Ministry's document entitled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated July 2005, as amended;

"**Professional Engineer**" means a Professional Engineer as defined within the *Professional Engineers Act*, R.S.O. 1990, c. P.28, as amended;

"**Provincial Officer**" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the *OWRA* or Section 5 of the *EPA* or Section 17 of the *PA* or Section 4 of the *NMA* or Section 8 of the *SDWA;*

"***Publication NPC-103***" means the Ministry's Publication NPC-103 of the Model Municipal Noise Control By-Law, Final Report, dated August 1978, published by the Ministry, as amended;

"***Publication NPC-205***" means the Ministry's Publication NPC-205, entitled "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", dated October, 1995, as amended;

"***Publication NPC-207***" means the Ministry's draft technical publication entitled "Impulse Vibration in Residential Buildings", dated November 1983, supplementing the Model Municipal Noise Control By-Law, Final Report, dated August 1978, published by the Ministry, as amended;

"***Publication NPC-232***" means the Ministry's Publication NPC-232, entitled "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", dated October, 1995, as amended;

"***Publication NPC-233***" means the Ministry's Publication NPC-233, entitled "Information to be Submitted for Approval of Stationary Sources of Sound", dated October, 1995, as amended;

"**Rejected Waste**" means either municipal waste which cannot be processed at the Facility or waste which the Site is not approved to accept. Rejected Waste includes but is not limited to the Bulky Unprocessable Items and the Unacceptable Waste;

"**Regional Director**" means the Regional Director of the Central Region of the Ministry;

"**Regions**" means The Regional Municipality of Durham and The Regional Municipality of York;

*"**Report EPS 1/PG/7**"* means the Environment Canada Report EPS 1/PG/7, entitled "Protocols and Performance Specifications for Continuous Monitoring of Gaseous Emissions from Thermal Generation", dated September, 1993, as amended;

"**Residual Waste**" means waste resulting from the Waste processing activities at the Site. Residual Waste is limited to the recovered ferrous metals, the recovered non-ferrous metals, the bottom ash (consisting of the ash fines and the grizzly overs) and the fly ash (untreated and following conditioning);

"**Residue Building**" means the building at the Site where the bottom ash and the fly ash are processed, temporarily stored and loaded in transport vehicles for off-site disposal;

"**Schedules**" means the following schedules "A", "B", "C", "D", "F" and "G", attached to the Certificate and forming part of the Certificate;

"***SDWA***" means the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, as amended;

"**Sensitive Receptor**" means any location where routine or normal activities occurring at reasonably expected times would experience adverse effect(s) from odour discharges from the Facility, including one or a combination of:

(a) private residences or public facilities where people sleep (e.g.: single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.);

(b) institutional facilities (e.g.: schools, churches, community centres, day care centres, recreational centres, etc.);

(c) outdoor public recreational areas (e.g.: trailer parks, play grounds, picnic areas, etc.); and

(d) other outdoor public areas where there are continuous human activities (e.g.: commercial plazas and office buildings);

"**Site**" means the property where the Owner has located and operates the Facility and the Works and located at 72 Osbourne Road, 27, Concession Broken Front, Part 1 in the Municipality of Clarington, Regional Municipality of Durham;

"**Source Testing**" means monitoring, sampling and testing to measure emissions resulting from operating the Facility under conditions which yield the worst case emissions within the approved operating range of the Facility;

"***Source Testing Code***" means the Ministry's document entitled "Source Testing Code, Version 2, Report No. ARB-66-80", dated November 1980, as amended;

"**Stack**" means the stack that discharges emissions from the Boilers after those emissions have been controlled by the associated APC Equipment;

"**Substantial Completion**" has the same meaning as "substantial performance" in the *Construction Lien Act* R.S.O. 1990, c.C-30, as amended;

"**Supporting Documentation**" means the documents listed in the attached Schedule "A" of this Certificate which forms part of this Certificate;

"**Test Contaminants**" means the contaminants set out in the attached Schedule "D";

"**Tipping Building**" means the building at the Site where the incoming Waste is received, sorted and temporarily stored;

"**Total Power Failure**" means the loss of the external power supply and concurrent loss of all in-plant power generation;

"**Trained Personnel**" means one or more Site personnel trained in accordance with the requirements of Condition 9.;

"**Waste**" means municipal solid waste as defined in the *O. Reg. 347* and limited to the approved waste set out in Condition No. 2.(2);

"**Waste Processing Rate** means the mass of Waste fed into one of the Boilers;

"**Works**" means the sewage works described in the Owner's application, this Certificate and in the Supporting Documentation referred to herein, to the extent approved by this Certificate;

"**Unacceptable Waste**" means the incoming Waste received at the Site that does not meet the incoming Waste quality criteria set out in this Certificate, is of hazardous nature and requires caution when handling; and

"**Undiluted Gases**" means the flue gas stream which contains oxygen, carbon monoxide, total hydrocarbons and all contaminants in the same concentrations as they exist in the flue gas stream emerging from an individual piece of equipment, such as the combustion chamber of one Boiler or one baghouse, and into which gas stream no ambient air and/or no other gas stream originating from another piece of equipment, except for dilution air introduced within the CEM Systems, has been introduced.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

GENERAL PROVISIONS

1. GENERAL

Compliance

(1) The Owner shall ensure compliance with all the conditions of this Certificate and shall ensure that any person authorized to carry out work on or operate any aspect of the Site, including the Works, is notified of this Certificate and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Certificate.

Build in Accordance

(3) (a) Except as otherwise provided by this Certificate, the Site shall be designed, developed, built, operated, monitored, inspected and maintained in accordance with the following applications:

(i) Applications for a Certificate of Approval (Air) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of

Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(ii) Applications for a Provisional Certificate of Approval (Waste Disposal Site) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(iii) Applications for a Certificate of Approval of Municipal and Private Sewage Works dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(b) (i) Any design optimization or modification that is inconsistent with the conceptual design set out in the Supporting Documentation in Schedule "A" shall be clearly identified, along with an explanation of the reasons for the change and submitted to the Director for approval.

(ii) If a change to the conceptual design is submitted to the Director for approval, no construction of the Site shall commence prior to the Director approving, in writing, the final conceptual design of the Site.

As-built Drawings

(4) (a) Within ninety (90) days of the completion of the initial successful Source Testing program, a set of as-built drawings showing the Facility and the Works and bearing the stamp of a Professional Engineer, shall be prepared and retained at the Site.

(b) These drawings shall be kept up-to-date through revisions undertaken from time to time and a copy shall be retained at the location of the Site or at the operational office of the Owner for the operational life of the Site.

(c) Notwithstanding provisions of Condition 1.(4)(b), an amendment to this Certificate shall be sought for changes to the as-built drawings, requiring approval.

(d) The as-built drawings shall be made available to Ministry staff upon request.

Interpretation

(5) Where there is a conflict between a provision of any document, including the application referred to in this Certificate and the conditions of this Certificate, the conditions in this Certificate shall take precedence.

(6) Where there is a conflict between the applications and a provision in any documents listed in Schedule "A", the applications shall take precedence, unless it is clear that the purpose of the document was to amend the applications and that the Ministry approved the amendment.

(7) Where there is a conflict between any two documents listed in Schedule "A", other than the applications, the document bearing the most recent date shall take precedence.

(8) The requirements of this Certificate are severable. If any requirement of this Certificate, or the application of any requirement of this Certificate to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Certificate shall not be affected thereby.

Other Legal Obligations

(9) The issuance of, and compliance with the conditions of this Certificate does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner to furnish any further information related to compliance with this Certificate.

Adverse Effects

(10) The Site shall be constructed, operated and maintained in a manner which ensures the health and safety of all persons and prevents adverse effects on the natural environment or on any persons.

(11) The Owner shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the approved operations at the Site, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

(12) Despite the Owner or any other person fulfilling any obligations imposed by this Certificate, the person remains responsible for any contravention of any other condition of this Certificate or any applicable statute, regulation, or other legal requirement resulting from any act or emission that caused the adverse effect to the natural environment or impairment of water quality.

(13) If at any time odours, pests, litter, dust, noise or other such negative effects are generated at this Site and cause an adverse effect, the Owner shall take immediate appropriate remedial action that may be necessary to alleviate the adverse effect, including suspension of all waste management activities if necessary.

Change of Ownership

(14) The Owner shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any changes:

(a) the ownership of the Site;
(b) the operator of the Site;
(c) the address of the Owner;
(d) the partners, where the Owner is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act,* R.S.O. 1990, c. B.17, as amended, shall be included in the notification;
(e) the name of the corporation where the Owner is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act*, R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

(15) No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance. In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Certificate, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Inspections by the Ministry

(16) No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the *OWRA,* the *EPA,* the *PA,* the *SDWA* or the *NMA* of any place to which this Certificate relates, and without limiting the foregoing:

(a) to enter upon the premises where the approved processing is undertaken, or the location where the records required by the conditions of this Certificate are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Certificate;
(c) to inspect the Site, related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this Certificate;
(e) to conduct interviews with staff, contractors, agents and assignees of the Owner; and
(f) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Certificate or the *EPA,* the *OWRA,* the *PA,* the *SDWA* or the *NMA.*

Information

(17) Any information requested by the Ministry, concerning the operation of the Site and its operation under this Certificate, including but not limited to any records required to be kept by this Certificate, manuals, plans, records, data, procedures and supporting documentation shall be provided to the Ministry, in a timely manner, upon request**.**

(18) The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this Certificate or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

(a) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Certificate or any statute, regulation or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

(19) The Owner shall ensure that a copy of this Certificate, in its entirety and including all its Notices of Amendment and the Supporting Documentation listed in Schedule "A" are retained at the Site at all times.

2. **SERVICE AREA, APPROVED WASTE TYPES, RATES and STORAGE**

(1) The service area for the Site is the area within the jurisdictional boundaries of The Regional Municipality of Durham and The Regional Municipality of York.

(2) The operation of this Site is limited to:

(a) receipt, temporary storage, transfer and processing, including thermal treatment, of solid non-hazardous waste remaining after Waste Diversion required by the EA Approval, limited to Waste from the following sources:

(i) domestic waste and Industrial Commercial and Institutional waste from the Regions' curbside collection and/or from the Regions' waste management facilities; and

(ii) waste generated on-Site through activities not relating to the handling and processing of Waste (ie. office, lunch room, etc.);

(b) collection and management of the stormwater run-off generated at the Site.

(3) The following Unacceptable Waste is prohibited from being accepted at the Site:

(a) hazardous waste, as defined in the *O. Reg. 347;*
(b) wastes which have been source-separated for the purposes of diversion;

(c) international waste generated outside of Canada, but collected within the jurisdictional boundaries of The Regional Municipality of Durham and The Regional Municipality of York.

(4) Waste Receipt Rate:

(a) The maximum daily amount of Waste that is approved to be accepted at the Site shall not exceed 1,520 tonnes per day.

(5) Storage Restrictions:

Solids:

(a) A maximum of 7,350 cubic metres shall be stored inside the Waste pit within the Tipping Building as shown in the Supporting Documentation.

(b) Rejected Waste, limited to the Bulky Unprocessable Items removed from the incoming Waste in the Tipping Building shall be stored:

(i) in two (2) roll-off bins having a maximum total storage capacity of 30 cubic metres, located within the confines of the Tipping Building; and/or

(ii) in the appropriate dedicated bunkers, located within the confines of the Residue Building and described in Conditions 2.(5)(c), 2.(5)(d) and 2.(5)(d), below.

(c) A maximum of approximately 77 tonnes or 106 cubic metres of the Residual Waste, limited to the recovered ferrous metals, shall be stored in one (1) dedicated bunker, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(d) A maximum of approximately 120 tonnes or 100 cubic metres of the Residual Waste, limited to the recovered non-ferrous metals, shall be stored in one (1) dedicated bunker, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(e) A maximum of 630 tonnes of the Residual Waste, limited to bottom ash shall be stored in two (2) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(f) A maximum of 700 tonnes of the Residual Waste, limited to the fly ash shall be stored in seven (7) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of thirty six (36) days.

(g) A maximum of 85 cubic metres of activated carbon for the carbon injection system shall be stored in one (1) outdoor tank, located adjacent to the APC Building.

(h) A maximum of 150 cubic metres of lime for the dry scrubber shall be stored in one (1) or more indoor tank(s), located within the confines of the APC Building.

(i) If required, recirculated residue shall be stored in one (1) or more indoor tank(s), located within the confines of the APC Building.

(j) A maximum of 35 tonnes or 25 cubic metres of cement for fly ash conditioning shall be stored in one (1) outdoor silo, located adjacent to the Residue Building.

(k) A maximum of 25 tonnes or 45 cubic metres of pozzolan for fly ash conditioning shall be stored in one (1) outdoor silo, located adjacent to the Residue Building.

Liquids:

(l) (i) A maximum of 36 cubic metres or 40 tonnes of aqueous ammonia for the SNCR System shall be stored in one (1) outdoor tank, located adjacent to the APC Building.

(ii) The Owner shall ensure that the aqueous ammonia storage tank is equipped with a liquid level monitoring device designed to provide a visual and an auditory alarm when the high level setpoint is reached.

(iii) The aqueous ammonia storage tank spill containment area and the loading area shall be designed in accordance with the requirements in the Ministry's document entitled *"Guidelines for Environmental Protection Measures at Chemical and Waste Storage Facilities"* dated May 2007, as amended.

(6) No outdoor storage of waste, including storage in vehicles, is approved under this Certificate.

(7) The Owner shall ensure that storage of all wastes is undertaken in a manner that does not cause an adverse effect or a hazard to the environment or any person.

(8) (a) Waste received at the Site shall be processed within four (4) days from its receipt at the Site.

(b) Emergency Waste storage duration extension:

(i) The Owner may store the incoming Waste inside the tipping pit within the confines of the Tipping Building for up-to seven (7) days from its receipt at the Site, on an emergency basis only.

(ii) Within twenty four (24) hours from the start of the emergency storage of the incoming Waste, the Owner shall notify, in writing, the District Manager that the incoming Waste is being stored longer then four (4) days.

(iii) Should there be public complaints about the extended incoming Waste storage, the Owner, in consultation with the District Manager, shall determine the cause of the complaints, propose appropriate abatement measures, including but not be limited to the removal and off-site disposal of the Waste contained in the tipping pit, and implement the said measures upon receiving written concurrence from the District Manager within the time frame acceptable to the District Manager.

(9) In the event that Waste cannot be processed at the Site and the Site is at its approved storage capacity, the Owner shall cease accepting additional Waste. Receipt of additional Waste may be resumed once such receipt complies with the waste storage limitations approved in this Certificate.

3. **SIGNS and SITE SECURITY**

(1) Prior to receipt of Waste at the Site, the Owner shall ensure that a sign is posted at the entrance to the Site. The sign shall be visible from the main road leading to the Site. The following information shall be included on the sign:

(a) name of the Owner;
(b) this Certificate number;
(c) hours during which the Site is open;
(d) waste types that are approved to be accepted at the Site;
(e) Owner's telephone number to which complaints may be directed;
(f) Owner's twenty-four hour emergency telephone number (if different from above);
(g) a warning against unauthorized access; and
(h) a warning against dumping at the Site.

(2) The Owner shall ensure that appropriate and visible signs are posted at the Site clearly identifying the wastes and the process reagents and stating warnings about the nature and any possible hazards of the wastes and the reagents.

(3) The Owner shall ensure that appropriate and visible signs are posted at the Site to prohibit smoking, open flames or sources of ignition from being allowed near any flammable materials storage areas.

(4) The Owner shall install and maintain appropriate and visible signs at the Site to direct vehicles to the Waste receiving and Residual Waste removal areas and to the reagent unloading areas.

(5) The Owner shall post appropriate and visible signs along the traffic route providing clear directions to the Site.

(6) The Owner shall ensure that the Site is fenced in and that all entrances are secured by lockable gates to restrict access only to authorized personnel when the Site is not open.

(7) The Owner shall ensure that access to the Site, with the exception of the area designated as a Public Information Centre, is regulated and that no unauthorized persons are permitted at the Site without the Trained Personnel escort.

(8) The Owner shall ensure that the Site is operated in a safe and secure manner, and that Waste, the Residual Waste and the Unacceptable Waste are properly handled, packaged or contained and stored so as not to pose any threat to the general public and the Site personnel.

4. SITE OPERATIONS

(1) **Operating hours:**

(a) The Site is approved to operate twenty-four (24) hours per day three hundred and sixty-five (365) days per year.

(b) Notwithstanding Condition 4.(1)(a), Waste shall only be received at the Site and the Residual Waste shall only be transferred from the Site between 7:00 a.m. and 7:00 p.m. Monday to Saturday. No receipt of the Waste or transfer of the Residual Waste shall be undertaken on statutory holidays.

(c) Emergency Receipt of Waste:

(i) The Owner may receive Waste at the Site outside of the operating hours specified in Condition 4.(1)(b), above, on an emergency basis only.

(ii) Within twenty four (24) hours from the receipt of Waste outside of the approved receiving hours, the Owner shall notify, in writing, the District Manager that Waste was received outside of the approved receiving hours.

(iii) Should there be complaints about Waste shipments outside of the approved hours, the Owner, in consultation with the District Manager, shall determine the cause of the complaint, propose appropriate abatement measures and implement the said measures upon receiving written concurrence from the District Manager within the time frame acceptable to the District Manager.

(2) **Incoming Waste receipt:**

(a) At the weigh scale, the Trained Personnel shall:

(i) inspect the required documentation prior to acceptance of the incoming Waste at the Site; and

(ii) inspect the incoming Waste with radiation detection equipment.

(b) In the Tipping Building, the Trained Personnel shall:

(i) visually inspect all incoming Waste being unloaded into the Waste pit; and

(ii) once per hour, or as accepted by the District Manager, unload the incoming Waste on the tipping floor for a manual visual inspection and sorting of the incoming Waste.

(c) The Owner shall only accept the incoming Waste that is delivered in vehicles that have been approved by the Ministry.

(d) The Owner shall ensure that all unloading of incoming Waste at the Site takes place entirely within the confines of the Tipping Building.

(3) **Unacceptable Waste handling:**

(a) In the event that waste that is not approved under this Certificate is inadvertently accepted at the Site, the Owner shall ensure that the Unacceptable Waste:

(i) is stored in a way that ensures that no adverse effects result from its storage;
(ii) is segregated from all other waste;
(iii) is handled and removed from the Site in accordance with the *O. Reg. 347* and the *EPA*; and
(iv) is removed from the Site within (4) days of its receipt or as acceptable to the District Manager.

(b) The Owner shall ensure that all loading of the Unacceptable Waste into transport vehicles is carried out entirely within the confines of the Tipping Building.

(4) **Waste Sorting:**

(a) The Trained Personnel shall remove the Bulky Unprocessable Items and Unacceptable Waste from the incoming Waste prior to charging of the Waste to the Boilers.

(b) All sorting of the incoming Waste at the Site shall be undertaken indoors, within the confines of the Tipping Building and/or the Refuse Building.

(5) **Residual Waste Handling and Disposal:**

(a) (i) Except for transportation of the Residual Waste between the Grizzly Building and the Residue Building, the Owner shall ensure that all

handling of the bottom ash and its segregated constituents, and of the fly ash, is undertaken within the confines of enclosed conveyors and enclosed buildings.

(ii) The Owner shall ensure that all loading of the Residual Waste into vehicles for its transport from the Site is carried out entirely within the confines of the Residue Building.

(b) (i) Different constituents of the Residual Waste shall not be comingled prior to the required compliance testing, unless all Residual Waste is to be disposed of at a Waste Disposal Site that is approved to accept hazardous waste.

(ii) The Owner shall ensure that the equipment used in handling of the hazardous wastes or that came in direct contact with the hazardous wastes is not used to handle other wastes.

(iii) On an emergency basis, the Owner may use equipment used to handle the hazardous wastes to handle other wastes provided that prior to such use the equipment has been thoroughly cleaned first.

(c) (i) Only haulers approved by the Ministry shall be used to transport the Residual Waste from the Site.

(ii) The Residual Waste shall be transported from the Site in appropriately covered vehicles that will not allow fugitive dust emissions to be emitted into the natural environment during the said transport.

d) Residual Waste generated at the Site shall be disposed of shall only be disposed of at an approved waste disposal site in accordance with the requirements in the *EPA* and the *O. Reg. 347* or at a location with the appropriate jurisdictional approval or a license, if required.

(e) Should the Residual Waste limited to the conditioned fly ash and/or the bottom ash be deemed a hazardous waste, the ash shall be disposed of at an approved waste disposal site in accordance with the Land Disposal Restrictions requirements in the *EPA* and the *O. Reg.* 347 or at a location with the appropriate jurisdictional approval or a license, if required.

(6) **Wastewater Management**

(a) The Owner shall ensure that all wastewater generated at the Site is contained within enclosed buildings, tanks, pipes and conveyors at the Site and the approved outdoor Wastewater Settling Basin.

(b) The Owner shall ensure that all wastewater generated at the Site is collected in leak-proof and sufficiently designed wastewater storage facilities:

(i) Wastewater Holding Tank, to collect the continuous reject water flow from the Boiler make-up water treatment system and the Boiler blowdown, having an approximate holding capacity of 100 cubic metres, located within the confines of the Boiler Building and venting to the atmosphere; and

(ii) Wastewater Settling Basin, to collect the wastewater from the floor drains in the buildings at the Site, except for the Tipping Building and the Residue Building, the ash discharger overflow and drain water, the Boiler and turbine-generator washdown water and the APC Equipment area washdown water, having an approximate holding capacity of 38 cubic metres, located outdoors, open to the atmosphere and equipped with a filter basket and an oil skimmer board.

(c) The wastewater pumps shall be located in the area designed in accordance with the Supporting Documentation to ensure that any potential leaks or drips are contained and directed to the Wastewater Settling Basin.

(d) (i) The wastewater level in the Wastewater Holding Tank shall be monitored and controlled to ensure that the wastewater inflow to the Tank does not cause the Tank overflow.

(ii) The wastewater level in the Wastewater Settling Basin shall be monitored and controlled to ensure that the atmospheric precipitation does not cause an overflow from the Basin.

(e) The Owner shall regularly empty, and clean as necessary, all sumps, wastewater storage/holding areas and equipment that are used to contain, collect and handling the wastewater generated at the Site.

(f) Should the Owner find it necessary to remove the wastewater from the Site, the wastewater shall only be disposed of at a Ministry-approved site in accordance with the site's certificate of approval or be discharged to the sanitary sewer in accordance with the agreement with the municipality accepting the discharge.

(g) The floors of the Tipping Building and the Residue Building shall be sufficiently sloped to facilitate the flow of the wastewater generated from the floor cleaning activities and from the truck washdown towards the designated wastewater collection area.

(h) The Owner shall ensure that the Wastewater Settling Basin is regularly cleaned out and that it does not become a source of odour emissions.

(7) All activities approved under this Certificate shall only be carried out by appropriately Trained Personnel.

5. EQUIPMENT and SITE INSPECTIONS and MAINTENANCE

Operation and Maintenance

(1) Prior to the receipt of the Waste at the Site, the Owner shall prepare and update as necessary, an Operation and Maintenance Manual for all the Equipment, the APC Equipment, the CEM Systems, the Works and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility. The Manual shall be prepared in accordance with the written manufacturer's and/or supplier's specifications and good engineering practice.

As a minimum, the Operation and Maintenance Manual shall specify:

(a) operation procedures of the Equipment, the APC Equipment, the CEM Systems, the Works, and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility, in accordance with manufacturers' recommendations and good engineering practices to achieve compliance with this Certificate, the *EPA,* the *OWRA* and their Regulations;
(b) calibration procedures for the CEM Systems as required by this Certificate;
(c) procedures for start-up and shutdown, including Controlled Shutdown and Emergency Shutdown;
(d) quality assurance procedures for the operation and calibration of the CEM Systems in accordance with *40 CFR 60*, Appendix F or *Report EPS 1/PG/7,* as appropriate;
(e) Waste receiving and screening procedures;
(f) Waste, Rejected Waste and Residual Waste handling procedures;
(g) testing and monitoring procedures as required by this Certificate;
(h) maintenance and preventative maintenance procedures as required by this Certificate;
(i) Facility inspection, including frequency of inspections, procedures;
(j) procedure for handling complaints as required by this Certificate.
(k) contingency measures to resolve upset conditions and/or minimize the environmental impacts from the Facility;
(l) emergency response procedures, including procedures for dealing with power failure, fire, explosion, spills and any other potential emergencies;
(m) procedures for record keeping activities as required by this Certificate;
(n) description of the responsibilities of the Site personnel and the personnel training protocols; and
(o) a list of personnel positions responsible for operation and maintenance, including supervisory personnel and personnel responsible for handling of the emergency situations, recording and reporting pursuant to the requirements of this Certificate, along with the training and experience required for the positions and a description of the responsibilities.

(2) A copy of this Operations and Maintenance Manual shall be kept at the Site, be accessible to the Site personnel at all times and be updated, as required. The Operations and Maintenance Manual shall be available for inspection by a Provincial Officer upon request.

(3) The Owner shall implement the operation, maintenance, preventative maintenance and calibration procedures set out in the Operations and Maintenance Manual required by this Certificate.

Critical Spare Parts

(4) (a) The Owner shall prepare a list of critical spare parts, update this list annually or more frequently, if necessary, to ensure that this list is maintained up-to-date and shall be available for inspection by a Provincial Officer upon request.

(b) The Owner shall ensure that the critical spare parts are available at the Site at all times or are immediately available from an off-Site supplier.

Inspections

(5) Prior to receipt of the Waste at the Site, the Owner shall prepare a comprehensive written inspection program which includes inspections of all aspects of the Site's operations including, but not limited to the following:

(a) buildings and the indoor waste storage facilities and presence of dust and odour and leaks in or near any openings, such as doorways, window, vent, louver or any other opening;
(b) outdoor Residual Waste transport equipment, and the presence of dust and leaks at or near transfer points or the equipment seams;
(c) the Equipment, the APC Equipment, the CEM Systems, the Works and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility;
(d) spill containment areas, loading areas and the conditions around the Wastewater Settling Basin;
(e) security fencing, gates, barriers and signs;
(f) off-site nuisance impacts such as odour, dust, litter, etc.
(g) presence of stormwater pooling at the Site; and
(h) condition of the on-Site roads for presence of leaks and drips from the waste delivery trucks or excessive dust emissions.

(6) The inspections, except for the inspection of the Works, are to be undertaken daily by the Trained Personnel in accordance with the inspection program to ensure that the Facility is maintained in good working order at all times and that no off-Site impacts are occurring. Any deficiencies detected during these regular inspections must be promptly corrected.

Inspections and Maintenance of the Works

(7) The Owner shall inspect the Works at least once a year and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

6. PERFORMANCE REQUIREMENTS

(1) The Owner shall, ensure that the Facility/Equipment is designed and operated in such a manner as to ensure that the following Performance Requirements are met:

(a) the maximum 10-minute average concentration of odour at the most impacted Sensitive Receptor, resulting from the operation of the Facility/Equipment, calculated in accordance with the procedures outlined in the attached Schedule "B", shall not exceed 1 odour unit;

(b) the noise emissions from the Facility shall comply with the limits set out in Ministry *Publication NPC-205;*

(c) the vibration emissions from the Facility shall comply with the limits set out in Ministry *Publication NPC-207.*

(2) The Owner shall ensure that the Boilers and the associated APC Equipment and the CEM Systems are designed and operated in such a manner as to ensure that the following Performance Requirements are met:

(a) (i) The temperature in the combustion zone of each Boiler shall reach a minimum of 1000 degrees Celsius (^{o}C) for one second, prior to introduction of the Waste into the combustion chamber of the Boiler during the start-up, and thereafter maintained during the entire thermal treatment cycle and subsequent shutdown until all Waste combustion is completed.

(ii) Compliance with the minimum temperature requirement shall be demonstrated by direct measurement at the location where the combustion gases have achieved the residence time of one second at a minimum temperature of 1000°C (the Target Location) or by correlation of the required temperature of 1000°C for one second to the temperature measured downstream of the Target Location as proven by a method acceptable to the Director.

(b) The concentration of residual oxygen in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, as measured and recorded by the CEM System, shall not be less than 6 percent by volume on a dry basis.

(c) (i) The operational target for the concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler is 40 milligrams per dry cubic metre, as a 4-hour rolling average, normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals, as measured and recorded by the CEM System, for the period from and including initial commissioning of the facility to twelve months following the completion of the first Source Testing program.

(ii) The 4-hour average concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, as measured and recorded by the CEM System, shall not be more than 40 milligrams per dry cubic metre, normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals, after the first twelve months following the completion of the first Source Testing program.

(d) The emissions from the Boilers after those emissions have been controlled by the associated APC Equipment for discharge into the atmosphere via the Stack shall comply with the emission concentration limits listed in the attached Schedule "C", as measured by a CEM System or by Source Testing as applicable.

(e) The Boilers shall include combustion air control systems, which are capable of automatically adjusting the distribution and the quantity of combustion air, in such a manner that changes in the Waste Processing Rate and/or Waste composition or irregularities in the loading and/or combustion shall not adversely affect the performance of the Boilers.

(f) The Boilers shall provide and maintain a high degree of gas turbulence and mixing in the combustion chamber.

(g) The Boilers shall achieve the temperature, oxygen availability and turbulence requirements over the complete range of operating parameters, including feed rate, feed characteristics, combustion air, flue gas flow rate and heat losses.

(h) The inlet temperature into each baghouse of the APC Equipment of the Boilers shall not be less than 120°C and not more than 185°C.

(3) The Owner shall install and maintain visual and audible alarm systems to alert the Facility/Equipment operators of any potential deviation from the above Performance Requirements for parameters that are continuously monitored by applicable CEM Systems and shall forthwith take all reasonable actions to bring the Equipment/Facility into compliance with all Performance Conditions.

(4) In the event that the CEM Systems indicate that emissions from the Boilers and the Stack exceed any Performance Requirements in the attached Schedule "C" for a continuous three (3) hour period, the Owner shall forthwith cut-off all Waste feed into the affected Boiler and initiate an Emergency Shutdown, while maintaining a temperature of 1000°C, as practicable, in the combustion zone of the Boiler.

Residual Waste Compliance Criteria

(5) (a) The Residual Waste generated at the Site and destined for a non-hazardous waste disposal site in Ontario shall not meet any of the criteria from the definition of "hazardous waste" set out in the *O. Reg. 347.*

(b) The Residual Waste that meets any of the criteria from the definition of "hazardous waste" set out in the *O. Reg.* 347 shall be handled and disposed of in accordance with the LDR requirements set out in the *EPA* and the *O. Reg. 347*.

(6) The Residual Waste, limited to the bottom ash, destined for a non-hazardous waste disposal site shall meet the definition of "incinerator ash" set out in the *O. Reg. 347*.

7. **TESTING, MONITORING** and **AUDITING**

Source Testing

(1) The Owner shall perform annual Source Testing in accordance with the procedures and schedule outlined in the attached Schedule "E", to determine the rate of emission of the Test Contaminants from the Stack. The first Source Testing program shall be conducted not later than six (6) months after the Commencement Date of Operation of the Facility/Equipment and subsequent Source Testing program shall be conducted once (1) every calendar year thereafter.

Continuous Monitoring

(2) The Owner shall select, test and install appropriate CEM Systems and continuous recording devices in accordance with the requirements outlined in the attached Schedule "F" to conduct and maintain a program to continuously monitor, as a minimum, the following parameters prior to commencement of operation of the Boilers:

(a) the temperature at one (1) second downstream of the combustion zone of each Boiler where most of the combustion has been completed and the combustion temperature is fully developed;

(b) the inlet temperature of the gases into each baghouse of the APC Equipment of each Boiler;

(c) the concentration of carbon monoxide, oxygen and organic matter (as methane) in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler;

(d) the opacity and moisture content of the flue gas and the concentration of oxygen, nitrogen oxides, sulphur dioxide, hydrogen chloride, hydrogen fluoride and ammonia in the Undiluted Gases leaving the baghouse of the APC Equipment of each Boiler.

Long-Term Sampling for Dioxins and Furans

(3) (a) The Owner shall develop, install, maintain and update as necessary a long-term sampling system, with a minimum monthly sampling frequency, to measure the concentration of Dioxins and Furans in the Undiluted Gases leaving the APC Equipment associated with each Boiler. The performance of

this sampling system will be evaluated during the annual Source Testing programs in accordance with the principles outlined by 40 CFR 60, Appendix B, Specification 4.

(b) The Owner shall evaluate the performance of the long-term sampling system in determining Dioxins and Furans emission trends and/or fluctuations as well as demonstrating the ongoing performance of the APC Equipment associated with the Boilers.

Ambient Air Monitoring

(4) (a) The Regions shall develop and implement the Ambient Air Monitoring and Reporting Plan, in accordance with the requirements set out in the EA Approval and as determined to be acceptable by the Regional Director.

(b) The Regions shall report the results of the Ambient Air Monitoring program to the Regional Director in accordance with the Ambient Air Monitoring and Reporting Plan and in accordance with the requirements of Condition 14.

(c) The Regions shall post the Ambient Air Monitoring and Reporting Plan and the results of the Ambient Air Monitoring program on the Owner's web site for the Facility in accordance with the requirements of the EA Approval and Condition 15.

Noise Monitoring - Acoustic Audit

(5) The Owner:

(a) shall carry out Acoustic Audit measurements on the actual noise emissions due to the operation of the Facility. The Acoustic Audit measurements shall be carried out in accordance with the procedures in *Publication NPC-103* and in accordance to the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director;

(b) shall submit an Acoustic Audit Report on the results of the Acoustic Audit, prepared by an Independent Acoustical Consultant, in accordance with the requirements of *Publication NPC-233* and the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director, to the District Manager and the Director, not later than three (3) months after the commencement of operation of the Facility.

(6) The Director:

(a) may not accept the results of the Acoustic Audit if the requirements of *Publication NPC-233* or the approved Noise Monitoring and Reporting Plan were not followed;

(b) may require the Owner to repeat the Acoustic Audit if the results of the Acoustic Audit are found unacceptable to the Director.

Residual Waste Testing

(7) (a) A minimum of six (6) months prior to the Commencement Date of Operation, the Owner shall submit to the Director for approval, a Testing Protocol for testing of the bottom ash for compliance with the criteria set out in the "incinerator ash" definition from the *O. Reg.* 347 and for testing of the Residual Waste for compliance with the criteria set out in this Certificate.

(b) As a minimum, the Testing Protocol shall comply with the Ministry's regulatory requirements for sampling and testing of waste, including the requirements set out in the Ministry's document entitled "Principles of Sampling and Analysis of Waste for TCLP under Ontario Regulation 347", dated February 2002, as amended.

(c) The Testing Protocol shall include the rationale for the proposed methods and the following:

(i) a sampling protocol, including the proposed number of samples to be taken and their locations, to ensure that representative sample(s) are being tested for compliance with this Certificate;

(ii) sample(s) handling and preserving procedures;

(iii) analytical protocol for the applicable contaminants to ensure that appropriate analytical method(s) are being used for compliance testing required by this Certificate; and

(iv) a testing protocol for the bottom ash during the Site commissioning period.

(d) The Owner shall implement the Testing Protocol on the Commencement Date of Operation.

(8) For handling of the bottom ash as a solid non-hazardous waste, the Owner shall follow the following schedule for compliance testing:

(a) for the Site commissioning period, the bottom ash shall be tested in accordance with the Testing Protocol approved by the Director;

(b) for the period following the Site commissioning period, the bottom ash shall be tested for the content of the combustible materials on an annual basis, until the compliance testing results indicate that the bottom ash meets the “incinerator ash” definition from the *O. Reg. 347* for three (3) consecutive years, following which a triennial compliance testing event may be carried out;

(c) should any annual or triennial compliance testing event indicate that the bottom ash does not meet the "incinerator ash" definition, prior to each of the next three (3) shipments from the Site, compliance testing of each of the three (3) shipments shall be carried out. Once three (3) consecutive tests re - establish compliance with the "incinerator ash" definition from the *O. Reg. 347* and that the bottom ash does not exceed the Leachate Toxicity Criteria, the compliance testing schedule set out in Condition 7.(8)(b) may be resumed; and

(d) should the results of any compliance testing of the bottom ash indicate that the concentrations of the leachate toxic contaminants in the bottom ash equal to or exceed the Leachate Toxicity Criteria, the bottom ash shall be handled as a hazardous waste. Once three (3) consecutive tests re - establish that the bottom ash does not exceed the Leachate Toxicity Criteria, the bottom ash compliance testing schedule set out in Condition 7.(8)(b) may be resumed.

(9) (a) For handling of the bottom ash as a hazardous waste and for handling of the fly ash, prior to final disposal at a hazardous waste landfill site in Ontario, the Owner shall undertake any sampling and testing that would be required to comply with the LDR requirements set out in the *EPA* and the *O. Reg. 347*.

(b) The Owner shall follow the following schedule for compliance testing:

(i) prior to each of the first three (3) shipments of the ash from the Site, the ash shall be tested so that for the compliance with the LDR requirements can be demonstrated;

(ii) following the three (3) initial compliance testing events, the ash shall be tested on an annual basis, until the compliance testing results indicate that the ash meets the LDR requirements during the three (3) consecutive years, following which a triennial compliance testing may be carried out; and

(iii) should any annual or triennial compliance testing event indicate that the ash does not meet the LDR requirements, prior to next three (3) shipments from the Site, compliance testing of each of the three (3) shipments shall be carried out. Once three (3) consecutive tests re - establish compliance with the LDR requirements, the compliance testing schedule set out in Condition 7.(9)(b)(ii) may be resumed.

Soil Testing:

(10) (a) Within one hundred and twenty (120) days from the date of this Certificate, the Regions shall undertake the soil testing in accordance with the Soil Testing Plan required by this Certificate.

(b) The soil testing shall be repeated every three (3) years or as agreed upon in writing by the Regional Director.

Disposal of Residual Waste

(11) The Owners shall ensure that no portion of the Residual Waste undergoing compliance testing is transferred from the Site until the results of the compliance testing required by this Certificate demonstrate compliance with the relevant Ministry's requirements.

(12) Bottom ash that is not a hazardous waste, as defined in the *O. Reg. 347,* may be disposed of at an approved non-hazardous waste landfill site or at a site approved to accept such waste by an appropriate government agency of equivalent jurisdiction.

(13) Residual Waste shall be treated to comply with the LDR requirements set out in the *EPA* and the *O. Reg. 347* prior to disposal of at an approved hazardous waste landfill site or at a site approved to accept such waste by an appropriate government agency of equivalent jurisdiction.

Groundwater and Surface Water Monitoring

(14) (a) The Regions shall develop and implement the Groundwater and Surface Water Monitoring Plan, in accordance with the requirements set out in the EA Approval and as determined to be acceptable to the Regional Director.

(b) The Regions shall report the results of the Groundwater and Surface Water Monitoring program to the Regional Director and to the Director in accordance with the schedule set out in the EA Approval and in accordance with the requirements of Condition 14.

(c) The Regions shall post the Groundwater and Surface Water Monitoring Plan and the results of the Groundwater and Surface Water Monitoring program on the Owner's web site for the Facility in accordance with the requirements of the EA Approval and Condition 15.

8. NUISANCE IMPACT CONTROL and HOUSEKEEPING

Odour Management

(1) (a) The Owner shall maintain a negative air pressure atmosphere in the Tipping Building at all times to contain any potential odours within the confines of the Tipping Building.

(b) (i) Once per year, or as required by the District Manager, the Owner shall undertake a test to measure the worse case scenario negative air pressure atmosphere throughout the Tipping Building, while the activities approved in this Certificate are carried out in the Tipping Building.

(ii) Notwithstanding the requirements set out in Condition 8.(1)(b)(i), the Owner shall install sufficient instrumentation to measure the air flow into the Boilers and demonstrate that adequate air flow is maintained

to maintain a negative air pressure atmosphere throughout the Tipping Building.

(c) In the event that adequate negative air pressure cannot be maintained, the Owner shall implement any necessary additional odour containment and control measures, including, but not necessarily limited to, those in the required Contingency and Emergency Response Plan.

(2) The Owner shall ensure that the entrance and exit doors into the Tipping Building, the Residue Building and the Grizzly Building are kept closed at all times except to permit the entry or exit of the respective waste transport vehicles and waste handling equipment into and out of these Buildings.

(3) The Owner shall ensure that, at all times, the air from the Tipping Building, the Residue Building, the Grizzly Building and from the Equipment is exhausted through an appropriate and fully functional APC Equipment approved by this Certificate.

(4) The Owner shall undertake appropriate housekeeping activities, including regular cleaning of the tipping floor to control potential sources of fugitive odour emissions.

(5) The Owner shall ensure that no Waste handling equipment or empty storage containers are stored outside, unless they have been washed to prevent fugitive odour emissions.

(6) The Owner shall regularly clean all equipment and storage areas that are used to handle, process and store waste at the Site, including the surfaces of the outdoor spill containment areas, as required.

(7) (i) Prior to the receipt of Waste at the Site, the Owner shall provide documentation which outlines the testing carried out by a licensed structural engineer to confirm the effectiveness of the containment in the buildings, conveyors and tanks and silos at the Site.

(ii) The testing shall be carried out and repeated as directed by the District Manager in accordance with the test protocol prepared in consultation with and approved by the District Manager.

(iii) These tests shall be repeated as directed or agreed by the District Manager.

(8) The Owner shall prepare and implement an Odour Management and Mitigation Plan in accordance with the requirements set out in the EA Approval and as determined to be acceptable to the Regional Director.

(9) (a) In addition to the requirements set out in the EA Approval, the Odour Management and Mitigation Plan shall include the following:

(i) identification of all potential sources of odourous emissions;

(ii) description of the preventative and control measures to minimize odourous emissions from the identified sources;
(iii) procedures for the implementation of the Odour Management and Mitigation Plan;
(iv) inspection and maintenance procedures to ensure effective implementation of the Odour Management and Mitigation Plan; and
(v) procedures for verification and recording the progress of the implementation of the Odour Management and Mitigation Plan.

(b) The Owner shall continue to submit an updated Odour Management and Mitigation Plan until such time as the Regional Director notifies the Owner in writing that further submissions are no longer required.

Vehicles and Traffic

(10) (a) The Owner shall ensure that all vehicles transporting waste to and from the Site are not leaking or dripping waste when arriving at or leaving the Site.

(b) Should the Owner become aware that the truck(s) delivering waste to the Site have leaked wastewater on the municipal roadways, the Owner shall immediately report the violation to the owner of the vehicle(s) and to the District Manager.

(c) The Owner shall ensure that the exterior of all vehicles delivering Waste to the Site or hauling waste from the Site is washed prior to the trucks' departure from the Site, if necessary.

(d) Any necessary truck washing shall occur only in the designated wash down area of the Tipping Building or the Residue Building.

(11) The Owner shall ensure that there is no queuing or parking of vehicles that are waiting to enter the Site on any roadway that is not a distinct part of the Site.

Litter

(12) The Owner shall:

(a) take all practical steps to prevent the escape of litter from the Site;
(b) pick up litter around the Site on a daily basis, or more frequently if necessary; and
(c) if necessary, erect litter fences around the areas causing a litter problem.

Dust

(13) The Owner shall ensure that all on-site roads and operations/yard areas are regularly swept/washed to prevent dust impacts off-Site.

Vermin and Vectors

(14) The Owner shall:

(a) implement necessary housekeeping procedures to eliminate sources and potential sources of attraction for vermin and vectors; and

(b) hire a qualified, licensed pest control professional to design and implement a pest control plan for the Site. The pest control plan shall remain in place, and be updated from time to time as necessary, until the Site has been closed and this Certificate has been revoked.

Visual Screening

(15) The Owner shall provide visual screening for the Site in accordance with the documentation included in the attached Schedule "A".

9. STAFF TRAINING

(1) (a) The Owner shall ensure that all operators of the Site are trained with respect to the following, as per the specific job requirements of each individual operator:

(i) terms and conditions of this Certificate and the requirements of the EA Approval;
(ii) operation and management of the Site, or area(s) within the Site, as per the specific job requirements of each individual operator, and which may include procedures for receiving, screening and identifying Waste, refusal, handling, processing and temporarily storing wastes, operation of the Equipment, the APC Equipment, the CEM System and the Works;
(iii) testing, monitoring and operating requirements;
(iv) maintenance and inspection procedures;
(v) recording procedures;
(vi) nuisance impact control and housekeeping procedures;
(vii) procedures for recording and responding to public complaints;
(viii) an outline of the responsibilities of Site personnel including roles and responsibilities during emergency situations;
(ix) the Contingency and Emergency Response Plan including exit locations and evacuation routing, and location of relevant equipment available for emergency situations;
(x) environmental, and occupational health and safety concerns pertaining to the wastes to be handled;
(xi) emergency first-aid information; and
(xii) relevant waste management legislation and regulations, including the *EPA,* the *OWRA,* the *O. Reg. 347,* the *O. Reg. 419/05* and the Ministry guidelines affecting thermal treatment facilities.

(2) The Owner shall ensure that all personnel are trained in the requirements of this Certificate relevant to the employee's position:

(a) upon commencing employment at the Site in a particular position;
(b) whenever items listed in Condition 9.(1) are changed or updated; and
(c) during the planned refresher training.

10. COMPLAINTS / ODOUR-CONTAMINANT EMISSIONS RESPONSE PROCEDURE

(1) The Owner or a designated representative of the Owner shall be available to receive public complaints caused by the operations at the Site twenty-four (24) hours per day, seven (7) days per week.

(2) If at any time, the Owner or the Ministry receives a complaint or the Owner or the Provincial Officer detects an emission of odour or any contaminant, (Emission Event), from the Site, in addition to the requirements set out in the EA approval, the Owner shall record all relevant information in the computerized tracking system and shall respond to the complaint/Emission Event according to the following procedure:

Step 1: Record of Complaint/Emission Event

(a) (i) The Owner shall record each complaint/Emission Event and each record shall include the following:

(A) name, address and the telephone number of the complainant, if known;
(B) time and date of the complaint/Emission Event;
(C) details of the complaint; and

(ii) After the complaint/Emission Event has been recorded in the tracking system, the Owner shall immediately report to the District Manager by phone or e-mail during office hours and to the Ministry's Spills Actions Centre at 1-800-268-6060 after office hours on the receipt of the complaint or occurrence of the Emission Event.

Step 2: Investigation and Handling of Complaint/Emission Event

(b) The Owner shall immediately initiate investigation of the complaint/Emission Event. As a minimum, the investigation shall include the following:

(i) determination of the activities being undertaken at the Site at the time of the complaint/Emission Event;
(ii) meteorological conditions including, but not limited to the ambient temperature, approximate wind speed and its direction.
(iii) determination if the complaint is attributed to activities being undertaken at the Site and if so, the possible cause(s) of the complaint/Emission Event; and

(iv) determination of the remedial action(s) to address the cause(s) of the Complaint/Emission Event, and the schedule for the implementation of the necessary remedial action(s).

(c) The Owner shall respond to the complainant, if known, and the response shall include the results of the investigation of the Complaint, the action(s) taken or planned to be taken to address the cause(s) of the Complaint, and if any follow-up response(s) will be provided.

(d) Upon completed investigation of the Complaint/Emission event, the Owner shall, within three (3) business days, submit a report to the District Manager on the Complaint, on the action(s) taken or planned to be taken to address the cause(s) of the Complaint and on all proposed action(s) to prevent recurrence of the Complaint/Emission Event in the future.

(3) If, in the opinion of the District Manager, failure of the APC Equipment and/or any other process or equipment upset or malfunction results in off-site Complaint/Emission Event, confirmed by the Owner or a Provincial Officer of the Ministry, the Owner shall, immediately upon notification from the District Manager, implement any necessary additional control measures, including, but not necessarily limited to, those in the Contingency and Emergency Response Plan required by this Certificate.

(4) If the District Manager deems the additional control measures taken as per condition 10.(3) to be unsuitable, insufficient or ineffective, the District Manager may direct the Owner, in writing, to take further measures to address the noted failure, upset or malfunction including pursuant to section 39 of the *EPA* requiring a reduction in the receipt of Waste, cessation of the receipt of Waste, removal and off-site disposal of Waste from the Tipping Building as well as making repairs or modifications to equipment or processes.

11. **CONTINGENCY and EMERGENCY RESPONSE PLAN**

(1) (a) The Owner shall develop and implement a Contingency and Emergency Response Plan in accordance with the requirements set out in the EA Approval.

(b) Notwithstanding the requirements set out in the EA Approval, the Contingency and Emergency Response Plan shall be prepared in consultation with the District Manager or designate, the local Municipality and the Fire Department.

(2) In addition to the requirements set out in the EA Approval, the Contingency and Emergency Response Plan, as a minimum, shall include the following:

(a) the Site plan clearly showing the equipment layout and all storage areas for wastes and reagents;

(b) a list of Site personnel responsible for the implementation of the contingency measures and various emergency response tasks and their training requirements;

(c) a list of equipment and materials required for the implementation of the contingency measures and the emergency situation response;

(d) maintenance and testing program for equipment required for the implementation of the contingency measures and the emergency situation response;

(e) procedures to be undertaken as part of the implementation of the contingency measures and the emergency situation response;

(f) names and telephone numbers of waste management companies available for emergency response;

(g) notification protocol, with names and telephone numbers of persons to be contacted, including the Owner, the Site personnel, the Ministry of the Environment Spills Action Centre and the York Durham District, the local Fire and Police Departments, the local Municipality, the local Medical Officer of Health, and the Ministry of Labour;

(h) procedures and actions to be taken should the incoming Waste not meet the applicable quality criteria specified in this Certificate;

(i) procedures and actions to be taken should the outgoing Residual Waste fail to meet the criteria specified in this Certificate;

(j) procedures and actions to be taken should the current disposal options for the outgoing Residual Waste become unavailable;

(k) design of the contingency measure, procedures and actions should the emissions from the Site, including the fugitive odour/dust emissions, cause occurrences of public Complaints;

(l) procedures and actions to be taken should the Owner be unable to maintain the negative pressure in the Tipping Building;

(m) procedures and actions to be taken should the occurrence of Complaints require the Owner to suspend the waste processing activities at the Site; and

(n) identification and risk assessment of all reasonably foreseeable incidents that may result in a discharge into the natural environment of any contaminant in an amount, concentration or level in excess of that prescribed by the Regulations and/or imposed by this Certificate, including but not limited to:

    (i) a breakdown of the Facility/Equipment or part of the Facility/Equipment, including the APC Equipment and the CEM Systems associated with the Boilers;

    (ii) CEM Systems indicate that the Boilers and associated APC Equipment have been out of compliance with the Performance Requirements;

    (iii) any change in process parameters which may result in non compliance with the Performance Requirements;

    (iv) power failure resulting in the use of the Emergency Diesel Generator or Total Power Failure; and

    (v) description of the preventative and control measures to minimize the occurrence or impacts of the above incidents; and

    (vi) procedures for corrective measures and timelines to take to address the above incidents in a timely manner to effectively prevent or minimize the discharge of any contaminant into the natural environment and continue to maintain compliance with the *EPA* , the Regulations and

this Certificate, including procedures for Waste Processing Rate reduction, waste feed cut-off, Controlled Shutdown or Emergency Shutdown of the Boilers as applicable.

(3) The Owner shall submit the finalized Contingency and Emergency Response Plan to the Director a minimum of one hundred and twenty (120) days prior to the Commencement Date of Operation, for approval.

(4) An up-to-date version of the Contingency and Emergency Response Plan shall be kept at the Site at all times, in a central location available to all staff, and it shall be available for inspection by a Provincial Officer upon request.

(5) The Owner shall ensure that the names and telephone numbers of the persons to be contacted in the event of an emergency situation are kept up-to-date, and that these numbers are prominently displayed at the Site and at all times available to all staff and emergency response personnel.

(6) The Contingency and Emergency Response Plan shall be reviewed on a regular basis and updated, as necessary. The revised version of the Contingency and Emergency Response Plan shall be submitted to the local Municipality and the Fire Department for comments and to the District Manager for comments and concurrence.

(7) The Owner shall implement the recommendations of the updated Contingency and Emergency Response Plan, immediately upon receipt of the written concurrence from the District Manager.

12. EMERGENCY SITUATION RESPONSE and REPORTING

(1) The Owner shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this Site and manage any emergency situation in accordance with the Contingency and Emergency Response Plan.

(2) The Owner shall ensure that the equipment and materials listed in the Contingency and Emergency Response Plan are immediately available at the Site, are in a good state of repair, and fully operational at all times.

(3) The Owner shall ensure that all Site personnel responsible for the emergency situation response are fully trained in the use of the equipment and related materials, and in the procedures to be employed in the event of an emergency.

(4) All Spills as defined in the *EPA* shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the emergency situation, and the action taken for clean-up, correction and prevention of future occurrences.

13. **SUBMISSIONS to the REGIONAL DIRECTOR or DISTRICT MANAGER**

(1) The Owner shall notify the District Manager in writing, at least six (60) days prior to the scheduled date for the first receipt of Waste at the Site, as to whether or not the construction of the Facility has been carried out in accordance with this Certificate to a point of Substantial Completion.

(2) (a) The Owner shall forthwith notify the District Manager and the Spills Action Centre by telephone, when any of the following incidents occur that may result in a discharge into the natural environment of any contaminant in an amount, concentration or level in excess of that prescribed by the Regulations and/or imposed by this Certificate:

(i) CEM Systems indicate that the Boilers and associated APC Equipment have been out of compliance with the Performance Requirements triggering a Waste Processing Rate Reduction, Waste Feed cut-off, Controlled Shutdown or Emergency Shutdown as specified in the Emergency Response and Contingency Plan;
(ii) failure of the APC Equipment associated with the Boilers; and
(iii) power failure resulting in the use of the emergency diesel generator or Total Power Failure;

(b) In addition to fulfilling the notification requirements from the *EPA,* the Owner shall prepare and submit a written report to the District Manager with respect to any of the above said occurrences, within five (5) calendar days of the occurrence, in the following format:

(i) date of the occurrence;
(ii) general description of the occurrence;
(iii) duration of the occurrence;
(iv) effect of the occurrence on the emissions from the Facility;
(v) measures taken to alleviate the effect of the occurrence on the emissions from the Facility; and
(vi) measures taken to prevent the occurrence of the same or similar occurrence in the future.

(3) Should a Spill, as defined in the *EPA*, occur at the Site, in addition to fulfilling the requirements from the *EPA* and applicable regulations, the Owner shall submit to the District Manager a written report within three (3) calendar days outlining the nature of the Spill, remedial measure taken and the measures taken to prevent future occurrences at the Site.

(4) (a) Within ninety (90) days from the date of this Certificate, the Regions shall prepare and submit to the District Manager for concurrence, a Soil Testing Plan to monitor the impact of the Site operations at the locations where the ambient air monitoring is proposed by the Owner in accordance with the requirements set out in the EA Approval.

(b) (i) This Plan shall ensure that representative samples of the soil to be tested are collected in sufficient numbers and that the samples are properly preserved and tested so that reliable data on the soil characteristics is collected.

(ii) As a minimum, the Plan shall include testing for cadmium, lead, chromium, nickel, cobalt, copper, molybdenum, selenium, zinc and mercury, Dioxins and Furans.

(iii) This Plan shall comply with the Ministry's regulatory requirements for sampling and testing of soil and it shall include the rationale for the proposed methods.

(iv) This Plan be kept at the Site at all times and be available for inspection by a Provincial Officer upon request.

14. RECORDS KEEPING

(1) Any information requested by the Ministry concerning the Facility and its operation under this Certificate, including, but not limited to, any records required to be kept by this Certificate, shall be provided to the Ministry, upon request**,** in a timely manner.

(2) The Owner shall retain, for a minimum of seven (7) years from the date of their creation, except as noted below, all reports, records and information described in this Certificate.

Daily Activities

(3) The Owner shall maintain an on-Site written or digital record of activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. As a minimum, the record shall include the following:

(a) date of record and the name and signature of the person completing the report;
(b) quantity and source of the incoming Waste received at the Site;
(c) records of the estimated quantity of Waste thermally treated in the Boilers;
(d) quantity of the Unacceptable Waste received at the Site by the end of the approved Waste receipt period and the type(s) of the Unacceptable Waste received;
(e) quantity and type of the Residual Waste shipped from the Site, including any required outgoing Residual Waste characterization results;
(f) destination and/or receiving site(s) for the Residual Waste shipped from the Site;
(g) quantity and type of any Rejected Waste accepted at the Site;
(h) destination and/or receiving site(s) for the Rejected Waste shipped from the Site;
(i) housekeeping activities, including litter collection and washing/cleaning activities, etc.
(j) amount of electricity produced;

(k) amount of excess electricity exported to the electrical grid.

Monitoring and Testing Records

(4) The Owner shall maintain an on-Site written or digital record of activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. As a minimum, the record shall include the following:

(a) day and time of the activity;
(b) all original records produced by the recording devices associated with the CEM Systems;
(c) a summary of daily records of readings of the CEM Systems, including:
  (i) the daily minimum and maximum 4-hour average readings for carbon monoxide;
  (ii) the daily minimum and maximum one hour average readings for oxygen;
  (iii) the daily minimum and maximum 10-minute average readings for organic matter;
  (iv) the daily minimum and maximum 24-hour average readings for sulphur dioxide;
  (v) the daily minimum and maximum 24-hour average readings for nitrogen oxides;
  (vi) the daily minimum and maximum 24-hour average readings for hydrogen chloride;
  (vii) the daily minimum and maximum 6-minute average and 2-hour average opacity readings; and
  (viii) the daily minimum and maximum one-hour average readings for temperature measurements.
(d) records of all excursions from the applicable Performance Requirements as measured by the CEM Systems, duration of the excursions, reasons for the excursions and corrective measures taken to eliminate the excursions;
(e) all records produced during any Acoustic Audit;
(f) all records produced during any Source Testing;
(g) all records produced by the long term sampling program for Dioxins and Furans required by this Certificate;
(h) all records produced during the Residual Waste compliance testing;
(i) all records produced during the Soil Testing;
(j) all records produced during the Groundwater and Surface Water Monitoring required by this Certificate;
(k) all records produced during the Ambient Air Monitoring required by this Certificate;
(l) all records associated with radiation monitoring of the incoming Waste, including but not limited to:
  (i) transaction number;
  (ii) hauler;
  (iii) vehicle ID;
  (iv) alarm level;
  (v) maximum CPS;
  (vi) uSv/hr;

(vii) comment;
(viii) background CPS;
(ix) driver time in and out; and
(x) name of the Trainer Personnel that carried out the monitoring.

(m) results of the containment testing carried out in the buildings, conveyors, tanks and silos, as required;
(n) results the negative pressure in the Tipping Building carried out, as required.

Inspections/Maintenance/Repairs

(5) The Owner shall maintain an on-Site written or digital record of inspections and maintenance as required by this Certificate. As a minimum, the record shall include the following:

(a) the name and signature of the Trained Personnel that conducted the inspection;
(b) the date and time of the inspection;
(c) the list of any deficiencies discovered, including the need for a maintenance or repair activity;
(d) the recommendations for remedial action;
(e) the date, time and description of actions (repair or maintenance) undertaken;
(f) the name and signature of the Trained Personnel who undertook the remedial action; and
(g) an estimate of the quantity of any materials removed during cleaning of the Works.

Emergency Situations

(6) The Owner shall maintain an on-Site written or digital record of the emergency situations. As a minimum, the record shall include the following:

(a) the type of an emergency situation;
(b) description of how the emergency situation was handled;
(c) the type and amount of material spilled, if applicable;
(d) a description of how the material was cleaned up and stored, if generated; and
(e) the location and time of final disposal, if applicable; and
(f) description of the preventative and control measures undertaken to minimize the potential for re-occurrence of the emergency situation in the future.

Complaints Response Records

(7) The Owner shall establish and maintain a written or digital record of complaints received and the responses made as required by this Certificate.

Training

(8) The Owner shall maintain an on-Site written or digital record of training as required by this Certificate. As a minimum, the record shall include the following:

(a) date of training;
(b) name and signature of person who has been trained; and
(c) description of the training provided.

Reports

(9) The Owner shall keep at the Site the following reports required by this Certificate:

(a) the ESDM Report
(b) the Acoustic Assessment Report;
(c) the Annual Report; and
(d) the Third Party Audit.

15. REPORTING

Annual Report

(1) By March 31st following the end of each operating year, the Owner shall prepare and submit to the District Manager and to the Advisory Committee, an Annual Report summarizing the operation of the Site covering the previous calendar year. This Annual Report shall include, as a minimum, the following information:

(a) a summary of the quality and the quantity of the Wastes accepted at the Site, including the maximum amount of the Waste received annually and daily and the sources of the Waste;

(b) a summary of the quality and the quantity of the Residual Waste shipped from the Site, including the analytical data required to characterize the Residual Waste, the off-Site destinations for the Residual Waste and its subsequent use, if known;

(c) estimated material balance for each month documenting the maximum amount of wastes stored at the Site;

(d) annual water usage;

(e) annual amount of the electricity produced and the annual amount of the electricity exported to the electrical grid;

(f) summaries and conclusions from the records required by Conditions 14.(3) through 14.(8) of this Certificate;

(g) the Emission Summary Table and the Acoustic Assessment Summary Table for the Facility as of December 31 from the previous calendar year;

(h) a summary of dates, duration and reasons for any environmental and operational problems, Boilers downtime, APC Equipment and CEM System malfunctions that may have negatively impacted the quality of the environment or any incidents triggered by the Emergency Response and

Contingency Plan and corrective measures taken to eliminate the environmental impacts of the incidents;

(i) a summary of the dates, duration and reasons for all excursions from the applicable Performance Requirements as measured by the CEM Systems or as reported by the annual Source Testing, reasons for the excursions and corrective measures taken to eliminate the excursions;

(j) results of the evaluation of the performance of the long-term sampling system in determining the Dioxins and Furans emission trends and/or fluctuations for the year reported on as well as demonstrating the ongoing performance of the APC Equipment associated with the Boilers;

(k) dates of all environmental complaints relating to the Site together with cause of the Complaints and actions taken to prevent future Complaints and/or events that could lead to future Complaints;

(l) any environmental and operational problems that could have negatively impacted the environment, discovered as a result of daily inspections or otherwise and any mitigative actions taken;

(m) a summary of any emergency situations that have occurred at the Site and how they were handled;

(n) the results and an interpretive analysis of the results of the groundwater and surface water, including an assessment of the need to amend the monitoring programs;

(o) summaries of the Advisory Committee meetings, including the issues raised by the public and their current status;

(p) any recommendations to improve the environmental and process performance of the Site in the future;

(q) statement of compliance with this Certificate, including compliance with the *O. Reg. 419/05* and all air emission limits based on the results of source testing, continuous monitoring and engineering calculations, as may be appropriate; and

(r) interpretation of the results and comparison to the results from previous Annual Reports to demonstrate the Facility's impact on the environment.

Third Party Audit

(2) (a) The Regions shall ensure that an independent technical review of the operations at the Site is undertaken in accordance with the requirements of the EA Approval.

(b) In addition to the Third Party Audit requirements set out in the EA approval, the Third Party Audit shall include the following:

(i) a review of the data from the monitoring and testing required by this Certificate;
(ii) a review of all complaints received about the operation of the Facility;
(iii) any recommendations for improving the operation of the Facility received from the Advisory Committee; and
(iv) a recommendation of any improvements that could be made to ensure that the operation of the Facility is optimized and is protective of the health and safety of people and the environment.

(3) The Regions shall submit a Written Audit Report on the results of the independent technical review to the Regional Director in accordance with the Audit Plan and retain a copy at the Site.

Soil Testing Report

(4) Within one (1) month of completion of each Soil Testing event, the Regions shall submit to the District Manager a Soil Testing Report, which includes the details on the sampling/testing procedures, the results of the testing and a comparison with the results obtained during the previous Soil Testing.

16. PUBLIC ACCESS TO DOCUMENTATION

(1) The Owner shall, at all times, maintain documentation that describes the current operations of the Facility. The Owner shall post the documentation at the website for the undertaking and during regular business hours, the Owner shall make the following documents available for inspection at the Site by any interested member of the public, upon submission to the Ministry for review:

(a) a current ESDM Report that demonstrates compliance with the Performance Limits for the Facility regarding all Compounds of Concern;

(b) a current Acoustic Assessment Report that demonstrates compliance with the Performance Limits for the Facility regarding noise emissions;

(c) the most recent Annual Report;

(d) the most current Third Party Audit Report;

(e) Odour Management and Mitigation Plan, prepared in accordance with the requirements of the EA Approval;

(f) Noise Monitoring and Reporting Plan, prepared in accordance with the requirements of the EA Approval; and

(g) Groundwater and Surface Water Monitoring and Reporting Plan, prepared in accordance with the requirements of the EA Approval.

(2) The Owner shall ensure that necessary hardware and software are provided at a location available to the public, to provide on-line real-time reporting of the operating parameter data for the Facility, including acceptable operating limits, stack emissions, and all other parameters for which continuous monitoring is required and that continuous records of the same be kept and made available to the public.

17. ADVISORY COMMITTEE

(1) The Regions shall establish an Advisory Committee in accordance with the requirements set out in the EA Approval.

18. CLOSURE of the SITE

(1) A minimum of nine (9) months prior to closure of the Site, the Owner shall submit, for approval by the Director, a written Closure Plan for the Site. This Plan shall include, as a minimum, a description of the work that will be done to facilitate closure of the Site and a schedule for completion of that work.

(2) Within ten (10) days after closure of the Site, the Owner shall notify the Director and the District Manager, in writing, that the Site is closed and that the approved Closure Plan has been implemented.

SCHEDULE "A"

Supporting Documentation

(1) Applications for a Certificate of Approval (Air) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) Emission Summary and Dispersion Modelling Report, dated March 2011, prepared by Golder Associates;

(b) Acoustic Assessment Report prepared by Golder Associates Ltd., dated March 2011 and signed by Paul Niejadlik.

(2) Applications for a Provisional Certificate of Approval (Waste Disposal Site) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) Attachment #1 containing the "Design and Operations Report", dated March 2011, prepared by Golder Associates Ltd.;

(b) Attachment #3 containing the "Public Consultation Report", dated March 2011, prepared by Golder Associates Ltd.;

(c) Attachment #4 containing the Host Community Agreement

(d) Attachment #5 containing the proof of legal name for Covanta Durham York Renewable Energy Limited Partnership; and

(e) A letter May 24, 2011 from Anthony Ciccone, Golder Associates Ltd., to Margaret Wojcik, Ontario Ministry of the Environment, providing additional technical information on the proposal and attaching a report entitled "Amendment #1 Durham York Energy Centre Design and Operations Report", dated May 2011;

(3) Applications for a Certificate of Approval of Municipal and Private Sewage Works dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of Durham and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) "Surface Water and Groundwater Technical Study Report" dated July 2009, prepared by Jacques Whitford, Markham, Ontario (CD Report).

(b) "Stormwater Design Model Output" prepared by Sigma Energy, dated March 2001 (CD Report).

(c) Clearance letter from Central Lake Ontario Conservation date February 22, 2011.

(d) A letter dated March 23, 2011, from Brian Bahor, Covanta Energy Corporation, to Stefanos Habtom, Ontario Ministry of the Environment, providing additional technical design information on the proposed stormwater management ponds.

SCHEDULE "B"

Procedure to calculate and record the 10-minute average concentration of odour at the Point of Impingement and at the most impacted Sensitive Receptor

(a) Calculate and record one-hour average concentration of odour at the Point of Impingement and at the most impacted Sensitive Receptor, employing CALPUFF atmospheric dispersion model or the dispersion model acceptable to the Director that employs at least five (5) years of hourly local meteorological data and that can provide results reported as individual one-hour average odour concentrations.

(b) Convert and record each of the one-hour average concentrations predicted over the five (5) years of hourly local meteorological data at the Point of Impingement and at the most impacted Sensitive Receptor to 10-minute average concentrations using the One-hour Average to 10-Minute Average Conversion described below; and

(c) Record and present the 10-Minute Average concentrations predicted to occur over a five (5) year period at the Point of Impingement and at the most impacted Sensitive Receptor in a histogram. The histogram shall identify all predicted 10-minute average odour concentration occurrences in terms of frequency, identifying the number of occurrences over the entire range of predicted odour concentration in increments of not more than 1/10 of one odour unit. The maximum 10-minute average concentration of odour at the Sensitive Receptor will be considered to be the maximum odour concentration at the most impacted Sensitive Receptor that occurs and is represented in the histogram, disregarding outlying data points on the histogram as agreed to by the Director.

One-hour Average To 10-minute Average Conversion

1. Use the following formula to convert and record one-hour average concentrations predicted by the CALPUFF atmospheric dispersion model or by the dispersion model acceptable to the Director to 10-minute average concentrations:

$$X10min = X60min*1.65$$

where X10min = 10-minute average concentration
X60min = one-hour average concentration

SCHEDULE "C"

PERFORMANCE REQUIREMENTS

In-Stack Emission Limits

Parameter	In-Stack Emission Limit	Verification of Compliance
Total Suspended Particulate Matter (filterable particulate measured in accordance with the Ontario Source Testing Code)	9 mg/Rm3	Results from compliance Source Testing
cadmium	7 µg/Rm3	Results from compliance Source Testing
lead	50 µg/Rm3	Results from compliance Source Testing
mercury	15 µg/Rm3	Results from compliance Source Testing
dioxins and furans	60 pg/Rm3	Results from compliance Source Testing; results expressed as I-TEQ
hydrochloric acid (HCl)	9 mg/Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
sulphur dioxide (SO2)	35 mg/Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
nitrogen oxides (NOx)	121 mg/ Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
organic matter (undiluted, expressed as equivalent methane)	50 ppmdv (33 mg/ Rm3)	Results from compliance source testing
carbon monoxide	35 ppmdv (40 mg/Rm3)	Calculated as the rolling arithmetic average of four (4) hours of data measured by a CEM System that provides data at least once every fifteen minutes, in accordance with condition 6 (2) (c)
opacity	10 percent	Calculated as the rolling arithmetic average of six (6) minutes of data measured by a CEM System that provides data at least once every minute
	5 percent	Calculated as the rolling arithmetic average of two (2) hours of data measured by a CEM System that provides data at least once every

		fifteen minutes

mg/Rm3- milligrams per reference cubic metre;

pg/Rm3 - picograms per reference cubic metre

ppmdv parts per million by dry volume,

µg/Rm3 - micrograms per reference cubic metre

R- reference conditions - 25 degrees Celsius, 101.3 kilopascals, dry basis, 11% oxygen

SCHEDULE "D"

TEST CONTAMINANTS

Hydrogen Chloride
Hydrogen Fluoride
Oxides of Nitrogen expressed as Nitrogen Dioxide
Sulphur Dioxide
Total Hydrocarbons, expressed as methane on wet basis
Carbon Dioxide
Total Suspended Particulate Matter (< 44 microns)
Total PM-10 including condensables
Total PM-2.5 including condensables

Metals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Selenium
Silver
Thallium
Vanadium
Zinc

Schedule "D" - Cont'd

Chlorobenzenes	Chlorophenols
Monochlorobenzene (MCB) 1,2-Dichlorobenzene (1,2-DCB) 1,3-Dichlorobenzene (1,3-DCB) 1,4-Dichlorobenzene (1,4-DCB) 1,2,3-Trichlorobenzene (1,2,3-TCB) 1,2,4-Trichlorobenzene (1,2,4-TCB) 1,3,5-Trichlorobenzene (1,3,5-TCB) 1,2,3,4-Tetrachlorobenzene (1,2,3,4-TeCB) 1,2,3,5-Tetrachlorobenzene (1,2,3,5-TeCB) 1,2,4,5-Tetrachlorobenzene (1,2,4,5-TeCB) Pentachlorobenzene (PeCB) Hexachlorobenzene (HxCB)	2-monochlorophenol (2-MCP) 3-monochlorophenol (3-MCP) 4-monochlorophenol (4-MCP) 2,3-dichlorophenol (2,3-DCP) 2,4-dichlorophenol (2,4-DCP) 2,5-dichlorophenol (2,5-DCP) 2,6-dichlorophenol (2,6-DCP) 3,4-dichlorophenol (3,4-DCP) 3,5-dichlorophenol (3,5-DCP) 2,3,4-trichlorophenol (2,3,4-T3CP) 2,3,5-trichlorophenol (2,3,5-T3CP) 2,3,6-trichlorophenol (2,3,6-T3CP) 2,4,5-trichlorophenol (2,4,5-T3CP) 2,4,6-trichlorophenol (2,4,6-T3CP) 3,4,5-trichlorophenol (3,4,5-T3CP) 2,3,4,5-tetrachlorophenol (2,3,4,5-T4CP) 2,3,4,6-tetrachlorophenol (2,3,4,6-T4CP) 2,3,5,6-tetrachlorophenol (2,3,5,6-T4CP) Pentachlorophenol (PeCP)

Schedule "D" - Cont'd

Co-Planar PCBs (Dioxin-like PCBs)	Volatile Organic Matter
PCB-077 (3,3',4,4'-TCB)	Acetaldehyde
PCB-081 (3,4,4',5-TCB)	Acetone
PCB-105 (2,3,3',4,4'-PeCB)	Acrolein
PCB-114 (2,3,4,4',5-PeCB)	Benzene
PCB-118 (2,3',4,4',5-PeCB)	Bromodichloromethane
PCB-123 (2',3,4,4',5-PeCB)	Bromoform
PCB-126 (3,3',4,4',5-PeCB)	Bromomethane
PCB-156 (2,3,3',4,4',5-HxCB)	Butadiene, 1,3 -
PCB-157 (2,3,3',4,4',5'-HxCB)	Butanone, 2 -
PCB-167 (2,3',4,4',5,5'-HxCB)	Carbon Tetrachloride
PCB-169 (3,3',4,4',5,5'-HxCB)	Chloroform
PCB-189 (2,3,3',4,4',5,5'-HpCB)	Cumene
	Dibromochloromethane
	Dichlorodifluoromethane
	Dichloroethane, 1,2 -
	Dichloroethene, Trans - 1,2
	Dichloroethene, 1,1 -
	Dichloropropane, 1,2 -
	Ethylbenzene
	Ethylene Dibromide
	Formaldehyde
	Mesitylene
	Methylene Chloride
	Styrene
	Tetrachloroethene
	Toluene
	Trichloroethane, 1,1,1 -
	Trichloroethene
	Trichloroethylene, 1,1,2 -
	Trichlorotrifluoroethane
	Trichlorofluoromethane
	Xylenes, M-, P- and O-
	Vinyl Chloride

Schedule "D" - Cont'd

Polycyclic Organic Matter	Dioxin/Furan Isomers
Acenaphthylene	
Acenaphthene	2,3,7,8-Tetrachlorodibenzo-p-dioxin
Anthracene	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
Benzo(a)anthracene	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
Benzo(b)fluoranthene	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
Benzo(k)fluoranthene	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
Benzo(a)fluorene	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
Benzo(b)fluorene	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin
Benzo(ghi)perylene	
Benzo(a)pyrene	2,3,7,8-Tetrachlorodibenzofuran
Benzo(e)pyrene	2,3,4,7,8-Pentachlorodibenzofuran
Biphenyl	1,2,3,7,8-Pentachlorodibenzofuran
2-Chloronaphthalene	1,2,3,4,7,8-Hexachlorodibenzofuran
Chrysene	1,2,3,6,7,8-Hexachlorodibenzofuran
Coronene	1,2,3,7,8,9-Hexachlorodibenzofuran
Dibenzo(a,c)anthracene	2,3,4,6,7,8-Hexachlorodibenzofuran
Dibenzo(a,h)anthracene	1,2,3,4,6,7,8-Heptachlorodibenzofuran
Dibenzo(a,e)pyrene	1,2,3,4,7,8,9-Heptachlorodibenzofuran
9,10-Dimethylanthracene	1,2,3,4,6,7,8,9-Octachlorodibenzofuran
7,12-Dimethylbenzo(a)anthracene	
Fluoranthene	
Fluorene	
Indeno(1,2,3-cd)pyrene	
2-Methylanthracene	
3-Methylcholanthrene	
1-Methylnaphthalene	
2-Methylnaphthalene	
1-Methylphenanthrene	
9-Methylphenanthrene	
Naphthalene	
Perylene	
Phenanthrene	
Picene	
Pyrene	
Tetralin	
M-terphenyl	
O-terphenyl	
P-terphenyl	
Triphenylene	

SCHEDULE "E"

SOURCE TESTING PROCEDURES

1. The Owner shall submit, to the Manager a test protocol including the Pre-Test Information required by the Source Testing Code, at least two (2) months prior to the scheduled Source Testing date.

2. (1) For the purpose of the Source Testing program, the Owner is temporarily permitted to operate the Boilers at a residual oxygen concentration below the performance limit outlined in Condition 6.(2)(b) during the period of the Source Testing. The Owner shall ensure that the concentration of residual oxygen in the Undiluted Gases leaving the combustion zone of the Boilers, as measured and recorded by the CEM System, shall not be less than 5 percent by volume on a dry basis, during this Source Testing program.

   (2) If the Source Testing results demonstrate that compliance with the Performance Requirements can be maintained at a residual oxygen concentration below the performance limit outlined in Condition 6.(2)(b), the Owner may apply to the Director for approval to alter the required residual oxygen concentration.

3. The Owner shall finalize the test protocol in consultation with the Manager.

4. The Owner shall not commence the Source Testing until the Manager has accepted the test protocol.

5. The Owner shall complete the first Source Testing not later than six (6) months after Commencement of Operation of the Facility/Equipment.

6. The Owner shall conduct subsequent Source Testing at least once (1) every calendar year thereafter.

7. The Owner shall notify the District Manager and the Manager in writing of the location, date and time of any impending Source Testing required by this Certificate, at least fifteen (15) days prior to the Source Testing.

8. The Owner shall submit a report on the Source Testing programs to the District Manager and the Manager not later than three (3) months after completing each Source Testing program. The report shall be in the format described in the Source Testing Code, and shall also include, but not be limited to:

   (1) an executive summary;
   (2) records of operating conditions; including process description, records of waste composition and feed rate during the Source Testing;
   (3) all records produced by the CEM Equipment;
   (4) procedures followed during the Source Testing and any deviation from the proposed test protocol and the reasons therefore;
   (5) the results of the analyses of the stack emissions;

(6) a summary table that compares the Source Testing results, the monitoring data and the records of operating conditions during the Source Testing to the requirements imposed by the *EPA*, the Regulation and/or the Performance Requirements;

(7) the results of dispersion calculations in accordance with the *O. Reg. 419/05*, indicating the maximum concentration of the Test Contaminants, at the Point of Impingement.

(8) an updated site wide emission source inventory to assess the aggregate point of impingement concentrations of the Test Contaminants.

9. The Owner shall ensure that the Source Testing Report is made available and easily accessible for review by the public at the Facility, immediately after the document is submitted to the Ministry.

10. The Director may not accept the results of the Source Testing if:

(1) the Source Testing Code or the requirements of the Manager were not followed; or

(2) the Owner did not notify the District Manager and the Manager of the Source Testing; or

(3) the Owner failed to provide a complete report on the Source Testing.

11. If the Director does not accept the results of the Source Testing, the Director may require re-testing.

SCHEDULE "F"

PARAMETER:
Temperature

LOCATION:
The sample point for the Continuous Temperature Monitor shall be located at a point where the temperature in the combustion zone of the Boilers has reached at least 1000°C for a period of not less than one second. Compliance shall be proven by direct measurement or/and a correlation between the measured temperature and the intended target proven by a method acceptable to the Director.

PERFORMANCE:
The Continuous Temperature Monitor shall meet the following minimum performance specifications for the following parameters.

	PARAMETERS	SPECIFICATION
1)	Type:	"K", "J" or other type or alternative measurement device with equivalent measurement accuracy and suitable to the temperature range being measured
2)	Accuracy:	± 1.5 percent of the minimum gas temperature

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor without a significant loss of accuracy and with a time resolution of 1 minutes or better. Temperature readings for record keeping and reporting purposes shall be kept as one-hour average values.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 95 percent of the time for each calendar quarter.

PARAMETER:
Carbon Monoxide

INSTALLATION:
The Continuous Carbon Monoxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (parts per million, ppm):	0 to ≥100 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Carbon Monoxide Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤10 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3) Calibration Error:	≤ 2.5 percent of actual concentration
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 5 percent of span value
7) Span Calibration Drift (24-hour):	≤5 percent of span value
8) Response Time (90 percent response to a step change):	≤180 seconds
9) Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Oxygen

INSTALLATION:
The Continuous Oxygen Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of oxygen in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler and in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (percentage):	0 - 20 or 0 - 25
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Oxygen Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (percentage):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤10 percent of the mean value of the reference method test data
3) Calibration Error:	0.25 percent O_2
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 0.5 percent O_2
7) Span Calibration Drift (24-hour):	≤ 0.5 percent O_2
8) Response Time (90 percent response to a step change):	≤ 90 seconds
9) Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better. Oxygen concentration readings for record keeping and reporting purposes shall be kept as one-hour average values.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Hydrogen Chloride

INSTALLATION:
The Continuous Hydrogen Chloride Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of hydrogen chloride in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (parts per million, ppm):	0 to ≥100 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Hydrogen Chloride Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤ 20 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3) Calibration Error:	≤ 2 percent of actual concentration
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 5 percent of span value
7) Span Calibration Drift (24-hour):	≤ 5 percent of span value
8) Response Time (90 percent response to a step change):	≤ 240 seconds
9) Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated daily at the sample point, to ensure that it meets the drift limits specified above, during the periods of the operation of the . The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 5 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Nitrogen Oxides

INSTALLATION:
The Continuous Nitrogen Oxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of nitrogen oxides in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Analyzer Operating Range (parts per million, ppm):	0 to ≥200 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Nitrogen Oxides Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data
3) Calibration Error:	≤ 2 percent of actual concentration
4) System Bias:	≤4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 2.5 percent of span value
7) Span Calibration Drift (24-hour):	≤ 2.5 percent of span value
8) Response Time (90 percent response to a step change):	≤ 240 seconds
9) Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Sulphur Dioxide

INSTALLATION:
The Continuous Sulphur Dioxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of sulphur dioxide in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1. Range (parts per million, ppm):	0 to ≥100 ppm
2. Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Sulphur Dioxide Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1. Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2. Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data
3. Calibration Error:	≤ 2 percent of actual concentration
4. System Bias:	≤ 4 percent of the mean value of the reference method test data
5. Procedure for Zero and Span Calibration Check:	all system components checked
6. Zero Calibration Drift (24-hour):	≤ 2.5 percent of span value
7. Span Calibration Drift (24-hour):	≤ 2.5 percent of span value
8. Response Time (90 percent response to a step change):	≤ 200 seconds
9. Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Total Hydrocarbons

INSTALLATION:
The Total Hydrocarbons Monitor shall be installed at an accessible location where the measurements are representative of the concentrations of Organic Matter (as methane) in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler and shall meet the following installation specifications.

PARAMETERS		SPECIFICATION
1.	Detector Type:	Flame Ionization
2.	Oven Temperature:	160°C minimum
3.	Flame Temperature:	1800 °C minimum at the corona of the hydrogen flame
4.	Range (parts per million, ppm):	0 to ≥200 ppm
5.	Calibration Gas:	propane in air or nitrogen
6.	Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Total Hydrocarbons Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS		SPECIFICATION
1.	Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2.	Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3.	System Bias:	≤ 4 percent of the mean value of the reference method test data
4.	Noise:	≤ 1 percent of span value on most sensitive range
5.	Repeatability:	≤ 1 percent of span value
6.	Linearity (response with propane in air):	≤ 3 percent of span value over all ranges
7.	Calibration Error:	≤ 2 percent of actual concentration
8.	Procedure for Zero and Span Calibration Check:	all system components checked on all ranges
9.	Zero Calibration Drift (24-hours):	≤ 2.5 percent of span value on all ranges
10.	Span Calibration Drift (24-hours):	≤ 2.5 percent of span value
11.	Response Time (90 percent response to a step change):	≤ 60 seconds
12.	Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better. Measurements of concentrations of organic matter (as methane) shall be kept as 10 minute average values for record keeping and reporting purposes.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER: Opacity

INSTALLATION: The Continuous Opacity Monitor shall be installed at an accessible location where the measurements are representative of the actual opacity of the Undiluted Gases leaving the APC Equipment associated with each Boiler and shall meet the following design and installation specifications.

PARAMETERS		SPECIFICATION
1)	Wavelength at Peak Spectral Response (nanometres, nm):	500 - 600
2)	Wavelength at Mean Spectral Response (nm):	500 - 600
3)	Detector Angle of View:	≤ 5 degrees
4)	Angle of Projection:	≤ 5 degrees
5)	Range (percent of opacity):	0 -100

PERFORMANCE:
The Continuous Opacity Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS		SPECIFICATION
1)	Span Value (percent opacity):	2 times the average normal opacity of the source
2)	Calibration Error:	≤3 percent opacity
3)	Attenuator Calibration:	≤2 percent opacity
4)	Response Time (95 percent response to a step change):	≤ 10 seconds
5)	Schedule for Zero and Calibration Checks:	daily minimum
6)	Procedure for Zero and Calibration Checks:	all system components checked
7)	Zero Calibration Drift (24-hours):	≤ 2 percent opacity
8)	Span Calibration Drift (24-hours):	≤ 2 percent opacity
9)	Conditioning Test Period:	≥ 168 hours without corrective maintenance
10)	Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated, to ensure that it meets the drift limits specified above, during the periods of the operation of the Equipment. The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 30 seconds or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Moisture, Hydrogen Fluoride and Ammonia

Selection and Installation

The Owner shall select and install a CEM System, to measure moisture content of the stack gases, the concentration of hydrogen fluoride and ammonia in the Undiluted Gases leaving the APC Equipment associated with each Boiler, as follows:

a) Design and Performance Specifications shall be in accordance with 40 CFR 60, Appendix B, Specification 4.

b) The Owner shall select the probe locations in compliance with 40 CFR 60, Appendix B, Specification 2.

Test Procedures

The Owner shall verify compliance with the Design and Performance Specifications in accordance with 40 CFR 60, Appendix B, Specification 4, with the reference method for the relative accuracy test being Method 4. of the Source Testing Code.

In furtherance of, but without limiting the generality of the foregoing, the mean difference between the calibration gas value and the analyzer response value at each of the four test concentrations shall be less than 5 percent of the measurement range.

SCHEDULE "G"

A stormwater management facility to service a 10.0 ha drainage area of the Durham York Energy Centre located on the west side of Osbourne Road and north of the CN Rail, Lot 27, Concession Broken Front, Part, Municipality of Clarington, Regional Municipality of Durham, designed to provide quality and quantity control of stormwater run-off by attenuating runoff from storm events up to 1:100 years return frequency to or below the pre-development levels, consisting of:

East Stormwater Management Pond (East SWM Pond)

A stormwater management facility to service a 5.7 ha drainage area comprising of the eastern part of the Durham York Energy Centre consisting of the following:

- one (1) approximately 128 m long drainage ditch collecting stormwater runoff from the north eastern part of the site, having an average horizontal slope of 1.56%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- one (1) approximately 199 m long drainage ditch collecting stormwater runoff from the eastern part of the site, having an average horizontal slope of 2.77%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- approximately fourteen (14) catch basins/maintenance holes and a total of 466.8 m long 450 mm diameter and 34.6 m of 600 mm diameter corrugated PE stormwater sewers conveying stormwater runoff collected from the north and north eastern part of the site, discharging to a forebay of a wet extended detention stormwater management pond described below;

- one (1) forebay with approximate bottom dimensions of 11.0 m wide and 34.8 m long and depth of 1.0 m, equipped with 600 mm diameter corrugated HDPE inlet pipe, a rip-rap covered inlet structure, and a forebay berm with top elevation of 95.0 m masl, discharging to a wet extended detention pond described below;

- one (1) wet extended detention stormwater management pond located at the south east part of the site, with approximate bottom dimensions of 21.0 m wide and 71.4 m long and a maximum depth of 2.7 m at 96.70 m masl elevation, having side slopes of 3H:1V and 5H:1V near the outlet structure, providing a permanent pool storage capacity of 1,008 m^3 at elevation 95.0 m masl, an active storage capacity of 3,099 m^3 at 96.70 m masl elevation, and total storage capacity of 4,107 m^3, equipped with an outlet structure consisting of a 150 mm diameter reverse slope inlet pipe with a gate valve and a 450 mm diameter perforated pipe riser fitted with 75 mm diameter orifice plate, a 75 mm diameter maintenance discharge pipe with a gate valve, and an emergency overflow structure at elevation 97.0 m masl, discharging through a 450 mm diameter outlet pipe to existing swale along the northern side of the CN Rail line to Tooley Creek and eventually to Lake Ontario;

West Stormwater Management Pond (West SWM Pond)

A stormwater management facility to service a 4.3 ha drainage area comprising of the western part of the Durham York Energy Centre consisting of the following:

- one (1) approximately 296 m long drainage ditch collecting stormwater runoff from the north western part of the site, having an average horizontal slope of 1.0%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- approximately five (5) catch basins/maintenance holes and a total of 272.2 m long 450 mm diameter corrugated PE stormwater sewers conveying stormwater runoff collected from the western part of the site, discharging to a forebay of a wet extended detention stormwater management pond described below;

- one (1) forebay with approximate bottom dimensions of 13.0 m wide and 26.0 m long and depth of 1.0 m, equipped with 450 mm diameter corrugated HDPE inlet pipe, a rip-rap covered inlet structure, and a forebay berm with top elevation of 95.0 m masl, discharging to a wet extended detention pond described below;

- one (1) wet extended detention stormwater management pond located at the south western part of the site, with approximate bottom dimensions of 13.0 m wide and 58.0 m long and a maximum depth of 2.5 m at 96.5 m masl elevation, having side slopes of 3H:1V and 5H:1V near the outlet structure, providing a permanent storage capacity of 623 m^3 at elevation 95.0 m masl, an active storage capacity of 2,054 m^3 at 96.50 m masl elevation, and total storage capacity of 2,677 m^3, equipped with an outlet structure consisting of a 150 mm diameter reverse slope inlet pipe with a gate valve and a 450 mm diameter perforated pipe riser fitted with 75 mm diameter orifice plate, a 75 mm diameter maintenance discharge pipe with a gate valve, and an emergency overflow structure at elevation 96.80 m masl, discharging through a 450 mm diameter outlet pipe to existing swale along the northern side of the CN Rail line to Tooley Creek and eventually to Lake Ontario;

including all associated controls and appurtenances.

The reasons for the imposition of these terms and conditions are as follows:

GENERAL

Conditions 1.(1), (2), (5), (6), (7), (8), (9), (10), (11), (12), (13), (17), (18) and (19) are included to clarify the legal rights and responsibilities of the Owner.

Conditions Nos.1.(3) and (4) are included to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

Condition No. 1.(14) is included to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.

Condition No.1.(15) is included to restrict potential transfer or encumbrance of the Site without the notification to the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Certificate.

Condition No. 1.(16) is included to ensure that the appropriate Ministry staff has ready access to the operations of the Site which are approved under this Certificate. The Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *EPA*, the *OWRA*, the *PA*, the *NMA* and the *SDWA*.

SERVICE AREA, APPROVED WASTE TYPES, RATES and STORAGE

Condition No. 2. is included to specify the approved waste receipt rates, the approved waste types and the service area from which waste may be accepted at the Site based on the Owner's application and supporting documentation. Condition No. 2. is also included to specify the maximum amount of waste that is approved to be stored at the Site.

SIGNS and SITE SECURITY

Condition No. 3. is included to ensure that the Site's users, operators and the public are fully aware of important information and restrictions related to the operation of the Site. Condition No. 3. is also included to ensure that the Site is sufficiently secured, supervised and operated by properly trained personnel and to ensure controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site personnel is on duty.

SITE OPERATIONS

Condition No. 4. is included to outline the operational requirements for the Facility to ensure that the said operation does not result in an adverse effect or a hazard to the natural environment or any person.

EQUIPMENT and SITE INSPECTIONS and MAINTENANCE

Condition No. 5. is included to require the Site to be maintained and inspected thoroughly on a regular basis to ensure that the operations at the Site are undertaken in a manner which does not result in an adverse effect or a hazard to the health and safety of the environment or any person.

PERFORMANCE REQUIREMENTS

Condition No. 6 is included to set out the minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the Facility.

TESTING, **MONITORING** and **AUDITING**

Condition No. 7. is to require the Owner to gather accurate information on the operation of the Facility so that the environmental impact and subsequent compliance with the *EPA*, the *OWRA*, their Regulations and this Certificate can be verified.

NUISANCE IMPACT CONTROL and HOUSEKEEPING

Condition No. 8. is included to ensure that the Site is operated and maintained in an environmentally acceptable manner which does not result in a negative impact on the natural environment or any person. Condition No. 8 is also included to specify odour control measures to minimize a potential for odour emissions from the Site.

STAFF TRAINING

Condition No. 9. is included to ensure that staff are properly trained in the operation of the equipment and instrumentation used at the Site, in the emergency response procedures and on the requirements and restrictions related to the Site operations under this Certificate.

COMPLAINTS RECORDING PROCEDURE

Condition No.10. is included to require the Owner to respond to any environmental complaints resulting from the Facility appropriately and in a timely manner and that appropriate actions are taken to prevent any further incidents that may cause complaints in the future.

CONTINGENCY and EMERGENCY RESPONSE PLAN and EMERGENCY SITUATIONS RESPONSE AND REPORTING

Conditions Nos.11. and 12. are included to ensure that the Owner is prepared and properly equipped to take immediate action in the event of an emergency situation.

SUBMISSIONS to the REGIONAL DIRECTOR or DISTRICT MANAGER

Condition No. 13. is included to set out the requirements for the submissions to the District Manager and the Regional Director regarding the operation of the Facility and the activities required by this Certificate.

RECORDS KEEPING

Condition No.14. is included to ensure that detailed records of Site activities, inspections, monitoring and upsets are recorded and maintained for inspection and information purposes.

REPORTING

Condition No.15. is to ensure that regular review of site, operations and monitoring is carried out and findings documented by a third party for determining whether or not the Site is being operated in compliance with this Certificate of Approval, the EPA and its regulations and whether or not any changes should be considered.

PUBLIC ACCESS to DOCUMENTATION

Condition No.16. is included to ensure that the public has access to information on the operation of the Site in order to participate in the activities of the Advisory Committee in a meaningful and effective way.

ADVISORY COMMITTEE

Condition No.17. is included to require the Owner to establish a forum for the exchange of information and public dialogue on activities carried out at the Site and to ensure that the local residents are properly informed of the activities at the Site and that their concerns can be heard and acted upon , as necessary. Open communication with the public and local authorities is important in helping to maintain high standards for the operation of the Site and protection of the natural environment. Condition 16. is also included to ensure that the requirements of the EA Approval are fulfilled.

CLOSURE of the SITE

Condition No.18. is included to ensure that the final closure of the Site is completed in accordance with Ministry's standards.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, and in accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written Notice served upon me, the Environmental Review Tribunal, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act and Section 101 of the

Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 9 and 39, *Environmental Protection Act*
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted site is approved under Section 9 and Section 27 of the Environmental Protection Act and Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 28th day of June, 2011

Signature
Ian Parrott, P .Eng.
Director
Section 9, *EPA*
Section 39, *EPA*
Section 53, *OWRA*

MW,QN,SH/

c: District Manager, MOE York-Durham
Regional Director, MOE Central Region

APPENDIX D

Odour Data

Initial Issue: August 2011
Revised: December 2014

DURHAM-YORK ENERGY CENTRE

Odour Management and Mitigation Plan

Submitted to:
Ontario Ministry of the Environment
Director - CENTRAL REGION OFFICE
Place Nouveau
8th Floor
5775 Yonge Street
Toronto, Ontario
M2M 4J1

REPORT

Report Number: 10-1151-0343-Odour

Distribution:

Electronic copy - Ontario Ministry of the Environment, Central Region Office

Electronic copy - Golder Associates Ltd., Mississauga, Ontario

Golder Associates

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D ENV 003 DYEC - Fugitive Dust and Odour Control

Maintenance Schedule for Odour Management:

See DYEC Operations & Maintenance Plan

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Periodic Inspection Form

APPENDIX C
Durham-York Energy Centre Odour Complaint Form

APPENDIX D
Odour Mitigation Log

1.0 INTRODUCTION

Under the Environmental Assessment Act – Notice to Proceed with Undertaking EA File No. 04-EA-02-08 (Section 18), an Odour Management and Mitigation Plan (OMMP or the Plan) is required prior to construction of the Durham York Energy Centre (DYEC) or by such other date as agreed to in writing by the Director. This OMMP becomes effective upon initial receipt of non-hazardous municipal solid waste is received by the DYEC, The OMMP includes the following:

1) Operating and shut down procedures for odour control;

2) Maintenance schedules;

3) Ongoing monitoring for and reporting of odour;

4) Corrective action measures and other best management practices for ongoing odour control and for potential operational malfunctions;

5) A schedule for odour testing at sensitive receptors; and

6) A section that specifically addresses odour control measures should operation of the undertaking be disrupted or cease.

In June 28, 2011, the DYEC obtained a multimedia Certificate of Approval (CofA) **7306-8FDKNX** with OMMP requirements including the following:

i) identification of all potential DYEC sources of odorous emissions;

ii) description of the preventative and control measures to minimize odorous emissions from the identified sources;

iii) procedures for the implementation of the Odour Management and Mitigation Plan;

iv) inspection and maintenance procedures to ensure effective implementation of the Odour Management and Mitigation Plan; and

v) procedures for verification and recording the progress of the implementation of the Odour Management and Mitigation Plan.

The OMMP is a live document, to be updated based on revisions to the DYEC operations.

Further, under the CofA, performance requirements were also added to the OMMP, namely that the maximum 10-minute odour impact at the most sensitive receptor does not exceed 1 odour unit. This plan also has been revised to reflect MOE comments of December 2, 2011 on the pre-construction publication of the OMMP and in conformance with the ongoing detailed design and the Durham/York Energy from Waste Complaint Protocol for Design, Construction & Operations (the Waste Complaint Protocol).

This Plan follows the following structure:

- Section 2 provides a brief description of the DYEC;
- Section 3 identifies the responsibilities of staff at DYEC with respect to this OMMP;
- Section 4 discusses odour control during normal operations;
- Section 5 addresses routine maintenance and inspection;
- Section 6 addresses monitoring, recording and reporting procedures;
- Section 7 addresses odour management procedures during shutdown or disruption of operations; and
- Section 8 presents odour complaint management requirements.

2.0 FACILITY DESCRIPTION

The Facility will accept Solid Waste from the Regions of Durham and York. The sources of waste are post-diversion residual waste collected at curbside as well as any residual waste materials collected at public drop-off centers and transfer stations. The only institutional, commercial, and industrial (IC&I) waste to be managed at the Facility will be residual waste where the Regions' will have waste management procedures in place.

The maximum thermal treatment rate for the facility established by the Certificate of Approval is 140,000 tonnes/year of waste. The Facility will operate on a continuous basis; 24 hours/day, seven (7) days/weeks, 365 days/year. Waste may be delivered six (6) days per week between 7:00am to 7:00pm. The proposed operating schedule may vary depending on demand and Facility needs.

The Facility consists of two (2) thermal treatment trains, each equipped with independently operated boilers/furnaces and air pollution control equipment. The treated exhaust gases are vented to a common 87.6 m stack and released into the atmosphere.

Waste will only be accepted from approved haulers that have a valid waste licence except for municipal or exempt vehicles as per Section 16(2) (a) of Regulation 347 *General – Waste Management*, made under the *Environmental Protection Act*, R.S.O. 1990. All incoming waste vehicles must proceed to a weigh scale to allow the vehicle weight, waste type and source to be recorded by the scale operator. A maximum of 7,350 cubic metres of waste storage will be provided in the storage pit with waste stored above and below the tipping floor level.

The facility will be designed to draw all combustion air from above the storage pit. This will maintain a negative pressure in the tipping building (i.e., building containment) and help prevent the escape of dust and odour from the Facility. When the entrance/exit doors are closed during non-delivery hours, combustion air will be admitted to the tipping area from outside the building through manually operable louvers in the tipping building walls.

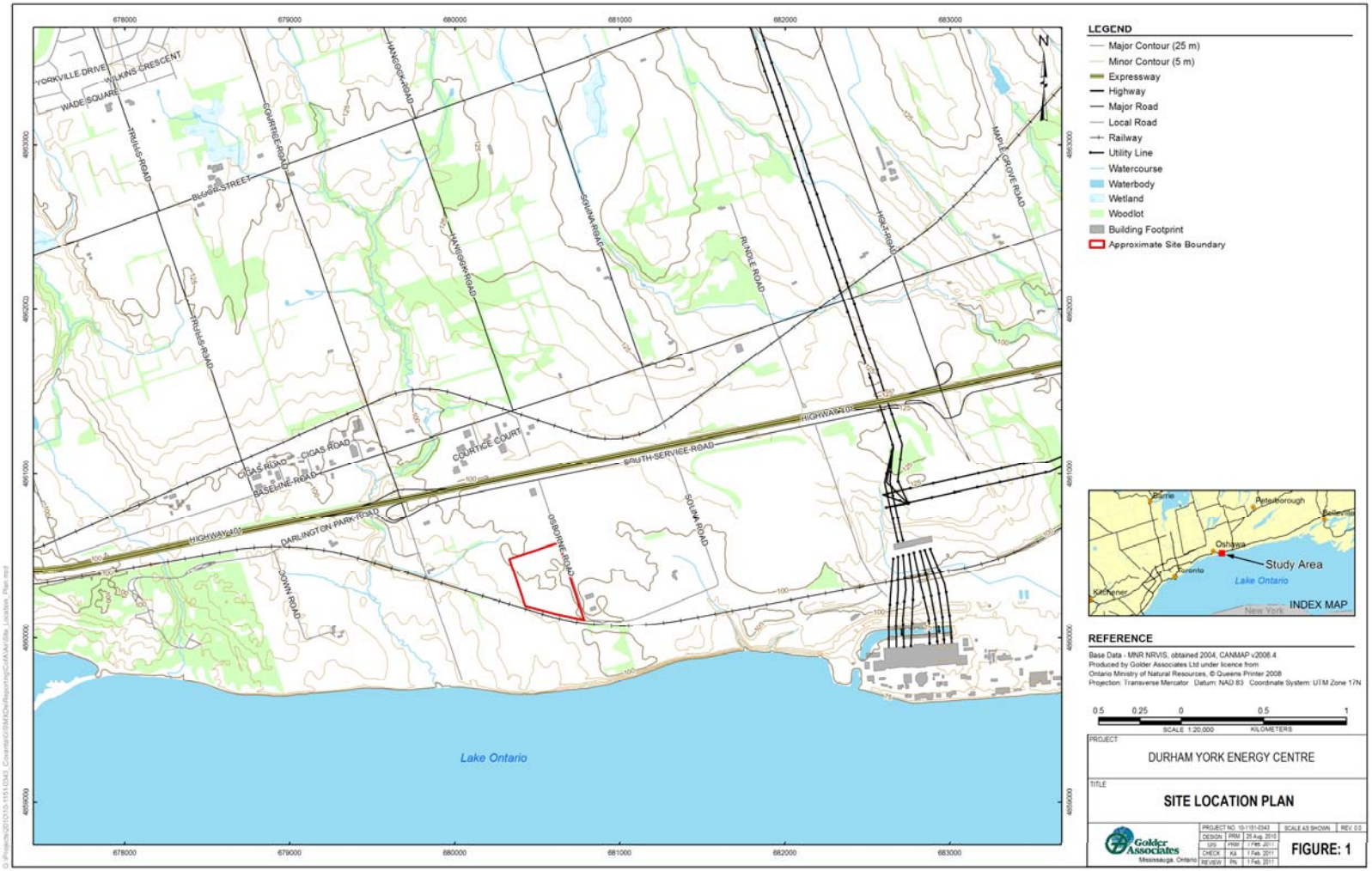
Table 1 presents general information about the Facility relevant to this Plan.

Table 1: Facility Description

Facility:	**Durham-York Energy Centre**
Location:	72 Osbourne Road, Courtice, Ontario, L1E 2R2 Clarington Energy Business Park, Clarington, Ontario
Main activities / equipment used:	Thermal Treatment of Solid Waste
Production:	140,000 tonnes/ year (MCR) 218 tonnes /day per unit @ 13 MJ/kg.
Predominant wind direction:	Northwest

The location of the facility is presented in Figure 1.

Figure 1: Location of Durham-York Energy Centre



3.0 RESPONSIBILITIES

The following identifies the responsibilities held by each of the employment levels at the Facility as they pertain to this Plan.

3.1 Facility Manager or designated official

The Facility Manager, or designate, is responsible for:

- reviewing the effectiveness of the current odour control measures at the Facility; and
- ensuring the required resources are in place to execute the plan.

3.2 Facility Environmental Specialist or designated official

The Facility Environmental Specialist, or designate, is responsible for:

- reviewing the effectiveness of the current odour control measures at the Facility;
- maintaining documentation of schedules and logs; and
- ensuring the training of site personnel and contractors on the plan and best management practices to be implemented.

3.3 Shift Supervisor or designated official

The Shift Supervisor is responsible for:

- reviewing the effectiveness of the current odour control measures at the Facility;
- implementing odour control measures; and
- scheduling and coordinating the implementation of odour control measures.

3.4 Site Personnel and Contractors

All Site Personnel and Contractors are responsible for:

- reviewing the effectiveness of the current odour control measures at the Facility; and
- following the odour control procedures that are currently in place.

Odour control measures will be reviewed and implemented according to Standard Operating Practices identified by D ENV 003 DYEC – Fugitive Dust and Odour Control and those contained in the DYEC Maintenance Plan.

4.0 NORMAL OPERATIONS ODOUR CONTROL

The application of good working practices and process control is of fundamental importance in eliminating and minimising the quantities of odours formed on site and their subsequent release to atmosphere. Containment and mitigation of odour at the source through operating procedures is proven and effective. The overall aim in the operation of the DYEC is to apply Best Management Practices at all stages of the waste treatment processes undertaken on site.

4.1 Identification of the Sources of Odour Emissions

The following sections explain mitigation procedures for potential DYEC odour sources during normal operations of the Facility. Once the odorous compound is emitted, its travelling distance from the source is affected by various parameters (e.g., wind speed and direction, building wake impacts).

Waste processed may include odorous substances. Potential odour emissions sources include:

- truck transportation of waste onto the site;
- handling and storage of waste in the Tipping Building; and
- thermal treatment of waste on-site.

4.2 Truck Transportation onto the site

A primary potential source of odour at the Facility is the waste delivery trucks entering or queuing to enter the plant.

The Regions have advanced waste management programs for source separation and diversion of waste from landfills. Specifically, the diversion of household organic waste will reduce the amount of potential odour generating waste from reaching the Facility.

Waste will be delivered to the Facility in standard packer vehicles or covered transfer trailers from Regional Transfer stations. Upon entering the Facility, trucks would be directed to an automated truck scale to maintain an accurate accounting of all refuse delivered to the Facility. Waste delivery vehicles would be present on-site (queuing) for a short duration. An objective of Facility design and operations will be to minimize queuing time to as short as possible.

Any waste that potentially falls off the trucks will be picked up and moved to the Tipping Building for disposal as soon as practicable. The facility sweeper truck will clean up the internal roads on a regular basis.

4.3 Handling and Storage of Waste during Normal Operations

All transfer trucks will be covered until they enter the Tipping Building, reducing the potential for the release of odour emissions. The tipping floor shall be totally enclosed with an overhead entrance door and sliding exit door. The entrance door will be approximately 4.9m wide x 5.5 m high. Entrance and exit doors will be designed to open and shut quickly. The tipping area general arrangement shall be designed to allow for the trucks to back-in toward the pit. The exit door shall be on the opposite side of the tipping floor from the entrance. The exit door (11m wide x 5.5m high) is designed to open widely to allow trucks to back into and exit the far west tipping bays safely.

Four tipping bays will allow simultaneous discharge of refuse from multiple vehicles into the refuse pit. Trucks entering the tipping enclosure are directed to a specific tipping bay by a tipping floor operator and discharge their waste into the pit or periodically per CofA requirements, onto the floor for inspection by the tipping floor operator. Any unacceptable waste is removed and placed in the appropriate bunker in the Residue Building or area within the Tipping Building for disposal. Storage requirements are stipulated in the CofA Section 2.

Under normal operating conditions one or two combustion trains will be on line. All combustion air will be drawn through the Tipping Building by the thermal treatment units' combustion air fans to combustion air inlet ducts above the storage pit. This will keep Tipping Building and refuse storage pit under negative pressure and prevent fugitive dust and odour from escaping into the environment. Potential malodorous air will be drawn into the furnace and destroyed. The combustion air will be introduced into the furnaces thereby subjecting these pollutants to direct flame, high temperature oxidation. The louvers in the Tipping Building are typically closed during truck deliveries to ensure adequate air flow velocities at the entrance/exit doors. When the entrance/exit doors are closed during non-delivery hours, combustion air will be admitted to the Tipping Building from outside the building through manually operable louvers in the Tipping Building walls.

4.4 Preventative and Control Measures at the Facility

Preventative and control measures will minimize potential odour impacts.

For purpose of this OMMP Plan, the following definitions apply:

- Preventative Measures - include types of measures that provide control through preventative actions such as operational practices; and
- Reactive (Control) Measures - include types of measures needed to accommodate unanticipated circumstances.

Table 2 presents description of preventative and control measures for odour emissions at the Facility.

Table 2: Description of Odour Preventative Control Measures Durham-York Energy Centre

Emission Source	Potential Source of Odour	Control Measures / Preventative Procedure
Trucks	➢ the queue time of trucks onsite ➢ Waste falling off trucks	➢ Minimize the queue time through effective delivery protocols ➢ If necessary, communication with Transfer Stations to divert trucks to designated locations. ➢ Regional and facility staff will monitor trucks visually and record drivers that do not follow protocol. Drivers will be assessed penalties for coming on to the site with uncovered vehicles. ➢ Fallen waste will be recovered and moved to the Tipping Building.
Waste Storage	➢ Outside storage ➢ Unacceptable waste	➢ Waste will not be stored outside of the Tipping building ➢ Unacceptable waste or waste under examination will be diverted to the Tipping Building. Rejected Waste will be reclaimed and transferred to a suitable location in a covered truck or container based on Regional/Facility SOPs
Tipping Building / Refuse Storage Building	➢ Fugitive odours	➢ Tipping building entrance and exit doors will be closed when waste is not being delivered ➢ Combustion Air Fans will continuously draw combustion air from the Tipping Building and Refuse Storage Building into the furnaces where the thermal treatment process will destroy any odour. ➢ An alarm will alert the control room when combustion air flow into the thermal treatment units drops below low level requiring Tipping Building air inlet investigation and possible adjustment.
Both thermal treatment trains have an unexpected outage lasting a prolonged period	➢ Both the facility thermal treatment units are off-line for an extended period	➢ Facility staff will communicate with Regional transfer stations to divert trucks from the Facility ➢ Trucks on-site will be diverted to appropriate locations ➢ Entrance and exit doors to the Tipping Building and louvers will be closed to prevent fugitive odour escape. ➢ ID Fans will continue to operate and convey air from the Tipping Building to the stack. ➢ In unusual case scenario of both units being off line for an extended period, waste in the pit may be recovered and transferred in a covered haul truck to appropriate disposal areas.

4.5 Implementation Schedule for the OMMP Plan

All of the prevention and control measures listed in Table 2 will be implemented at the Facility prior to commercial operations. Facility personnel will also undergo training as described in Section 5.4 to ensure they are aware of the requirements of the OMMP and the CofA prior to commercial operations.

5.0 INSPECTION AND MAINTENANCE

Planned maintenance and inspection is crucial to maintaining the effectiveness of odour control measures. DYEC will ensure the good performance of all plant processes and equipment. An effective, planned inspection and preventative maintenance regime will be used on all odour-critical plant and equipment, as specified below. This will include:

- a written maintenance programme; and
- a record of maintenance.

A maintenance schedule of all facility equipment is included as part of the facility Operations and Maintenance Manual. A list of spare parts required and the procedure for re-ordering will be developed as part of DYEC Maintenance Management System.

5.1 Maintaining Negative Pressure

In order to prevent odours being released to the environment, it is essential that the integrity of the Tipping Building is regularly maintained. The operation of roller doors will be checked routinely, as well as the operation of the louvers.

The combustion airflows used in each of the two thermal treatment units will be monitored continuously to ensure proper airflow through the Tipping Building is maintained, with louver position being adjusted as necessary.

5.2 Inspection Frequency and Checklists

An inspection of the conformity with the OMMP will be documented using the Odour Control Inspection Form located in Appendix B. Corrective action will be taken to eliminate the causes of the non-conformance. All deficiencies identified in inspections will be addressed as soon as possible.

Table 3 provide a summary of the inspections that take place at the site under this Plan and the inspection frequency. Table 4 presents a summary of the forms that will be used to support ongoing conformity with preventative and control measures described in Table 2 for each emission source.

Table 3: Inspection Frequency

Inspection Type	Frequency
Entrance and Exit Doors	Daily
Combustion Air Flow to the Thermal Treatment Units	Continuously Recorded as part of plant data acquisition system
Odour Control Inspection Form	Monthly or as complaints dictate
Haul Truck Inspection Form	Random, One truck per day
Waste Storage Inspection Form	Weekly
Activity Logs	Daily

Table 4: Inspection Documentation

Documentation	Document Control / Recordkeeping
Odour Control Inspection Forms	7 years
Haul Truck Inspection Forms	
Waste Storage Inspection Forms	
Activity Logs	

As part of recordkeeping procedures, the above information should be recorded in electronic files and hard copies and maintained for a minimum period of seven (7) years. The Environmental Specialist at the Facility will be responsible for recordkeeping.

In addition, the Facility will have routine equipment maintenance inspection for the operation of the Facility as part of the Facility Operating and Maintenance Manual.

5.3 OMMP Plan Review and Continuous Improvement

Inspections and monitoring procedures will assist Facility personnel in maintaining of an effective OMMP. The OMMP will be reviewed and updated, as follows:

- if there are significant changes in the odour emissions sources or in DYEC operations;
- periodically, every five years (minimum); and
- if there are verified complaints associated with odour emissions from the Facility.

Review of the OMMP is intended to evaluate the effectiveness of the odour control practices and focus on the identification of improvement opportunities that can reduce the possibility of the release of fugitive odour emissions.

5.4 Training

As part of maintaining OMMP for controlling and preventing odour emissions, Facility staff will be trained to identify odour concerns. The training will cover:

- the control techniques in place for managing odour and how to maintain them; how to conduct a odour observation check and fill out the associated paperwork;
- what to do in the case of an unexpected odour release; and
- who to notify of any concerns or problems pertaining to odour.

Refresher training will be provided as necessary, based on changes to the odour emission control techniques. DYEC will identify site personnel and contractors that are to receive training on the requirements of this Plan. Training will be provided by the DYEC Environmental Specialist or designated official operations.

6.0 MONITORING, RECORDING AND REPORTING

This section of the OMMP sets out the monitoring procedures that will be implemented, during normal operations, to assess the effectiveness of operational practices to prevent and contain odours, and to assess the nature and extent of an odour problem should it arise.

During normal operating hours, all staff are responsible to report any abnormal odour emissions at the site. If an abnormal odour is observed by Facility staff, the Supervisor will implement reactive measures to determine the root cause of the odour. DYEC developed Standard Operating Procedures (SOP) which are part of the Facility Operations and Maintenance Manual to react to and mitigate the situation. Please refer to the Waste Complaint Protocol and the SOP developed for the DYEC for procedures on recording complaints. The SOP will:

- Identify records to be kept, including documentation of maintenance and control parameters;
- Identify weather monitoring records to be kept; and
- Identify the odour complaint recording and investigation procedure.

6.1 Overview of Monitoring Plan

DYEC will monitor combustion air flow rates, adjust Tipping Building louvers as necessary and maintain equipment to meet the odour control requirements of the CofA. To evaluate the performance of control measures and reaction measures in use at the DYEC, the following monitoring will be carried out:

a) Continuous monitoring of combustion airflow by each unit;

b) Daily monitoring of weather forecasts and on-site meteorological data; and

c) Monitoring of complaints and other forms of community feedback.

The following parts of this section give further detail on how this monitoring would be carried out.

6.1.1 Monitoring of Combustion Airflow

The continuous monitoring of the combustion airflow rate through the Tipping Building is a surrogate for determining whether negative pressure is being maintained within the building. Air flow devices such as a venturi with pressure transducers will be installed in the combustion air duct work to continuously measure and record flow. An alarm indicator in the control room will alert the control room operator of low combustion air flows.

6.1.2 Monitoring of On-site Meteorological Data

The monitoring of real-time meteorological data is an effective tool in the management of potential odorous emissions from the facility. Certain meteorological conditions, such as cold conditions combined with low wind speeds, can result in poor dispersion of fugitive waste odours should odours be released. This can potentially lead to an increased risk of odour annoyance at sensitive receptors. The DYEC will have access to two meteorological stations, as described in the Ambient Air Monitoring Plan submitted to the MOE. These two stations automatically record atmospheric conditions at upwind and downwind locations and will aid in predicting adverse conditions for the dispersion fugitive odours. The meteorological data will be used to:

- predict periods when poor dispersion of released odours are likely to occur;
- predict where odour impacts could potentially occur during the time of abnormal events; and
- investigate odour complaints or to verify community observations.

The meteorological stations will be sited and operated according to MOE's *Operation Manual for Air Quality Monitoring in Ontario, 2008.*

Should these stations be decommissioned, DYEC staff will select a public station in consultation with MOE.

6.1.3 Complaints Monitoring

Complaint data are the single most important tool for assessing the overall level of odour impacts experienced by members of the public at locations outside the site boundary. It is vital to record and act upon complaints received, and communicate the outcome of investigations to complainants. DYEC will implement a system of complaint monitoring and analysis in accordance with the Waste Complaint Protocol. Additionally, odour complaints will be collected, registered and validated as described in Section 8.0 of this OMMP. DYEC will summarise any validated complaints annually or as requested by the MOE.

6.1.4 Recording of Results

DYEC will maintain records of all monitoring carried out under this OMMP, including records of the taking and analysis of samples, instrumental measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data. The odour assessment will include odour modelling in comparison to Ontario air quality standards. The records will be retained, as required by the CofA.

Odour modelling will be carried out using the source odour concentrations obtained in accordance with Section 6.2. Modelling will follow the same methodology as described in the C of A Schedule "B".

6.2 Source Odour Sampling

The principle source of potential odours from DYEC during operations will be fugitive odour from the Tipping Building/Storage Pit. Odours are controlled at this location since all combustion air utilized by the boilers/furnaces are drawn from this building. This will maintain a negative pressure in the tipping building (i.e., building containment) which prevents the escape of dust and odour from the Facility. Organics and dust contained are subsequently destroyed in the furnace and controlled by the post-combustion air pollution control system. Potential odours generated from haul trucks will be minimal since all trucks entering DYEC must be covered. Additionally, as the facility is designed to minimize onsite queuing before waste is stored in the Tipping building, fugitive odours will be minimal. In addition, DYEC will have a response team to clean up any onsite spillage from the trucks. No odours are also expected from the top of the stack as complete combustion in the furnace will have destroyed any odourous organics. DYEC will carry out representative odour sampling at the Tipping Building following the Draft Ontario Source Testing Code Version #3 (2010), "Method ON-6. – Determination of Odour Emissions from Stationary Sources" which includes the requirement for a pre-test plan to be submitted and approved by the MOE Standards Development Branch.

Triplicate odour samples will be collected on the charging floor during normal operating conditions after Commercial Operations of the DYEC have started. Samples will be taken with the aid of an "evacuated lung" and samples will be evaluated using dynamic olfactometry with a panel of eight (8) human assessors (e.g., odour panel evaluation technique).

The evacuated lung method will be used since temperatures in the Tipping Building will not be elevated (i.e. ~25C) with low relative humidity.

6.3 Annual Reporting

DYEC shall prepare and submit annual Odour Management and Mitigation Monitoring Reports (OMMMR) to the York Durham Regional Director, with the first report submitted beginning six months following the initial acceptance of non-hazardous municipal solid waste at the site or such other date agreed to with the Director. The reports shall be submitted every 12 months until such time that the Director notifies DYEC that the OMMMR are not required.

The OMMMR will be posted on the DYEC website when finalized.

7.0 SHUT-DOWN OR DISRUPTION OF OPERATIONS

As identified in Section 4.1, a potential source of odours is the delivery of waste trucks to the Facility. During periods of facility wide disruptions or shut-downs, waste trucks will be diverted from the Facility to other sites based on a SOP developed between the Facility and the transfer stations which are operated by the Regions.

Storage and handling of waste can also lead to potential odour emissions during shut-down or disruptions. During periods when both combustion units are offline, procedures will ensure that any odour from the waste in the storage pit will be contained and/or mitigated. This will include:

- minimization or diversion of waste in the pit; and
- ensuring all doors and louvers remain closed, and all other means as required.

During these periods of disruption or shut-down, odour monitoring efforts will be increased such as having trained staff qualitatively monitor the downwind perimeter of the site for odours. In the unusual case where both units are offline with no reasonable expectation to be returned to service in the near future, and odours generated from the waste are unable to be contained, the facility will transfer the waste to an alternate disposal site.

7.1 Actions in the Event of Abnormal Emissions

In the event that monitoring indicates that abnormal odour events from the DYEC are occurring, the site management team would take the following actions:

- check relevant items of odour control equipment to identify possible cause of the abnormal event (for example, door failure or drop in combustion airflow, etc);
- cease the activity causing the abnormal situation, if necessary;
- as appropriate, take immediate steps to eliminate the cause of the abnormal odour event in accordance with the measures outlined within this OMMP;
- record response to alarm and remedial action taken; and
- Follow DYEC internal procedures to advice of possible complaints with details of the problem.

8.0 ODOUR COMPLAINT RESPONSE PROCEDURE

DYEC has a comprehensive system of monitoring and inspection to check that all odour control measures are functioning effectively. However, in the event that an odour complaint is received, it is important that complaints are properly and systematically addressed and resolved.

As required by the CofA, DYEC will maintain a register of all complaints. Administrative arrangements will be put in place for the DYEC to efficiently record complaints, validation of complaints, and resolution of complaints where necessary and to produce summary reports on complaints. In all cases managers shall ensure that all complaints have been adequately handled and that any measures necessary to prevent a recurrence have been put in place.

8.1 Complaints Management and Registration

8.1.1 Publicising Contact Details for Odour Complaints

In conformance with the Waste Complaint Protocol, members of the public are able to contact DYEC with any odour complaints about the Facility by the following means:

- By telephone (during business hours) – toll free 1-800-667- 5671
- By telephone (during after hours) – toll free project number 1-800-667-5671 to be answered by an automated system which will direct the caller appropriately if it is an Emergency or request that the caller leave the pertinent information which will be immediately transferred as a voice recording to dedicated email addresses of the EFW Project Team. By email to info@durhamyorkwaste.ca
- By mail to:

  The Regional Municipality of Durham
  c/o EFW Project Team
  605 Rossland Road East
  Whitby, ON L1N 6A3

  Or

  The Regional Municipality of York
  c/o EFW Project Team
  17250 Yonge Street
  Newmarket, ON L3Y 6Z1

- via the project website at: http://www.durhamyorkwaste.ca/
- Or by fax: Durham 905-666-6206 York 905-830-6927.

Once a complaint has been received and the details collected, the complaint must be processed. DYEC will maintain a record and log of all complaints received. In the event that DYEC receives a complaint alleging potential odour nuisance from the Facility:

- the complaint will be fed into the registration system;
- complaint data will be recorded in a systematic way, enabling comparison with standard odour descriptors, with wind direction and with site work activities;
- the EFW Project team will report to the other members including but not limited to the Municipality of Clarington and Regional Municipality of Durham by phone or e-mail during office hours upon the receipt of the complaint; and
- DYEC will report to the District Manager by phone or e-mail during office hours and to the Ministry's Spills Actions Centre at 1-800-268-6060 after office hours on the receipt of the complaint.

The DYEC facility complaints register will be reviewed on a monthly basis by the DYEC Management staff (Section 3.0) to obtain the data necessary for complaints monitoring and analysis. The results of this complaints monitoring and analysis will be reported in the annual Odour Management and Mitigation Monitoring Report (OMMMR).

8.1.2 Collecting the Relevant Complaint Details

The following minimum information will be collected for each complaint, if possible:

- the time and date when the offensive odour was observed;
- the location where the offensive odour was observed, (e.g. postal address, intersection);
- the Complainant`s description of odour (e.g., intensity, characteristic, relative unpleasantness (either pleasant, unpleasant or neutral), frequency and duration;
- the identity of the complainant, if possible, to assess the repeated nature of complaints;
- the residential address of the complainant; and
- any other information the complainant can offer on activities at the alleged odour source.

It is also necessary to collect (by observation or further investigation) the following additional information to allow subsequent analysis and collation of complaints:

- wind direction and speed, and atmospheric stability class at the time of complaint;
- any process incidents at the time of complaint; and
- other off-site activities ongoing at the time, such as agricultural operations.

A standardised form will be used for recording this information and entering it on the registration system as identified in APPENDIX C.

8.2 Investigation and Validation of Odour Complaints

This response procedure sets out what investigative actions will be taken in response to a complaint. The aim of the investigative actions will be to establish:

a) whether the DYEC is the source of the odour for which the complaint was reported and if generated by the DYEC; and

b) determine the impact of the odour.

A series of investigative tools will be used until these two questions can be satisfactorily answered. This then enables the appropriate odour controls to be applied if the impact is significant and the source is confirmed as the DYEC.

8.2.1 Complaint Screening

The investigation will start with an initial screening of the complaint. If the screening process fails to confirm the odour incident, then the investigation will stop at that point. If the screening process validates the odour incident, then a more detailed investigation is carried out. The objective of the initial screening is to quickly screen out those odour complaints that are unlikely to be due to DYEC. The initial screening exercise will consider the following:

- knowledge of potential sources at DYEC (including work activities in progress, any technical problems, etc);
- knowledge of other potential sources in the area;
- wind direction at the time of the alleged odour episode; and
- distance of the complainant from site.

If practical, trained staff may be deployed to the complaint location to carry out effective appraisal of the complaints.

DYEC will liaise with applicable entities (including the complainant) and inform them on the outcome of the screening assessment of the complaint and whether or not any action is to be taken.

8.2.2 Further Investigation of the Complaint

If the initial screening concludes that the DYEC could be the source of the odour complaint, then further investigation will be carried out, which will either 'confirm' and 'further characterise' the odour incident as due to the DYEC, or it will 'fail to confirm' the incident.

DYEC will implement an “odour monitoring” program to acquire data on evaluating the source of odours and potential mitigation. The monitoring effort may be increased in a graduated way until the data generated is sufficient to satisfactorily determine the source of odours or not with some level of confidence.

As well as monitoring, DYEC may be able to obtain more detailed information from operator records about process conditions, observations or inspections at the time of complaint – this would allow odour trends to be identified and possibly reconciled with particular process operations or maintenance.

Any mitigation will be recorded in an Odour Mitigation Log included in Appendix D.

8.2.3 Off-site Ambient Odour Monitoring

In the event of an odour complaint that has been confirmed in accordance with Sections 8.2.1 and 8.2.2, off-site odour monitoring will be carried out following the Draft Ontario Source Testing Code Version #3 (2010), *“Method ON-6.* – Determination *of Odour Emissions from Stationary Sources - Section 10.3.2 Ambient Odour Sampling via Evacuated Lung”.* Samples will be taken at the nearest sensitive receptors that are downwind of DYEC, based on wind direction from the local meteorological station over a 10 minute sampling period. An upwind sample will also be acquired at the same time.

Evaluation will be carried out by dynamic ofactormety with an eight (8) member panel.

8.3 Communications of Odour Reporting

An acknowledgement and initial response will be given by telephone or by email within two business days, provided that telephone or email contact details have been given by the complainant. Where complaints cannot be resolved on initial contact and further investigations are required, a written response will be made within 10 working days of submission of the complaint. DYEC shall respond to the complainant, if known, and the response shall include:

- the results of the investigation of the complaint;
- the action(s) taken or planned to be taken to address the cause(s) of the complaint, and
- if any follow-up response(s) will be provided.

In the event that a complaint is made by a member of the public about any odour matter associated with the DYEC, DYEC will provide immediate notification to the MOE District Manager and to the Ministry’s Spill Action Centre in accordance with Condition 10.(2)(a)(ii) of the CoA. Within three (3) business days, the DYEC will submit a report to the MOE District Manager on the complaint, on the action(s) taken or planned to be taken to address the cause(s) of the complaint and on all proposed action(s) to prevent recurrence of the complaint in the future.

REFERENCES

Ontario Ministry of the Environment. Proposed Revisions to Odour-based Ambient Air Quality Criteria and Development of an Odour Policy Framework. March 2005.

Ontario Ministry of the Environment. Procedure for Preparing an Emission Summary and Dispersion Modelling Report – Version 3.0. March 2009.

Ontario Ministry of the Environment. Ontario Source Testing Code (Version # 3). June 2010.

Report Signature Page

GOLDER ASSOCIATES LTD.

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Principal

ADC/am

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APPENDIX A

Standard Operating Procedures for Odour Management:

D ENV 003 DYEC - Fugitive Dust and Odour Control

Maintenance Schedule for Odour Management:

See DYEC Operations & Maintenance Plan

APPENDIX B

Periodic Inspection Form

Sample Durham-York Energy Centre Odour Inspection Form

Inspection Details

Inspector:_____

Date	Time	Location	Operation	Odour Result (Y/N)	Action Required

Signature:_____

APPENDIX C

Durham-York Energy Centre Odour Complaint Form

Sample Complaint Form

Durham-York Energy Centre Odour Complaint Form

Complainant Details

Date	Time	Complainant Name	Address	Phone Number

*Note: Person may choose to remain anonymous

Operating Conditions During Complaint Conditions

Weather Conditions

Wind Speed	
Wind Direction	
Data Source	

Operating Conditions

Follow-up/Comments

APPENDIX D

Odour Mitigation Log

Odour Mitigation Log (Sample Form)

Date	Activity Reviewed	Implemented (yes/no)	Rationale

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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and VOC Issues

Source Test Report
Odour Test at
Durham York Energy Centre

Prepared for: **Durham York Renewable Energy LP**
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Courtice, Ontario L7E 2R2

Prepared by: Michael R. E. Rix, B.Sc., QEP
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Project Technologist

Report No.: **14-290-R1.1**

Date: November 23, 2015

REPORT

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1 INTRODUCTION

The Durham York Energy Centre (DYEC) is an energy-from-waste (EFW) facility located in Clarington, Ontario, in Durham Region. The facility accepts municipal solid waste (MSW) from the Regional Municipalities of Durham and York, and uses the MSW as fuel to generate electricity. One of many tests required by the Environmental Compliance Approval (ECA) at the DYEC is a test for potential odour emissions. This requirement was included as an element of the Odour Management and Mitigation Plan, which was required to meet conditions in the ECA and in the Environmental Assessment (EA) Approval for the project. A copy of the ECA is included in Appendix A.

The odour testing requirement is described in Section 6.2 of the Odour Management and Mitigation Plan. This states that triplicate samples will be collected from the charging floor during normal operation. A Test Plan was submitted to the MOECC based on this requirement, and this plan further stated that two tests will be conducted on consecutive days, the first day being at the beginning of a delivery period (i.e. after a weekend). Triplicate samples will be collected on each day. Tests will be conducted as per Method ON-6; collection in gas sample bags followed by analysis by an 8-member odour panel.

The sampling location was chosen to represent the only significant odour source at the facility - odours from the tipping area and storage pit. However, the building is designed so that these odours should not be released directly to the outside environment. Air from this area is exclusively used as combustion air for the furnaces, and by design the air flow to the furnaces is sufficient to contain odours and dust by induced air flow. The design ensures that any odours in the tipping building cannot escape, but are drawn through the combustion process, which then will completely destroy the odours due to the high temperatures and residence time of the combustion system. The untreated odour emissions from the building were used to calculate a hypothetical worst-case odour emission which could occur if both combustion trains at the facility are not in operation, but the fans remain on to ventilate the boiler for outage work. Under this scenario, the untreated odour emissions would be dispersed from the stack.

Testing was conducted following methodologies outlined in the Ontario Source Testing Code (OSTC) dated 2010, PIBs#1310e03 where applicable.

A Pre-Test Plan was submitted to the Source Assessment group, Technology Standards Section, Standards Development Branch on September 17, 2014, and test methods were accepted by the MOE in a letter (TSS File No.: CR:SA:109194:14) dated September 19, 2014. A copy of the Pre-Test Plan review is in Appendix B. Odour Source Testing was conducted on October 8 and 9, 2015 and was witnessed by Guillermo Azocar of the MOECC Standards Development Branch. Although sampling was conducted later in the week of waste receipts this was deemed an acceptable deviation from the pre-test plan.

Triplicate samples for odour were collected from the indoor ambient air in the charging area of the tipping building. The maximum air flow rate for the system during outages was used to calculate an odour emission rate for the facility for the hypothetical worst-case emission scenario.

2 Key Personnel

The following identifies key personnel who will be involved with the odour source testing program:

Organization	Contact	Contact Details
Durham York Renewable Energy, L.P.	Matt Neild, Facility Manager	Tel: (905) 404-4030 Fax (905) 404-6745 Email: htitus@covanta.com
	Amanda Huxter, Environmental Specialist	Tel: (905) 404-4041 Fax: (905) 404-6745 Email: ahuxter@covanta.com
Durham York Energy Centre	Leon Brasowski, Project Coordinator	Tel: (862) 345-5306 Fax: (862) 345-5210 Email: lbrasowski@covanta.com
ZORIX Environmental	Michael Rix, Odour Assessment Specialist	Tel: (905) 829-3939 Fax: (905) 829-3935 Email: mrix@zorix.ca
	Tom Vallarino, Senior Technologist	Email: tvallarino@zorix.ca

3 Facility Description

The Facility is operated by Covanta Durham York Renewable Energy Limited Partnership (DYRE) under contract from the Regions of Durham and York. The Facility accepts waste from the Regions of Durham and York. The sources of waste are post-diversion residual waste collected by the Regions' municipal curbside collection programs, municipal public drop-off centers and transfer stations or from Regional operations where the Regions' have waste management procedures in place.

The maximum waste processing rate for the facility established by the ECA is 140,000 tonnes/year of waste. The Facility is permitted to operate on a continuous basis; 24 hours/day, seven (7) days/week, 365 days/year. Waste may be delivered six (6) days per week between 7:00 am to 7:00 pm. The proposed receiving schedule may vary within these limits, depending on demand and Facility needs.

Waste will only be accepted from approved haulers that have a valid waste licence as per Section 16(2)(a) of O.Reg. 347. All incoming waste vehicles must proceed to a weigh scale to allow the vehicle weight, waste type and source to be determined and recorded by the scale operator. A maximum of 7,350 cubic metres of waste storage will be provided in the storage pit with waste stored above and below the tipping floor level.

The Facility Tipping Building is designed to draw all combustion air from above the storage pit. Induced air flow through the building helps to prevent the escape of dust and odour from the Facility. Combustion air is admitted to the tipping area from outside the building either through the entrance/exit doors when opened, or manually operable louvers in the tipping building walls.

The Facility consists of two (2) thermal treatment trains, each equipped with independently operated boilers/furnaces and air pollution control equipment. Table 1 presents general information about the Facility relevant to this Plan.

Table 1 - Facility Description

Facility:	Durham-York Energy Centre
Location:	**1835 Energy Drive, Courtice, Ontario, L1E 2R2** **Clarington Energy Business Park** **Clarington, Ontario**
Main activities / equipment used:	**Thermal Treatment of Solid Waste**
Production:	**140,000 tonnes/year (MCR) 218 tonnes/day per unit @ 13 MJ/kg.**
Predominant wind direction:	**Northwest**

4 Odour Source Test Program

Samples were collected from one location in the facility, the charging floor in the tipping building, on two consecutive days, October 8 and 9, 2015.

Table 2 below provides a test matrix for Odour Source Testing of the facility.

Table 2 - Test Matrix

Plant Operation	Sample Location	Parameter	No. of Samples	Sample Method	Analytical Method
1st day	Charging Floor	Odour	3	OSTC Method ON-6	EN-13725
2nd day	Charging Floor	Odour	3	OSTC Method ON-6	EN-13725

5 METHODOLOGY

Sampling was conducted in accordance with the methodologies outlined in the Ontario Source Testing Code (OSTC) dated June 2010, PIBs#1310e03 and described in the Pre-Test Plan as well as communications with the Ontario Ministry of Environment. These methodologies are described in more detail in the following sections.

5.1 Odour Sampling

The odour sampling procedure is designed to provide a representative sample of the air at the odour source, without loss of the chemical constituents of that may contribute to the odour. The time required to collect samples needs to be brief (approximately 10 minutes per sample) and results therefore provide a "snap-shot" of emissions at a given time.

5.1.1 Sample Collection Methodology

OSTC Method ON-6 requires selection of sampling methods based on the moisture content and temperature of the source, and the ambient temperatures that the sample will experience before it is analysed. A dilution sampling methodology is required if moisture content of the air stream is high. This approach is used to prevent the possibility of condensation of water vapour in the gas sample bag. Condensed water in the sample bag can absorb odorant compounds and negatively bias results.

Since the sampling location was at ambient temperature and humidity, a dilution sampling methodology was not required for the sampling at the charging floor. Samples were therefore collected using an evacuated lung sampling procedure as described in Section 6.0 of Method ON-6. The apparatus, shown in Figure 1, consisted of a length of Teflon tubing, connected to a sample bag within a rigid, air-tight case. A pump is used to evacuate the case, which then causes the sample bag to be filled through the Teflon tubing.

Tedlar gas sample bags (40 litre capacity) were used as sample containers. All bags were baked out before use and checked to ensure there was no background odour.

Each sample bag was purged once with sample and then evacuated in order to precondition the bag with the sample gas. The sample was then collected over a period of approximately 10 minutes.

Three samples were collected at each sampling location on each test day. One field blank was collected on the second day. The field blank was a sample collected at the same location using the same apparatus as described above, but with an activated carbon filter on the end of the Teflon sampling tube.

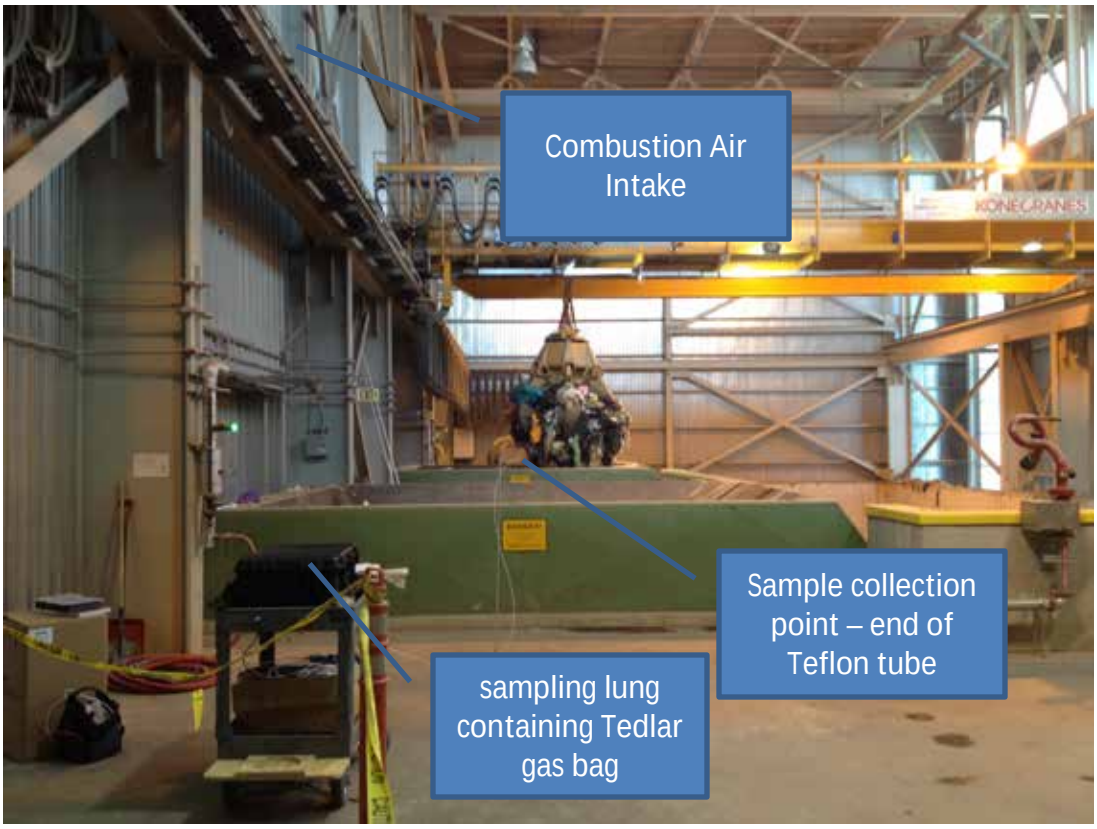

Figure 1 - Sampling Equipment and Location on Charging Deck

Sampling conditions were recorded on a field data sheet. Sample bags were identified by a numeric code. Samples were stored in opaque containers, and were transported the same day to the olfactometry laboratory.

5.1.2 Odour Evaluation (Olfactometry) Methodology

The primary purpose of the odour measurement process is to determine the odour detection threshold for each sample, expressed in odour units (OU) or odour units per cubic metre (OU/m³). Odour units may be considered a measure of the "concentration" of the odour in a sample. In general the olfactometry methodology followed the European Standard EN 13725:2003 – *Air Quality – Determination of Odour Concentration by Dynamic Olfactometry*.

The emission samples were evaluated by an eight person panel within 24 hours of sampling, on October 9, 2015. The odour evaluation process involved obtaining responses from eight pre-screened, qualified and independent panelists to the sample presented to them at various dilutions. The apparatus used to dilute the samples and present them to the panelists is

referred to as a dynamic dilution olfactometer. The evaluations all took place in ZORIX's odour evaluation laboratory, which is enclosed in a specialized room, designed to provide odour-free environment for accurate and reliable evaluation. Details of the system are as follows:

Olfactometry Lab – ZORIX's odour laboratory consists of a specially constructed evaluation room with stations for eight panelists. The operator's console and other related equipment are located in a separate area adjacent to the evaluation room. Fittings, furnishings, and materials of construction used in the odour laboratory were chosen to minimize the potential for odour emission (off-gassing) and adsorption.

Ventilation System – The ventilation air supplied to the evaluation room is air conditioned and filtered through a series of activated carbon filters as well as a fine particulate filter to maintain an odourless background environment in the odour laboratory. The room is kept under a positive pressure so that any odours from the surrounding environment cannot enter the room. The supply air to the odour laboratory provides about 50 air changes per hour. The air flow pattern in the room is designed to provide an even air flow from ceiling to floor, to ensure that any odours released into the room during an evaluation session are quickly removed from the breathing zone.

Olfactometer – An olfactometer is a device or system for presenting accurate dilutions of a sample to a panel of people, incorporating a means to record the responses of these "assessors" or "panelists". ZORIX's olfactometer was designed to present odour samples to eight panelists simultaneously. Each panelist is thus responding to the identical sample under the same conditions. The olfactometer flow system is constructed of Teflon® tubing with Teflon® fittings, and glass "sniff ports". The olfactometer/nose interface or "sniff ports" have been custom designed and manufactured to provide a uniform face velocity. The flow rate for each "sniff port" is 20 litres per minute, and the ports have been sized to allow the panelist to easily sniff from the ports without the sample being diluted by ambient air.

Each of the eight evaluation booths has two ports. One of these ports is always a reference port (odourless air only) available for comparison to the odorous sample. The sample port and

reference port are randomly switched, and the panelists are required to identify the port bearing the odorous sample.

A custom software program controls most aspects of the operation of the olfactometer. The olfactometer operator monitors the responses of the panelists, and controls the pace of the evaluation session, to ensure the panelists remain focused and do not become de-sensitized, and to monitor potential problems such as contamination of the olfactometer by high strength odour samples.

The olfactometer supply air is filtered through a series of high capacity activated carbon filtrations. At the beginning of the day the panel operator checks the odour from the system to ensure that it is odourless.

Panelists (Odour Assessors) – Panelists are the "sensors" in an olfactometry system. The maintenance of the pool of screened, trained, and motivated panelists is essential to obtaining reliable odour threshold data. The panelists employed by ZORIX Consultants have been drawn from the community, and have been selected based on a demonstration of a "normal" sense of smell, as shown by their response to test odorants, primarily n-butanol, and a comparison of their responses to the established acceptable range of detection as specified in EN13725.

Olfactometry Protocol - ZORIX's olfactometer was operated in a "non-forced choice" mode, with an ascending presentation sequence (low concentration to high concentration). "Non-forced choice" means that the panelists are not required to identify which port contains the odour if they are unsure, i.e. if they think there is "no difference" between the two ports. An ascending presentation sequence, i.e. from most dilute (weakest) presentation to progressively stronger presentations, minimizes the possibility for "adaptation" or "olfactometry fatigue", by which exposure to odour causes a reduction in sensitivity. Occasionally during the evaluation of a new sample, the initial dilution chosen as the starting point for a presentation sequence may be too low (concentration too high). In that case, the presentation sequence will be restarted at a higher dilution level, after a sufficient period of time to allow recovery from any possible temporary desensitization.

At each presentation the panelists were given about 20 seconds to evaluate the air from the two ports and make responses. The presentation protocol ensures that there is a rest period between presentations of at least 1 minute. The odorant concentration was increased by a factor of 2 or less at each presentation step.

Olfactometry Data Recording and Processing – The responses of the odour panelists to each odour presentation were logged by a data acquisition system with other olfactometer data such as dilution factors and flow rates. The responses were subsequently processed to obtain an odour detection threshold based on the geometric mean of the individual detection thresholds.

Odour calculations were based on determination of individual odour detection thresholds for each panelist as described in EN 13725:2003. A sample of n-butanol in nitrogen was also evaluated by the odour panelists on October 9 to determine if the response of the panel is consistent with the n-butanol detection criterion in EN 13725:2003.

5.2 Volumetric Flow Rate Determination

As already discussed, the odour emission rate being determined by this program is not an actual odour emission rate but is a theoretical emission rate assuming a worst-case scenario in which the furnaces are not operating to perform system maintenance. Under normal operating conditions, odours in the tipping building would be destroyed by as the air from the area is drawn into the furnaces and treated at high temperatures. Under the theoretical worst-case scenario, the furnaces would be off, but fans would continue to run and untreated emissions would be conveyed to the stack for dispersion.

The DYEC has developed and successfully implemented a Fugitive Dust and Odour Control Standard Operating Procedure (SOP) to minimize the potential of the DYEC to generate offsite odours. Included in this SOP is a procedure to mist the MSW storage area with a micro-nutrient product during periods of boiler outage. During the outage, combustion fan load is reduced to approximately 15-30% of design load, dependent on the type of maintenance work being conducted in the boiler. A variable frequency drive allows these fans to operate at a wide range of set points.

The micronutrients significantly reduce odors by biologically promoting the consumption of odour generating organics. Implementation of the Odour SOP in combination with the reduction of air flow to the stack significantly reduces actual untreated odours emissions released from the stack. To conservatively estimate the rate of untreated odour emission release from the stack a maximum outage air flow of 11 cubic meters per second (approximately 30% of the design flow of 38.7 cubic meters per second) was utilized.

6 RESULTS

Emissions from the DYEC tipping building were sampled on October 8 and October 9, 2015. All samples were evaluated in odour panel sessions on the morning of October 9.

Odour concentrations as determined by the odour panel for all samples are shown in Table 3. The "blank" or "zero" sample collected on October 9 had no measureable odour (< 11 OU/m³). The certified standard n-butanol standard (49.9 ppm in nitrogen), was determined to have an odour concentration of 939 OU/m³, corresponding to a detection threshold for n-butanol of 0.053 ppm, which is in the acceptable range of 0.020 to 0.080 ppm.

The total odour emission rate from the stack was calculated using the formula shown below.

$$Geom.\,Mean\ Odour\ Conc.\left({}^{OU}/_{m^3}\right) x\ Max.\,Outage\ Flow\ Rate\ (wet, ref.\,basis)\left({}^{m^3}/_{s}\right) = Odour\ Emission\ Rate\ \left({}^{OU}/_{s}\right)$$

Table 4 summarizes the odour emission rates calculated on this basis for each of the two test days. Based on these results the worst-case result was 10,000 OU/s, based on the results on the first day. This odour emission rate may be used to calculate off-property odour concentrations at nearby sensitive receptors as described in Schedule "B" of the ECA for the facility. It should be emphasized again that the modelling results would show the predicted impacts for a hypothetical worst-case scenario of untreated emissions being released when furnaces are not in operation, and would not represent the impact of the facility under normal operating conditions.

Table 3 - Odour Concentration Results

Date	Test ID	Test Location	Test Condition	Sample Time	Bag No.	Sample ID	Pre-Dilution	raw OTV (odour units)	net OTV (odour units)	Geometric Mean (odour units)
8-Oct-15	1	Mezzanine of Charging Floor	Maximum Capacity on Charging Floor (1st Day)	10:38 AM	261A	3418	1	861	861	912
	2			10:48 AM	255A	3419	1	939	939	
	3			10:58 AM	260A	3420	1	939	939	
9-Oct-15	4	Mezzanine of Charging Floor	Maximum Capacity on Charging Floor (2nd Day)	8:19 AM	268	3425	1	664	664	861
	5			8:28 AM	262A	3426	1	1117	1,117	
	6			8:37 AM	276	2727	1	861	861	
	7		A/C Filtered Air (field blank)	8:52 AM	266A	3428	1	<11	<11	<11
9-Oct-15	8	Laboratory	n-butanol (49.9ppm)	11:08 AM	143A	3429	1	939	939	939

Table 4 - Odour Emission Rate

Date	Operating Condition	Odour Concentration (OU/m³)	Geometric Mean (OU/m³)	Maximum Outage Flow Rate (30% of Design)* (m³/s)	Total Odour Emission Rate (OU/s)
8-Oct-15	Maximum Capacity on Charging Floor (1st Day)	861	912	11	10,000
		939			
		939			
9-Oct-15	Maximum Capacity on Charging Floor (2nd Day)	664	861	11	9,500
		1,117			
		861			
Highest odour emission rate of the two days/conditions:					10,000

** based on design flow of 38.7m³/s from Golder Report No. 10-1151-0343 EMRP (DYEC Air Emission Monitoring Plan),*

7 CLOSURE

Should there be any questions regarding the contents of this report, please contact the undersigned.

Michael R. E. Rix, B.Sc., QEP
Project Manager
Specialist – Odour Assessments

Appendix A

Environmental Compliance Approval (ECA) No. 7306-8FDKNX

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 2
Issue Date: cto e 24, 2014

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3

and
The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

and

TransRiver Canada Incorporated, as general partner for and on behalf of Covanta Durham York Renewable Energy Limited Partnership
445 South St
Morristown, New Jersey
USA 07960

Site Location: Durham York Energy Centre
1835 Energy Drive
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 for Waste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment, as follows:

1. The address of the Site has been changed to read as follows:

   Durham York Energy Centre
   1835 Energy Drive
   Clarington Municipality, Regional Municipality of Durham
   L1E 2R2

2. The following definitions have been added:

"**Operator**" means any person other than the Regions' employees, authorized by the Regions as having the charge, management or control of any aspect of the Site and includes TransRiver Canada Incorporated, as general partner for and on behalf of Covanta Durham York Renewable Energy Limited Partnership, the partnership under the laws of Nova Scotia more particularly described in the October 6, 2014 letter from Joanna Rosengarten to the Ministry of Environment and Climate Change, and includes its successors and assignees, their successors and assignees;

"**Regions**" means any person that is responsible for the establishment or operation of the Site being approved by this Approval, and it includes The Regional Municipality of Durham and The Regional Municipality of York, their successors and assignees;

2. The following definition has been amended to read as follows:

"**Site**" means the property referred to as Durham York Energy Centre where the Owner has located and operates the Facility and the Works and located at 1835 Energy Drive in the Municipality of Clarington, Regional Municipality of Durham;

"**Owner**" within the context of this Approval, means the Regions and the Operator;

3. The following Conditions have been amended to read as follows:

"General: Change of Ownership" Conditions 1.(14) and 1.(15):

(14) The Regions shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any changes:

(a) the ownership of the Site;
(b) the operator of the Site;
(c) the address of the Regions;
(d) the partners, where the Regions are or at any time become a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R.S.O. 1990, c. B.17, as amended, shall be included in the notification;
(e) the name of the corporation where the Regions are or at any time become a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act*, R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

(15) No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance. In the event of any change in ownership of the Site, other than change to a successor municipality, the Regions shall notify the successor of and provide the successor with a copy of this Approval, and the Regions shall provide a copy of the notification to the District Manager and the Director.

"Service Area, Approved Waste Types, Rates And Storage: Storage Restrictions" Condition 2.(5)(e):

2.(5)(e) (i) A maximum of 630 tonnes of the Residual Waste, limited to the bottom ash shall be stored in two (2) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation.

(ii) The storage duration of bottom ash in the bunkers is limited to a maximum of seven (7) days.

(iii) Should additional storage location(s) and a longer storage duration be required during testing, a minimum of forty eight (48) hours before the storage parameters are changed from those approved in Condition 2.(5)(e)(i) and (ii), the Owner shall notify the District Manager, in writing, of the proposed changes and provide the reasons for the changes.

"Site Operations: Residual Waste Handling and Disposal" Condition 4.(5)(b)(iii):

4.(5)(b)(iii) The Owner may use the equipment that comes in contact with the hazardous wastes to handle other wastes provided that prior to such use, the equipment has been cleaned, as confirmed by visual inspections, to ensure the removal of any hazardous waste residues and to prevent cross contamination.

"Closure of the Site" Conditions 18.(1) and 18.(2):

(1) A minimum of nine (9) months prior to closure of the Site, the Regions shall submit, for approval by the Director, a written Closure Plan for the Site. This Plan shall include, as a minimum, a description of the work that will be done to facilitate closure of the Site and a schedule for completion of that work.

(2) Within ten (10) days after closure of the Site, the Regions shall notify the Director and the District Manager, in writing, that the Site is closed and that the approved Closure Plan has been implemented.

4. "Covanta Durham York Renewable Energy Limited Partnership" is replaced with "TransRiver Canada Incorporated, as general partner for and on behalf of Covanta Durham York Renewable Energy Limited Partnership, the partnership under the laws of Nova Scotia more particularly described in the October 6, 2014 letter from Joanna Rosengarten to the Ministry of Environment and Climate Change and includes its successors and assignees", in the Environmental Compliance Approval dated June 28, 2011 and in the Notice of Amendment dated August 12, 2014.

5. The following documents are added to Schedule "A":

8. Application for Environmental Compliance Approval Application dated May 23, 2014, signed by Matthew R. Mulcahy, Covanta Durham York Renewable Energy Limited Partnership, Application for Environmental Compliance Approval Application dated May

23, 2014, signed by Cliff Curtis, The Regional Municipality of Durham and Application for Environmental Compliance Approval Application dated May 23, 2014, signed by Laura McDowell, The Regional Municipality of York, including the following attached supporting documentation:

(a) revised Section 8.0 "Ash Handling and Associated System" and revised Section 10.0 "Potable Process and Wastewater" dated May 2014, of the document entitled "Design and Operations Report", dated March 2011, prepared by Golder Associates Ltd.

(b) Drawing No. M-2530, entitled "Piping & Instrumentation Diagram Bottom Ash Lime Slurry System"

(c) Drawing No. 70258-1-ME-GA-SK-001, entitled "Covanta Durham York Hydrated Lime System for Boiler Bottom Ash"

9. E-mail dated September 10, 2014 (2:26 p.m.) from Leon Brasowski, Covanta Durham York Renewable Energy Limited Partnership, to Margaret Wojcik, Ontario Ministry of the Environment and Climate Change, providing additional supporting documentation on the proposal, including an attachment entitled "M-1500^0360 Highlighted for MOE.pdf".

10. E-mail dated October 13, 2014 (3:23 p.m.) from Leon Brasowski, Covanta Durham York Renewable Energy Limited Partnership, to Ricki Allum, Ontario Ministry of the Environment and Climate Change, providing additional supporting documentation on the legal name of the applicant, including an attachment entitled "Partnership Legal Clarification.pdf".

The reasons for this amendment to the Approval are as follows:

to approve the proposed Bottom Ash Lime Conditioning System, to correct the typographical errors in the Notice of Amendment dated August 12, 2014, to clarify the intent of the Residual Waste equipment cleaning condition and to allow different bottom ash storage conditions during testing.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and

conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-3717 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 24th day of October, 2014

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental*

MW/
c: District Manager, MOE York-Durham
Leon Brasowski, Covanta Energy Corporation

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Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7306-8FDKNX
Notice No. 1
Issue Date: August 12, 2014

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3

and

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

and

Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
72 Osbourne Rd Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham
L1E 2R2

You are hereby notified that I have amended Approval No. 7306-8FDKNX issued on June 28, 2011 forWaste Disposal Site (Incineration), complete with an Energy from Waste Facility and associated equipment,, as follows:

1. The following definition has been added:

"Contingency and Emergency Response Plan" also means the document entitled "Spill Contingency and Emergency Response Plan";

2. The following Conditions are amended to read as follows:

2.(5)(b)(iii) The Owner may use equipment used to handle the hazardous wastes to handle other wastes provided that prior to such use the equipment has been thoroughly cleaned first.

4.(5)(e) A maximum of 630 tonnes of the Residual Waste, limited to the bottom ash shall be stored in two (2) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is as follows:

(i) The storage duration is limited to a maximum of seven (7) days.

(ii) Should longer storage duration be required to accommodate the duration of the required compliance testing, a minimum of forty eight (48) hours before the storage extension is commenced, the Owner shall notify the District Manager of the required extension. The

notification shall include the duration of the extension and the reasons.

3. The following Conditions are added:

7.(7) (e) The Owner shall carry out the required bottom and fly ash compliance testing in accordance with the document entitled "Ash Sampling and Testing Protocol", listed in the attached Schedule.

11.8 Containment evaluations performed under the Spill Contingency and Emergency Response Plan shall be conducted by the Owner in accordance to procedures agreed by the District Manager pursuant to Conditions 8.(7)(i),(ii) and (iii).

4. The following documents have been added to Schedule "A":

4. October 31, 2013 letter from Mirka Januszkiewicz, the Regional Municipality of Durham to Ian Parrott, Ministry of the Environment and Climate Change, requesting approval of the Ash Sampling and Testing Protocol and the document entitled "Durham York Energy Centre, Ash Sampling and Testing Protocol", prepared by by Golder Associates and dated June 2014.

5. Document entitled "Durham York Energy Centre, Spill Contingency & Emergency Response Plan" prepared by Covanta Durham York Renewable Energy Limited Partnership and dated January 13, 2014, excluding section entitled "Containment Evaluation".

6. Document entitled "Durham York Energy Centre, Protocol for the Measurement of Combustion Temperature and the Development of Time and Temperature Correlations", prepared by Covanta Durham York Renewable Energy Limited Partnership and dated June 2014.

7. Document entitled "Durham York Energy Centre, Noise Monitoring and Reporting Plan", prepared by Golder Associates and dated September 2011.

The reasons for this amendment to the Approval are as follows:

to approve the "Ash Sampling and Testing Protocol" as required Condition 7.(7)(a), the "Durham York Energy Centre, Spill Contingency & Emergency Response Plan", as required Condition 11.(3), "Durham York Energy Centre, Noise Monitoring and Reporting Plan" as required Condition 7.(5)(a) and "Durham York Energy Centre, Protocol for the Measurement of Combustion Temperature and the Development of Time and Temperature Correlations" as proposed by the applicant.

This Notice shall constitute part of the approval issued under Approval No. 7306-8FDKNX dated June 28, 2011, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;

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8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of
the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-3717 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of August, 2014

Ian Parrott, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

MW/
c: District Manager, MOE York-Durham
n/a, The Regional Municipality of Durham

Ministry of the Environment
Ministère de l'Environnement

CERTIFICATE OF APPROVAL

MULTI-MEDIA
Number 7306-8FDKNX
Issue Date: June 28, 2011

The Regional Municipality of Durham
605 Rossland Rd E 5th Floor
Whitby, Ontario
L1N 6A3

and

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

and

Covanta Durham York Renewable Energy Limited Partnership
445 South Street
Morristown, New Jersey
United States of America
07960

Site Location: Durham York Energy Centre
72 Osbourne Road
Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham

You have applied in accordance with Sections 9 and 27 of the Environmental Protection Act and Section 53 of the Ontario Water Resources Act for approval of:

A thermal treatment facility to be used for the receipt and manual and/or mechanical sorting of solid non-hazardous post-diversion municipal waste (Waste), temporary storage and thermal treatment of the Waste, abatement of the emissions from the processes and activities undertaken at the Site, handling, screening, sorting and/or conditioning of the residual wastes and management of the wastewater and the non-contact stormwater generated at the Site. The Facility's maximum Waste thermal treatment rate is 140,000 tonnes per year of Waste, the nominal electricity generation rate is 20 Megawatts and the nominal steam generation rate 72,000 kilograms per hour of steam.

The facility consists of the following major processes and support units:

(1) two (2) identical combustion trains, each having a nominal capacity of 218 tonnes of Waste per day venting into the atmosphere via a common exhaust stack, having an exit diameter of 1.71 metres, extending 87.6 metres above grade.

Each combustion train is an independent process train and it consists of the following main components:

(a) a stoker grate steam Boiler, having a design heat input of 118 Gigajoules per hour, equipped with a natural gas fired auxiliary Low NOx burner, having a nominal heat input of 59.5 Gigajoules per hour; and

(b) the following air pollution control equipment:

(i) a Selective Non Catalytic Reduction System (SNCR System) with ammonia injection for NOx control;
(ii) an activated carbon injection system, to reduce mercury and dioxins in flue gas;
(iii) a dry recirculation lime injection scrubber to control acid gases;
(iv) a pulse jet type baghouse to control particulate emissions;

(2) one (1) steam turbine generator set having a rated capacity of 20 Megawatts;

(3) waste and reagent storage as described in Condition 2.:

(4) fly ash conditioning system including two (2) surge bins, two (2) pugmills and seven (7) curing/storage bunkers;

(5) bottom ash sorting system including conveyors, screens, a rotary drum magnet and an eddy separator;

(6) one (1) emergency diesel generator, rated at 250 Kilowatts;

(7) natural gas-fired combustion equipment for comfort heating;

(8) a wastewater management system for collection, recirculation and reuse of the process water; and

(9) a stormwater management facility for collection, transmission and discharge of non-contact runoff at the Site, as described in the attached Schedule "G",

Note: Use of the site for any other type of waste is not approved under this Certificate, and requires obtaining a separate approval amending this Certificate.

For the purpose of this Provisional Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"***Acoustic Assessment Report***" means the report, prepared in accordance with *Publication NPC-233* by Paul Niejadlik / Golder Associates Ltd. and dated March 2011 submitted in support of the application, that documents all sources of noise emissions and Noise Control Measures present at the Facility;

"**Acoustic Assessment Summary Table**" means a table summarizing the results of the Acoustic Assessment Report;

"**Acoustic Audit**" means an investigative procedure consisting of measurements of all noise emissions due to the operation of the Facility, assessed in comparison to the Performance Limits for the Facility regarding noise emissions, completed in accordance with the procedures set in the Ministry's *Publication NPC-103* and reported in accordance with the Ministry's *Publication NPC-233;*

"**Acoustic Audit Report**" means a report presenting the results of an Acoustic Audit, prepared in accordance with the Ministry's *Publication NPC-233;*

"**Acoustical Consultant**" means a person currently active in the field of environmental acoustics and noise/vibration control, who is familiar with Ministry noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from a Facility;

"**Air Standards Manager**" means the Manager, Human Toxicology and Air Standards Section, Standards Development Branch, or any other person who represents and carries out the duties of the Manager, Human Toxicology and Air Standards Section, Standards Development Branch, as those duties relate to the conditions of this Certificate;

"**APC Building**" means the building at the Site where the APC Equipment and the reagent indoor storage tanks are located;

"**APC Equipment**" means all the air pollution control equipment at the Facility, including the SNCR System, the activated carbon injection system, the dry recirculation lime injection scrubber and the pulse jet type baghouse to control emissions from the combustion chamber of the Boilers, the dust collectors to control emissions from the Residue Building and the dust collectors to control emissions from the reagent storage silos;

"**Boiler Building**" means the building at the Site where the Boilers, turbine generator and the air cooled condenser(s) are located;

"**Boilers**" means the two (2) steam boilers firing the approved Waste described in this Certificate;

"**Bulky Unprocessable Items**" means the incoming Waste received at the Site that cannot be processed in the Equipment;

"**CEM Systems**" means the continuous monitoring and recording systems used to measure and record the temperature and the emissions from the Boilers as specified in the attached Schedule "F";

"**Certificate**" means this entire provisional Certificate of Approval, issued in accordance with Sections 39 and 9 of the *EPA* and Section 53 of the *OWRA,* and includes any schedules attached to it, the application and the supporting documentation listed in the attached Schedule "A;

"***40 CFR 60***" means title 40, part 60 under the Code of Federal Regulations (Air Programs, U.S. Environmental Protection Agency), revised as of July 1, 1990, published by the Office of the Federal Register, National Archives and Records, Administration in the United States of America;

"**Complaint**" means a complaint received either by the Owner or the District Manager that has been confirmed by staff of the Ministry and the cause of which is attributed to the Owner's activities at the Facility;

"**Commencement Date of Operation**" means the date when the approved Waste is first received at the Site;

"**Compound of Concern**" means a contaminant that, based on generally available information, may be emitted to the atmosphere in a quantity from any source at the Facility that is significant either in comparison to the relevant Ministry Point of Impingement Limit or if a Ministry Point of Impingement Limit is not available for the compound then, based on generally available toxicological information, the compound has the potential to cause an adverse effect as defined by the *EPA* at a Point of Impingement;

"**Controlled Shutdown**" means an immediate cut-off of all waste into the Boilers, while maintaining the operation of the combustion chamber and the APC Equipment within the Performance Requirements;

"**Description Section**" means the section on page one of the Certificate describing the Owner's operations and the Equipment located at the Facility and specifying the Facility Production Limit for the Facility;

"**Dioxins and Furans**" means polychlorinated dibenzo-dioxins and polychlorinated dibenzofurans;

"**Director**" means any person appointed in writing by the Minister of the Environment pursuant to section 5 of the *EPA* and pursuant to section 5 of the *OWRA* as a Director for the purposes of Part V of the *EPA,* section 9 of the *EPA* and section 53 of the *OWRA;*

"**District Manager**" means the District Manager of the York Durham District Office of the Ministry;

"**Emergency Shutdown**" means an immediate cut-off of all waste feed into the Boilers, followed by an accelerated extinction of all combustion in the Boilers, while maintaining the combustion temperature within the Performance Requirements, except when unreasonable;

"**Emission Summary Table**" means the table prepared in accordance with *O. Reg. 419/05* and the Procedure Document listing the appropriate Point of Impingement concentrations of each Compound of Concern from the Facility and providing comparison to the corresponding Ministry Point of Impingement Limit;

"***EAA***" means the Environmental Assessment Act, R.S.O. 1990, c. E.18, as amended;

"**EA Approval**" means the Notice of Approval to Proceed with the Undertaking signed by the Minister of the Environment on November 3, 2010, EA File No. 04-EA-02-08;

"***EPA***" means the Environmental Protection Act, R.S.O. 1990, c. E.19, as amended;

"**Equipment**" means equipment or processes associated with the thermal treatment of the approved Waste described in this Certificate and in the Supporting Documentation referred to herein and any other equipment or processes handling wastes and reagents;

"**ESDM Report**" means the Emission Summary and Dispersion Modelling Report prepared in accordance with the Procedure Document by Golder Associates and dated March 2011 submitted in support of the application, and includes any amendments to the ESDM Report listed in the attached Schedule "A" and all subsequent up-dated ESDM Reports as applicable;

"**Facility**" means the entire operation associated with thermal treatment of Waste located on the property where the Equipment is located;

"**Facility Production Limit**" means the production limit placed on the main product(s) or raw materials used by the Facility that represents the design capacity of the Facility and assists in the definition of the operations approved by the Director;

"**Grizzly Building**" means the building at the Site where the bottom ash is screened and where the oversized constituents of the bottom ash (grizzly overs) are temporarily stored prior to transport for subsequent storage in the Residue Building;

"**Independent Acoustical Consultant**" means an Acoustical Consultant who is not representing the Owner and was not involved in preparing the Acoustic Assessment Report or the design/implementation of Noise Control Measures for the Facility and/or Equipment. The Independent Acoustical Consultant shall not be retained by the Acoustical Consultant involved in the noise impact assessment or the design/implementation of Noise Control Measures for the Facility and/or Equipment;

"**I-TEF**" means International Toxic Equivalency Factor derived for each dioxin and furan congener by comparing its toxicity to the toxicity of 2,3,7,8 tetrachloro dibenzo-p-dioxin, as recommended by the North Atlantic Treaty Organization Committee on Challenges to Modern Society (NATO CCMS) in 1989 and adopted by Canada in 1990;

"**I-TEQ**" means International Toxic Equivalent of dioxins and furans calculated using the I-TEFs, as recommended by the NATO CCMS in 1989 and adopted by Canada in 1990;

"**Manager**" means the Manager, Technology Standards Section, Standards Development Branch, who has been appointed under Section 5 of the *EPA* for the purposes of Section 11(1)2 of the *O. Reg. 419/05,* or any other person who represents and carries out the duties of the Manager,

Technology Standards Section, Standards Development Branch, as those duties relate to the conditions of this Certificate;

"**Ministry**" means the ministry of the government of Ontario responsible for the *EPA* and the *OWRA* and includes all officials, employees or other persons acting on its behalf or the Ontario Ministry of the Environment;

"**Municipality**" means the Municipality of Clarington;

"***NMA***" means the *Nutrient Management Act*, 2002, S.O. 2002, c. 4, as amended;

"**Noise Control Measures**" means measures to reduce the noise emission from the Facility and/or Equipment including, but not limited to silencers, acoustic louvers, enclosures, absorptive treatment, plenums and barriers;

"**LDR**" means the Lands Disposal Restrictions referred to in sections 74 through 85 of the *O. Reg. 347,* which prohibit the disposal of hazardous wastes on land until they have been treated to meet the treatment standards under the *O. Reg. 347;*

"**Leachate Toxicity Criteria**" means the concentrations of any of the contaminants listed in Schedule 4 at a concentration equal to or in excess of the concentration specified for that contaminant in Schedule 4 using the Toxicity Characteristic Leaching Procedure, defined in the *O. Reg. 347*;

"***O. Reg. 419/05***" means the *Ontario Regulation 419/05,* Air Pollution – Local Air Quality enacted under the *EPA,* as amended;

*"**O. Reg. 347**"* means the *Ontario Regulation 347,* R.R.O 1990 (General –Waste Management) enacted under the *EPA,* as amended;

"***OWRA***" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40, as amended;

"**Owner**" means any person that is responsible for the establishment and operation of the Site being approved by this Certificate, and it includes The Regional Municipality of Durham, The Regional Municipality of York, and Covanta Durham York Renewable Energy Limited Partnership (operator), their successors and assignees;

"***PA***" means the *Pesticides Act*, R.S.O. 1990, c.P. 11, as amended;

"**Performance Requirements**" means the performance requirements and emission limits specified in the section of this Certificate entitled "Performance Requirements";

"**Point of Impingement**" means any point outside the Facility in the natural environment and as defined by s.2 of the *O. Reg. 419/05;*

"**Point of Reception**" means the Point of Reception as defined by *Publication NPC-205* and/or *Publication NPC-232*, as applicable;

"**Pre-test Information**" means the information outlined in Section 1.1 of the Source Testing Code;

"**Procedure Document**" means the Ministry's document entitled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated July 2005, as amended;

"**Professional Engineer**" means a Professional Engineer as defined within the *Professional Engineers Act*, R.S.O. 1990, c. P.28, as amended;

"**Provincial Officer**" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the *OWRA* or Section 5 of the *EPA* or Section 17 of the *PA* or Section 4 of the *NMA* or Section 8 of the *SDWA;*

"***Publication NPC-103***" means the Ministry's Publication NPC-103 of the Model Municipal Noise Control By-Law, Final Report, dated August 1978, published by the Ministry, as amended;

"***Publication NPC-205***" means the Ministry's Publication NPC-205, entitled "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", dated October, 1995, as amended;

"***Publication NPC-207***" means the Ministry's draft technical publication entitled "Impulse Vibration in Residential Buildings", dated November 1983, supplementing the Model Municipal Noise Control By-Law, Final Report, dated August 1978, published by the Ministry, as amended;

"***Publication NPC-232***" means the Ministry's Publication NPC-232, entitled "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", dated October, 1995, as amended;

"***Publication NPC-233***" means the Ministry's Publication NPC-233, entitled "Information to be Submitted for Approval of Stationary Sources of Sound", dated October, 1995, as amended;

"**Rejected Waste**" means either municipal waste which cannot be processed at the Facility or waste which the Site is not approved to accept. Rejected Waste includes but is not limited to the Bulky Unprocessable Items and the Unacceptable Waste;

"**Regional Director**" means the Regional Director of the Central Region of the Ministry;

"**Regions**" means The Regional Municipality of Durham and The Regional Municipality of York;

*"**Report EPS 1/PG/7**"* means the Environment Canada Report EPS 1/PG/7, entitled "Protocols and Performance Specifications for Continuous Monitoring of Gaseous Emissions from Thermal Generation", dated September, 1993, as amended;

"**Residual Waste**" means waste resulting from the Waste processing activities at the Site. Residual Waste is limited to the recovered ferrous metals, the recovered non-ferrous metals, the bottom ash (consisting of the ash fines and the grizzly overs) and the fly ash (untreated and following conditioning);

"**Residue Building**" means the building at the Site where the bottom ash and the fly ash are processed, temporarily stored and loaded in transport vehicles for off-site disposal;

"**Schedules**" means the following schedules "A", "B", "C", "D", "F" and "G", attached to the Certificate and forming part of the Certificate;

"***SDWA***" means the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, as amended;

"**Sensitive Receptor**" means any location where routine or normal activities occurring at reasonably expected times would experience adverse effect(s) from odour discharges from the Facility, including one or a combination of:

(a) private residences or public facilities where people sleep (e.g.: single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.);

(b) institutional facilities (e.g.: schools, churches, community centres, day care centres, recreational centres, etc.);

(c) outdoor public recreational areas (e.g.: trailer parks, play grounds, picnic areas, etc.); and

(d) other outdoor public areas where there are continuous human activities (e.g.: commercial plazas and office buildings);

"**Site**" means the property where the Owner has located and operates the Facility and the Works and located at 72 Osbourne Road, 27, Concession Broken Front, Part 1 in the Municipality of Clarington, Regional Municipality of Durham;

"**Source Testing**" means monitoring, sampling and testing to measure emissions resulting from operating the Facility under conditions which yield the worst case emissions within the approved operating range of the Facility;

"***Source Testing Code***" means the Ministry's document entitled "Source Testing Code, Version 2, Report No. ARB-66-80", dated November 1980, as amended;

"**Stack**" means the stack that discharges emissions from the Boilers after those emissions have been controlled by the associated APC Equipment;

"**Substantial Completion**" has the same meaning as "substantial performance" in the *Construction Lien Act* R.S.O. 1990, c.C-30, as amended;

"**Supporting Documentation**" means the documents listed in the attached Schedule "A" of this Certificate which forms part of this Certificate;

"**Test Contaminants**" means the contaminants set out in the attached Schedule "D";

"**Tipping Building**" means the building at the Site where the incoming Waste is received, sorted and temporarily stored;

"**Total Power Failure**" means the loss of the external power supply and concurrent loss of all in-plant power generation;

"**Trained Personnel**" means one or more Site personnel trained in accordance with the requirements of Condition 9.;

"**Waste**" means municipal solid waste as defined in the *O. Reg. 347* and limited to the approved waste set out in Condition No. 2.(2);

"**Waste Processing Rate** means the mass of Waste fed into one of the Boilers;

"**Works**" means the sewage works described in the Owner's application, this Certificate and in the Supporting Documentation referred to herein, to the extent approved by this Certificate;

"**Unacceptable Waste**" means the incoming Waste received at the Site that does not meet the incoming Waste quality criteria set out in this Certificate, is of hazardous nature and requires caution when handling; and

"**Undiluted Gases**" means the flue gas stream which contains oxygen, carbon monoxide, total hydrocarbons and all contaminants in the same concentrations as they exist in the flue gas stream emerging from an individual piece of equipment, such as the combustion chamber of one Boiler or one baghouse, and into which gas stream no ambient air and/or no other gas stream originating from another piece of equipment, except for dilution air introduced within the CEM Systems, has been introduced.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

GENERAL PROVISIONS

1. GENERAL

Compliance

(1) The Owner shall ensure compliance with all the conditions of this Certificate and shall ensure that any person authorized to carry out work on or operate any aspect of the Site, including the Works, is notified of this Certificate and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Certificate.

Build in Accordance

(3) (a) Except as otherwise provided by this Certificate, the Site shall be designed, developed, built, operated, monitored, inspected and maintained in accordance with the following applications:

(i) Applications for a Certificate of Approval (Air) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of

Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(ii) Applications for a Provisional Certificate of Approval (Waste Disposal Site) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(iii) Applications for a Certificate of Approval of Municipal and Private Sewage Works dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the Supporting Documentation listed in the attached Schedule "A".

(b) (i) Any design optimization or modification that is inconsistent with the conceptual design set out in the Supporting Documentation in Schedule "A" shall be clearly identified, along with an explanation of the reasons for the change and submitted to the Director for approval.

(ii) If a change to the conceptual design is submitted to the Director for approval, no construction of the Site shall commence prior to the Director approving, in writing, the final conceptual design of the Site.

As-built Drawings

(4) (a) Within ninety (90) days of the completion of the initial successful Source Testing program, a set of as-built drawings showing the Facility and the Works and bearing the stamp of a Professional Engineer, shall be prepared and retained at the Site.

(b) These drawings shall be kept up-to-date through revisions undertaken from time to time and a copy shall be retained at the location of the Site or at the operational office of the Owner for the operational life of the Site.

(c) Notwithstanding provisions of Condition 1.(4)(b), an amendment to this Certificate shall be sought for changes to the as-built drawings, requiring approval.

(d) The as-built drawings shall be made available to Ministry staff upon request.

Interpretation

(5) Where there is a conflict between a provision of any document, including the application referred to in this Certificate and the conditions of this Certificate, the conditions in this Certificate shall take precedence.

(6) Where there is a conflict between the applications and a provision in any documents listed in Schedule "A", the applications shall take precedence, unless it is clear that the purpose of the document was to amend the applications and that the Ministry approved the amendment.

(7) Where there is a conflict between any two documents listed in Schedule "A", other than the applications, the document bearing the most recent date shall take precedence.

(8) The requirements of this Certificate are severable. If any requirement of this Certificate, or the application of any requirement of this Certificate to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Certificate shall not be affected thereby.

Other Legal Obligations

(9) The issuance of, and compliance with the conditions of this Certificate does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner to furnish any further information related to compliance with this Certificate.

Adverse Effects

(10) The Site shall be constructed, operated and maintained in a manner which ensures the health and safety of all persons and prevents adverse effects on the natural environment or on any persons.

(11) The Owner shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the approved operations at the Site, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

(12) Despite the Owner or any other person fulfilling any obligations imposed by this Certificate, the person remains responsible for any contravention of any other condition of this Certificate or any applicable statute, regulation, or other legal requirement resulting from any act or emission that caused the adverse effect to the natural environment or impairment of water quality.

(13) If at any time odours, pests, litter, dust, noise or other such negative effects are generated at this Site and cause an adverse effect, the Owner shall take immediate appropriate remedial action that may be necessary to alleviate the adverse effect, including suspension of all waste management activities if necessary.

Change of Ownership

(14) The Owner shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any changes:

(a) the ownership of the Site;
(b) the operator of the Site;
(c) the address of the Owner;
(d) the partners, where the Owner is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act,* R.S.O. 1990, c. B.17, as amended, shall be included in the notification;
(e) the name of the corporation where the Owner is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act*, R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

(15) No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance. In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Certificate, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Inspections by the Ministry

(16) No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the *OWRA,* the *EPA,* the *PA,* the *SDWA* or the *NMA* of any place to which this Certificate relates, and without limiting the foregoing:

(a) to enter upon the premises where the approved processing is undertaken, or the location where the records required by the conditions of this Certificate are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Certificate;
(c) to inspect the Site, related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this Certificate;
(e) to conduct interviews with staff, contractors, agents and assignees of the Owner; and
(f) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Certificate or the *EPA,* the *OWRA,* the *PA,* the *SDWA* or the *NMA.*

Information

(17) Any information requested by the Ministry, concerning the operation of the Site and its operation under this Certificate, including but not limited to any records required to be kept by this Certificate, manuals, plans, records, data, procedures and supporting documentation shall be provided to the Ministry, in a timely manner, upon request**.**

(18) The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this Certificate or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

(a) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Certificate or any statute, regulation or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

(19) The Owner shall ensure that a copy of this Certificate, in its entirety and including all its Notices of Amendment and the Supporting Documentation listed in Schedule "A" are retained at the Site at all times.

2. **SERVICE AREA, APPROVED WASTE TYPES, RATES and STORAGE**

(1) The service area for the Site is the area within the jurisdictional boundaries of The Regional Municipality of Durham and The Regional Municipality of York.

(2) The operation of this Site is limited to:

(a) receipt, temporary storage, transfer and processing, including thermal treatment, of solid non-hazardous waste remaining after Waste Diversion required by the EA Approval, limited to Waste from the following sources:

(i) domestic waste and Industrial Commercial and Institutional waste from the Regions' curbside collection and/or from the Regions' waste management facilities; and

(ii) waste generated on-Site through activities not relating to the handling and processing of Waste (ie. office, lunch room, etc.);

(b) collection and management of the stormwater run-off generated at the Site.

(3) The following Unacceptable Waste is prohibited from being accepted at the Site:

(a) hazardous waste, as defined in the *O. Reg. 347;*
(b) wastes which have been source-separated for the purposes of diversion;

(c) international waste generated outside of Canada, but collected within the jurisdictional boundaries of The Regional Municipality of Durham and The Regional Municipality of York.

(4) Waste Receipt Rate:

(a) The maximum daily amount of Waste that is approved to be accepted at the Site shall not exceed 1,520 tonnes per day.

(5) Storage Restrictions:

Solids:

(a) A maximum of 7,350 cubic metres shall be stored inside the Waste pit within the Tipping Building as shown in the Supporting Documentation.

(b) Rejected Waste, limited to the Bulky Unprocessable Items removed from the incoming Waste in the Tipping Building shall be stored:

(i) in two (2) roll-off bins having a maximum total storage capacity of 30 cubic metres, located within the confines of the Tipping Building; and/or

(ii) in the appropriate dedicated bunkers, located within the confines of the Residue Building and described in Conditions 2.(5)(c), 2.(5)(d) and 2.(5)(d), below.

(c) A maximum of approximately 77 tonnes or 106 cubic metres of the Residual Waste, limited to the recovered ferrous metals, shall be stored in one (1) dedicated bunker, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(d) A maximum of approximately 120 tonnes or 100 cubic metres of the Residual Waste, limited to the recovered non-ferrous metals, shall be stored in one (1) dedicated bunker, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(e) A maximum of 630 tonnes of the Residual Waste, limited to bottom ash shall be stored in two (2) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of seven (7) days.

(f) A maximum of 700 tonnes of the Residual Waste, limited to the fly ash shall be stored in seven (7) dedicated bunkers, located within the confines of the Residue Building, described in the Supporting Documentation. The storage duration is limited to a maximum of thirty six (36) days.

(g) A maximum of 85 cubic metres of activated carbon for the carbon injection system shall be stored in one (1) outdoor tank, located adjacent to the APC Building.

(h) A maximum of 150 cubic metres of lime for the dry scrubber shall be stored in one (1) or more indoor tank(s), located within the confines of the APC Building.

(i) If required, recirculated residue shall be stored in one (1) or more indoor tank(s), located within the confines of the APC Building.

(j) A maximum of 35 tonnes or 25 cubic metres of cement for fly ash conditioning shall be stored in one (1) outdoor silo, located adjacent to the Residue Building.

(k) A maximum of 25 tonnes or 45 cubic metres of pozzolan for fly ash conditioning shall be stored in one (1) outdoor silo, located adjacent to the Residue Building.

Liquids:

(l) (i) A maximum of 36 cubic metres or 40 tonnes of aqueous ammonia for the SNCR System shall be stored in one (1) outdoor tank, located adjacent to the APC Building.

(ii) The Owner shall ensure that the aqueous ammonia storage tank is equipped with a liquid level monitoring device designed to provide a visual and an auditory alarm when the high level setpoint is reached.

(iii) The aqueous ammonia storage tank spill containment area and the loading area shall be designed in accordance with the requirements in the Ministry's document entitled *"Guidelines for Environmental Protection Measures at Chemical and Waste Storage Facilities"* dated May 2007, as amended.

(6) No outdoor storage of waste, including storage in vehicles, is approved under this Certificate.

(7) The Owner shall ensure that storage of all wastes is undertaken in a manner that does not cause an adverse effect or a hazard to the environment or any person.

(8) (a) Waste received at the Site shall be processed within four (4) days from its receipt at the Site.

(b) Emergency Waste storage duration extension:

(i) The Owner may store the incoming Waste inside the tipping pit within the confines of the Tipping Building for up-to seven (7) days from its receipt at the Site, on an emergency basis only.

(ii) Within twenty four (24) hours from the start of the emergency storage of the incoming Waste, the Owner shall notify, in writing, the District Manager that the incoming Waste is being stored longer then four (4) days.

(iii) Should there be public complaints about the extended incoming Waste storage, the Owner, in consultation with the District Manager, shall determine the cause of the complaints, propose appropriate abatement measures, including but not be limited to the removal and off-site disposal of the Waste contained in the tipping pit, and implement the said measures upon receiving written concurrence from the District Manager within the time frame acceptable to the District Manager.

(9) In the event that Waste cannot be processed at the Site and the Site is at its approved storage capacity, the Owner shall cease accepting additional Waste. Receipt of additional Waste may be resumed once such receipt complies with the waste storage limitations approved in this Certificate.

3. **SIGNS and SITE SECURITY**

(1) Prior to receipt of Waste at the Site, the Owner shall ensure that a sign is posted at the entrance to the Site. The sign shall be visible from the main road leading to the Site. The following information shall be included on the sign:

(a) name of the Owner;
(b) this Certificate number;
(c) hours during which the Site is open;
(d) waste types that are approved to be accepted at the Site;
(e) Owner's telephone number to which complaints may be directed;
(f) Owner's twenty-four hour emergency telephone number (if different from above);
(g) a warning against unauthorized access; and
(h) a warning against dumping at the Site.

(2) The Owner shall ensure that appropriate and visible signs are posted at the Site clearly identifying the wastes and the process reagents and stating warnings about the nature and any possible hazards of the wastes and the reagents.

(3) The Owner shall ensure that appropriate and visible signs are posted at the Site to prohibit smoking, open flames or sources of ignition from being allowed near any flammable materials storage areas.

(4) The Owner shall install and maintain appropriate and visible signs at the Site to direct vehicles to the Waste receiving and Residual Waste removal areas and to the reagent unloading areas.

(5) The Owner shall post appropriate and visible signs along the traffic route providing clear directions to the Site.

(6) The Owner shall ensure that the Site is fenced in and that all entrances are secured by lockable gates to restrict access only to authorized personnel when the Site is not open.

(7) The Owner shall ensure that access to the Site, with the exception of the area designated as a Public Information Centre, is regulated and that no unauthorized persons are permitted at the Site without the Trained Personnel escort.

(8) The Owner shall ensure that the Site is operated in a safe and secure manner, and that Waste, the Residual Waste and the Unacceptable Waste are properly handled, packaged or contained and stored so as not to pose any threat to the general public and the Site personnel.

4. SITE OPERATIONS

(1) **Operating hours:**

(a) The Site is approved to operate twenty-four (24) hours per day three hundred and sixty-five (365) days per year.

(b) Notwithstanding Condition 4.(1)(a), Waste shall only be received at the Site and the Residual Waste shall only be transferred from the Site between 7:00 a.m. and 7:00 p.m. Monday to Saturday. No receipt of the Waste or transfer of the Residual Waste shall be undertaken on statutory holidays.

(c) Emergency Receipt of Waste:

(i) The Owner may receive Waste at the Site outside of the operating hours specified in Condition 4.(1)(b), above, on an emergency basis only.

(ii) Within twenty four (24) hours from the receipt of Waste outside of the approved receiving hours, the Owner shall notify, in writing, the District Manager that Waste was received outside of the approved receiving hours.

(iii) Should there be complaints about Waste shipments outside of the approved hours, the Owner, in consultation with the District Manager, shall determine the cause of the complaint, propose appropriate abatement measures and implement the said measures upon receiving written concurrence from the District Manager within the time frame acceptable to the District Manager.

(2) **Incoming Waste receipt:**

(a) At the weigh scale, the Trained Personnel shall:

(i) inspect the required documentation prior to acceptance of the incoming Waste at the Site; and

(ii) inspect the incoming Waste with radiation detection equipment.

(b) In the Tipping Building, the Trained Personnel shall:

(i) visually inspect all incoming Waste being unloaded into the Waste pit; and

(ii) once per hour, or as accepted by the District Manager, unload the incoming Waste on the tipping floor for a manual visual inspection and sorting of the incoming Waste.

(c) The Owner shall only accept the incoming Waste that is delivered in vehicles that have been approved by the Ministry.

(d) The Owner shall ensure that all unloading of incoming Waste at the Site takes place entirely within the confines of the Tipping Building.

(3) **Unacceptable Waste handling:**

(a) In the event that waste that is not approved under this Certificate is inadvertently accepted at the Site, the Owner shall ensure that the Unacceptable Waste:

(i) is stored in a way that ensures that no adverse effects result from its storage;
(ii) is segregated from all other waste;
(iii) is handled and removed from the Site in accordance with the *O. Reg. 347* and the *EPA*; and
(iv) is removed from the Site within (4) days of its receipt or as acceptable to the District Manager.

(b) The Owner shall ensure that all loading of the Unacceptable Waste into transport vehicles is carried out entirely within the confines of the Tipping Building.

(4) **Waste Sorting:**

(a) The Trained Personnel shall remove the Bulky Unprocessable Items and Unacceptable Waste from the incoming Waste prior to charging of the Waste to the Boilers.

(b) All sorting of the incoming Waste at the Site shall be undertaken indoors, within the confines of the Tipping Building and/or the Refuse Building.

(5) **Residual Waste Handling and Disposal:**

(a) (i) Except for transportation of the Residual Waste between the Grizzly Building and the Residue Building, the Owner shall ensure that all

handling of the bottom ash and its segregated constituents, and of the fly ash, is undertaken within the confines of enclosed conveyors and enclosed buildings.

(ii) The Owner shall ensure that all loading of the Residual Waste into vehicles for its transport from the Site is carried out entirely within the confines of the Residue Building.

(b) (i) Different constituents of the Residual Waste shall not be comingled prior to the required compliance testing, unless all Residual Waste is to be disposed of at a Waste Disposal Site that is approved to accept hazardous waste.

(ii) The Owner shall ensure that the equipment used in handling of the hazardous wastes or that came in direct contact with the hazardous wastes is not used to handle other wastes.

(iii) On an emergency basis, the Owner may use equipment used to handle the hazardous wastes to handle other wastes provided that prior to such use the equipment has been thoroughly cleaned first.

(c) (i) Only haulers approved by the Ministry shall be used to transport the Residual Waste from the Site.

(ii) The Residual Waste shall be transported from the Site in appropriately covered vehicles that will not allow fugitive dust emissions to be emitted into the natural environment during the said transport.

d) Residual Waste generated at the Site shall be disposed of shall only be disposed of at an approved waste disposal site in accordance with the requirements in the *EPA* and the *O. Reg. 347* or at a location with the appropriate jurisdictional approval or a license, if required.

(e) Should the Residual Waste limited to the conditioned fly ash and/or the bottom ash be deemed a hazardous waste, the ash shall be disposed of at an approved waste disposal site in accordance with the Land Disposal Restrictions requirements in the *EPA* and the *O. Reg.* 347 or at a location with the appropriate jurisdictional approval or a license, if required.

(6) **Wastewater Management**

(a) The Owner shall ensure that all wastewater generated at the Site is contained within enclosed buildings, tanks, pipes and conveyors at the Site and the approved outdoor Wastewater Settling Basin.

(b) The Owner shall ensure that all wastewater generated at the Site is collected in leak-proof and sufficiently designed wastewater storage facilities:

(i) Wastewater Holding Tank, to collect the continuous reject water flow from the Boiler make-up water treatment system and the Boiler blowdown, having an approximate holding capacity of 100 cubic metres, located within the confines of the Boiler Building and venting to the atmosphere; and

(ii) Wastewater Settling Basin, to collect the wastewater from the floor drains in the buildings at the Site, except for the Tipping Building and the Residue Building, the ash discharger overflow and drain water, the Boiler and turbine-generator washdown water and the APC Equipment area washdown water, having an approximate holding capacity of 38 cubic metres, located outdoors, open to the atmosphere and equipped with a filter basket and an oil skimmer board.

(c) The wastewater pumps shall be located in the area designed in accordance with the Supporting Documentation to ensure that any potential leaks or drips are contained and directed to the Wastewater Settling Basin.

(d) (i) The wastewater level in the Wastewater Holding Tank shall be monitored and controlled to ensure that the wastewater inflow to the Tank does not cause the Tank overflow.

(ii) The wastewater level in the Wastewater Settling Basin shall be monitored and controlled to ensure that the atmospheric precipitation does not cause an overflow from the Basin.

(e) The Owner shall regularly empty, and clean as necessary, all sumps, wastewater storage/holding areas and equipment that are used to contain, collect and handling the wastewater generated at the Site.

(f) Should the Owner find it necessary to remove the wastewater from the Site, the wastewater shall only be disposed of at a Ministry-approved site in accordance with the site's certificate of approval or be discharged to the sanitary sewer in accordance with the agreement with the municipality accepting the discharge.

(g) The floors of the Tipping Building and the Residue Building shall be sufficiently sloped to facilitate the flow of the wastewater generated from the floor cleaning activities and from the truck washdown towards the designated wastewater collection area.

(h) The Owner shall ensure that the Wastewater Settling Basin is regularly cleaned out and that it does not become a source of odour emissions.

(7) All activities approved under this Certificate shall only be carried out by appropriately Trained Personnel.

5. EQUIPMENT and SITE INSPECTIONS and MAINTENANCE

Operation and Maintenance

(1) Prior to the receipt of the Waste at the Site, the Owner shall prepare and update as necessary, an Operation and Maintenance Manual for all the Equipment, the APC Equipment, the CEM Systems, the Works and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility. The Manual shall be prepared in accordance with the written manufacturer's and/or supplier's specifications and good engineering practice.

As a minimum, the Operation and Maintenance Manual shall specify:

(a) operation procedures of the Equipment, the APC Equipment, the CEM Systems, the Works, and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility, in accordance with manufacturers' recommendations and good engineering practices to achieve compliance with this Certificate, the *EPA,* the *OWRA* and their Regulations;
(b) calibration procedures for the CEM Systems as required by this Certificate;
(c) procedures for start-up and shutdown, including Controlled Shutdown and Emergency Shutdown;
(d) quality assurance procedures for the operation and calibration of the CEM Systems in accordance with *40 CFR 60*, Appendix F or *Report EPS 1/PG/7,* as appropriate;
(e) Waste receiving and screening procedures;
(f) Waste, Rejected Waste and Residual Waste handling procedures;
(g) testing and monitoring procedures as required by this Certificate;
(h) maintenance and preventative maintenance procedures as required by this Certificate;
(i) Facility inspection, including frequency of inspections, procedures;
(j) procedure for handling complaints as required by this Certificate.
(k) contingency measures to resolve upset conditions and/or minimize the environmental impacts from the Facility;
(l) emergency response procedures, including procedures for dealing with power failure, fire, explosion, spills and any other potential emergencies;
(m) procedures for record keeping activities as required by this Certificate;
(n) description of the responsibilities of the Site personnel and the personnel training protocols; and
(o) a list of personnel positions responsible for operation and maintenance, including supervisory personnel and personnel responsible for handling of the emergency situations, recording and reporting pursuant to the requirements of this Certificate, along with the training and experience required for the positions and a description of the responsibilities.

(2) A copy of this Operations and Maintenance Manual shall be kept at the Site, be accessible to the Site personnel at all times and be updated, as required. The Operations and Maintenance Manual shall be available for inspection by a Provincial Officer upon request.

(3) The Owner shall implement the operation, maintenance, preventative maintenance and calibration procedures set out in the Operations and Maintenance Manual required by this Certificate.

Critical Spare Parts

(4) (a) The Owner shall prepare a list of critical spare parts, update this list annually or more frequently, if necessary, to ensure that this list is maintained up-to-date and shall be available for inspection by a Provincial Officer upon request.

(b) The Owner shall ensure that the critical spare parts are available at the Site at all times or are immediately available from an off-Site supplier.

Inspections

(5) Prior to receipt of the Waste at the Site, the Owner shall prepare a comprehensive written inspection program which includes inspections of all aspects of the Site's operations including, but not limited to the following:

(a) buildings and the indoor waste storage facilities and presence of dust and odour and leaks in or near any openings, such as doorways, window, vent, louver or any other opening;
(b) outdoor Residual Waste transport equipment, and the presence of dust and leaks at or near transfer points or the equipment seams;
(c) the Equipment, the APC Equipment, the CEM Systems, the Works and any other equipment associated with managing of the Waste and with the control of environmental impacts from the Facility;
(d) spill containment areas, loading areas and the conditions around the Wastewater Settling Basin;
(e) security fencing, gates, barriers and signs;
(f) off-site nuisance impacts such as odour, dust, litter, etc.
(g) presence of stormwater pooling at the Site; and
(h) condition of the on-Site roads for presence of leaks and drips from the waste delivery trucks or excessive dust emissions.

(6) The inspections, except for the inspection of the Works, are to be undertaken daily by the Trained Personnel in accordance with the inspection program to ensure that the Facility is maintained in good working order at all times and that no off-Site impacts are occurring. Any deficiencies detected during these regular inspections must be promptly corrected.

Inspections and Maintenance of the Works

(7) The Owner shall inspect the Works at least once a year and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

6. PERFORMANCE REQUIREMENTS

(1) The Owner shall, ensure that the Facility/Equipment is designed and operated in such a manner as to ensure that the following Performance Requirements are met:

(a) the maximum 10-minute average concentration of odour at the most impacted Sensitive Receptor, resulting from the operation of the Facility/Equipment, calculated in accordance with the procedures outlined in the attached Schedule "B", shall not exceed 1 odour unit;

(b) the noise emissions from the Facility shall comply with the limits set out in Ministry *Publication NPC-205;*

(c) the vibration emissions from the Facility shall comply with the limits set out in Ministry *Publication NPC-207.*

(2) The Owner shall ensure that the Boilers and the associated APC Equipment and the CEM Systems are designed and operated in such a manner as to ensure that the following Performance Requirements are met:

(a) (i) The temperature in the combustion zone of each Boiler shall reach a minimum of 1000 degrees Celsius (^{o}C) for one second, prior to introduction of the Waste into the combustion chamber of the Boiler during the start-up, and thereafter maintained during the entire thermal treatment cycle and subsequent shutdown until all Waste combustion is completed.

(ii) Compliance with the minimum temperature requirement shall be demonstrated by direct measurement at the location where the combustion gases have achieved the residence time of one second at a minimum temperature of 1000°C (the Target Location) or by correlation of the required temperature of 1000°C for one second to the temperature measured downstream of the Target Location as proven by a method acceptable to the Director.

(b) The concentration of residual oxygen in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, as measured and recorded by the CEM System, shall not be less than 6 percent by volume on a dry basis.

(c) (i) The operational target for the concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler is 40 milligrams per dry cubic metre, as a 4-hour rolling average, normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals, as measured and recorded by the CEM System, for the period from and including initial commissioning of the facility to twelve months following the completion of the first Source Testing program.

(ii) The 4-hour average concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, as measured and recorded by the CEM System, shall not be more than 40 milligrams per dry cubic metre, normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals, after the first twelve months following the completion of the first Source Testing program.

(d) The emissions from the Boilers after those emissions have been controlled by the associated APC Equipment for discharge into the atmosphere via the Stack shall comply with the emission concentration limits listed in the attached Schedule "C", as measured by a CEM System or by Source Testing as applicable.

(e) The Boilers shall include combustion air control systems, which are capable of automatically adjusting the distribution and the quantity of combustion air, in such a manner that changes in the Waste Processing Rate and/or Waste composition or irregularities in the loading and/or combustion shall not adversely affect the performance of the Boilers.

(f) The Boilers shall provide and maintain a high degree of gas turbulence and mixing in the combustion chamber.

(g) The Boilers shall achieve the temperature, oxygen availability and turbulence requirements over the complete range of operating parameters, including feed rate, feed characteristics, combustion air, flue gas flow rate and heat losses.

(h) The inlet temperature into each baghouse of the APC Equipment of the Boilers shall not be less than 120°C and not more than 185°C.

(3) The Owner shall install and maintain visual and audible alarm systems to alert the Facility/Equipment operators of any potential deviation from the above Performance Requirements for parameters that are continuously monitored by applicable CEM Systems and shall forthwith take all reasonable actions to bring the Equipment/Facility into compliance with all Performance Conditions.

(4) In the event that the CEM Systems indicate that emissions from the Boilers and the Stack exceed any Performance Requirements in the attached Schedule "C" for a continuous three (3) hour period, the Owner shall forthwith cut-off all Waste feed into the affected Boiler and initiate an Emergency Shutdown, while maintaining a temperature of 1000°C, as practicable, in the combustion zone of the Boiler.

Residual Waste Compliance Criteria

(5) (a) The Residual Waste generated at the Site and destined for a non-hazardous waste disposal site in Ontario shall not meet any of the criteria from the definition of "hazardous waste" set out in the *O. Reg. 347.*

(b) The Residual Waste that meets any of the criteria from the definition of "hazardous waste" set out in the *O. Reg.* 347 shall be handled and disposed of in accordance with the LDR requirements set out in the *EPA* and the *O. Reg. 347*.

(6) The Residual Waste, limited to the bottom ash, destined for a non-hazardous waste disposal site shall meet the definition of "incinerator ash" set out in the *O. Reg. 347*.

7. **TESTING, MONITORING** and **AUDITING**

Source Testing

(1) The Owner shall perform annual Source Testing in accordance with the procedures and schedule outlined in the attached Schedule "E", to determine the rate of emission of the Test Contaminants from the Stack. The first Source Testing program shall be conducted not later than six (6) months after the Commencement Date of Operation of the Facility/Equipment and subsequent Source Testing program shall be conducted once (1) every calendar year thereafter.

Continuous Monitoring

(2) The Owner shall select, test and install appropriate CEM Systems and continuous recording devices in accordance with the requirements outlined in the attached Schedule "F" to conduct and maintain a program to continuously monitor, as a minimum, the following parameters prior to commencement of operation of the Boilers:

(a) the temperature at one (1) second downstream of the combustion zone of each Boiler where most of the combustion has been completed and the combustion temperature is fully developed;

(b) the inlet temperature of the gases into each baghouse of the APC Equipment of each Boiler;

(c) the concentration of carbon monoxide, oxygen and organic matter (as methane) in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler;

(d) the opacity and moisture content of the flue gas and the concentration of oxygen, nitrogen oxides, sulphur dioxide, hydrogen chloride, hydrogen fluoride and ammonia in the Undiluted Gases leaving the baghouse of the APC Equipment of each Boiler.

Long-Term Sampling for Dioxins and Furans

(3) (a) The Owner shall develop, install, maintain and update as necessary a long-term sampling system, with a minimum monthly sampling frequency, to measure the concentration of Dioxins and Furans in the Undiluted Gases leaving the APC Equipment associated with each Boiler. The performance of

this sampling system will be evaluated during the annual Source Testing programs in accordance with the principles outlined by 40 CFR 60, Appendix B, Specification 4.

(b) The Owner shall evaluate the performance of the long-term sampling system in determining Dioxins and Furans emission trends and/or fluctuations as well as demonstrating the ongoing performance of the APC Equipment associated with the Boilers.

Ambient Air Monitoring

(4) (a) The Regions shall develop and implement the Ambient Air Monitoring and Reporting Plan, in accordance with the requirements set out in the EA Approval and as determined to be acceptable by the Regional Director.

(b) The Regions shall report the results of the Ambient Air Monitoring program to the Regional Director in accordance with the Ambient Air Monitoring and Reporting Plan and in accordance with the requirements of Condition 14.

(c) The Regions shall post the Ambient Air Monitoring and Reporting Plan and the results of the Ambient Air Monitoring program on the Owner's web site for the Facility in accordance with the requirements of the EA Approval and Condition 15.

Noise Monitoring - Acoustic Audit

(5) The Owner:

(a) shall carry out Acoustic Audit measurements on the actual noise emissions due to the operation of the Facility. The Acoustic Audit measurements shall be carried out in accordance with the procedures in *Publication NPC-103* and in accordance to the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director;

(b) shall submit an Acoustic Audit Report on the results of the Acoustic Audit, prepared by an Independent Acoustical Consultant, in accordance with the requirements of *Publication NPC-233* and the Noise Monitoring and Reporting Plan prepared in accordance with the requirements set out in the EA Approval and as approved by the Director, to the District Manager and the Director, not later than three (3) months after the commencement of operation of the Facility.

(6) The Director:

(a) may not accept the results of the Acoustic Audit if the requirements of *Publication NPC-233* or the approved Noise Monitoring and Reporting Plan were not followed;

(b) may require the Owner to repeat the Acoustic Audit if the results of the Acoustic Audit are found unacceptable to the Director.

Residual Waste Testing

(7) (a) A minimum of six (6) months prior to the Commencement Date of Operation, the Owner shall submit to the Director for approval, a Testing Protocol for testing of the bottom ash for compliance with the criteria set out in the "incinerator ash" definition from the *O. Reg.* 347 and for testing of the Residual Waste for compliance with the criteria set out in this Certificate.

(b) As a minimum, the Testing Protocol shall comply with the Ministry's regulatory requirements for sampling and testing of waste, including the requirements set out in the Ministry's document entitled "Principles of Sampling and Analysis of Waste for TCLP under Ontario Regulation 347", dated February 2002, as amended.

(c) The Testing Protocol shall include the rationale for the proposed methods and the following:

(i) a sampling protocol, including the proposed number of samples to be taken and their locations, to ensure that representative sample(s) are being tested for compliance with this Certificate;

(ii) sample(s) handling and preserving procedures;

(iii) analytical protocol for the applicable contaminants to ensure that appropriate analytical method(s) are being used for compliance testing required by this Certificate; and

(iv) a testing protocol for the bottom ash during the Site commissioning period.

(d) The Owner shall implement the Testing Protocol on the Commencement Date of Operation.

(8) For handling of the bottom ash as a solid non-hazardous waste, the Owner shall follow the following schedule for compliance testing:

(a) for the Site commissioning period, the bottom ash shall be tested in accordance with the Testing Protocol approved by the Director;

(b) for the period following the Site commissioning period, the bottom ash shall be tested for the content of the combustible materials on an annual basis, until the compliance testing results indicate that the bottom ash meets the “incinerator ash” definition from the *O. Reg. 347* for three (3) consecutive years, following which a triennial compliance testing event may be carried out;

(c) should any annual or triennial compliance testing event indicate that the bottom ash does not meet the "incinerator ash" definition, prior to each of the next three (3) shipments from the Site, compliance testing of each of the three (3) shipments shall be carried out. Once three (3) consecutive tests re - establish compliance with the "incinerator ash" definition from the *O. Reg. 347* and that the bottom ash does not exceed the Leachate Toxicity Criteria, the compliance testing schedule set out in Condition 7.(8)(b) may be resumed; and

(d) should the results of any compliance testing of the bottom ash indicate that the concentrations of the leachate toxic contaminants in the bottom ash equal to or exceed the Leachate Toxicity Criteria, the bottom ash shall be handled as a hazardous waste. Once three (3) consecutive tests re - establish that the bottom ash does not exceed the Leachate Toxicity Criteria, the bottom ash compliance testing schedule set out in Condition 7.(8)(b) may be resumed.

(9) (a) For handling of the bottom ash as a hazardous waste and for handling of the fly ash, prior to final disposal at a hazardous waste landfill site in Ontario, the Owner shall undertake any sampling and testing that would be required to comply with the LDR requirements set out in the *EPA* and the *O. Reg. 347*.

(b) The Owner shall follow the following schedule for compliance testing:

(i) prior to each of the first three (3) shipments of the ash from the Site, the ash shall be tested so that for the compliance with the LDR requirements can be demonstrated;

(ii) following the three (3) initial compliance testing events, the ash shall be tested on an annual basis, until the compliance testing results indicate that the ash meets the LDR requirements during the three (3) consecutive years, following which a triennial compliance testing may be carried out; and

(iii) should any annual or triennial compliance testing event indicate that the ash does not meet the LDR requirements, prior to next three (3) shipments from the Site, compliance testing of each of the three (3) shipments shall be carried out. Once three (3) consecutive tests re - establish compliance with the LDR requirements, the compliance testing schedule set out in Condition 7.(9)(b)(ii) may be resumed.

Soil Testing:

(10) (a) Within one hundred and twenty (120) days from the date of this Certificate, the Regions shall undertake the soil testing in accordance with the Soil Testing Plan required by this Certificate.

(b) The soil testing shall be repeated every three (3) years or as agreed upon in writing by the Regional Director.

Disposal of Residual Waste

(11) The Owners shall ensure that no portion of the Residual Waste undergoing compliance testing is transferred from the Site until the results of the compliance testing required by this Certificate demonstrate compliance with the relevant Ministry's requirements.

(12) Bottom ash that is not a hazardous waste, as defined in the *O. Reg. 347,* may be disposed of at an approved non-hazardous waste landfill site or at a site approved to accept such waste by an appropriate government agency of equivalent jurisdiction.

(13) Residual Waste shall be treated to comply with the LDR requirements set out in the *EPA* and the *O. Reg. 347* prior to disposal of at an approved hazardous waste landfill site or at a site approved to accept such waste by an appropriate government agency of equivalent jurisdiction.

Groundwater and Surface Water Monitoring

(14) (a) The Regions shall develop and implement the Groundwater and Surface Water Monitoring Plan, in accordance with the requirements set out in the EA Approval and as determined to be acceptable to the Regional Director.

(b) The Regions shall report the results of the Groundwater and Surface Water Monitoring program to the Regional Director and to the Director in accordance with the schedule set out in the EA Approval and in accordance with the requirements of Condition 14.

(c) The Regions shall post the Groundwater and Surface Water Monitoring Plan and the results of the Groundwater and Surface Water Monitoring program on the Owner's web site for the Facility in accordance with the requirements of the EA Approval and Condition 15.

8. NUISANCE IMPACT CONTROL and HOUSEKEEPING

Odour Management

(1) (a) The Owner shall maintain a negative air pressure atmosphere in the Tipping Building at all times to contain any potential odours within the confines of the Tipping Building.

(b) (i) Once per year, or as required by the District Manager, the Owner shall undertake a test to measure the worse case scenario negative air pressure atmosphere throughout the Tipping Building, while the activities approved in this Certificate are carried out in the Tipping Building.

(ii) Notwithstanding the requirements set out in Condition 8.(1)(b)(i), the Owner shall install sufficient instrumentation to measure the air flow into the Boilers and demonstrate that adequate air flow is maintained

to maintain a negative air pressure atmosphere throughout the Tipping Building.

(c) In the event that adequate negative air pressure cannot be maintained, the Owner shall implement any necessary additional odour containment and control measures, including, but not necessarily limited to, those in the required Contingency and Emergency Response Plan.

(2) The Owner shall ensure that the entrance and exit doors into the Tipping Building, the Residue Building and the Grizzly Building are kept closed at all times except to permit the entry or exit of the respective waste transport vehicles and waste handling equipment into and out of these Buildings.

(3) The Owner shall ensure that, at all times, the air from the Tipping Building, the Residue Building, the Grizzly Building and from the Equipment is exhausted through an appropriate and fully functional APC Equipment approved by this Certificate.

(4) The Owner shall undertake appropriate housekeeping activities, including regular cleaning of the tipping floor to control potential sources of fugitive odour emissions.

(5) The Owner shall ensure that no Waste handling equipment or empty storage containers are stored outside, unless they have been washed to prevent fugitive odour emissions.

(6) The Owner shall regularly clean all equipment and storage areas that are used to handle, process and store waste at the Site, including the surfaces of the outdoor spill containment areas, as required.

(7) (i) Prior to the receipt of Waste at the Site, the Owner shall provide documentation which outlines the testing carried out by a licensed structural engineer to confirm the effectiveness of the containment in the buildings, conveyors and tanks and silos at the Site.

(ii) The testing shall be carried out and repeated as directed by the District Manager in accordance with the test protocol prepared in consultation with and approved by the District Manager.

(iii) These tests shall be repeated as directed or agreed by the District Manager.

(8) The Owner shall prepare and implement an Odour Management and Mitigation Plan in accordance with the requirements set out in the EA Approval and as determined to be acceptable to the Regional Director.

(9) (a) In addition to the requirements set out in the EA Approval, the Odour Management and Mitigation Plan shall include the following:

(i) identification of all potential sources of odourous emissions;

(ii) description of the preventative and control measures to minimize odourous emissions from the identified sources;
(iii) procedures for the implementation of the Odour Management and Mitigation Plan;
(iv) inspection and maintenance procedures to ensure effective implementation of the Odour Management and Mitigation Plan; and
(v) procedures for verification and recording the progress of the implementation of the Odour Management and Mitigation Plan.

(b) The Owner shall continue to submit an updated Odour Management and Mitigation Plan until such time as the Regional Director notifies the Owner in writing that further submissions are no longer required.

Vehicles and Traffic

(10) (a) The Owner shall ensure that all vehicles transporting waste to and from the Site are not leaking or dripping waste when arriving at or leaving the Site.

(b) Should the Owner become aware that the truck(s) delivering waste to the Site have leaked wastewater on the municipal roadways, the Owner shall immediately report the violation to the owner of the vehicle(s) and to the District Manager.

(c) The Owner shall ensure that the exterior of all vehicles delivering Waste to the Site or hauling waste from the Site is washed prior to the trucks' departure from the Site, if necessary.

(d) Any necessary truck washing shall occur only in the designated wash down area of the Tipping Building or the Residue Building.

(11) The Owner shall ensure that there is no queuing or parking of vehicles that are waiting to enter the Site on any roadway that is not a distinct part of the Site.

Litter

(12) The Owner shall:

(a) take all practical steps to prevent the escape of litter from the Site;
(b) pick up litter around the Site on a daily basis, or more frequently if necessary; and
(c) if necessary, erect litter fences around the areas causing a litter problem.

Dust

(13) The Owner shall ensure that all on-site roads and operations/yard areas are regularly swept/washed to prevent dust impacts off-Site.

Vermin and Vectors

(14) The Owner shall:

(a) implement necessary housekeeping procedures to eliminate sources and potential sources of attraction for vermin and vectors; and

(b) hire a qualified, licensed pest control professional to design and implement a pest control plan for the Site. The pest control plan shall remain in place, and be updated from time to time as necessary, until the Site has been closed and this Certificate has been revoked.

Visual Screening

(15) The Owner shall provide visual screening for the Site in accordance with the documentation included in the attached Schedule "A".

9. STAFF TRAINING

(1) (a) The Owner shall ensure that all operators of the Site are trained with respect to the following, as per the specific job requirements of each individual operator:

(i) terms and conditions of this Certificate and the requirements of the EA Approval;
(ii) operation and management of the Site, or area(s) within the Site, as per the specific job requirements of each individual operator, and which may include procedures for receiving, screening and identifying Waste, refusal, handling, processing and temporarily storing wastes, operation of the Equipment, the APC Equipment, the CEM System and the Works;
(iii) testing, monitoring and operating requirements;
(iv) maintenance and inspection procedures;
(v) recording procedures;
(vi) nuisance impact control and housekeeping procedures;
(vii) procedures for recording and responding to public complaints;
(viii) an outline of the responsibilities of Site personnel including roles and responsibilities during emergency situations;
(ix) the Contingency and Emergency Response Plan including exit locations and evacuation routing, and location of relevant equipment available for emergency situations;
(x) environmental, and occupational health and safety concerns pertaining to the wastes to be handled;
(xi) emergency first-aid information; and
(xii) relevant waste management legislation and regulations, including the *EPA,* the *OWRA,* the *O. Reg. 347,* the *O. Reg. 419/05* and the Ministry guidelines affecting thermal treatment facilities.

(2) The Owner shall ensure that all personnel are trained in the requirements of this Certificate relevant to the employee's position:

(a) upon commencing employment at the Site in a particular position;
(b) whenever items listed in Condition 9.(1) are changed or updated; and
(c) during the planned refresher training.

10. COMPLAINTS / ODOUR-CONTAMINANT EMISSIONS RESPONSE PROCEDURE

(1) The Owner or a designated representative of the Owner shall be available to receive public complaints caused by the operations at the Site twenty-four (24) hours per day, seven (7) days per week.

(2) If at any time, the Owner or the Ministry receives a complaint or the Owner or the Provincial Officer detects an emission of odour or any contaminant, (Emission Event), from the Site, in addition to the requirements set out in the EA approval, the Owner shall record all relevant information in the computerized tracking system and shall respond to the complaint/Emission Event according to the following procedure:

Step 1: Record of Complaint/Emission Event

(a) (i) The Owner shall record each complaint/Emission Event and each record shall include the following:

(A) name, address and the telephone number of the complainant, if known;
(B) time and date of the complaint/Emission Event;
(C) details of the complaint; and

(ii) After the complaint/Emission Event has been recorded in the tracking system, the Owner shall immediately report to the District Manager by phone or e-mail during office hours and to the Ministry's Spills Actions Centre at 1-800-268-6060 after office hours on the receipt of the complaint or occurrence of the Emission Event.

Step 2: Investigation and Handling of Complaint/Emission Event

(b) The Owner shall immediately initiate investigation of the complaint/Emission Event. As a minimum, the investigation shall include the following:

(i) determination of the activities being undertaken at the Site at the time of the complaint/Emission Event;
(ii) meteorological conditions including, but not limited to the ambient temperature, approximate wind speed and its direction.
(iii) determination if the complaint is attributed to activities being undertaken at the Site and if so, the possible cause(s) of the complaint/Emission Event; and

(iv) determination of the remedial action(s) to address the cause(s) of the Complaint/Emission Event, and the schedule for the implementation of the necessary remedial action(s).

(c) The Owner shall respond to the complainant, if known, and the response shall include the results of the investigation of the Complaint, the action(s) taken or planned to be taken to address the cause(s) of the Complaint, and if any follow-up response(s) will be provided.

(d) Upon completed investigation of the Complaint/Emission event, the Owner shall, within three (3) business days, submit a report to the District Manager on the Complaint, on the action(s) taken or planned to be taken to address the cause(s) of the Complaint and on all proposed action(s) to prevent recurrence of the Complaint/Emission Event in the future.

(3) If, in the opinion of the District Manager, failure of the APC Equipment and/or any other process or equipment upset or malfunction results in off-site Complaint/Emission Event, confirmed by the Owner or a Provincial Officer of the Ministry, the Owner shall, immediately upon notification from the District Manager, implement any necessary additional control measures, including, but not necessarily limited to, those in the Contingency and Emergency Response Plan required by this Certificate.

(4) If the District Manager deems the additional control measures taken as per condition 10.(3) to be unsuitable, insufficient or ineffective, the District Manager may direct the Owner, in writing, to take further measures to address the noted failure, upset or malfunction including pursuant to section 39 of the *EPA* requiring a reduction in the receipt of Waste, cessation of the receipt of Waste, removal and off-site disposal of Waste from the Tipping Building as well as making repairs or modifications to equipment or processes.

11. **CONTINGENCY and EMERGENCY RESPONSE PLAN**

(1) (a) The Owner shall develop and implement a Contingency and Emergency Response Plan in accordance with the requirements set out in the EA Approval.

(b) Notwithstanding the requirements set out in the EA Approval, the Contingency and Emergency Response Plan shall be prepared in consultation with the District Manager or designate, the local Municipality and the Fire Department.

(2) In addition to the requirements set out in the EA Approval, the Contingency and Emergency Response Plan, as a minimum, shall include the following:

(a) the Site plan clearly showing the equipment layout and all storage areas for wastes and reagents;

(b) a list of Site personnel responsible for the implementation of the contingency measures and various emergency response tasks and their training requirements;

(c) a list of equipment and materials required for the implementation of the contingency measures and the emergency situation response;

(d) maintenance and testing program for equipment required for the implementation of the contingency measures and the emergency situation response;

(e) procedures to be undertaken as part of the implementation of the contingency measures and the emergency situation response;

(f) names and telephone numbers of waste management companies available for emergency response;

(g) notification protocol, with names and telephone numbers of persons to be contacted, including the Owner, the Site personnel, the Ministry of the Environment Spills Action Centre and the York Durham District, the local Fire and Police Departments, the local Municipality, the local Medical Officer of Health, and the Ministry of Labour;

(h) procedures and actions to be taken should the incoming Waste not meet the applicable quality criteria specified in this Certificate;

(i) procedures and actions to be taken should the outgoing Residual Waste fail to meet the criteria specified in this Certificate;

(j) procedures and actions to be taken should the current disposal options for the outgoing Residual Waste become unavailable;

(k) design of the contingency measure, procedures and actions should the emissions from the Site, including the fugitive odour/dust emissions, cause occurrences of public Complaints;

(l) procedures and actions to be taken should the Owner be unable to maintain the negative pressure in the Tipping Building;

(m) procedures and actions to be taken should the occurrence of Complaints require the Owner to suspend the waste processing activities at the Site; and

(n) identification and risk assessment of all reasonably foreseeable incidents that may result in a discharge into the natural environment of any contaminant in an amount, concentration or level in excess of that prescribed by the Regulations and/or imposed by this Certificate, including but not limited to:

    (i) a breakdown of the Facility/Equipment or part of the Facility/Equipment, including the APC Equipment and the CEM Systems associated with the Boilers;

    (ii) CEM Systems indicate that the Boilers and associated APC Equipment have been out of compliance with the Performance Requirements;

    (iii) any change in process parameters which may result in non compliance with the Performance Requirements;

    (iv) power failure resulting in the use of the Emergency Diesel Generator or Total Power Failure; and

    (v) description of the preventative and control measures to minimize the occurrence or impacts of the above incidents; and

    (vi) procedures for corrective measures and timelines to take to address the above incidents in a timely manner to effectively prevent or minimize the discharge of any contaminant into the natural environment and continue to maintain compliance with the *EPA* , the Regulations and

this Certificate, including procedures for Waste Processing Rate reduction, waste feed cut-off, Controlled Shutdown or Emergency Shutdown of the Boilers as applicable.

(3) The Owner shall submit the finalized Contingency and Emergency Response Plan to the Director a minimum of one hundred and twenty (120) days prior to the Commencement Date of Operation, for approval.

(4) An up-to-date version of the Contingency and Emergency Response Plan shall be kept at the Site at all times, in a central location available to all staff, and it shall be available for inspection by a Provincial Officer upon request.

(5) The Owner shall ensure that the names and telephone numbers of the persons to be contacted in the event of an emergency situation are kept up-to-date, and that these numbers are prominently displayed at the Site and at all times available to all staff and emergency response personnel.

(6) The Contingency and Emergency Response Plan shall be reviewed on a regular basis and updated, as necessary. The revised version of the Contingency and Emergency Response Plan shall be submitted to the local Municipality and the Fire Department for comments and to the District Manager for comments and concurrence.

(7) The Owner shall implement the recommendations of the updated Contingency and Emergency Response Plan, immediately upon receipt of the written concurrence from the District Manager.

12. EMERGENCY SITUATION RESPONSE and REPORTING

(1) The Owner shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this Site and manage any emergency situation in accordance with the Contingency and Emergency Response Plan.

(2) The Owner shall ensure that the equipment and materials listed in the Contingency and Emergency Response Plan are immediately available at the Site, are in a good state of repair, and fully operational at all times.

(3) The Owner shall ensure that all Site personnel responsible for the emergency situation response are fully trained in the use of the equipment and related materials, and in the procedures to be employed in the event of an emergency.

(4) All Spills as defined in the *EPA* shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the emergency situation, and the action taken for clean-up, correction and prevention of future occurrences.

13. **SUBMISSIONS to the REGIONAL DIRECTOR or DISTRICT MANAGER**

(1) The Owner shall notify the District Manager in writing, at least six (60) days prior to the scheduled date for the first receipt of Waste at the Site, as to whether or not the construction of the Facility has been carried out in accordance with this Certificate to a point of Substantial Completion.

(2) (a) The Owner shall forthwith notify the District Manager and the Spills Action Centre by telephone, when any of the following incidents occur that may result in a discharge into the natural environment of any contaminant in an amount, concentration or level in excess of that prescribed by the Regulations and/or imposed by this Certificate:

(i) CEM Systems indicate that the Boilers and associated APC Equipment have been out of compliance with the Performance Requirements triggering a Waste Processing Rate Reduction, Waste Feed cut-off, Controlled Shutdown or Emergency Shutdown as specified in the Emergency Response and Contingency Plan;
(ii) failure of the APC Equipment associated with the Boilers; and
(iii) power failure resulting in the use of the emergency diesel generator or Total Power Failure;

(b) In addition to fulfilling the notification requirements from the *EPA,* the Owner shall prepare and submit a written report to the District Manager with respect to any of the above said occurrences, within five (5) calendar days of the occurrence, in the following format:

(i) date of the occurrence;
(ii) general description of the occurrence;
(iii) duration of the occurrence;
(iv) effect of the occurrence on the emissions from the Facility;
(v) measures taken to alleviate the effect of the occurrence on the emissions from the Facility; and
(vi) measures taken to prevent the occurrence of the same or similar occurrence in the future.

(3) Should a Spill, as defined in the *EPA*, occur at the Site, in addition to fulfilling the requirements from the *EPA* and applicable regulations, the Owner shall submit to the District Manager a written report within three (3) calendar days outlining the nature of the Spill, remedial measure taken and the measures taken to prevent future occurrences at the Site.

(4) (a) Within ninety (90) days from the date of this Certificate, the Regions shall prepare and submit to the District Manager for concurrence, a Soil Testing Plan to monitor the impact of the Site operations at the locations where the ambient air monitoring is proposed by the Owner in accordance with the requirements set out in the EA Approval.

(b) (i) This Plan shall ensure that representative samples of the soil to be tested are collected in sufficient numbers and that the samples are properly preserved and tested so that reliable data on the soil characteristics is collected.

(ii) As a minimum, the Plan shall include testing for cadmium, lead, chromium, nickel, cobalt, copper, molybdenum, selenium, zinc and mercury, Dioxins and Furans.

(iii) This Plan shall comply with the Ministry's regulatory requirements for sampling and testing of soil and it shall include the rationale for the proposed methods.

(iv) This Plan be kept at the Site at all times and be available for inspection by a Provincial Officer upon request.

14. RECORDS KEEPING

(1) Any information requested by the Ministry concerning the Facility and its operation under this Certificate, including, but not limited to, any records required to be kept by this Certificate, shall be provided to the Ministry, upon request**,** in a timely manner.

(2) The Owner shall retain, for a minimum of seven (7) years from the date of their creation, except as noted below, all reports, records and information described in this Certificate.

Daily Activities

(3) The Owner shall maintain an on-Site written or digital record of activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. As a minimum, the record shall include the following:

(a) date of record and the name and signature of the person completing the report;
(b) quantity and source of the incoming Waste received at the Site;
(c) records of the estimated quantity of Waste thermally treated in the Boilers;
(d) quantity of the Unacceptable Waste received at the Site by the end of the approved Waste receipt period and the type(s) of the Unacceptable Waste received;
(e) quantity and type of the Residual Waste shipped from the Site, including any required outgoing Residual Waste characterization results;
(f) destination and/or receiving site(s) for the Residual Waste shipped from the Site;
(g) quantity and type of any Rejected Waste accepted at the Site;
(h) destination and/or receiving site(s) for the Rejected Waste shipped from the Site;
(i) housekeeping activities, including litter collection and washing/cleaning activities, etc.
(j) amount of electricity produced;

(k) amount of excess electricity exported to the electrical grid.

Monitoring and Testing Records

(4) The Owner shall maintain an on-Site written or digital record of activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. As a minimum, the record shall include the following:

(a) day and time of the activity;
(b) all original records produced by the recording devices associated with the CEM Systems;
(c) a summary of daily records of readings of the CEM Systems, including:
  (i) the daily minimum and maximum 4-hour average readings for carbon monoxide;
  (ii) the daily minimum and maximum one hour average readings for oxygen;
  (iii) the daily minimum and maximum 10-minute average readings for organic matter;
  (iv) the daily minimum and maximum 24-hour average readings for sulphur dioxide;
  (v) the daily minimum and maximum 24-hour average readings for nitrogen oxides;
  (vi) the daily minimum and maximum 24-hour average readings for hydrogen chloride;
  (vii) the daily minimum and maximum 6-minute average and 2-hour average opacity readings; and
  (viii) the daily minimum and maximum one-hour average readings for temperature measurements.
(d) records of all excursions from the applicable Performance Requirements as measured by the CEM Systems, duration of the excursions, reasons for the excursions and corrective measures taken to eliminate the excursions;
(e) all records produced during any Acoustic Audit;
(f) all records produced during any Source Testing;
(g) all records produced by the long term sampling program for Dioxins and Furans required by this Certificate;
(h) all records produced during the Residual Waste compliance testing;
(i) all records produced during the Soil Testing;
(j) all records produced during the Groundwater and Surface Water Monitoring required by this Certificate;
(k) all records produced during the Ambient Air Monitoring required by this Certificate;
(l) all records associated with radiation monitoring of the incoming Waste, including but not limited to:
  (i) transaction number;
  (ii) hauler;
  (iii) vehicle ID;
  (iv) alarm level;
  (v) maximum CPS;
  (vi) uSv/hr;

(vii) comment;
(viii) background CPS;
(ix) driver time in and out; and
(x) name of the Trainer Personnel that carried out the monitoring.

(m) results of the containment testing carried out in the buildings, conveyors, tanks and silos, as required;
(n) results the negative pressure in the Tipping Building carried out, as required.

Inspections/Maintenance/Repairs

(5) The Owner shall maintain an on-Site written or digital record of inspections and maintenance as required by this Certificate. As a minimum, the record shall include the following:

(a) the name and signature of the Trained Personnel that conducted the inspection;
(b) the date and time of the inspection;
(c) the list of any deficiencies discovered, including the need for a maintenance or repair activity;
(d) the recommendations for remedial action;
(e) the date, time and description of actions (repair or maintenance) undertaken;
(f) the name and signature of the Trained Personnel who undertook the remedial action; and
(g) an estimate of the quantity of any materials removed during cleaning of the Works.

Emergency Situations

(6) The Owner shall maintain an on-Site written or digital record of the emergency situations. As a minimum, the record shall include the following:

(a) the type of an emergency situation;
(b) description of how the emergency situation was handled;
(c) the type and amount of material spilled, if applicable;
(d) a description of how the material was cleaned up and stored, if generated; and
(e) the location and time of final disposal, if applicable; and
(f) description of the preventative and control measures undertaken to minimize the potential for re-occurrence of the emergency situation in the future.

Complaints Response Records

(7) The Owner shall establish and maintain a written or digital record of complaints received and the responses made as required by this Certificate.

Training

(8) The Owner shall maintain an on-Site written or digital record of training as required by this Certificate. As a minimum, the record shall include the following:

(a) date of training;
(b) name and signature of person who has been trained; and
(c) description of the training provided.

Reports

(9) The Owner shall keep at the Site the following reports required by this Certificate:

(a) the ESDM Report
(b) the Acoustic Assessment Report;
(c) the Annual Report; and
(d) the Third Party Audit.

15. REPORTING

Annual Report

(1) By March 31st following the end of each operating year, the Owner shall prepare and submit to the District Manager and to the Advisory Committee, an Annual Report summarizing the operation of the Site covering the previous calendar year. This Annual Report shall include, as a minimum, the following information:

(a) a summary of the quality and the quantity of the Wastes accepted at the Site, including the maximum amount of the Waste received annually and daily and the sources of the Waste;

(b) a summary of the quality and the quantity of the Residual Waste shipped from the Site, including the analytical data required to characterize the Residual Waste, the off-Site destinations for the Residual Waste and its subsequent use, if known;

(c) estimated material balance for each month documenting the maximum amount of wastes stored at the Site;

(d) annual water usage;

(e) annual amount of the electricity produced and the annual amount of the electricity exported to the electrical grid;

(f) summaries and conclusions from the records required by Conditions 14.(3) through 14.(8) of this Certificate;

(g) the Emission Summary Table and the Acoustic Assessment Summary Table for the Facility as of December 31 from the previous calendar year;

(h) a summary of dates, duration and reasons for any environmental and operational problems, Boilers downtime, APC Equipment and CEM System malfunctions that may have negatively impacted the quality of the environment or any incidents triggered by the Emergency Response and

Contingency Plan and corrective measures taken to eliminate the environmental impacts of the incidents;

(i) a summary of the dates, duration and reasons for all excursions from the applicable Performance Requirements as measured by the CEM Systems or as reported by the annual Source Testing, reasons for the excursions and corrective measures taken to eliminate the excursions;

(j) results of the evaluation of the performance of the long-term sampling system in determining the Dioxins and Furans emission trends and/or fluctuations for the year reported on as well as demonstrating the ongoing performance of the APC Equipment associated with the Boilers;

(k) dates of all environmental complaints relating to the Site together with cause of the Complaints and actions taken to prevent future Complaints and/or events that could lead to future Complaints;

(l) any environmental and operational problems that could have negatively impacted the environment, discovered as a result of daily inspections or otherwise and any mitigative actions taken;

(m) a summary of any emergency situations that have occurred at the Site and how they were handled;

(n) the results and an interpretive analysis of the results of the groundwater and surface water, including an assessment of the need to amend the monitoring programs;

(o) summaries of the Advisory Committee meetings, including the issues raised by the public and their current status;

(p) any recommendations to improve the environmental and process performance of the Site in the future;

(q) statement of compliance with this Certificate, including compliance with the *O. Reg. 419/05* and all air emission limits based on the results of source testing, continuous monitoring and engineering calculations, as may be appropriate; and

(r) interpretation of the results and comparison to the results from previous Annual Reports to demonstrate the Facility's impact on the environment.

Third Party Audit

(2) (a) The Regions shall ensure that an independent technical review of the operations at the Site is undertaken in accordance with the requirements of the EA Approval.

(b) In addition to the Third Party Audit requirements set out in the EA approval, the Third Party Audit shall include the following:

(i) a review of the data from the monitoring and testing required by this Certificate;
(ii) a review of all complaints received about the operation of the Facility;
(iii) any recommendations for improving the operation of the Facility received from the Advisory Committee; and
(iv) a recommendation of any improvements that could be made to ensure that the operation of the Facility is optimized and is protective of the health and safety of people and the environment.

(3) The Regions shall submit a Written Audit Report on the results of the independent technical review to the Regional Director in accordance with the Audit Plan and retain a copy at the Site.

Soil Testing Report

(4) Within one (1) month of completion of each Soil Testing event, the Regions shall submit to the District Manager a Soil Testing Report, which includes the details on the sampling/testing procedures, the results of the testing and a comparison with the results obtained during the previous Soil Testing.

16. PUBLIC ACCESS TO DOCUMENTATION

(1) The Owner shall, at all times, maintain documentation that describes the current operations of the Facility. The Owner shall post the documentation at the website for the undertaking and during regular business hours, the Owner shall make the following documents available for inspection at the Site by any interested member of the public, upon submission to the Ministry for review:

(a) a current ESDM Report that demonstrates compliance with the Performance Limits for the Facility regarding all Compounds of Concern;

(b) a current Acoustic Assessment Report that demonstrates compliance with the Performance Limits for the Facility regarding noise emissions;

(c) the most recent Annual Report;

(d) the most current Third Party Audit Report;

(e) Odour Management and Mitigation Plan, prepared in accordance with the requirements of the EA Approval;

(f) Noise Monitoring and Reporting Plan, prepared in accordance with the requirements of the EA Approval; and

(g) Groundwater and Surface Water Monitoring and Reporting Plan, prepared in accordance with the requirements of the EA Approval.

(2) The Owner shall ensure that necessary hardware and software are provided at a location available to the public, to provide on-line real-time reporting of the operating parameter data for the Facility, including acceptable operating limits, stack emissions, and all other parameters for which continuous monitoring is required and that continuous records of the same be kept and made available to the public.

17. ADVISORY COMMITTEE

(1) The Regions shall establish an Advisory Committee in accordance with the requirements set out in the EA Approval.

18. CLOSURE of the SITE

(1) A minimum of nine (9) months prior to closure of the Site, the Owner shall submit, for approval by the Director, a written Closure Plan for the Site. This Plan shall include, as a minimum, a description of the work that will be done to facilitate closure of the Site and a schedule for completion of that work.

(2) Within ten (10) days after closure of the Site, the Owner shall notify the Director and the District Manager, in writing, that the Site is closed and that the approved Closure Plan has been implemented.

SCHEDULE "A"

Supporting Documentation

(1) Applications for a Certificate of Approval (Air) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) Emission Summary and Dispersion Modelling Report, dated March 2011, prepared by Golder Associates;

(b) Acoustic Assessment Report prepared by Golder Associates Ltd., dated March 2011 and signed by Paul Niejadlik.

(2) Applications for a Provisional Certificate of Approval (Waste Disposal Site) dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of York and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) Attachment #1 containing the "Design and Operations Report", dated March 2011, prepared by Golder Associates Ltd.;

(b) Attachment #3 containing the "Public Consultation Report", dated March 2011, prepared by Golder Associates Ltd.;

(c) Attachment #4 containing the Host Community Agreement

(d) Attachment #5 containing the proof of legal name for Covanta Durham York Renewable Energy Limited Partnership; and

(e) A letter May 24, 2011 from Anthony Ciccone, Golder Associates Ltd., to Margaret Wojcik, Ontario Ministry of the Environment, providing additional technical information on the proposal and attaching a report entitled "Amendment #1 Durham York Energy Centre Design and Operations Report", dated May 2011;

(3) Applications for a Certificate of Approval of Municipal and Private Sewage Works dated March 2, 2011, each signed by Cliff Curtis, Commissioner of Works, The Regional Municipality of Durham, by Erin Mahoney, Commissioner of Environmental Services, The Regional Municipality of Durham and by Matthew R. Mulcahy, Senior Vice President, Business Development, Covanta Durham York Renewable Energy Limited Partnership, and the following supporting documentation:

(a) "Surface Water and Groundwater Technical Study Report" dated July 2009, prepared by Jacques Whitford, Markham, Ontario (CD Report).

(b) "Stormwater Design Model Output" prepared by Sigma Energy, dated March 2001 (CD Report).

(c) Clearance letter from Central Lake Ontario Conservation date February 22, 2011.

(d) A letter dated March 23, 2011, from Brian Bahor, Covanta Energy Corporation, to Stefanos Habtom, Ontario Ministry of the Environment, providing additional technical design information on the proposed stormwater management ponds.

SCHEDULE "B"

Procedure to calculate and record the 10-minute average concentration of odour at the Point of Impingement and at the most impacted Sensitive Receptor

(a) Calculate and record one-hour average concentration of odour at the Point of Impingement and at the most impacted Sensitive Receptor, employing CALPUFF atmospheric dispersion model or the dispersion model acceptable to the Director that employs at least five (5) years of hourly local meteorological data and that can provide results reported as individual one-hour average odour concentrations.

(b) Convert and record each of the one-hour average concentrations predicted over the five (5) years of hourly local meteorological data at the Point of Impingement and at the most impacted Sensitive Receptor to 10-minute average concentrations using the One-hour Average to 10-Minute Average Conversion described below; and

(c) Record and present the 10-Minute Average concentrations predicted to occur over a five (5) year period at the Point of Impingement and at the most impacted Sensitive Receptor in a histogram. The histogram shall identify all predicted 10-minute average odour concentration occurrences in terms of frequency, identifying the number of occurrences over the entire range of predicted odour concentration in increments of not more than 1/10 of one odour unit. The maximum 10-minute average concentration of odour at the Sensitive Receptor will be considered to be the maximum odour concentration at the most impacted Sensitive Receptor that occurs and is represented in the histogram, disregarding outlying data points on the histogram as agreed to by the Director.

One-hour Average To 10-minute Average Conversion

1. Use the following formula to convert and record one-hour average concentrations predicted by the CALPUFF atmospheric dispersion model or by the dispersion model acceptable to the Director to 10-minute average concentrations:

$$X10min = X60min*1.65$$

where X10min = 10-minute average concentration
X60min = one-hour average concentration

SCHEDULE "C"

PERFORMANCE REQUIREMENTS

In-Stack Emission Limits

Parameter	In-Stack Emission Limit	Verification of Compliance
Total Suspended Particulate Matter (filterable particulate measured in accordance with the Ontario Source Testing Code)	9 mg/Rm3	Results from compliance Source Testing
cadmium	7 µg/Rm3	Results from compliance Source Testing
lead	50 µg/Rm3	Results from compliance Source Testing
mercury	15 µg/Rm3	Results from compliance Source Testing
dioxins and furans	60 pg/Rm3	Results from compliance Source Testing; results expressed as I-TEQ
hydrochloric acid (HCl)	9 mg/Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
sulphur dioxide (SO2)	35 mg/Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
nitrogen oxides (NOx)	121 mg/ Rm3	Calculated as the rolling arithmetic average of 24 hours of data measured by a CEM System that provides data at least once every 15 minutes
organic matter (undiluted, expressed as equivalent methane)	50 ppmdv (33 mg/ Rm3)	Results from compliance source testing
carbon monoxide	35 ppmdv (40 mg/Rm3)	Calculated as the rolling arithmetic average of four (4) hours of data measured by a CEM System that provides data at least once every fifteen minutes, in accordance with condition 6 (2) (c)
opacity	10 percent	Calculated as the rolling arithmetic average of six (6) minutes of data measured by a CEM System that provides data at least once every minute
	5 percent	Calculated as the rolling arithmetic average of two (2) hours of data measured by a CEM System that provides data at least once every

		fifteen minutes

mg/Rm3- milligrams per reference cubic metre;

pg/Rm3 - picograms per reference cubic metre

ppmdv parts per million by dry volume,

µg/Rm3 - micrograms per reference cubic metre

R- reference conditions - 25 degrees Celsius, 101.3 kilopascals, dry basis, 11% oxygen

SCHEDULE "D"

TEST CONTAMINANTS

Hydrogen Chloride
Hydrogen Fluoride
Oxides of Nitrogen expressed as Nitrogen Dioxide
Sulphur Dioxide
Total Hydrocarbons, expressed as methane on wet basis
Carbon Dioxide
Total Suspended Particulate Matter (< 44 microns)
Total PM-10 including condensables
Total PM-2.5 including condensables

Metals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Selenium
Silver
Thallium
Vanadium
Zinc

Schedule "D" - Cont'd

Chlorobenzenes	Chlorophenols
Monochlorobenzene (MCB) 1,2-Dichlorobenzene (1,2-DCB) 1,3-Dichlorobenzene (1,3-DCB) 1,4-Dichlorobenzene (1,4-DCB) 1,2,3-Trichlorobenzene (1,2,3-TCB) 1,2,4-Trichlorobenzene (1,2,4-TCB) 1,3,5-Trichlorobenzene (1,3,5-TCB) 1,2,3,4-Tetrachlorobenzene (1,2,3,4-TeCB) 1,2,3,5-Tetrachlorobenzene (1,2,3,5-TeCB) 1,2,4,5-Tetrachlorobenzene (1,2,4,5-TeCB) Pentachlorobenzene (PeCB) Hexachlorobenzene (HxCB)	2-monochlorophenol (2-MCP) 3-monochlorophenol (3-MCP) 4-monochlorophenol (4-MCP) 2,3-dichlorophenol (2,3-DCP) 2,4-dichlorophenol (2,4-DCP) 2,5-dichlorophenol (2,5-DCP) 2,6-dichlorophenol (2,6-DCP) 3,4-dichlorophenol (3,4-DCP) 3,5-dichlorophenol (3,5-DCP) 2,3,4-trichlorophenol (2,3,4-T3CP) 2,3,5-trichlorophenol (2,3,5-T3CP) 2,3,6-trichlorophenol (2,3,6-T3CP) 2,4,5-trichlorophenol (2,4,5-T3CP) 2,4,6-trichlorophenol (2,4,6-T3CP) 3,4,5-trichlorophenol (3,4,5-T3CP) 2,3,4,5-tetrachlorophenol (2,3,4,5-T4CP) 2,3,4,6-tetrachlorophenol (2,3,4,6-T4CP) 2,3,5,6-tetrachlorophenol (2,3,5,6-T4CP) Pentachlorophenol (PeCP)

Schedule "D" - Cont'd

Co-Planar PCBs (Dioxin-like PCBs)	Volatile Organic Matter
PCB-077 (3,3',4,4'-TCB)	Acetaldehyde
PCB-081 (3,4,4',5-TCB)	Acetone
PCB-105 (2,3,3',4,4'-PeCB)	Acrolein
PCB-114 (2,3,4,4',5-PeCB)	Benzene
PCB-118 (2,3',4,4',5-PeCB)	Bromodichloromethane
PCB-123 (2',3,4,4',5-PeCB)	Bromoform
PCB-126 (3,3',4,4',5-PeCB)	Bromomethane
PCB-156 (2,3,3',4,4',5-HxCB)	Butadiene, 1,3 -
PCB-157 (2,3,3',4,4',5'-HxCB)	Butanone, 2 -
PCB-167 (2,3',4,4',5,5'-HxCB)	Carbon Tetrachloride
PCB-169 (3,3',4,4',5,5'-HxCB)	Chloroform
PCB-189 (2,3,3',4,4',5,5'-HpCB)	Cumene
	Dibromochloromethane
	Dichlorodifluoromethane
	Dichloroethane, 1,2 -
	Dichloroethene, Trans - 1,2
	Dichloroethene, 1,1 -
	Dichloropropane, 1,2 -
	Ethylbenzene
	Ethylene Dibromide
	Formaldehyde
	Mesitylene
	Methylene Chloride
	Styrene
	Tetrachloroethene
	Toluene
	Trichloroethane, 1,1,1 -
	Trichloroethene
	Trichloroethylene, 1,1,2 -
	Trichlorotrifluoroethane
	Trichlorofluoromethane
	Xylenes, M-, P- and O-
	Vinyl Chloride

Schedule "D" - Cont'd

Polycyclic Organic Matter	Dioxin/Furan Isomers
Acenaphthylene	
Acenaphthene	2,3,7,8-Tetrachlorodibenzo-p-dioxin
Anthracene	1,2,3,7,8-Pentachlorodibenzo-p-dioxin
Benzo(a)anthracene	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin
Benzo(b)fluoranthene	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin
Benzo(k)fluoranthene	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin
Benzo(a)fluorene	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin
Benzo(b)fluorene	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin
Benzo(ghi)perylene	
Benzo(a)pyrene	2,3,7,8-Tetrachlorodibenzofuran
Benzo(e)pyrene	2,3,4,7,8-Pentachlorodibenzofuran
Biphenyl	1,2,3,7,8-Pentachlorodibenzofuran
2-Chloronaphthalene	1,2,3,4,7,8-Hexachlorodibenzofuran
Chrysene	1,2,3,6,7,8-Hexachlorodibenzofuran
Coronene	1,2,3,7,8,9-Hexachlorodibenzofuran
Dibenzo(a,c)anthracene	2,3,4,6,7,8-Hexachlorodibenzofuran
Dibenzo(a,h)anthracene	1,2,3,4,6,7,8-Heptachlorodibenzofuran
Dibenzo(a,e)pyrene	1,2,3,4,7,8,9-Heptachlorodibenzofuran
9,10-Dimethylanthracene	1,2,3,4,6,7,8,9-Octachlorodibenzofuran
7,12-Dimethylbenzo(a)anthracene	
Fluoranthene	
Fluorene	
Indeno(1,2,3-cd)pyrene	
2-Methylanthracene	
3-Methylcholanthrene	
1-Methylnaphthalene	
2-Methylnaphthalene	
1-Methylphenanthrene	
9-Methylphenanthrene	
Naphthalene	
Perylene	
Phenanthrene	
Picene	
Pyrene	
Tetralin	
M-terphenyl	
O-terphenyl	
P-terphenyl	
Triphenylene	

SCHEDULE "E"

SOURCE TESTING PROCEDURES

1. The Owner shall submit, to the Manager a test protocol including the Pre-Test Information required by the Source Testing Code, at least two (2) months prior to the scheduled Source Testing date.

2. (1) For the purpose of the Source Testing program, the Owner is temporarily permitted to operate the Boilers at a residual oxygen concentration below the performance limit outlined in Condition 6.(2)(b) during the period of the Source Testing. The Owner shall ensure that the concentration of residual oxygen in the Undiluted Gases leaving the combustion zone of the Boilers, as measured and recorded by the CEM System, shall not be less than 5 percent by volume on a dry basis, during this Source Testing program.

   (2) If the Source Testing results demonstrate that compliance with the Performance Requirements can be maintained at a residual oxygen concentration below the performance limit outlined in Condition 6.(2)(b), the Owner may apply to the Director for approval to alter the required residual oxygen concentration.

3. The Owner shall finalize the test protocol in consultation with the Manager.

4. The Owner shall not commence the Source Testing until the Manager has accepted the test protocol.

5. The Owner shall complete the first Source Testing not later than six (6) months after Commencement of Operation of the Facility/Equipment.

6. The Owner shall conduct subsequent Source Testing at least once (1) every calendar year thereafter.

7. The Owner shall notify the District Manager and the Manager in writing of the location, date and time of any impending Source Testing required by this Certificate, at least fifteen (15) days prior to the Source Testing.

8. The Owner shall submit a report on the Source Testing programs to the District Manager and the Manager not later than three (3) months after completing each Source Testing program. The report shall be in the format described in the Source Testing Code, and shall also include, but not be limited to:

   (1) an executive summary;
   (2) records of operating conditions; including process description, records of waste composition and feed rate during the Source Testing;
   (3) all records produced by the CEM Equipment;
   (4) procedures followed during the Source Testing and any deviation from the proposed test protocol and the reasons therefore;
   (5) the results of the analyses of the stack emissions;

(6) a summary table that compares the Source Testing results, the monitoring data and the records of operating conditions during the Source Testing to the requirements imposed by the *EPA*, the Regulation and/or the Performance Requirements;

(7) the results of dispersion calculations in accordance with the *O. Reg. 419/05*, indicating the maximum concentration of the Test Contaminants, at the Point of Impingement.

(8) an updated site wide emission source inventory to assess the aggregate point of impingement concentrations of the Test Contaminants.

9. The Owner shall ensure that the Source Testing Report is made available and easily accessible for review by the public at the Facility, immediately after the document is submitted to the Ministry.

10. The Director may not accept the results of the Source Testing if:

(1) the Source Testing Code or the requirements of the Manager were not followed; or

(2) the Owner did not notify the District Manager and the Manager of the Source Testing; or

(3) the Owner failed to provide a complete report on the Source Testing.

11. If the Director does not accept the results of the Source Testing, the Director may require re-testing.

SCHEDULE "F"

PARAMETER:
Temperature

LOCATION:
The sample point for the Continuous Temperature Monitor shall be located at a point where the temperature in the combustion zone of the Boilers has reached at least 1000°C for a period of not less than one second. Compliance shall be proven by direct measurement or/and a correlation between the measured temperature and the intended target proven by a method acceptable to the Director.

PERFORMANCE:
The Continuous Temperature Monitor shall meet the following minimum performance specifications for the following parameters.

	PARAMETERS	SPECIFICATION
1)	Type:	"K", "J" or other type or alternative measurement device with equivalent measurement accuracy and suitable to the temperature range being measured
2)	Accuracy:	± 1.5 percent of the minimum gas temperature

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor without a significant loss of accuracy and with a time resolution of 1 minutes or better. Temperature readings for record keeping and reporting purposes shall be kept as one-hour average values.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 95 percent of the time for each calendar quarter.

PARAMETER:
Carbon Monoxide

INSTALLATION:
The Continuous Carbon Monoxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of carbon monoxide in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (parts per million, ppm):	0 to ≥100 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Carbon Monoxide Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤10 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3) Calibration Error:	≤ 2.5 percent of actual concentration
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 5 percent of span value
7) Span Calibration Drift (24-hour):	≤5 percent of span value
8) Response Time (90 percent response to a step change):	≤180 seconds
9) Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Oxygen

INSTALLATION:
The Continuous Oxygen Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of oxygen in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler and in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (percentage):	0 - 20 or 0 - 25
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Oxygen Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (percentage):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤10 percent of the mean value of the reference method test data
3) Calibration Error:	0.25 percent O_2
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 0.5 percent O_2
7) Span Calibration Drift (24-hour):	≤ 0.5 percent O_2
8) Response Time (90 percent response to a step change):	≤ 90 seconds
9) Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better. Oxygen concentration readings for record keeping and reporting purposes shall be kept as one-hour average values.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Hydrogen Chloride

INSTALLATION:
The Continuous Hydrogen Chloride Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of hydrogen chloride in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Range (parts per million, ppm):	0 to ≥100 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Hydrogen Chloride Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤ 20 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3) Calibration Error:	≤ 2 percent of actual concentration
4) System Bias:	≤ 4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 5 percent of span value
7) Span Calibration Drift (24-hour):	≤ 5 percent of span value
8) Response Time (90 percent response to a step change):	≤ 240 seconds
9) Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated daily at the sample point, to ensure that it meets the drift limits specified above, during the periods of the operation of the . The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 5 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Nitrogen Oxides

INSTALLATION:
The Continuous Nitrogen Oxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of nitrogen oxides in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1) Analyzer Operating Range (parts per million, ppm):	0 to ≥200 ppm
2) Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Nitrogen Oxides Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1) Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2) Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data
3) Calibration Error:	≤ 2 percent of actual concentration
4) System Bias:	≤4 percent of the mean value of the reference method test data
5) Procedure for Zero and Span Calibration Check:	all system components checked
6) Zero Calibration Drift (24-hour):	≤ 2.5 percent of span value
7) Span Calibration Drift (24-hour):	≤ 2.5 percent of span value
8) Response Time (90 percent response to a step change):	≤ 240 seconds
9) Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER:
Sulphur Dioxide

INSTALLATION:
The Continuous Sulphur Dioxide Monitor shall be installed at an accessible location where the measurements are representative of the actual concentration of sulphur dioxide in the Undiluted Gases leaving the APC Equipment associated with each Boiler, and shall meet the following installation specifications.

PARAMETERS	SPECIFICATION
1. Range (parts per million, ppm):	0 to ≥100 ppm
2. Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Sulphur Dioxide Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1. Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2. Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data
3. Calibration Error:	≤ 2 percent of actual concentration
4. System Bias:	≤ 4 percent of the mean value of the reference method test data
5. Procedure for Zero and Span Calibration Check:	all system components checked
6. Zero Calibration Drift (24-hour):	≤ 2.5 percent of span value
7. Span Calibration Drift (24-hour):	≤ 2.5 percent of span value
8. Response Time (90 percent response to a step change):	≤ 200 seconds
9. Operational Test Period:	≥168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Total Hydrocarbons

INSTALLATION:
The Total Hydrocarbons Monitor shall be installed at an accessible location where the measurements are representative of the concentrations of Organic Matter (as methane) in the Undiluted Gases leaving the combustion zone via the economizer outlet of each Boiler and shall meet the following installation specifications.

PARAMETERS		SPECIFICATION
1.	Detector Type:	Flame Ionization
2.	Oven Temperature:	160°C minimum
3.	Flame Temperature:	1800 °C minimum at the corona of the hydrogen flame
4.	Range (parts per million, ppm):	0 to ≥200 ppm
5.	Calibration Gas:	propane in air or nitrogen
6.	Calibration Gas Ports:	close to the sample point

PERFORMANCE:
The Continuous Total Hydrocarbons Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS		SPECIFICATION
1.	Span Value (nearest ppm equivalent):	2 times the average normal concentration of the source
2.	Relative Accuracy:	≤ 10 percent of the mean value of the reference method test data or ± 5 ppm whichever is greater
3.	System Bias:	≤ 4 percent of the mean value of the reference method test data
4.	Noise:	≤ 1 percent of span value on most sensitive range
5.	Repeatability:	≤ 1 percent of span value
6.	Linearity (response with propane in air):	≤ 3 percent of span value over all ranges
7.	Calibration Error:	≤ 2 percent of actual concentration
8.	Procedure for Zero and Span Calibration Check:	all system components checked on all ranges
9.	Zero Calibration Drift (24-hours):	≤ 2.5 percent of span value on all ranges
10.	Span Calibration Drift (24-hours):	≤ 2.5 percent of span value
11.	Response Time (90 percent response to a step change):	≤ 60 seconds
12.	Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
Daily calibration drift checks on the monitor shall be performed and recorded in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better. Measurements of concentrations of organic matter (as methane) shall be kept as 10 minute average values for record keeping and reporting purposes.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent thereafter.

PARAMETER: Opacity

INSTALLATION: The Continuous Opacity Monitor shall be installed at an accessible location where the measurements are representative of the actual opacity of the Undiluted Gases leaving the APC Equipment associated with each Boiler and shall meet the following design and installation specifications.

PARAMETERS		SPECIFICATION
1)	Wavelength at Peak Spectral Response (nanometres, nm):	500 - 600
2)	Wavelength at Mean Spectral Response (nm):	500 - 600
3)	Detector Angle of View:	≤ 5 degrees
4)	Angle of Projection:	≤ 5 degrees
5)	Range (percent of opacity):	0 -100

PERFORMANCE:
The Continuous Opacity Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS		SPECIFICATION
1)	Span Value (percent opacity):	2 times the average normal opacity of the source
2)	Calibration Error:	≤3 percent opacity
3)	Attenuator Calibration:	≤2 percent opacity
4)	Response Time (95 percent response to a step change):	≤ 10 seconds
5)	Schedule for Zero and Calibration Checks:	daily minimum
6)	Procedure for Zero and Calibration Checks:	all system components checked
7)	Zero Calibration Drift (24-hours):	≤ 2 percent opacity
8)	Span Calibration Drift (24-hours):	≤ 2 percent opacity
9)	Conditioning Test Period:	≥ 168 hours without corrective maintenance
10)	Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated, to ensure that it meets the drift limits specified above, during the periods of the operation of the Equipment. The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 30 seconds or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter.

PARAMETER:
Moisture, Hydrogen Fluoride and Ammonia

Selection and Installation

The Owner shall select and install a CEM System, to measure moisture content of the stack gases, the concentration of hydrogen fluoride and ammonia in the Undiluted Gases leaving the APC Equipment associated with each Boiler, as follows:

a) Design and Performance Specifications shall be in accordance with 40 CFR 60, Appendix B, Specification 4.

b) The Owner shall select the probe locations in compliance with 40 CFR 60, Appendix B, Specification 2.

Test Procedures

The Owner shall verify compliance with the Design and Performance Specifications in accordance with 40 CFR 60, Appendix B, Specification 4, with the reference method for the relative accuracy test being Method 4. of the Source Testing Code.

In furtherance of, but without limiting the generality of the foregoing, the mean difference between the calibration gas value and the analyzer response value at each of the four test concentrations shall be less than 5 percent of the measurement range.

SCHEDULE "G"

A stormwater management facility to service a 10.0 ha drainage area of the Durham York Energy Centre located on the west side of Osbourne Road and north of the CN Rail, Lot 27, Concession Broken Front, Part, Municipality of Clarington, Regional Municipality of Durham, designed to provide quality and quantity control of stormwater run-off by attenuating runoff from storm events up to 1:100 years return frequency to or below the pre-development levels, consisting of:

East Stormwater Management Pond (East SWM Pond)

A stormwater management facility to service a 5.7 ha drainage area comprising of the eastern part of the Durham York Energy Centre consisting of the following:

- one (1) approximately 128 m long drainage ditch collecting stormwater runoff from the north eastern part of the site, having an average horizontal slope of 1.56%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- one (1) approximately 199 m long drainage ditch collecting stormwater runoff from the eastern part of the site, having an average horizontal slope of 2.77%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- approximately fourteen (14) catch basins/maintenance holes and a total of 466.8 m long 450 mm diameter and 34.6 m of 600 mm diameter corrugated PE stormwater sewers conveying stormwater runoff collected from the north and north eastern part of the site, discharging to a forebay of a wet extended detention stormwater management pond described below;

- one (1) forebay with approximate bottom dimensions of 11.0 m wide and 34.8 m long and depth of 1.0 m, equipped with 600 mm diameter corrugated HDPE inlet pipe, a rip-rap covered inlet structure, and a forebay berm with top elevation of 95.0 m masl, discharging to a wet extended detention pond described below;

- one (1) wet extended detention stormwater management pond located at the south east part of the site, with approximate bottom dimensions of 21.0 m wide and 71.4 m long and a maximum depth of 2.7 m at 96.70 m masl elevation, having side slopes of 3H:1V and 5H:1V near the outlet structure, providing a permanent pool storage capacity of 1,008 m^3 at elevation 95.0 m masl, an active storage capacity of 3,099 m^3 at 96.70 m masl elevation, and total storage capacity of 4,107 m^3, equipped with an outlet structure consisting of a 150 mm diameter reverse slope inlet pipe with a gate valve and a 450 mm diameter perforated pipe riser fitted with 75 mm diameter orifice plate, a 75 mm diameter maintenance discharge pipe with a gate valve, and an emergency overflow structure at elevation 97.0 m masl, discharging through a 450 mm diameter outlet pipe to existing swale along the northern side of the CN Rail line to Tooley Creek and eventually to Lake Ontario;

West Stormwater Management Pond (West SWM Pond)

A stormwater management facility to service a 4.3 ha drainage area comprising of the western part of the Durham York Energy Centre consisting of the following:

- one (1) approximately 296 m long drainage ditch collecting stormwater runoff from the north western part of the site, having an average horizontal slope of 1.0%, depth of 0.5 m, bottom width of 1.0 m, and side slopes of 2.5H:1V, discharging to storm sewers described below;

- approximately five (5) catch basins/maintenance holes and a total of 272.2 m long 450 mm diameter corrugated PE stormwater sewers conveying stormwater runoff collected from the western part of the site, discharging to a forebay of a wet extended detention stormwater management pond described below;

- one (1) forebay with approximate bottom dimensions of 13.0 m wide and 26.0 m long and depth of 1.0 m, equipped with 450 mm diameter corrugated HDPE inlet pipe, a rip-rap covered inlet structure, and a forebay berm with top elevation of 95.0 m masl, discharging to a wet extended detention pond described below;

- one (1) wet extended detention stormwater management pond located at the south western part of the site, with approximate bottom dimensions of 13.0 m wide and 58.0 m long and a maximum depth of 2.5 m at 96.5 m masl elevation, having side slopes of 3H:1V and 5H:1V near the outlet structure, providing a permanent storage capacity of 623 m^3 at elevation 95.0 m masl, an active storage capacity of 2,054 m^3 at 96.50 m masl elevation, and total storage capacity of 2,677 m^3, equipped with an outlet structure consisting of a 150 mm diameter reverse slope inlet pipe with a gate valve and a 450 mm diameter perforated pipe riser fitted with 75 mm diameter orifice plate, a 75 mm diameter maintenance discharge pipe with a gate valve, and an emergency overflow structure at elevation 96.80 m masl, discharging through a 450 mm diameter outlet pipe to existing swale along the northern side of the CN Rail line to Tooley Creek and eventually to Lake Ontario;

including all associated controls and appurtenances.

The reasons for the imposition of these terms and conditions are as follows:

GENERAL

Conditions 1.(1), (2), (5), (6), (7), (8), (9), (10), (11), (12), (13), (17), (18) and (19) are included to clarify the legal rights and responsibilities of the Owner.

Conditions Nos.1.(3) and (4) are included to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

Condition No. 1.(14) is included to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.

Condition No.1.(15) is included to restrict potential transfer or encumbrance of the Site without the notification to the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Certificate.

Condition No. 1.(16) is included to ensure that the appropriate Ministry staff has ready access to the operations of the Site which are approved under this Certificate. The Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *EPA*, the *OWRA*, the *PA*, the *NMA* and the *SDWA*.

SERVICE AREA, APPROVED WASTE TYPES, RATES and STORAGE

Condition No. 2. is included to specify the approved waste receipt rates, the approved waste types and the service area from which waste may be accepted at the Site based on the Owner's application and supporting documentation. Condition No. 2. is also included to specify the maximum amount of waste that is approved to be stored at the Site.

SIGNS and SITE SECURITY

Condition No. 3. is included to ensure that the Site's users, operators and the public are fully aware of important information and restrictions related to the operation of the Site. Condition No. 3. is also included to ensure that the Site is sufficiently secured, supervised and operated by properly trained personnel and to ensure controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site personnel is on duty.

SITE OPERATIONS

Condition No. 4. is included to outline the operational requirements for the Facility to ensure that the said operation does not result in an adverse effect or a hazard to the natural environment or any person.

EQUIPMENT and SITE INSPECTIONS and MAINTENANCE

Condition No. 5. is included to require the Site to be maintained and inspected thoroughly on a regular basis to ensure that the operations at the Site are undertaken in a manner which does not result in an adverse effect or a hazard to the health and safety of the environment or any person.

PERFORMANCE REQUIREMENTS

Condition No. 6 is included to set out the minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the Facility.

TESTING, **MONITORING** and **AUDITING**

Condition No. 7. is to require the Owner to gather accurate information on the operation of the Facility so that the environmental impact and subsequent compliance with the *EPA*, the *OWRA*, their Regulations and this Certificate can be verified.

NUISANCE IMPACT CONTROL and HOUSEKEEPING

Condition No. 8. is included to ensure that the Site is operated and maintained in an environmentally acceptable manner which does not result in a negative impact on the natural environment or any person. Condition No. 8 is also included to specify odour control measures to minimize a potential for odour emissions from the Site.

STAFF TRAINING

Condition No. 9. is included to ensure that staff are properly trained in the operation of the equipment and instrumentation used at the Site, in the emergency response procedures and on the requirements and restrictions related to the Site operations under this Certificate.

COMPLAINTS RECORDING PROCEDURE

Condition No.10. is included to require the Owner to respond to any environmental complaints resulting from the Facility appropriately and in a timely manner and that appropriate actions are taken to prevent any further incidents that may cause complaints in the future.

CONTINGENCY and EMERGENCY RESPONSE PLAN and EMERGENCY SITUATIONS RESPONSE AND REPORTING

Conditions Nos.11. and 12. are included to ensure that the Owner is prepared and properly equipped to take immediate action in the event of an emergency situation.

SUBMISSIONS to the REGIONAL DIRECTOR or DISTRICT MANAGER

Condition No. 13. is included to set out the requirements for the submissions to the District Manager and the Regional Director regarding the operation of the Facility and the activities required by this Certificate.

RECORDS KEEPING

Condition No.14. is included to ensure that detailed records of Site activities, inspections, monitoring and upsets are recorded and maintained for inspection and information purposes.

REPORTING

Condition No.15. is to ensure that regular review of site, operations and monitoring is carried out and findings documented by a third party for determining whether or not the Site is being operated in compliance with this Certificate of Approval, the EPA and its regulations and whether or not any changes should be considered.

PUBLIC ACCESS to DOCUMENTATION

Condition No.16. is included to ensure that the public has access to information on the operation of the Site in order to participate in the activities of the Advisory Committee in a meaningful and effective way.

ADVISORY COMMITTEE

Condition No.17. is included to require the Owner to establish a forum for the exchange of information and public dialogue on activities carried out at the Site and to ensure that the local residents are properly informed of the activities at the Site and that their concerns can be heard and acted upon , as necessary. Open communication with the public and local authorities is important in helping to maintain high standards for the operation of the Site and protection of the natural environment. Condition 16. is also included to ensure that the requirements of the EA Approval are fulfilled.

CLOSURE of the SITE

Condition No.18. is included to ensure that the final closure of the Site is completed in accordance with Ministry's standards.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, and in accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written Notice served upon me, the Environmental Review Tribunal, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act and Section 101 of the

Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 9 and 39, *Environmental Protection Act*
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted site is approved under Section 9 and Section 27 of the Environmental Protection Act and Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 28th day of June, 2011

Signature
Ian Parrott, P .Eng.
Director
Section 9, *EPA*
Section 39, *EPA*
Section 53, *OWRA*

MW,QN,SH/

c: District Manager, MOE York-Durham
Regional Director, MOE Central Region

Appendix B

Response to Test Plan from Guillermo Azocar, Technology Standards Section, Standards Development Branch, MOECC, September 19, 2014, File No.: CR:SA:109194:14

Ministry of the Environment & Climate Change
Standards Development Branch

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o o to N M4 1M2
www.ene.gov.on.ca

Ministère de l'Environnement et de l'Action en matière de changement climatique
Direction de l'élaboration des normes
40, a e ue t. ai ouest
o o to, N M4 1M2
www.ene.gov.on.ca

Ontario

Via email: lbrasowski covanta.com
TSS File No.: CR:SA:109194:14

2014/09/19

Mr. Leon Brasowski, Director Environmental Engineering
Covanta
445 South St.
Morristown, New Jersey
07960

Dear Mr. Brasowski:

Subject: Pre-test plan for re-testing to be conducted at Durham-York Energy Centre (Courtice facility). Odour Management Mitigation Plan (April 2012).

We reviewed your pre-test plan (Covanta Project 11-1151-3943), dated 2014/09/17, prepared on behalf of Durham-York Energy Centre (DYEC), and referring to source testing to be conducted at DYEC's Energy-From-Waste facility. The pre-test plan was submitted to fulfill requirement for odour measurements as outlined in the Odour Management and Mitigation Plan (OMMP), dated April 2012.

The OMMP was prepared in support of the EAA Notice to proceed with undertaking EA File No. 04-EA-02-08 (Section 18); as well as, for the Environmental Compliance Approval (ECA) No. 7306-8FD N , issued on 2011/06/28; and subsequent ECA Notice (No.1) dated 2014/08/12.

***Target Source*:**

- Solid waste charging floor – Tipping Building (2 locations).

Notes: *The two sampling locations are not identified in the pre-test plan. The sampling locations need to be set (when possible) within the emissions envelope of the activity, equipment or process with the potential of generating the odorous emissions. A plant drawing showing the process, areas of activity and equipment (considered to be potential sources of odour) and the sampling locations shall be provided to this office to determine the suitability of such locations to represent worst case emissions scenario within the charging floor.*

Two primary potential odour emissions were identified; but only testing at the charging floor has been stated. Based on the pre-test plan, there is the expectation that there may be a queue of waste delivery trucks waiting to enter the plant. As truck transportation of waste onto the site has been identified as a primary potential

odour emission source, Covanta shall provide to the MOECC York-Durham District Office with the rationale for not undertaking odour measurements to address this primary potential source of odour.

Target Contaminants:

- Odour

***Reference methodologies*:**

- Odour: ***OSTC – Method ON-6 for Odour.*** *The odour samples will be collected undiluted in Tedlar bags using a vacuum lung, samples will be collected in triplicate for each of the sources, evaluated within 24 hours by a panel of 8 members using a dynamic dilution olfactometer, with the sample presentation to the panel on an ascending concentration. In very general terms, it is stated that the strategy to be used for the determination of the exhaust gas flow characteristics will follow the requirements of the Ontario Source Testing Code.*

Notes: *As the sampling strategies to be used are similar to ambient sampling, the strategy to be used for the determination of the exhaust gas flow characteristics needs to be submitted by the selected source testing consultant to this office, for consensus.*

***Brief Process Description*:**

The DYEC is an energy-from-waste facility was built with the aim at processing solid waste from the Regions of Durham and York. The maximum thermal processing rate stated in the ECA is 140,000 tonnes of waste per year. The facility is expected to operate on a continuous basis, 24 hours/day, 7 days/week, 365 days/year, with the waste delivered initially set at 6 days per week between 07:00 and 19:00 hours.

The facility consists of two thermal treatment lines, each equipped with independent operated boilers/furnaces and air pollution control equipment. The treated exhaust gases from both lines are vented to a common stack and released to the atmosphere.

The source of waste are post-diversion residual waste collected at curbside; as well as, any residual waste material collected at public drop-off centers and transfer stations. The only industrial, commercial and industrial waste to be managed by this facility will be non-hazardous residual waste.

.

Target Process Condition during the Source Testing Program:

Not indicated in the pre-test plan, but it is expected that source testing will be conducted when the charging area is operating at its maximum capacity.

Process Data Monitoring:

It is assumed (not stated in the pre-test plan) that DYEC (or Covanta) personnel will be responsible for the monitoring, collection, compilation and reporting of relevant process parameters pertaining to the facility's operations, in order to establish production/processing levels.

The following process information will be recorded during the source testing program

- Power output (megawatts)
- Daily waste combusted
- Auxiliary fuel combusted
- Steam generated
- Details of any upset conditions during the source testing program
- Real time meteorological data

Notes: *As the sampling of odours is of short duration (10-minute), Covanta should make an effort at providing hourly rate of the process parameters of interest.*

Air flow, direction and temperature need to be monitored close to the odour sampling station during each of the test-runs.

Our review indicates that the proposed reference methodologies, sampling strategies, and process data monitoring/collection are acceptable; conditional on Covanta addressing our observations outlined in notes made throughout this letter, and the undertaking of actions stated in those notes, where actions are required to be undertaken.

We noted that the source testing is tentatively scheduled for not earlier than 2014/11/22. Please provide the schedule at least 15 days prior to conducting the source testing. The testing notification (with the scheduled sampling dates) needs to be sent (via email) to the MOECC's Standards Development Branch (Guillermo Azocar) and to the MOECC's York-Durham District Office (Sandra Thomas).

Just a reminder that the source testing report is required to be submitted only in electronic format to the Technology Standards Section; and in electronic and hardcopy formats to the MOECC's York-Durham District Office.

If you have any question with regards to this assessment, I can be reached by phone at 416-327-6403, or by email at guillermo.azocar ontario.ca.

Sincerely yours,

Guillermo Azocar

cc: . Titus – Covanta (via email: htitus covanta.com)
D. Fumerton – York-Durham District Office (via email: dave.fumerton ontario.ca)
S. Thomas – York-Durham District Office (via email: Sandra.thomas ontario.ca)
M. Wojcik – EAB (via email: margaret.wojcik ontario.ca)
L. ussain/C. Ruddy – SDB (via email)
File A -02 (Durham-York Energy Centre)

Appendix C

Sampling Datasheets

ZORIX Consultants Inc.
Odour Sampling Data Sheet/Chain of Custody Form

ZORIX

Client: Covanta
Project: Source Test 2015
Sampling Location: Tipping floor
Date: Oct 8/15
Sampling Crew: MR / TV

Note: Protect samples from light and excessive heat.

Scheduled Evaluation Date: Oct 9/15

Check all fittings? ☑ Leak Check? ☑ *Pa* Correct calibration table? ☑ N/A Manometer zeroed? ☑ N/A

Date: Oct 9/15

Test ID No.	Start Time	End Time	Tedlar Bag No.	Sampler Parameters: Control Box No.	Sampler Number	Umbilical ID	Nitrogen *psig*	Delta p *Pa*	Temp. *°C*	Dilution	Probe *°C*	Test Condition	Laboratory: Sample ID. (assigned by lab)	Time	Bag H_2S Conc. (ppm)
1	10:38	10:47	261A	~ lung #1			—	—	—	1x	–	normal production	3418		N/A
2	10:48	10:58	255 A	~ lung #1			—	—	—	1x	–	normal production	3419		N/A
3	10:58	11:11	260A	~ lung #1			—	—	—	1x	–	normal production	3420		N/A

Pre-Dilution Determinations

Anticipated Ambient Conditions	Source Conditions	
Bar. Pressure (Kpa)	Barometric Pressure (Kpa)	
Temp. (°C)	Temperature (°C)	
Sat. Vapour Conc. (g/m3)	Saturated Vapour Conc. (g/m3)	
	Relative Humidity (%)	
	Calculated Pre-Dilution Ratio:	

Field Notes

Using Teflon tubing ~ 5' above grade with a stand to sample behind the hoppers

10:46, crane dumped into hopper behind sample point
10:51, crane dumped into hopper behind sample point
10:54, crane dumped into hopper behind sample point
10:59, crane dumped into hopper behind sample point

Chain of Custody for All Samples Above

Delivered By: Date and Time: Received By:

Delivered By: Date and Time: Received By:

~2m behind hopper is sample point.

ZORIX Consultants Inc.
Odour Sampling Data Sheet/Chain of Custody Form

ZORIX

Client: Covanta
Project: Odour Test
Sampling Location: Charging Deck
Date: Oct. 9, 2015
Sampling Crew: MR

Note: Protect samples from light and excessive heat.

Scheduled Evaluation Date: Oct-9-2015

Check all fittings? ☑ Leak Check? ☒ NA *Pa* Correct calibration table? ☒ NA Manometer zeroed? ☐ NA

Test ID No.	Start Time	End Time	Tedlar Bag No.	Sampler Parameters: Control Box No.	Sampler Number	Umbilical ID	Nitrogen *psig*	Delta p *Pa*	Temp. °C	Dilution	Probe °C	Source H_2S Conc. (ppm)	Bag H_2S Conc. (ppm)	Laboratory (Date: Oct 9, 2015): Sample ID. (assigned by lab)	Time	Bag H_2S Conc. (ppm)
1	08:19	08:27	268	lung		—	—	—	—	—	—			3425		N/A
2	08:28	08:37	262A	lung										3426		N/A
3	08:37	08:46	276	lung										3427		N/A
4	08:52	09:02	266A	lung	+	AC	filter					blank		3428		N/A

Pre-Dilution Determinations

Anticipated Ambient Conditions	Source Conditions	
Bar. Pressure (Kpa)	Barometric Pressure (Kpa)	
Temp. (°C)	Temperature (°C)	
Sat. Vapour Conc. (g/m3)	Saturated Vapour Conc. (g/m3)	
	Relative Humidity (%)	
	Calculated Pre-Dilution Ratio:	

Field Notes blank - with carbon filter at end of tubing
8:31 - load dropped into hopper (photos)
- only 1 load dropped during collection of samples
- one load during blank collection

Chain of Custody for All Samples Above

Delivered By: Date and Time: Received By:

Delivered By: Date and Time: Received By:

Appendix D

Odour Panel Responses

Session No: 697 **Date:** 09-Oct-15 **Session Start Time:** 9:01

Sample No: 3418 **Bag No:** 261a **Date** 08-Oct-15 **Time** 10:38 **Predilution:** 1 **Location:** tipping floor

TestCondition: normal production

		Panelists									
Challenge No	**Dilution**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**No. of Panelists**	**Correct Resp.**
1	11585	1	1	1	1	1	1	1	1	8	0
2	5793	1	1	1	1	1	1	1	1	8	0
3	2896	1	4	1	1	1	1	1	1	8	0
4	1448	4	1	1	1	1	1	1	6	8	1
5	724	6	6	6	4	4	4	6	6	8	5
6	362	6	6	6	6	6	6	6	6	8	8

Sample No: 3419 **Bag No:** 255a **Date** 08-Oct-15 **Time** 10:48 **Predilution:** 1 **Location:** tipping floor

TestCondition: normal production

		Panelists									
Challenge No	**Dilution**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**No. of Panelists**	**Correct Resp.**
1	5793	1	1	1	1	1	1	1	1	8	0
2	2896	1	1	1	1	1	1	1	1	8	0
3	1448	1	4	1	1	1	1	6	1	8	1
4	724	6	6	6	4	6	4	6	6	8	6
5	362	6	6	1	6	6	4	6	6	8	6
6	362	6	6	6	6	6	6	6	6	8	8

Sample No: 3420 **Bag No:** 260a **Date** 08-Oct-15 **Time** 10:58 **Predilution:** 1 **Location:** tipping floor

TestCondition: normal production

		Panelists									
Challenge No	**Dilution**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**No. of Panelists**	**Correct Resp.**
1	5793	1	1	1	1	1	1	1	1	8	0
2	2896	1		1	1	1	1	1	1	7	0
3	2896	1	1	1	1	1	1	1	6	8	1
4	1448	1	1	1	1	4	1	6	6	8	2
5	724	1	6	1	4	6	4	6	6	8	4
6	362	6	6	6	6	6	6	6	6	8	8

Panelist responses:
1="no detection" 3="uncertain, wrong port" 4="uncertain, correct port", 5="certain, wrong port", 6="certain, correct port"

Sample No: 3425 **Bag No:** 268 **Date** 09-Oct-15 **Time** 8:19 **Predilution:** 1 **Location:** tipping floor

TestCondition: normal production, 2nd day

		Panelists									
Challenge No	**Dilution**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**No. of Panelists**	**Correct Resp.**
1	2896	1	1	1	1	1	1	1	1	8	0
2	1448	1	1	1	1	1	1	1	1	8	0
3	724	4	6	6	1	6	4	6	6	8	5
4	362	6	6	6	1	6	6	6	6	8	7
5	181	6	6	6	1	6	6	6	6	8	7
6	91	6	6	6	6	6	6	6	6	8	8

Sample No: 3426 **Bag No:** 268 **Date** 09-Oct-15 **Time** 8:28 **Predilution:** 1 **Location:** tipping floor

TestCondition: normal production, 2nd day

		Panelists									
Challenge No	**Dilution**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**No. of Panelists**	**Correct Resp.**
1	2896	1	1	1	1	1	1	1	1	8	0
2	1448	1	1	1		4	1	4	5	7	0
3	1448	1	1	1	4	6	1	6	6	8	3
4	724	4	6	6	6	6	1	6	6	8	6
5	362	6	6	6	6	6	6	6	6	8	8

Sample No: 3427 **Bag No:** 276 **Date** 09-Oct-15 **Time** 8:37 **Predilution:** 1 **Location:** tipping floor

TestCondition: normal production, 2nd day

		Panelists									
Challenge No	**Dilution**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**No. of Panelists**	**Correct Resp.**
1	5793	1	1	1	1	1	1	1	1	8	0
2	2896	1	1	1	1	1	1	1	1	8	0
3	1448	1	1	1	1	4	4	6	1	8	1
4	724	1	1	6	4	6	6	6	6	8	5
5	362	6	6	6	6	6	6	6	6	8	8

Sample No: 3428 **Bag No:** 266a **Date** 09-Oct-15 **Time** 8:52 **Predilution:** 1 **Location:** tipping floor

TestCondition: ambient + a/c filter

		Panelists									
Challenge No	**Dilution**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**No. of Panelists**	**Correct Resp.**
1	91	1	1	1	1	1	1	1	1	8	0
2	45	1	1	1	1	1	1	1	1	8	0
3	23	1	1	6	1	1	1	1	1	8	1
4	11	1	1	6	4	4	1	1	1	8	1

Panelist responses:
1="no detection" 3="uncertain, wrong port" 4="uncertain, correct port", 5="certain, wrong port", 6="certain, correct port"

Sample No: 3429 **Bag No:** 143a **Date** 09-Oct-15 **Time** 11:08 **Predilution:** 1 **Location:** lab

TestCondition: qc n-butanol (49.9ppm)

		Panelists									
Challenge No	**Dilution**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**No. of Panelists**	**Correct Resp.**
1	5793	1	1	1	1	1	1	1	1	8	0
2	2896	1	1	1	1	1	1	1	1	8	0
3	1448	1	1	6	1	4	1	6	1	8	2
4	724	6	1	6	1	6	4	6	6	8	5
5	362	6	6	6	6	6	6	6	6	8	8
6	181	6	6	6	6	6	6	6	6	8	8
7	91	6	6	6	6	6	6	6	6	8	8

Panelist responses:
1="no detection" 3="uncertain, wrong port" 4="uncertain, correct port", 5="certain, wrong port", 6="certain, correct port"

APPENDIX E

Approvals Under S7 and S13 of O.Reg 419/05

Ministry of the Environment, Conservation and Parks

Environmental Monitoring and Reporting Branch

125 Resources Road
Toronto ON M9P 3V6
Tel.: 416 235-6300

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction de la surveillance environnementale

125, chemin Resources
Toronto ON M9P 3V6
Tél. : 416 235-6300

Ontario

Notice number: ***1730-C8VS5F***
Reference number: ***3308-8M4SRZ***

Notice

Pursuant to subsection 7(1) of O. Reg. 419/05, made under the Environmental Protection Act, R.S.O. 1990, c.E 19 (EPA)

To: **TransRiver Canada Incorporated operating as**

Covanta Durham York Renewable Energy Limited Partnership
445 South St Morristown, New Jersey
USA 07960

and

The Regional Municipality of Durham
605 Rossland Road East
Level 5
Whitby, Ontario L1N 0B7

and

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario L3Y 6Z1

Site: **Durham York Energy Centre**
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham L1E 2R2

Part 1: Definitions

In this Notice,

"Act" means the *Environmental Protection* Act, R.S.O. 1990, c. E. 19, as amended;

"Director" means the undersigned Director or any other person appointed under section 5 of the Act as a Director for the purposes of section 7 of the Regulation;

"Facility" means the plant, structure and any other thing that may discharge a contaminant that is located at

1835 Energy Dr Lot 27, Concession Broken Front, Part 1 Clarington Municipality, Regional Municipality of Durham;

"Notice" means this Notice number 1730-C8VS5F, as it may be amended from time to time;

"Persons Responsible" means TransRiver Canada Incorporated *operating as* Covanta Durham York Renewable Energy Limited Partnership, The Regional Municipality of Durham *and* The Regional Municipality of York being the persons who discharges or causes or permits the discharge of contaminants from the Facility into the air; and

"Regulation" means Ontario Regulation 419/05: *Air Pollution - Local Air Quality*, made under the Act.

Part 2: Legal Authority

The following provisions of the regulation sets out the legal authority that forms the basis for this Notice:

7. (1) The Director may give written notice to a person who discharges or causes or permits the discharge of a contaminant from a property stating that the Director is of the opinion that, with respect to discharges of the contaminant from that property,

(a) one or more dispersion models specified in the notice would predict concentrations of the contaminant at least as accurately as an approved dispersion model;

(b) a combination specified in the notice of two or more dispersion models would predict concentrations of the contaminant at least as accurately as an approved dispersion model;

(c) a combination specified in the notice of one or more dispersion models and one or more sampling and measuring techniques would predict concentrations of the contaminant at least as accurately as an approved dispersion model; or

(d) one or more approved dispersion models specified in the notice would predict concentrations of the contaminant less accurately than,

(i) a dispersion model or combination specified under clause (a), (b) or (c), or

(ii) another approved dispersion model. O. Reg. 419/05, s. 7 (1); O. Reg. 507/09, s. 5 (1).

(2) Before the Director gives a person a notice under subsection (1), the Director shall give the person a draft of the notice and an opportunity to make written submissions to the Director during the period that ends 30 days after the draft is given. O. Reg. 419/05, s. 7 (2).

(3) If a notice is given under subsection (1) with respect to discharges of a contaminant from a property, a reference in this Part to an approved dispersion model shall be deemed, with respect to those discharges,

(a) to include a dispersion model or combination specified under clause (1) (a), (b) or (c); and

(b) not to include a dispersion model that is specified under clause (1) (d). O. Reg. 419/05, s. 7 (3).

(4) Revoked: O. Reg. 507/09, s. 5 (2).

(5) Subsection (3) does not apply to a discharge of a contaminant until,

(a) three months after the notice is given under subsection (1), unless clause (b) applies; or

(b) one year after the notice is given under subsection (1), if the notice includes a notice under clause (1) (c). O. Reg. 419/05, s. 7 (5).

(6) Subsection (5) does not apply for the purpose of preparing a report to which subsection 22 (1.1) or (1.2), 23 (3), 24 (2), 30 (5) or 33 (6) applies. O. Reg. 419/05, s. 7 (6); O. Reg. 605/05, s. 2 (1); O. Reg. 507/09, s. 5 (3).

(7) Subsection (5) does not apply to a discharge of a contaminant if subsection (3) would have the effect of permitting the discharge. O. Reg. 419/05, s. 7 (7).

(8) If a notice is given to a person under subsection (1) and section 20 does not apply to the person in respect of a contaminant, subsection (3) applies to the person in respect of the contaminant only after section 20 begins to apply to the person in respect of the contaminant. O. Reg. 419/05, s. 7 (8).

(9) Despite subsection (8), if a notice is given to a person under subsection (1) and section 20 does not apply to the person in respect of a contaminant, subsection (3) applies to the person in respect of the contaminant for the purpose of preparing a report to which subsection 22 (1.2), 23 (3), 24 (2), 30 (5) or 33 (6) applies. O. Reg. 419/05, s. 7 (9); O. Reg. 605/05, s. 2 (2); O. Reg. 507/09, s. 5 (4).

(10) If a notice given under subsection (1) is amended by a notice given under section 52, the notice under section 52 takes effect, and subsection (3) begins to apply to the amended notice,

(a) three months after the notice is given under section 52, unless clause (b) or (c) applies;

(b) one year after the notice is given under section 52, if the amendment adds a statement described in clause (1) (c) to the notice given under subsection (1), unless clause (c) applies; or

(c) on the day the notice is given under section 52, if the application of subsection (3) to the amended notice would have the effect of permitting a discharge that would otherwise be prohibited. O. Reg. 507/09, s. 5 (5).

(11) If a notice given under subsection (1) is revoked by a notice given under section 52, the notice under section 52 takes effect, and subsection (3) ceases to apply to discharges of the contaminant,

(a) three months after the notice is given under section 52, unless clause (b) applies; or

(b) on the day the notice is given under section 52, if the revocation of the notice given under subsection (1) would have the effect of permitting a discharge that would otherwise be prohibited. O. Reg. 507/09, s. 5 (5).

Part 3: Grounds for Notice

3.1 For the purpose of subsection 7(1)(a) of the Regulation, I, the Director am of the opinion that the following dispersion model would predict concentrations of a contaminant at least as accurately as an approved dispersion model:

- CALPUFF version 7.2.1, level 150618, used in conjunction with CALMET version 6.5.0, level 150223

3.2 This notice is being issued for the following reason:

- CALPUFF version 7.2.1, level 150618 and CALMET version 6.5.0, level 150223, includes advanced model algorithms for a more comprehensive assessment of shoreline fumigation of the Facility's air emissions.

3.3 In accordance with subsection 7(2) of the Regulation, the Director provided a draft of this Notice to the Persons Responsible and provided an opportunity for those persons to make written submissions to the Director during a thirty (30) day period.

Part 4 Notice Requirements

Pursuant to my authority under subsection 7(1) of the Regulation, with the issuance of this Notice, I hereby require the Persons Responsible to do the following:

4.1 Use an approved dispersion model in accordance with subsection 7(3) of the Regulation.

4.2 In particular, a reference to an approved dispersion model in Part II of the Regulation shall be deemed to include:

- CALPUFF version 7.2.1, level 150618, used in conjunction with CALMET version 6.5.0, level 150223.

4.3 This notice expires on the 2nd of December 2031.

Part 5: General

5.1 Where service is made by mail, the service shall be deemed to be made on the fifth day after the day of mailing.

5.2 The time for making written submissions to the Director under section 7 (2) of the Regulation is not extended by choosing service by mail.

5.3 All notices are issued in the English language and may be translated into the French language. In the event that there should be a conflict between the English original and the French translation, the English original shall prevail.

5.4 The requirements of this notice are severable. If any requirement of this notice or the application of any requirement to any circumstance is held invalid, the application of such requirement to other circumstances and the remainder of the notice shall not be affected thereby.

5.5 Any request to change a requirement in this notice shall be made in writing to the Director with reasons for the request, at least 45 days prior to any compliance date for that requirement.

5.6 The requirements of this notice are minimum requirements only and do not relieve you from:

(a) complying with any other applicable order, statute, regulation, municipal, provincial or federal law; and

(b) obtaining any approvals or consents not specified in this notice.

5.7 Subsection 186(1) of the Act states that every person who contravenes this Act or the regulations is guilty of an offence.

5.8 Any written submissions to the Director made under subsection 7 (2) of the Regulation must be made in accordance with the requirements of section 182 of the Act and Ontario Regulation 227/07 made under the Act, as they may be amended from time to time.

This notice is effective from the date of issue.

Issued this 2nd day of December 2021.

Yvonne Hall
Director, Section 7, O. Reg. 419/05

Ministry of the Environment, Conservation and Parks

Environmental Monitoring and Reporting Branch

125 Resources Road
Etobicoke ON M9P 3V6
Tel.: 416 235-6300

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction de la Surveillance Environnmentale

125, chemin Resources
Etobicoke ON M9P 3V6
Tél. : 416 235-6300

Ontario

December 2, 2021

Christopher Baker, Vice President and General Manager
TransRiver Canada Incorporated operating as Covanta Durham York Renewable Energy Limited Partnership,
445 South St Morristown
New Jersey USA 07960

and

Gioseph Anello, Director of Waste Management Services
The Regional Municipality of Durham
605 Rossland Road East
Level 5
Whitby, Ontario L1N 0B7

and

Laura McDowell, Director Environmental Promotion and Protection
The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario L3Y 6Z1

Dear Madam/Sir:

Re: Requests for Approval under Paragraph 3 of subsection 13(1) of Regulation 419/05 For use of Site-Specific Meteorological Data: TransRiver Canada Incorporated *operating as* Covanta Durham York Renewable Energy Limited Partnership, The Regional Municipality of Durham *and* The Regional Municipality of York – Durham York Energy Centre (located at 1835 Energy Drive, Municipality of Clarington, Ontario)

This is with respect to the requests made by TransRiver Canada Incorporated *operating as* Covanta Durham York Renewable Energy Limited Partnership dated October 12, 2021, The Regional Municipality of Durham dated August 5, 2021 *and* The Regional Municipality of York dated October 13, 2021 and signed by you for approval under paragraph 3 of s.13(1) of O. Reg. 419/05 of site-specific meteorological data for the above-referenced site.

The methodology proposed to develop the meteorological data for the above-referenced site and the justification for using CALMET version 6.5.0, level 150223, for the period of 2014-2018, was acceptable for the following reasons:

1. the representative land use and terrain data is processed and provided by the Ministry for the purpose of this approval;
2. the gridded meteorological data used as key input to CALMET comes from an acceptable meso-scale meteorological model, namely, the advanced research version of the Weather Research and Forecasting (WRF-ARW) model;
3. the observed meteorological data from the Courtice, Rundle stations (administered by Region of Durham), and Cobourg, and Oshawa stations is used in refining the CALMET results for the purpose of this approval;
4. the options chosen in the CALMET input file are reasonable; and
5. the CALMET results are reasonable.

Accordingly, I, the Director appointed under s.5 of the *Environmental Protection Act* for the purposes of section 13 of O. Reg. 419/05, approve the above-noted site-specific meteorological data as a reasonable reflection of meteorological and local geophysical (land use and topographic) conditions at the above-referenced facility located at 1835 Energy Drive, Municipality of Clarington, Ontario.

This approval expires on December 2, 2021.

Should you have any comments or questions relating to the above site-specific meteorological dataset, please send an e-mail to MetDataENE@ontario.ca within 30 days of the date of this correspondence with details, so that this dataset can be modified, if necessary.

Yours truly,

Yvonne Hall
Director, Section 13, O. Reg. 419/05

cc: District Manager, York-Durham District Office
Director, Section 9, Environmental Protection Act
Environmental Permissions Branch
Golder Associates Ltd.

~~Appendix A~~

Ministry of the Environment

Environmental Monitoring and Reporting Branch

125 Resources Road
Toronto ON M9P 3V6
Tel.: 416 235-6300
Fax: 416 235-6235

Ministère de l'Environnement

Direction de la surveillance environnementale

125, chemin Resources
Toronto ON M9P 3V6
Tél. : 416 235-6300
Téléc. : 416 235-6235

Ontario

Joey Neuhoff, Director, Business Development
Covanta Energy –Covanta Holding Corporation
40 Lane Road, Fairfield, NJ 07004
USA

August 24, 2010

Dear Sir;

Re: Request for Approval under S7(1) and S13(1) of Regulation 419/05 for use of Alternative Dispersion Model and Use of Site-Specific Meteorological Data for York/Durham's Energy from Waste Facility, Clarington, Durham

I have reviewed the S7 and S13 requests submitted by Golder Associates Ltd. The methodology proposed to develop the meteorological data and justification for using CALMET/CALPUFF is acceptable for the following reasons:

1. The methodology proposed in this request is exactly the same as in a previous EA for this facility which has gone through an extensive pre-consultations and thorough reviews.
2. The site is located over complex terrain near Lake of Ontario shoreline of which impacts are taken into account in CALMET/CALPUFF.
3. The regional scale meteorological data proposed as key input to CALMET come from the accepted meso-scale meteorological model, Weather Research and Forecasting (WRF) model.
4. Correct land use file was provided by the Ministry of Environment under a confidential memorandum.
5. The proponent used EMRB-suggested lake temperatures and WRF grids for pseudo buoy stations for lake temperature.
6. Adequate number of surface weather stations from Environment Canada will be included in the input to CALMET.
7. Precipitation data were correctly processed.
8. The options chosen in the CALMET input are reasonable and the CALMET results, especially winds, were reasonable.
9. Dry deposition velocity and wet scavenging rates were calculated correctly.
10. The options chosen in the CALPUFF input file are reasonable.

Please note that in accordance with the above-referenced request, this modelling methodology can only be used to model discharges from York/Durham's Energy from Waste Facility at 72 Osborne Road, Clarington, Ontario.

This request for notice was submitted with an application for a Certificate of Approval under Section 9 of the Environmental Protection Act (EPA) as part of an ESDM assessment and is subsequently approved for use in the Certificate of Approval application corresponding to this project.

Yours truly,

Robert B Bloxam

Dr. Robert Bloxam
Senior Leader, Modelling
Director, Sections 7 and 13, O. Reg. 419

cc: District Manager, York-Durham District Office
Director, Standards Development Branch
Environmental Assessment and Approvals Branch

Ministry of the Environment, Conservation and Parks

Environmental Monitoring and Reporting Branch

125 Resources Road
Toronto ON M9P 3V6
Tel.: 416 235-6300

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction de la surveillance environnementale

125, chemin Resources
Toronto ON M9P 3V6
Tél. : 416 235-6300

Ontario

Notice number: ***0336-C9AT9U***
Reference number: ***6316-C9AT8D***

Notice

s. 52 of O. Regulation 419/05 as amended
made under the Environmental Protection Act, R.S.O. 1990, c.E 19 (EPA), as amended

To: **TransRiver Canada Incorporated** ***operating as***

Covanta Durham York Renewable Energy Limited Partnership
445 South St Morristown, New Jersey
USA 07960

and

The Regional Municipality of Durham
605 Rossland Road East
Level 5
Whitby, Ontario L1N 0B7

and

The Regional Municipality of York
17250 Yonge Street
Newmarket, Ontario L3Y 6Z1

Site: **Durham York Energy Centre**
1835 Energy Dr Lot 27, Concession Broken Front, Part 1
Clarington Municipality, Regional Municipality of Durham L1E 2R2

Part 1: Definitions

In this Notice,

"Act" means the *Environmental Protection* Act, R.S.O. 1990, c. E. 19, as amended;

"Director" means the undersigned Director or any other person appointed under section 5 of the Act as a Director for the purposes of sections 7, 13 and 52 of the Regulation;

"Facility" means the Durham York Energy Centre located at 1835 Energy Dr Lot 27, Concession Broken Front, Part 1 Clarington Municipality, Regional Municipality of Durham;

"Notice" means this Notice number 0336-C9AT9U, as it may be amended from time to time;

"Persons Responsible" means TransRiver Canada Incorporated *operating as* Covanta Durham York Renewable Energy Limited Partnership, The Regional Municipality of Durham *and* The Regional Municipality of York being the persons who discharges or causes or permits the discharge of contaminants from the Facility into the air;

"Regulation" means Ontario Regulation 419/05: *Air Pollution - Local Air Quality*, made under the Act; and

"Section 7 and 13 Notice" means the notice issued to Covanta Energy – Covanta Holding Corporation (now TransRiver Canada Incorporated *operating as* Covanta Durham York Renewable Energy Limited Partnership *and* The Regional Municipality of Durham *and* The Regional Municipality of York) under sections 7 and 13 of the Regulation issued on August 24, 2010, together with a notice under section 13 of the Regulation, a copy of which is attached in Appendix 1.

Part 2: Legal Authority

The following sets out the legal authority that forms the basis for this Notice:

52. (1) Subject to subsections 7 (10) and (11), the Director may, by written notice, amend or revoke any notice given by the Director under this Regulation. O. Reg. 507/09, s. 32 (1).

(2) Before the Director gives a person a notice under subsection (1), the Director shall give the person a draft of the notice and an opportunity to make written submissions to the Director during the period that ends 30 days after the draft is given. O. Reg. 507/09, s. 32 (1).

Part 3: Grounds for Notice

3.1 Pursuant to clause 7(1)(a) and paragraph 3 of subsection 13(1) of the Regulation, on August 28, 2010, the Director issued the Section 7 and 13 Notice to the Persons Responsible to include CALPUFF version 6.263, level 080827 in conjunction with CALMET version 5.8, level 070623 as an approved dispersion model under the Regulation

3.2 Pursuant to section 52 of the Regulation, I am revoking the Section 7 and 13 Notice issued on August 24, 2010 (copy included in Appendix 1).

3.3 This notice is being issued for the following reason:

- CALPUFF version 6.263, level 080827 in conjunction with CALMET version 5.8, level 070623 is an older combination of these models and are not expected to provide as accurate an assessment of emissions from this facility as updated combinations of these models, which are now available.
- On December 2, 2021, I issued Notice number 1730-C8VS5F under section 7 (1) (a) of the Regulation providing for the use of an updated version of CALPUFF, namely CALPUFF version 7.2.1, level 150618, used in conjunction with CALMET version 6.5.0, level 150223, and issued a section 13(1) approval for meteorological data using CALMET version 6.5.0, level 150223.

3.4 In accordance with subsection 52(2) of the Regulation, the Director provided a draft of this Notice to the Persons Responsible at the Facility and provided an opportunity for those persons to make written submissions to the Director during a thirty (30) day period.

Part 4 Notice Requirements

Pursuant to my authority under subsection 52(1) of the Regulation, I hereby revoke the Section 7 and 13 Notice issued on August 24, 2010.

Part 5: General

5.1 Where service is made by mail, the service shall be deemed to be made on the fifth day after the day of mailing.

5.2 The time for making written submissions to the Director under section 52 of the Regulation is not extended by choosing service by mail.

5.3 All notices are issued in the English language and may be translated into the French language. In the event that there should be a conflict between the English original and the French translation, the English original shall prevail.

5.4 The requirements of this notice are severable. If any requirement of this notice or the application of any requirement to any circumstance is held invalid, the application of such requirement to other circumstances and the remainder of the notice shall not be affected thereby.

5.5 Any request to change a requirement in this notice shall be made in writing to the Director with reasons for the request, at least 45 days prior to any compliance date for that requirement.

5.6 The requirements of this notice are minimum requirements only and do not relieve you from:

(a) complying with any other applicable order, statute, regulation, municipal, provincial or federal law; and

(b) obtaining any approvals or consents not specified in this notice.

5.7 Subsection 53(2) of the Regulation provides a person who is required to do something by a notice given by the Director under this Regulation shall comply with the requirement.

5.8 Subsection 186(1) of the Act states that every person who contravenes this Act or the regulations is guilty of an offence.

5.9 Any written submissions to the Director made under subsection 7 (2) or section 52 of the Regulation must be made in accordance with the requirements of section 182 of the Act and Ontario Regulation 227/07 made under the Act, as they may be amended from time to time.

This notice is effective from the date of issue.

Issued this 2nd day of December, 2021.

Yvonne Hall
Director, Section 7 and 13, O. Reg. 419/05

Appendix 1

Ministry of the Environment

Environmental Monitoring and Reporting Branch

125 Resources Road
Toronto ON M9P 3V6
Tel.: 416 235-6300
Fax: 416 235-6235

Ministère de l'Environnement

Direction de la surveillance environnementale

125, chemin Resources
Toronto ON M9P 3V6
Tél. : 416 235-6300
Téléc. : 416 235-6235

Ontario

Joey Neuhoff, Director, Business Development
Covanta Energy –Covanta Holding Corporation
40 Lane Road, Fairfield, NJ 07004
USA

August 24, 2010

Dear Sir;

Re: Request for Approval under S7(1) and S13(1) of Regulation 419/05 for use of Alternative Dispersion Model and Use of Site-Specific Meteorological Data for York/Durham's Energy from Waste Facility, Clarington, Durham

I have reviewed the S7 and S13 requests submitted by Golder Associates Ltd. The methodology proposed to develop the meteorological data and justification for using CALMET/CALPUFF is acceptable for the following reasons:

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4. Correct land use file was provided by the Ministry of Environment under a confidential memorandum.
5. The proponent used EMRB-suggested lake temperatures and WRF grids for pseudo buoy stations for lake temperature.
6. Adequate number of surface weather stations from Environment Canada will be included in the input to CALMET.
7. Precipitation data were correctly processed.
8. The options chosen in the CALMET input are reasonable and the CALMET results, especially winds, were reasonable.
9. Dry deposition velocity and wet scavenging rates were calculated correctly.
10. The options chosen in the CALPUFF input file are reasonable.

Please note that in accordance with the above-referenced request, this modelling methodology can only be used to model discharges from York/Durham's Energy from Waste Facility at 72 Osborne Road, Clarington, Ontario.

This request for notice was submitted with an application for a Certificate of Approval under Section 9 of the Environmental Protection Act (EPA) as part of an ESDM assessment and is subsequently approved for use in the Certificate of Approval application corresponding to this project.

Yours truly,

Dr. Robert Bloxam
Senior Leader, Modelling
Director, Sections 7 and 13, O. Reg. 419

cc: District Manager, York-Durham District Office
Director, Standards Development Branch
Environmental Assessment and Approvals Branch

APPENDIX F

Supporting Info for CALMET

Meteorological Station Calibration Data Sheet

Client: DYEC **Date:** 20-Dec-18
Station ID: Rundle **Operator:** SRS/NM

Installed Equipment

Parameter	Model
Data Logger	CR1000
Wind Head	RM Young
Temperature/Humidity	HMP-60
Precipitation	Texas Instruments TR-525M

Windhead Check

Calibrator: RM Young

Wind Direction (deg from)		Wind Speed (m/s)	
Direction Setpoint	DAS Reading	Speed Setpoint	DAS Reading
0	0/357	0.98	0.98
45	45/42	2.45	2.45
90	90/87	3.92	3.92
135	135/132	5.39	5.39
180	180/177	6.86	6.86
225	225/222	9.31	9.31
270	270/268		
315	315/313		

Criteria Met: ☑ Yes ☐ No

Comments:

Temperature Check

Standard Thermometer: Digisense

Reference Temperature: 4.5 degC DAS Temperature: 3.9 degC

Criteria Met: ☑ Yes ☐ No

Comments:

Barometric Pressure Check

Standard Barometer: N/A

Reference Pressure: _____ DAS Pressure: _____

Criteria Met: ☐ Yes ☐ No

Comments: There is no barometer at this location

Relative Humidity Check

Standard Humidity Instrument: Digisense

Reference Humidity: 79% DAS Humidity: 79%

Criteria Met: ☑ Yes ☐ No

Comments: _____

Precipitation Check

Graduated Cylinder Volume: 250 ml

Instrument Level: ☑ Yes ☐ No
Debris in inlet basin: ☐Yes ☑ No

Volume of water poured 125 ml
Number of tips 26
Multiplier from Program 0.1

Criteria Met: ☑ Yes ☐ No

Comments: _____

Calibration Performed by: Steve Sanderson/ Nathan McFadden

Meteorological Station Calibration Data Sheet

Client: DYEC **Date:** 24-May-19
Station ID: Rundle **Operator:** SRS

Installed Equipment

Parameter	Model
Data Logger	CR1000
Wind Head	RM Young
Temperature/Humidity	HMP-60
Precipitation	Texas Instruments TR-525M

Windhead Check

Calibrator: _____

Wind Direction (deg from)		Wind Speed (m/s)	
Direction Setpoint	DAS Reading	Speed Setpoint	DAS Reading
0		0.98	
45		2.45	
90		3.92	
135		5.39	
180		6.86	
225		9.31	
270			
315			

Criteria Met: ☐Yes ☐ No

Comments: Windhead calibration was not performed as there were safety issues with lowering and raising the tower

Temperature Check

Standard Thermometer: Digisense

Reference Temperature: 18.6 degC DAS Temperature: 15.5 degC

Criteria Met: ☑ Yes ☐ No

Comments: _____

Barometric Pressure Check

Standard Barometer: N/A

Reference Pressure: _____ DAS Pressure: _____

Criteria Met: ☐ Yes ☐ No

Comments: There is no barometer at this location

Relative Humidity Check

Standard Humidity Instrument: Digisense

Reference Humidity: 60% DAS Humidity: 67%

Criteria Met: ☑ Yes ☐ No

Comments: _____

Precipitation Check

Graduated Cylinder Volume: 100 ml

Instrument Level: ☑ Yes ☐ No
Debris in inlet basin: ☐Yes ☑ No

Volume of water poured 100 ml
Number of tips 21
Multiplier from Program 0.1

Criteria Met: ☑ Yes ☐ No

Comments: _____

Calibration Performed by: Steve Sanderson

METEOROLOGICAL STATION CALIBRATION DATA SHEET

Client: Durham Region Date: May 24, 2019

Station ID: Courtice Time: 14:00

Installed Equipment

Parameter	Model
Temperature	Vaisala HMP-60
Relative Humidity	Vaisala HMP-60
Wind Speed	RM Young 05103
Wind Direction	RM Young 05103
Precipitation	Texas Instruments TR-525M

Windhead Check

Calibrator: RM Young Cal (# 1114)

Wind Direction (deg from)			Wind Speed (m/s)			
Direction Setpoint	DAS Reading	Actual Reading	Speed Setpoint	DAS Reading	Theoretical Speed	Actual Speed
0	0	0.3	0.98m/s (200rpm)	0.98m/s	3.53	2.98
45	45	45.3	2.45m/s (500rpm)	2.45m/s	8.82	7.70
90	90	90.3	3.92m/s (800rpm)	3.92m/s	14.11	13.01
135	135	135	5.39m/s (1100rpm)	5.39m/s	19.40	18.21
180	180	180.3	6.86m/s (1400rpm)	6.86m/s	24.69	22.88
225	225	225	9.31m/s (1900rpm)	9.31m/s	33.52	31.41
270	270	270.3				
315	315	314.7				

Criteria Met: ■ Yes ☐ No

Comments: Error Allowance for WS component (+/- 0.72 km/h + 5% of Reference Value)

Temperature Check

Standard Thermometer: Vaisala HMI-41

Reference Temperature: 15.6 DAS Temperature: 14.8

Criteria Met: ■ Yes ☐ No

Comments:

Barometric Pressure Check

Standard Barometer: ___Digisense Traceable____

Reference Pressure: ____29.84_____ DAS Pressure: _____29.80_____

Criteria Met: ■ Yes ☐ No

Comments: _____

_____

Relative Humidity Check

Standard Humidity Instrument: _____Vaisala HMI-41_____

Reference Humidity: ____60%_____ DAS Humidity: _____63%_____

Criteria Met: ■ Yes ☐ No

Comments: _____

_____

Precipitation Check

Graduated Cylinder Volume: _____250 mL_____

Instrument Level: ■ Yes ☐ No

Debris in inlet basin: ☐ Yes ■ No

Volume of water poured_____100 mL_____

Number of tips: ____20
Multiplier from Program: ____0.1

Criteria Met: ■ Yes ☐ No

Comments: _____

_____

Meteorological Station Calibration Data Sheet

Client: DYEC **Date:** 20-Dec-18
Station ID: Rundle **Operator:** SRS/NM

Installed Equipment

Parameter	Model
Data Logger	CR1000
Wind Head	RM Young
Temperature/Humidity	HMP-60
Precipitation	Texas Instruments TR-525M

Windhead Check

Calibrator: RM Young

Wind Direction (deg from)		Wind Speed (m/s)	
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0	0/357	0.98	0.98
45	45/42	2.45	2.45
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225	225/222	9.31	9.31
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315	315/313		

Criteria Met: ☑ Yes ☐ No

Comments:

Temperature Check

Standard Thermometer: Digisense

Reference Temperature: 4.5 degC DAS Temperature: 3.9 degC

Criteria Met: ☑ Yes ☐ No

Comments:

Barometric Pressure Check

Standard Barometer: N/A

Reference Pressure: _____ DAS Pressure: _____

Criteria Met: ☐ Yes ☐ No

Comments: There is no barometer at this location

Relative Humidity Check

Standard Humidity Instrument: Digisense

Reference Humidity: 79% DAS Humidity: 79%

Criteria Met: ☑ Yes ☐ No

Comments: _____

Precipitation Check

Graduated Cylinder Volume: 250 ml

Instrument Level: ☑ Yes ☐ No
Debris in inlet basin: ☐Yes ☑ No

Volume of water poured 125 ml
Number of tips 26
Multiplier from Program 0.1

Criteria Met: ☑ Yes ☐ No

Comments: _____

Calibration Performed by: Steve Sanderson/ Nathan McFadden

Meteorological Station Calibration Data Sheet

Client: DYEC **Date:** 24-May-19
Station ID: Rundle **Operator:** SRS

Installed Equipment

Parameter	Model
Data Logger	CR1000
Wind Head	RM Young
Temperature/Humidity	HMP-60
Precipitation	Texas Instruments TR-525M

Windhead Check

Calibrator: _____

Wind Direction (deg from)		Wind Speed (m/s)	
Direction Setpoint	DAS Reading	Speed Setpoint	DAS Reading
0		0.98	
45		2.45	
90		3.92	
135		5.39	
180		6.86	
225		9.31	
270			
315			

Criteria Met: ☐Yes ☐ No

Comments: Windhead calibration was not performed as there were safety issues with lowering and raising the tower

Temperature Check

Standard Thermometer: Digisense

Reference Temperature: 18.6 degC DAS Temperature: 15.5 degC

Criteria Met: ☑ Yes ☐ No

Comments: _____

Barometric Pressure Check

Standard Barometer: N/A

Reference Pressure: _____ DAS Pressure: _____

Criteria Met: ☐ Yes ☐ No

Comments: There is no barometer at this location

Relative Humidity Check

Standard Humidity Instrument: Digisense

Reference Humidity: 60% DAS Humidity: 67%

Criteria Met: ☑ Yes ☐ No

Comments: _____

Precipitation Check

Graduated Cylinder Volume: 100 ml

Instrument Level: ☑ Yes ☐ No
Debris in inlet basin: ☐Yes ☑ No

Volume of water poured 100 ml
Number of tips 21
Multiplier from Program 0.1

Criteria Met: ☑ Yes ☐ No

Comments: _____

Calibration Performed by: Steve Sanderson

AMBIENT AIR QUALITY MONITORING PLAN

DURHAM YORK RESIDUAL WASTE STUDY

Prepared for:
The Region of Durham
605 Rossland Rd
Whitby, ON
L1N 6A3

Prepared by:
Stantec Consulting Ltd.
300-675 Cochrane Dr., West Tower,
Markham, ON L3R 0B8

May 8, 2012

Project No.: 160930024

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1 INTRODUCTION

1.1 Monitoring Objectives

The Regional Municipalities of Durham and York are proposing to construct and operate the Durham York Energy Centre (DYEC) which will be 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.

This monitoring plan was developed based on the Regional Council mandate to provide ambient monitoring in the area of the DYEC for a three year period. An ambient monitoring and reporting program was also a requirement laid out in the Provincial Minister's Notice of Approval to Proceed with the Undertaking, detailed in Condition 11 of the Notice of Approval (MOE, 2010). The purposes of the ambient monitoring program will be to:

1. Quantify any measureable ground level concentrations resulting from emissions from the DYEC cumulative to local air quality, including validating the predicted concentrations from the dispersion modelling conducted in the Environmental Assessment (Jacques Whitford, 2009a);
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.

1.2 Monitoring Period

The monitoring program will commence one (1) year prior to DYEC commissioning (approximately July 1, 2013) to monitor baseline air quality in the absence of emissions from the DYEC (as per Condition 11 of the Ministry of Environment (MOE) Notice of Approval). During commissioning (starting approximately July 1, 2014) continuous monitoring parameters only will be collected. When the EFW Facility is fully operational, monitoring of all contaminants will again be conducted continuously until notification from the MOE Regional Director that the monitoring is no longer required is received. Based on the Regional Council mandate, operational monitoring will be conducted for a minimum 3 year period. The need for further monitoring beyond this time frame will be determined based on the results of the monitoring program in consultation with the Ontario Ministry of Environment (MOE) and the Durham Region Medical Officer of Health (MOH).

1.3 Project Description

The proposed DYEC will process about 140,000 tonnes of municipal solid waste annually. There will be two completely independent waste processing trains at the DYEC. Each train will consist of a feed chute, stoker, integrated furnace/boiler, acid gas scrubber, a fabric filter baghouse and associated ash and residue collection systems. Steam produced in the boilers will drive a turbine-generator to produce electricity for delivery to the grid, for in-plant use and potentially to provide district heating to the neighbouring Courtice Water Pollution Control Plant and Clarington Energy Park. A site plan showing the layout of the DYEC is presented in Figure 1-1.

The following emissions sources were identified based on the preliminary design:

- A conventional stack associated with air pollution control equipment on the waste processing trains which is defined by location, base elevation, stack height, stack diameter, gas exit velocity, gas exit temperature, and contaminant emission rates (the stack typically operates on a continuous basis with relatively constant emission rates);
- One 250 kW emergency diesel generator;
- Two 224 kW emergency diesel fire pumps;
- Diesel tanks for the emergency generator and fire pumps;
- Onsite vehicle traffic;
- Comfort heating of the administration and support buildings;
- A welding station in the storage and maintenance shop; and,
- Fugitive emissions associated with refuse, fly ash and bottom ash transport and handling.

1.4 EFW Site Characteristics

The DYEC will be located on undeveloped land owned by Durham Region, located south of Highway 401 in the Municipality of Clarington (the Site). The Site is on the west side of Osborne Road north of a CN Rail corridor. There are commercial properties north of the Site. The lands east and west of the site are undeveloped commercial land, which are currently used for agricultural purposes. The Courtice Water Pollution Control Plant is south and the Darlington Nuclear Generating Station is located approximately 1.8 km to the east of the Site. The nearest major intersection is Highway 401 and Courtice Road, which is approximately 1.7 km from the Site. The location of the DYEC relative to the local area is shown in Figure 1-2.

The DYEC will be located about 750 m north of Lake Ontario. The Lake is at an elevation of approximately 70 m above mean sea level and along the shoreline there is an escarpment which is approximately 20 m above the Lake's water level. North of the lake shore, the local

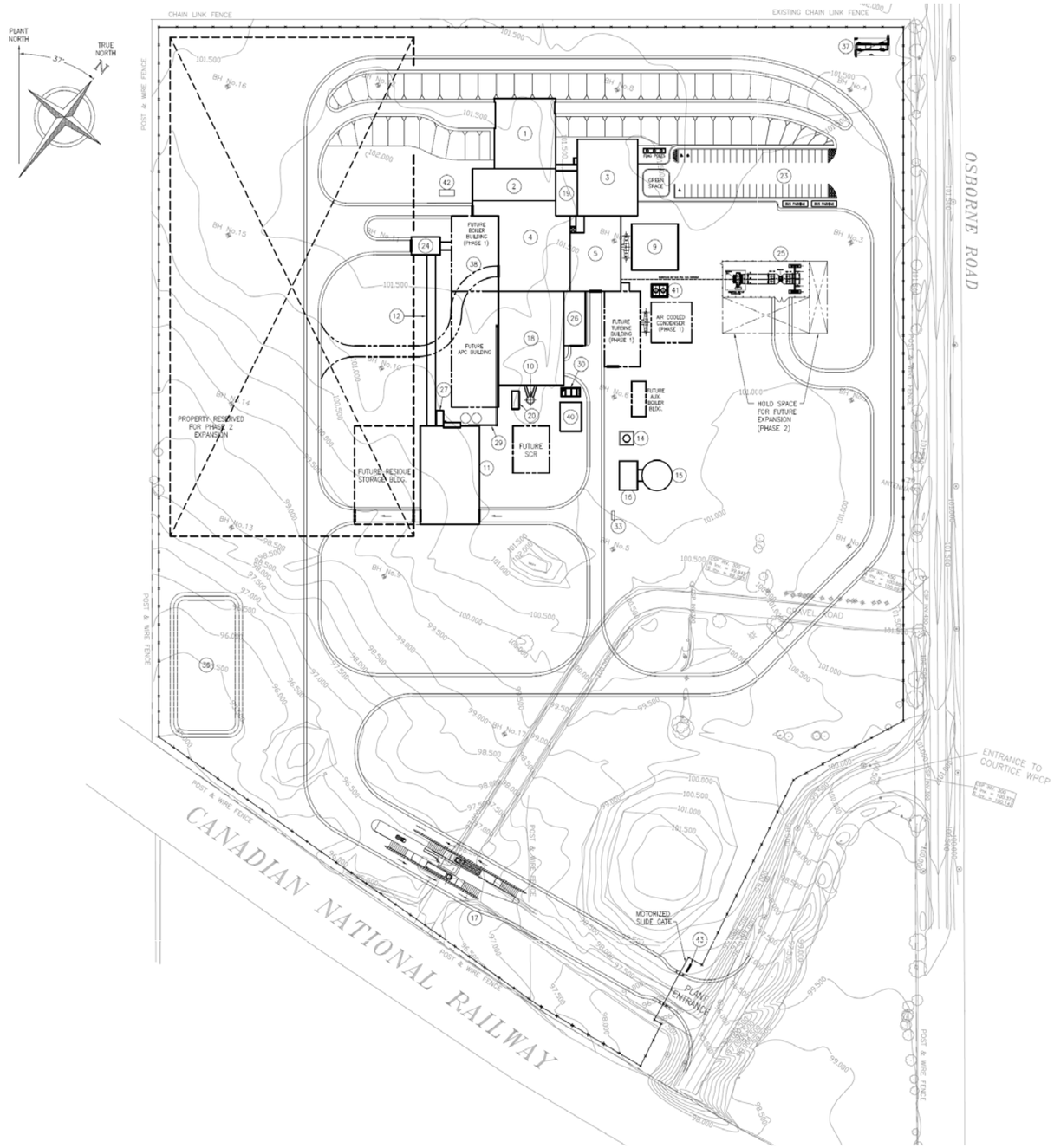
topography is relatively flat with terrain elevations varying from 90 m to 100 m above mean sea level within the immediate vicinity of the Site.

A total of 391 discrete sensitive receptors in the study area were examined in the Environmental Assessment of the DYEC. These receptors included industrial areas, residences/residential areas, hospitals, schools, day cares, nursing homes, recreational areas and water bodies. A plot of the special receptors in proximity to the DYEC is shown in Figure 1-3. A listing of all special receptors can be found in Table 3-9 of the AQTSR (Jacques Whitford, 2009a). The properties adjacent to the site in all directions are current or future industrial. There are two farms each located about 500-m to the east and west of the site. The nearest residential areas to the site are located about 1.5-km to the north-west (Solinas and Baseline Roads) and about 1.5-km to the north-east (Baseline and Trulls Roads).

1.5 Report Contents

The MOE's Operations Manual for Air Quality Monitoring in Ontario (MOE, 2008) (Operations Manual) requires a monitoring plan to include the following sections:

- Purpose or objectives of the monitoring program – Section 1.1
- Expected duration of the monitoring program – Section 1.1
- Identified and suspected air emission source(s) – Sections 1.2, 1.3
- Identified and suspected receptors – Sections 1.3, 2.2
- Number and location of monitoring sites (including meteorological sites) – Section 4.2
- Air quality parameters to be monitored and the monitoring frequency – Sections 4.1, 5.1, 5.2
- Monitoring methods/instruments to be used – Section 5
- Analytical methods/procedures – Sections 5, 6
- Laboratory services support to be used – Section 6
- Dispersion model to be used (if applicable) – N/A
- Quality Assurance and Quality Control (QA/QC) plan – Section 7
- Data reporting procedures – Section 8.



LEGEND

1. TIPPING FLOOR
2. REFUSE BUILDING
3. ADMINISTRATION BUILDING
4. BOILER BUILDING
5. TURBINE BLDG.
6. NOT USED
7. NOT USED
8. NOT USED
9. AIR COOLED CONDENSER
10. STACK
11. RESIDUE STORAGE BUILDING
12. INCLINED BELT CONVEYOR GALLERY ENCLOSURE
13. NOT USED
14. AMMONIA STORAGE TANK & CONTAINMENT
15. FIRE WATER STORAGE TANK
16. FIRE WATER PUMP HOUSE
17. TRUCK SCALE AREA
18. FDG/APC BUILDING/BAGHOUSE BLDG.
19. CONTROL/ELECTRICAL ROOMS
20. CEMS BUILDING
21. NOT USED
22. NOT USED
23. PARKING LOT
24. GRIZZLY BUILDING
25. SWITCHYARD
26. MAINTENANCE AND STORAGE BUILDING
27. RESIDUE PROCESSING ELECTRICAL BUILDING
28. NOT USED
29. FLY ASH TRANSPORT CONVEYORS
30. SETTLING BASIN
31. NOT USED
32. NOT USED
33. MAINT. TRUCK DIESEL OIL STORAGE TANK
34. NOT USED
35. NOT USED
36. RETENTION POND
37. GAS METERING STATION
38. GRAVEL ACCESS ROAD
39. NOT USED
40. ID FAN VFD BUILDING
41. CLOSED COOLING WATER HEAT EXCHANGER
42. EMERGENCY DIESEL GENERATOR ENCLOSURE
43. PLANT ENTRANCE SIGN

GRAPHIC SCALE
0m 10m 20m 30m 40m 50m 60m
METERS

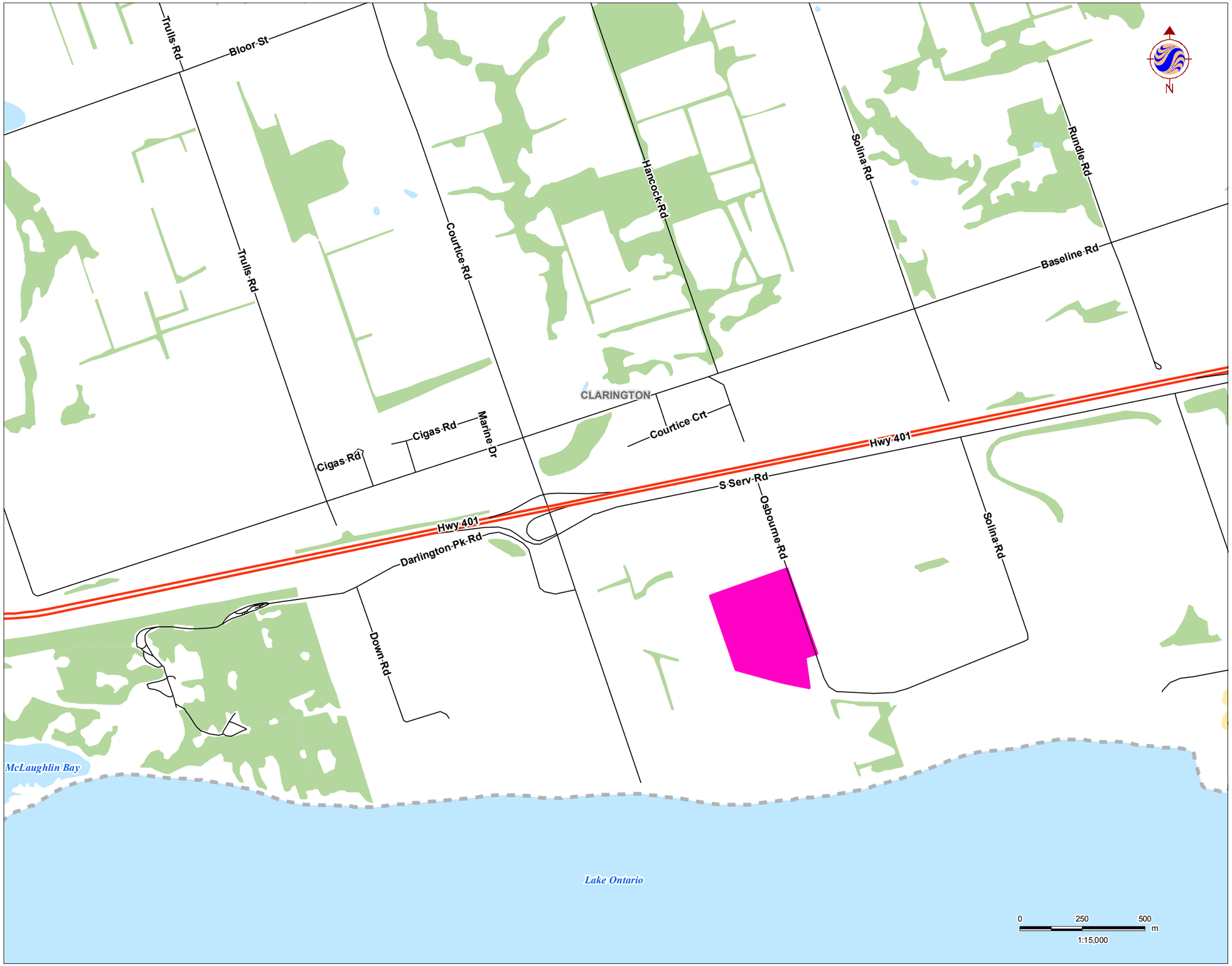
GRAPHIC SCALE
0' 20' 40' 60' 80' 100' 150' 200'
1"=80'-0"

PRELIMINARY

COVANTA ENERGY INC.
40 LANE ROAD
FAIRFIELD, NEW JERSEY 07007-2615

Figure 1-1 Proposed 140,000 tonnes/yr Facility Site Plan

DATE: 8/30/2011
PROJECT: 160930024



Legend

- Road
- Highway
- Proposed EFW Facility Site
- Waterbody
- Wooded Area

Notes

1. Coordinate System: UTM NAD 83 - Zone 17 (N).
2. Data provided by Ontario Ministry of Natural Resources. Copyright 2004 Queen's Printer Ontario

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January 2011
160930024

Client/Project

YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

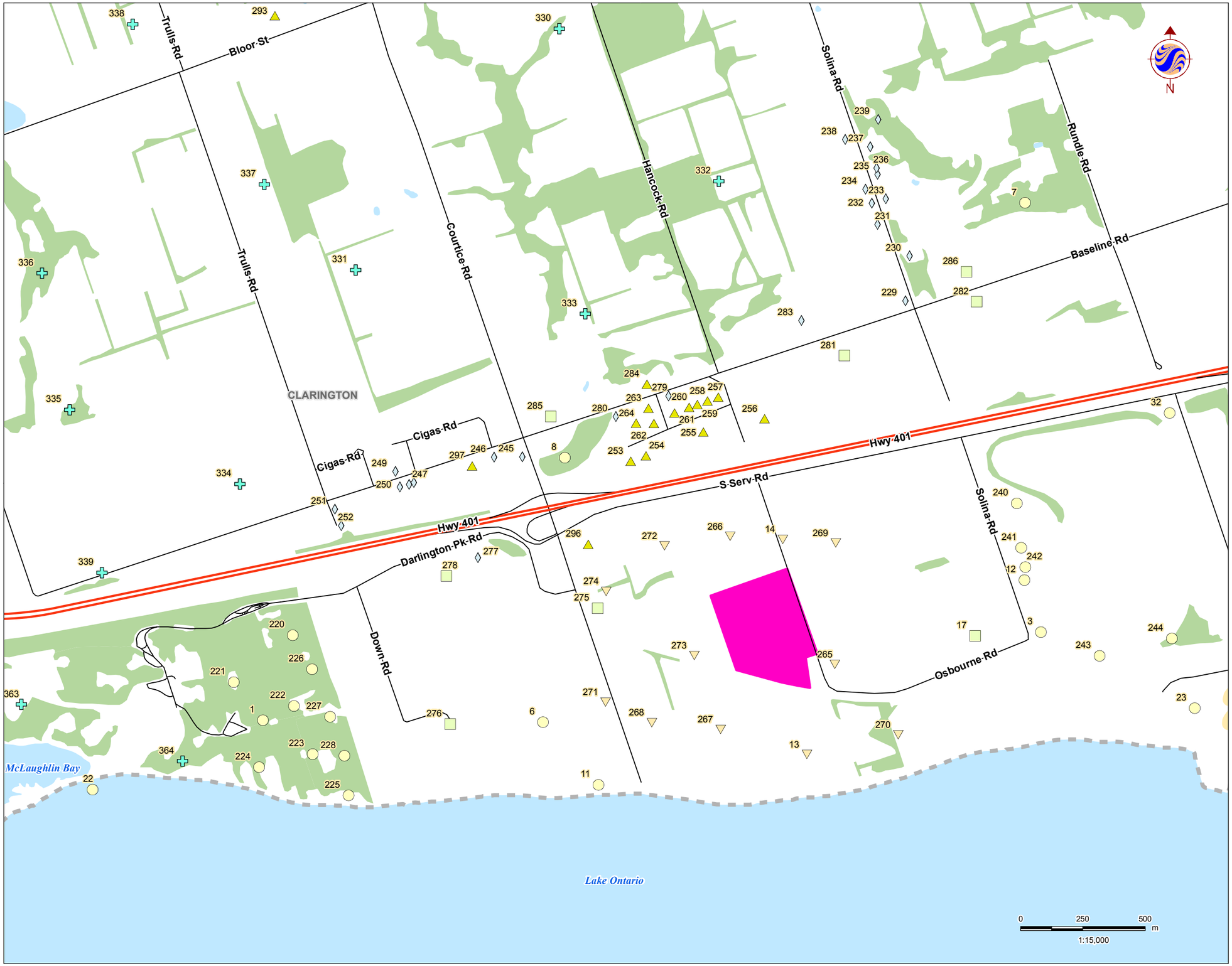
Figure No.

1-2

Title

Location of EFW Facility and Surrounding Area

V:\01223\active_other_pcs\160930001\drawing\gis\Figures\Report\1009497_087_Proposed_Monitoring_Locations_Stantec.mxd
Revised on: January 7, 2011 By: sallen



Legend

- Road
- Highway
- Proposed EFW Facility Site
- Waterbody
- Wooded Area

Receptor Category

- Farm
- Commercial/Industrial
- Future Commercial/Industrial
- Natural/Recreational
- Residence
- Watershed

Notes

1. Coordinate System: UTM NAD 83 - Zone 17 (N).
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YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

Figure No.

1-3

Title

Locations of Sensitive Receptors

Path: V:\01223\active_other_pcs\160930024 Durham York Ambient Monitoring\background\Methods- HF HCl NH3\Drawing\mxd\201105_Report\160930024_Fig1-3_Sensitive Receptors.mxd
Revised on: May 27, 2011 By: bcowper

2 SUMMARY OF DISPERSION MODELLING PREDICTIONS

Dispersion model predictions are an aide in the siting of monitoring stations recommended by the United States Environmental Protection Agency (40 CFR, Part 58) (US EPA). A dispersion modelling study of emissions from the DYEC was completed as part of the approved environmental assessment (EA) for this project (Jacques Whitford, 2009a). This study examined emissions of about 90 different contaminants of potential concern including criteria air contaminants, metals, PAHs, and dioxins/furans. The maximum off-property ground-level concentrations due to emissions from the DYEC were estimated using the CALPUFF dispersion model.

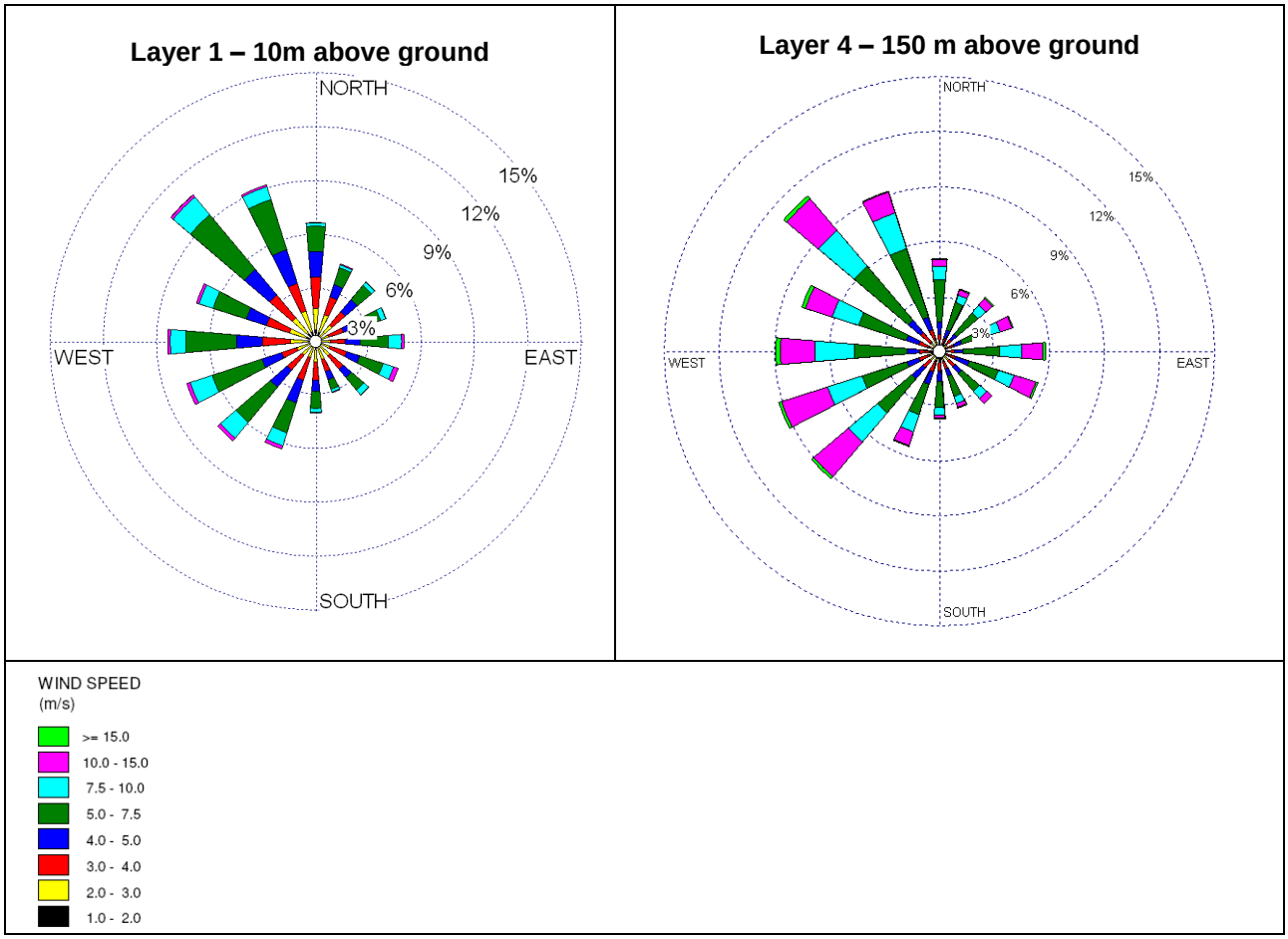
This section presents a brief overview of the dispersion modelling methodology and results relevant to the siting of the ambient monitors. Additional details can be found in the Air Quality Technical Study Report prepared for the EA (Jacques Whitford, 2009a).

2.1 Meteorological Modelling

As part of the dispersion modelling study, data from Environment Canada regional surface meteorological stations, in conjunction with modelled wind data from the Weather Research and Forecasting (WRF) model were used as inputs into the CALPUFF meteorological model. The CALMET meteorological model was run over a five year period to depict a wide range of meteorological conditions and associated dispersion conditions per the MOE's Air Dispersion Modelling Guideline for Ontario (MOE, 2009). The five years of meteorological data produced by the CALMET model were used to initialize the CALPUFF dispersion model.

Wind rose diagrams are an efficient and convenient way of summarizing wind speed and directional data. The length of the radial barbs gives the total percent frequency of winds from the indicated direction, while the portions of the barbs of different widths indicate the frequency of associated wind speed categories. Figure 2-1 below summarizes the hourly CALMET-output winds at the model grid cell nearest to the DYEC Site location. The wind data presented has been extracted from CALMET model levels 1 and 4 (which correspond to 10-m and 150-m above ground) and spans all hours in the five-year modelling period.

Figure 2-1 Summary of Winds at the Site Location



The wind rose diagrams show winds occur most frequently from the southwest and northwest directions, and occur least frequently from the south and northeast directions. During the winter months, winds occur more frequently from the west and northwest, while during the summer, the prevailing wind direction tends to be from the southwest.

2.2 Dispersion Modelling

The dispersion modelling assessment was conducted to predict the downwind concentrations of air contaminants emitted by the DYEC.

The primary emissions source in the DYEC is the 87.6 metre tall main stack. The waste processing operations in the DYEC (including the truck tipping bay and storage pit) are all enclosed and kept under negative pressure, with the air from these areas being used in the combustion process and vented to the main stack. Therefore, no low level emissions will occur from the DYEC operations with the exception of emergency diesel generator testing, road dust

from vehicles on paved roads and the occasional filling of carbon/lime storage silos (which are equipped with fabric filters to minimize emissions). Therefore, the main stack is the only source of emissions of concern from the waste processing facility. The minor emissions from low level emissions sources were modeled in the EA (and ECA application) and demonstrated to be in compliance with MOE air quality criteria. As the low level emissions are of common contaminants that occur from many industrial/commercial facilities, their consideration for ambient monitoring is not required.

Contour plots showing the maximum predicted ground level concentrations for a unit emission rate (facility-wide emission rate of 1 g/s) from the DYEC stack over the five year modeling period are presented in Figures 2-2 through 2-4 for hourly, 24-hour and annual averaging periods, respectively. In all cases, the figures show results for emissions released under maximum normal Facility operation (100% capacity).

Figures 2-2 and 2-3 show that the areas with the highest predicted short-term concentrations occur to the north-west of the DYEC, within 500m of the property line. Moving beyond this 500 m radius, the predicted concentrations become gradually lower with increasing distance from the DYEC. It should be noted that the maximum predicted short-term events occur infrequently and represents a modelled worst-case hourly or daily average prediction over a five-year period.

The areas with the highest annual averaging concentrations are shown in Figure 2-4. This contour plot shows that the predicted maximum annual average concentration occurs approximately 1.5 km to the northeast of the DYEC, with another area of almost as high annual concentrations occurring about 1.5 km to the west-northwest of the DYEC.

Dispersion modelling of maximum total annual contaminant depositions was conducted to predict particulate and gaseous depositions at the special receptors considered in the air quality assessment. Plots of total annual particulate and gaseous dry depositions for a unit emission rate (1 g/s) from the facility are presented in Figures 2-5 and 2-6 for the special receptors in close proximity to the DYEC. For both particulate and gaseous, these plots show that depositions are lower in close proximity to the facility than for receptors further away. This is attributable to the high stack height (87.6-m) resulting in plume impingement more frequently occurring at distances further away from the facility than at the property line.

Legend

Maximum GLC

Facility

FIGURE 2-2

Plot of Maximum Predicted Hourly-Average Ground Level Concentrations for Normalized Facility-Wide Emission Rate

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 8/30/2011
PROJECT: 160930024

Scenario 1A (MCR, 140,000 tonnes/yr Facility)

Predicted Statistical Maximum GLC = 8.78 (µg/m^3)/(g/s)

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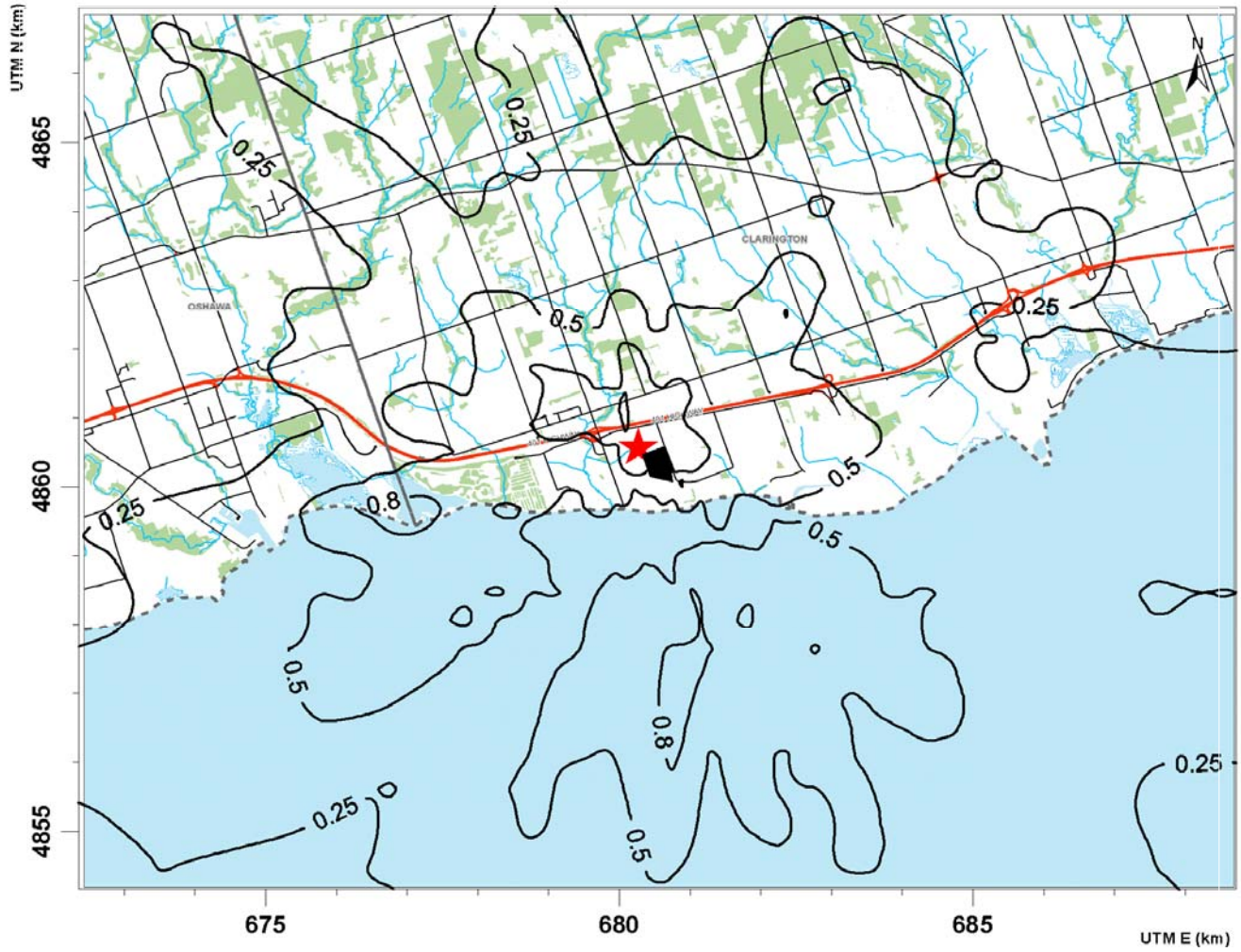

Legend

★ Maximum GLC

■ Facility

FIGURE 2-3

Plot of Maximum Predicted 24-Hour-Average Ground Level Concentrations for Normalized Facility-Wide Emission Rate

Scenario 1A (MCR, 140,000 tonnes/yr Facility)

Predicted Statistical Maximum GLC = 1.21 (µg/m^3)/(g/s)

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 8/30/2011
PROJECT: 160930024

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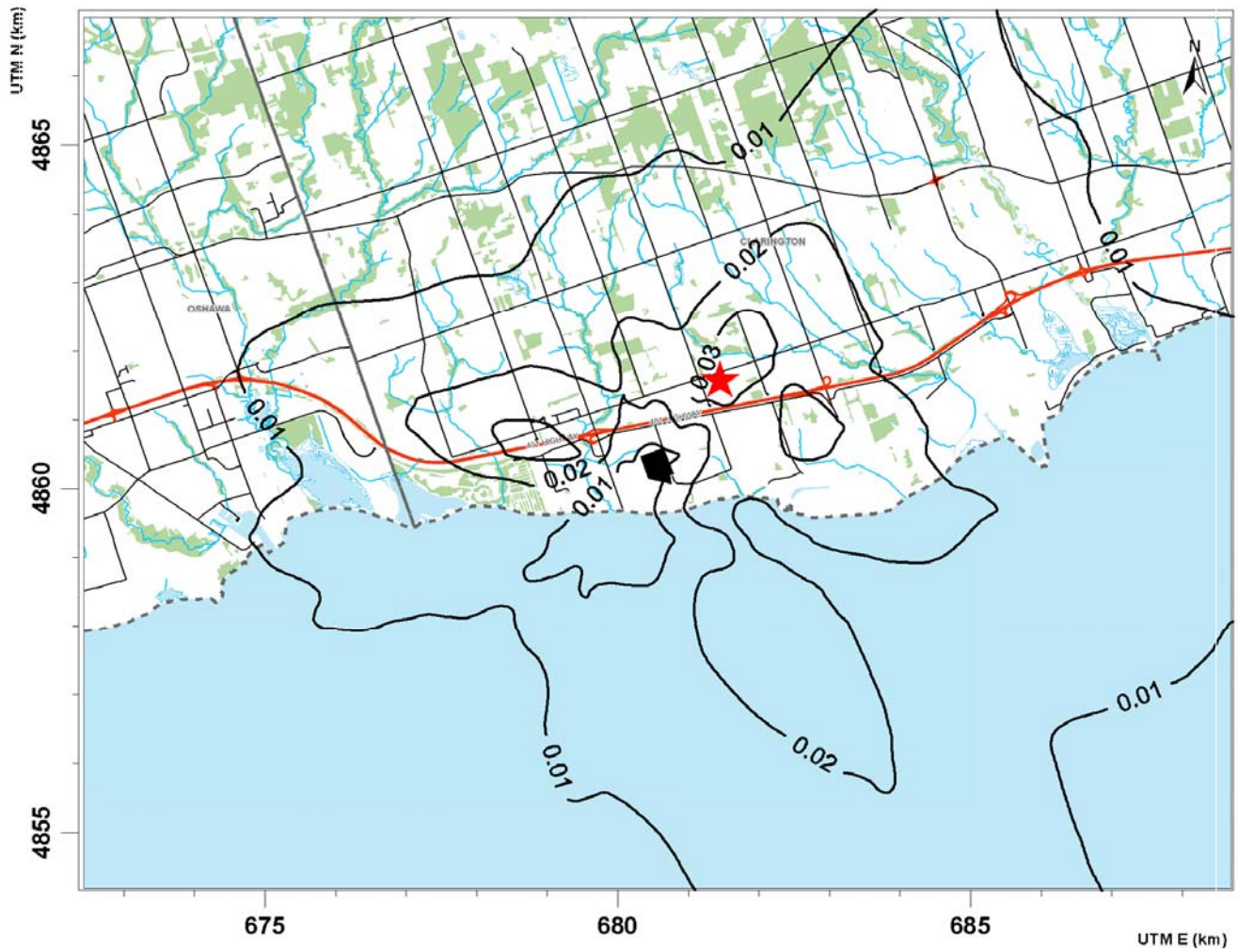

Legend

★ Maximum GLC

■ Facility

FIGURE 2-4

Plot of Maximum Predicted Annual-Average Ground Level Concentrations for Normalized Facility-Wide Emission Rate

Map Parameters
Projection: UTM
Datum: NAD 83
Zone: 17
Map Units: m
DATE: 8/30/2011
PROJECT: 160930024

Scenario 1A (MCR, 140,000 tonnes/yr Facility)

Predicted Statistical Maximum GLC = 0.035 (µg/m^3)/(g/s)

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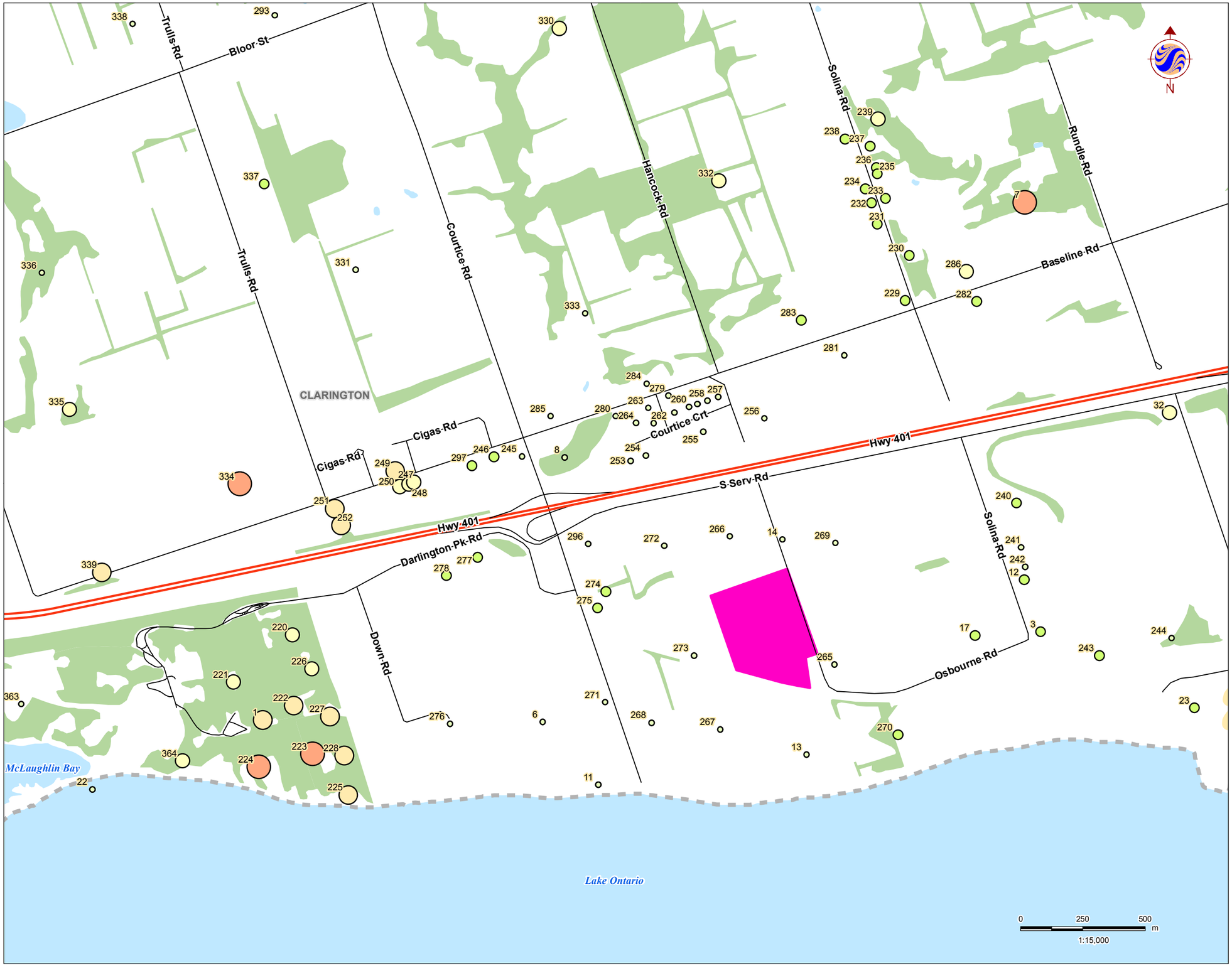

Legend

- Road
- Highway
- Proposed EFW Facility Site
- Waterbody
- Wooded Area

Deposition Particulates

ug/m2/yr/(g/s)

- 65 - 500
- 501 - 1000
- 1001 - 2500
- 2501 - 5000
- 5001 - 6150

Notes

1. Coordinate System: UTM NAD 83 - Zone 17 (N).
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RESIDUAL WASTE STUDY

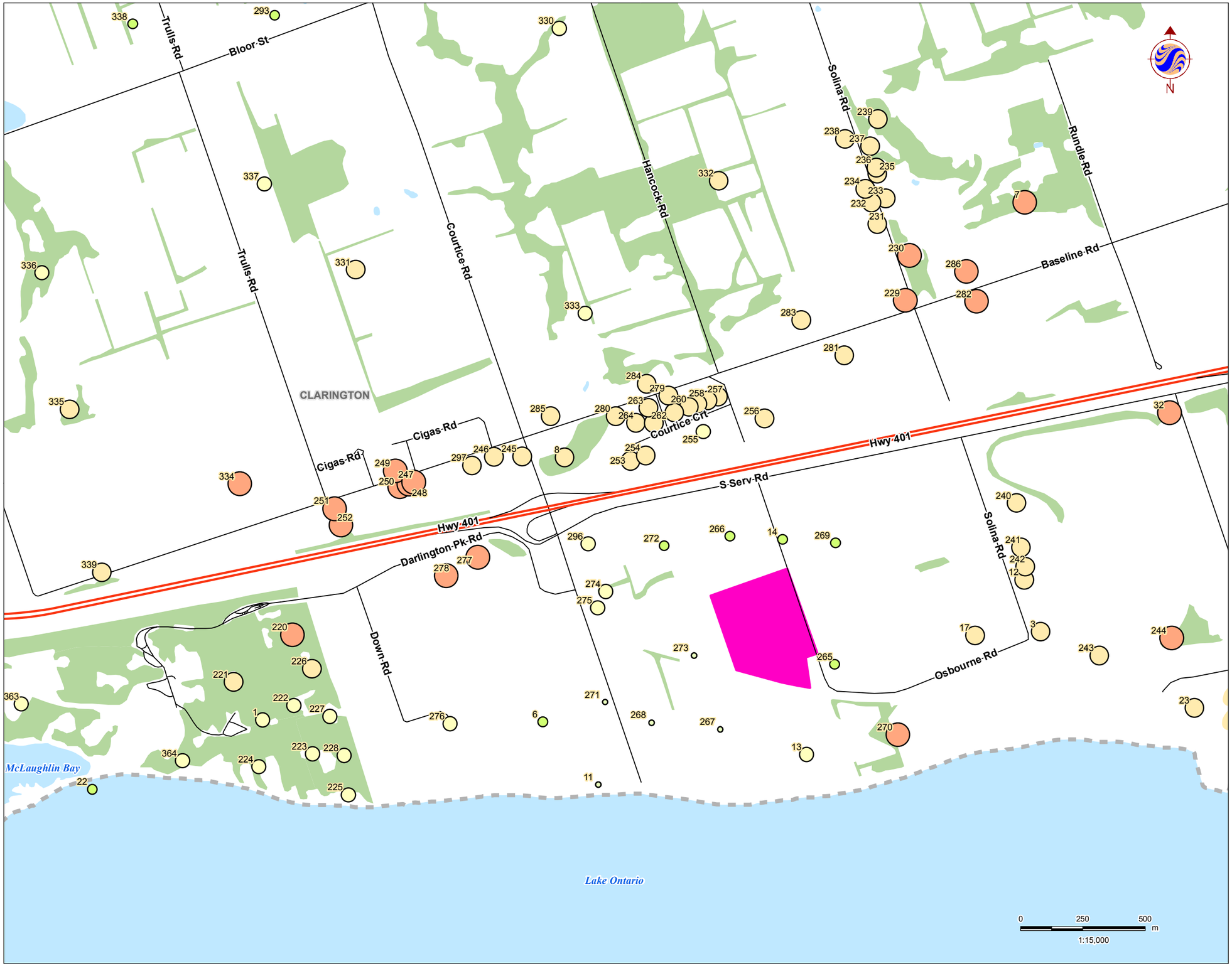
Figure No.

2-5

Title

Plot of Total Annual Particulate Dry Deposition for a Normalized Facility-Wide Emission Rate

Path: V:\01223\active_other_pcs\160930024 Durham York Ambient Monitoring\background\Methods- HF HCl NH3\Drawing\mxd\201105_Report\160930024_Fig2-5_Deposition Particulate.mxd
Revised on: May 30, 2011 By: bcowper



Legend

- Road
- Highway
- Proposed EFW Facility Site
- Waterbody
- Wooded Area

Deposition Vapour

ug/m2/yr/(g/s)

- 1053 - 1500
- 1501 - 2000
- 2001 - 3000
- 3001 - 4000
- 4001 - 5503

Notes

1. Coordinate System: UTM NAD 83 - Zone 17 (N).
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YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

Figure No.

2-6

Title

Plot of Total Annual Gaseous Dry Deposition for a Normalized Facility-Wide Emission Rate

Path: V:\01223\active_other_pcs\160930024 Durham York Ambient Monitoring\background\Methods- HF HCl NH3\Drawing\mxd\201105_Report\160930024_Fig2-6_Deposition_Vapour.mxd
Revised on: May 30, 2011 By: bcowper

3 GENERAL SITING CONSIDERATIONS

3.1 Scale of Representativeness

Proper siting of monitoring stations requires a precise specification of the monitoring objective, which usually includes a desired spatial scale of representativeness. The spatial scale of representativeness is described in terms of the physical dimensions of the air parcel nearest to a monitoring station through which the pollutant concentration is reasonably uniform. The goal in siting monitoring stations is to correctly match the spatial scale represented by the sample of monitored air with the monitoring objective of the station. The scales of representativeness of most interest for local air monitoring are:

- Microscale – defines concentrations in air volumes associated with area dimensions ranging from several metres up to about 100 m.
- Middle Scale – defines the concentration typical of areas ranging in size from about 100 m to 0.5 km.
- Neighbourhood Scale – defines concentrations within extended areas with relatively uniform land use with dimensions of 0.5 to 4.0 km.
- Urban Scale – defines overall city-wide conditions with dimensions on the order of 4 to 50 km.

US Consolidated Federal Regulations, Section 40, Part 58 (40CFR Part 58), (US EPA, 2010) provide guidelines on the scales of representativeness required for specific monitoring objectives. The objective of monitoring source impact is associated with micro, middle and neighbourhood scales. Monitoring for background concentrations requires neighbourhood or regional scales of representativeness.

This monitoring plan has been developed to meet the following objectives:

1. to quantify the ground level concentration resulting from emissions from the DYEC on local air quality, including validating the predicted concentrations;
2. to monitor concentration levels in nearby residential areas; and,
3. to quantify background ambient levels in the area.

Based on the objectives listed above, the monitor should be situated to capture middle to neighbourhood scales of representativeness (hundreds of metres to 4 km). The dispersion modeling results summarized in Section 3 show the maximum predicted concentrations occur within this range for both short-term and long-term averaging periods.

3.2 Siting Requirements

The following table provides a summary of siting requirements listed in the MOE's Operations Manual (MOE, 2008) that will be followed as closely as possible for the siting of the monitor, however the final location of the station will be constrained to sites with adequate security (within a secured, fenced area), vehicle access, set-back from roadways, and access to power.

Table 3-1 Summary of Siting Criteria for Ambient Monitors

Contaminant	MOE Recommended Criteria
Sulphur Dioxide (SO_2)	3 - 15 m above ground
	> 1 m vertical and horizontal distance from supporting structure
	> 20 m from trees
	Distance from sampler to any air flow obstacle must be >2x height of obstacle above the sampler
	Unrestricted air flow in 3 of the 4 wind quadrants
	No nearby furnace or incineration flues
	Probe material - Pyrex glass or FEP Teflon
Nitrogen Dioxide (NO_2)	3 - 15 m above ground
	> 1 m vertical and horizontal distances from supporting structure
	> 20 m from trees
	Distance from sampler to any air flow obstacle must be >2x height of obstacle above the sampler
	Unrestricted air flow in 3 of the 4 wind quadrants
	Spacing from roadways varies with road traffic
	No nearby furnace or incineration flues
Total Suspended Particulate (TSP): General	2 - 15 m above ground
	> 1 m vertical and > 2 m horizontal distance from supporting structure
	> 20 m from trees
	Distance from sampler to any air flow obstacle must be >2x height of obstacle above the sampler
	Unrestricted air flow in 3 of the 4 wind quadrants
	No nearby furnace or incineration flues
	Distance from sampler to roadway should be > 20-25 m for sampler inlet heights of 2-5 m

Table 3-1 Summary of Siting Criteria for Ambient Monitors

Contaminant	MOE Recommended Criteria
Particulate Matter less than 2.5 Microns in Diameter ($PM_{2.5}$): General	2 - 15 m above ground
	> 1 m vertical and > 2 m horizontal distance from supporting structure
	> 20 m from trees
	Distance from sampler to any air flow obstacle must be >2x height of obstacle above the sampler
	Unrestricted air flow in 3 of the 4 wind quadrants
	> 5 m from chimneys with natural gas combustion emissions
	> 20 - 25 m from major roadways
PAHs and Dioxins/Furans	3 - 15 m above ground
	> 1 m vertical and > 2 m horizontal distance from supporting structure
	No nearby sources of PAHs, dioxins and furans which could interfere with sample results
Wind speed and Direction	=> 10 m height above ground
	> 1 building height (H) upwind of a building obstruction
	> 1.5 H above building roof for rooftop installation
	> 5-10 H downwind of building
	> 10 m above dense vegetative canopy
	> 2 tower side widths (D) for boom installations
Air Temperature	> 2 m height above ground
	Temperature sensor > 4 obstruction heights and > 30 m from large paved areas
	> 1 D for tower mast installations

3.3 Number of Monitors

US Consolidated Federal Regulations, Section 40, Part 58 (40CFR Part 58), Appendix D (US EPA, 2010) provides criteria for the basic air monitoring requirements including the total number of monitoring sites that will serve specific data needs. EPA notes that the optimum size of a particular network involves trade-offs among data needs and available resources. The numbers of monitoring sites recommended in Appendix D are based on population levels and contaminant being monitored. The relevant study area for the DYEC would cover the Municipality of Clarington, which has a population of 77,820 (2006 census data). The contaminants considered in 40CFR Part 58, App D relevant to the DYEC are NO_2 and $PM_{2.5}$. For NO_2 one monitoring station is recommended for areas with less than 1 million people, while for $PM_{2.5}$, 40CFR Part 58, App D recommends one monitoring station in areas with populations between 50,000 to 500,000.

Thus, based on the guideline data available from US EPA, a minimum of one monitoring station would be required. Discussions with the MOE have indicated that they will require that an upwind station and a property line monitor (for a 1-year period) are also included in the monitoring network.

Other considerations in setting the number of monitoring stations would be the presence of potentially health sensitive receptors within the scales of representativeness identified in Section 3.1 (100's of metres to 4–km). The nearest hospital to the DYEC is located about 4.8 km to the east-northeast, in a predominantly upwind direction and outside the siting area of consideration. The nearest daycare centre identified in the EA is located about 3.9 km to the north-northeast, also in a predominantly upwind direction and at the edge of the siting area of interest. The nearest primary and secondary schools are located about 4.0 and 4.7 km from the site in east-northeasterly and northeasterly directions respectively. The schools are both located in predominantly upwind directions and near the edge or outside of the siting area of interest. As all of these receptors are either outside the siting area of consideration or located considerable distances from the DYEC in predominantly upwind directions (where predicted concentration levels are considerably lower than in closer proximity to the DYEC), monitoring at these locations would not be expected to provide useful information.

Another objective of the monitoring program will be to validate the dispersion model predictions conducted in the EA. The CALPUFF model used in the air quality assessment was extensively validated against multiple ambient measurement data sets (for different emissions sources and in different terrain) prior to the model being accepted as a regulatory model by the US EPA. To adequately validate the dispersion modelling for the DYEC therefore only requires measurements upwind and downwind of the DYEC to quantify background and source contributions to ambient air quality for comparison to the model predictions. As a number of contaminant emission rates will be continuously monitored at the stack as well as at the two monitoring stations, this provides an extensive data base of measurements with which to validate the model (8760 hours of measurement/model prediction points each year).

Further discussion on the number of monitoring stations is provided in Section 4.3.

Based on the on-going results of the ambient monitoring program, the need for additional monitoring stations will be assessed and the network adjusted accordingly. If the ambient monitoring data do not agree well with the dispersion model predictions, the need for additional monitoring stations (or re-location of the existing stations) will be reviewed and assessed with the MOE.

4 CONTAMINANTS AND LOCATIONS FOR MONITORING

The proposed contaminants to be monitored were determined based on the results of the Site-Specific Human Health and Ecological Risk Assessment (HHERA) (Stantec, December 2009), conducted in support of the EA for the DYEC as well as the ambient monitoring program completed for the undertaking. The proposed locations for monitoring were determined based on the results of the Air Quality Assessment, prevailing wind direction, locations of nearby residences, and the general siting requirements outlined in Section 3.

4.1 Contaminants to be Monitored

The HHERA was prepared in support of the approved Durham and York Region's Residual Waste Planning EA.

The HHERA examined the potential for emissions from the DYEC to pose an unacceptable risk to human and ecological receptors in the short-term and long-term (i.e., after 30 years of operating the DYEC). The HHERA evaluated the potential risk from the DYEC operating at its permitted capacity of 140,000 tonnes/year (tpy). The Local Risk Assessment Study Area (LRASA) encompassed a 10 km radius from the proposed DYEC and included the evaluation of 309 receptor locations and all of the watershed areas within.

A total of 87 contaminants of potential concern (COPCs) were evaluated in the inhalation assessment and 57 of these were evaluated in a multiple pathway assessment for human and ecological receptors. The first scenario involved the evaluation of baseline conditions of COPCs in air, soil, vegetation, water and biota. Baseline Case acute (1-hr or 24-hr) and chronic (annual) risk estimates for inhalation exposure to COPCs did not exceed their regulatory benchmark, which have been developed to be protective of human health and the environment. Therefore no adverse health risk was expected from exposure to baseline air concentrations of chemicals.

The results of the multi-pathway assessment predicted that exposure to DYEC-related air emissions would have no undue carcinogenic or non-carcinogenic risk to human receptors living or visiting the LRASA while the DYEC is operating at 140,000 tpy. All hazard quotients and incremental lifetime cancer risks were below their respective government benchmarks for all chemicals and exposure scenarios. The ecological risk assessment did not predict any undue ecological risks from DYEC emissions when operating at 140,000 tpy.

Therefore, based on the results of the risk assessment, there were no COPCs that warrant any special attention or inclusion in the air monitoring program to be undertaken. However, given it

is a requirement in the Minister's Notice of Approval, detailed in Condition 11 (MOE, 2010), a list of chemicals was developed based on:

- Their emission rate from the DYEC;
- Those chemicals that were already present in the ambient air at appreciable concentrations; and,
- Those that are considered to be of greatest concern to public or environmental health.

Based on these criteria, the following contaminants were chosen to be included in this monitoring program:

- Nitrogen oxides (NO_X);
- Sulphur dioxide (SO_2);
- Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$);
- Metals in total suspended particulate matter (TSP);
- Polycyclic Aromatic Hydrocarbons (PAHs); and,
- Dioxins and Furans.

A full listing of speciated metals and PAHs to be analyzed is provided in Section 5 of this monitoring plan.

The maximum predicted ground level speciated PAH, dioxins and furans, and metals concentrations due to DYEC emissions are either close to or less than their method detection limits. Therefore it is not expected that appreciable changes in ambient levels of these contaminants will be detected, however they are included in the monitoring due to their potential for human health effects and because they are contaminants of concern to the public.

The contaminant list to be monitored will act as a surrogate for the greater list of chemicals that are expected to be emitted from the DYEC.

4.2 Contaminants not Monitored

The following CoPCs were not chosen to be sampled:

- Speciated VOCs;
- Hydrogen Fluoride;
- Hydrogen Chloride; and,
- Ammonia.

VOCs were not chosen to be sampled, as emissions of these contaminants are expected to occur in trace amounts and predicted ambient levels of speciated VOCs are all well below

typical laboratory method detection limits for VOC CoPCs included a standard US EPA TO-15 analysis (see Table 4-1). As can be seen in this table, the maximum predicted VOC concentrations are all much less than their respective laboratory detection limits, so no detectable changes in ambient concentrations would be expected to be measured.

Table 4-1 Comparison of Maximum Predicted Speciated VOC Concentrations to Laboratory MDLs`

Contaminant	Laboratory MDL ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$)
1,1,1-Trichloroethane	1.6	7.15E-05
1,2,4-Trichlorobenzene	14.8	2.58E-06
1,2-Dichlorobenzene	2.4	1.02E-04
Benzene	0.6	1.55E-03
Bromodichloromethane	1.3	1.26E-02
Bromoform	2.1	3.46E-03
Bromomethane	0.7	1.80E-03
Carbon Tetrachloride	1.9	2.16E-05
Chloroform	0.7	2.55E-05
Dichlorodifluoromethane (FREON 12)	1.0	4.36E-03
Ethylbenzene	0.9	5.19E-05
Ethylene Dibromide	1.3	2.03E-05
m / p-Xylene	1.6	3.02E-02
Methylene Chloride(Dichloromethane)	1.0	8.81E-03
o-Xylene	0.9	3.02E-02
Toluene	0.8	2.52E-03
Trichlorofluoromethane (FREON 11)	1.1	8.62E-03
Vinyl Chloride	0.5	2.18E-03

Similarly to VOCs, hydrogen fluoride (HF) was not chosen to be monitored as the maximum predicted 24-hour average concentration of 0.05 $\mu g/m^3$ was about two orders of magnitude less than the best available method detection limit. HF will be continuously monitored at the stack and therefore HF emissions to the environment will be well quantified.

Hydrogen chloride was not chosen to be monitored as the maximum predicted 24-hour average concentration of 0.45 $\mu g/m^3$ was about an order of magnitude less than the best available method detection limit. Also HCl will be continuously monitored at the stack and therefore HCL emissions to the environment will be well quantified.

Ammonia was also not included in the monitoring as the maximum predicted NH_3 concentration of 0.27 µg/m^3 is more than an order of magnitude less than the available method detection limit.

4.3 Monitoring Locations

Based on the results of the air quality modelling, the locations of nearby sensitive receptors, and the general siting criteria discussed in the previous sections, three monitoring stations (one downwind, one property line, and one upwind) are proposed for the ambient monitoring program. The selected downwind location takes into account the following specific considerations:

- The dominant wind direction which could result in plume transport to nearby residential receptors is southwesterly;
- The dispersion modelling predicted the highest concentrations over longer-term periods would occur within a 1 to 2 km radius measured from the Site location, with the highest predicted area of influence located to the northeast;
- The land use immediately adjacent to the site is current or future industrial;
- The majority of residential areas are located north of the Site;
- Highway 401 is located approximately 500 m north of the Site;
- There are no residential receptors located between the Site and Highway 401 in the predominant wind direction (winds blowing from southwesterly directions towards the northeast);
- As seen in Figures 2-5 and 2-6, predicted particulate and gaseous deposition is larger at receptors further away from the site as opposed to the receptors immediately adjacent to the site; and,
- The monitor(s) should be situated to capture middle to neighbourhood scales of representativeness (hundreds of metres to 4 km).

Based on these considerations, the proposed downwind ambient monitoring program will monitor the contaminants listed above at a downwind monitoring station sited northeast of the DYEC (in the area with the highest predicted annual-average concentrations). Two alternative sites in the same general area have been identified as being viable alternatives for the monitoring station, shown in Figure 4-1 as Downwind #1 (D-1) and Downwind #2 (D-2). One of these two locations will be used for the downwind monitoring site dependent on successful negotiations with the property owners. The monitoring station will measure all the air contaminants listed in Section 4.1. As can be seen in Figure 1-3, the two proposed alternatives for the downwind monitoring location are in the vicinity of the first grouping of residential receptors downwind of the DYEC in this direction. Both of these locations fall in the area where maximum annual concentrations are predicted to occur (in Figure 2-4 this is taken to be the 0.03 µg/m^3/(g/s) contour line). The highest predicted annual concentration was

0.035 µg/m^3/(g/s) so anywhere within the 0.03 contour is greater than or equal to 86% of the maximum predicted level.

Location D-1 falls on the edge of this area (on the 0.03 contour line) and would measure about 86% of the max predicted concentration, while Location D-2 falls within the 0.03 contour so would be measuring >86% of the maximum predicted level.

The receptors identified in the EA between these monitoring locations and the DYEC are either industrial (adjacent to the DYEC property) or farmland. These proposed downwind locations are also in the vicinity of elevated deposition predictions for both gaseous and particulate contaminants relative to locations closer the DYEC (see Figures 3-5 and 3-6).

MOE provided feedback on the draft ambient monitoring plan (March 2011) that they would recommend a second downwind ambient monitoring station be included in closer proximity to the site. This recommendation was premised on there being sensitive residential receptors located between locations D-1/D-2 and the Site (south of Highway 401) and that depositions would be higher closer to the Site than at locations D-1/D-2. As noted above, depositions are predicted to be greater further away from the Site than close to the property line (attributable to the very tall stack) and there are no residential receptors between the Site and Highway 401 to the north-west.

MOE has requested (Nov 30th 2011) that a second downwind monitoring station be installed in the vicinity of the plant property line (for a minimum of one year) and measure TSP and metals concentrations after construction is complete. The approximate location of this station, which will be located within the perimeter fence along the north east portion of the DYEC property (near the gas metering station) is presented in Figure 4-1.

One location for the upwind monitoring site requested by the MOE has also been identified. Based on MOE feedback, the siting of the upwind station was requested to be to the west or southwest of the DYEC in order to measure background air quality in the predominantly upwind direction. The proposed location is presented in Figure 4-1 as Upwind #1 (U-1). This location is the same site used for background monitoring during the EA from September 2007 to December of 2008. The monitoring station will continuously measure SO_2, $NO_{X,}$ and $PM_{2.5}$ as well as wind speed/direction, temperature, and relative humidity. TSP and metals will also be measured at this station. Monitoring these contaminants is expected to provide sufficient data to determine the DYEC's incremental contribution to local air quality (in an upwind/downwind analysis for facility contribution) as they will act as surrogates for all other potential contaminants. Trees which provided partial obstruction on the site during the EA sampling will be removed for the proposed sampling program.

A comparison of how these proposed locations for the monitoring stations compare to the MOE probe siting criteria for ambient monitors is presented in Table 4-1. All of the proposed locations for the stations meet the criteria. Photos of the alternative locations are shown in Figures 4-2 to 4-4 below.

In the design of the program, monitoring at a nearby soccer field east of the proposed DYEC and west of the Darlington Nuclear Power Plant was considered, due to its proximity to the DYEC Site. As the soccer field may be removed as part of a planned expansion at the Darlington Nuclear Plant, inclusion of monitoring at this location was not considered warranted due to the limited exposure time for participants at this location, and the uncertainty of its use in the near future.

Table 4-2 Comparison of Proposed Monitoring Locations to Probe Siting Criteria

Contaminant	MOE Recommended Criteria	Proposed Downwind Monitoring Station Location[1]			Proposed Upwind Monitoring Station Location (U-1)
		Alternate Location 1 (D-1)	Alternate Location 2 (D-2)	Property Line	
SO_2	3 - 15 m height above ground	> 3 m	> 3 m	NA	> 3 m
	> 1 m vertical and horizontal distance from supporting structure	Yes	Yes	NA	Yes
	> 20 m from trees	> 20 m [2]	> 20 m	NA	> 20 m [5]
	Distance from sampler to any air flow obstacle must be > 2x height of obstacle above the sampler	Yes	Yes [3]	NA	Yes
	Unrestricted air flow in 3 of the 4 wind quadrants	Yes	Yes	NA	Yes
	No nearby furnace or incineration flues	N/A	N/A	NA	N/A
	Probe material - Pyrex glass or FEP Teflon	Yes	Yes	NA	Yes
NO_2	3 - 15 m height above ground	> 3 m	> 3 m	NA	> 3 m
	> 1 m vertical and horizontal distance from supporting structure	Yes	Yes	NA	Yes
	> 20 m from trees	> 20 m [2]	> 20 m	NA	> 20 m [5]
	Distance from sampler to any air flow obstacle must be > 2x height of obstacle above the sampler	Yes	Yes [3]	NA	Yes
	Unrestricted air flow in 3 of the 4 wind quadrants	Yes	Yes	NA	Yes
	Spacing from roadways varies with road traffic	Meets criteria [4]	Meets criteria [4]	NA	Meets criteria [4]

Table 4-2 Comparison of Proposed Monitoring Locations to Probe Siting Criteria

Contaminant	MOE Recommended Criteria	Proposed Downwind Monitoring Station Location[1]			Proposed Upwind Monitoring Station Location (U-1)
		Alternate Location 1 (D-1)	Alternate Location 2 (D-2)	Property Line	
	No nearby furnace or incineration flues	N/A	N/A	NA	N/A
Metals/TSP (general)	2 - 15 m height above ground	> 2 m	> 2 m	> 2 m	> 2 m
	> 1 m vertical and > 2 m horizontal distance from supporting structure	Yes	Yes	Yes	Yes
	> 20 m from trees	> 20 m [2]	> 20 m	> 20 m	> 20 m
	Distance from sampler to any air flow obstacle must be > 2x height of obstacle above the sampler	Yes	Yes [3]	Yes [3]	Yes [3]
	Unrestricted air flow in 3 of the 4 wind quadrants	Yes	Yes	Yes	Yes
	No nearby furnace or incineration flues	N/A	N/A	N/A	N/A
	Distance from sampler to roadway should be > 20-25 m for sampler inlet heights of 2-5 m	> 20 m from side road, > 500 m from Hwy. 401	> 20 m from side road, > 500 m from Hwy. 401	> 20 m from Osborne Road, >400-m from Hwy. 401	> 20 m from side road, > 500 m from Hwy. 401
$PM_{2.5}$ (general)	2 - 15 m height above ground	> 2 m	> 2 m	NA	> 2 m
	> 1 m vertical and > 2 m horizontal distance from supporting structure	Yes	Yes	NA	Yes
	> 20 m from trees	> 20 m [2]	> 20 m	NA	> 20 m [5]
	Distance from sampler to any air flow obstacle must be > 2x height of obstacle above the sampler	Yes	Yes [3]	NA	Yes
	Unrestricted air flow in 3 of the 4 wind quadrants	Yes	Yes	NA	Yes
	> 5 m from chimneys with natural gas combustion emissions	N/A	N/A	NA	NA
	> 20- 25 m from major roadways	> 20 m from side road, > 500 m from Hwy. 401	> 20 m from side road, > 500 m from Hwy. 401	NA	> 20 m from side road, > 500 m from Hwy. 401

Table 4-2 Comparison of Proposed Monitoring Locations to Probe Siting Criteria

Contaminant	MOE Recommended Criteria	Proposed Downwind Monitoring Station Location[1]			Proposed Upwind Monitoring Station Location (U-1)
		Alternate Location 1 (D-1)	Alternate Location 2 (D-2)	Property Line	
PAHs and Dioxins/ Furans	3 - 15 m height above ground	> 3 m	> 3 m	NA	NA
	> 1 m vertical and > 2 m horizontal distance from supporting structure	Yes	Yes	NA	NA
	No nearby sources of PAHs, dioxins which could interfere with sample results	Yes	Yes	NA	NA
Wind speed and Direction	=> 10 m height above ground	> 10 m	> 10 m	NA	>10 m
	> 1 building height (H) upwind of a building obstruction	Yes	Yes	NA	Yes
	> 1.5 H above building roof for rooftop installation	Yes	Yes	NA	Yes
	> 5-10 H downwind of building	Yes	Yes [3]	NA	Yes [6]
	> 10 m above dense vegetative canopy	N/A	N/A	NA	N/A
	> 2 tower side widths (D) for boom installations	N/A	N/A	NA	N/A
Air Temperature	> 2 m height above ground	> 2 m	> 2 m	NA	> 2 m
	Temperature sensor > 4 obstruction heights and > 30 m from large paved areas	Yes	Yes	NA	Yes
	> 1 D for tower mast installations	Yes	Yes	NA	Yes

Note:

1 – Final sampler locations on the potential sites are still to be determined.

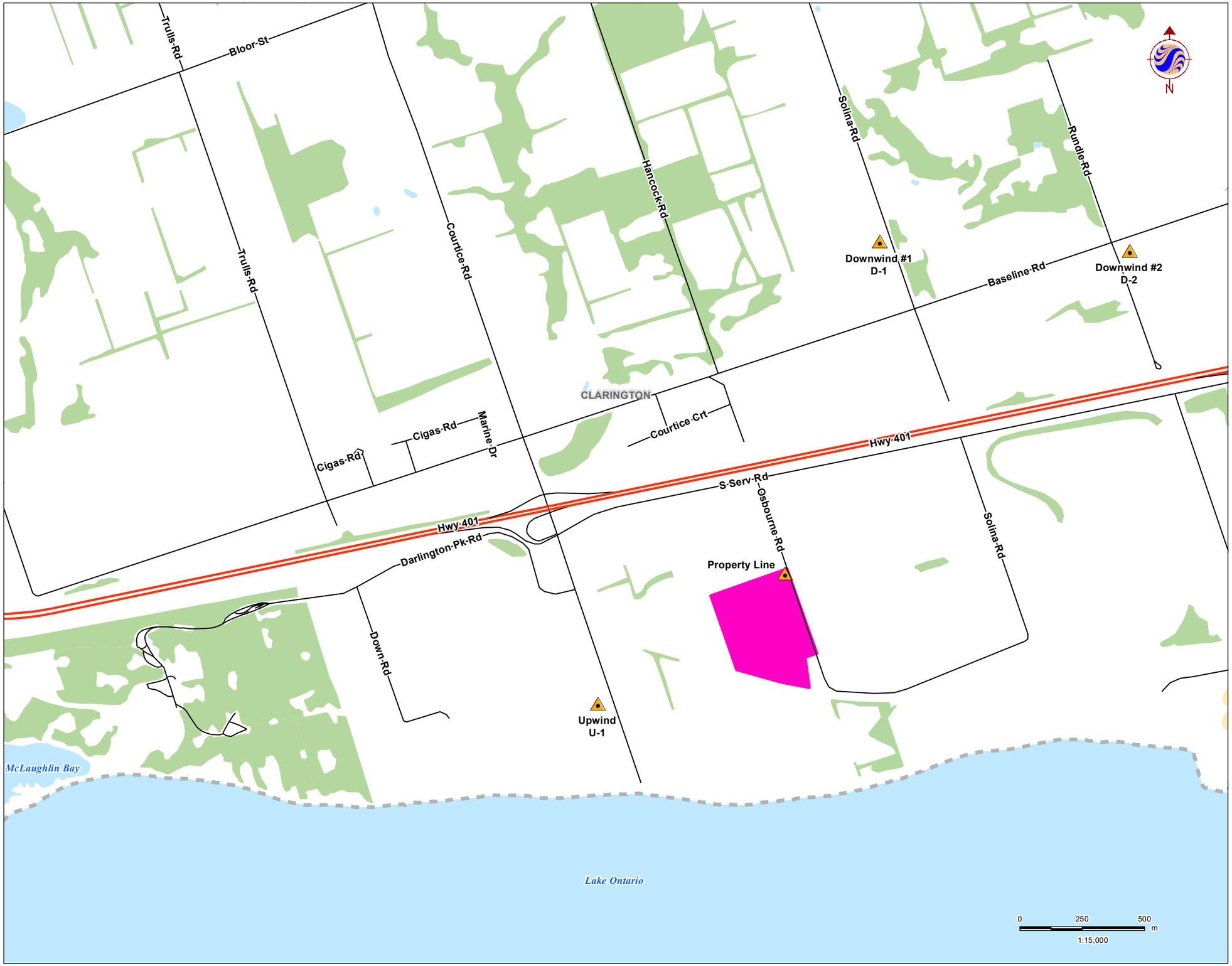
2 – Alternate Location #1 has some trees located to the north of the potential sampling location, as shown in Figure 4-2. It is anticipated that a sampling location can be chosen on the potential site to meet the MOE recommended separation distance of at least 20 m.

3 – Alternate Location #2 has a one-story structure located on the site, as shown in Figure 4-3. It is anticipated that a sampling location can be chosen on the potential site to meet the MOE recommended separation distance.

4 – Both sites meet the recommended separation distances between sampler locations and roadways of different capacities as listed in the MOE document “Operations Manual for Air Quality Monitoring in Ontario”.

5 – With removal of two trees, the 20-m spacing criteria can be met.

6 – The monitor will be located in a predominantly upwind location about 4H from the nearest building. Station not downwind of this building for the predominant wind direction.



Legend

- Station Location
- Road
- Highway
- Proposed EFW Facility Site
- Waterbody
- Wooded Area

Notes

1. Coordinate System: UTM NAD 83 - Zone 17 (N).
2. Data provided by Ontario Ministry of Natural Resources. Copyright 2004 Queen's Printer Ontario
3. One of D-1 or D-2 to be chosen for downwind station location.

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Client/Project

YORK REGION AND DURHAM REGION RESIDUAL WASTE STUDY

Figure No.

4-1

Title

Location of Proposed Monitoring Locations

Projection text in notes (2nd note should still reflect the base features copyright):
Coordinate System: NAD 1983 UTM Zone 17N

Figure 4-2 Proposed Location for the Downwind Monitoring Station – Alternative D-1

Figure 4-3 Proposed Location for the Downwind Monitoring Station – Alternative D-2

Figure 4-4 Proposed Location for the Upwind Monitoring Station – U-1

Note – photograph shows the ambient monitoring station for the EA 2008 measurements on the site.

Table 4-3 UTM Coordinates of Proposed Monitoring Locations

Location	UTM Northing (m)	UTM Easting (m)
Downwind D-1	4861915	680995
Downwind D-2	4861877	681997
Property Line [1]	~ 4860586	~ 680616
Upwind U-1	4860067	679899

1 – Location approximate. Exact location will be finalized in consultation with the MOE prior to installation.

5 INSTRUMENTATION AND DATA ACQUSITION

The measurement program at the monitoring site will include 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) will be conducted on a continuous basis over the duration of the ambient air monitoring program. Monitoring for metals in total suspended particulates (TSP), polycyclic aromatic hydrocarbons (PAHs) and dioxins and furans will be conducted at the downwind monitoring station with non-continuous monitors, per the methodology and analysis recommended by the MOE Operations Manual (MOE, 2008).

A 10-m meteorological tower will be installed at each station to continuously monitor wind speed, wind direction, atmospheric temperature and relative humidity. Barometric pressure will be measured at one station.

The following sections detail the continuous and non-continuous monitors proposed for this sampling program.

5.1 Continuous Ambient Monitors

5.1.1 Respirable Particulate Matter ($PM_{2.5}$)

The $PM_{2.5}$ sampler will consist of a Thermo Sharp 5030 Synchronized Hybrid Ambient Real-time Particulate Monitor (or equivalent). The sampler operates using a synchronized hybrid approach combining light scattering photometry and beta radiation attenuation for continuous $PM_{2.5}$ measurement.

Principle of Operation:	Light Scattering Photometry/Beta Attenuation
Range:	0-10 mg/m^3
Time interval:	1 minute

5.1.2 Nitrogen Oxides (NO_X)

The NO_X sampler will consist of an API Model 200E Chemiluminescence Analyzer (or equivalent) to measure continuous concentrations of nitric oxide (NO), nitrogen dioxide (NO_2) and nitrogen oxides (NO_X). The sampler operates based on the principle of chemiluminescence, where the amount of light given off during a chemical reaction is measured. Nitric oxide (NO) reacts with ozone (O_3) to produce nitrogen dioxide (NO_2), 10 %

electronically excited nitrogen dioxide (NO_2*) and oxygen. Following the NO-O3 reaction, the NO_2* molecules immediately revert to NO_2. This process creates a light emission directly proportional to the NO concentration in the sample. The intensity of the resulting light emission is then measured by a photomultiplier tube and associated electronics. An NO_2 to NO converter will be used to measure the amount of NO_X (NO + NO_2) in the sample.

Principle of Operation:	Chemiluminescence
Range:	0-1000 ppb
Time interval:	1 second

5.1.3 Sulphur Dioxide (SO_2)

The SO_2 sampler will consist of a Teledyne Monitor Labs Sulphur Dioxide Analyzer (or equivalent). The sampler operates using the principle of "Pulsed Fluorescence". Sulphur dioxide molecules absorb fluorescent energy, producing electronically excited SO_2 molecule with a known spectral decay rate to the ground state. The fluorescence emitted by the reaction is detected by a photo multiplier tube and the signal is converted proportionally to an electronic output signal which is then captured by a data logger.

Principle of Operation:	Pulsed Florescence
Range:	0-1000 ppb
Time interval:	1 second

5.2 Non-Continuous Ambient Monitors

5.2.1 Metals in Total Suspended Particulate (TSP)

Total suspended particulate matter (TSP) and metals will be collected onto pre-weighed, conditioned Teflon coated glass fibre filters for a 24-hour period using a Tisch Environmental TE-5170 volumetric-flow high volume sampler (or equivalent) measuring TSP. This monitor operates by continuously drawing a sample of ambient air through a filter onto which particulate matter is deposited. The filters will be subsequently weighed for particulate loading and analysed using the Atomic Emission Spectroscopy/Inductively Coupled Plasma (AES/ICP) technique to determine metals content. Analysis of the TSP/metals samples will be conducted by a Canadian Assurance for Laboratory Accreditation (CALA) accredited laboratory following MOE guidance. The sampling schedule will correspond with the MOE's province-wide ambient sampling schedule (one sample taken every six days).

The list of metals to be analysed is:

- Aluminum (Al)
- Antimony (Sb)
- Boron (B)
- Thallium (Tl)
- Arsenic (As)
- Barium (Ba)
- Beryllium (Be)
- Cadmium (Cd)
- Chromium (Cr) (Total)
- Cobalt (Co)
- Lead (Pb)
- Mercury (Hg)
- Manganese (Mn)
- Nickel (Ni)
- Phosphorus (Ph)
- Selenium (Se)
- Silver (Ag)
- Tin (Sn)
- Vanadium (V)
- Zinc (Zn)

Additionally, although not expected to be emitted from the DYEC in appreciable quantities (based on the literature review of EFW emissions conducted as part of the EA), to address comments received from the Ambient Air Monitoring and Reporting Working Group (AAMRWG), the following additional metals will be monitored:

- Bismuth (Bi)
- Magnesium (Mg)
- Strontium (Sr)
- Thallium (Tl)
- Uranium (U)
- Zirconium (Zr)
- Copper (Cu)
- Iron (Fe)
- Molybdenum (Mo)
- Titanium (Ti)

5.2.2 Polycyclic Aromatic Hydrocarbons (PAHs) and Dioxins and Furans

PAHs and dioxins and furans will be collected with Tisch Environmental TE-1000 mass-flow high volume air samplers (or equivalent). The samplers will be located on the roof of the instrumentation shelter to meet the required MOE siting characteristics. Each sampler is equipped with a dual chambered sampling module to contain a Teflon-coated glass fibre filter and a Poly-Urethane Foam (PUF) cartridge. PAHs will be collected for a 24-hour period at 12-day intervals and dioxins and furans will be collected, also for a 24-hour period, at 24-day intervals.

The list of PAHs to be analyzed is:

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

The samples will be submitted to a CAL accredited laboratory. PAHs and dioxins/furans will be analyzed using Gas Chromatography/Mass Spectrometry (GC/MS) as per the protocols defined by US EPA Compendium Method TO-13A (for PAHs) and Compendium Method TO 9A (for dioxins and furans).

5.3 Data Acquisition System

In addition to instrument resident data logging registers, a rack mounted digital data acquisition system (DAS) will be installed. Although the exact DAS model has not been determined, a typical model, such as a Campbell Scientific CRX1000 station data acquisition system (or equivalent) will be used to collect ambient instrument data and status codes from the ambient air monitors. Typically, continuous station data will be maintained in the data loggers, and data

will be viewed locally using a laptop and the relevant DAS software applications. The logger will typically store approximately 21 days of five minute averages and 3 months of one hour averages. If possible, the DAS will acquire data and control the ambient analyzers via serial communication. Remote data transmission will be accomplished by the periodic transmission of collected station air quality data via phone line.

5.4 Meteorological Tower

Horizontal wind speed, wind direction, ambient temperature, relative humidity, barometric pressure, and rainfall will be collected. The meteorological sensors will be mounted on an external telescoping 10 m aluminum tower. Meteorological sensor measurement data will be logged using the DAS mentioned above. The proposed meteorological equipment will be:

- Wind Speed/Wind Direction: Met One Instruments Inc. Model 034B (or equivalent)
- Temperature: Campbell Scientific Model 107 (or equivalent)
- Relative Humidity: Campbell Scientific Model HMP60 (or equivalent)
- Atmospheric Pressure: Campbell Scientific Model CS106 (or equivalent)
- Rainfall: Texas Electronic TE525M (or equivalent)

5.5 Equipment Enclosure and Sampling Manifold

A custom instrumentation shelter will be used to store the monitoring equipment. The shelter will have a steel frame structure covered in a weatherproof exterior. A rooftop guardrail and accompanying ladder will be installed to provide access to the hi-volume samplers. Wall mounted HVAC units will be installed to provide adequate heating and cooling to the shelter during different weather conditions, which will ensure correct temperature readings during the sampling.

A shelter temperature of 20-25°C will be maintained to within +/- 1°C by an automatic heat/cool thermostat with adjustable hysteresis. The shelter temperature will be measured and collected along with the pollutant and meteorological data, and alarmed with limits. Out-of-limit shelter temperature conditions will be immediately flagged and communicated to maintenance technicians via phone line/cellular call out.

Ambient air will be drawn into the station using an insulated 6” Teflon lined stainless steel sampling cane and, 4 port manifold (or equivalent). The manifold flow rate will be approximately 60 cubic feet per meter (cfm) to ensure an adequate ambient air exchange rate. The temperature control on the manifold will be automatically adjusted to ensure that the manifold temperature is at least 10°C above the ambient dew point to prevent the formation of condensation or water droplets.

6 LABORATORY ANALYTICAL PROCEDURES

All samples will be obtained and analysed following US EPA reference or equivalent methods, as per the MOE Operations Manual (MOE, 2008). A summary of the contaminants to be assessed by laboratory analytical procedures during this monitoring program and their laboratory reference methods is provided below.

Table 6-1 Summary of Laboratory Reference Methods

Contaminant	Laboratory Reference Method
Total Suspended Particulate (TSP) and Metals	US EPA Manual Reference Method: 40 CFR Part 50, Appendix B Compendium Method IO-3 with Atomic Emission Spectroscopy/Inductively Coupled Plasma (AES/ICP)
Polycyclic Aromatic Hydrocarbons (PAHs)	Gas Chromatography/Mass Spectrometry (GC/MS) following US EPA Method TO-13A
Dioxins and Furans	Gas Chromatography/Mass Spectrometry (GC/MS) following US EPA Method TO-9A

A summary of the method detection limits to be used in the analysis versus their applicable air quality criteria is presented in Tables 6-2 to 6-4. As required by the MOE, the MDLs for all contaminants are at least a factor of ten less than their applicable criteria (with the exception of the dioxin and furan MDL for which a single value for the MDL cannot be presented, as explained below).

Table 6-2 Method Detection Limits for Metals

Contaminant	MOE 24-Hour Criteria ($\mu g/m^3$)	MDL ($\mu g/m^3$) [1]	Ratio of MDL to Criteria
Aluminum	4.8	1.18E-02	408
Antimony	25	5.88E-03	4250
Arsenic	0.3	3.53E-03	85
Barium	10	5.88E-04	17000
Beryllium	0.01	5.88E-04	17
Boron	120	3.53E-03	34000
Cadmium	0.025	1.18E-03	21
Total Chromium (and compounds)	0.5	1.18E-03	425
Cobalt	0.1	1.18E-03	85
Lead	0.5	1.76E-03	283

Table 6-2 Method Detection Limits for Metals

Contaminant	MOE 24-Hour Criteria ($\mu g/m^3$)	MDL ($\mu g/m^3$) [1]	Ratio of MDL to Criteria
Nickel	0.2	1.76E-03	113
Phosphorus	0.35	1.47E-02	24
Silver	1	5.88E-04	1700
Selenium	10	5.88E-03	1700
Tin	10	5.88E-03	1700
Vanadium	2	1.18E-03	1700
Zinc	120	2.94E-03	40800
Bismuth	no criteria	3.53E-03	NA
Copper	50	1.18E-03	42500
Iron	4	2.94E-03	1360
Magnesium (JSL List)	0.2	5.88E-03	34
Molybdenum	120	1.76E-03	68000
Strontium	120	5.88E-04	204000
Thallium (JSL List)	0.24	5.88E-03	40.8
Titanium	120	5.88E-04	204000
Uranium	0.3	1.76E-02	17
Zirconium (JSL List)	20	5.88E-04	34000

Note: 1 - Based on a hi-vol sample volume of 1700 m^3 in a 24-hour period (typical value from EA ambient monitoring program).

Table 6-3 Method Detection Limits for PAHs

Contaminant	MOE 24-Hour Criteria ($\mu g/m^3$)	MDL ($\mu g/m^3$) [1]	Ratio of MDL to Criteria
Acenaphthylene	3.5	9.42E-05	37170
Acenaphthene	no criteria	9.42E-05	NA
Anthracene	0.2	9.42E-05	2124
Benzo(a)anthracene	no criteria	9.42E-05	NA
Benzo(b)fluoranthene	no criteria	9.42E-05	NA
Benzo(k)fluoranthene	no criteria	9.42E-05	NA
Benzo(a)fluorene	no criteria	1.88E-04	NA
Benzo(b)fluorene	no criteria	1.88E-04	NA
Benzo(ghi)perylene	1.2	9.42E-05	12744

Table 6-3 Method Detection Limits for PAHs

Contaminant	MOE 24-Hour Criteria ($\mu g/m^3$)	MDL ($\mu g/m^3$) [1]	Ratio of MDL to Criteria
Benzo(a)pyrene [2]	5.0E-05	5.6E-08	885
Benzo(e)pyrene	no criteria	1.88E-04	NA
Biphenyl	no criteria	1.88E-04	NA
Chrysene	no criteria	9.42E-05	NA
Dibenzo(a,h)anthracene	no criteria	9.42E-05	NA
Fluoranthene	140	9.42E-05	1486800
Indeno(1,2,3-cd)pyrene	no criteria	9.42E-05	NA
1-methylnaphthalene	12	1.88E-04	63720
2-methylnaphthalene	10	1.88E-04	53100
Naphthalene	22.5	1.36E-04	165938
Perylene	no criteria	1.88E-04	NA
Phenanthrene	no criteria	9.42E-05	NA
Pyrene	0.2	9.42E-05	2124
Tetralin	1200	1.88E-04	6372000
O-terphenyl	no criteria	1.88E-04	NA

Note: 1 - Based on a hi-vol sample volume of 531 m^3 in a 24-hour period (typical value from EA ambient monitoring program).
2 – Using High Resolution Mass Spectrometry (HRMS)

Table 6-4 Method Detection Limits for Dioxins and Furans

Contaminant	MOE 24-Hour Criteria ($\mu g/m^3$)	MDL ($\mu g/m^3$) [1]	Ratio of MDL to Criteria
Dioxins and Furans (TEQ)	1.00E-07	6.3E-09 to 2.4E-08	16 to 4

Note: 1 - Based on a hi-vol sample volume of 531 m^3 in a 24-hour period and maximum and minimum TEQ DL values from the EA ambient monitoring program.

For dioxins and furans, a TEQ MDL range is presented in Table 6-4. The TEQ MDL will vary depending on the estimated detection limit of each dioxin and furan cogener included in the TEQ calculation and therefore cannot be accurately represented by a single value. To gauge the relative range of the expected dioxin and furan TEQ MDLs, the maximum and minimum sample specific DLs measured during the EA ambient monitoring program were examined. The ratio of laboratory TEQ DLs to the MOE dioxin and furan AAQC varied from 16 to 4. The factor of 16 meets the MOE criteria for the MDL to be 10 times lower than the AAQC. At the other end of the range, the ratio of 4 would not meet the MOE requirement, but would meet the US EPA requirement for dioxin and furan ambient monitoring presented in 40 CFR Part 136, Appendix B (DL to be less than 1/3 of the regulatory compliance level).

7 QUALITY ASSURANCE PROCEDURES

7.1 Operator Requirements

The proposed monitoring program will be operated by a third-party consultant hired by the Regions. The consultant will be responsible for all data analysis and for preparing both quarterly and annual reports summarizing the monitoring to date.

The consultant will be required to provide the Regions with a quality plan for operating and maintaining the monitoring program, which will include the following general provisions:

- All field activities will be recorded in standardized field notes. Hi-vol data sheets will include initial and final flow measurements for each sample;
- Chain of custody forms will be completed and submitted along with exposed samples to the CALA laboratory used for analysis;
- All original containers will be used when submitting filters for analysis to avoid cross-contamination of samples, which will be recorded in the chain of custody forms; and,
- Maintaining training records for all personnel involved in the project.

7.2 Instrumentation Calibration

Samplers will be bench-tested and calibrated prior to their installation in the field. If required, the samplers will be re-calibrated once installed before their first use. On-going calibration of the samplers will follow the recommended calibration schedule listed in the MOE Operations Manual (MOE, 2008), but will be done on a quarterly basis at a minimum.

MOE will conduct periodic audits of the equipment including prior to commencement of the monitoring program.

7.3 Accuracy Checks of Analysis Techniques

Travel and field blank samples will be submitted to the CALA accredited laboratory to ensure the accuracy of the analytical techniques used. Blank samples will account for ten percent (10%) of total submitted samples.

7.4 Sample Collection and Transportation

Samples will be properly handled to ensure that there is no contamination. For filters this entails the use of surgical gloves and tweezers to avoid contamination. All samples will be carefully removed from the monitoring device by a trained operator, and placed in sealed, non-reactive

containers. All samples will be placed in protective cases for protection from breakage, contamination or loss during transportation.

Quality records for sample collection will be maintained. The quality record will include at least the following parameters:

- Station ID;
- Station name/location;
- Filter/canister ID;
- Sample start date/time;
- Sample end date/time or elapsed time;
- Date/time sample collected;
- Technician name;
- Meteorological conditions during sampling; and,
- Comments on visual inspection of filters/canisters prior to and after sampling.

7.5 Data Review and Validation

Data collected from the continuous monitors will be screened for any suspicious data including outliers, instrumentation drift and missing data following MOE protocols given in the document Operations Manual (MOE, 2008). In general, the Operations Manual states that at a minimum, the required rate of recovery of valid data for both continuous and non-continuous monitors is 75% (both seasonally and annually). In addition, for NO_X and SO_2 sampling, zero drifts beyond 5 parts per billion (ppb) require an off-set adjustment.

A final data screening of all measurement data will be performed at the end of the monitoring program to examine overall trends and to identify and correct any suspect data following MOE protocols (MOE, 2008).

8 REPORTING REQUIREMENTS

Both quarterly and annual reports will be generated that include the results of the ambient monitoring program. The quarterly reports will follow a standardized format to be agreed upon by the Regions, and will include the following statistical information as required by the MOE (MOE, 2008):

For Continuous Monitors:

- Period Arithmetic Mean;
- Monthly Arithmetic Mean;
- Maximum for any averaging period used for comparison to statutory or regulatory limits;
- Maximum 24-hour; and,
- Percentage of valid hours.

For Non-Continuous Monitors:

- No. of valid samples;
- Percentage of valid data;
- Period arithmetic mean;
- Period geometric mean (TSP only);
- Maximum 24-hour value; and,
- Maximum monthly value.

In addition, should a validated exceedance of O.Reg.419/05 criteria occur, it will be reported. For quarterly report submissions, continuous and non-continuous data will be submitted electronically (Excel format) along with the report. Edit logs for all continuous and non-continuous monitors will be provided in the quarterly reports.

Annual reports will follow a similar format to the quarterly reports, and will include both a summary and analysis of the ambient monitoring program of the previous year. In addition to the required sections as detailed for the quarterly report, the annual report will include the following:

- A map showing the location of emitting sources, property boundaries, and monitoring stations, including scaling and north arrow;
- A summary of overall operations, e.g., summary of parameters monitored and equipment/model numbers, frequency of site visits and calibrations, confirmation of data backups and/or archiving, list of problems that resulted in significant losses of data along with remedial actions;

- A summary of audits and audit outcomes;
- Summary statistics, including:
  - Annual Arithmetic Mean;
  - Annual Geometric Mean (TSP only);
  - Maximum 1-hour (continuous data only);
  - Maximum 24-hour;
  - Number of valid hours or sampling periods;
  - Percent of valid data;
- A summary of any exceedences of O.Reg.419/05 or other applicable criteria for each applicable averaging period and the number of times exceedances occurred; and,
- A comparison to historical data collected at the monitoring station.

Further requirements for both the quarterly and annual reports can be found in the MOE Operations Manual (MOE, 2008).

The quarterly and annual reports and data collected from the monitoring program will be made available to the Ontario Ministry of Environment per the requirements of the MOE Operations Manual (MOE, 2008). The Regions will make this information available to other parties per the requirements of the Minister's Notice of Approval for the EA.

9 DATA REVIEW AND TRIGGERS FOR PROGRAM ALTERATION

9.1 Data Review and Corrective Actions

Bi-weekly screening of the analytical data will be conducted to ensure that short-term 1 hour and 24 hour objectives are met. These are acute exposure timeframes that should be monitored to ensure that health and the environment are protected in between the timeframe of preparing quarterly and annual reports. This process will be conducted for the first year of monitoring during DYEC operation and the need for continued review will be re-visited based on the results of the first year. The results of the bi-weekly review will be summarized in a letter report to the Regions only (the MOE will be notified of exceedances, as described below).

Two sets of standards will be used for comparison to the air quality data during the screening process. The first set of standards will be the limits reported in O.Reg.419/05 (Schedules 3 and 6). These are compliance based standards used through the province of Ontario. However, not all chemicals have O.Reg.419/05 criteria, or in some instances updated health-based standards were used in the human health risk assessment (HHRA) conducted in support of the Environmental Assessment. These health-based values, which are 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, 2009b) will be used as the second set of standards.

If at any time at the monitoring locations the 1 hour and 24 hour criteria are exceeded for one or more contaminants, then the Regions, the MOE and the Medical Officer of Health (MOH) for Durham Region will be immediately notified and an investigation into the root cause will be undertaken, as there may be several potential explanations for an exceedance other than the DYEC emissions (e.g. other emissions sources, instrument malfunction, field handling/laboratory analysis errors, etc). The notification of exceedances of applicable air standards for ambient air quality criteria will be reported to the MOE District Manager within 7 days of the exceedance(s) being identified. It is noted that minor exceedances of the health-based standards may not necessarily be cause for concern. These benchmarks have a number of safety factors built in and the toxicological endpoint is usually an irritant effect for the 1 hour values, such that it would be highly unlikely of anyone experiencing an actual health effect. A qualified toxicologist will evaluate the magnitude of the exceedance and the potential for health effects.

If it is determined that the DYEC was the likely cause, for example through review of facility operations and stack emissions data during that period, then the MOE will be formally notified as per the requirements of Section 28 of O. Reg. 419/05. Appropriate corrective actions will be

undertaken in consultation with the Region, MOE and MOH and following the requirements of Section 28 of O. Reg. 419/05.

9.2 Monitoring Program Review

9.2.1 Placement and Location of Ambient Monitoring Stations

Selection of the two monitoring stations – upwind and downwind – was based on sound science and engineering practices and professional experience of the air quality engineers. The MOE has also requested that a property line station be installed. If ongoing review of the monitoring data suggests that any of the monitoring stations are not providing relevant information to the program objectives, then in consultation with the MOE, consideration will be given to altering their location(s).

If unexpected results (e.g., measured exceedances of contaminants attributable to DYEC emissions or measured concentrations are significantly higher than those predicted in the EA for the DYEC emissions) then consideration will be given to installation of additional monitoring locations and/or relocation of the existing stations.

Neither of these decisions would be made without detailed review of the data in consultation with the MOE, Regions and the MOH.

9.2.2 Environmental Assessment Model Validation

One of the objectives of the air monitoring program will be to assess the accuracy of the dispersion modeling exercise undertaken during the Environmental Assessment and used to evaluate the potential risk to health and the environment.

Once an appropriate amount of air quality data has been collected at both monitoring locations (a minimum of one-year of measurements (with a 75% data completeness in each quarter) during DYEC operation or to the satisfaction of the Regional Director), it will be used to validate the predictions made in the EA. Model validation procedures will include comparison of maximum measured concentrations at each stations (for each contaminant) to the EA predictions and development of Q-Q plots or measured and modeled concentrations at each location.

If the air quality model predictions used in the EA/HHRA are shown to be either reflective of actual measurements or higher than those measured during facility operation, then no further action would be required. This would mean that the values used in the risk assessment were accurate / conservative and that predictions of potential risk to human and ecological receptors would remain valid.

If air quality modeled predictions underestimated actual ground level concentrations measured during DYEC operation, then the results of the HHERA would need to be revisited using the actual measured data. This would be required for only those chemicals that have higher ground level concentrations that could be attributed to the facility. It is important to note that if higher concentrations are measured at ground level during operation it does not necessarily mean that there would be an unacceptable health or ecological risk. For the majority of chemicals and exposure timeframes (i.e., 1 hour, 24 hour, and annual) the concentration ratios (CR) and incremental lifetime cancer risks (ILCRs) that were used to benchmark potential health risks were often several orders of magnitude below those of concern.

In the event that measured ground level concentrations during DYEC operations are above the health thresholds, then immediate notification of the MOE, Regions and MOH would be required and appropriate corrective actions undertaken in consultation with the Region, MOE and MOH.

9.2.3 Revisions to the Ambient Monitoring Plan

As noted in Section 11.6 of the Provincial Minister's Notice of Approval to Proceed with the Undertaking, the Regional Director may require changes be made (or approve requested changes) to this ambient monitoring and reporting plan. The Region shall revise the plan and implement it in accordance with the required/requested changes.

10 CLOSURE

This Ambient Monitoring Plan (Report) has been prepared by Stantec Consulting Limited (Stantec) for the use of the Regions of Durham and York. The assessment represents the conditions of the proposed DYEC and other identified locations only at the time of the assessment, and is based on the information referenced and contained in this Report. The conclusions presented herein respecting current conditions and potential future conditions at the DYEC and other identified locations represent the best judgment of the assessor based on current environmental standards and information. Stantec attests that to the best of our knowledge, the information presented in this Report is accurate. The use of this Report for other projects or matters without the written permission of Durham Region, York Region and Stantec is solely at the user's own risk.

Respectfully Submitted,

STANTEC CONSULTING LTD.

Original Signed by G. Crooks

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GC/mcs

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June 5, 2012

Greg Borchuk
Regional Municipality of Durham

RE: Ambient Air Quality Monitoring Plan Locations

I am writing to confirm acceptance of the proposed upwind (Courtice Water Control Plant), the Durham York Energy Centre property line and the downwind ambient air monitoring locations.

The Regions in consultation with the Ministry of the Environment agreed to monitor ambient air in three locations at an upwind, the Durham York Energy Centre property line and a downwind location. Your proposed Durham York Residual Waste Study dated February 10, 2012, indicated the upwind location to be situated at 180 Courtice Road. An alternative upwind site at the Courtice Water Control Plant was found which optimizes siting criteria requirements. This new location would replace the proposed site as indicated in the Durham York Residual Waste Study. This site is an adequate replacement upwind monitoring location. The proposed downwind location (D-2) is also acceptable as a monitoring location.

It is the Regions' responsibility to ensure data quality and integrity for all three air monitoring sites.

If you have any further questions concerning the acceptance of these locations please contact me at 416-326-3477.

Sincerely,

Dan Panko
APEP Supervisor
Central Region
Ministry of the Environment

cc. Dave Fumerton MOE

Set of 5 years (2014-2018) Met Data with 1 km resolution for CALPUFF model for Clarington, Ontario, Canada.

Validation report.

Requested by:
Golder Associates Ltd.
6925 Century Avenue, Suite 100
Mississauga, Ontario, Canada
Tel: +1 905 567 444
www.golder.com

Submitted by:
Meteosim, S.L.
Parque Científico de Barcelona
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Fax: +34 934 490 010
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13th November, 2020

Authour:

Miguel Ángel Manzanares Gutiérrez
Graduated in Mathematical Sciences and Physical Sciences from the Complutense University of Madrid (Spain). Master in Meteorology from the University of Barcelona (Spain).

Conclusions reflected in this report should be understood only as the result of the information used and the procedures carried out on it.

The client agrees that the securing of a determined result is not in charge, but rather the elaboration of a study that contemplates the contents or parameters fixed in the order sheet. Meteosim will not be responsible for the damages or losses that the content of the report may cause to the interests of the client.

The WRF-ARW meteorological model was used to carry out the study. For the meteorological calibration and validation, the meteorological station data from the Executive Weather Agency of the Canadian Government was used.

For the purposes of the provisions of Article 355 of Law 1/2000 of Civil Procedure of the Spanish Government, the undersigned hereby declares, under promise, that he has acted and, where appropriate, will act with the greatest possible objectivity.

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1. Introduction

This report refers to the "Set of 5 years (2014-2018) with 1-kilometre resolution for CALPUFF model for Clarington, Ontario, Canada. Validation report", which aims to validate the results of the meteorological dataset provided by the WRF simulations and guarantee the accuracy of them to be used as a main input for air quality purposes using the CALPUFF model.

The report contains information about the meteorological stations that have been used (section 2), main characteristics of the WRF meteorological model and its configuration for the project (section 3) and the process performed to compute the comparison between the modelled data and the nearest observations, including the final results of the validation and its comparison with the benchmark values provided by the scientific biography (section 4).

2. Observational data: meteorological stations.

The service includes the validation of the simulated meteorological data. Validation process has been performed using as observational data the ones found in the official historical data of the Canadian Government (https://climate.weather.gc.ca/historical_data/search_historic_data_e.html). For that reason, the closest official weather stations to the point with the following coordinates has been selected: Latitude: 43.935° Longitude: -78.608333). During the searching process in this database, it should be noted that the selected stations have to be representative enough of the domain of interest, so that the results obtained in the validation in these points could be extended for the whole domain.

With that, the following stations with available data during part or the whole period of interest (2014-2018) has been found on the database, all of them located less than 25 km from the point of interest (which will be the centre of the meteorological domain in the model simulations):

- Oshawa WPCP (19.6 km from the point of interest).
- PA General Motors Centre (20.5 km from the point of interest).
- Oshawa (22.0 km from the point of interest).

Table 1 and Figure 1 show the location of the meteorological station.

Table 1. Location of the local meteorological stations. *m.a.s.l.: meters above sea level.

Location	Owner	Latitude	Longitude	Height (m.a.s.l*)
Oshawa	Canadian Government	43.520° N	78.500° W	84
Oshawa WPCP	Canadian Government	43.554° N	78.530° W	140
PA General Motors Centre	Canadian Government	43.535° N	78.515 W	125

Figure 1. Map showing the location of the meteorological stations (white triangles) and the centre of the domain in the surroundings of Clarington, Ontario, Canada (red star).

Regarding the locations of the selected meteorological stations and the point of interest, it can be checked that there are similarities between them related to the topographic characteristics (similar altitude and similar location in terms of distance to the Lake Ontario). So that, we can consider that the selected meteorological stations are representative enough of the point of interest and of all the domain to be considered in the meteorological modelling, including the municipality of Clarington and its surroundings. So that, these observational data can be used during the validation process of the meteorological model done in the Section 4 of this report.

3. Modelled data: meteorological model WRF.

In order to analyze the meteorological conditions of an area, meteorological information is required spatially and temporally characterized. This meteorological information can be obtained through weather stations or through meteorological models.

The information obtained from the weather stations, even though it provides a glimpse on the current or past reality, has several disadvantages: station data only offer information from the same point where the measurement is made; and they only offer values of the variables that have measurement sensors such as temperature, wind, humidity, temperature and pressure.

On the other hand, meteorological models despite requiring to be calibrated on the simulated area, offer the possibility to model in the past, the present and the future. They also offer information with a defined resolution in the region of interest. Moreover, they provide data of many other meteorological variables that cannot be measured at the measurement stations.

For all these reasons, in this project weather station information and high-resolution information from meteorological modeling have been combined.

The WRF[1] (*Weather Research and Forecasting)* Model developed and maintained by NCAR (*National Center for Atmospheric Research*) and NOAA (*National Oceanic and Atmospheric Administration*) was used to generate the necessary meteorological data.

WRF has a modular structure (Figure 2) and it has the capacity to be executed in multitasking mode on computers with distributed or shared memory. Some of its many characteristics are:

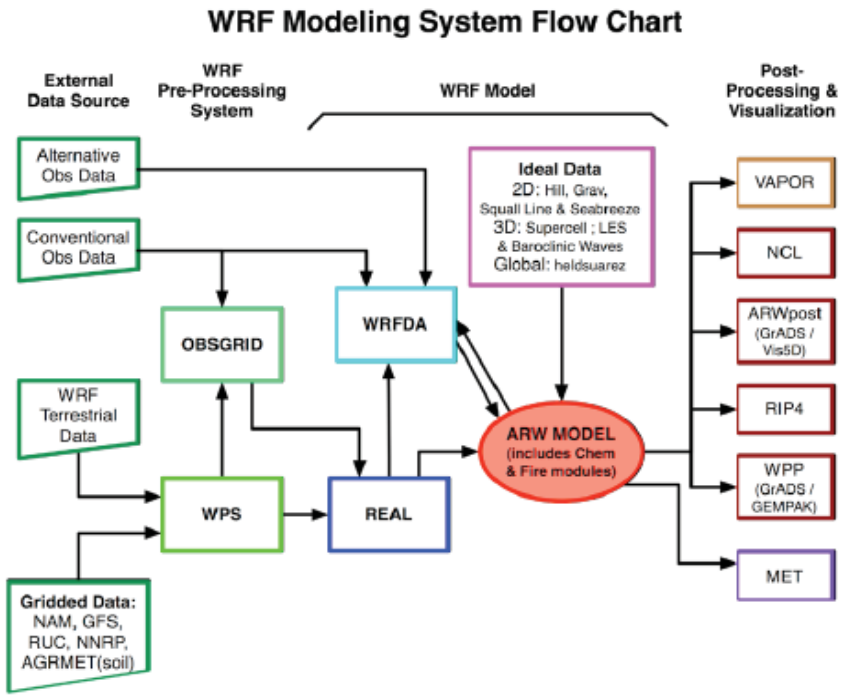
- Multiple geographic projection options (polar stereographic, Mercator, Lambert, latitude-longitude) and vertical sigma coordinates that follow the terrain.
- The capacity of multiple nesting between the domains. This characteristic is useful for the study of atmospheric phenomena of different spatial scales and the design of high-resolution predictions. The interaction between the domains can be in one direction (one-way nesting) or in two (two-way nesting), and the nested grids can be mobile.
- WRF is a fully compressible and non-hydrostatic model with terrain-following hydrostatic pressure coordinate, which allows the model to be used to represent phenomena of dimensions less than 10 km.
- Implementation of realistic parametrization schemes of physical processes related to atmospheric radiation, microphysics of clouds and precipitation, convection, turbulence and energy flows and amount of movement on the earth's surface.

The input data need to run the model are:

- Physiographic data on the domain of the simulation: terrain height, land uses, vegetation index, sea climate temperature, etc.
- Initial and boundary conditions. The CFSv2 (*Climate Forecast System v2*) reanalysis data from the NCEP (*National Center for Environmental Prediction*) have been used for the initialization

[1] Skamarock, W.C., Klemp, J.B., Dudhia, J., Gill, D.O., Barker, D.M., Wang, W., Powers, J.G., 2005. A description of the advanced research WRF version 2 NCAR Tech Notes-46 +STR.

of the WRF model. CFSv2 performs atmospheric simulations for all the globe with a resolution of 0.5 ° (approximately 55km). CFSv2 corresponds to a coupled model since it contains in an only model an atmospheric and an oceanic model, representing the interaction between the atmosphere, the oceans, the continental surface and the ice cover. CFSv2 assimilates satellite information from the last 30 days, which allows it to provide a complete description of the state of the atmosphere. In this way the initialization of the WRF model has been carried out



from CFSv2 reanalysis with a horizontal resolution of 0.5° and the physiographic data of the domain are provided by the model itself.

Figure 2. Schematic representation of the operation of WRF-ARW.
http://www.mmm.ucar.edu/wrf/users/docs/user_guide_V3/contents.htm

WRF has been configured to specifically represent the area of study, using two-way nesting architecture for running the simulations, ensuring that the influence between the meteorological processes of different scales and represented in the different modeling domains defined is bijective. For the current study, WRF version 3.9.1.1 has been used, with a horizontal spatial grid resolution up to 333 m.

3.1. Meteorological domains and meteorological simulation characteristics.

For the execution of the WRF-ARW numerical weather forecasting model in its version 3.9.1.1, and for the subsequent calculation of mean wind speeds and maximum wind gusts, simulations were performed on four domains with different horizontal resolutions. These domains configure a modelling architecture that ensures the modelling of meteorological processes at the synoptic, mesoscale and microscale scales. The geographical characteristics of the selected domains are shown in Figure 3 and Table 2.

Table 2. Simulation domains and its characteristics.

CHARACTERISTIC	DOMAIN D01	DOMAIN D02	DOMAIN D03	DOMAIN D04
Description	Eastern half of North America	Eastern half of Great Lakes area and surrounding	West and Central Lake Ontario and surroundings	Clarington and surroundings
Horizontal resolution	27km x 27km	9km x 9km	3km x 3km	1km x1km
Grid size	100 x 100	100 x 100	100 x 100	100 x 100
Domain size	2700km x 2700km	900km x 900km	300km x 300km	100km x 100km

For the analysis of results, the domain defined as D04, with the highest horizontal resolution, centered over Clarington, was considered.

A set of 1826 meteorological simulation has been computed. These simulations have been initialized at 12 UTC of every day between 31st December 2013 and 30th December 2018, and they have been carried out over a period of 36 hours, with a time step[2] of 3 seconds, and considering the first 12 hours of the simulation as spin-up time[3] . With this methodology, the period between 00 UTC on 1st January 2014 and 00:00 UTC on 1st January 2019 is covered, which is equivalent in local time to the period between 10:00 AEDT on December 26th, 2017 and 10:00 AEDT on December 27th, 2017.

The simulations have been initialized taking as initial and boundary conditions the data from the global analysis CFSv2 ("NCEP coupled forecast system model", version 2). CFSv2 (http://rda.ucar.edu/datasets/ds094.2) performs atmospheric simulations for everyone with a resolution of 0.5°. CFSv2 corresponds to a coupled model since it combines an atmospheric and an oceanic model into a single model, representing the interaction between the atmosphere, the oceans, the land and the ice cover. CFSv2 assimilates remote sensing information (satellites, metars, radiosonde, weather stations, etc.) from the past 30 days, allowing you to provide a complete description of the state of the atmosphere.

[2] The model time step corresponds to the time interval between successive resolutions of the primitive equations of dynamic meteorology.

[3] It is the time that the model requires to provide reliable results.

Figure 3. Simulation domains. Domains D01, D02, D03 and D04 (upper right); Domains D02, D03 and D04 (upper left); Domains D03 and D04 (lower left) and Domain D04 (lower right).

For the precise configuration of the WRF model, different vertical levels of constant pressure must be defined. In this way, the model represents the atmosphere divided into levels and their corresponding strata, so that it solves the equations of dynamic meteorology in each cell of the domain represented by cubes with a given horizontal and vertical resolution. The simulation defined a total of 32 vertical levels with an unequal distribution in height, with a higher density in the lower layers of the atmosphere, which has allowed us to describe in the best way the microscale processes that could participate in the meteorological episode.

4. Model validation: comparison between observed and modelled values

Inside the meteorological domain named as D04 (1 kilometre of horizontal resolution), there are three official meteorological stations: Oshawa, Oshawa WPCP and PA General Motors Centre, all of them owned by the Canadian Government. These stations are closer than 30 kilometres from centre of the meteorological domain (Latitude: 43.935° Longitude: -78.608333, which is the point of interest, and they have been proved to be representative of the area of study. For this reason, its observed data could be used in the validation of the meteorological model.

Regarding the considerations that needs to be done for the validation process, it is important to note the following statements.

- Regarding data from the PA General Motors Centre station: data is available only in daily basis, while for the validation process, data need to be in an hourly basis in order to be able to compare the results with the benchmarks provided by the scientific bibliography.
- Regarding data from the Oshawa WPCP station: although its data are presented in an hourly basis, data area only available during the period between October 2014 and October 2015, which means that only 20% of the period is cover by this station.

To maintain consistency of the analysis, data from these two stations would not be considered on the model validation process. So that, the model validation will be performed considering the observational data from Oshawa station, which are in hourly basis and covers more than 99% of the time-period of interest.

Then, a numerical comparison between observed values and data from the model in the location of the weather station has been done. For this comparison, observed and modelled values have been considered for the period between 00:00 UTC 1st January 2014 and 00:00 UTC 1st January 2019.

For this numerical deterministic comparison between data, statistics have been used. As it is defined by the European Environmental Agency (EEA) in its technical report Nº 10/2011 (http://www.eea.europa.eu/publications/fairmode), the statistics selection (which are used are benchmark of the model quality) depends on the model use and its motivation, as well as from the available observed data. To compute the comparative analysis between observations and data obtained from the WRF model, the statistics which have a benchmark value defined in the previous report have been used (Table A.2.3 in the technical report Nº 10/2011). These statistics and its benchmark values are also included in the report of the United States Environmental Protection Agency (U.S. EPA) *Draft Guidance on meteorological model evaluation* (2009), and that were also suggested by Emery et al. (2001) and Tesche et al. (2002). These values have been taken as the recommended by the scientific community to assure the quality of the meteorological simulation.

Then, the selected statistics for the numerical comparison between observed and modelled data, i. e., model validation, are shown below:

$$MB = \frac{1}{N}\sum_{i=1}^{N}(M_i - O_i)$$

Mean Bias: it measures the difference between observed and modelled data. This statistic shows overestimation (MB > 0) or underestimation (MB<0) of the simulation.

$$RMSE = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(M_i - O_i)^2}$$

Root Mean Square Error: it measures the square difference between observed and modelled data, which penalizes the higher deviations.

$$MAGE = \frac{1}{N}\sum_{i=1}^{N}|M_i - O_i|$$

Mean Absolute Gross Error: this statistic measures the error by the absolute differences between observed and modelled data.

$$IOA = 1 - \frac{\sum_{i=1}^{N}(Oi - M_i)^2}{\sum_{i=1}^{N}|M_i - \bar{O}| + |O_i - \bar{O}|^2}$$

Index of Agreement: it measures the correlation between observed and modelled values.

where $O_i$and M_i are the observed and modelled values, respectively, $\bar{O}$ and $\bar{M}$ are the observed and modelled average, respectively, and N is the number of hourly data considered in the evaluation.

Table 3 shows the validation results for the 10m wind speed, 10m wind direction, 2m temperature and 2m relative humidity for the selected meteorological station. These results are completed with the figures of the hourly series of observed and modelled data for the mentioned meteorological variables (Figures 4 and 5) and a set of wind roses based on observed and modelled data for the whole period (Figure 6) and in yearly (Figure 7), seasonally (Figure 8), monthly (Figure 9) and hourly basis (Figure 10).

Table 3. Results of the numerical comparison between observed and modelled data in the Oshawa meteorological station, averaging data in hourly basis during the studied time-periods (between 00:00 UTC 1st January 2014 and 00:00 AEDT 1st January 2019). Benchmark values recommended by the scientific community are shown. *Uncertainty of the model for the mean wind speed it shows in meters per second (m/s) to compute a direct comparison with the benchmark values. At the same time, all the benchmark values shown in the table are based for statistical calculations in a longer time range, for at least 1 year. ** m.a.s.l: meters above sea level.

Variable	**Mean Wind Speed (10m)**			**Mean Wind Direction (10m)**		**Temperature (2m)**			**Relative Humidity (2m)**		
Statistic	**MB**	**RMSE**	**IOA**	**MB**	**MAGE**	**MB**	**MAGE**	**IOA**	**MB**	**MAGE**	**IOA**
Station	< ±0.5 m/s	< 2.0 m/s *	≥ 0.60	< ±10°	< 30°	<±0.5°C	<2.0°C	≥0.80	<±10%	<20%	≥0.60
Oshawa	0.9	2.0	0.83	7	27	0.3	1.8	0.99	-1	9	0.86

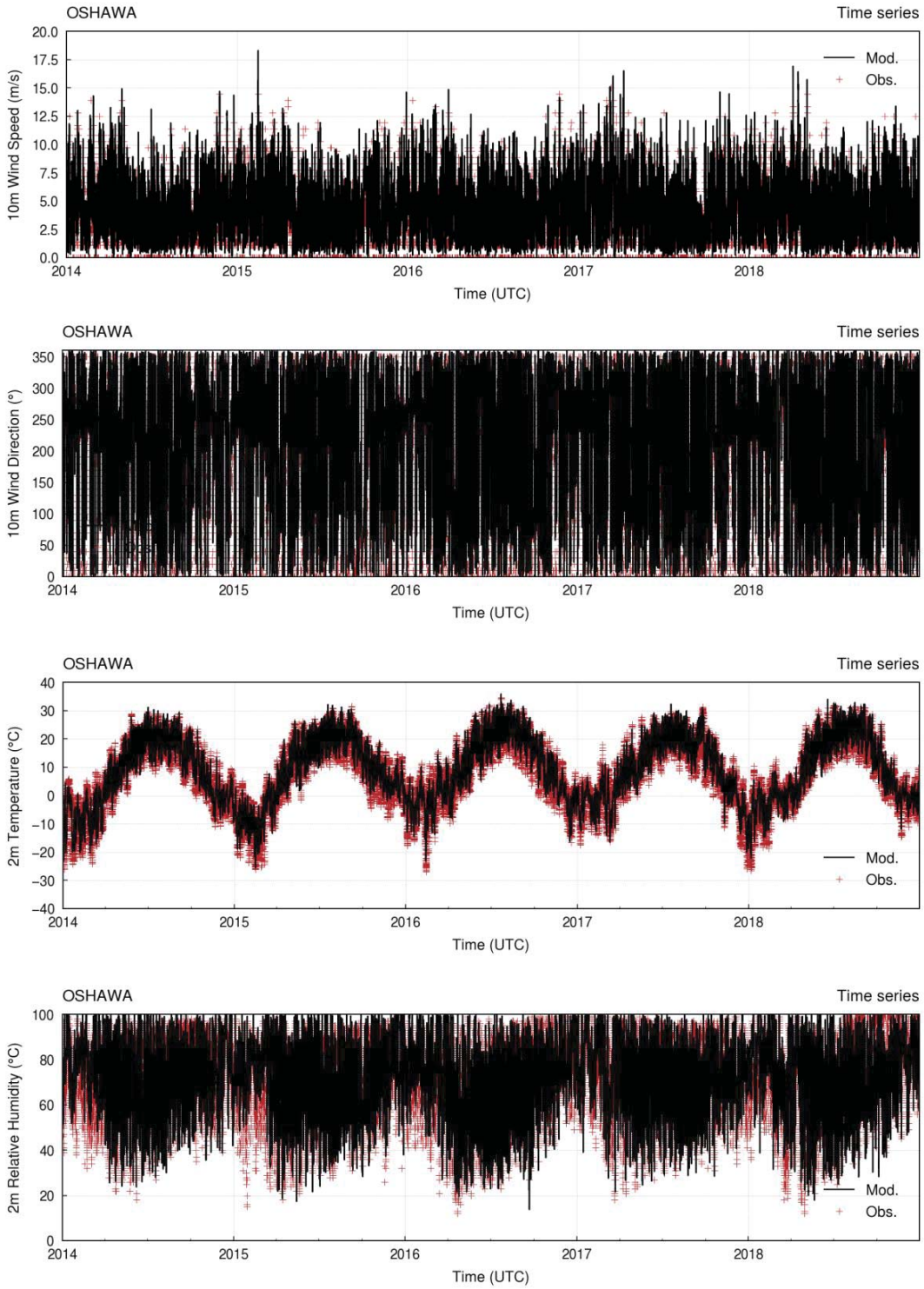


Figure 4. Hourly series of (from upper to lower) mean 10-meter wind speed, 10-meter wind direction, 2 metre temperature and 2 metre relative humidity modelled and observed at the weather station of Oshawa, owned by the Canadian Government, located inside the meteorological domain, between 00:00 UTC on the 1st January 2014 and 00:00 UTC on the 1st January 2019.

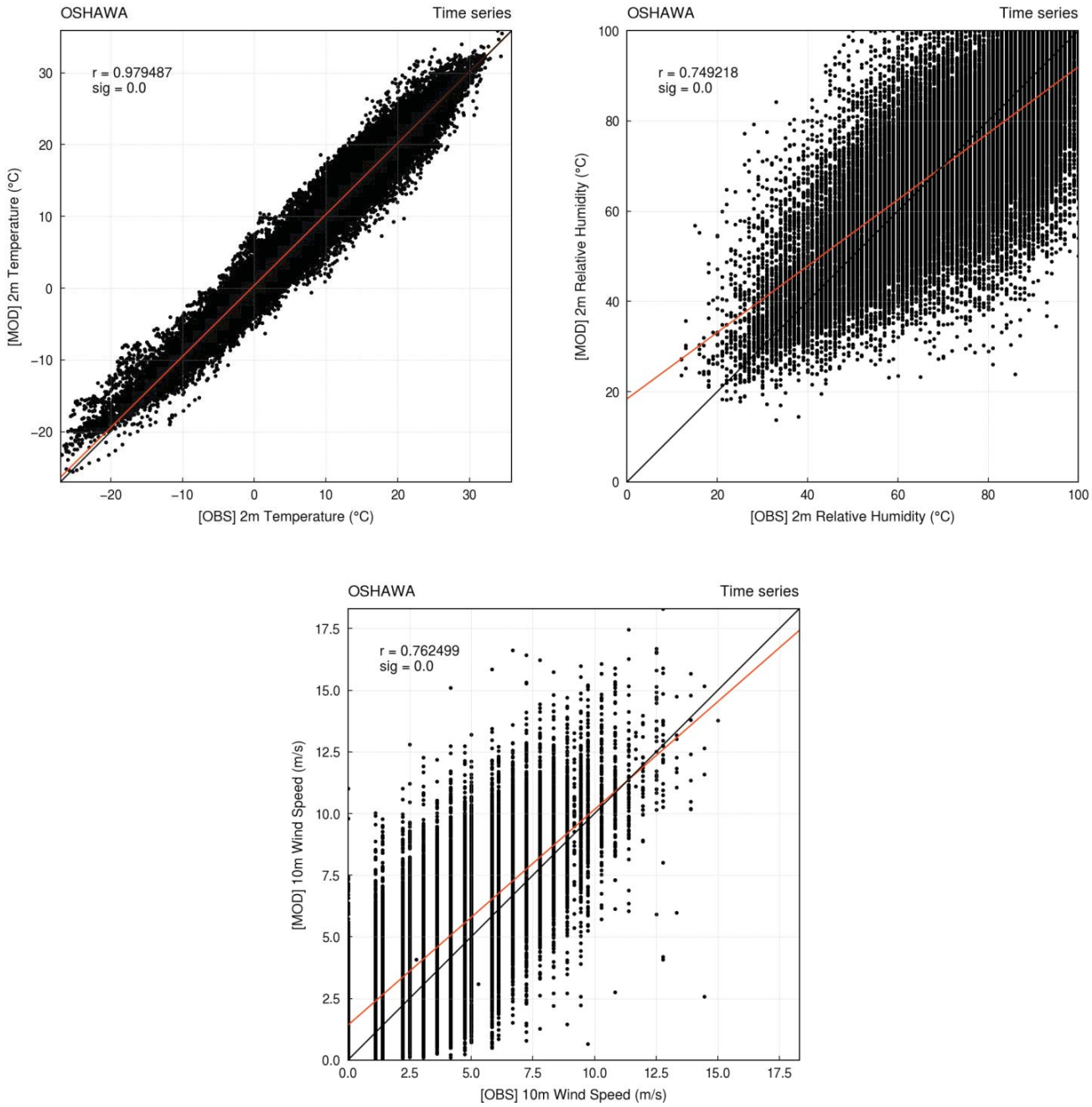
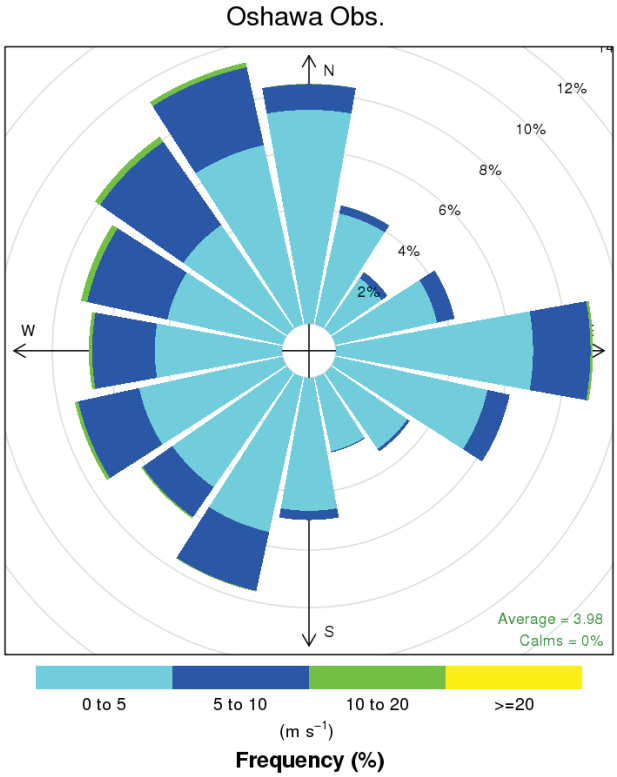


Figure 5. Scatter plot of mean 2-meter temperature (upper left), 2-meter relative humidity (upper right) and 10-meter wind speed (lower) modelled and observed at the weather station of Oshawa, owned by the Canadian Government and located inside the meteorological domain, between 00:00 UTC on the 1st January 2014 and 00:00 UTC on the 1st January 2019.



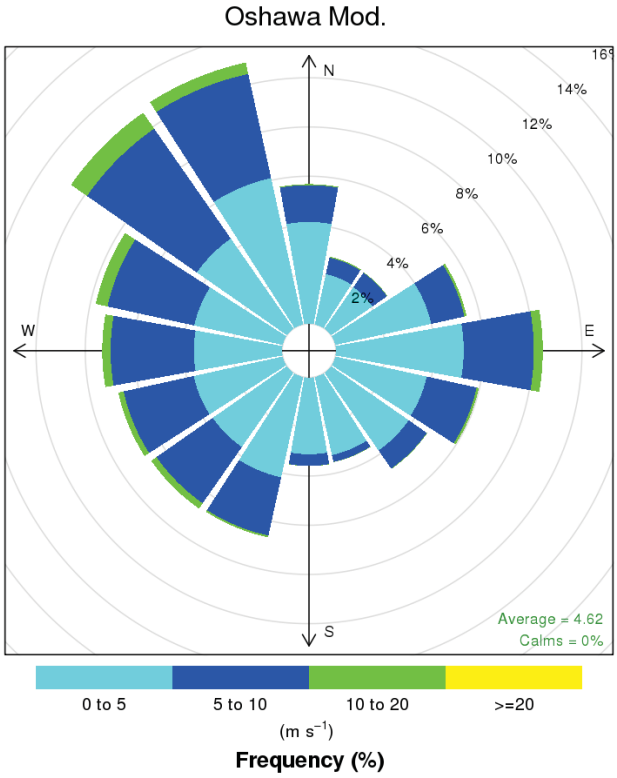


Figure 6. Wind roses based on observed (upper) and modelled (lower) data at the weather station of Oshawa, owned by the Canadian Government and located inside the meteorological domain, between 00:00 UTC on the 1st January 2014 and 00:00 UTC on the 1st January 2019.

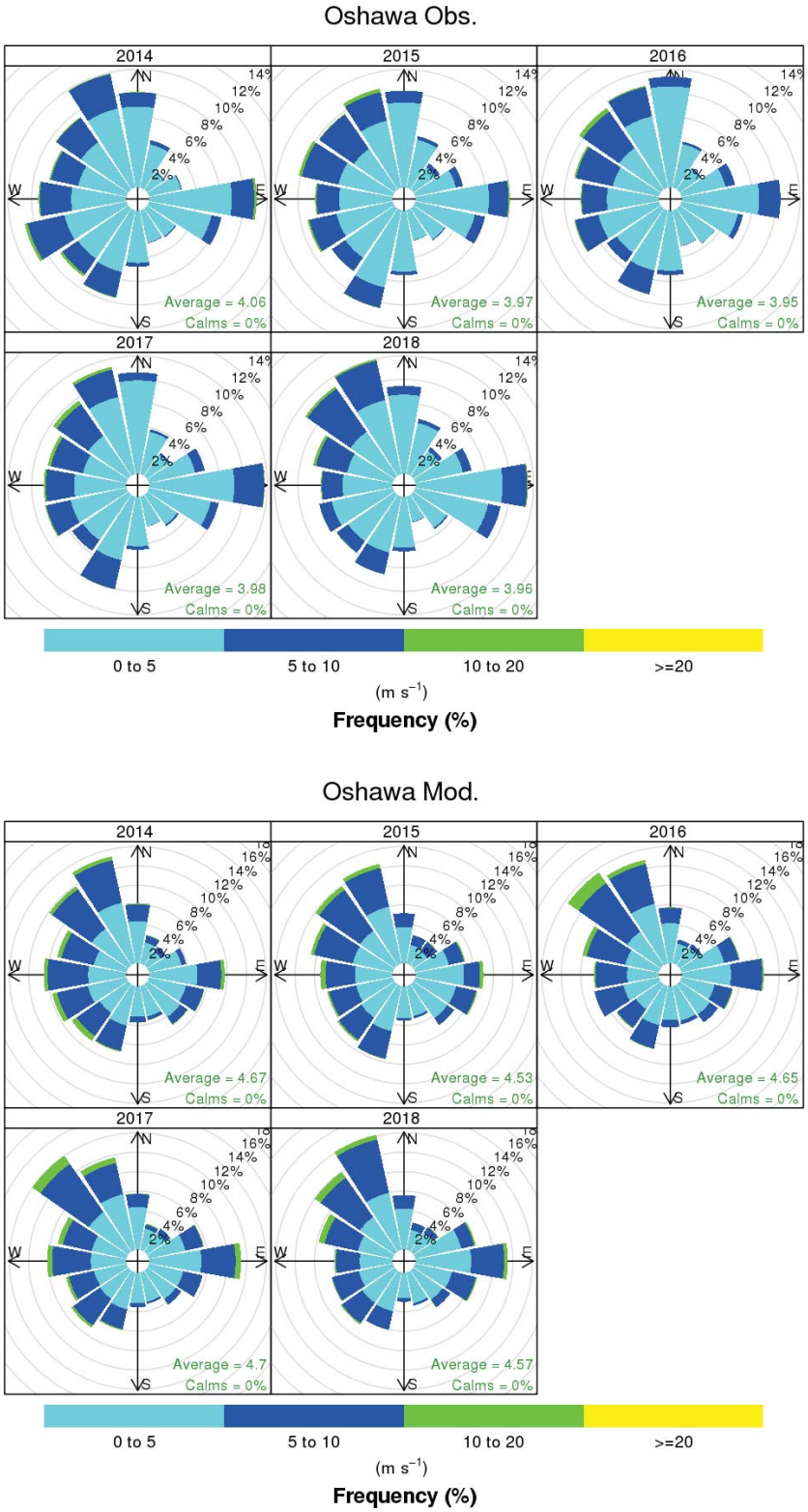
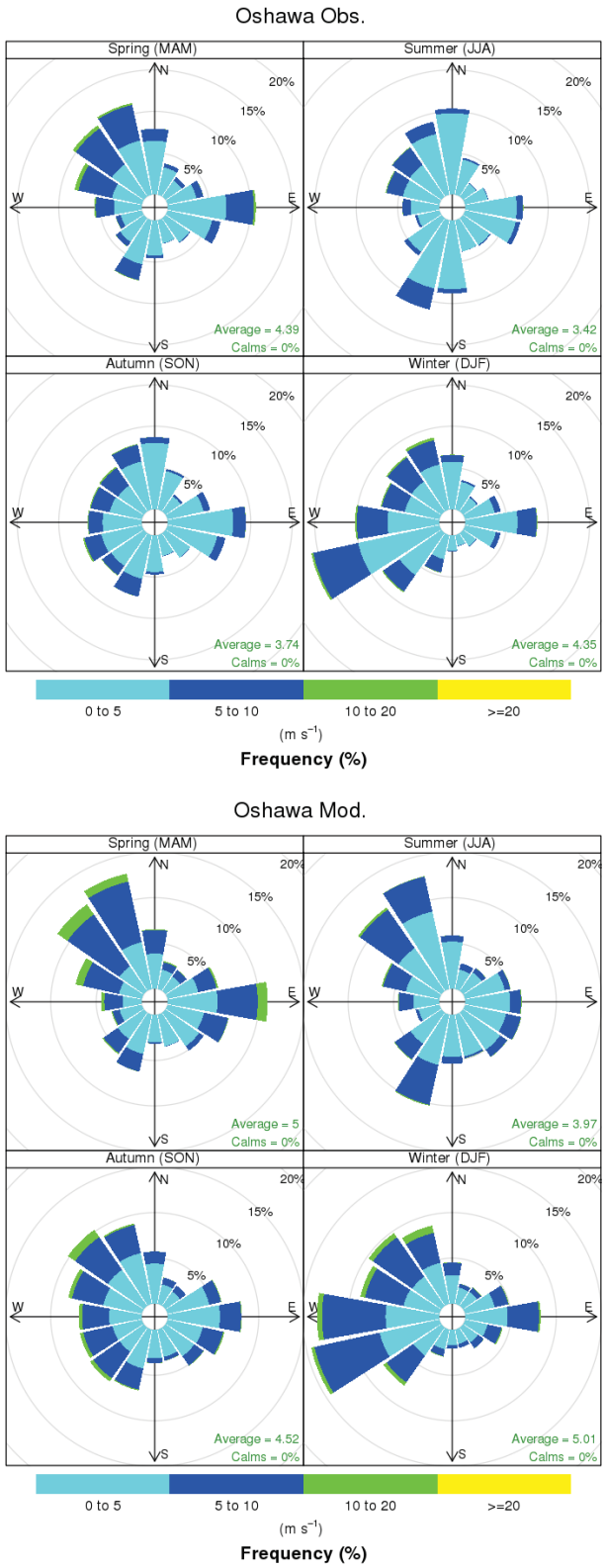


Figure 7. Yearly wind roses based on observed (upper) and modelled (lower) data at the weather station of Oshawa, owned by the Canadian Government and located inside the meteorological domain, between 00:00 UTC on the 1st January 2014 and 00:00 UTC on the 1st January 2019.



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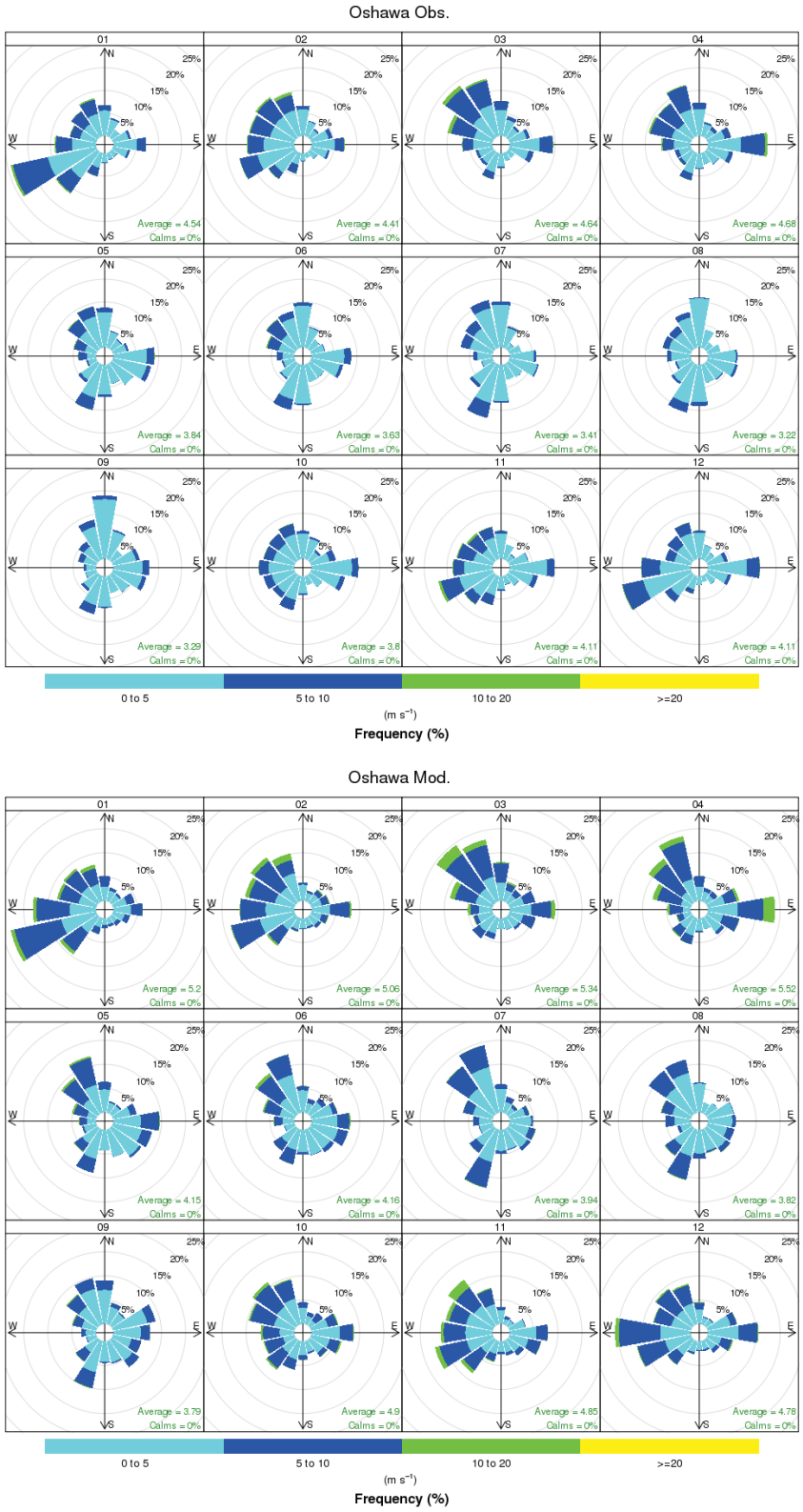

Figure 9. Monthly wind roses based on observed (upper) and modelled (lower) data at the weather station of Oshawa, owned by the Canadian Government and located inside the meteorological domain, between 00:00 UTC on the 1st January 2014 and 00:00 UTC on the 1st January 2019.

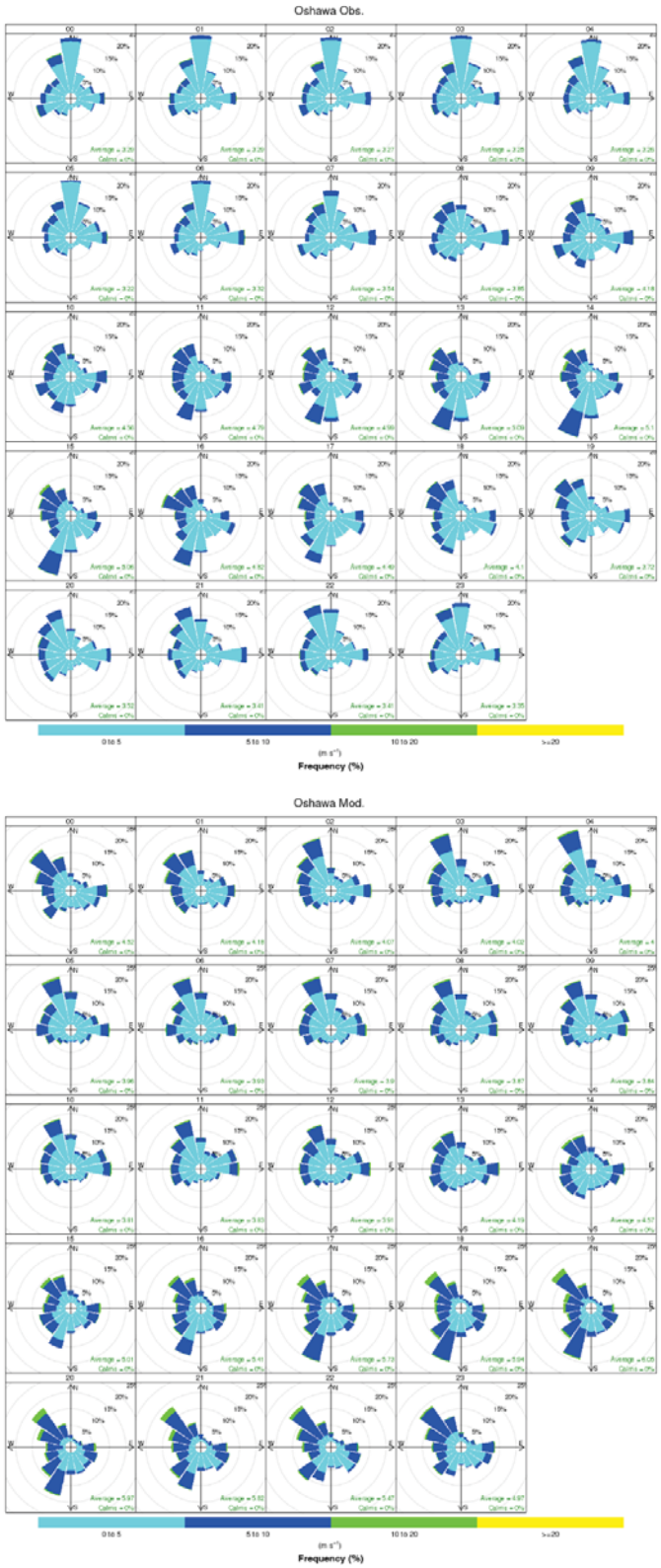

Figure 10. Hourly wind roses based on observed (upper) and modelled (lower) data at the weather station of Oshawa, owned by the Canadian Government and located inside the meteorological domain, between 00:00 UTC on the 1st January 2014 and 00:00 UTC on the 1st January 2019.

From the results shown above:

- Regarding the bias of each of the variable, which is evaluated by the MB, it should be noticed that there are no significant over- or under-estimation in any of the variables, with all the results in the range of values recommended, with only the wind speed MB (0.9 m/s) slightly exceeding the recommended benchmark (0.5 m/s), which is not quite significant considering the complexity of the topography over the area (more detail about that in the following paragraph).
- Regarding the absolute error, which is evaluated by the MAGE (for temperature, relative humidity, and wind direction) and RMSE (for wind speed), all the computed statistics accomplish with the recommended benchmarks. Focusing on the wind fields, which will be key variables for the good performance of the air quality forecast, RMSE for the wind speed has a value of 1.9 m/s, just below the limit of 2.0 m/s that is recommended for model simulations longer than 1 year, and MAGE for wind direction has a value of 27°, also below the maximum recommended error of 30°. It should be noticed that these benchmarks for wind fields are typically used in areas with simple topography conditions that may not have an important influence in the meteorology. This is not the case of the location of the study, as there is an important lake (Lake Ontario) in the vicinities of the analysed weather station that can highly influence the meteorology in the area. So that, in these cases it is expected a higher error of the modelled results due to mesoscale effects such as lake breeze, temperature and relative humidity modifications due to variations on the lake surface temperature, etc… that may not be well reflected for most of the meteorological model. However, it seems that the parametrizations introduced during the calibration process of the WRF model has achieved to correctly consider these mesoscale phenomena, so that, the wind fields validation results show a very good performance of the model.
- Regarding the correlation between observation and modelled data, which is evaluated by the IOA, once again all the statistics for each of the variables accomplish with the expected benchmarks values.

Therefore, numerical comparison between observed and modelled data show a good to very good performance of the WRF model, that supports the reliability of the model simulations run between 1st January 2014 and 31st December 2018 to be used as a main input for an air quality simulation purpose.

Moreover, the results of the statistics provided in this section, that accomplish with all the benchmark proposed by the scientifical biography, could be used as an uncertainty measure associated with the meteorological modelled results, which regarding the results, would be not statistically significante.

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6. Bibliography

- Emery, C., Tai, E., 2001. *"Enhanced Meteorological Modeling and Performance Evaluation for Two Texas Ozone Episodes"*. *Final report submitted to Texas Natural Resources Conservation Commission, prepared by ENVIRON, International Corp,* Novato, CA.
- Tesche, T.W., McNally, D.E., Tremback, C., 2002. *"Operational Evaluation of the MM5 Meteorological Model Over the Continental United States: Protocol for Annual and Episodic Evaluation". Prepared for US EPA by Alpine Geophysics, LLC, Ft. Wright, KY, and ATMET, Inc.*, Boulder, CO. http://www.epa.gov/scram001/reports/tesche_2002_evaluation_protocol.pdf

7. Annex

7.1. Meteosim presentation

Meteosim S.L. is a spin-off created in 2003 by members of the Department of Astronomy and Meteorology at the University of Barcelona and the North American company Meso Inc. (Troy, New York). The company is specialized in the development and research of mesoscale weather prediction models, aimed at the wind industry, meteorologically sensitive sectors and air quality.

Since its creation, Meteosim has dedicated its Research and Development resources in the creation of products derived from numerical weather forecasting with important contributions to the business and in consulting studies related to the environment. Our efforts in numerical forecasting have made us world benchmarks in accurate and reliable forecasting for meteorologically sensitive companies.

Most of the meteorological forecasting products and services that Meteosim develops and commercializes have as raw material the information generated by both internationally recognized meteorological models and by their own developed models. In this sense, meteorological models can be used both to forecast the meteorological variables of any region or country in real time, several times a day with a horizon of a few hours to several weeks, as well as to carry out meteorological studies in past time to reproduce the conditions occurred.

Experience and recognition in the development of short-term forecasts for highly localized areas, long-term seasonal forecasts, maritime forecasts, historical studies of past weather conditions, pollutant dispersion models, risk maps, water resources, etc. allow Meteosim to work in different sectors: energy, environment, forensic meteorology, risk management, mining, defense and civil protection, navigation, maritime transport, etc.

In order to reach these scientific levels, the company is made up of a highly qualified team of physics graduates and doctors, masters in meteorology, senior engineers and graduates in environmental sciences, where the spirit of scientific research is combined with customer orientation to put in the market the best technical solutions

Meteosim's main asset is applied scientific knowledge, giving value to the solutions demanded by our clients. Meteosim is proud to have a portfolio of loyal customers that guarantee the quality of service throughout the world, ranging from large multinationals to engineering or public administration.

The Durham York Energy Centre (DYEC) Project team assessed the suitability of the meteorological data collected as part of the DYEC's ambient air program for use in development of an Air Quality Impact Assessment (AQIA) and updated Emissions Summary and Dispersion Model (ESDM) for the facility, as requested by the MECP following a teleconference call on July 7, 2020.

The ambient air program stations were established in 2012 in accordance with the "Ambient Air Quality Monitoring Plan - Durham York Residual Waste Study", prepared by Stantec Consulting Ltd and dated May 2012, and in consultation with the MECP.

The program includes two monitoring stations:

- one station associated with the pre-existing meteorological tower which was relocated to the Courtice Water Pollution Control Plant from a location located at 180 Courtice Road following the completion of the Environmental Assessment and approval of the Ambient Air Quality Monitoring Program. This station is referred to as the "Courtice Station" and
- one station referred to as the "Rundle Station", located in proximity of the intersection of Rundle Road and Baseline Road.

The locations of the two stations and DYEC are presented on Figure 1, below.

Figure 1: Location of Courtice and Rundle Stations

Section 2.3 of MECP document "Operations Manual for Air Quality Monitoring in Ontario", dated 2018 states that "If there is any intention to use meteorological data for modelling under *O. Reg. 419/05*, the meteorological instrumentation must meet the requirements of *O. Reg. 419/05* and be included in the audit program. Approval for the use of site specific meteorological data for modelling must be obtained from the ministry as per the requirements of *O. Reg. 419/05*." At the time of installation of the stations, using these meteorological station data to support the air quality modelling was not considered as all modelling was carried out using existing site specific data approved by the MECP under Section 13(1) of Ontario Regulation (O.Reg.) 419/05. The MECP provides quarterly review of the meteorological data from both stations as part of the ambient air quality monitoring program and any concerns with the data are addressed as part of that program on an ongoing basis.

STATION CALIBRATION

In response to comments received from MECP by the DYEC Project team on the 2018 Q3/Q4 reports, questions were raised as to the frequency of meteorological equipment calibration. The meteorological station that supports the Courtice ambient air quality monitoring station is operated as part of the Courtice Water Pollution Control Plant (WPCP), and was originally established to support WPCP operations. The Courtice ambient air monitoring station was ultimately located in proximity to the existing 20 m meteorological tower. As the Courtice meteorological station for the WPCP was not installed as part of an MECP program, data from that instrumentation had not been reported to the MECP and no annual calibration has been carried out for the unit. A calibration of the meteorological station was carried out in May 2019 and will be completed annually as part of the DYEC air monitoring program.

At the time of the initial installation of the meteorological station at the Courtice WPCP the unit was configured to report winds as 'blowing to' as opposed to the Environment and Climate Change Canada (ECCC) convention, which uses "blowing from". At the onset of the ambient air quality monitoring program in 2013, the consultant responsible for reporting the data was aware of how the winds were reported and upon receipt of the data they would correct the data by 180 degrees during reporting. Following a change in the consultant responsible for maintaining the meteorological station, the wind direction was not consistently corrected during reporting. Consequentially the station was adjusted on November 14, 2019 so that the station would report per ECCC convention.

The Rundle meteorological station has been operating with the co-located ambient air monitoring station since 2013 and is calibrated annually. A copy of the May 2019 Calibration certificate is included in Attachment 1. Meteorological data for the Rundle Station is reviewed by MECP quarterly as part of the DYEC ambient air monitoring program.

METEOROLOGICAL TOWER HEIGHT

As described above, the Courtice station has a sensor height of 20m above grade as it was established prior to the commencement of the DYEC ambient air monitoring program.

During the review of the quarterly reports for Rundle Station, a discrepancy was identified between the proposed and installed tower height. Prior to Q3 2018 a tower was installed with a height of 7.9 m instead of the proposed 10m. This was remedied during Q3 2018 and reported Section 6.2 of the 2018 Q3 report prepared by RWDI Air Inc. (November 2018). At this time, a repair of the wind vane at Rundle Station was attempted, prior to it ultimately being replaced in Q4 due to the existing wind heads continuing malfunction. The MET One Instruments Model 034B wind head at the Rundle station was replaced with a RM Young wind head on December 20, 2018.

Meteorological Data Analysis

Analysis of meteorological data form the Courtice and Rundle stations was completed on the validated data provided by the DYEC Project team to assess whether the data seems reasonable and suitable for inclusion in the CALMET/CALPUFF modelling. Updated modelling is proposed for the period of 2014-2018 and only these data within this period were considered in the analysis. The data analysis considered only the following parameters, which may be used as inputs to CALMET:

- Temperature;
- Relative Humidity;
- Wind Speed; and
- Wind Direction.

The Courtice and Rundle Stations also report precipitation data but these data will not be included in this analysis since wet deposition is not included in the modelling.

The following modifications have been made to the validated data supplied by the DYEC project team:

1) Wind Direction Correction – As noted above, the wind direction for Courtice was incorrectly reported by 180 degrees for the period between July 1st 2018 (0:00) and November 14th (10:00). This data was therefore corrected.

2) Where wind speeds are reported as “0” m/s, the wind direction was changed to “CALM”.

To add additional context to the review of data, meteorological data was also downloaded from the Oshawa weather station located just south of Oshawa Airport and maintained by ECCC. Oshawa weather station is located further inland than either the Courtice or Rundle locations, approximately 11 km NW from Courtice and 12 km, WNW from Rundle. The following modifications were made to the data downloaded directly from the ECCC website:

1) ECCC provide wind direction to the nearest 10 degrees. As wind roses are typically presented for 15 degree increments, a randomization was applied to vary wind direction by +/- 5° as per typical MECP practice.

2) Where wind speeds are reported as “0 m/s”, the wind direction was changed to “CALM”.

A comparison of the three different stations is provided in Table 1, below.

Table 1: Meteorological Station Comparison

Station Name	ID	Maintained by	Approximate Distance from DYEC	Approximate Distance from Lake Ontario	Tower height
Courtice	N/A	Region of Durham	0.4 km W	0.3 km	20 m
Rundle	N/A	Region of Durham	2 km NE	2 km	7.9 m (prior to Q3 2018) 10 m (post Q3 2018)
Oshawa	71697	ECCC	11 km NW	7 km	10 m

Data Availability

The availability of data at the Courtice and Rundle Stations was calculated for the 2014-2018 period and is summarised in Table 2 and Table 3, respectively.

The Courtice Station (Table 2) has over 95% availability of all parameters for the data period. The Rundle Station (Table 3) has over 95% data availability for the majority of parameters with the exception of wind speed and direction records for 2018. In 2018, problems with the wind head were reported resulting in approximately 15% downtime of the wind sensors.

Table 2: Courtice Station - Data Availability (2014-2018)

Data Year	Temperature	Relative Humidity	Wind Speed	Wind Direction
2014	100%	100%	100%	100%
2015	100%	100%	100%	100%
2016	100%	99%	100%	100%
2017	100%	100%	100%	100%
2018	97%	96%	99%	99%

Table 3: Rundle Station - Data Availability (2014-2018)

Data Year	Temperature	Relative Humidity	Wind Speed	Wind Direction
2014	100%	100%	100%	100%
2015	100%	100%	100%	100%
2016	100%	100%	100%	100%
2017	100%	100%	100%	99%
2018	95%	95%	85%	85%

Review of Temperature Data

Temperature data for the three different stations is compared as follows in Figures 2 and 3:

1) Comparison of average monthly temperature for each calendar year;

2) Comparison of minimum monthly temperature for each calendar year;

3) Comparison of maximum monthly temperature for each calendar year;

4) Comparison of average diurnal profile over the data period, for each month of the year.

The comparisons of average monthly temperature for each calendar year indicate that each of the three stations exhibits a very similar average temperature profile for each month, with the exception of average temperature recorded at Rundle Station in March 2018, which is approximately 2°C lower.

The comparisons of **minimum monthly temperature** for each calendar year analysed indicates that each of the three stations exhibits a very similar profile for minimum temperature each month with slightly warmer minimum temperatures typically recorded at the Courtice Station, which is located closest to Lake Ontario. Two exceptions are noted:

1) The minimum recorded temperature at Oshawa Station in March 2015 is approximately 5°C lower than the minimum recorded temperature at Rundle Station and 7°C lower than the minimum temperature at the Courtice Station. Given that the minimum temperature for at Courtice and Rundle Station are within 2°C of one another, this is likely to have occurred due to local effects at the Oshawa Station, which is located over 10 km away.

2) The minimum temperature recoded at the Rundle Station in March 2018 is significantly lower than the minimum temperatures recorded at Courtice Station or Oshawa Station over this same period. Further investigation shows that on March 28th 2018 at 22:00, the recorded temperature at Rundle Station dropped from 5.4°C to -14.6°C within 1 hour measurements and remained below -12°C until April 1st, 2018 at 00:00, 3 days later, when it rose from -16.3°C to 2.5°C within 1 hour measurements. These extreme temperature changes were not recorded at either the Courtice or Oshawa Stations. As a result, this period of temperature data recorded at Rundle Station is considered to be erroneous and is proposed to be discarded. This would also explain the lower average temperature recorded at Rundle Station in March 2018 and discussed above.

The comparisons of **maximum monthly temperature** for each calendar year analysed indicates that each of the three stations exhibits a very similar profile for maximum temperature each month with the highest maximum temperatures typically recorded at Oshawa Station, which is the most inland. One exception was noted. In March 2015, the maximum recorded temperature was approximately 9°C higher than the maximum temperature recorded at Courtice Station and 11°C higher than the maximum recorded temperature at Oshawa Station. On further inspection of the data, the temperature recorded on March 16, 2015 the temperature recorded at 7:00 was 18.5 °C compared to a temperature of -0.1°C the preceding hour and 6.3°C the following hour. Temperatures of -0.8°C and 4.8°C were recorded at the same hour, as a result, this hour of temperature at the Rundle Station is considered to be erroneous and it is proposed to be discarded.

The comparison of the **diurnal temperature** profile for each month illustrate similar profiles across all three stations. Typically, Courtice is shown to have the warmest average temperatures in winter months and the lowest average temperatures in summer months. This is attributed to being located approximately 300 m from Lake Ontario and subject to lake effects.

Overall, the temperature data for the Courtice and Rundle Stations exhibits very similar patterns to the data for the temperature recorded at Oshawa Station over the same period. The data appears to be reasonable.

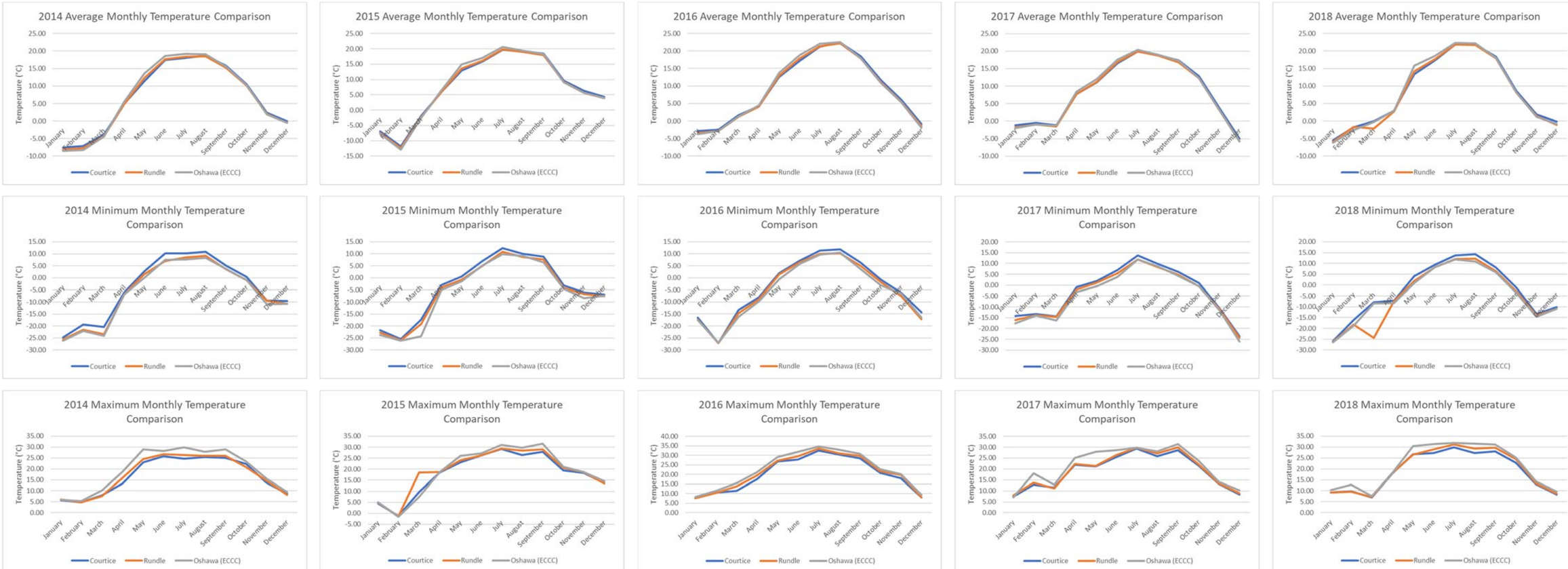


Figure 2: Annual Temperature Profiles (Average, Minimum and Maximum) for 2014-2018 Data Period

Figure 3: Comparison of Diurnal Temperature Profiles for 2014-2018 Data Period

Review of Relative Humidity Data

Average monthly relative humidity for each calendar year is illustrated in Figure 4 The recorded data shows very similar patterns for each of the three stations. The difference between recorded relative humidity is typically smallest in summer months and greatest in the winter months with Courtice typically recording the lowest relative humidity data. Overall, the relative humidity data for the Courtice and Rundle Stations shows reasonable correlation with the data recorded at the Oshawa Station over the same period and no data is identified as erroneous and/or unsuitable for use.

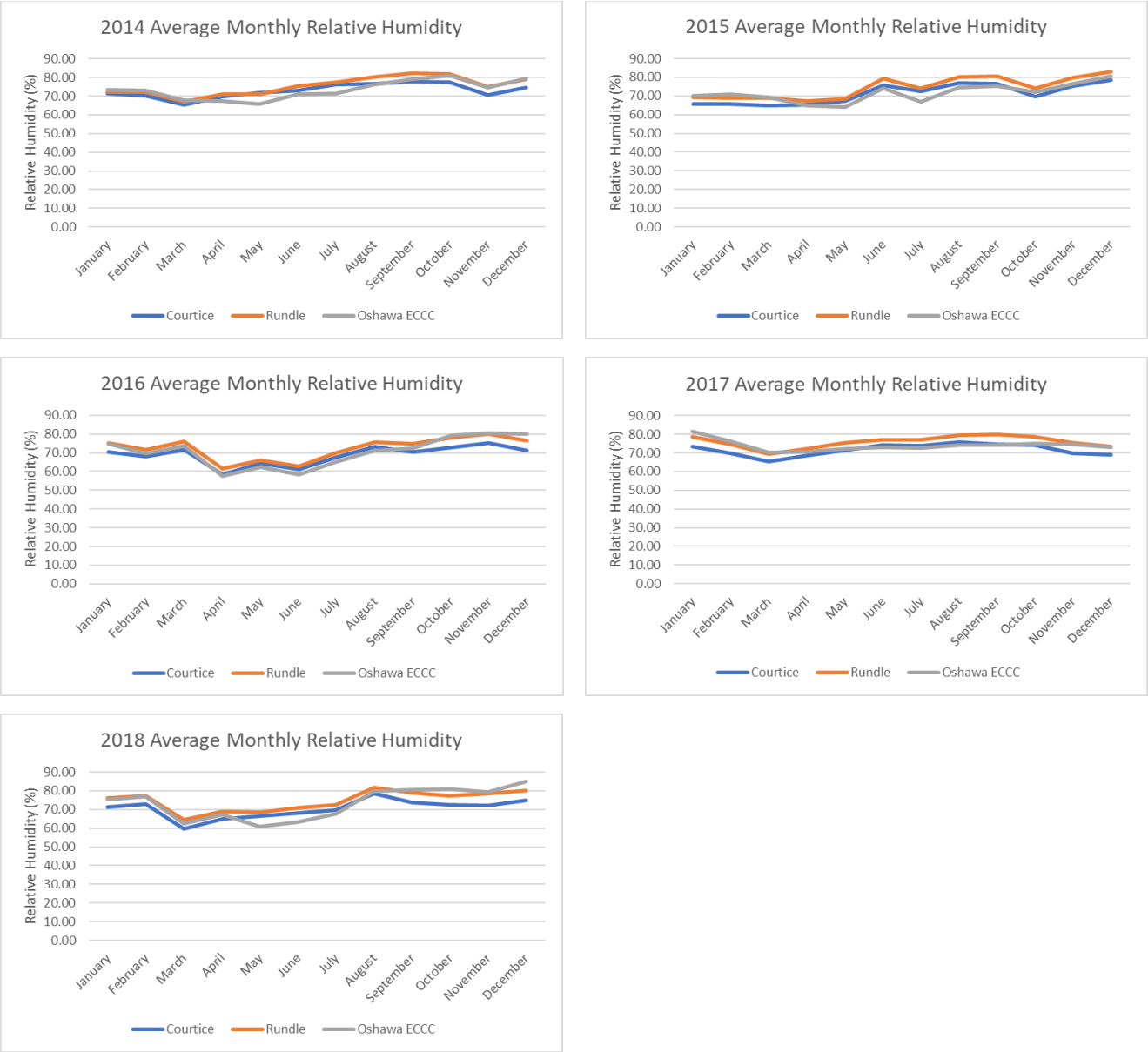


Figure 4: Comparison of Average Relative Humidity for 2014-2018 Data Period

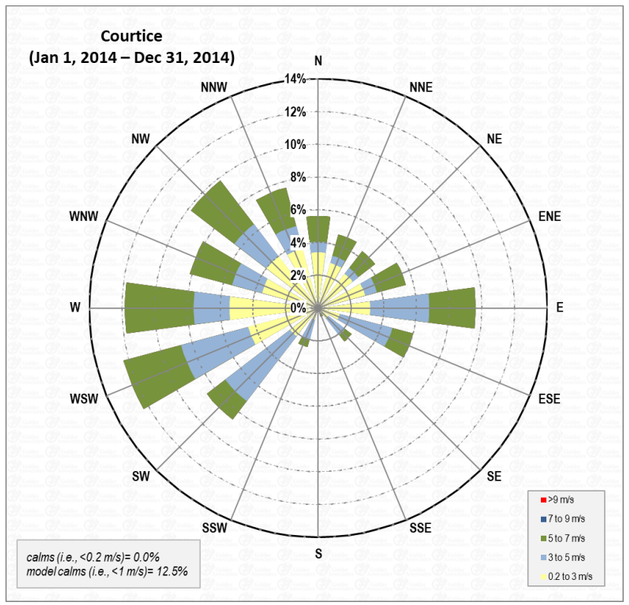
Review of Wind Data

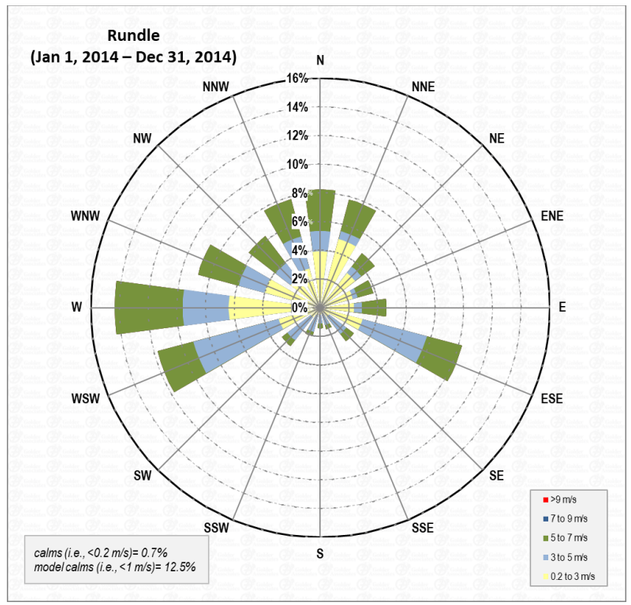
Wind Roses are presented for each station in Figure 5. There are differences in the height of each wind tower and in the distances of each station from Lake Ontario which should be considered when reviewing the windrose data.

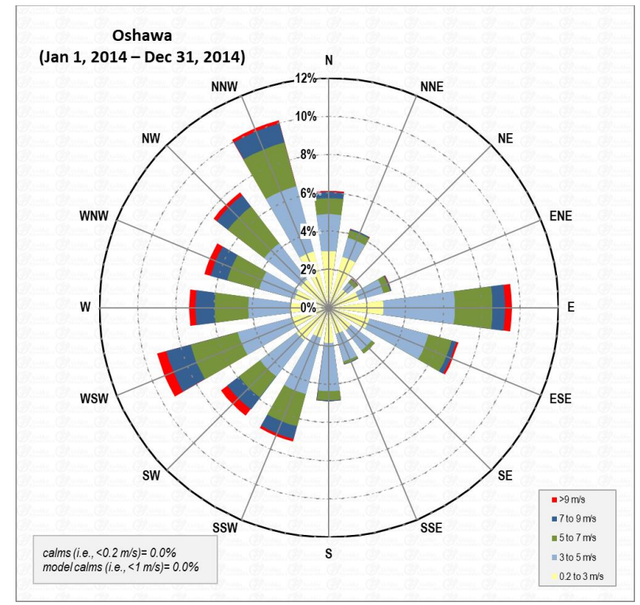
For each year of data, the Courtice Station illustrates a bi-modal distribution with the most frequent winds from the west and east. This station has a 20 m high wind tower but it is located closest to lake Ontario (approximately 300m).

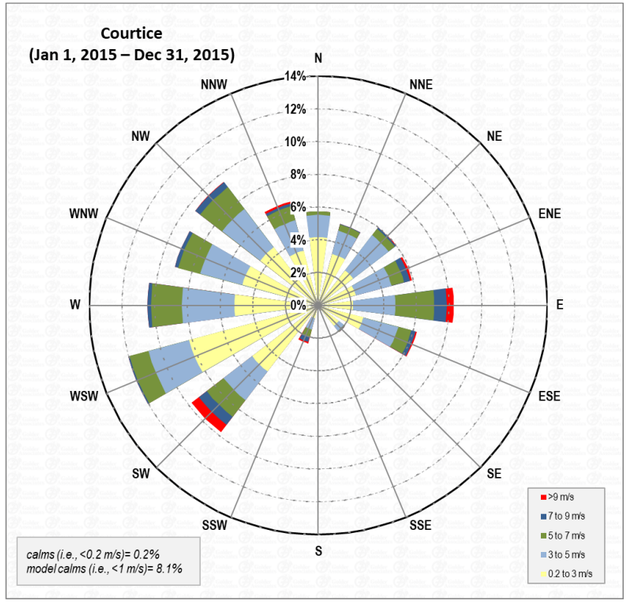
The Rundle Station exhibits a strong WSW predominant wind direction for 2015 – 2017. In 2018, the wind tower was increased in height from 7.8 m to 10 m. The predominant wind direction is reported as more westerly in the years following this change, although it is noted that there was approximately 15% downtime in 2018.

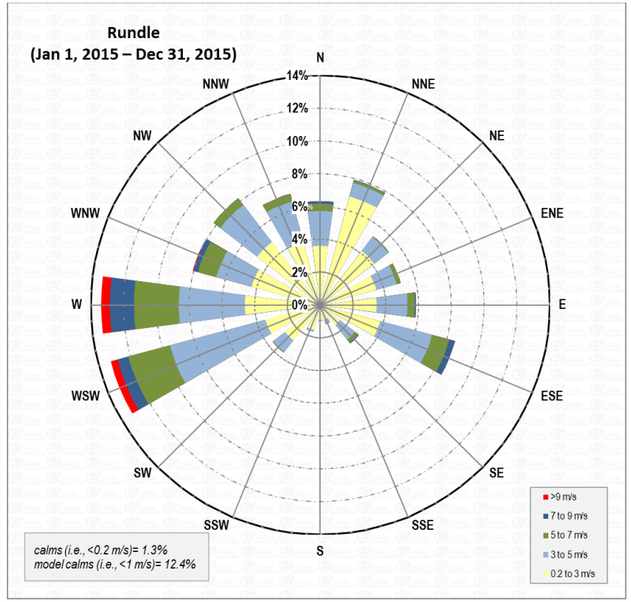
The Oshawa Station shows much more variability in wind direction with predominant winds from the NW. This station is located the furthest from Lake Ontario. The Oshawa station reports less calm wind speeds (i.e. less than 0.2 m/s), however it is identified that the wind speed sensor at this station that may not be as sensitive as the sensors at Courtice and Rundle Stations as the lowest non-zero recorded wind speed is 4 km/hr. Comparatively wind speeds of 0.1 km/hr were recorded at both Courtice and Rundle Stations.

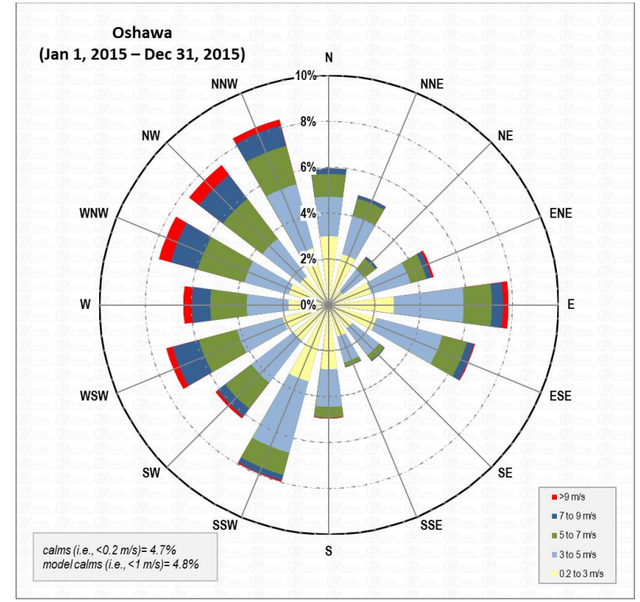

Courtice
(Jan 1, 2014 – Dec 31, 2014)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
14%
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 0.0%
model calms (i.e., <1 m/s)= 12.5%

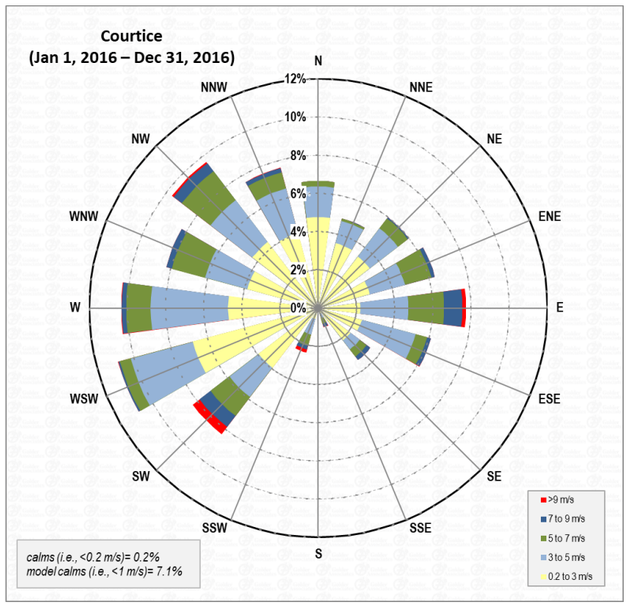

Rundle
(Jan 1, 2014 – Dec 31, 2014)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16%
14%
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 0.7%
model calms (i.e., <1 m/s)= 12.5%

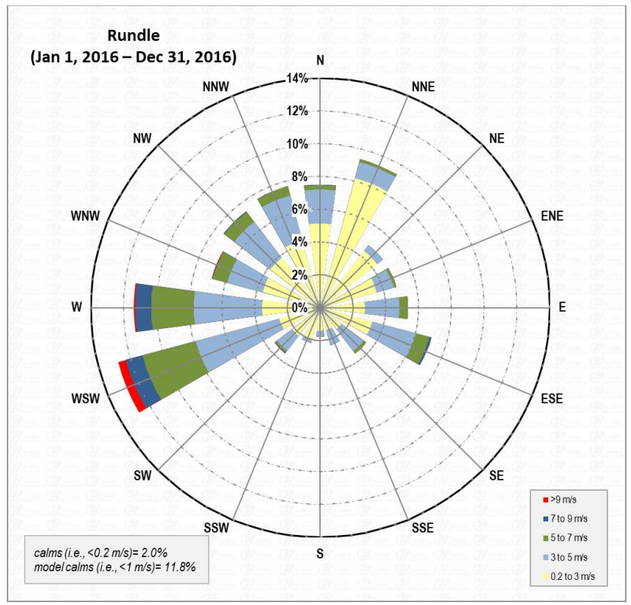

Oshawa
(Jan 1, 2014 – Dec 31, 2014)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 0.0%
model calms (i.e., <1 m/s)= 0.0%

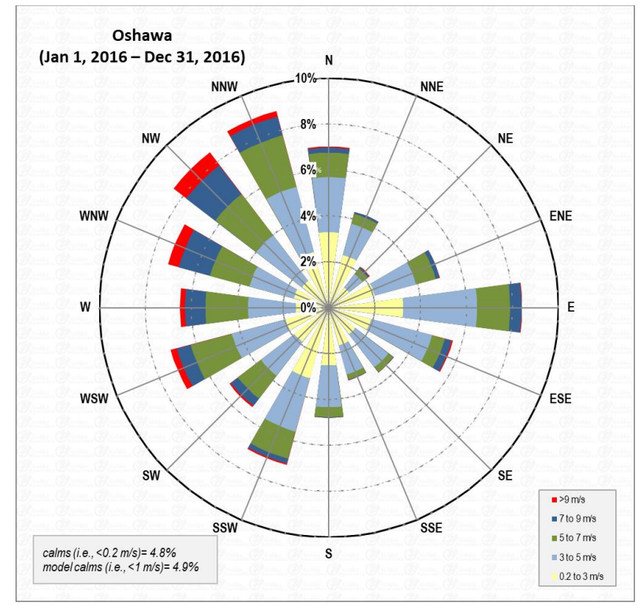

Courtice
(Jan 1, 2015 – Dec 31, 2015)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
14%
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 0.2%
model calms (i.e., <1 m/s)= 8.1%

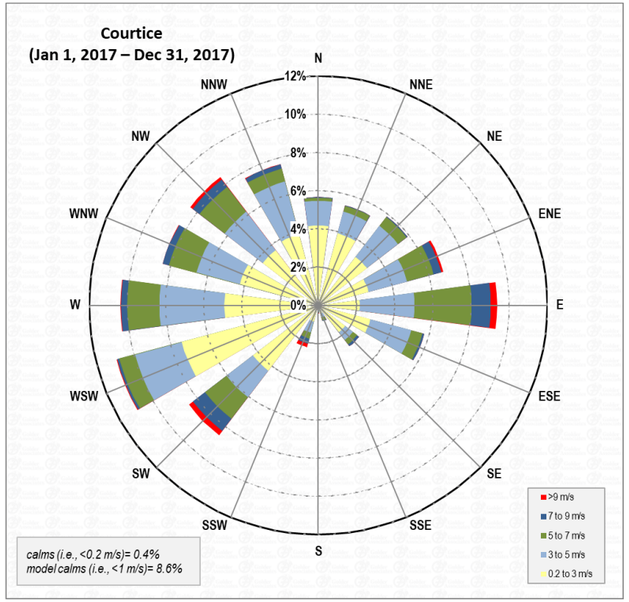

Rundle
(Jan 1, 2015 – Dec 31, 2015)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
14%
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 1.3%
model calms (i.e., <1 m/s)= 12.4%

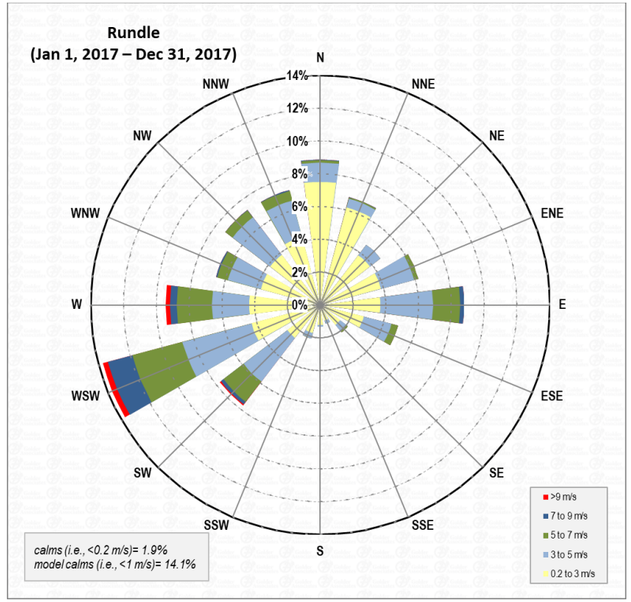

Oshawa
(Jan 1, 2015 – Dec 31, 2015)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 4.7%
model calms (i.e., <1 m/s)= 4.8%

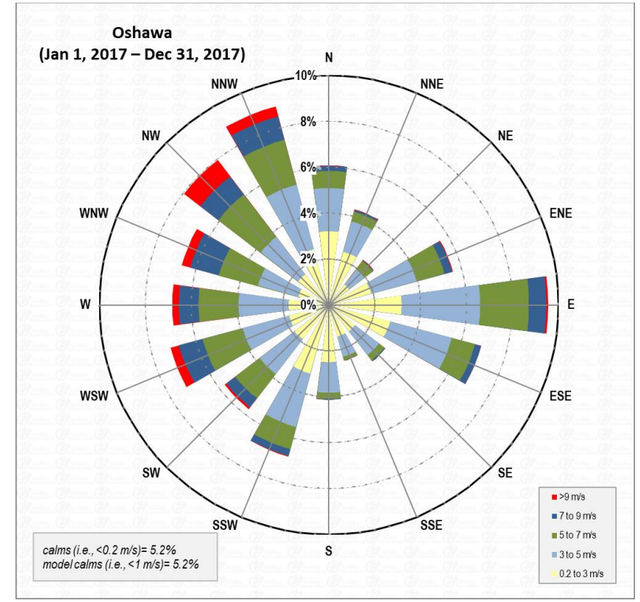

Courtice
(Jan 1, 2016 – Dec 31, 2016)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 0.2%
model calms (i.e., <1 m/s)= 7.1%


Rundle
(Jan 1, 2016 – Dec 31, 2016)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
14%
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 2.0%
model calms (i.e., <1 m/s)= 11.8%


Oshawa
(Jan 1, 2016 – Dec 31, 2016)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 4.8%
model calms (i.e., <1 m/s)= 4.9%


Courtice
(Jan 1, 2017 – Dec 31, 2017)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 0.4%
model calms (i.e., <1 m/s)= 8.6%


Rundle
(Jan 1, 2017 – Dec 31, 2017)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
14%
12%
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 1.9%
model calms (i.e., <1 m/s)= 14.1%


Oshawa
(Jan 1, 2017 – Dec 31, 2017)
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
10%
8%
6%
4%
2%
0%
>9 m/s
7 to 9 m/s
5 to 7 m/s
3 to 5 m/s
0.2 to 3 m/s
calms (i.e., <0.2 m/s)= 5.2%
model calms (i.e., <1 m/s)= 5.2%

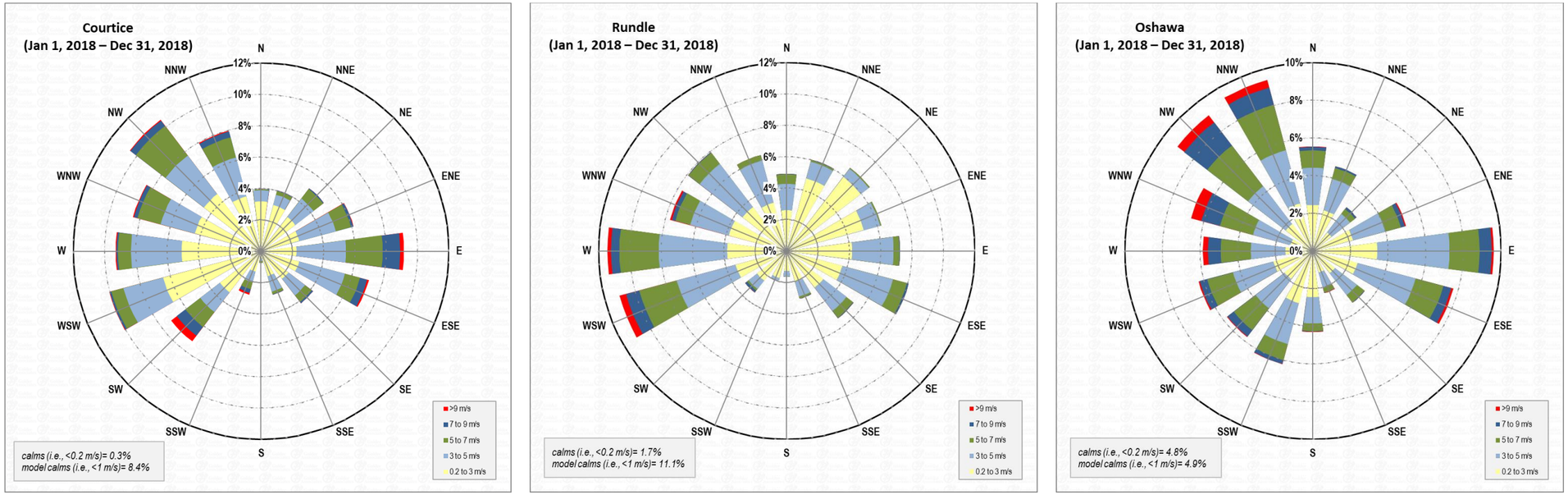


Figure 5: Annual Windroses for the 2014-2018 Data Period by Station

Summary of Data Analysis

Overall, the data from Courtice and Rundle shows reasonable correlation with the Oshawa station for the temperature and relative humidity data.

For wind data , there is more variability between the stations due to the difference in both tower heights and station locations. Overall the data shows consistent annual trends at each station on a yearly basis and the data appears to be reasonable.

Conclusions

The Courtice and Rundle Stations have been calibrated throughout the 2014-2018 period and data validation is completed by the consulting firm responsible for their maintenance. Golder completed a review of the data and found most of the data to be to be suitable for inclusion in the CALMET modelling, taking into account change in wind sensor height and disqualified data (during equipment downtime/maintenance).

```
CALMET.INP      2.2             Hour Start and End Times with Seconds
Template CALMET simulation for winter months
19117255 DYEC 2021 AQIA

---------------- Run title (3 lines) ----------------------------------------

                    CALMET MODEL CONTROL FILE
                    -------------------------

--------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names


Subgroup (a)
------------
Default Name  Type          File Name
------------  ----          ---------
GEO.DAT       input    ! GEODAT=GEO_UD_WINTER_DYEC.DAT       !
SURF.DAT      input    ! SRFDAT=SURF.DAT      !
CLOUD.DAT     input    * CLDDAT=            *
PRECIP.DAT    input    * CLDDAT=            *
WT.DAT        input    * WTDAT=             *

CALMET.LST    output   ! METLST=CALMET_W1.LST     !
CALMET.DAT    output   ! METDAT=CALMET_W1.DAT    !
PACOUT.DAT    output   * PACDAT=            *

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = F !
         F = UPPER CASE

NUMBER OF UPPER AIR & OVERWATER STATIONS:

    Number of upper air stations (NUSTA)  No default     ! NUSTA =  0  !
    Number of overwater met stations
                                 (NOWSTA) No default     ! NOWSTA =  1  !

NUMBER OF PROGNOSTIC and IGF-CALMET FILEs:

    Number of MM4/MM5/3D.DAT files
                                 (NM3D) No default       ! NM3D =  1  !

    Number of IGF-CALMET.DAT files
                                 (NIGF)   No default     ! NIGF =  0  !

                       !END!
--------------------------------------------------------------------------------
Subgroup (b)
----------------------------------
Upper air files (one per station)
----------------------------------
Default Name  Type       File Name
------------  ----       ---------

--------------------------------------------------------------------------------
Subgroup (c)
------------------------------------------
Overwater station files (one per station)
------------------------------------------
Default Name  Type       File Name
------------  ----       ---------
SEA1.DAT       input     1  ! SEADAT=BUOY.DAT!    !END!
--------------------------------------------------------------------------------
Subgroup (d)
```

```
-----------------------------------------------
MM4/MM5/3D.DAT files (consecutive or overlapping)
-----------------------------------------------
Default Name  Type       File Name
------------  ----       ---------
MM51.DAT       input      1  ! M3DDAT=201401.DAT!    !END!



-------------------------------------------------------------------------------
Subgroup (e)
-----------------------------------------------
IGF-CALMET.DAT files (consecutive or overlapping)
-----------------------------------------------
Default Name  Type       File Name
------------  ----       ---------
IGFn.DAT       input     1  * IGFDAT=CALMET0.DAT *    *END*
-------------------------------------------------------------------------------
Subgroup (f)
----------------
Other file names
----------------

Default Name  Type       File Name
------------  ----       ---------
DIAG.DAT      input      * DIADAT=                  *
PROG.DAT      input      * PRGDAT=                  *

TEST.PRT      output     * TSTPRT=                  *
TEST.OUT      output     * TSTOUT=                  *
TEST.KIN      output     * TSTKIN=                  *
TEST.FRD      output     * TSTFRD=                  *
TEST.SLP      output     * TSTSLP=                  *
DCST.GRD      output     * DCSTGD=                  *

-------------------------------------------------------------------------------
NOTES: (1) File/path names can be up to 70 characters in length
       (2) Subgroups (a) and (f) must have ONE 'END' (surrounded by
           delimiters) at the end of the group
       (3) Subgroups (b) through (e) are included ONLY if the corresponding
           number of files (NUSTA, NOWSTA, NM3D, NIGF) is not 0, and each must have
           an 'END' (surround by delimiters) at the end of EACH LINE

                         !END!


-----------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

     Starting date:    Year   (IBYR)  --    No default   ! IBYR  =  2014  !
                       Month  (IBMO)  --    No default   ! IBMO  =  1  !
                       Day    (IBDY)  --    No default   ! IBDY  =  1  !
     Starting time:    Hour   (IBHR)  --    No default   ! IBHR  =  0  !
                       Second (IBSEC) --    No default   ! IBSEC =  0  !

     Ending date:      Year   (IEYR)  --    No default   ! IEYR  =  2014  !
                       Month  (IEMO)  --    No default   ! IEMO  =  1  !
                       Day    (IEDY)  --    No default   ! IEDY  =  31  !
     Ending time:      Hour   (IEHR)  --    No default   ! IEHR  =  23  !
                       Second (IESEC) --    No default   ! IESEC =  3600  !

      UTC time zone         (ABTZ) -- No default       ! ABTZ= UTC-0500 !
         (character*8)
         PST = UTC-0800, MST = UTC-0700 , GMT = UTC-0000
```

```
         CST = UTC-0600, EST = UTC-0500

     Length of modeling time-step (seconds)
     Must divide evenly into 3600 (1 hour)
     (NSECDT)                        Default:3600     ! NSECDT =  3600  !
                                     Units: seconds

     Run type            (IRTYPE) -- Default: 1       ! IRTYPE=  1  !

        0 = Computes wind fields only
        1 = Computes wind fields and micrometeorological variables
            (u*, w*, L, zi, etc.)
        (IRTYPE must be 1 to run CALPUFF or CALGRID)

     Compute special data fields required
     by CALGRID (i.e., 3-D fields of W wind
     components and temperature)
     in additional to regular            Default: T    ! LCALGRD = T !
     fields ? (LCALGRD)
     (LCALGRD must be T to run CALGRID)

      Flag to stop run after
      SETUP phase (ITEST)             Default: 2       ! ITEST=  2   !
      (Used to allow checking
      of the model inputs, files, etc.)
      ITEST = 1 - STOPS program after SETUP phase
      ITEST = 2 - Continues with execution of
                  COMPUTATIONAL phase after SETUP


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                   No Default       ! MREG =  0   !

        0 = NO checks are made
        1 = Technical options must conform to USEPA guidance
                  IMIXH    -1     Maul-Carson convective mixing height
                                  over land; OCD mixing height overwater
                  ICOARE   0      OCD deltaT method for overwater fluxes
                  THRESHL  0.0    Threshold buoyancy flux over land needed
                                  to sustain convective mixing height growth
                  ISURFT   > 0    in OBS mode (pick one representative station)
                           -2     in NOOBS mode (itprog=2) (average all
                                  surface prognostic temperatures to get
                                  a single representative sf. temp)
                  IUPT     > 0    in OBS mode (pick one representative station)
                           -2     in NOOBS mode (ITPROG>0) (average all surface
                                  prognostic temperatures to get a single
                                  representative sf. temp)
                  IZICRLX  0      Do NOT use convective mixing height relaxation
                                  to equilibrium value

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = UTM  !

         UTM :  Universal Transverse Mercator
```

```
    TTM :  Tangential Transverse Mercator
    LCC :  Lambert Conformal Conic
     PS :  Polar Stereographic
     EM :  Equatorial Mercator
   LAZA :  Lambert Azimuthal Equal Area

False Easting and Northing (km) at the projection origin
(Used only if PMAP= TTM, LCC, or LAZA)
(FEAST)                    Default=0.0     ! FEAST  = 0.000  !
(FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

UTM zone (1 to 60)
(Used only if PMAP=UTM)
(IUTMZN)                   No Default      ! IUTMZN =  17   !

Hemisphere for UTM projection?
(Used only if PMAP=UTM)
(UTMHEM)                   Default: N      ! UTMHEM = N  !
    N   :  Northern hemisphere projection
    S   :  Southern hemisphere projection

Latitude and Longitude (decimal degrees) of projection origin
(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
(RLAT0)                    No Default      ! RLAT0 = 40N  !
(RLON0)                    No Default      ! RLON0 = 90E  !

    TTM :  RLON0 identifies central (true N/S) meridian of projection
           RLAT0 selected for convenience
    LCC :  RLON0 identifies central (true N/S) meridian of projection
           RLAT0 selected for convenience
    PS  :  RLON0 identifies central (grid N/S) meridian of projection
           RLAT0 selected for convenience
    EM  :  RLON0 identifies central meridian of projection
           RLAT0 is REPLACED by 0.0N (Equator)
    LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
           RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1)                    No Default      ! XLAT1 = 30N  !
(XLAT2)                    No Default      ! XLAT2 = 60N  !

    LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
    PS  :  Projection plane slices through Earth at XLAT1
           (XLAT2 is not used)

----------
Note:  Latitudes and longitudes should be positive, and include a
       letter N,S,E, or W indicating north or south latitude, and
       east or west longitude.  For example,
       35.9  N Latitude  =  35.9N
       118.7 E Longitude = 118.7E


Datum-region
------------

The Datum-Region for the coordinates is identified by a character
string.  Many mapping products currently available use the model of the
Earth known as the World Geodetic System 1984 (WGS-84).  Other local
models may be in use, and their selection in CALMET will make its output
consistent with local mapping products.  The list of Datum-Regions with
official transformation parameters is provided by the National Imagery and
Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)
```

```
     ------------------------------------------------------------------------------
     WGS-84    WGS-84 Reference Ellipsoid and Geoid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
     NAR-C     NORTH AMERICAN 1983 GRS 80 Spheroid, MEAN FOR CONUS (NAD83)
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                    Default: WGS-84    ! DATUM =  WGS-84 !


     Horizontal grid definition:
     ---------------------------

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =   160  !
            No. Y grid cells (NY)      No default     ! NY =   160  !

     Grid spacing (DGRIDKM)            No default     ! DGRIDKM = 0.25 !
                                       Units: km

     Reference grid coordinate of
     SOUTHWEST corner of grid cell (1,1)

        X coordinate (XORIGKM)         No default     ! XORIGKM = 662.536 !
        Y coordinate (YORIGKM)         No default     ! YORIGKM = 4845.000 !
                                       Units: km


   Vertical grid definition:
     -------------------------

        No. of vertical layers (NZ)    No default     ! NZ =  8  !

        Cell face height in arbitrary
        vertical grid (ZFACE(NZ+1))    No defaults
                                       Units: m
        ! ZFACE = 0.,20.,50.,100.,200.,500.,1000.,2000.,3300. !

!END!


------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output Options
--------------


    DISK OUTPUT OPTION

       Save met. fields in an unformatted
       output file ?              (LSAVE)  Default: T     ! LSAVE = T !
       (F = Do not save, T = Save)

       Type of unformatted output file:
       (IFORMO)                            Default: 1    ! IFORMO =  1  !

            1 = CALPUFF/CALGRID type file (CALMET.DAT)
            2 = MESOPUFF-II type file     (PACOUT.DAT)


    LINE PRINTER OUTPUT OPTIONS:

       Print met. fields ?  (LPRINT)       Default: F     ! LPRINT = F !
```

```
(F = Do not print, T = Print)
(NOTE: parameters below control which
       met. variables are printed)

Print interval
(IPRINF) in hours                    Default: 1     ! IPRINF =  1  !
(Meteorological fields are printed
 every  1  hours)


Specify which layers of U, V wind component
to print (IUVOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T)        Defaults: NZ*0
! IUVOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !
------------------------


Specify which levels of the W wind component to print
(NOTE: W defined at TOP cell face --  10  values)
(IWOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)
-----------------------------------
                                     Defaults: NZ*0
 ! IWOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !


Specify which levels of the 3-D temperature field to print
(ITOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)
-----------------------------------
                                     Defaults: NZ*0
 ! ITOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !

Specify which meteorological fields
to print
(used only if LPRINT=T)              Defaults: 0 (all variables)
------------------------


  Variable            Print ?
                 (0 = do not print,
                  1 = print)
  --------        ------------------

!  STABILITY  =          0           ! - PGT stability class
!  USTAR      =          0           ! - Friction velocity
!  MONIN      =          0           ! - Monin-Obukhov length
!  MIXHT      =          0           ! - Mixing height
!  WSTAR      =          0           ! - Convective velocity scale
!  PRECIP     =          0           ! - Precipitation rate
!  SENSHEAT   =          0           ! - Sensible heat flux
!  CONVZI     =          0           ! - Convective mixing ht.


Testing and debug print options for micrometeorological module

   Print input meteorological data and
   internal variables (LDB)          Default: F       ! LDB = F !
   (F = Do not print, T = print)
   (NOTE: this option produces large amounts of output)

   First time step for which debug data
   are printed (NN1)                 Default: 1       ! NN1 =  1  !
```

```
          Last time step for which debug data
          are printed (NN2)                Default: 1       ! NN2 =  1  !

          Print distance to land
          internal variables (LDBCST)      Default: F       ! LDBCST = F !
          (F = Do not print, T = print)
          (Output in .GRD file DCST.GRD, defined in input group 0)

       Testing and debug print options for wind field module
       (all of the following print options control output to
        wind field module's output files: TEST.PRT, TEST.OUT,
        TEST.KIN, TEST.FRD, and TEST.SLP)

          Control variable for writing the test/debug
          wind fields to disk files (IOUTD)
          (0=Do not write, 1=write)        Default: 0       ! IOUTD =  0  !

          Number of levels, starting at the surface,
          to print (NZPRN2)                Default: 1       ! NZPRN2 =  0  !

          Print the INTERPOLATED wind components ?
          (IPR0) (0=no, 1=yes)             Default: 0       !  IPR0 =  0  !

          Print the TERRAIN ADJUSTED surface wind
          components ?
          (IPR1) (0=no, 1=yes)             Default: 0       !  IPR1 =  0  !

          Print the SMOOTHED wind components and
          the INITIAL DIVERGENCE fields ?
          (IPR2) (0=no, 1=yes)             Default: 0       !  IPR2 =  0  !

          Print the FINAL wind speed and direction
          fields ?
          (IPR3) (0=no, 1=yes)             Default: 0       !  IPR3 =  0  !

          Print the FINAL DIVERGENCE fields ?
          (IPR4) (0=no, 1=yes)             Default: 0       !  IPR4 =  0  !

          Print the winds after KINEMATIC effects
          are added ?
          (IPR5) (0=no, 1=yes)             Default: 0       !  IPR5 =  0  !

          Print the winds after the FROUDE NUMBER
          adjustment is made ?
          (IPR6) (0=no, 1=yes)             Default: 0       !  IPR6 =  0  !

          Print the winds after SLOPE FLOWS
          are added ?
          (IPR7) (0=no, 1=yes)             Default: 0       !  IPR7 =  0  !

          Print the FINAL wind field components ?
          (IPR8) (0=no, 1=yes)             Default: 0       !  IPR8 =  0  !

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 4 -- Meteorological data options
--------------

    NO OBSERVATION MODE              (NOOBS)  Default: 0     ! NOOBS =  1   !
          0 = Use surface, overwater, and upper air stations
          1 = Use surface and overwater stations (no upper air observations)
              Use MM4/MM5/3D for upper air data
```

```
          2 = No surface, overwater, or upper air observations
              Use MM4/MM5/3D for surface, overwater, and upper air data

    NUMBER OF SURFACE & PRECIP. METEOROLOGICAL STATIONS

       Number of surface stations   (NSSTA)  No default     ! NSSTA =  8  !

       Number of precipitation stations
       (NPSTA=-1: flag for use of MM5/3D precip data)
                                    (NPSTA)  No default     ! NPSTA =  -1  !

    CLOUD DATA OPTIONS
       Output option - output a CLOUD.DAT file (yes or no)
       0=no, 1=yes
                                  (ICLDOUT) Default:999      ! ICLDOUT = 0  !

       Method to compute cloud fields:
                                  (MCLOUD)  Default: 999     ! MCLOUD =  1  !
       MCLOUD = 1 - Clouds data generated from surface observations
       MCLOUD = 2 - Gridded CLOUD.DAT read from CLOUD.DAT file (no output
                    is possible since already exist)
       MCLOUD = 3 - Gridded cloud cover from Prognostic Rel. Humidity
                    at 850mb (Teixera)
       MCLOUD = 4 - Gridded cloud cover from Prognostic Rel. Humidity
                    at all levels (MM5toGrads algorithm)

    FILE FORMATS

       Surface meteorological data file format
                                  (IFORMS)  Default: 2     ! IFORMS =  2  !
       (1 = unformatted (e.g., SMERGE output))
       (2 = formatted   (free-formatted user input))

       Precipitation data file format
                                  (IFORMP)  Default: 2     ! IFORMP =  2  !
       (1 = unformatted (e.g., PMERGE output))
       (2 = formatted   (free-formatted user input))

       Cloud data file format
                                  (IFORMC)  Default: 2     ! IFORMC =  2  !
       (1 = unformatted - CALMET unformatted output)
       (2 = formatted   - free-formatted CALMET output or user input)

!END!


------------------------------------------------------------------------------

INPUT GROUP: 5 -- Wind Field Options and Parameters
--------------


    WIND FIELD MODEL OPTIONS
       Model selection variable (IWFCOD)     Default: 1      ! IWFCOD =  1  !
          0 = Objective analysis only
          1 = Diagnostic wind module

       Compute Froude number adjustment
       effects ? (IFRADJ)                    Default: 1      ! IFRADJ =  1  !
       (0 = NO, 1 = YES)

       Compute kinematic effects ? (IKINE)   Default: 0      ! IKINE  =  0  !
       (0 = NO, 1 = YES)

       Use O'Brien procedure for adjustment
       of the vertical velocity ? (IOBR)     Default: 0      ! IOBR =  0  !
```

```
      (0 = NO, 1 = YES)

      Compute slope flow effects ? (ISLOPE) Default: 1      ! ISLOPE  =  1  !
      (0 = NO, 1 = YES)

      Extrapolate surface wind observations
      to upper layers ? (IEXTRP)            Default: -4     ! IEXTRP = -4  !
      (1 = no extrapolation is done,
       2 = power law extrapolation used,
       3 = user input multiplicative factors
           for layers 2 - NZ used (see FEXTRP array)
       4 = similarity theory used
       -1, -2, -3, -4 = same as above except layer 1 data
           at upper air stations are ignored

      Extrapolate surface winds even
      if calm? (ICALM)                      Default: 0      ! ICALM  =  0  !
      (0 = NO, 1 = YES)

      Layer-dependent biases modifying the weights of
      surface and upper air stations (BIAS(NZ))
        -1<=BIAS<=1
      Negative BIAS reduces the weight of upper air stations
        (e.g. BIAS=-0.1 reduces the weight of upper air stations
      by 10%; BIAS= -1, reduces their weight by 100 %)
      Positive BIAS reduces the weight of surface stations
        (e.g. BIAS= 0.2 reduces the weight of surface stations
      by 20%; BIAS=1 reduces their weight by 100%)
      Zero BIAS leaves weights unchanged (1/R**2 interpolation)
      Default: NZ*0
                             ! BIAS =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !

      Minimum distance from nearest upper air station
      to surface station for which extrapolation
      of surface winds at surface station will be allowed
      (RMIN2: Set to -1 for IEXTRP = 4 or other situations
       where all surface stations should be extrapolated)
                                            Default: 4.     ! RMIN2 = -1.0 !

      Use gridded prognostic wind field model
      output fields as input to the diagnostic
      wind field model (IPROG)              Default: 0      ! IPROG =  14  !
      (0 = No, [IWFCOD = 0 or 1]
       1 = Yes, use CSUMM prog. winds as Step 1 field, [IWFCOD = 0]
       2 = Yes, use CSUMM prog. winds as initial guess field [IWFCOD = 1]
       3 = Yes, use winds from MM4.DAT file as Step 1 field [IWFCOD = 0]
       4 = Yes, use winds from MM4.DAT file as initial guess field [IWFCOD = 1]
       5 = Yes, use winds from MM4.DAT file as observations [IWFCOD = 1]
       13 = Yes, use winds from MM5/3D.DAT file as Step 1 field [IWFCOD = 0]
       14 = Yes, use winds from MM5/3D.DAT file as initial guess field [IWFCOD = 1]
       15 = Yes, use winds from MM5/3D.DAT file as observations [IWFCOD = 1]

      Timestep (seconds) of the prognostic
      model input data   (ISTEPPGS)        Default: 3600    ! ISTEPPGS =  3600   !

      Use coarse CALMET fields as initial guess fields (IGFMET)
      (overwrites IGF based on prognostic wind fields if any)
                                            Default: 0      ! IGFMET =  0  !

   RADIUS OF INFLUENCE PARAMETERS

      Use varying radius of influence       Default: F      ! LVARY =  F!
      (if no stations are found within RMAX1,RMAX2,
       or RMAX3, then the closest station will be used)

      Maximum radius of influence over land
```

```
      in the surface layer (RMAX1)          No default      ! RMAX1 = 30. !
                                            Units: km
      Maximum radius of influence over land
      aloft (RMAX2)                         No default      ! RMAX2 = 30. !
                                            Units: km
      Maximum radius of influence over water
      (RMAX3)                               No default      ! RMAX3 = 128. !
                                            Units: km


   OTHER WIND FIELD INPUT PARAMETERS

      Minimum radius of influence used in
      the wind field interpolation (RMIN)   Default: 0.1    ! RMIN = 0.1 !
                                            Units: km
      Radius of influence of terrain
      features (TERRAD)                     No default      ! TERRAD = 2. !

                                            Units: km
      Relative weighting of the first
      guess field and observations in the
      SURFACE layer (R1)                    No default      ! R1 = 2. !
      (R1 is the distance from an           Units: km
      observational station at which the
      observation and first guess field are
      equally weighted)

      Relative weighting of the first
      guess field and observations in the
      layers ALOFT (R2)                     No default      ! R2 = 2. !
      (R2 is applied in the upper layers    Units: km
      in the same manner as R1 is used in
      the surface layer).

      Relative weighting parameter of the
      prognostic wind field data (RPROG)    No default      ! RPROG = 0. !
      (Used only if IPROG = 1)              Units: km
      ------------------------

      Maximum acceptable divergence in the
      divergence minimization procedure
      (DIVLIM)                              Default: 5.E-6  ! DIVLIM= 5.0E-06 !

      Maximum number of iterations in the
      divergence min. procedure (NITER)     Default: 50     ! NITER =  50  !

      Number of passes in the smoothing
      procedure (NSMTH(NZ))
      NOTE: NZ values must be entered
           Default: 2,(mxnz-1)*4 ! NSMTH =
 2 ,  4 ,  4 ,  4 ,  4 ,  4 ,  4 ,  4 ,  4 ,  4  !

      Maximum number of stations used in
      each layer for the interpolation of
      data to a grid point (NINTR2(NZ))
      NOTE: NZ values must be entered       Default: 99.    ! NINTR2 = 99 !

      Critical Froude number (CRITFN)       Default: 1.0    ! CRITFN = 1. !

      Empirical factor controlling the
      influence of kinematic effects
      (ALPHA)                               Default: 0.1    ! ALPHA = 0.1 !

      Multiplicative scaling factor for
      extrapolation of surface observations
      to upper layers (FEXTR2(NZ))          Default: NZ*0.0
```

```
      ! FEXTR2 = 0., 0., 0., 0., 0., 0., 0., 0., 0., 0. !
      (Used only if IEXTRP = 3 or -3)


   BARRIER INFORMATION

      Number of barriers to interpolation
      of the wind fields (NBAR)             Default: 0      ! NBAR =  0  !

      Level (1 to NZ) up to which barriers
      apply (KBAR)                          Default: NZ     ! KBAR =  8  !

      THE FOLLOWING 4 VARIABLES ARE INCLUDED
      ONLY IF NBAR > 0
      NOTE: NBAR values must be entered     No defaults
            for each variable               Units: km

         X coordinate of BEGINNING
         of each barrier (XBBAR(NBAR))      ! XBBAR = 0. !
         Y coordinate of BEGINNING
         of each barrier (YBBAR(NBAR))      ! YBBAR = 0. !

         X coordinate of ENDING
         of each barrier (XEBAR(NBAR))      ! XEBAR = 0. !
         Y coordinate of ENDING
         of each barrier (YEBAR(NBAR))      ! YEBAR = 0. !


   DIAGNOSTIC MODULE DATA INPUT OPTIONS

      Surface temperature (IDIOPT1)         Default: 0      ! IDIOPT1 =  0  !
         0 = Compute internally from
             hourly surface observations or prognostic fields
         1 = Read preprocessed values from
             a data file (DIAG.DAT)

         Surface met. station to use for
         the surface temperature (ISURFT)    Default: -1    ! ISURFT =  -1  !
         (Must be a value from 1 to NSSTA
         or -1 to use 2-D spatially varying
            surface temperatures).
         or -2 to use a domain-average prognostic
         lapse rate (only with ITPROG=2)
         (Used only if IDIOPT1 = 0)
         --------------------------

         Temperature lapse rate used in the    Default: 0     ! IDIOPT2 =  0  !
         computation of terrain-induced
         circulations (IDIOPT2)
         0 = Compute internally from (at least) twice-daily
             upper air observations or prognostic fields
         1 = Read hourly preprocessed values
             from a data file (DIAG.DAT)

         Upper air station to use for
         the domain-scale lapse rate (IUPT) Default: -1   ! IUPT   =  -1  !
         (Must be a value from 1 to NUSTA
         or -1 to use 2-D spatially varying lapse rate)
         or -2 to use a domain-average prognostic
         lapse rate (only with ITPROG>0)
         (Used only if IDIOPT2 = 0)
         --------------------------

         Depth through which the domain-scale
         lapse rate is computed (ZUPT)      Default: 200.  ! ZUPT = 200. !
         (Used only if IDIOPT2 = 0)         Units: meters
```

```
   --------------------------

Initial Guess Field Winds
(IDIOPT3)                              Default: 0     ! IDIOPT3 =  0  !
   0 = Compute internally from
       observations or prognostic wind fields
   1 = Read hourly preprocessed domain-average wind values
       from a data file (DIAG.DAT)

   Upper air station to use for
   the initial guess winds (IUPWND)    Default: -1    ! IUPWND = -1  !
   (Must be a value from -1 to NUSTA, with
   -1 indicating 3-D initial guess fields,
   and IUPWND>1 domain-scaled (i.e. constant) IGF
   (Used only if IDIOPT3 = 0 and noobs=0)
   ---------------------------------------

   Bottom and top of layer through
   which the domain-scale winds
   are computed
   (ZUPWND(1), ZUPWND(2))        Defaults: 1., 1000. ! ZUPWND= 1., 1000. !
   (Used only if IDIOPT3 = 0, NOOBS>0 and IUPWND>0)    Units: meters
   --------------------------

Observed surface wind components
for wind field module (IDIOPT4)  Default: 0     ! IDIOPT4 =  0  !
   0 = Read WS, WD from a surface
       data file (SURF.DAT)
   1 = Read hourly preprocessed U, V from
       a data file (DIAG.DAT)

Observed upper air wind components
for wind field module (IDIOPT5)  Default: 0     ! IDIOPT5 =  0  !
   0 = Read WS, WD from an upper
       air data file (UP1.DAT, UP2.DAT, etc.)
   1 = Read hourly preprocessed U, V from
       a data file (DIAG.DAT)

LAKE BREEZE INFORMATION

   Use Lake Breeze Module  (LLBREZE)
                                   Default: F      ! LLBREZE = F !

    Number of lake breeze regions (NBOX)            ! NBOX =  0  !

 X Grid line 1 defining the region of interest
                                                   ! XG1 = 0. !
 X Grid line 2 defining the region of interest
                                                   ! XG2 = 0. !
 Y Grid line 1 defining the region of interest
                                                   ! YG1 = 0. !
 Y Grid line 2 defining the region of interest
                                                   ! YG2 = 0. !

  X Point defining the coastline (Straight line)
            (XBCST)  (KM)   Default: none    ! XBCST = 0. !

  Y Point defining the coastline (Straight line)
            (YBCST)  (KM)   Default: none    ! YBCST = 0. !

  X Point defining the coastline (Straight line)
            (XECST)  (KM)   Default: none    ! XECST = 0. !

  Y Point defining the coastline (Straight line)
            (YECST)  (KM)   Default: none    ! YECST = 0. !
```

```
       Number of stations in the region     Default: none ! NLB =  0 !
       (Surface stations + upper air stations)

       Station ID's  in the region   (METBXID(NLB))
       (Surface stations first, then upper air stations)
         ! METBXID =  0 !

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 6 -- Mixing Height, Temperature and Precipitation Parameters
--------------

    EMPIRICAL MIXING HEIGHT CONSTANTS

       Neutral, mechanical equation
       (CONSTB)                              Default: 1.41   ! CONSTB = 1.41 !
       Convective mixing ht. equation
       (CONSTE)                              Default: 0.15   ! CONSTE = 0.15 !
       Stable mixing ht. equation
       (CONSTN)                              Default: 2400.  ! CONSTN = 2400.!
       Overwater mixing ht. equation
       (CONSTW)                              Default: 0.16   ! CONSTW = 0.16 !
       Absolute value of Coriolis
       parameter (FCORIOL)                   Default: 1.E-4  ! FCORIOL = 1.0E-04!
                                             Units: (1/s)

    SPATIAL AVERAGING OF MIXING HEIGHTS

       Conduct spatial averaging
       (IAVEZI)  (0=no, 1=yes)               Default: 1      ! IAVEZI =  1  !

       Max. search radius in averaging
       process (MNMDAV)                      Default: 1      ! MNMDAV =  10  !
                                             Units: Grid
                                                    cells
       Half-angle of upwind looking cone
       for averaging (HAFANG)                Default: 30.    ! HAFANG = 30. !
                                             Units: deg.
       Layer of winds used in upwind
       averaging (ILEVZI)                    Default: 1      ! ILEVZI =  1  !
       (must be between 1 and NZ)


    CONVECTIVE MIXING HEIGHT OPTIONS:
       Method to compute the convective
       mixing height(IMIHXH)                 Default: 1      ! IMIXH =  1  !
           1: Maul-Carson for land and water cells
          -1: Maul-Carson for land cells only -
              OCD mixing height overwater
           2: Batchvarova and Gryning for land and water cells
          -2: Batchvarova and Gryning for land cells only
              OCD mixing height overwater

       Threshold buoyancy flux required to
       sustain convective mixing height growth
       overland (THRESHL)                    Default: 0.0   ! THRESHL = 0.0 !
       (expressed as a heat flux             units: W/m3
        per meter of boundary layer)


       Threshold buoyancy flux required to
       sustain convective mixing height growth
```

```
   overwater (THRESHW)                    Default: 0.05   ! THRESHW = 0.05 !
   (expressed as a heat flux              units: W/m3
    per meter of boundary layer)


   Flag to allow relaxation of convective mixing height
   to equilibrium value when  0<QH<THRESHL (overland)
                          or  0<QH<THRESHW (overwater)
   (IZICRLX)                              Default: 1      ! IZICRLX =  1  !
      0 : do NOT use convective mixing height relaxation
          to equilibrium value (treatment identical to CALMET v5.8)
      1 : use convective mixing height relaxation
          to equilibrium value

   Relaxation time of convective mixing height to
   equilibrium value when  0<QH<THRESHL (overland)
                       or  0<QH<THRESHW (overwater)
   (Used only if IZICRLX = 1 and  TZICRLX must be >= 1.)
   (TZICRLX)                              Default: 800.   ! TZICRLX =  800.  !
                                          Units: seconds

   Option for overwater lapse rates used
   in convective mixing height growth
   (ITWPROG)                              Default: 0      ! ITWPROG =  0  !
   0 : use SEA.DAT lapse rates and deltaT (or assume neutral
       conditions if missing)
   1 : use prognostic lapse rates (only if IPROG>2)
       and SEA.DAT deltaT (or neutral if missing)
   2 : use prognostic lapse rates and prognostic delta T
       (only if iprog>12 and 3D.DAT version# 2.0 or higher)

   Land Use category ocean in 3D.DAT datasets
   (ILUOC3D)                              Default: 16     ! ILUOC3D =  16  !
   Note: if 3D.DAT from MM5 version 3.0, iluoc3d = 16
         if MM4.DAT,           typically iluoc3d = 7


OTHER MIXING HEIGHT VARIABLES

   Minimum potential temperature lapse
   rate in the stable layer above the
   current convective mixing ht.          Default: 0.001  ! DPTMIN = 0.001 !
   (DPTMIN)                               Units: deg. K/m
   Depth of layer above current conv.
   mixing height through which lapse      Default: 200.   ! DZZI = 200. !
   rate is computed (DZZI)                Units: meters

   Minimum overland mixing height         Default:  50.   ! ZIMIN = 50. !
   (ZIMIN)                                Units: meters
   Maximum overland mixing height         Default: 3000.  ! ZIMAX = 2500. !
   (ZIMAX)                                Units: meters
   Minimum overwater mixing height        Default:   50.  ! ZIMINW = 50. !
   (ZIMINW) -- (Not used if observed      Units: meters
   overwater mixing hts. are used)
   Maximum overwater mixing height        Default: 3000.  ! ZIMAXW = 2500. !
   (ZIMAXW) -- (Not used if observed      Units: meters
   overwater mixing hts. are used)


OVERWATER SURFACE FLUXES METHOD and PARAMETERS
      (ICOARE)                            Default: 10      ! ICOARE =  10   !
       0: original deltaT method (OCD)
      10: COARE with no wave parameterization (jwave=0, Charnock)
      11: COARE with wave option jwave=1 (Oost et al.)
          and default wave properties
     -11: COARE with wave option jwave=1 (Oost et al.)
```

```
            and observed wave properties (must be in SEA.DAT files)
        12: COARE with wave option 2 (Taylor and Yelland)
             and default wave properties
       -12: COARE with wave option 2 (Taylor and Yelland)
            and observed wave properties (must be in SEA.DAT files)


        Note:  When ICOARE=0, similarity wind profile stability PSI functions
               based on Van Ulden and Holtslag (1985) are substituted for
               later formulations used with the COARE module, and temperatures
               used for surface layer parameters are obtained from either the
               nearest surface station temperature or prognostic model 2D
               temperatures (if ITPROG=2).



        Coastal/Shallow water length scale (DSHELF)
        (for modified z0 in shallow water)
        ( COARE fluxes only)
                                      Default : 0.        ! DSHELF = 0. !
                                      units: km

         COARE warm layer computation (IWARM)             ! IWARM =  0   !
         1: on - 0: off (must be off if SST measured with
         IR radiometer)               Default: 0

         COARE cool skin layer computation (ICOOL)        ! ICOOL =  0   !
         1: on - 0: off (must be off if SST measured with
         IR radiometer)               Default: 0

    RELATIVE HUMIDITY PARAMETERS

       3D relative humidity from observations or
       from prognostic data? (IRHPROG)       Default:0        ! IRHPROG =  0   !

          0 = Use RH from SURF.DAT file
              (only if NOOBS = 0,1)
          1 = Use prognostic RH
              (only if NOOBS = 0,1,2)

    TEMPERATURE PARAMETERS

       3D temperature from observations or
       from prognostic data? (ITPROG)        Default:0        ! ITPROG =  1   !

          0 = Use Surface and upper air stations
              (only if NOOBS = 0)
          1 = Use Surface stations (no upper air observations)
              Use MM5/3D for upper air data
              (only if NOOBS = 0,1)
          2 = No surface or upper air observations
              Use MM5/3D for surface and upper air data
              (only if NOOBS = 0,1,2)

       Interpolation type
       (1 = 1/R ; 2 = 1/R**2)                Default:1         ! IRAD =  1  !

       Radius of influence for temperature
       interpolation (TRADKM)                Default: 500.     ! TRADKM = 20. !
                                             Units: km

       Maximum Number of stations to include
       in temperature interpolation (NUMTS)  Default: 5        ! NUMTS = 5  !

       Conduct spatial averaging of temp-
       eratures (IAVET)  (0=no, 1=yes)       Default: 1        ! IAVET =  1  !
```

```
       (will use mixing ht MNMDAV,HAFANG
        so make sure they are correct)

       Default temperature gradient          Default: -.0098   ! TGDEFB = -0.0098 !
       below the mixing height over          Units: K/m
       water (TGDEFB)

       Default temperature gradient          Default: -.0045   ! TGDEFA = -0.0045 !
       above the mixing height over          Units: K/m
       water (TGDEFA)

       Beginning (JWAT1) and ending (JWAT2)
       land use categories for temperature                     ! JWAT1 =  999  !
       interpolation over water -- Make                        ! JWAT2 =  999  !
       bigger than largest land use to disable

   PRECIP INTERPOLATION PARAMETERS

       Method of interpolation (NFLAGP)      Default: 2       ! NFLAGP =  2  !
        (1=1/R,2=1/R**2,3=EXP/R**2)
       Radius of Influence  (SIGMAP)         Default: 100.0   ! SIGMAP = 50. !
        (0.0 => use half dist. btwn          Units: km
         nearest stns w & w/out
         precip when NFLAGP = 3)
       Minimum Precip. Rate Cutoff (CUTP)    Default: 0.01    ! CUTP = 0.01 !
        (values < CUTP = 0.0 mm/hr)          Units: mm/hr
!END!


-------------------------------------------------------------------------------

INPUT GROUP: 7 -- Surface meteorological station parameters
--------------

     SURFACE STATION VARIABLES
     (One record per station --  8  records in all)


             1     2
         Name   ID            X coord.   Y coord.   Time   Anem.
                               (km)       (km)      zone   Ht.(m)
        ---------------------------------------------------------
! SS1  ='COUR'    111111      680.050     4860.016    5    20  !
! SS2  ='RUND'    222222      681.958     4861.864    5    7.9 !
! SS3  ='OSHA'    071697      668.892     4865.761    5    10  !
! SS4  ='COBO'    071431      728.587     4870.940    5    10  !
! SS5  ='BUTT'    071639      631.101     4857.709    5    10  !
! SS6  ='BBTA'    071265      629.393     4831.751    5    10  !
! SS7  ='YYZA'    071624      610.389     4836.873    5    10  !
! SS8  ='TREN'    071621      777.397     4890.676    5    10  !



-------------------
      1
        Four character string for station name
        (MUST START IN COLUMN 9)

      2
        Six digit integer for station ID

!END!


-------------------------------------------------------------------------------
```

```
INPUT GROUP: 8 -- Upper air meteorological station parameters
--------------

     UPPER AIR STATION VARIABLES
     (One record per station --  3  records in all)

             1     2
         Name    ID      X coord.   Y coord.  Time zone
                            (km)       (km)
        ----------------------------------------------

-------------------
      1
        Four character string for station name
        (MUST START IN COLUMN 9)

      2
        Five digit integer for station ID

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 9 -- Precipitation station parameters
--------------

     PRECIPITATION STATION VARIABLES
     (One record per station --  16  records in all)
     (NOT INCLUDED IF NPSTA = 0)

            1          2
         Name   Station    X coord.  Y coord.
                  Code       (km)      (km)
         -------------------------------------



-------------------
      1
        Four character string for station name
        (MUST START IN COLUMN 9)

      2
        Six digit station code composed of state
        code (first 2 digits) and station ID (last
        4 digits)

!END!
```

```
CALPUFF.INP     7.0             Groups 0f,0g added; new emission scaling
19117255 DYEC 2021 AQIA
CALPUFF Input File for DYEC 2021 Environmental Screening Assessment
(140 ktpa scenario - Unit Emission Rate )

---------------- Run title (3 lines) ----------------------------------------
   MODEL:  Version TNG
SOFTWARE:  CALApps v2.0197 (Beta) - September 22, 2014
------------------------------------------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names
--------------

Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =             *
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =CALPUFF.LST  !
CONC.DAT      output   ! CONDAT =CALPUFF.CON  !
DFLX.DAT      output   * DFDAT  =             *
WFLX.DAT      output   * WFDAT  =             *

VISB.DAT      output   * VISDAT =             *
TK2D.DAT      output   * T2DDAT =             *
RHO2D.DAT     output   * RHODAT =             *
RESTARTE.DAT  output   * RSTARTE=             *
------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =    *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
AUX           input    ! AUXEXT =    aux!
(Extension added to METDAT filename(s) for files
 with auxiliary 2D and 3D data)
H2O2.DAT      input    * H2O2DAT=             *
NH3Z.DAT      input    * NH3ZDAT=             *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    ! CSTDAT=../../COAST-V2.DAT   !
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
RISE.DAT      output   * RISDAT=             *
PFTRAK.DAT    output   * TRKDAT=             *
------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = F !
         F = UPPER CASE
```

```
NOTE: (1) file/path names can be up to 132 characters in length


Provision for multiple CALMET Domains and files
-------------------------------------------------------

     Number of CALMET.DAT Domains (NMETDOM)
                                   Default: 1       ! NMETDOM =   1   !

     Number of CALMET.DAT files (NMETDAT)
     (Total for ALL Domains)
                                   Default: 1       ! NMETDAT =   12   !

Variable point/area/volume/flare emissions input files
--------------------------------------------------------

     Number of POINT source files (PTEMARB.DAT)
     with time-varying data (NPTDAT)
                                   Default: 0       ! NPTDAT =  0   !

     Number of BUOYANT AREA source files (BAEMARB.DAT)
     with time-varying data (NARDAT)
                                   Default: 0       ! NARDAT =  0   !

     Number of VOLUME source files (VOLEMARB.DAT)
     with time-varying data (NVOLDAT)
                                   Default: 0       ! NVOLDAT =  0  !

     Number of FLARE source files (FLEMARB.DAT)
     with time-varying data (NFLDAT)
                                   Default: 0       ! NFLDAT   =  0 !

     Number of ROAD source files (RDEMARB.DAT)
     with time-varying data (NRDDAT)
                                   Default: 0       ! NRDDAT   =  0 !

     Number of BUOYANT LINE source files (LNEMARB.DAT)
     with time-varying data (NLNDAT)
                                   Default: 0       ! NLNDAT   =  0 !
     Note:  Only 1 BUOYANT LINE source file is allowed
     -----

!END!


-------------
Subgroup (0a)
-------------

  Provide a name for each CALMET domain if NMETDOM > 1
  Enter NMETDOM lines.
                                  a,b
Default Name             Domain Name
------------             ------------
 none                  * DOMAIN1=     *   *END*
 none                  * DOMAIN2=     *   *END*
 none                  * DOMAIN3=     *   *END*


  The following CALMET.DAT filenames are processed in sequence
  if NMETDAT > 1

  Enter NMETDAT lines, 1 line for each file name.

                                  a,c,d
Default Name  Type          File Name
```

```
------------  ----          ---------
 none         input    ! METDAT=../CALMET_W1.DAT!   !END!
 none         input    ! METDAT=../CALMET_W2.DAT!   !END!
 none         input    ! METDAT=../CALMET_SP3.DAT!  !END!
 none         input    ! METDAT=../CALMET_SP4.DAT!   !END!
 none         input    ! METDAT=../CALMET_SP5.DAT!   !END!
 none         input    ! METDAT=../CALMET_SU6.DAT!  !END!
 none         input    ! METDAT=../CALMET_SU7.DAT!   !END!
 none         input    ! METDAT=../CALMET_SU8.DAT!   !END!
 none         input    ! METDAT=../CALMET_F9.DAT!   !END!
 none         input    ! METDAT=../CALMET_F10.DAT!   !END!
 none         input    ! METDAT=../CALMET_F11.DAT!   !END!
 none         input    ! METDAT=../CALMET_W12.DAT!  !END!

-------------
    a
     The name for each CALMET domain and each CALMET.DAT file is treated
     as a separate input subgroup and therefore must end with an input
     group terminator.
    b
     Use DOMAIN1= to assign the name for the outermost CALMET domain.
     Use DOMAIN2= to assign the name for the next inner CALMET domain.
     Use DOMAIN3= to assign the name for the next inner CALMET domain, etc.
      ------------------------------------------------------------------
      |   When inner domains with equal resolution (grid-cell size)      |
      |   overlap, the data from the FIRST such domain in the list will  |
      |   be used if all other criteria for choosing the controlling     |
      |   grid domain are inconclusive.                                  |
      ------------------------------------------------------------------
    c
     Use METDAT1= to assign the file names for the outermost CALMET domain.
     Use METDAT2= to assign the file names for the next inner CALMET domain.
     Use METDAT3= to assign the file names for the next inner CALMET domain, etc.
    d
     The filenames for each domain must be provided in sequential order


-------------
Subgroup (0b) - PTEMARB.DAT files
-------------

  POINT Source File Names
  The following PTEMARB.DAT filenames are processed if NPTDAT>0
  A total of NPTDAT lines is expected with one file name assigned per line
  Each line is treated as an input group and must terminate with END
  (surrounded by delimiters)
  (Each file contains emissions parameters for the entire period modeled
   for 1 or more sources)

Default Name  Type          File Name
------------  ----          ---------
 none         input       * PTDAT=     *   *END*


-------------
Subgroup (0c) - BAEMARB.DAT files
-------------

  BUOYANT AREA Source File Names
  The following BAEMARB.DAT filenames are processed if NARDAT>0
  A total of NARDAT lines is expected with one file name assigned per line
  Each line is treated as an input group and must terminate with END
  (surrounded by delimiters)
  (Each file contains emissions parameters for the entire period modeled
   for 1 or more sources)
```

```
Default Name  Type          File Name
------------  ----          ---------
 none         input       * ARDAT=     *   *END*


-------------
Subgroup (0d) - VOLEMARB.DAT files
-------------

  VOLUME Source File Names
  The following VOLEMARB.DAT filenames are processed if NVOLDAT>0
  A total of NVOLDAT lines is expected with one file name assigned per line
  Each line is treated as an input group and must terminate with END
   (surrounded by delimiters)
   (Each file contains emissions parameters for the entire period modeled
    for 1 or more sources)

Default Name  Type          File Name
------------  ----          ---------
 none         input       * VOLDAT=     *   *END*


-------------
Subgroup (0e) - FLEMARB.DAT files
-------------

  FLARE Source File Names
  The following FLEMARB.DAT filenames are processed if NFLDAT>0
  A total of NFLDAT lines is expected with one file name assigned per line
  Each line is treated as an input group and must terminate with END
   (surrounded by delimiters)
   (Each file contains emissions parameters for the entire period modeled
    for 1 or more sources)

Default Name  Type          File Name
------------  ----          ---------
 none         input       * FLDAT=     *   *END*


-------------
Subgroup (0f) - RDEMARB.DAT files
-------------

  ROAD Source File Names
  The following RDEMARB.DAT filenames are processed if NRDDAT>0
  A total of NRDDAT lines is expected with one file name assigned per line
  Each line is treated as an input group and must terminate with END
   (surrounded by delimiters)
   (Each file contains emissions parameters for the entire period modeled
    for 1 or more sources)

Default Name  Type          File Name
------------  ----          ---------
 none         input       * RDDAT=     *   *END*


-------------
Subgroup (0g) - LNEMARB.DAT file
-------------

  BUOYANT LINE Source File Name  (not more than 1)
  The following LNEMARB.DAT filename is processed if NLNDAT>0
  The assignment is treated as an input group and must terminate with END
   (surrounded by delimiters)

Default Name  Type          File Name
```

```
------------  ----          ---------
LNEMARB.DAT   input       * LNDAT=     *   *END*


--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

        METRUN = 0 - Run period explicitly defined below
        METRUN = 1 - Run all periods in met. file

     Starting date:    Year   (IBYR)  --    No default   ! IBYR  =  2014  !
                       Month  (IBMO)  --    No default   ! IBMO  =  1  !
                       Day    (IBDY)  --    No default   ! IBDY  =  1  !
     Starting time:    Hour   (IBHR)  --    No default   ! IBHR  =  0  !
                       Minute (IBMIN) --    No default   ! IBMIN =  0  !
                       Second (IBSEC) --    No default   ! IBSEC =  0  !

     Ending date:      Year   (IEYR)  --    No default   ! IEYR  =  2014  !
                       Month  (IEMO)  --    No default   ! IEMO  =  12  !
                       Day    (IEDY)  --    No default   ! IEDY  =  31  !
     Ending time:      Hour   (IEHR)  --    No default   ! IEHR  =  24  !
                       Minute (IEMIN) --    No default   ! IEMIN =  0  !
                       Second (IESEC) --    No default   ! IESEC =  0  !

     (These are only used if METRUN = 0)

     Base time zone:          (ABTZ)  --    No default   ! ABTZ= UTC-0500 !
      (character*8)
     The modeling domain may span multiple time zones.  ABTZ defines the
     base time zone used for the entire simulation.  This must match the
     base time zone of the meteorological data.
     Examples:
         Greenwich Mean Time (GMT) = UTC+0000
         EST                       = UTC-0500
         CST                       = UTC-0600
         MST                       = UTC-0700
         PST                       = UTC-0800
         Los Angeles, USA          = UTC-0800
         New York, USA             = UTC-0500
         Santiago, Chile           = UTC-0400
         UK                        = UTC+0000
         Western Europe            = UTC+0100
         Rome, Italy               = UTC+0100
         Cape Town, S.Africa       = UTC+0200
         Sydney, Australia         = UTC+1000

     Length of modeling time-step (seconds)
     Equal to update period in the primary
     meteorological data files, or an
     integer fraction of it (1/2, 1/3 ...)
     Must be no larger than 1 hour
     (NSECDT)                       Default:3600     ! NSECDT =  3600  !
                                    Units: seconds

     Number of chemical species (NSPEC)
                                    Default: 5       ! NSPEC =  1   !

     Number of chemical species
     to be emitted  (NSE)           Default: 3       ! NSE =  1   !

     Flag to stop run after
```

```
SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
(Used to allow checking
of the model inputs, files, etc.)
      ITEST = 1 - STOPS program after SETUP phase
      ITEST = 2 - Continues with execution of program
                  after SETUP

Restart Configuration:

   Control flag (MRESTART)      Default: 0       ! MRESTART =  0   !

      0 = Do not read or write a restart file
      1 = Read a restart file at the beginning of
          the run
      2 = Write a restart file during run
      3 = Read a restart file at beginning of run
          and write a restart file during run

   Number of periods in Restart
   output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

      0 = File written only at last period
     >0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
                                Default: 1       ! METFM =  1   !

      METFM = 1 - CALMET binary file (CALMET.MET)
      METFM = 2 - ISC ASCII file (ISCMET.MET)
      METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
      METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                  surface parameters file (SURFACE.DAT)
      METFM = 5 - AERMET tower file (PROFILE.DAT) and
                  surface parameters file (SURFACE.DAT)

Meteorological Profile Data Format (MPRFFM)
       (used only for METFM = 1, 2, 3)
                                Default: 1       ! MPRFFM =  1   !

      MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
      MPRFFM = 2 - AERMET tower file (PROFILE.DAT)


Sigma-y is adjusted by the factor (AVET/PGTIME)**0.2 to either
decrease it if the averaging time selected is less than the base
averaging time, or increase it if the averaging time is greater.
The base averaging time is denoted as PGTIME due to historical
reasons as this adjustment was originally applied to the PG sigma
option.  It is now applied to all dispersion options.
The factor is applied to the ambient turbulence sigma-v (m/s) and
does not alter buoyancy enhancement or far-field Heffter growth.

Averaging Time (minutes) (AVET)
                                Default: 60.0    ! AVET = 60. !
Base Averaging Time (minutes) (PGTIME)
                                Default: 60.0    ! PGTIME = 60. !


Output units for binary concentration and flux files
written in Dataset v2.2 or later formats
(IOUTU)                         Default: 1       ! IOUTU = 1 !
    1 = mass      -  g/m3 (conc) or g/m2/s (dep)
    2 = odour     -  odour_units (conc)
    3 = radiation -  Bq/m3 (conc) or Bq/m2/s (dep)
```

```
!END!

------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                    Default: 1     ! MGAUSS =  1   !
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                               Default: 3     ! MCTADJ =  3   !
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                           Default: 0     ! MCTSG =  0   !
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated slugs? (MSLUG)               Default: 0     ! MSLUG =  0   !
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled?
     (MTRANS)                               Default: 1     ! MTRANS =  1   !
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)             Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to compute plume rise for
     point sources not subject to building
     downwash? (MRISE)                      Default: 1     ! MRISE =   1  !
        1 = Briggs plume rise
        2 = Numerical plume rise

     Apply stack-tip downwash to FLARE sources?
     (MTIP_FL)                              Default: 0     ! MTIP_FL  =  0 !
        0 = no  (no stack-tip downwash)
        1 = yes (apply stack-tip downwash)

     Plume rise module for FLARE sources
     (MRISE_FL)                             Default: 2     ! MRISE_FL =  2 !
        1 = Briggs module
        2 = Numerical rise module

     Method used to simulate building
     downwash? (MBDW)                       Default: 1     ! MBDW =   2  !
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top (modified Briggs plume rise)?
     (MSHEAR)                               Default: 0     ! MSHEAR =  0  !
        0 = no  (i.e., vertical wind shear not modeled)
```

```
      1 = yes (i.e., vertical wind shear modeled)

   Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0  !
      0 = no (i.e., puffs not split)
      1 = yes (i.e., puffs are split)

   Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  0   !
      0 = chemical transformation not
          modeled
      1 = transformation rates computed
          internally (MESOPUFF II scheme)
      2 = user-specified transformation
          rates used
      3 = transformation rates computed
          internally (RIVAD/ARM3 scheme)
      4 = secondary organic aerosol formation
          computed (MESOPUFF II scheme for OH)
      5 = user-specified half-life with or
          without transfer to child species
      6 = transformation rates computed
          internally (Updated RIVAD scheme with
          ISORROPIA equilibrium)
      7 = transformation rates computed
          internally (Updated RIVAD scheme with
          ISORROPIA equilibrium and CalTech SOA)

   Aqueous phase transformation flag (MAQCHEM)
   (Used only if MCHEM = 6, or 7)        Default: 0     ! MAQCHEM =  0   !
      0 = aqueous phase transformation
          not modeled
      1 = transformation rates and wet
          scavenging coefficients adjusted
          for in-cloud aqueous phase reactions
          (adapted from RADM cloud model
           implementation in CMAQ/SCICHEM)

   Liquid Water Content flag (MLWC)
   (Used only if MAQCHEM = 1)            Default: 1     ! MLWC =  1   !
      0 = water content estimated from cloud cover
          and presence of precipitation
      1 = gridded cloud water data read from CALMET
          water content output files (filenames are
          the CALMET.DAT names PLUS the extension
          AUXEXT provided in Input Group 0)

   Wet removal modeled ? (MWET)          Default: 1     ! MWET =  0   !
      0 = no
      1 = yes

   Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  0   !
      0 = no
      1 = yes
      (dry deposition method specified
       for each species in Input Group 3)


   Gravitational settling (plume tilt)
   modeled ? (MTILT)                     Default: 0     ! MTILT =  0   !
      0 = no
      1 = yes
      (puff center falls at the gravitational
       settling velocity for 1 particle species)

   Restrictions:
       - MDRY  = 1
       - NSPEC = 1  (must be particle species as well)
```

```
    - sg    = 0  GEOMETRIC STANDARD DEVIATION in Group 8 is
                 set to zero for a single particle diameter

Method used to compute dispersion
coefficients (MDISP)                  Default: 3     ! MDISP =  2   !

   1 = dispersion coefficients computed from measured values
       of turbulence, sigma v, sigma w
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.
   5 = CTDM sigmas used for stable and neutral conditions.
       For unstable conditions, sigmas are computed as in
       MDISP = 3, described above.  MDISP = 5 assumes that
       measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3  !
   1 = use sigma-v or sigma-theta measurements
       from PROFILE.DAT to compute sigma-y
       (valid for METFM = 1, 2, 3, 4, 5)
   2 = use sigma-w measurements
       from PROFILE.DAT to compute sigma-z
       (valid for METFM = 1, 2, 3, 4, 5)
   3 = use both sigma-(v/theta) and sigma-w
       from PROFILE.DAT to compute sigma-y and sigma-z
       (valid for METFM = 1, 2, 3, 4, 5)
   4 = use sigma-theta measurements
       from PLMMET.DAT to compute sigma-y
       (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)                      Default: 3     ! MDISP2 =  3  !
(used only if MDISP = 1 or 5)
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY)                              Default: 0     ! MTAULY =  0  !
   0 = Draxler default 617.284 (s)
   1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
  10 < Direct user input (s)             -- e.g., 306.9


[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV)                             Default: 0     ! MTAUADV =  0  !
   0 = No turbulence advection
   1 = Computed (OPTION NOT IMPLEMENTED)
  10 < Direct user input (s)   -- e.g., 800
```

```
Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB)                              Default: 1     ! MCTURB =  1  !
   1 = Standard CALPUFF subroutines
   2 = AERMOD subroutines

PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0  !
(MROUGH)
   0 = no
   1 = yes

Partial plume penetration of          Default: 1     ! MPARTL =  1  !
elevated inversion modeled for
point sources?
(MPARTL)
   0 = no
   1 = yes

Partial plume penetration of          Default: 1     ! MPARTLBA =  1  !
elevated inversion modeled for
buoyant area sources?
(MPARTLBA)
   0 = no
   1 = yes

Strength of temperature inversion     Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
   0 = no (computed from measured/default gradients)
   1 = yes

PDF used for dispersion under convective conditions?
                                      Default: 0     ! MPDF =  1  !
(MPDF)
   0 = no
   1 = yes

Sub-Grid TIBL module used for shore line?
                                      Default: 0     ! MSGTIBL = 1  !
(MSGTIBL)
   0 = no
   1 = yes

Boundary conditions (concentration) modeled?
                                      Default: 0     ! MBCON = 0  !
(MBCON)
   0 = no
   1 = yes, using formatted BCON.DAT file
   2 = yes, using unformatted CONC.DAT file

Note:  MBCON > 0 requires that the last species modeled
       be 'BCON'.  Mass is placed in species BCON when
       generating boundary condition puffs so that clean
       air entering the modeling domain can be simulated
       in the same way as polluted air.  Specify zero
       emission of species BCON for all regular sources.

Individual source contributions saved?
                                      Default: 0     ! MSOURCE = 0  !
(MSOURCE)
   0 = no
   1 = yes
```

```
     Analyses of fogging and icing impacts due to emissions from
     arrays of mechanically-forced cooling towers can be performed
     using CALPUFF in conjunction with a cooling tower emissions
     processor (CTEMISS) and its associated postprocessors.  Hourly
     emissions of water vapor and temperature from each cooling tower
     cell are computed for the current cell configuration and ambient
     conditions by CTEMISS. CALPUFF models the dispersion of these
     emissions and provides cloud information in a specialized format
     for further analysis. Output to FOG.DAT is provided in either
     'plume mode' or 'receptor mode' format.

     Configure for FOG Model output?
                                          Default: 0     ! MFOG =  0   !
     (MFOG)
        0 = no
        1 = yes  - report results in PLUME Mode format
        2 = yes  - report results in RECEPTOR Mode format


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                       Default: 1     ! MREG =  0   !

        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
                       METFM    1 or 2
                       AVET     60. (min)
                       PGTIME   60. (min)
                       MGAUSS   1
                       MCTADJ   3
                       MTRANS   1
                       MTIP     1
                       MRISE    1
                       MCHEM    1 or 3 (if modeling SOx, NOx)
                       MWET     1
                       MDRY     1
                       MDISP    2 or 3
                       MPDF     0 if MDISP=3
                                1 if MDISP=2
                       MROUGH   0
                       MPARTL   1
                       MPARTLBA 0
                       SYTDEP   550. (m)
                       MHFTSZ   0
                       SVMIN    0.5 (m/s)


!END!


------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          UNIT !         !END!


                                                        Dry                OUTPUT GROUP
```

```
    SPECIES          MODELED          EMITTED       DEPOSITED                NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,                 (0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS        1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE   2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)     3= etc.)

!          UNIT  =         1,               1,           0,                 0   !


!END!

  Note:  The last species in (3a) must be 'BCON' when using the
         boundary condition option (MBCON > 0).  Species BCON should
         typically be modeled as inert (no chem transformation or
         removal).


-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.


-------------------------------------------------------------------------------


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = UTM  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  17   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 = 0N  !
```

```
     (RLON0)                    No Default      ! RLON0 = 0E  !

         TTM :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
                RLAT0 identifies latitude of tangent-point of mapping plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                    No Default      ! XLAT1 = 0N  !
     (XLAT2)                    No Default      ! XLAT2 = 0N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of the
     Earth known as the World Geodetic System 1984 (WGS-84).  Other local
     models may be in use, and their selection in CALMET will make its output
     consistent with local mapping products.  The list of Datum-Regions with
     official transformation parameters is provided by the National Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)
     ------------------------------------------------------------------------------
     WGS-84    WGS-84 Reference Ellipsoid and Geoid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
     NAR-C     NORTH AMERICAN 1983 GRS 80 Spheroid, MEAN FOR CONUS (NAD83)
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                    Default: WGS-84    ! DATUM = WGS-84  !


METEOROLOGICAL Grid (outermost if nested CALMET grids are used):

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =  160   !
            No. Y grid cells (NY)      No default     ! NY =  160   !
         No. vertical layers (NZ)      No default     ! NZ =  8     !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 0.25 !
                                       Units: km

                 Cell face heights
```

```
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = .0, 20.0, 50.0, 100.0, 200.0, 500.0, 1000.0, 2000.0, 3300.0 !

           Reference Coordinates
          of SOUTHWEST corner of
               grid cell(1, 1):

           X coordinate (XORIGKM)     No default     ! XORIGKM = 662.536 !
           Y coordinate (YORIGKM)     No default     ! YORIGKM = 4845.0 !
                                     Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET. grid.
     The lower left (LL) corner of the computational grid is at grid point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
     computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
     The grid spacing of the computational grid is the same as the MET. grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1   !
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1   !
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =  160  !
                  (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)      No default     ! JECOMP =  160   !
                  (1 <= JECOMP <= NY)


SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  0   !
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  0   !
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =  0   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =  0   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1  !
        (MESHDN is an integer >= 1)
```

```
!END!

-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                                *                          *
     FILE                        DEFAULT VALUE             VALUE THIS RUN
     ----                        -------------             --------------

   Concentrations (ICON)              1                    !  ICON =  1   !
   Dry Fluxes (IDRY)                  1                    !  IDRY =  0   !
   Wet Fluxes (IWET)                  1                    !  IWET =  0   !
   2D Temperature (IT2D)              0                    !  IT2D =  0   !
   2D Density (IRHO)                  0                    !  IRHO =  0   !
   Relative Humidity (IVIS)           1                    !  IVIS =  0   !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                          Default: T         ! LCOMPRS = T !

   *
    0 = Do not create file, 1 = create file


    QA PLOT FILE OUTPUT OPTION:

       Create a standard series of output files (e.g.
       locations of sources, receptors, grids ...)
       suitable for plotting?
       (IQAPLOT)                      Default: 1         ! IQAPLOT =  1   !
         0 = no
         1 = yes

    DIAGNOSTIC PUFF-TRACKING OUTPUT OPTION:

       Puff locations and properties reported to
       PFTRAK.DAT file for postprocessing?
       (IPFTRAK)                      Default: 0         ! IPFTRAK =  0   !
         0 = no
         1 = yes, update puff output at end of each timestep
         2 = yes, update puff output at end of each sampling step

    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported?
       (IMFLX)                        Default: 0         ! IMFLX =  0  !
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported?
       (IMBAL)                        Default: 0         ! IMBAL =  0 !
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    NUMERICAL RISE OUTPUT OPTION:
```

```
      Create a file with plume properties for each rise
      increment, for each model timestep?
      This applies to sources modeled with numerical rise
      and is limited to ONE source in the run.
      (INRISE)                        Default: 0         ! INRISE =  0   !
        0 = no
        1 = yes (RISE.DAT filename is
                 specified in Input Group 0)


   LINE PRINTER OUTPUT OPTIONS:

      Print concentrations (ICPRT)    Default: 0         ! ICPRT =  1   !
      Print dry fluxes (IDPRT)        Default: 0         ! IDPRT =  0   !
      Print wet fluxes (IWPRT)        Default: 0         ! IWPRT =  0   !
      (0 = Do not print, 1 = Print)

      Concentration print interval
      (ICFRQ) in timesteps            Default: 1         ! ICFRQ =  1   !
      Dry flux print interval
      (IDFRQ) in timesteps            Default: 1         ! IDFRQ =  1   !
      Wet flux print interval
      (IWFRQ) in timesteps            Default: 1         ! IWFRQ =  1   !

      Units for Line Printer Output
      (IPRTU)                         Default: 1         ! IPRTU =  3   !
                     for            for
                Concentration    Deposition
          1 =       g/m**3         g/m**2/s
          2 =      mg/m**3        mg/m**2/s
          3 =      ug/m**3        ug/m**2/s
          4 =      ng/m**3        ng/m**2/s
          5 =     Odour Units
          6 =      TBq/m**3       TBq/m**2/s    TBq=terabecquerel
          7 =      GBq/m**3       GBq/m**2/s    GBq=gigabecquerel
          8 =       Bq/m**3        Bq/m**2/s    Bq=becquerel (disintegrations/s)

      Messages tracking progress of run
      written to the screen ?
      (IMESG)                         Default: 2         ! IMESG =  2   !
        0 = no
        1 = yes (advection step, puff ID)
        2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


    SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                  ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ---
                      ---   -- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON
       DISK?   SAVED ON DISK?
   -------       -----------------------   -----------------------   ---------------0-----
       ---   ---------------
!          UNIT =     1,           1,           0,           0,           0,           0,
    0   !


  Note:  Species BCON (for MBCON > 0) does not need to be saved on disk.


    OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

      Logical for debug output
      (LDEBUG)                                Default: F     ! LDEBUG = F !
```

```
       First puff to track
       (IPFDEB)                                  Default: 1     ! IPFDEB =  1  !

       Number of puffs to track
       (NPFDEB)                                  Default: 1     ! NPFDEB =  1  !

       Met. period to start output
       (NN1)                                     Default: 1     ! NN1 =  1   !

       Met. period to end output
       (NN2)                                     Default: 10    ! NN2 =  10  !

!END!


------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)        Default: 0     ! NHILL =  0   !

       Number of special complex terrain
       receptors  (NCTREC)                       Default: 0     ! NCTREC =  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                   No Default     ! MHILL =  2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1.0 !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1.0 !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL           XC        YC       THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1
    SCALE 2    AMAX1     AMAX2
 NO.           (km)      (km)      (deg.)   (m)     (m)       (m)       (m)       (m)        (
     m)        (m)       (m)
----           ----      ----      ------  -----  ------    ------    ------   -------    ---
```

```
    ----    -----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT        ZRCT          XHH
                      (km)         (km)         (m)
                     ------        -----      ------         ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
                     (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a separate
           input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE
          HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)                                            (s/cm)
           (dimensionless)
      -------     -----------      ----------      ----------    --------------------     --
          ----------------------


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.
```

```
     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                  DEVIATION
                        (microns)                 (microns)
      -------      -------------------        ------------------


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                         Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                           Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                           Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------

                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 11a, 11b -- Chemistry Parameters
---------------------

---------------
Subgroup (11a)
---------------

     Several parameters are needed for one or more of the chemical transformation
     mechanisms.  Those used for each mechanism are:
```

Mechanism (MCHEM)	MOZ	BCKO3	MNH3	MAVGNH3	BCKNH3	RNITE1	RNITE2	RNITE3	MH2O2	BCKH2O2	RH-IS RP	SO4-IS RP	BCKPMF	OFRAC	VCNX	NDECAY
0 None	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1 MESOPUFF II	X	X	.	.	X	X	X	X	.	.	.	.	.	.	.	.
2 User Rates	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3 RIVAD	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.
4 SOA	X	X	.	.	.	.	.	.	.	.	.	.	X	X	X	.
5 Radioactive Decay	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X
6 RIVAD/ISORRPIA	X	X	X	X	X	X	.	.	X	X	X	X	.	.	.	.
7 RIVAD/ISORRPIA/SOA	X	X	X	X	X	X	.	.	X	X	X	X	X	X	.	.

```
Ozone data input option (MOZ)     Default: 1            ! MOZ =  0   !
(Used only if MCHEM = 1,3,4,6, or 7)
   0 = use a monthly background ozone value
   1 = read hourly ozone concentrations from
       the OZONE.DAT data file

Monthly ozone concentrations in ppb (BCKO3)
(Used only if MCHEM = 1,3,4,6, or 7 and either
   MOZ = 0, or
   MOZ = 1 and all hourly O3 data missing)
                                  Default: 12*80.
     !  BCKO3 = 17.30, 14.80, 32.70, 33.50, 32.90, 37.70, 36.50, 33.10, 30.10, 21.20,
         19.10, 16.20 !

Ammonia data option (MNH3)        Default: 0            ! MNH3 =  0   !
(Used only if MCHEM = 6 or 7)
   0 = use monthly background ammonia values (BCKNH3) - no vertical variation
   1 = read monthly background ammonia values for each layer from
       the NH3Z.DAT data file

Ammonia vertical averaging option (MAVGNH3)
(Used only if MCHEM = 6 or 7, and MNH3 = 1)
   0 = use NH3 at puff center height (no averaging is done)
   1 = average NH3 values over vertical extent of puff
                                  Default: 1            ! MAVGNH3 =  0   !

Monthly ammonia concentrations in ppb (BCKNH3)
(Used only if MCHEM = 1 or 3, or
           if MCHEM = 6 or 7, and MNH3 = 0)
                                  Default: 12*10.
!  BCKNH3 = 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00
    , 10.00 !

Nighttime SO2 loss rate in %/hour (RNITE1)
(Used only if MCHEM = 1, 6 or 7)
This rate is used only at night for MCHEM=1
and is added to the computed rate both day
and night for MCHEM=6,7 (heterogeneous reactions)
                                  Default: 0.2          ! RNITE1 = .2 !

Nighttime NOx loss rate in %/hour (RNITE2)
(Used only if MCHEM = 1)
                                  Default: 2.0          ! RNITE2 = 2.0 !

Nighttime HNO3 formation rate in %/hour (RNITE3)
(Used only if MCHEM = 1)
                                  Default: 2.0          ! RNITE3 = 2.0 !
```

```
    H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =  1   !
    (Used only if MCHEM = 6 or 7, and MAQCHEM = 1)
       0 = use a monthly background H2O2 value
       1 = read hourly H2O2 concentrations from
           the H2O2.DAT data file

    Monthly H2O2 concentrations in ppb (BCKH2O2)
    (Used only if MQACHEM = 1 and either
       MH2O2 = 0 or
       MH2O2 = 1 and all hourly H2O2 data missing)
                                      Default: 12*1.
    !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


 --- Data for ISORROPIA Option
    (used only if MCHEM = 6 or 7)

    Minimum relative humidity used in ISORROPIA computations (RH_ISRP)
                                      Default: 50.          ! RH_ISRP = 50.0 !
                                      Units: %

    Minimum SO4 used in ISORROPIA computations (SO4_ISRP)
                                      Default: 0.4          ! SO4_ISRP = .4 !
                                      Units: ug/m3


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Options
    (used only if MCHEM = 4 or 7)

    The MCHEM = 4 SOA module uses monthly values of:
         Fine particulate concentration in ug/m^3 (BCKPMF)
         Organic fraction of fine particulate     (OFRAC)
         VOC / NOX ratio (after reaction)         (VCNX)

    The MCHEM = 7 SOA module uses monthly values of:
         Fine particulate concentration in ug/m^3 (BCKPMF)
         Organic fraction of fine particulate     (OFRAC)

    These characterize the air mass when computing
    the formation of SOA from VOC emissions.
    Typical values for several distinct air mass types are:

       Month    1    2    3    4    5    6    7    8    9   10   11   12
               Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

    Clean Continental
       BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
       OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
       VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Clean Marine (surface)
       BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
       OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
       VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Urban - low biogenic (controls present)
       BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
       OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
       VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

    Urban - high biogenic (controls present)
       BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
       OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
       VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.
```

```
     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00
         , 50.00 !

 --- End Data for SECONDARY ORGANIC AEROSOL (SOA) Options


     Number of half-life decay specification blocks provided in Subgroup 11b
     (Used only if MCHEM = 5)
     (NDECAY)                                    Default: 0      ! NDECAY =  0   !

!END!


--------------
Subgroup (11b)
--------------

     Each species modeled may be assigned a decay half-life (sec), and the associated
     mass lost may be assigned to one or more other modeled species using a mass yield
     factor. This information is used only for MCHEM=5.

     Provide NDECAY blocks assigning the half-life for a parent species and mass yield
     factors for each child species (if any) produced by the decay.
     Set HALF_LIFE=0.0 for NO decay (infinite half-life).

                                a            b
        SPECIES      Half-Life   Mass Yield
         NAME          (sec)       Factor
        -------      ---------   ----------

     *   SPEC1   =    3600.,        -1.0   *    (Parent)
     *   SPEC2   =     -1.0,         0.0   *    (Child)
   *END*

--------
    a
     Specify a half life that is greater than or equal to zero for 1 parent species
     in each block, and set the yield factor for this species to -1
    b
     Specify a yield factor that is greater than or equal to zero for 1 or more child
     species in each block, and set the half-life for each of these species to -1

     NOTE: Assignments in each block are treated as a separate input
           subgroup and therefore must end with an input group terminator.
           If NDECAY=0, no assignments and input group terminators should appear.

-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
```

```
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP = 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                  Default: 0      ! MHFTSZ =  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                              Default: 5      ! JSUP =  5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01   ! CONK1 = .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                   Default: 0.1    ! CONK2 = .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                     Default: 0.5    ! TBD = .5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                            Default: 10     ! IURB1 =  10  !
                                                        19     ! IURB2 =  19  !

     Site characterization parameters for single-point Met data files ---------
     (needed for METFM = 2,3,4,5)

        Land use category for modeling domain
        (ILANDUIN)                             Default: 20     ! ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                 Default: 0.25   ! Z0IN = .25 !

        Leaf area index for modeling domain
        (XLAIIN)                               Default: 3.0    ! XLAIIN = 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                               Default: 0.0    ! ELEVIN = .0 !

        Latitude (degrees) for met location
        (XLATIN)                               Default: -999.  ! XLATIN = -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                               Default: -999.  ! XLONIN = -999.0 !

     Specialized information for interpreting single-point Met data files -----

        Anemometer height (m) (Used only if METFM = 2,3)
        (ANEMHT)                               Default: 10.    ! ANEMHT = 10.0 !

        Form of lateral turbulance data in PROFILE.DAT file
        (Used only if METFM = 4,5 or MTURBVW = 1 or 3)
        (ISIGMAV)                              Default: 1      ! ISIGMAV =  1  !
            0 = read sigma-theta
            1 = read sigma-v

        Choice of mixing heights (Used only if METFM = 4)
        (IMIXCTDM)                             Default: 0      ! IMIXCTDM =  0  !
```

```
       0 = read PREDICTED mixing heights
       1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                                  Default: 1.0    ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                                 Default: 1.0    ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                                   Default: 99     ! MXNEW =  99   !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                                   Default: 99     ! MXSAM =  99   !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                                  Default: 2      ! NCOUNT =  2   !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                                   Default: 1.0    ! SYMIN = 1.0  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                                   Default: 1.0    ! SZMIN = 1.0  !

Maximum sigma z (m) allowed to avoid
numerical problem in calculating virtual
time or distance.  Cap should be large
enough to have no influence on normal events.
Enter a negative cap to disable.
(SZCAP_M)                                 Default: 5.0e06 ! SZCAP_M = 5.0E06 !


Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

                ----------  LAND  ----------       ---------  WATER  ----------
   Stab Class :  A    B    C    D    E    F         A    B    C    D    E    F
                 ---  ---  ---  ---  ---  ---       ---  ---  ---  ---  ---  ---
Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08, .06, .03, .016

      ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370,
          0.370, 0.370!
      ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060,
          0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                                 Default: 0.0,0.0  ! CDIV = .0, .0 !

Search radius (number of cells) for nearest
land and water cells used in the subgrid
TIBL module
(NLUTIBL)                                 Default: 4      ! NLUTIBL = 4  !

Minimum wind speed (m/s) allowed for
```

```
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                                    Default: 0.5    ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                                    Default: 3000.  ! XMAXZI = 3000.0 !

Minimum mixing height (m)
(XMINZI)                                    Default: 50.    ! XMINZI = 50.0 !


Temperatures (K) used for defining upper bound of
categories for emissions scale-factors
11 upper bounds (K) are entered; the 12th class has no upper limit
(TKCAT(11))
            Default   : 265., 270., 275., 280., 285., 290., 295., 300., 305., 310.,
                315.  (315.+)
                         <     <     <     <     <     <     <     <     <     <     <
    Temperature Class :  1     2     3     4     5     6     7     8     9     10    11
        (12)
                        ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ---
                            -
             ! TKCAT  = 265., 270., 275., 280., 285., 290., 295., 300., 305., 310.,
                 315. !

Wind Speeds (m/s) used for defining upper bound of
categories for emissions scale-factors
5 upper bounds (m/s) are entered; the 6th class has no upper limit
(WSCAT(5))                       Default   :
                                 ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                          Wind Speed Class :  1     2     3     4     5
                                              ---   ---   ---   ---   ---
                                   ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                        Default   : ISC RURAL values
                                 ISC RURAL : .07, .07, .10, .15, .35, .55
                                 ISC URBAN : .15, .15, .20, .25, .30, .30

                           Stability Class :  A     B     C     D     E     F
                                              ---   ---   ---   ---   ---   ---
                                      ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                        Default: 0.020, 0.035
                                      ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))                   Stability Class :  A     B     C     D     E     F
                              Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                              ---   ---   ---   ---   ---   ---
                                      !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)                                Default: 10.        ! SL2PF = 10.0 !

Receptor-specific puff/slug properties (e.g., sigmas and height above
ground at the time when the trajectory is nearest the receptor) may be
```

```
extrapolated forward or backward in time along the current step using
the current dispersion, for receptors that lie upwind of the puff/slug
position at the start of a step, or downwind at the end of a step.
Specify the upwind/downwind extrapolation zone in sigma-y units.
Using FCLIP=1.0 clips the the upwind zone at one sigma-y at the start
of the step and the downwind zone at one sigma-y at the end of the step.
This is consistent with the sampling done in CALPUFF versions through
v6.42 prior to the introduction of the FCLIP option.
The default is No Extrapolation, FCLIP=0.0.
(FCLIP)                              Default: 0.0        ! FCLIP = 0.0 !

Puff-splitting control variables ------------------------

  VERTICAL SPLIT
  --------------

  Number of puffs that result every time a puff
  is split - nsplit=2 means that 1 puff splits
  into 2
  (NSPLIT)                           Default:   3        ! NSPLIT =  3  !

  Time(s) of a day when split puffs are eligible to
  be split once again; this is typically set once
  per day, around sunset before nocturnal shear develops.
  24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
  0=do not re-split    1=eligible for re-split
  (IRESPLIT(24))                     Default:  Hour 17 = 1
  !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

  Split is allowed only if last hour's mixing
  height (m) exceeds a minimum value
  (ZISPLIT)                          Default: 100.       ! ZISPLIT = 100.0 !

  Split is allowed only if ratio of last hour's
  mixing ht to the maximum mixing ht experienced
  by the puff is less than a maximum value (this
  postpones a split until a nocturnal layer develops)
  (ROLDMAX)                          Default: 0.25       ! ROLDMAX = 0.25 !


  HORIZONTAL SPLIT
  ----------------

  Number of puffs that result every time a puff
  is split - nsplith=5 means that 1 puff splits
  into 5
  (NSPLITH)                          Default:   5        ! NSPLITH =  5  !

  Minimum sigma-y (Grid Cells Units) of puff
  before it may be split
  (SYSPLITH)                         Default:  1.0       ! SYSPLITH = 1.0 !

  Minimum puff elongation rate (SYSPLITH/hr) due to
  wind shear, before it may be split
  (SHSPLITH)                         Default:  2.        ! SHSPLITH = 2.0 !

  Minimum concentration (g/m^3) of each
  species in puff before it may be split
  Enter array of NSPEC values; if a single value is
  entered, it will be used for ALL species
  (CNSPLITH)                         Default:  1.0E-07   ! CNSPLITH = 1.0E-07 !

Integration control variables ------------------------

  Fractional convergence criterion for numerical SLUG
  sampling integration
```

```
       (EPSSLUG)                          Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

       Fractional convergence criterion for numerical AREA
       source integration
       (EPSAREA)                          Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

       Trajectory step-length (m) used for numerical rise
       integration
       (DSRISE)                           Default:   1.0      ! DSRISE = 1.0 !

       Boundary Condition (BC) Puff control variables ------------------------

       Minimum height (m) to which BC puffs are mixed as they are emitted
       (MBCON=2 ONLY).  Actual height is reset to the current mixing height
       at the release point if greater than this minimum.
       (HTMINBC)                          Default:   500.     ! HTMINBC = 500.0 !

       Search radius (km) about a receptor for sampling nearest BC puff.
       BC puffs are typically emitted with a spacing of one grid cell
       length, so the search radius should be greater than DGRIDKM.
       (RSAMPBC)                          Default:   10.      ! RSAMPBC = 10.0 !

       Near-Surface depletion adjustment to concentration profile used when
       sampling BC puffs?
       (MDEPBC)                           Default:   1        ! MDEPBC =  1  !
          0 = Concentration is NOT adjusted for depletion
          1 = Adjust Concentration for depletion

!END!


--------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =  1  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr
           8 =     Bq/s  (Bq = becquerel = disintegrations/s)
           9 =     GBq/yr


     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !
```

```
     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                        a
          POINT SOURCE: CONSTANT DATA
          ----------------------------
                                                                                  b          c
  Source       X         Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
              (km)      (km)       (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = STCK1 !
   1 ! X = 680.53812,   4860.34615, 87.6, 100.94,    1.7,     23.02, 405.37,  1.0, 1.0E00 !
   1 ! ZPLTFM  =       .0 !
   1 ! FMFAC  =      1.0 !   !END!

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
             the effect of rain-caps or other physical configurations that
             reduce momentum rise associated with the actual exit velocity.
             (Default: 1.0  -- full momentum used)
     ZPLTFM  is the platform height (m) for sources influenced by an isolated
             structure that has a significant open area between the surface
             and the bulk of the structure, such as an offshore oil platform.
             The Base Elevation is that of the surface (ground or ocean),
             and the Stack Height is the release height above the Base (not
             above the platform).  Building heights entered in Subgroup 13c
             must be those of the buildings on the platform, measured from
             the platform deck.  ZPLTFM is used only with MBDW=1 (ISC
             downwash method) for sources with building downwash.
             (Default: 0.0)

    b
     0. = No building downwash modeled
     1. = Downwash modeled for buildings resting on the surface
     2. = Downwash modeled for buildings raised above the surface (ZPLTFM > 0.)
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
```

```
            ---------------------------------------------------------
Source                                                                  a
 No.        Effective building height, width, length and X/Y offset (in meters)
            every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed for
            MBDW=2 (PRIME downwash option)
------      ---------------------------------------------------------------------
1    ! SRCNAM  =   STCK1 !
1    ! HEIGHT  =  34.9,    34.9,      31,      31,   18.44,   18.44,
                 18.44,   18.44,   18.44,   18.44,      31,      31,
                 34.9,    34.9,    34.9,    34.9,    34.9,    34.9,
                 34.9,    34.9,      31,      31,   18.44,   18.44,
                 18.44,   18.44,   18.44,   18.44,      31,      31,
                 34.9,    34.9,    34.9,    34.9,    34.9,    34.9!
 1    ! WIDTH  =  54.17,    56.2,   32.98,   31.24,      48,   45.54,
                 41.69,   43.32,   46.55,   48.37,   31.92,   33.24,
                 42.89,   37.52,   37.12,   35.59,   36.37,   37.47,
                 54.17,    56.2,   32.98,   31.24,      48,   45.54,
                 41.69,   43.32,   46.55,   48.37,   31.92,   33.24,
                 42.89,   40.24,   39.78,   40.74,   45.29,    50.5!
1    ! LENGTH =  45.77,   45.65,   33.24,   33.55,   41.07,   35.88,
                 29.59,   32.65,   38.51,    43.2,   33.71,   32.98,
                 55.12,   26.42,   21.38,   15.68,   17.93,   23.38,
                 45.77,   45.65,   33.24,   33.55,   41.07,   35.88,
                 29.59,   32.65,   38.51,    43.2,   33.71,   32.98,
                 55.12,   52.05,   47.39,    41.3,   41.88,    44.5!
1    ! XBADJ  =  35.11,   28.81,    8.55,    3.38,  -10.13,  -11.87,
                 -13.25,   -19.1,  -26.52,  -33.14,  -38.73,  -43.15,
                 -85.14, -101.34, -102.58,  -100.7,   -99.9,  -98.01,
                 -80.88,  -74.46,  -41.79,  -36.93,  -30.94,     -24,
                 -16.34,  -13.56,  -11.99,  -10.06,    5.02,   10.17,
                 30.02,   36.31,    41.5,   45.42,   44.35,   40.34!
1    ! YBADJ  =  33.66,   43.02,   26.66,   30.64,   24.01,    25.5,
                 26.21,   26.03,   25.11,   23.43,   29.42,   25.17,
                 35.24,   29.33,   13.59,   -2.56,  -18.64,  -34.16,
                -33.66,  -43.02,  -26.66,  -30.64,  -24.01,   -25.5,
                -26.21,  -26.03,  -25.11,  -23.43,  -29.42,  -25.17,
                -35.24,  -25.67,  -13.61,    0.18,   12.18,   23.27!
! END !


--------
```

a
Building height, width, length, and X/Y offset from the source are treated as a separate input subgroup for each source and therefore must end with an input group terminator. The X/Y offset is the position, relative to the stack, of the center of the upwind face of the projected building, with the x-axis pointing along the flow direction.

```
---------------
Subgroup (13d)
---------------
                                                        a
          POINT SOURCE: EMISSION-RATE SCALING FACTORS
          -------------------------------------------
```

Use this subgroup to identify temporal variations in the emission rates given in 13b. Factors assigned multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

Sets of emission-rate scale factors are defined in Input Group 19, and are referenced by the FACTORNAME. Provide NSPT1 lines that identify the emission-rate scale factor table for each source-species combination that uses the scaling option. Note that a scale-factor table can be used with more than one source-species combination so a FACTORNAME can be repeated.

```
  Source-                Source      Species      Scale-factor table
  Species                Name   b    Name   c     Name        d
   No.                  (SRCNAM)     (CSPEC)      (FACTORNAME)
  ------                ------------ ------------ ---------------------



--------
    a
     Assignment for each source-specie is treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     Source name must match one of the SRCNAM names defined in Input Group 13b
    c
     Species name must match one of the CSPEC names of emitted species defined in Input
         Group 3
    d
     Scale-factor name must match one of the FACTORNAME names defined in Input Group 19


-------------------------------------------------------------------------------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
---------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0   !

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1  !
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr
           8 =     Bq/m**2/s  (Bq = becquerel = disintegrations/s)
           9 =     GBq/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                   a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
```

```
                                                        b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           ---------------------------------------------------------
Source                                                            a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                                   a
          AREA SOURCE: EMISSION-RATE SCALING FACTORS
          ------------------------------------------

      Use this subgroup to identify temporal variations in the emission
      rates given in 14b.  Factors assigned multiply the rates in 14b.
      Skip sources here that have constant emissions.  For more elaborate
      variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

      Sets of emission-rate scale factors are defined in Input Group 19, and
      are referenced by the FACTORNAME.  Provide NSAR1 lines that identify the
      emission-rate scale factor table for each source-species combination that
      uses the scaling option.  Note that a scale-factor table can be used with
      more than one source-species combination so a FACTORNAME can be repeated.


  Source-                Source      Species      Scale-factor table
  Species                Name   b    Name   c     Name        d
   No.                  (SRCNAM)     (CSPEC)      (FACTORNAME)
  ------               ------------ ------------ ---------------------

    1  * SCALEFACTOR  =   1,           SO2,       AREAS               *  *END*

--------
    a
     Assignment for each source-specie is treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     Source name must match one of the SRCNAM names defined in Input Group 14b
```

```
    c
     Species name must match one of the CSPEC names of emitted species defined in Input
         Group 3
    d
     Scale-factor name must match one of the FACTORNAME names defined in Input Group 19


-------------------------------------------------------------------------------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
----------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                              No default  !  NLN2 =  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)        No default   ! NLINES =  0  !

     Units used for line source
     emissions below                (ILNU)          Default: 1  !  ILNU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr
           8 =     Bq/s  (Bq = becquerel = disintegrations/s)
           9 =     GBq/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1)         Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   ! MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   ! NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL = .0 !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL = .0 !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL = .0 !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML = .0 !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL = .0 !
                                                    (in meters)
```

```
        Average buoyancy parameter (FPRIMEL)        No default   ! FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------
                                                                                  a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base        Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height    Elevation     Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------   ---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                        a
          BUOYANT LINE SOURCE: EMISSION-RATE SCALING FACTORS
          --------------------------------------------------

      Use this subgroup to identify temporal variations in the emission
      rates given in 15b.  Factors assigned multiply the rates in 15b.
      Skip sources here that have constant emissions.  For more elaborate
      variation in source parameters, use LNEMARB.DAT and NLN2 > 0.

      Sets of emission-rate scale factors are defined in Input Group 19, and
      are referenced by the FACTORNAME.  Provide NSLN1 lines that identify the
      emission-rate scale factor table for each source-species combination that
      uses the scaling option.  Note that a scale-factor table can be used with
      more than one source-species combination so a FACTORNAME can be repeated.


  Source-                Source      Species      Scale-factor table
  Species                Name   b    Name   c     Name        d
   No.                  (SRCNAM)     (CSPEC)      (FACTORNAME)
  ------               ------------ ------------ ---------------------


--------
    a
     Assignment for each source-specie is treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     Source name must match one of the SRCNAM names defined in Input Group 15b
    c
     Species name must match one of the CSPEC names of emitted species defined in Input
         Group 3
    d
     Scale-factor name must match one of the FACTORNAME names defined in Input Group 19
```

```
------------------------------------------------------------------------------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr
           8 =     Bq/s  (Bq = becquerel = disintegrations/s)
           9 =     GBq/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0   !

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                        a
           VOLUME SOURCE: CONSTANT DATA
           ----------------------------
                                                                          b
Source         X           Y        Effect.    Base     Initial    Initial    Emission
 No.       Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z     Rates
              (km)        (km)        (m)       (m)        (m)        (m)
------     ----------  ----------   ------    ------    --------   --------   --------

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
```

VOLUME SOURCE: EMISSION-RATE SCALING FACTORS[a]

Use this subgroup to identify temporal variations in the emission rates given in 16b. Factors assigned multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

Sets of emission-rate scale factors are defined in Input Group 19, and are referenced by the FACTORNAME. Provide NSVL1 lines that identify the emission-rate scale factor table for each source-species combination that uses the scaling option. Note that a scale-factor table can be used with more than one source-species combination so a FACTORNAME can be repeated.

Source-Species No.	Source Name[b] (SRCNAM)	Species Name[c] (CSPEC)	Scale-factor table Name[d] (FACTORNAME)

---

[a] Assignment for each source-specie is treated as a separate input subgroup and therefore must end with an input group terminator.

[b] Source name must match one of the SRCNAM names defined in Input Group 16b

[c] Species name must match one of the CSPEC names of emitted species defined in Input Group 3

[d] Scale-factor name must match one of the FACTORNAME names defined in Input Group 19

INPUT GROUP: 17 -- FLARE source control parameters (variable emissions file)

Number of flare sources defined in FLEMARB.DAT file(s)
(NFL2) Default: 0 ! NFL2 = 0 !

(At least 1 FLEMARB.DAT file is needed if NFL2 > 0)

!END!

INPUT GROUPS: 18a, 18b, 18c -- Road Emissions parameters

Subgroup (18a)

Emissions from roads are generated from individual line segments defined by a sequence of coordinates provided for each road-link. Each link is entered as a discrete source and is defined as a section of the road for which emissions are uniform.

A long, winding isolated road might be characterized by a single link made up of many coordinate triples (x,y,z) that describe its pathway. These

```
     points should be sufficient to resolve curves, but need not have uniform
     spacing.  For example, a straight flat segment can be defined by 2 points,
     regardless of the distance covered.  Long line segments are automatically
     divided further within the model into segments that are limited by the
     grid-cell boundaries (no segment may extend across multiple cells).
     One emission rate (g/m/s) for each species is used for the entire road.

     Near a congested intersection, many short links may be required to resolve
     the spatial and temporal distribution of emissions.  Each is entered and
     modeled as a discrete source.

     Number of road-links with emission parameters
     provided in Subgroup 18b (NRD1)      No default      !  NRD1 =  0   !

     Number of road-links with arbitrarily time-varying
     emission parameters (NRD2)           No default      !  NRD2 =  0   !
     (If NRD2 > 0, ALL variable road data
     are read from the file: RDEMARB.DAT)


     Emissions from one or more of the roads presented in Subgroup 18b
     may vary over time-based cycles or by meteorology.  This variability
     is modeled by applying an emission-rate scale factor specified for
     particular road links and species in Subgroup 18c.

     Number of road links and species combinations
     with variable emission-rate scale-factors
     (NSFRDS)                             Default: 0      !  NSFRDS =  0   !

!END!

---------------
Subgroup (18b)
---------------
                                                                    a
      DATA FOR ROADS WITH CONSTANT OR SCALED EMISSION PARAMETERS
      ----------------------------------------------------------
                                                                   b
Road                   Effect.   Initial    Initial    Emission
 No.                   Height    Sigma z    Sigma y     Rates
                       (mAGL)      (m)        (m)      (g/s/m)
-------                ------    ------     --------   ---------


--------
    a
     Data for each of the NRD1 roads are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     NSPEC Emission rates must be entered (one for every pollutant modeled).
     Enter emission rate of zero for secondary pollutants.
    c
     Road-source names are entered without spaces, and may be 16 characters long.


---------------
Subgroup (18c)
---------------
                                a
      EMISSION-RATE SCALING FACTORS
      -----------------------------

      Use this subgroup to identify temporal variations in the emission
      rates given in 18b.  Factors assigned multiply the rates in 18b.
      Skip sources here that have constant emissions.  For more elaborate
      variation in source parameters, use RDEMARB.DAT and NRD2 > 0.
```

Sets of emission-rate scale factors are defined in Input Group 19, and are referenced by the FACTORNAME. Provide NSFRDS lines that identify the emission-rate scale factor table for each source-species combination that uses the scaling option. Note that a scale-factor table can be used with more than one source-species combination so a FACTORNAME can be repeated.

Source-Species No.	Source Name b (SRCNAM)	Species Name c (CSPEC)	Scale-factor table Name d (FACTORNAME)

---

a Assignment for each source-specie is treated as a separate input subgroup and therefore must end with an input group terminator.

b Source name must match one of the SRCNAM names defined in Input Group 18b

c Species name must match one of the CSPEC names of emitted species defined in Input Group 3

d Scale-factor name must match one of the FACTORNAME names defined in Input Group 19

Subgroup (18d)

COORDINATES FOR EACH NAMED ROAD a

Coordinate No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)

---

a Each line of coordinates is treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 19a, 19b -- Emission rate scale-factor tables

Use this group to enter variation factors applied to emission rates for any source-specie combinations that use this feature. The tables of emission-rate scale factors are referenced by the name assigned to FACTORNAME. These names do not need to include specific source or species names used in the simulation, particularly if one factor table is used for many types of sources and species, but should be descriptive. But if a factor table applies to just one source, the reference name for it should generally contain that source-name. FACTORNAME must NOT include spaces.

The FACTORTYPE for each table must be one of the following:

CONSTANT1	1	scaling factor
MONTH12	12	scaling factors: months 1-12
DAY7	7	scaling factors: days 1-7

```
                            [SUNDAY,MONDAY, ... FRIDAY,SATURDAY]
         HOUR24             24  scaling factors: hours 1-24
         HOUR24_DAY7        168 scaling factors: hours 1-24,
                              repeated  7 times: SUNDAY, MONDAY, ... SATURDAY
         HOUR24_MONTH12     288 scaling factors: hours 1-24,
                              repeated 12 times: months 1-12
         WSP6               6   scaling factors: wind speed classes 1-6
                            [speed classes (WSCAT) defined in Group 12]
         WSP6_PGCLASS6      36  scaling factors: wind speed classes 1-6
                              repeated  6 times: PG classes A,B,C,D,E,F
                            [speed classes (WSCAT) defined in Group 12]
         TEMPERATURE12      12  scaling factors: temperature classes 1-12
                            [temperature classes (TKCAT) defined in Group 12]

     The number of tables defined may exceed the number of tables referenced in the
     input groups for each source type above (for convenience), but tables for all
     FACTORNAME names referenced must be present here.

---------------
Subgroup (19a)
---------------

     Number of Emission Scale-Factor
     tables                        (NSFTAB) Default: 0  !  NSFTAB =  0  !

     !END!


---------------
Subgroup (19b)
---------------
                                                                  a,b,c
     Enter factors for NSFTAB Emission Scale-Factor tables




--------
    a
     Assignments for each table are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     FACTORNAME must be no longer than 40 characters
    c
     Spaces are NOT allowed in any FACTORNAME or FACTORTYPE assignment,
     and the names are NOT case-sensitive



--------------------------------------------------------------------------------

INPUT GROUPS: 20a, 20b, 20c -- Non-gridded (discrete) receptor information
---------------------------

---------------
Subgroup (20a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  4353   !


     Group names can be used to assign receptor locations in
     Subgroup 20c and thereby provide an identification that
     can be referenced when postprocessing receptors.  The
     default assignment name X is used when NRGRP = 0.
```

```
     Number of receptor group names (NRGRP)  Default: 0  !  NRGRP =  0   !

!END!

---------------
Subgroup (20b)
---------------

     Provide a name for each receptor group if NRGRP>0.
     Enter NRGRP lines.
                     a,b
            Group Name
            ----------



-------------
    a
     Each group name provided is treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     Receptor group names must not include blanks.


---------------
Subgroup (20c)
---------------
                                                a
           NON-GRIDDED (DISCRETE) RECEPTOR DATA
           ------------------------------------

              c           X            Y          Ground        Height   b
Receptor Group         Coordinate   Coordinate    Elevation   Above Ground
  No.    Name            (km)         (km)          (m)           (m)
-------- -----         ----------   ----------    ---------   ------------
 1!X=680.15,  4859.96,  85.63,  0.000!!END!
2!X=680.17,  4859.96,  86.26,  0.000!!END!
3!X=680.19,  4859.96,  87.1,  0.000!!END!
4!X=680.21,  4859.96,  88.29,  0.000!!END!
5!X=680.23,  4859.96,  89.47,  0.000!!END!
6!X=680.25,  4859.96,  90.63,  0.000!!END!
7!X=680.27,  4859.96,  91.16,  0.000!!END!
8!X=680.29,  4859.96,  91.68,  0.000!!END!
9!X=680.31,  4859.96,  92.2,  0.000!!END!
10!X=680.33,  4859.96,  92.39,  0.000!!END!
11!X=680.35,  4859.96,  92.44,  0.000!!END!
12!X=680.37,  4859.96,  92.5,  0.000!!END!
13!X=680.39,  4859.96,  92.55,  0.000!!END!
14!X=680.41,  4859.96,  92.61,  0.000!!END!
15!X=680.43,  4859.96,  92.68,  0.000!!END!
16!X=680.45,  4859.96,  92.75,  0.000!!END!
17!X=680.47,  4859.96,  92.82,  0.000!!END!
18!X=680.49,  4859.96,  92.89,  0.000!!END!
19!X=680.51,  4859.96,  92.97,  0.000!!END!
20!X=680.53,  4859.96,  92.95,  0.000!!END!
21!X=680.55,  4859.96,  92.86,  0.000!!END!
22!X=680.57,  4859.96,  92.77,  0.000!!END!
23!X=680.59,  4859.96,  92.85,  0.000!!END!
24!X=680.61,  4859.96,  93.35,  0.000!!END!
25!X=680.63,  4859.96,  93.85,  0.000!!END!
26!X=680.65,  4859.96,  94.34,  0.000!!END!
27!X=680.67,  4859.96,  94.83,  0.000!!END!
28!X=680.69,  4859.96,  95.32,  0.000!!END!
29!X=680.71,  4859.96,  95.8,  0.000!!END!
30!X=680.73,  4859.96,  96,  0.000!!END!
31!X=680.75,  4859.96,  95.99,  0.000!!END!
```

```
32!X=680.77,  4859.96,  95.99,  0.000!!END!
33!X=680.79,  4859.96,  96.29,  0.000!!END!
34!X=680.81,  4859.96,  97.57,  0.000!!END!
35!X=680.83,  4859.96,  98.84,  0.000!!END!
36!X=680.85,  4859.96,  100.11,  0.000!!END!
37!X=680.87,  4859.96,  100.38,  0.000!!END!
38!X=680.89,  4859.96,  100.53,  0.000!!END!
39!X=680.91,  4859.96,  100.7,  0.000!!END!
40!X=680.93,  4859.96,  101.2,  0.000!!END!
41!X=680.95,  4859.96,  101.98,  0.000!!END!
42!X=680.15,  4859.98,  86.16,  0.000!!END!
43!X=680.17,  4859.98,  86.77,  0.000!!END!
44!X=680.19,  4859.98,  87.59,  0.000!!END!
45!X=680.21,  4859.98,  88.73,  0.000!!END!
46!X=680.23,  4859.98,  89.88,  0.000!!END!
47!X=680.25,  4859.98,  91.01,  0.000!!END!
48!X=680.27,  4859.98,  91.62,  0.000!!END!
49!X=680.29,  4859.98,  92.22,  0.000!!END!
50!X=680.31,  4859.98,  92.82,  0.000!!END!
51!X=680.33,  4859.98,  93,  0.000!!END!
52!X=680.35,  4859.98,  92.98,  0.000!!END!
53!X=680.37,  4859.98,  92.97,  0.000!!END!
54!X=680.39,  4859.98,  92.96,  0.000!!END!
55!X=680.41,  4859.98,  92.96,  0.000!!END!
56!X=680.43,  4859.98,  92.96,  0.000!!END!
57!X=680.45,  4859.98,  92.96,  0.000!!END!
58!X=680.47,  4859.98,  92.97,  0.000!!END!
59!X=680.49,  4859.98,  92.98,  0.000!!END!
60!X=680.51,  4859.98,  92.99,  0.000!!END!
61!X=680.53,  4859.98,  92.99,  0.000!!END!
62!X=680.55,  4859.98,  92.97,  0.000!!END!
63!X=680.57,  4859.98,  92.94,  0.000!!END!
64!X=680.59,  4859.98,  93.1,  0.000!!END!
65!X=680.61,  4859.98,  93.66,  0.000!!END!
66!X=680.63,  4859.98,  94.23,  0.000!!END!
67!X=680.65,  4859.98,  94.79,  0.000!!END!
68!X=680.67,  4859.98,  95.34,  0.000!!END!
69!X=680.69,  4859.98,  95.89,  0.000!!END!
70!X=680.71,  4859.98,  96.44,  0.000!!END!
71!X=680.73,  4859.98,  96.53,  0.000!!END!
72!X=680.75,  4859.98,  96.33,  0.000!!END!
73!X=680.77,  4859.98,  96.14,  0.000!!END!
74!X=680.79,  4859.98,  96.36,  0.000!!END!
75!X=680.81,  4859.98,  97.77,  0.000!!END!
76!X=680.83,  4859.98,  99.17,  0.000!!END!
77!X=680.85,  4859.98,  100.56,  0.000!!END!
78!X=680.87,  4859.98,  100.58,  0.000!!END!
79!X=680.89,  4859.98,  100.48,  0.000!!END!
80!X=680.91,  4859.98,  100.38,  0.000!!END!
81!X=680.93,  4859.98,  100.82,  0.000!!END!
82!X=680.95,  4859.98,  101.67,  0.000!!END!
83!X=680.15,  4860,  86.62,  0.000!!END!
84!X=680.17,  4860,  87.36,  0.000!!END!
85!X=680.19,  4860,  88.16,  0.000!!END!
86!X=680.21,  4860,  89.04,  0.000!!END!
87!X=680.23,  4860,  89.93,  0.000!!END!
88!X=680.25,  4860,  90.81,  0.000!!END!
89!X=680.27,  4860,  91.42,  0.000!!END!
90!X=680.29,  4860,  92.02,  0.000!!END!
91!X=680.31,  4860,  92.62,  0.000!!END!
92!X=680.33,  4860,  92.97,  0.000!!END!
93!X=680.35,  4860,  93.22,  0.000!!END!
94!X=680.37,  4860,  93.46,  0.000!!END!
95!X=680.39,  4860,  93.59,  0.000!!END!
96!X=680.41,  4860,  93.57,  0.000!!END!
97!X=680.43,  4860,  93.56,  0.000!!END!
```

```
98!X=680.45,  4860,  93.54,  0.000!!END!
99!X=680.47,  4860,  93.41,  0.000!!END!
100!X=680.49,  4860,  93.3,  0.000!!END!
101!X=680.51,  4860,  93.19,  0.000!!END!
102!X=680.53,  4860,  93.19,  0.000!!END!
103!X=680.55,  4860,  93.23,  0.000!!END!
104!X=680.57,  4860,  93.26,  0.000!!END!
105!X=680.59,  4860,  93.46,  0.000!!END!
106!X=680.61,  4860,  94.01,  0.000!!END!
107!X=680.63,  4860,  94.56,  0.000!!END!
108!X=680.65,  4860,  95.11,  0.000!!END!
109!X=680.67,  4860,  95.67,  0.000!!END!
110!X=680.69,  4860,  96.23,  0.000!!END!
111!X=680.71,  4860,  96.79,  0.000!!END!
112!X=680.73,  4860,  96.87,  0.000!!END!
113!X=680.75,  4860,  96.65,  0.000!!END!
114!X=680.77,  4860,  96.42,  0.000!!END!
115!X=680.79,  4860,  96.63,  0.000!!END!
116!X=680.81,  4860,  97.99,  0.000!!END!
117!X=680.83,  4860,  99.38,  0.000!!END!
118!X=680.85,  4860,  100.78,  0.000!!END!
119!X=680.87,  4860,  100.64,  0.000!!END!
120!X=680.89,  4860,  100.38,  0.000!!END!
121!X=680.91,  4860,  100.11,  0.000!!END!
122!X=680.93,  4860,  100.49,  0.000!!END!
123!X=680.95,  4860,  101.35,  0.000!!END!
124!X=680.15,  4860.02,  87.09,  0.000!!END!
125!X=680.17,  4860.02,  87.96,  0.000!!END!
126!X=680.19,  4860.02,  88.71,  0.000!!END!
127!X=680.21,  4860.02,  89.33,  0.000!!END!
128!X=680.23,  4860.02,  89.97,  0.000!!END!
129!X=680.25,  4860.02,  90.61,  0.000!!END!
130!X=680.27,  4860.02,  91.22,  0.000!!END!
131!X=680.29,  4860.02,  91.82,  0.000!!END!
132!X=680.31,  4860.02,  92.42,  0.000!!END!
133!X=680.33,  4860.02,  92.96,  0.000!!END!
134!X=680.35,  4860.02,  93.47,  0.000!!END!
135!X=680.37,  4860.02,  93.96,  0.000!!END!
136!X=680.39,  4860.02,  94.24,  0.000!!END!
137!X=680.41,  4860.02,  94.22,  0.000!!END!
138!X=680.43,  4860.02,  94.2,  0.000!!END!
139!X=680.45,  4860.02,  94.17,  0.000!!END!
140!X=680.47,  4860.02,  93.92,  0.000!!END!
141!X=680.49,  4860.02,  93.68,  0.000!!END!
142!X=680.51,  4860.02,  93.44,  0.000!!END!
143!X=680.53,  4860.02,  93.45,  0.000!!END!
144!X=680.55,  4860.02,  93.55,  0.000!!END!
145!X=680.57,  4860.02,  93.65,  0.000!!END!
146!X=680.59,  4860.02,  93.89,  0.000!!END!
147!X=680.61,  4860.02,  94.37,  0.000!!END!
148!X=680.63,  4860.02,  94.85,  0.000!!END!
149!X=680.65,  4860.02,  95.34,  0.000!!END!
150!X=680.67,  4860.02,  95.83,  0.000!!END!
151!X=680.69,  4860.02,  96.33,  0.000!!END!
152!X=680.71,  4860.02,  96.83,  0.000!!END!
153!X=680.73,  4860.02,  96.99,  0.000!!END!
154!X=680.75,  4860.02,  96.96,  0.000!!END!
155!X=680.77,  4860.02,  96.92,  0.000!!END!
156!X=680.79,  4860.02,  97.21,  0.000!!END!
157!X=680.81,  4860.02,  98.26,  0.000!!END!
158!X=680.83,  4860.02,  99.32,  0.000!!END!
159!X=680.85,  4860.02,  100.4,  0.000!!END!
160!X=680.87,  4860.02,  100.33,  0.000!!END!
161!X=680.89,  4860.02,  100.19,  0.000!!END!
162!X=680.91,  4860.02,  100.06,  0.000!!END!
163!X=680.93,  4860.02,  100.36,  0.000!!END!
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164!X=680.95,  4860.02,  100.96,  0.000!!END!
165!X=680.15,  4860.04,  87.57,  0.000!!END!
166!X=680.17,  4860.04,  88.57,  0.000!!END!
167!X=680.19,  4860.04,  89.25,  0.000!!END!
168!X=680.21,  4860.04,  89.61,  0.000!!END!
169!X=680.23,  4860.04,  89.99,  0.000!!END!
170!X=680.25,  4860.04,  90.41,  0.000!!END!
171!X=680.27,  4860.04,  91.02,  0.000!!END!
172!X=680.29,  4860.04,  91.62,  0.000!!END!
173!X=680.31,  4860.04,  92.22,  0.000!!END!
174!X=680.33,  4860.04,  92.96,  0.000!!END!
175!X=680.35,  4860.04,  93.73,  0.000!!END!
176!X=680.37,  4860.04,  94.48,  0.000!!END!
177!X=680.39,  4860.04,  94.89,  0.000!!END!
178!X=680.41,  4860.04,  94.87,  0.000!!END!
179!X=680.43,  4860.04,  94.85,  0.000!!END!
180!X=680.45,  4860.04,  94.8,  0.000!!END!
181!X=680.47,  4860.04,  94.42,  0.000!!END!
182!X=680.49,  4860.04,  94.05,  0.000!!END!
183!X=680.51,  4860.04,  93.69,  0.000!!END!
184!X=680.53,  4860.04,  93.72,  0.000!!END!
185!X=680.55,  4860.04,  93.88,  0.000!!END!
186!X=680.57,  4860.04,  94.05,  0.000!!END!
187!X=680.59,  4860.04,  94.31,  0.000!!END!
188!X=680.61,  4860.04,  94.72,  0.000!!END!
189!X=680.63,  4860.04,  95.14,  0.000!!END!
190!X=680.65,  4860.04,  95.57,  0.000!!END!
191!X=680.67,  4860.04,  96,  0.000!!END!
192!X=680.69,  4860.04,  96.43,  0.000!!END!
193!X=680.71,  4860.04,  96.86,  0.000!!END!
194!X=680.73,  4860.04,  97.12,  0.000!!END!
195!X=680.75,  4860.04,  97.29,  0.000!!END!
196!X=680.77,  4860.04,  97.44,  0.000!!END!
197!X=680.79,  4860.04,  97.78,  0.000!!END!
198!X=680.81,  4860.04,  98.5,  0.000!!END!
199!X=680.83,  4860.04,  99.24,  0.000!!END!
200!X=680.85,  4860.04,  100,  0.000!!END!
201!X=680.87,  4860.04,  100.02,  0.000!!END!
202!X=680.89,  4860.04,  100.01,  0.000!!END!
203!X=680.91,  4860.04,  100.01,  0.000!!END!
204!X=680.93,  4860.04,  100.21,  0.000!!END!
205!X=680.95,  4860.04,  100.56,  0.000!!END!
206!X=680.15,  4860.06,  88.05,  0.000!!END!
207!X=680.17,  4860.06,  89.18,  0.000!!END!
208!X=680.19,  4860.06,  89.77,  0.000!!END!
209!X=680.21,  4860.06,  89.88,  0.000!!END!
210!X=680.23,  4860.06,  90,  0.000!!END!
211!X=680.25,  4860.06,  90.21,  0.000!!END!
212!X=680.27,  4860.06,  90.82,  0.000!!END!
213!X=680.29,  4860.06,  91.42,  0.000!!END!
214!X=680.31,  4860.06,  92.02,  0.000!!END!
215!X=680.33,  4860.06,  92.98,  0.000!!END!
216!X=680.35,  4860.06,  94,  0.000!!END!
217!X=680.37,  4860.06,  95.01,  0.000!!END!
218!X=680.39,  4860.06,  95.54,  0.000!!END!
219!X=680.41,  4860.06,  95.52,  0.000!!END!
220!X=680.43,  4860.06,  95.5,  0.000!!END!
221!X=680.45,  4860.06,  95.42,  0.000!!END!
222!X=680.47,  4860.06,  94.92,  0.000!!END!
223!X=680.49,  4860.06,  94.42,  0.000!!END!
224!X=680.51,  4860.06,  93.92,  0.000!!END!
225!X=680.53,  4860.06,  93.99,  0.000!!END!
226!X=680.55,  4860.06,  94.22,  0.000!!END!
227!X=680.57,  4860.06,  94.45,  0.000!!END!
228!X=680.59,  4860.06,  94.72,  0.000!!END!
229!X=680.61,  4860.06,  95.08,  0.000!!END!
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230!X=680.63,  4860.06,  95.43,  0.000!!END!
231!X=680.65,  4860.06,  95.79,  0.000!!END!
232!X=680.67,  4860.06,  96.16,  0.000!!END!
233!X=680.69,  4860.06,  96.52,  0.000!!END!
234!X=680.71,  4860.06,  96.89,  0.000!!END!
235!X=680.73,  4860.06,  97.26,  0.000!!END!
236!X=680.75,  4860.06,  97.62,  0.000!!END!
237!X=680.77,  4860.06,  97.97,  0.000!!END!
238!X=680.79,  4860.06,  98.33,  0.000!!END!
239!X=680.81,  4860.06,  98.73,  0.000!!END!
240!X=680.83,  4860.06,  99.15,  0.000!!END!
241!X=680.85,  4860.06,  99.58,  0.000!!END!
242!X=680.87,  4860.06,  99.72,  0.000!!END!
243!X=680.89,  4860.06,  99.84,  0.000!!END!
244!X=680.91,  4860.06,  99.96,  0.000!!END!
245!X=680.93,  4860.06,  100.05,  0.000!!END!
246!X=680.95,  4860.06,  100.14,  0.000!!END!
247!X=680.15,  4860.08,  88.73,  0.000!!END!
248!X=680.17,  4860.08,  89.94,  0.000!!END!
249!X=680.19,  4860.08,  90.48,  0.000!!END!
250!X=680.21,  4860.08,  90.45,  0.000!!END!
251!X=680.23,  4860.08,  90.43,  0.000!!END!
252!X=680.25,  4860.08,  90.52,  0.000!!END!
253!X=680.27,  4860.08,  91.06,  0.000!!END!
254!X=680.29,  4860.08,  91.61,  0.000!!END!
255!X=680.31,  4860.08,  92.16,  0.000!!END!
256!X=680.33,  4860.08,  93.18,  0.000!!END!
257!X=680.35,  4860.08,  94.3,  0.000!!END!
258!X=680.37,  4860.08,  95.43,  0.000!!END!
259!X=680.39,  4860.08,  96,  0.000!!END!
260!X=680.41,  4860.08,  96,  0.000!!END!
261!X=680.43,  4860.08,  96,  0.000!!END!
262!X=680.45,  4860.08,  95.92,  0.000!!END!
263!X=680.47,  4860.08,  95.34,  0.000!!END!
264!X=680.49,  4860.08,  94.76,  0.000!!END!
265!X=680.51,  4860.08,  94.17,  0.000!!END!
266!X=680.53,  4860.08,  94.27,  0.000!!END!
267!X=680.55,  4860.08,  94.56,  0.000!!END!
268!X=680.57,  4860.08,  94.84,  0.000!!END!
269!X=680.59,  4860.08,  95.13,  0.000!!END!
270!X=680.61,  4860.08,  95.43,  0.000!!END!
271!X=680.63,  4860.08,  95.72,  0.000!!END!
272!X=680.65,  4860.08,  96.01,  0.000!!END!
273!X=680.67,  4860.08,  96.31,  0.000!!END!
274!X=680.69,  4860.08,  96.61,  0.000!!END!
275!X=680.71,  4860.08,  96.92,  0.000!!END!
276!X=680.73,  4860.08,  97.42,  0.000!!END!
277!X=680.75,  4860.08,  97.97,  0.000!!END!
278!X=680.77,  4860.08,  98.51,  0.000!!END!
279!X=680.79,  4860.08,  98.86,  0.000!!END!
280!X=680.81,  4860.08,  98.94,  0.000!!END!
281!X=680.83,  4860.08,  99.04,  0.000!!END!
282!X=680.85,  4860.08,  99.16,  0.000!!END!
283!X=680.87,  4860.08,  99.42,  0.000!!END!
284!X=680.89,  4860.08,  99.68,  0.000!!END!
285!X=680.91,  4860.08,  99.92,  0.000!!END!
286!X=680.93,  4860.08,  99.87,  0.000!!END!
287!X=680.95,  4860.08,  99.7,  0.000!!END!
288!X=680.15,  4860.1,  89.54,  0.000!!END!
289!X=680.17,  4860.1,  90.81,  0.000!!END!
290!X=680.19,  4860.1,  91.34,  0.000!!END!
291!X=680.21,  4860.1,  91.32,  0.000!!END!
292!X=680.23,  4860.1,  91.3,  0.000!!END!
293!X=680.25,  4860.1,  91.38,  0.000!!END!
294!X=680.27,  4860.1,  91.86,  0.000!!END!
295!X=680.29,  4860.1,  92.35,  0.000!!END!
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296!X=680.31,  4860.1,  92.84,  0.000!!END!
297!X=680.33,  4860.1,  93.69,  0.000!!END!
298!X=680.35,  4860.1,  94.62,  0.000!!END!
299!X=680.37,  4860.1,  95.55,  0.000!!END!
300!X=680.39,  4860.1,  96,  0.000!!END!
301!X=680.41,  4860.1,  96,  0.000!!END!
302!X=680.43,  4860.1,  96,  0.000!!END!
303!X=680.45,  4860.1,  95.92,  0.000!!END!
304!X=680.47,  4860.1,  95.48,  0.000!!END!
305!X=680.49,  4860.1,  95.02,  0.000!!END!
306!X=680.51,  4860.1,  94.56,  0.000!!END!
307!X=680.53,  4860.1,  94.66,  0.000!!END!
308!X=680.55,  4860.1,  94.88,  0.000!!END!
309!X=680.57,  4860.1,  95.1,  0.000!!END!
310!X=680.59,  4860.1,  95.39,  0.000!!END!
311!X=680.61,  4860.1,  95.74,  0.000!!END!
312!X=680.63,  4860.1,  96.1,  0.000!!END!
313!X=680.65,  4860.1,  96.42,  0.000!!END!
314!X=680.67,  4860.1,  96.53,  0.000!!END!
315!X=680.69,  4860.1,  96.65,  0.000!!END!
316!X=680.71,  4860.1,  96.79,  0.000!!END!
317!X=680.73,  4860.1,  97.32,  0.000!!END!
318!X=680.75,  4860.1,  97.98,  0.000!!END!
319!X=680.77,  4860.1,  98.62,  0.000!!END!
320!X=680.79,  4860.1,  99.02,  0.000!!END!
321!X=680.81,  4860.1,  99.07,  0.000!!END!
322!X=680.83,  4860.1,  99.11,  0.000!!END!
323!X=680.85,  4860.1,  99.16,  0.000!!END!
324!X=680.87,  4860.1,  99.37,  0.000!!END!
325!X=680.89,  4860.1,  99.59,  0.000!!END!
326!X=680.91,  4860.1,  99.81,  0.000!!END!
327!X=680.93,  4860.1,  99.69,  0.000!!END!
328!X=680.95,  4860.1,  99.43,  0.000!!END!
329!X=680.15,  4860.12,  90.34,  0.000!!END!
330!X=680.17,  4860.12,  91.68,  0.000!!END!
331!X=680.19,  4860.12,  92.21,  0.000!!END!
332!X=680.21,  4860.12,  92.18,  0.000!!END!
333!X=680.23,  4860.12,  92.16,  0.000!!END!
334!X=680.25,  4860.12,  92.24,  0.000!!END!
335!X=680.27,  4860.12,  92.66,  0.000!!END!
336!X=680.29,  4860.12,  93.08,  0.000!!END!
337!X=680.31,  4860.12,  93.5,  0.000!!END!
338!X=680.33,  4860.12,  94.19,  0.000!!END!
339!X=680.35,  4860.12,  94.92,  0.000!!END!
340!X=680.37,  4860.12,  95.66,  0.000!!END!
341!X=680.39,  4860.12,  96,  0.000!!END!
342!X=680.41,  4860.12,  96,  0.000!!END!
343!X=680.43,  4860.12,  96,  0.000!!END!
344!X=680.45,  4860.12,  95.94,  0.000!!END!
345!X=680.47,  4860.12,  95.62,  0.000!!END!
346!X=680.49,  4860.12,  95.3,  0.000!!END!
347!X=680.51,  4860.12,  94.96,  0.000!!END!
348!X=680.53,  4860.12,  95.04,  0.000!!END!
349!X=680.55,  4860.12,  95.2,  0.000!!END!
350!X=680.57,  4860.12,  95.36,  0.000!!END!
351!X=680.59,  4860.12,  95.65,  0.000!!END!
352!X=680.61,  4860.12,  96.07,  0.000!!END!
353!X=680.63,  4860.12,  96.48,  0.000!!END!
354!X=680.65,  4860.12,  96.82,  0.000!!END!
355!X=680.67,  4860.12,  96.74,  0.000!!END!
356!X=680.69,  4860.12,  96.67,  0.000!!END!
357!X=680.71,  4860.12,  96.61,  0.000!!END!
358!X=680.73,  4860.12,  97.18,  0.000!!END!
359!X=680.75,  4860.12,  97.89,  0.000!!END!
360!X=680.77,  4860.12,  98.61,  0.000!!END!
361!X=680.79,  4860.12,  99.05,  0.000!!END!
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362!X=680.81,  4860.12,  99.16,  0.000!!END!
363!X=680.83,  4860.12,  99.27,  0.000!!END!
364!X=680.85,  4860.12,  99.37,  0.000!!END!
365!X=680.87,  4860.12,  99.45,  0.000!!END!
366!X=680.89,  4860.12,  99.54,  0.000!!END!
367!X=680.91,  4860.12,  99.64,  0.000!!END!
368!X=680.93,  4860.12,  99.52,  0.000!!END!
369!X=680.95,  4860.12,  99.32,  0.000!!END!
370!X=680.15,  4860.14,  91.16,  0.000!!END!
371!X=680.17,  4860.14,  92.56,  0.000!!END!
372!X=680.19,  4860.14,  93.07,  0.000!!END!
373!X=680.21,  4860.14,  93.05,  0.000!!END!
374!X=680.23,  4860.14,  93.02,  0.000!!END!
375!X=680.25,  4860.14,  93.1,  0.000!!END!
376!X=680.27,  4860.14,  93.45,  0.000!!END!
377!X=680.29,  4860.14,  93.81,  0.000!!END!
378!X=680.31,  4860.14,  94.17,  0.000!!END!
379!X=680.33,  4860.14,  94.68,  0.000!!END!
380!X=680.35,  4860.14,  95.22,  0.000!!END!
381!X=680.37,  4860.14,  95.76,  0.000!!END!
382!X=680.39,  4860.14,  96,  0.000!!END!
383!X=680.41,  4860.14,  96,  0.000!!END!
384!X=680.43,  4860.14,  96,  0.000!!END!
385!X=680.45,  4860.14,  95.96,  0.000!!END!
386!X=680.47,  4860.14,  95.77,  0.000!!END!
387!X=680.49,  4860.14,  95.57,  0.000!!END!
388!X=680.51,  4860.14,  95.37,  0.000!!END!
389!X=680.53,  4860.14,  95.42,  0.000!!END!
390!X=680.55,  4860.14,  95.51,  0.000!!END!
391!X=680.57,  4860.14,  95.61,  0.000!!END!
392!X=680.59,  4860.14,  95.91,  0.000!!END!
393!X=680.61,  4860.14,  96.39,  0.000!!END!
394!X=680.67,  4860.14,  96.94,  0.000!!END!
395!X=680.69,  4860.14,  96.68,  0.000!!END!
396!X=680.71,  4860.14,  96.43,  0.000!!END!
397!X=680.73,  4860.14,  97.03,  0.000!!END!
398!X=680.75,  4860.14,  97.81,  0.000!!END!
399!X=680.77,  4860.14,  98.59,  0.000!!END!
400!X=680.79,  4860.14,  99.08,  0.000!!END!
401!X=680.81,  4860.14,  99.26,  0.000!!END!
402!X=680.83,  4860.14,  99.43,  0.000!!END!
403!X=680.85,  4860.14,  99.57,  0.000!!END!
404!X=680.87,  4860.14,  99.52,  0.000!!END!
405!X=680.89,  4860.14,  99.48,  0.000!!END!
406!X=680.91,  4860.14,  99.45,  0.000!!END!
407!X=680.93,  4860.14,  99.35,  0.000!!END!
408!X=680.95,  4860.14,  99.21,  0.000!!END!
409!X=680.15,  4860.16,  91.97,  0.000!!END!
410!X=680.17,  4860.16,  93.44,  0.000!!END!
411!X=680.19,  4860.16,  93.93,  0.000!!END!
412!X=680.21,  4860.16,  93.91,  0.000!!END!
413!X=680.23,  4860.16,  93.89,  0.000!!END!
414!X=680.25,  4860.16,  93.96,  0.000!!END!
415!X=680.27,  4860.16,  94.24,  0.000!!END!
416!X=680.29,  4860.16,  94.54,  0.000!!END!
417!X=680.31,  4860.16,  94.83,  0.000!!END!
418!X=680.33,  4860.16,  95.16,  0.000!!END!
419!X=680.35,  4860.16,  95.5,  0.000!!END!
420!X=680.37,  4860.16,  95.86,  0.000!!END!
421!X=680.39,  4860.16,  96,  0.000!!END!
422!X=680.41,  4860.16,  96,  0.000!!END!
423!X=680.43,  4860.16,  96,  0.000!!END!
424!X=680.45,  4860.16,  95.99,  0.000!!END!
425!X=680.47,  4860.16,  95.93,  0.000!!END!
426!X=680.49,  4860.16,  95.86,  0.000!!END!
427!X=680.51,  4860.16,  95.79,  0.000!!END!
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428!X=680.53,  4860.16,  95.8,  0.000!!END!
429!X=680.55,  4860.16,  95.82,  0.000!!END!
430!X=680.67,  4860.16,  97.14,  0.000!!END!
431!X=680.69,  4860.16,  96.68,  0.000!!END!
432!X=680.71,  4860.16,  96.24,  0.000!!END!
433!X=680.73,  4860.16,  96.89,  0.000!!END!
434!X=680.75,  4860.16,  97.74,  0.000!!END!
435!X=680.77,  4860.16,  98.58,  0.000!!END!
436!X=680.79,  4860.16,  99.12,  0.000!!END!
437!X=680.81,  4860.16,  99.36,  0.000!!END!
438!X=680.83,  4860.16,  99.59,  0.000!!END!
439!X=680.85,  4860.16,  99.76,  0.000!!END!
440!X=680.87,  4860.16,  99.59,  0.000!!END!
441!X=680.89,  4860.16,  99.42,  0.000!!END!
442!X=680.91,  4860.16,  99.26,  0.000!!END!
443!X=680.93,  4860.16,  99.18,  0.000!!END!
444!X=680.95,  4860.16,  99.11,  0.000!!END!
445!X=680.15,  4860.18,  92.2,  0.000!!END!
446!X=680.17,  4860.18,  93.56,  0.000!!END!
447!X=680.19,  4860.18,  94.08,  0.000!!END!
448!X=680.21,  4860.18,  94.19,  0.000!!END!
449!X=680.23,  4860.18,  94.3,  0.000!!END!
450!X=680.25,  4860.18,  94.44,  0.000!!END!
451!X=680.27,  4860.18,  94.68,  0.000!!END!
452!X=680.29,  4860.18,  94.92,  0.000!!END!
453!X=680.31,  4860.18,  95.16,  0.000!!END!
454!X=680.33,  4860.18,  95.36,  0.000!!END!
455!X=680.35,  4860.18,  95.56,  0.000!!END!
456!X=680.37,  4860.18,  95.78,  0.000!!END!
457!X=680.39,  4860.18,  95.91,  0.000!!END!
458!X=680.41,  4860.18,  96,  0.000!!END!
459!X=680.43,  4860.18,  96.07,  0.000!!END!
460!X=680.45,  4860.18,  96.15,  0.000!!END!
461!X=680.47,  4860.18,  96.25,  0.000!!END!
462!X=680.49,  4860.18,  96.34,  0.000!!END!
463!X=680.67,  4860.18,  97.46,  0.000!!END!
464!X=680.69,  4860.18,  96.86,  0.000!!END!
465!X=680.71,  4860.18,  96.26,  0.000!!END!
466!X=680.73,  4860.18,  96.94,  0.000!!END!
467!X=680.75,  4860.18,  97.8,  0.000!!END!
468!X=680.77,  4860.18,  98.67,  0.000!!END!
469!X=680.79,  4860.18,  99.21,  0.000!!END!
470!X=680.81,  4860.18,  99.48,  0.000!!END!
471!X=680.83,  4860.18,  99.75,  0.000!!END!
472!X=680.85,  4860.18,  99.94,  0.000!!END!
473!X=680.87,  4860.18,  99.65,  0.000!!END!
474!X=680.89,  4860.18,  99.35,  0.000!!END!
475!X=680.91,  4860.18,  99.06,  0.000!!END!
476!X=680.93,  4860.18,  99.01,  0.000!!END!
477!X=680.95,  4860.18,  99.01,  0.000!!END!
478!X=680.15,  4860.2,  92.4,  0.000!!END!
479!X=680.17,  4860.2,  93.64,  0.000!!END!
480!X=680.19,  4860.2,  94.18,  0.000!!END!
481!X=680.21,  4860.2,  94.42,  0.000!!END!
482!X=680.23,  4860.2,  94.65,  0.000!!END!
483!X=680.25,  4860.2,  94.86,  0.000!!END!
484!X=680.27,  4860.2,  95.03,  0.000!!END!
485!X=680.29,  4860.2,  95.2,  0.000!!END!
486!X=680.31,  4860.2,  95.38,  0.000!!END!
487!X=680.33,  4860.2,  95.45,  0.000!!END!
488!X=680.35,  4860.2,  95.53,  0.000!!END!
489!X=680.37,  4860.2,  95.61,  0.000!!END!
490!X=680.39,  4860.2,  95.78,  0.000!!END!
491!X=680.41,  4860.2,  96,  0.000!!END!
492!X=680.43,  4860.2,  96.2,  0.000!!END!
493!X=680.69,  4860.2,  97.64,  0.000!!END!
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494!X=680.71,  4860.2,  97.1,  0.000!!END!
495!X=680.73,  4860.2,  97.77,  0.000!!END!
496!X=680.75,  4860.2,  98.57,  0.000!!END!
497!X=680.77,  4860.2,  99.37,  0.000!!END!
498!X=680.79,  4860.2,  99.72,  0.000!!END!
499!X=680.81,  4860.2,  99.73,  0.000!!END!
500!X=680.83,  4860.2,  99.75,  0.000!!END!
501!X=680.85,  4860.2,  99.73,  0.000!!END!
502!X=680.87,  4860.2,  99.5,  0.000!!END!
503!X=680.89,  4860.2,  99.27,  0.000!!END!
504!X=680.91,  4860.2,  99.03,  0.000!!END!
505!X=680.93,  4860.2,  99.1,  0.000!!END!
506!X=680.95,  4860.2,  99.21,  0.000!!END!
507!X=680.15,  4860.22,  92.6,  0.000!!END!
508!X=680.17,  4860.22,  93.71,  0.000!!END!
509!X=680.19,  4860.22,  94.28,  0.000!!END!
510!X=680.21,  4860.22,  94.65,  0.000!!END!
511!X=680.23,  4860.22,  95.01,  0.000!!END!
512!X=680.25,  4860.22,  95.27,  0.000!!END!
513!X=680.27,  4860.22,  95.38,  0.000!!END!
514!X=680.29,  4860.22,  95.49,  0.000!!END!
515!X=680.31,  4860.22,  95.59,  0.000!!END!
516!X=680.33,  4860.22,  95.53,  0.000!!END!
517!X=680.35,  4860.22,  95.48,  0.000!!END!
518!X=680.37,  4860.22,  95.44,  0.000!!END!
519!X=680.39,  4860.22,  95.66,  0.000!!END!
520!X=680.41,  4860.22,  96,  0.000!!END!
521!X=680.69,  4860.22,  98.42,  0.000!!END!
522!X=680.71,  4860.22,  97.94,  0.000!!END!
523!X=680.73,  4860.22,  98.59,  0.000!!END!
524!X=680.75,  4860.22,  99.33,  0.000!!END!
525!X=680.77,  4860.22,  100.07,  0.000!!END!
526!X=680.79,  4860.22,  100.22,  0.000!!END!
527!X=680.81,  4860.22,  99.97,  0.000!!END!
528!X=680.83,  4860.22,  99.73,  0.000!!END!
529!X=680.85,  4860.22,  99.52,  0.000!!END!
530!X=680.87,  4860.22,  99.36,  0.000!!END!
531!X=680.89,  4860.22,  99.19,  0.000!!END!
532!X=680.91,  4860.22,  99.02,  0.000!!END!
533!X=680.93,  4860.22,  99.22,  0.000!!END!
534!X=680.95,  4860.22,  99.46,  0.000!!END!
535!X=680.15,  4860.24,  92.79,  0.000!!END!
536!X=680.17,  4860.24,  93.77,  0.000!!END!
537!X=680.19,  4860.24,  94.39,  0.000!!END!
538!X=680.21,  4860.24,  94.88,  0.000!!END!
539!X=680.23,  4860.24,  95.38,  0.000!!END!
540!X=680.25,  4860.24,  95.68,  0.000!!END!
541!X=680.27,  4860.24,  95.72,  0.000!!END!
542!X=680.29,  4860.24,  95.77,  0.000!!END!
543!X=680.31,  4860.24,  95.8,  0.000!!END!
544!X=680.33,  4860.24,  95.61,  0.000!!END!
545!X=680.35,  4860.24,  95.43,  0.000!!END!
546!X=680.37,  4860.24,  95.26,  0.000!!END!
547!X=680.39,  4860.24,  95.55,  0.000!!END!
548!X=680.41,  4860.24,  96.02,  0.000!!END!
549!X=680.69,  4860.24,  99.2,  0.000!!END!
550!X=680.71,  4860.24,  98.79,  0.000!!END!
551!X=680.73,  4860.24,  99.42,  0.000!!END!
552!X=680.75,  4860.24,  100.09,  0.000!!END!
553!X=680.77,  4860.24,  100.76,  0.000!!END!
554!X=680.79,  4860.24,  100.71,  0.000!!END!
555!X=680.81,  4860.24,  100.2,  0.000!!END!
556!X=680.83,  4860.24,  99.7,  0.000!!END!
557!X=680.85,  4860.24,  99.32,  0.000!!END!
558!X=680.87,  4860.24,  99.22,  0.000!!END!
559!X=680.89,  4860.24,  99.12,  0.000!!END!
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560!X=680.91,  4860.24,  99.01,  0.000!!END!
561!X=680.93,  4860.24,  99.34,  0.000!!END!
562!X=680.95,  4860.24,  99.71,  0.000!!END!
563!X=680.15,  4860.26,  92.94,  0.000!!END!
564!X=680.17,  4860.26,  93.82,  0.000!!END!
565!X=680.19,  4860.26,  94.5,  0.000!!END!
566!X=680.21,  4860.26,  95.13,  0.000!!END!
567!X=680.23,  4860.26,  95.75,  0.000!!END!
568!X=680.25,  4860.26,  96.09,  0.000!!END!
569!X=680.27,  4860.26,  96.08,  0.000!!END!
570!X=680.29,  4860.26,  96.07,  0.000!!END!
571!X=680.31,  4860.26,  96.03,  0.000!!END!
572!X=680.33,  4860.26,  95.72,  0.000!!END!
573!X=680.35,  4860.26,  95.41,  0.000!!END!
574!X=680.37,  4860.26,  95.1,  0.000!!END!
575!X=680.39,  4860.26,  95.45,  0.000!!END!
576!X=680.69,  4860.26,  99.99,  0.000!!END!
577!X=680.71,  4860.26,  99.65,  0.000!!END!
578!X=680.73,  4860.26,  100.24,  0.000!!END!
579!X=680.75,  4860.26,  100.84,  0.000!!END!
580!X=680.77,  4860.26,  101.45,  0.000!!END!
581!X=680.79,  4860.26,  101.18,  0.000!!END!
582!X=680.81,  4860.26,  100.41,  0.000!!END!
583!X=680.83,  4860.26,  99.66,  0.000!!END!
584!X=680.85,  4860.26,  99.12,  0.000!!END!
585!X=680.87,  4860.26,  99.08,  0.000!!END!
586!X=680.89,  4860.26,  99.05,  0.000!!END!
587!X=680.91,  4860.26,  99,  0.000!!END!
588!X=680.93,  4860.26,  99.47,  0.000!!END!
589!X=680.95,  4860.26,  99.97,  0.000!!END!
590!X=680.15,  4860.28,  93.04,  0.000!!END!
591!X=680.17,  4860.28,  93.85,  0.000!!END!
592!X=680.19,  4860.28,  94.62,  0.000!!END!
593!X=680.21,  4860.28,  95.38,  0.000!!END!
594!X=680.23,  4860.28,  96.13,  0.000!!END!
595!X=680.25,  4860.28,  96.52,  0.000!!END!
596!X=680.27,  4860.28,  96.51,  0.000!!END!
597!X=680.29,  4860.28,  96.5,  0.000!!END!
598!X=680.31,  4860.28,  96.45,  0.000!!END!
599!X=680.33,  4860.28,  96.14,  0.000!!END!
600!X=680.35,  4860.28,  95.83,  0.000!!END!
601!X=680.37,  4860.28,  95.52,  0.000!!END!
602!X=680.39,  4860.28,  95.9,  0.000!!END!
603!X=680.71,  4860.28,  100.01,  0.000!!END!
604!X=680.73,  4860.28,  100.53,  0.000!!END!
605!X=680.75,  4860.28,  101.06,  0.000!!END!
606!X=680.77,  4860.28,  101.6,  0.000!!END!
607!X=680.79,  4860.28,  101.24,  0.000!!END!
608!X=680.81,  4860.28,  100.41,  0.000!!END!
609!X=680.83,  4860.28,  99.58,  0.000!!END!
610!X=680.85,  4860.28,  99.02,  0.000!!END!
611!X=680.87,  4860.28,  99.06,  0.000!!END!
612!X=680.89,  4860.28,  99.1,  0.000!!END!
613!X=680.91,  4860.28,  99.13,  0.000!!END!
614!X=680.93,  4860.28,  99.66,  0.000!!END!
615!X=680.95,  4860.28,  100.22,  0.000!!END!
616!X=680.15,  4860.3,  93.14,  0.000!!END!
617!X=680.17,  4860.3,  93.88,  0.000!!END!
618!X=680.19,  4860.3,  94.75,  0.000!!END!
619!X=680.21,  4860.3,  95.64,  0.000!!END!
620!X=680.23,  4860.3,  96.52,  0.000!!END!
621!X=680.25,  4860.3,  96.95,  0.000!!END!
622!X=680.27,  4860.3,  96.94,  0.000!!END!
623!X=680.29,  4860.3,  96.93,  0.000!!END!
624!X=680.31,  4860.3,  96.88,  0.000!!END!
625!X=680.33,  4860.3,  96.57,  0.000!!END!
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626!X=680.35,  4860.3,  96.26,  0.000!!END!
627!X=680.37,  4860.3,  95.95,  0.000!!END!
628!X=680.39,  4860.3,  96.35,  0.000!!END!
629!X=680.73,  4860.3,  100.41,  0.000!!END!
630!X=680.75,  4860.3,  100.82,  0.000!!END!
631!X=680.77,  4860.3,  101.23,  0.000!!END!
632!X=680.79,  4860.3,  100.88,  0.000!!END!
633!X=680.81,  4860.3,  100.18,  0.000!!END!
634!X=680.83,  4860.3,  99.47,  0.000!!END!
635!X=680.85,  4860.3,  99.06,  0.000!!END!
636!X=680.87,  4860.3,  99.24,  0.000!!END!
637!X=680.89,  4860.3,  99.4,  0.000!!END!
638!X=680.91,  4860.3,  99.57,  0.000!!END!
639!X=680.93,  4860.3,  99.98,  0.000!!END!
640!X=680.95,  4860.3,  100.41,  0.000!!END!
641!X=680.15,  4860.32,  93.23,  0.000!!END!
642!X=680.17,  4860.32,  93.91,  0.000!!END!
643!X=680.19,  4860.32,  94.89,  0.000!!END!
644!X=680.21,  4860.32,  95.9,  0.000!!END!
645!X=680.23,  4860.32,  96.91,  0.000!!END!
646!X=680.25,  4860.32,  97.39,  0.000!!END!
647!X=680.27,  4860.32,  97.37,  0.000!!END!
648!X=680.29,  4860.32,  97.36,  0.000!!END!
649!X=680.31,  4860.32,  97.3,  0.000!!END!
650!X=680.33,  4860.32,  96.99,  0.000!!END!
651!X=680.35,  4860.32,  96.68,  0.000!!END!
652!X=680.37,  4860.32,  96.37,  0.000!!END!
653!X=680.73,  4860.32,  100.29,  0.000!!END!
654!X=680.75,  4860.32,  100.56,  0.000!!END!
655!X=680.77,  4860.32,  100.84,  0.000!!END!
656!X=680.79,  4860.32,  100.52,  0.000!!END!
657!X=680.81,  4860.32,  99.95,  0.000!!END!
658!X=680.83,  4860.32,  99.37,  0.000!!END!
659!X=680.85,  4860.32,  99.11,  0.000!!END!
660!X=680.87,  4860.32,  99.42,  0.000!!END!
661!X=680.89,  4860.32,  99.71,  0.000!!END!
662!X=680.91,  4860.32,  100,  0.000!!END!
663!X=680.93,  4860.32,  100.29,  0.000!!END!
664!X=680.95,  4860.32,  100.59,  0.000!!END!
665!X=680.15,  4860.34,  93.32,  0.000!!END!
666!X=680.17,  4860.34,  93.94,  0.000!!END!
667!X=680.19,  4860.34,  95.03,  0.000!!END!
668!X=680.21,  4860.34,  96.18,  0.000!!END!
669!X=680.23,  4860.34,  97.31,  0.000!!END!
670!X=680.25,  4860.34,  97.82,  0.000!!END!
671!X=680.27,  4860.34,  97.81,  0.000!!END!
672!X=680.29,  4860.34,  97.79,  0.000!!END!
673!X=680.31,  4860.34,  97.72,  0.000!!END!
674!X=680.33,  4860.34,  97.41,  0.000!!END!
675!X=680.35,  4860.34,  97.1,  0.000!!END!
676!X=680.37,  4860.34,  96.79,  0.000!!END!
677!X=680.71,  4860.34,  100.01,  0.000!!END!
678!X=680.73,  4860.34,  100.15,  0.000!!END!
679!X=680.75,  4860.34,  100.3,  0.000!!END!
680!X=680.77,  4860.34,  100.45,  0.000!!END!
681!X=680.79,  4860.34,  100.17,  0.000!!END!
682!X=680.81,  4860.34,  99.72,  0.000!!END!
683!X=680.83,  4860.34,  99.27,  0.000!!END!
684!X=680.85,  4860.34,  99.17,  0.000!!END!
685!X=680.87,  4860.34,  99.61,  0.000!!END!
686!X=680.89,  4860.34,  100.03,  0.000!!END!
687!X=680.91,  4860.34,  100.44,  0.000!!END!
688!X=680.93,  4860.34,  100.6,  0.000!!END!
689!X=680.95,  4860.34,  100.77,  0.000!!END!
690!X=680.15,  4860.36,  93.72,  0.000!!END!
691!X=680.17,  4860.36,  94.39,  0.000!!END!
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692!X=680.19,  4860.36,  95.49,  0.000!!END!
693!X=680.21,  4860.36,  96.63,  0.000!!END!
694!X=680.23,  4860.36,  97.77,  0.000!!END!
695!X=680.25,  4860.36,  98.23,  0.000!!END!
696!X=680.27,  4860.36,  98.18,  0.000!!END!
697!X=680.29,  4860.36,  98.14,  0.000!!END!
698!X=680.31,  4860.36,  98.05,  0.000!!END!
699!X=680.33,  4860.36,  97.77,  0.000!!END!
700!X=680.35,  4860.36,  97.5,  0.000!!END!
701!X=680.37,  4860.36,  97.21,  0.000!!END!
702!X=680.71,  4860.36,  100,  0.000!!END!
703!X=680.73,  4860.36,  100.01,  0.000!!END!
704!X=680.75,  4860.36,  100.03,  0.000!!END!
705!X=680.77,  4860.36,  100.05,  0.000!!END!
706!X=680.79,  4860.36,  99.82,  0.000!!END!
707!X=680.81,  4860.36,  99.51,  0.000!!END!
708!X=680.83,  4860.36,  99.19,  0.000!!END!
709!X=680.85,  4860.36,  99.24,  0.000!!END!
710!X=680.87,  4860.36,  99.8,  0.000!!END!
711!X=680.89,  4860.36,  100.36,  0.000!!END!
712!X=680.91,  4860.36,  100.87,  0.000!!END!
713!X=680.93,  4860.36,  100.9,  0.000!!END!
714!X=680.95,  4860.36,  100.94,  0.000!!END!
715!X=680.15,  4860.38,  94.25,  0.000!!END!
716!X=680.17,  4860.38,  95.05,  0.000!!END!
717!X=680.19,  4860.38,  96.11,  0.000!!END!
718!X=680.21,  4860.38,  97.18,  0.000!!END!
719!X=680.23,  4860.38,  98.26,  0.000!!END!
720!X=680.25,  4860.38,  98.62,  0.000!!END!
721!X=680.27,  4860.38,  98.51,  0.000!!END!
722!X=680.29,  4860.38,  98.4,  0.000!!END!
723!X=680.31,  4860.38,  98.27,  0.000!!END!
724!X=680.33,  4860.38,  98.06,  0.000!!END!
725!X=680.35,  4860.38,  97.85,  0.000!!END!
726!X=680.71,  4860.38,  100.21,  0.000!!END!
727!X=680.73,  4860.38,  100.2,  0.000!!END!
728!X=680.75,  4860.38,  100.19,  0.000!!END!
729!X=680.77,  4860.38,  100.19,  0.000!!END!
730!X=680.79,  4860.38,  99.9,  0.000!!END!
731!X=680.81,  4860.38,  99.54,  0.000!!END!
732!X=680.83,  4860.38,  99.19,  0.000!!END!
733!X=680.85,  4860.38,  99.27,  0.000!!END!
734!X=680.87,  4860.38,  99.87,  0.000!!END!
735!X=680.89,  4860.38,  100.46,  0.000!!END!
736!X=680.91,  4860.38,  101,  0.000!!END!
737!X=680.93,  4860.38,  100.95,  0.000!!END!
738!X=680.95,  4860.38,  100.92,  0.000!!END!
739!X=680.15,  4860.4,  94.79,  0.000!!END!
740!X=680.17,  4860.4,  95.72,  0.000!!END!
741!X=680.19,  4860.4,  96.72,  0.000!!END!
742!X=680.21,  4860.4,  97.73,  0.000!!END!
743!X=680.23,  4860.4,  98.74,  0.000!!END!
744!X=680.25,  4860.4,  99.01,  0.000!!END!
745!X=680.27,  4860.4,  98.83,  0.000!!END!
746!X=680.29,  4860.4,  98.66,  0.000!!END!
747!X=680.31,  4860.4,  98.5,  0.000!!END!
748!X=680.33,  4860.4,  98.36,  0.000!!END!
749!X=680.35,  4860.4,  98.21,  0.000!!END!
750!X=680.69,  4860.4,  100.46,  0.000!!END!
751!X=680.71,  4860.4,  100.42,  0.000!!END!
752!X=680.73,  4860.4,  100.42,  0.000!!END!
753!X=680.75,  4860.4,  100.41,  0.000!!END!
754!X=680.77,  4860.4,  100.4,  0.000!!END!
755!X=680.79,  4860.4,  100.05,  0.000!!END!
756!X=680.81,  4860.4,  99.63,  0.000!!END!
757!X=680.83,  4860.4,  99.22,  0.000!!END!
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758!X=680.85,  4860.4,  99.28,  0.000!!END!
759!X=680.87,  4860.4,  99.88,  0.000!!END!
760!X=680.89,  4860.4,  100.48,  0.000!!END!
761!X=680.91,  4860.4,  100.99,  0.000!!END!
762!X=680.93,  4860.4,  100.88,  0.000!!END!
763!X=680.95,  4860.4,  100.78,  0.000!!END!
764!X=680.15,  4860.42,  95.34,  0.000!!END!
765!X=680.17,  4860.42,  96.39,  0.000!!END!
766!X=680.19,  4860.42,  97.34,  0.000!!END!
767!X=680.21,  4860.42,  98.28,  0.000!!END!
768!X=680.23,  4860.42,  99.23,  0.000!!END!
769!X=680.25,  4860.42,  99.39,  0.000!!END!
770!X=680.27,  4860.42,  99.15,  0.000!!END!
771!X=680.29,  4860.42,  98.92,  0.000!!END!
772!X=680.31,  4860.42,  98.73,  0.000!!END!
773!X=680.33,  4860.42,  98.65,  0.000!!END!
774!X=680.35,  4860.42,  98.57,  0.000!!END!
775!X=680.69,  4860.42,  100.58,  0.000!!END!
776!X=680.71,  4860.42,  100.64,  0.000!!END!
777!X=680.73,  4860.42,  100.63,  0.000!!END!
778!X=680.75,  4860.42,  100.63,  0.000!!END!
779!X=680.77,  4860.42,  100.62,  0.000!!END!
780!X=680.79,  4860.42,  100.2,  0.000!!END!
781!X=680.81,  4860.42,  99.72,  0.000!!END!
782!X=680.83,  4860.42,  99.24,  0.000!!END!
783!X=680.85,  4860.42,  99.3,  0.000!!END!
784!X=680.87,  4860.42,  99.9,  0.000!!END!
785!X=680.89,  4860.42,  100.5,  0.000!!END!
786!X=680.91,  4860.42,  100.97,  0.000!!END!
787!X=680.93,  4860.42,  100.8,  0.000!!END!
788!X=680.95,  4860.42,  100.64,  0.000!!END!
789!X=680.15,  4860.44,  95.88,  0.000!!END!
790!X=680.17,  4860.44,  97.04,  0.000!!END!
791!X=680.19,  4860.44,  97.93,  0.000!!END!
792!X=680.21,  4860.44,  98.82,  0.000!!END!
793!X=680.23,  4860.44,  99.7,  0.000!!END!
794!X=680.25,  4860.44,  99.78,  0.000!!END!
795!X=680.27,  4860.44,  99.47,  0.000!!END!
796!X=680.29,  4860.44,  99.17,  0.000!!END!
797!X=680.31,  4860.44,  98.97,  0.000!!END!
798!X=680.33,  4860.44,  98.95,  0.000!!END!
799!X=680.35,  4860.44,  98.93,  0.000!!END!
800!X=680.69,  4860.44,  100.69,  0.000!!END!
801!X=680.71,  4860.44,  100.85,  0.000!!END!
802!X=680.73,  4860.44,  100.85,  0.000!!END!
803!X=680.75,  4860.44,  100.84,  0.000!!END!
804!X=680.77,  4860.44,  100.84,  0.000!!END!
805!X=680.79,  4860.44,  100.35,  0.000!!END!
806!X=680.81,  4860.44,  99.8,  0.000!!END!
807!X=680.83,  4860.44,  99.25,  0.000!!END!
808!X=680.85,  4860.44,  99.32,  0.000!!END!
809!X=680.87,  4860.44,  99.91,  0.000!!END!
810!X=680.89,  4860.44,  100.51,  0.000!!END!
811!X=680.91,  4860.44,  100.96,  0.000!!END!
812!X=680.93,  4860.44,  100.72,  0.000!!END!
813!X=680.95,  4860.44,  100.49,  0.000!!END!
814!X=680.15,  4860.46,  96.31,  0.000!!END!
815!X=680.17,  4860.46,  97.27,  0.000!!END!
816!X=680.19,  4860.46,  98.03,  0.000!!END!
817!X=680.21,  4860.46,  98.8,  0.000!!END!
818!X=680.23,  4860.46,  99.57,  0.000!!END!
819!X=680.25,  4860.46,  99.67,  0.000!!END!
820!X=680.27,  4860.46,  99.49,  0.000!!END!
821!X=680.29,  4860.46,  99.31,  0.000!!END!
822!X=680.31,  4860.46,  99.11,  0.000!!END!
823!X=680.33,  4860.46,  98.89,  0.000!!END!
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824!X=680.67,  4860.46,  100.61,  0.000!!END!
825!X=680.69,  4860.46,  100.83,  0.000!!END!
826!X=680.71,  4860.46,  101.01,  0.000!!END!
827!X=680.73,  4860.46,  101.05,  0.000!!END!
828!X=680.75,  4860.46,  101.08,  0.000!!END!
829!X=680.77,  4860.46,  101.1,  0.000!!END!
830!X=680.79,  4860.46,  100.57,  0.000!!END!
831!X=680.81,  4860.46,  99.99,  0.000!!END!
832!X=680.83,  4860.46,  99.39,  0.000!!END!
833!X=680.85,  4860.46,  99.44,  0.000!!END!
834!X=680.87,  4860.46,  100,  0.000!!END!
835!X=680.89,  4860.46,  100.57,  0.000!!END!
836!X=680.91,  4860.46,  100.96,  0.000!!END!
837!X=680.93,  4860.46,  100.65,  0.000!!END!
838!X=680.95,  4860.46,  100.34,  0.000!!END!
839!X=680.15,  4860.48,  96.73,  0.000!!END!
840!X=680.17,  4860.48,  97.5,  0.000!!END!
841!X=680.19,  4860.48,  98.13,  0.000!!END!
842!X=680.21,  4860.48,  98.76,  0.000!!END!
843!X=680.23,  4860.48,  99.41,  0.000!!END!
844!X=680.25,  4860.48,  99.54,  0.000!!END!
845!X=680.27,  4860.48,  99.5,  0.000!!END!
846!X=680.29,  4860.48,  99.44,  0.000!!END!
847!X=680.31,  4860.48,  99.22,  0.000!!END!
848!X=680.33,  4860.48,  98.74,  0.000!!END!
849!X=680.67,  4860.48,  100.94,  0.000!!END!
850!X=680.69,  4860.48,  100.97,  0.000!!END!
851!X=680.71,  4860.48,  101.05,  0.000!!END!
852!X=680.73,  4860.48,  101.21,  0.000!!END!
853!X=680.75,  4860.48,  101.37,  0.000!!END!
854!X=680.77,  4860.48,  101.53,  0.000!!END!
855!X=680.79,  4860.48,  101.11,  0.000!!END!
856!X=680.81,  4860.48,  100.65,  0.000!!END!
857!X=680.83,  4860.48,  100.19,  0.000!!END!
858!X=680.85,  4860.48,  100.24,  0.000!!END!
859!X=680.87,  4860.48,  100.67,  0.000!!END!
860!X=680.89,  4860.48,  101.12,  0.000!!END!
861!X=680.91,  4860.48,  101.37,  0.000!!END!
862!X=680.93,  4860.48,  100.99,  0.000!!END!
863!X=680.95,  4860.48,  100.62,  0.000!!END!
864!X=680.15,  4860.5,  97.14,  0.000!!END!
865!X=680.17,  4860.5,  97.72,  0.000!!END!
866!X=680.19,  4860.5,  98.22,  0.000!!END!
867!X=680.21,  4860.5,  98.72,  0.000!!END!
868!X=680.23,  4860.5,  99.24,  0.000!!END!
869!X=680.25,  4860.5,  99.43,  0.000!!END!
870!X=680.27,  4860.5,  99.51,  0.000!!END!
871!X=680.29,  4860.5,  99.58,  0.000!!END!
872!X=680.31,  4860.5,  99.31,  0.000!!END!
873!X=680.33,  4860.5,  98.58,  0.000!!END!
874!X=680.35,  4860.5,  97.86,  0.000!!END!
875!X=680.67,  4860.5,  101.27,  0.000!!END!
876!X=680.69,  4860.5,  101.11,  0.000!!END!
877!X=680.71,  4860.5,  101.09,  0.000!!END!
878!X=680.73,  4860.5,  101.39,  0.000!!END!
879!X=680.75,  4860.5,  101.68,  0.000!!END!
880!X=680.77,  4860.5,  101.96,  0.000!!END!
881!X=680.79,  4860.5,  101.66,  0.000!!END!
882!X=680.81,  4860.5,  101.32,  0.000!!END!
883!X=680.83,  4860.5,  100.99,  0.000!!END!
884!X=680.85,  4860.5,  101.04,  0.000!!END!
885!X=680.87,  4860.5,  101.34,  0.000!!END!
886!X=680.89,  4860.5,  101.65,  0.000!!END!
887!X=680.91,  4860.5,  101.77,  0.000!!END!
888!X=680.93,  4860.5,  101.33,  0.000!!END!
889!X=680.95,  4860.5,  100.89,  0.000!!END!
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890!X=680.15,  4860.52,  97.53,  0.000!!END!
891!X=680.17,  4860.52,  97.93,  0.000!!END!
892!X=680.19,  4860.52,  98.3,  0.000!!END!
893!X=680.21,  4860.52,  98.68,  0.000!!END!
894!X=680.23,  4860.52,  99.06,  0.000!!END!
895!X=680.25,  4860.52,  99.31,  0.000!!END!
896!X=680.27,  4860.52,  99.52,  0.000!!END!
897!X=680.29,  4860.52,  99.73,  0.000!!END!
898!X=680.31,  4860.52,  99.39,  0.000!!END!
899!X=680.33,  4860.52,  98.4,  0.000!!END!
900!X=680.35,  4860.52,  97.42,  0.000!!END!
901!X=680.37,  4860.52,  96.61,  0.000!!END!
902!X=680.39,  4860.52,  97.28,  0.000!!END!
903!X=680.41,  4860.52,  97.95,  0.000!!END!
904!X=680.65,  4860.52,  101.96,  0.000!!END!
905!X=680.67,  4860.52,  101.59,  0.000!!END!
906!X=680.69,  4860.52,  101.23,  0.000!!END!
907!X=680.71,  4860.52,  101.15,  0.000!!END!
908!X=680.73,  4860.52,  101.57,  0.000!!END!
909!X=680.75,  4860.52,  101.99,  0.000!!END!
910!X=680.77,  4860.52,  102.4,  0.000!!END!
911!X=680.79,  4860.52,  102.21,  0.000!!END!
912!X=680.81,  4860.52,  102,  0.000!!END!
913!X=680.83,  4860.52,  101.8,  0.000!!END!
914!X=680.85,  4860.52,  101.83,  0.000!!END!
915!X=680.87,  4860.52,  102,  0.000!!END!
916!X=680.89,  4860.52,  102.19,  0.000!!END!
917!X=680.91,  4860.52,  102.17,  0.000!!END!
918!X=680.93,  4860.52,  101.67,  0.000!!END!
919!X=680.95,  4860.52,  101.17,  0.000!!END!
920!X=680.15,  4860.54,  97.97,  0.000!!END!
921!X=680.17,  4860.54,  98.23,  0.000!!END!
922!X=680.19,  4860.54,  98.52,  0.000!!END!
923!X=680.21,  4860.54,  98.81,  0.000!!END!
924!X=680.23,  4860.54,  99.09,  0.000!!END!
925!X=680.25,  4860.54,  99.38,  0.000!!END!
926!X=680.27,  4860.54,  99.67,  0.000!!END!
927!X=680.29,  4860.54,  99.95,  0.000!!END!
928!X=680.31,  4860.54,  99.57,  0.000!!END!
929!X=680.33,  4860.54,  98.41,  0.000!!END!
930!X=680.35,  4860.54,  97.24,  0.000!!END!
931!X=680.37,  4860.54,  96.27,  0.000!!END!
932!X=680.39,  4860.54,  96.8,  0.000!!END!
933!X=680.41,  4860.54,  97.35,  0.000!!END!
934!X=680.43,  4860.54,  97.91,  0.000!!END!
935!X=680.45,  4860.54,  98.26,  0.000!!END!
936!X=680.47,  4860.54,  98.54,  0.000!!END!
937!X=680.65,  4860.54,  102.46,  0.000!!END!
938!X=680.67,  4860.54,  101.89,  0.000!!END!
939!X=680.69,  4860.54,  101.34,  0.000!!END!
940!X=680.71,  4860.54,  101.21,  0.000!!END!
941!X=680.73,  4860.54,  101.76,  0.000!!END!
942!X=680.75,  4860.54,  102.3,  0.000!!END!
943!X=680.77,  4860.54,  102.83,  0.000!!END!
944!X=680.79,  4860.54,  102.76,  0.000!!END!
945!X=680.81,  4860.54,  102.69,  0.000!!END!
946!X=680.83,  4860.54,  102.61,  0.000!!END!
947!X=680.85,  4860.54,  102.61,  0.000!!END!
948!X=680.87,  4860.54,  102.66,  0.000!!END!
949!X=680.89,  4860.54,  102.71,  0.000!!END!
950!X=680.91,  4860.54,  102.57,  0.000!!END!
951!X=680.93,  4860.54,  102,  0.000!!END!
952!X=680.95,  4860.54,  101.44,  0.000!!END!
953!X=680.15,  4860.56,  98.46,  0.000!!END!
954!X=680.17,  4860.56,  98.67,  0.000!!END!
955!X=680.19,  4860.56,  98.96,  0.000!!END!
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956!X=680.21,  4860.56,  99.25,  0.000!!END!
957!X=680.23,  4860.56,  99.53,  0.000!!END!
958!X=680.25,  4860.56,  99.82,  0.000!!END!
959!X=680.27,  4860.56,  100.11,  0.000!!END!
960!X=680.29,  4860.56,  100.39,  0.000!!END!
961!X=680.31,  4860.56,  100.1,  0.000!!END!
962!X=680.33,  4860.56,  99.2,  0.000!!END!
963!X=680.35,  4860.56,  98.29,  0.000!!END!
964!X=680.37,  4860.56,  97.55,  0.000!!END!
965!X=680.39,  4860.56,  97.89,  0.000!!END!
966!X=680.41,  4860.56,  98.25,  0.000!!END!
967!X=680.43,  4860.56,  98.61,  0.000!!END!
968!X=680.45,  4860.56,  98.91,  0.000!!END!
969!X=680.47,  4860.56,  99.2,  0.000!!END!
970!X=680.49,  4860.56,  99.48,  0.000!!END!
971!X=680.51,  4860.56,  99.78,  0.000!!END!
972!X=680.53,  4860.56,  100.12,  0.000!!END!
973!X=680.65,  4860.56,  102.81,  0.000!!END!
974!X=680.67,  4860.56,  102.11,  0.000!!END!
975!X=680.69,  4860.56,  101.42,  0.000!!END!
976!X=680.71,  4860.56,  101.2,  0.000!!END!
977!X=680.73,  4860.56,  101.71,  0.000!!END!
978!X=680.75,  4860.56,  102.23,  0.000!!END!
979!X=680.77,  4860.56,  102.74,  0.000!!END!
980!X=680.79,  4860.56,  102.75,  0.000!!END!
981!X=680.81,  4860.56,  102.76,  0.000!!END!
982!X=680.83,  4860.56,  102.77,  0.000!!END!
983!X=680.85,  4860.56,  102.76,  0.000!!END!
984!X=680.87,  4860.56,  102.74,  0.000!!END!
985!X=680.89,  4860.56,  102.73,  0.000!!END!
986!X=680.91,  4860.56,  102.51,  0.000!!END!
987!X=680.93,  4860.56,  101.91,  0.000!!END!
988!X=680.95,  4860.56,  101.31,  0.000!!END!
989!X=680.15,  4860.58,  98.95,  0.000!!END!
990!X=680.17,  4860.58,  99.11,  0.000!!END!
991!X=680.19,  4860.58,  99.4,  0.000!!END!
992!X=680.21,  4860.58,  99.69,  0.000!!END!
993!X=680.23,  4860.58,  99.97,  0.000!!END!
994!X=680.25,  4860.58,  100.26,  0.000!!END!
995!X=680.27,  4860.58,  100.55,  0.000!!END!
996!X=680.29,  4860.58,  100.83,  0.000!!END!
997!X=680.31,  4860.58,  100.64,  0.000!!END!
998!X=680.33,  4860.58,  100,  0.000!!END!
999!X=680.35,  4860.58,  99.35,  0.000!!END!
1000!X=680.37,  4860.58,  98.82,  0.000!!END!
1001!X=680.39,  4860.58,  98.97,  0.000!!END!
1002!X=680.41,  4860.58,  99.13,  0.000!!END!
1003!X=680.43,  4860.58,  99.31,  0.000!!END!
1004!X=680.45,  4860.58,  99.57,  0.000!!END!
1005!X=680.47,  4860.58,  99.85,  0.000!!END!
1006!X=680.49,  4860.58,  100.13,  0.000!!END!
1007!X=680.51,  4860.58,  100.47,  0.000!!END!
1008!X=680.53,  4860.58,  100.88,  0.000!!END!
1009!X=680.55,  4860.58,  101.28,  0.000!!END!
1010!X=680.57,  4860.58,  101.71,  0.000!!END!
1011!X=680.59,  4860.58,  102.34,  0.000!!END!
1012!X=680.63,  4860.58,  103.63,  0.000!!END!
1013!X=680.65,  4860.58,  103.13,  0.000!!END!
1014!X=680.67,  4860.58,  102.3,  0.000!!END!
1015!X=680.69,  4860.58,  101.47,  0.000!!END!
1016!X=680.71,  4860.58,  101.16,  0.000!!END!
1017!X=680.73,  4860.58,  101.54,  0.000!!END!
1018!X=680.75,  4860.58,  101.94,  0.000!!END!
1019!X=680.77,  4860.58,  102.31,  0.000!!END!
1020!X=680.79,  4860.58,  102.32,  0.000!!END!
1021!X=680.81,  4860.58,  102.33,  0.000!!END!
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1022!X=680.83,  4860.58,  102.34,  0.000!!END!
1023!X=680.85,  4860.58,  102.28,  0.000!!END!
1024!X=680.87,  4860.58,  102.2,  0.000!!END!
1025!X=680.89,  4860.58,  102.12,  0.000!!END!
1026!X=680.91,  4860.58,  101.82,  0.000!!END!
1027!X=680.93,  4860.58,  101.16,  0.000!!END!
1028!X=680.95,  4860.58,  100.49,  0.000!!END!
1029!X=680.15,  4860.6,  99.43,  0.000!!END!
1030!X=680.17,  4860.6,  99.55,  0.000!!END!
1031!X=680.19,  4860.6,  99.84,  0.000!!END!
1032!X=680.21,  4860.6,  100.13,  0.000!!END!
1033!X=680.23,  4860.6,  100.41,  0.000!!END!
1034!X=680.25,  4860.6,  100.7,  0.000!!END!
1035!X=680.27,  4860.6,  100.99,  0.000!!END!
1036!X=680.29,  4860.6,  101.27,  0.000!!END!
1037!X=680.31,  4860.6,  101.2,  0.000!!END!
1038!X=680.33,  4860.6,  100.82,  0.000!!END!
1039!X=680.35,  4860.6,  100.42,  0.000!!END!
1040!X=680.37,  4860.6,  100.08,  0.000!!END!
1041!X=680.39,  4860.6,  100.04,  0.000!!END!
1042!X=680.41,  4860.6,  100.01,  0.000!!END!
1043!X=680.43,  4860.6,  99.99,  0.000!!END!
1044!X=680.45,  4860.6,  100.23,  0.000!!END!
1045!X=680.47,  4860.6,  100.51,  0.000!!END!
1046!X=680.49,  4860.6,  100.79,  0.000!!END!
1047!X=680.51,  4860.6,  101.16,  0.000!!END!
1048!X=680.53,  4860.6,  101.63,  0.000!!END!
1049!X=680.55,  4860.6,  102.1,  0.000!!END!
1050!X=680.57,  4860.6,  102.57,  0.000!!END!
1051!X=680.59,  4860.6,  103.07,  0.000!!END!
1052!X=680.61,  4860.6,  103.58,  0.000!!END!
1053!X=680.63,  4860.6,  104.1,  0.000!!END!
1054!X=680.65,  4860.6,  103.43,  0.000!!END!
1055!X=680.67,  4860.6,  102.47,  0.000!!END!
1056!X=680.69,  4860.6,  101.52,  0.000!!END!
1057!X=680.71,  4860.6,  101.11,  0.000!!END!
1058!X=680.73,  4860.6,  101.37,  0.000!!END!
1059!X=680.75,  4860.6,  101.63,  0.000!!END!
1060!X=680.77,  4860.6,  101.87,  0.000!!END!
1061!X=680.79,  4860.6,  101.89,  0.000!!END!
1062!X=680.81,  4860.6,  101.9,  0.000!!END!
1063!X=680.83,  4860.6,  101.91,  0.000!!END!
1064!X=680.85,  4860.6,  101.8,  0.000!!END!
1065!X=680.87,  4860.6,  101.65,  0.000!!END!
1066!X=680.89,  4860.6,  101.51,  0.000!!END!
1067!X=680.91,  4860.6,  101.13,  0.000!!END!
1068!X=680.93,  4860.6,  100.4,  0.000!!END!
1069!X=680.95,  4860.6,  99.67,  0.000!!END!
1070!X=680.15,  4860.62,  99.91,  0.000!!END!
1071!X=680.17,  4860.62,  99.99,  0.000!!END!
1072!X=680.19,  4860.62,  100.28,  0.000!!END!
1073!X=680.21,  4860.62,  100.57,  0.000!!END!
1074!X=680.23,  4860.62,  100.85,  0.000!!END!
1075!X=680.25,  4860.62,  101.14,  0.000!!END!
1076!X=680.27,  4860.62,  101.43,  0.000!!END!
1077!X=680.29,  4860.62,  101.71,  0.000!!END!
1078!X=680.31,  4860.62,  101.77,  0.000!!END!
1079!X=680.33,  4860.62,  101.64,  0.000!!END!
1080!X=680.35,  4860.62,  101.51,  0.000!!END!
1081!X=680.37,  4860.62,  101.33,  0.000!!END!
1082!X=680.39,  4860.62,  101.1,  0.000!!END!
1083!X=680.41,  4860.62,  100.87,  0.000!!END!
1084!X=680.43,  4860.62,  100.66,  0.000!!END!
1085!X=680.45,  4860.62,  100.88,  0.000!!END!
1086!X=680.47,  4860.62,  101.16,  0.000!!END!
1087!X=680.49,  4860.62,  101.44,  0.000!!END!
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1088!X=680.51,  4860.62,  101.86,  0.000!!END!
1089!X=680.53,  4860.62,  102.39,  0.000!!END!
1090!X=680.55,  4860.62,  102.92,  0.000!!END!
1091!X=680.57,  4860.62,  103.42,  0.000!!END!
1092!X=680.59,  4860.62,  103.8,  0.000!!END!
1093!X=680.61,  4860.62,  104.18,  0.000!!END!
1094!X=680.63,  4860.62,  104.57,  0.000!!END!
1095!X=680.65,  4860.62,  103.73,  0.000!!END!
1096!X=680.67,  4860.62,  102.64,  0.000!!END!
1097!X=680.69,  4860.62,  101.56,  0.000!!END!
1098!X=680.71,  4860.62,  101.06,  0.000!!END!
1099!X=680.73,  4860.62,  101.18,  0.000!!END!
1100!X=680.75,  4860.62,  101.32,  0.000!!END!
1101!X=680.77,  4860.62,  101.44,  0.000!!END!
1102!X=680.79,  4860.62,  101.45,  0.000!!END!
1103!X=680.81,  4860.62,  101.46,  0.000!!END!
1104!X=680.83,  4860.62,  101.48,  0.000!!END!
1105!X=680.85,  4860.62,  101.31,  0.000!!END!
1106!X=680.87,  4860.62,  101.1,  0.000!!END!
1107!X=680.89,  4860.62,  100.9,  0.000!!END!
1108!X=680.91,  4860.62,  100.44,  0.000!!END!
1109!X=680.93,  4860.62,  99.64,  0.000!!END!
1110!X=680.95,  4860.62,  98.85,  0.000!!END!
1111!X=680.15,  4860.64,  100.28,  0.000!!END!
1112!X=680.17,  4860.64,  100.42,  0.000!!END!
1113!X=680.19,  4860.64,  100.66,  0.000!!END!
1114!X=680.21,  4860.64,  100.9,  0.000!!END!
1115!X=680.23,  4860.64,  101.14,  0.000!!END!
1116!X=680.25,  4860.64,  101.35,  0.000!!END!
1117!X=680.27,  4860.64,  101.56,  0.000!!END!
1118!X=680.29,  4860.64,  101.78,  0.000!!END!
1119!X=680.31,  4860.64,  101.87,  0.000!!END!
1120!X=680.33,  4860.64,  101.88,  0.000!!END!
1121!X=680.35,  4860.64,  101.88,  0.000!!END!
1122!X=680.37,  4860.64,  101.83,  0.000!!END!
1123!X=680.39,  4860.64,  101.6,  0.000!!END!
1124!X=680.41,  4860.64,  101.36,  0.000!!END!
1125!X=680.43,  4860.64,  101.12,  0.000!!END!
1126!X=680.45,  4860.64,  101.36,  0.000!!END!
1127!X=680.47,  4860.64,  101.65,  0.000!!END!
1128!X=680.49,  4860.64,  101.94,  0.000!!END!
1129!X=680.51,  4860.64,  102.38,  0.000!!END!
1130!X=680.53,  4860.64,  102.93,  0.000!!END!
1131!X=680.55,  4860.64,  103.49,  0.000!!END!
1132!X=680.57,  4860.64,  104.01,  0.000!!END!
1133!X=680.59,  4860.64,  104.33,  0.000!!END!
1134!X=680.61,  4860.64,  104.64,  0.000!!END!
1135!X=680.63,  4860.64,  104.95,  0.000!!END!
1136!X=680.65,  4860.64,  104,  0.000!!END!
1137!X=680.67,  4860.64,  102.81,  0.000!!END!
1138!X=680.69,  4860.64,  101.62,  0.000!!END!
1139!X=680.71,  4860.64,  101.02,  0.000!!END!
1140!X=680.73,  4860.64,  101.01,  0.000!!END!
1141!X=680.75,  4860.64,  101,  0.000!!END!
1142!X=680.77,  4860.64,  101.01,  0.000!!END!
1143!X=680.79,  4860.64,  101.02,  0.000!!END!
1144!X=680.81,  4860.64,  101.03,  0.000!!END!
1145!X=680.83,  4860.64,  101.04,  0.000!!END!
1146!X=680.85,  4860.64,  100.82,  0.000!!END!
1147!X=680.87,  4860.64,  100.55,  0.000!!END!
1148!X=680.89,  4860.64,  100.28,  0.000!!END!
1149!X=680.91,  4860.64,  99.74,  0.000!!END!
1150!X=680.93,  4860.64,  98.88,  0.000!!END!
1151!X=680.95,  4860.64,  98.02,  0.000!!END!
1152!X=680.15,  4860.66,  100.63,  0.000!!END!
1153!X=680.17,  4860.66,  100.84,  0.000!!END!
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1154!X=680.19,  4860.66,  101.01,  0.000!!END!
1155!X=680.21,  4860.66,  101.19,  0.000!!END!
1156!X=680.23,  4860.66,  101.37,  0.000!!END!
1157!X=680.25,  4860.66,  101.44,  0.000!!END!
1158!X=680.27,  4860.66,  101.53,  0.000!!END!
1159!X=680.29,  4860.66,  101.62,  0.000!!END!
1160!X=680.31,  4860.66,  101.65,  0.000!!END!
1161!X=680.33,  4860.66,  101.66,  0.000!!END!
1162!X=680.35,  4860.66,  101.67,  0.000!!END!
1163!X=680.37,  4860.66,  101.64,  0.000!!END!
1164!X=680.39,  4860.66,  101.54,  0.000!!END!
1165!X=680.41,  4860.66,  101.43,  0.000!!END!
1166!X=680.43,  4860.66,  101.32,  0.000!!END!
1167!X=680.45,  4860.66,  101.58,  0.000!!END!
1168!X=680.47,  4860.66,  101.88,  0.000!!END!
1169!X=680.49,  4860.66,  102.17,  0.000!!END!
1170!X=680.51,  4860.66,  102.54,  0.000!!END!
1171!X=680.53,  4860.66,  102.96,  0.000!!END!
1172!X=680.55,  4860.66,  103.39,  0.000!!END!
1173!X=680.57,  4860.66,  103.82,  0.000!!END!
1174!X=680.59,  4860.66,  104.2,  0.000!!END!
1175!X=680.61,  4860.66,  104.58,  0.000!!END!
1176!X=680.63,  4860.66,  104.96,  0.000!!END!
1177!X=680.65,  4860.66,  104.08,  0.000!!END!
1178!X=680.67,  4860.66,  103.02,  0.000!!END!
1179!X=680.69,  4860.66,  101.96,  0.000!!END!
1180!X=680.71,  4860.66,  101.38,  0.000!!END!
1181!X=680.73,  4860.66,  101.24,  0.000!!END!
1182!X=680.75,  4860.66,  101.11,  0.000!!END!
1183!X=680.77,  4860.66,  101.02,  0.000!!END!
1184!X=680.79,  4860.66,  101.14,  0.000!!END!
1185!X=680.81,  4860.66,  101.26,  0.000!!END!
1186!X=680.83,  4860.66,  101.37,  0.000!!END!
1187!X=680.85,  4860.66,  101.17,  0.000!!END!
1188!X=680.87,  4860.66,  100.92,  0.000!!END!
1189!X=680.89,  4860.66,  100.66,  0.000!!END!
1190!X=680.91,  4860.66,  100.13,  0.000!!END!
1191!X=680.93,  4860.66,  99.31,  0.000!!END!
1192!X=680.95,  4860.66,  98.49,  0.000!!END!
1193!X=680.15,  4860.68,  100.99,  0.000!!END!
1194!X=680.17,  4860.68,  101.25,  0.000!!END!
1195!X=680.19,  4860.68,  101.36,  0.000!!END!
1196!X=680.21,  4860.68,  101.47,  0.000!!END!
1197!X=680.23,  4860.68,  101.59,  0.000!!END!
1198!X=680.25,  4860.68,  101.53,  0.000!!END!
1199!X=680.27,  4860.68,  101.49,  0.000!!END!
1200!X=680.29,  4860.68,  101.45,  0.000!!END!
1201!X=680.31,  4860.68,  101.44,  0.000!!END!
1202!X=680.33,  4860.68,  101.44,  0.000!!END!
1203!X=680.35,  4860.68,  101.45,  0.000!!END!
1204!X=680.37,  4860.68,  101.46,  0.000!!END!
1205!X=680.39,  4860.68,  101.49,  0.000!!END!
1206!X=680.41,  4860.68,  101.51,  0.000!!END!
1207!X=680.43,  4860.68,  101.53,  0.000!!END!
1208!X=680.45,  4860.68,  101.81,  0.000!!END!
1209!X=680.47,  4860.68,  102.1,  0.000!!END!
1210!X=680.49,  4860.68,  102.39,  0.000!!END!
1211!X=680.51,  4860.68,  102.68,  0.000!!END!
1212!X=680.53,  4860.68,  102.98,  0.000!!END!
1213!X=680.55,  4860.68,  103.28,  0.000!!END!
1214!X=680.57,  4860.68,  103.63,  0.000!!END!
1215!X=680.59,  4860.68,  104.08,  0.000!!END!
1216!X=680.61,  4860.68,  104.52,  0.000!!END!
1217!X=680.63,  4860.68,  104.96,  0.000!!END!
1218!X=680.65,  4860.68,  104.17,  0.000!!END!
1219!X=680.67,  4860.68,  103.24,  0.000!!END!
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1220!X=680.69,  4860.68,  102.31,  0.000!!END!
1221!X=680.71,  4860.68,  101.74,  0.000!!END!
1222!X=680.73,  4860.68,  101.47,  0.000!!END!
1223!X=680.75,  4860.68,  101.2,  0.000!!END!
1224!X=680.77,  4860.68,  101.05,  0.000!!END!
1225!X=680.79,  4860.68,  101.3,  0.000!!END!
1226!X=680.81,  4860.68,  101.55,  0.000!!END!
1227!X=680.83,  4860.68,  101.78,  0.000!!END!
1228!X=680.85,  4860.68,  101.65,  0.000!!END!
1229!X=680.87,  4860.68,  101.46,  0.000!!END!
1230!X=680.89,  4860.68,  101.26,  0.000!!END!
1231!X=680.91,  4860.68,  100.82,  0.000!!END!
1232!X=680.93,  4860.68,  100.13,  0.000!!END!
1233!X=680.95,  4860.68,  99.44,  0.000!!END!
1234!X=680.15,  4860.7,  101.35,  0.000!!END!
1235!X=680.17,  4860.7,  101.66,  0.000!!END!
1236!X=680.19,  4860.7,  101.7,  0.000!!END!
1237!X=680.21,  4860.7,  101.75,  0.000!!END!
1238!X=680.23,  4860.7,  101.79,  0.000!!END!
1239!X=680.25,  4860.7,  101.61,  0.000!!END!
1240!X=680.27,  4860.7,  101.44,  0.000!!END!
1241!X=680.29,  4860.7,  101.27,  0.000!!END!
1242!X=680.31,  4860.7,  101.22,  0.000!!END!
1243!X=680.33,  4860.7,  101.23,  0.000!!END!
1244!X=680.35,  4860.7,  101.23,  0.000!!END!
1245!X=680.37,  4860.7,  101.29,  0.000!!END!
1246!X=680.39,  4860.7,  101.45,  0.000!!END!
1247!X=680.41,  4860.7,  101.6,  0.000!!END!
1248!X=680.43,  4860.7,  101.74,  0.000!!END!
1249!X=680.45,  4860.7,  102.03,  0.000!!END!
1250!X=680.47,  4860.7,  102.32,  0.000!!END!
1251!X=680.49,  4860.7,  102.62,  0.000!!END!
1252!X=680.51,  4860.7,  102.83,  0.000!!END!
1253!X=680.53,  4860.7,  102.99,  0.000!!END!
1254!X=680.55,  4860.7,  103.17,  0.000!!END!
1255!X=680.57,  4860.7,  103.44,  0.000!!END!
1256!X=680.59,  4860.7,  103.96,  0.000!!END!
1257!X=680.61,  4860.7,  104.46,  0.000!!END!
1258!X=680.63,  4860.7,  104.97,  0.000!!END!
1259!X=680.65,  4860.7,  104.26,  0.000!!END!
1260!X=680.67,  4860.7,  103.47,  0.000!!END!
1261!X=680.69,  4860.7,  102.66,  0.000!!END!
1262!X=680.71,  4860.7,  102.09,  0.000!!END!
1263!X=680.73,  4860.7,  101.69,  0.000!!END!
1264!X=680.75,  4860.7,  101.3,  0.000!!END!
1265!X=680.77,  4860.7,  101.09,  0.000!!END!
1266!X=680.79,  4860.7,  101.47,  0.000!!END!
1267!X=680.81,  4860.7,  101.84,  0.000!!END!
1268!X=680.83,  4860.7,  102.21,  0.000!!END!
1269!X=680.85,  4860.7,  102.14,  0.000!!END!
1270!X=680.87,  4860.7,  102.01,  0.000!!END!
1271!X=680.89,  4860.7,  101.88,  0.000!!END!
1272!X=680.91,  4860.7,  101.52,  0.000!!END!
1273!X=680.93,  4860.7,  100.96,  0.000!!END!
1274!X=680.95,  4860.7,  100.39,  0.000!!END!
1275!X=680.15,  4860.72,  101.62,  0.000!!END!
1276!X=680.17,  4860.72,  101.96,  0.000!!END!
1277!X=680.19,  4860.72,  101.97,  0.000!!END!
1278!X=680.21,  4860.72,  101.98,  0.000!!END!
1279!X=680.23,  4860.72,  101.96,  0.000!!END!
1280!X=680.25,  4860.72,  101.68,  0.000!!END!
1281!X=680.27,  4860.72,  101.39,  0.000!!END!
1282!X=680.29,  4860.72,  101.09,  0.000!!END!
1283!X=680.31,  4860.72,  101.01,  0.000!!END!
1284!X=680.33,  4860.72,  101.01,  0.000!!END!
1285!X=680.35,  4860.72,  101.02,  0.000!!END!
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1286!X=680.37,  4860.72,  101.13,  0.000!!END!
1287!X=680.39,  4860.72,  101.41,  0.000!!END!
1288!X=680.41,  4860.72,  101.69,  0.000!!END!
1289!X=680.43,  4860.72,  101.96,  0.000!!END!
1290!X=680.45,  4860.72,  102.26,  0.000!!END!
1291!X=680.47,  4860.72,  102.55,  0.000!!END!
1292!X=680.49,  4860.72,  102.84,  0.000!!END!
1293!X=680.51,  4860.72,  102.96,  0.000!!END!
1294!X=680.53,  4860.72,  103,  0.000!!END!
1295!X=680.55,  4860.72,  103.05,  0.000!!END!
1296!X=680.57,  4860.72,  103.26,  0.000!!END!
1297!X=680.59,  4860.72,  103.84,  0.000!!END!
1298!X=680.61,  4860.72,  104.41,  0.000!!END!
1299!X=680.63,  4860.72,  104.98,  0.000!!END!
1300!X=680.65,  4860.72,  104.36,  0.000!!END!
1301!X=680.67,  4860.72,  103.7,  0.000!!END!
1302!X=680.69,  4860.72,  103.02,  0.000!!END!
1303!X=680.71,  4860.72,  102.43,  0.000!!END!
1304!X=680.73,  4860.72,  101.9,  0.000!!END!
1305!X=680.75,  4860.72,  101.38,  0.000!!END!
1306!X=680.77,  4860.72,  101.13,  0.000!!END!
1307!X=680.79,  4860.72,  101.64,  0.000!!END!
1308!X=680.81,  4860.72,  102.14,  0.000!!END!
1309!X=680.83,  4860.72,  102.64,  0.000!!END!
1310!X=680.85,  4860.72,  102.63,  0.000!!END!
1311!X=680.87,  4860.72,  102.56,  0.000!!END!
1312!X=680.89,  4860.72,  102.49,  0.000!!END!
1313!X=680.91,  4860.72,  102.22,  0.000!!END!
1314!X=680.93,  4860.72,  101.79,  0.000!!END!
1315!X=680.95,  4860.72,  101.36,  0.000!!END!
1316!X=680.15,  4860.74,  101.45,  0.000!!END!
1317!X=680.17,  4860.74,  101.75,  0.000!!END!
1318!X=680.19,  4860.74,  101.75,  0.000!!END!
1319!X=680.21,  4860.74,  101.76,  0.000!!END!
1320!X=680.23,  4860.74,  101.75,  0.000!!END!
1321!X=680.25,  4860.74,  101.6,  0.000!!END!
1322!X=680.27,  4860.74,  101.43,  0.000!!END!
1323!X=680.29,  4860.74,  101.26,  0.000!!END!
1324!X=680.31,  4860.74,  101.21,  0.000!!END!
1325!X=680.33,  4860.74,  101.2,  0.000!!END!
1326!X=680.35,  4860.74,  101.2,  0.000!!END!
1327!X=680.37,  4860.74,  101.31,  0.000!!END!
1328!X=680.39,  4860.74,  101.6,  0.000!!END!
1329!X=680.41,  4860.74,  101.89,  0.000!!END!
1330!X=680.43,  4860.74,  102.19,  0.000!!END!
1331!X=680.45,  4860.74,  102.48,  0.000!!END!
1332!X=680.47,  4860.74,  102.77,  0.000!!END!
1333!X=680.49,  4860.74,  103.06,  0.000!!END!
1334!X=680.51,  4860.74,  103.18,  0.000!!END!
1335!X=680.53,  4860.74,  103.22,  0.000!!END!
1336!X=680.55,  4860.74,  103.25,  0.000!!END!
1337!X=680.57,  4860.74,  103.46,  0.000!!END!
1338!X=680.59,  4860.74,  104,  0.000!!END!
1339!X=680.61,  4860.74,  104.56,  0.000!!END!
1340!X=680.63,  4860.74,  105.11,  0.000!!END!
1341!X=680.65,  4860.74,  104.49,  0.000!!END!
1342!X=680.67,  4860.74,  103.85,  0.000!!END!
1343!X=680.69,  4860.74,  103.23,  0.000!!END!
1344!X=680.71,  4860.74,  102.65,  0.000!!END!
1345!X=680.73,  4860.74,  102.11,  0.000!!END!
1346!X=680.75,  4860.74,  101.55,  0.000!!END!
1347!X=680.77,  4860.74,  101.3,  0.000!!END!
1348!X=680.79,  4860.74,  101.8,  0.000!!END!
1349!X=680.81,  4860.74,  102.32,  0.000!!END!
1350!X=680.83,  4860.74,  102.85,  0.000!!END!
1351!X=680.85,  4860.74,  102.91,  0.000!!END!
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1352!X=680.87,  4860.74,  102.94,  0.000!!END!
1353!X=680.89,  4860.74,  102.96,  0.000!!END!
1354!X=680.91,  4860.74,  102.81,  0.000!!END!
1355!X=680.93,  4860.74,  102.54,  0.000!!END!
1356!X=680.95,  4860.74,  102.26,  0.000!!END!
1357!X=680.15,  4860.76,  101.28,  0.000!!END!
1358!X=680.17,  4860.76,  101.53,  0.000!!END!
1359!X=680.19,  4860.76,  101.54,  0.000!!END!
1360!X=680.21,  4860.76,  101.54,  0.000!!END!
1361!X=680.23,  4860.76,  101.55,  0.000!!END!
1362!X=680.25,  4860.76,  101.52,  0.000!!END!
1363!X=680.27,  4860.76,  101.48,  0.000!!END!
1364!X=680.29,  4860.76,  101.44,  0.000!!END!
1365!X=680.31,  4860.76,  101.43,  0.000!!END!
1366!X=680.33,  4860.76,  101.42,  0.000!!END!
1367!X=680.35,  4860.76,  101.41,  0.000!!END!
1368!X=680.37,  4860.76,  101.53,  0.000!!END!
1369!X=680.39,  4860.76,  101.83,  0.000!!END!
1370!X=680.41,  4860.76,  102.12,  0.000!!END!
1371!X=680.43,  4860.76,  102.41,  0.000!!END!
1372!X=680.45,  4860.76,  102.7,  0.000!!END!
1373!X=680.47,  4860.76,  103,  0.000!!END!
1374!X=680.49,  4860.76,  103.29,  0.000!!END!
1375!X=680.51,  4860.76,  103.45,  0.000!!END!
1376!X=680.53,  4860.76,  103.55,  0.000!!END!
1377!X=680.55,  4860.76,  103.64,  0.000!!END!
1378!X=680.57,  4860.76,  103.88,  0.000!!END!
1379!X=680.59,  4860.76,  104.36,  0.000!!END!
1380!X=680.61,  4860.76,  104.85,  0.000!!END!
1381!X=680.63,  4860.76,  105.32,  0.000!!END!
1382!X=680.65,  4860.76,  104.62,  0.000!!END!
1383!X=680.67,  4860.76,  103.92,  0.000!!END!
1384!X=680.69,  4860.76,  103.23,  0.000!!END!
1385!X=680.71,  4860.76,  102.72,  0.000!!END!
1386!X=680.73,  4860.76,  102.31,  0.000!!END!
1387!X=680.75,  4860.76,  101.88,  0.000!!END!
1388!X=680.77,  4860.76,  101.66,  0.000!!END!
1389!X=680.79,  4860.76,  101.91,  0.000!!END!
1390!X=680.81,  4860.76,  102.17,  0.000!!END!
1391!X=680.83,  4860.76,  102.45,  0.000!!END!
1392!X=680.85,  4860.76,  102.54,  0.000!!END!
1393!X=680.87,  4860.76,  102.63,  0.000!!END!
1394!X=680.89,  4860.76,  102.72,  0.000!!END!
1395!X=680.91,  4860.76,  102.7,  0.000!!END!
1396!X=680.93,  4860.76,  102.63,  0.000!!END!
1397!X=680.95,  4860.76,  102.54,  0.000!!END!
1398!X=679.85,  4859.66,  74.37,  0.000!!END!
1399!X=679.9,  4859.66,  74.34,  0.000!!END!
1400!X=679.95,  4859.66,  74.58,  0.000!!END!
1401!X=680,  4859.66,  75.02,  0.000!!END!
1402!X=680.05,  4859.66,  75.44,  0.000!!END!
1403!X=680.1,  4859.66,  75.05,  0.000!!END!
1404!X=680.15,  4859.66,  74.79,  0.000!!END!
1405!X=680.2,  4859.66,  74.91,  0.000!!END!
1406!X=680.25,  4859.66,  75.71,  0.000!!END!
1407!X=680.3,  4859.66,  77.17,  0.000!!END!
1408!X=680.35,  4859.66,  78.05,  0.000!!END!
1409!X=680.4,  4859.66,  78.3,  0.000!!END!
1410!X=680.45,  4859.66,  78.53,  0.000!!END!
1411!X=680.5,  4859.66,  79.38,  0.000!!END!
1412!X=680.55,  4859.66,  80.22,  0.000!!END!
1413!X=680.6,  4859.66,  80.44,  0.000!!END!
1414!X=680.65,  4859.66,  77.96,  0.000!!END!
1415!X=680.7,  4859.66,  76.83,  0.000!!END!
1416!X=680.75,  4859.66,  76.37,  0.000!!END!
1417!X=680.8,  4859.66,  76.25,  0.000!!END!
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1418!X=680.85,  4859.66,  76.13,  0.000!!END!
1419!X=680.9,  4859.66,  76.01,  0.000!!END!
1420!X=680.95,  4859.66,  75.78,  0.000!!END!
1421!X=681,  4859.66,  75.24,  0.000!!END!
1422!X=681.05,  4859.66,  73.4,  0.000!!END!
1423!X=681.1,  4859.66,  73,  0.000!!END!
1424!X=681.15,  4859.66,  73,  0.000!!END!
1425!X=681.2,  4859.66,  73,  0.000!!END!
1426!X=681.25,  4859.66,  73,  0.000!!END!
1427!X=679.85,  4859.71,  75.24,  0.000!!END!
1428!X=679.9,  4859.71,  75.07,  0.000!!END!
1429!X=679.95,  4859.71,  75.68,  0.000!!END!
1430!X=680,  4859.71,  76.78,  0.000!!END!
1431!X=680.05,  4859.71,  77.73,  0.000!!END!
1432!X=680.1,  4859.71,  76.99,  0.000!!END!
1433!X=680.15,  4859.71,  76.6,  0.000!!END!
1434!X=680.2,  4859.71,  76.97,  0.000!!END!
1435!X=680.25,  4859.71,  78.55,  0.000!!END!
1436!X=680.3,  4859.71,  81.27,  0.000!!END!
1437!X=680.35,  4859.71,  82.92,  0.000!!END!
1438!X=680.4,  4859.71,  83.53,  0.000!!END!
1439!X=680.45,  4859.71,  84.19,  0.000!!END!
1440!X=680.5,  4859.71,  84.2,  0.000!!END!
1441!X=680.55,  4859.71,  84.11,  0.000!!END!
1442!X=680.6,  4859.71,  83.89,  0.000!!END!
1443!X=680.65,  4859.71,  83.03,  0.000!!END!
1444!X=680.7,  4859.71,  81.54,  0.000!!END!
1445!X=680.75,  4859.71,  80.69,  0.000!!END!
1446!X=680.8,  4859.71,  80.57,  0.000!!END!
1447!X=680.85,  4859.71,  80.45,  0.000!!END!
1448!X=680.9,  4859.71,  80.33,  0.000!!END!
1449!X=680.95,  4859.71,  79.9,  0.000!!END!
1450!X=681,  4859.71,  78.59,  0.000!!END!
1451!X=681.05,  4859.71,  73.94,  0.000!!END!
1452!X=681.1,  4859.71,  73,  0.000!!END!
1453!X=681.15,  4859.71,  73,  0.000!!END!
1454!X=681.2,  4859.71,  73,  0.000!!END!
1455!X=681.25,  4859.71,  73,  0.000!!END!
1456!X=679.85,  4859.76,  75.8,  0.000!!END!
1457!X=679.9,  4859.76,  75.22,  0.000!!END!
1458!X=679.95,  4859.76,  76.45,  0.000!!END!
1459!X=680,  4859.76,  78.64,  0.000!!END!
1460!X=680.05,  4859.76,  80.39,  0.000!!END!
1461!X=680.1,  4859.76,  79.29,  0.000!!END!
1462!X=680.15,  4859.76,  79,  0.000!!END!
1463!X=680.2,  4859.76,  79.92,  0.000!!END!
1464!X=680.25,  4859.76,  82.3,  0.000!!END!
1465!X=680.3,  4859.76,  85.13,  0.000!!END!
1466!X=680.35,  4859.76,  86.49,  0.000!!END!
1467!X=680.4,  4859.76,  86.79,  0.000!!END!
1468!X=680.45,  4859.76,  87.44,  0.000!!END!
1469!X=680.5,  4859.76,  87.44,  0.000!!END!
1470!X=680.55,  4859.76,  87.13,  0.000!!END!
1471!X=680.6,  4859.76,  86.65,  0.000!!END!
1472!X=680.65,  4859.76,  86.23,  0.000!!END!
1473!X=680.7,  4859.76,  86.13,  0.000!!END!
1474!X=680.75,  4859.76,  86.59,  0.000!!END!
1475!X=680.8,  4859.76,  87.45,  0.000!!END!
1476!X=680.85,  4859.76,  87.96,  0.000!!END!
1477!X=680.9,  4859.76,  87.85,  0.000!!END!
1478!X=680.95,  4859.76,  87.25,  0.000!!END!
1479!X=681,  4859.76,  85.97,  0.000!!END!
1480!X=681.05,  4859.76,  82.97,  0.000!!END!
1481!X=681.1,  4859.76,  82.14,  0.000!!END!
1482!X=681.15,  4859.76,  80.7,  0.000!!END!
1483!X=681.2,  4859.76,  78.17,  0.000!!END!
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1484!X=681.25,  4859.76,  75.59,  0.000!!END!
1485!X=679.85,  4859.81,  76.33,  0.000!!END!
1486!X=679.9,  4859.81,  75.98,  0.000!!END!
1487!X=679.95,  4859.81,  77.45,  0.000!!END!
1488!X=680,  4859.81,  79.8,  0.000!!END!
1489!X=680.05,  4859.81,  81.66,  0.000!!END!
1490!X=680.1,  4859.81,  80.84,  0.000!!END!
1491!X=680.15,  4859.81,  81.09,  0.000!!END!
1492!X=680.2,  4859.81,  82.62,  0.000!!END!
1493!X=680.25,  4859.81,  85.54,  0.000!!END!
1494!X=680.3,  4859.81,  88.11,  0.000!!END!
1495!X=680.35,  4859.81,  89.23,  0.000!!END!
1496!X=680.4,  4859.81,  89.47,  0.000!!END!
1497!X=680.45,  4859.81,  90.19,  0.000!!END!
1498!X=680.5,  4859.81,  90.3,  0.000!!END!
1499!X=680.55,  4859.81,  89.87,  0.000!!END!
1500!X=680.6,  4859.81,  89.27,  0.000!!END!
1501!X=680.65,  4859.81,  89.27,  0.000!!END!
1502!X=680.7,  4859.81,  90.51,  0.000!!END!
1503!X=680.75,  4859.81,  92.34,  0.000!!END!
1504!X=680.8,  4859.81,  94.37,  0.000!!END!
1505!X=680.85,  4859.81,  95.84,  0.000!!END!
1506!X=680.9,  4859.81,  95.94,  0.000!!END!
1507!X=680.95,  4859.81,  95.33,  0.000!!END!
1508!X=681,  4859.81,  94.61,  0.000!!END!
1509!X=681.05,  4859.81,  94.83,  0.000!!END!
1510!X=681.1,  4859.81,  94.56,  0.000!!END!
1511!X=681.15,  4859.81,  91.42,  0.000!!END!
1512!X=681.2,  4859.81,  85.59,  0.000!!END!
1513!X=681.25,  4859.81,  79.39,  0.000!!END!
1514!X=679.85,  4859.86,  76.84,  0.000!!END!
1515!X=679.9,  4859.86,  77.32,  0.000!!END!
1516!X=679.95,  4859.86,  78.61,  0.000!!END!
1517!X=680,  4859.86,  80.13,  0.000!!END!
1518!X=680.05,  4859.86,  81.19,  0.000!!END!
1519!X=680.1,  4859.86,  81.46,  0.000!!END!
1520!X=680.15,  4859.86,  82.71,  0.000!!END!
1521!X=680.2,  4859.86,  84.86,  0.000!!END!
1522!X=680.25,  4859.86,  87.78,  0.000!!END!
1523!X=680.3,  4859.86,  89.18,  0.000!!END!
1524!X=680.35,  4859.86,  90.02,  0.000!!END!
1525!X=680.4,  4859.86,  90.57,  0.000!!END!
1526!X=680.45,  4859.86,  91.29,  0.000!!END!
1527!X=680.5,  4859.86,  91.76,  0.000!!END!
1528!X=680.55,  4859.86,  91.47,  0.000!!END!
1529!X=680.6,  4859.86,  90.99,  0.000!!END!
1530!X=680.65,  4859.86,  91.4,  0.000!!END!
1531!X=680.7,  4859.86,  92.34,  0.000!!END!
1532!X=680.75,  4859.86,  93.78,  0.000!!END!
1533!X=680.8,  4859.86,  95.58,  0.000!!END!
1534!X=680.85,  4859.86,  97.46,  0.000!!END!
1535!X=680.9,  4859.86,  98.68,  0.000!!END!
1536!X=680.95,  4859.86,  99.36,  0.000!!END!
1537!X=681,  4859.86,  99.64,  0.000!!END!
1538!X=681.05,  4859.86,  99.89,  0.000!!END!
1539!X=681.1,  4859.86,  98.26,  0.000!!END!
1540!X=681.15,  4859.86,  94.56,  0.000!!END!
1541!X=681.2,  4859.86,  89.45,  0.000!!END!
1542!X=681.25,  4859.86,  85.23,  0.000!!END!
1543!X=679.85,  4859.91,  78.16,  0.000!!END!
1544!X=679.9,  4859.91,  78.31,  0.000!!END!
1545!X=679.95,  4859.91,  79.38,  0.000!!END!
1546!X=680,  4859.91,  80.6,  0.000!!END!
1547!X=680.05,  4859.91,  81.33,  0.000!!END!
1548!X=680.1,  4859.91,  82.53,  0.000!!END!
1549!X=680.15,  4859.91,  84.23,  0.000!!END!
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1550!X=680.2,  4859.91,  86.53,  0.000!!END!
1551!X=680.25,  4859.91,  89.49,  0.000!!END!
1552!X=680.3,  4859.91,  90.42,  0.000!!END!
1553!X=680.35,  4859.91,  91.08,  0.000!!END!
1554!X=680.4,  4859.91,  91.62,  0.000!!END!
1555!X=680.45,  4859.91,  92.19,  0.000!!END!
1556!X=680.5,  4859.91,  92.77,  0.000!!END!
1557!X=680.55,  4859.91,  92.62,  0.000!!END!
1558!X=680.6,  4859.91,  92.41,  0.000!!END!
1559!X=680.65,  4859.91,  93.25,  0.000!!END!
1560!X=680.7,  4859.91,  94.07,  0.000!!END!
1561!X=680.75,  4859.91,  95.1,  0.000!!END!
1562!X=680.8,  4859.91,  96.63,  0.000!!END!
1563!X=680.85,  4859.91,  99,  0.000!!END!
1564!X=680.9,  4859.91,  101.01,  0.000!!END!
1565!X=680.95,  4859.91,  102.78,  0.000!!END!
1566!X=681,  4859.91,  103.96,  0.000!!END!
1567!X=681.05,  4859.91,  104,  0.000!!END!
1568!X=681.1,  4859.91,  100.62,  0.000!!END!
1569!X=681.15,  4859.91,  96.48,  0.000!!END!
1570!X=681.2,  4859.91,  92.75,  0.000!!END!
1571!X=681.25,  4859.91,  91.75,  0.000!!END!
1572!X=679.85,  4859.96,  79.74,  0.000!!END!
1573!X=679.9,  4859.96,  79.08,  0.000!!END!
1574!X=679.95,  4859.96,  79.96,  0.000!!END!
1575!X=680,  4859.96,  81.16,  0.000!!END!
1576!X=680.05,  4859.96,  81.93,  0.000!!END!
1577!X=680.1,  4859.96,  83.93,  0.000!!END!
1578!X=681,  4859.96,  103.53,  0.000!!END!
1579!X=681.05,  4859.96,  103.97,  0.000!!END!
1580!X=681.1,  4859.96,  100.14,  0.000!!END!
1581!X=681.15,  4859.96,  97.01,  0.000!!END!
1582!X=681.2,  4859.96,  94.92,  0.000!!END!
1583!X=681.25,  4859.96,  94.12,  0.000!!END!
1584!X=679.85,  4860.01,  80.46,  0.000!!END!
1585!X=679.9,  4860.01,  80.37,  0.000!!END!
1586!X=679.95,  4860.01,  80.93,  0.000!!END!
1587!X=680,  4860.01,  81.72,  0.000!!END!
1588!X=680.05,  4860.01,  82.54,  0.000!!END!
1589!X=680.1,  4860.01,  84.76,  0.000!!END!
1590!X=681,  4860.01,  102.66,  0.000!!END!
1591!X=681.05,  4860.01,  103.31,  0.000!!END!
1592!X=681.1,  4860.01,  99.55,  0.000!!END!
1593!X=681.15,  4860.01,  97.54,  0.000!!END!
1594!X=681.2,  4860.01,  96.81,  0.000!!END!
1595!X=681.25,  4860.01,  96.1,  0.000!!END!
1596!X=679.85,  4860.06,  81.08,  0.000!!END!
1597!X=679.9,  4860.06,  81.8,  0.000!!END!
1598!X=679.95,  4860.06,  81.95,  0.000!!END!
1599!X=680,  4860.06,  82.28,  0.000!!END!
1600!X=680.05,  4860.06,  83.14,  0.000!!END!
1601!X=680.1,  4860.06,  85.36,  0.000!!END!
1602!X=681,  4860.06,  100.26,  0.000!!END!
1603!X=681.05,  4860.06,  100.1,  0.000!!END!
1604!X=681.1,  4860.06,  98.58,  0.000!!END!
1605!X=681.15,  4860.06,  97.52,  0.000!!END!
1606!X=681.2,  4860.06,  96.91,  0.000!!END!
1607!X=681.25,  4860.06,  96.6,  0.000!!END!
1608!X=679.85,  4860.11,  81.1,  0.000!!END!
1609!X=679.9,  4860.11,  81.85,  0.000!!END!
1610!X=679.95,  4860.11,  82.3,  0.000!!END!
1611!X=680,  4860.11,  83.01,  0.000!!END!
1612!X=680.05,  4860.11,  84.27,  0.000!!END!
1613!X=680.1,  4860.11,  86.83,  0.000!!END!
1614!X=681,  4860.11,  98.79,  0.000!!END!
1615!X=681.05,  4860.11,  98.19,  0.000!!END!
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1616!X=681.1,  4860.11,  97.91,  0.000!!END!
1617!X=681.15,  4860.11,  97.42,  0.000!!END!
1618!X=681.2,  4860.11,  96.96,  0.000!!END!
1619!X=681.25,  4860.11,  96.87,  0.000!!END!
1620!X=679.85,  4860.16,  81.36,  0.000!!END!
1621!X=679.9,  4860.16,  82.01,  0.000!!END!
1622!X=679.95,  4860.16,  82.79,  0.000!!END!
1623!X=680,  4860.16,  83.87,  0.000!!END!
1624!X=680.05,  4860.16,  85.52,  0.000!!END!
1625!X=680.1,  4860.16,  88.43,  0.000!!END!
1626!X=681,  4860.16,  98.93,  0.000!!END!
1627!X=681.05,  4860.16,  98.69,  0.000!!END!
1628!X=681.1,  4860.16,  97.6,  0.000!!END!
1629!X=681.15,  4860.16,  97.14,  0.000!!END!
1630!X=681.2,  4860.16,  96.82,  0.000!!END!
1631!X=681.25,  4860.16,  96.33,  0.000!!END!
1632!X=679.85,  4860.21,  82.92,  0.000!!END!
1633!X=679.9,  4860.21,  83.17,  0.000!!END!
1634!X=679.95,  4860.21,  84.57,  0.000!!END!
1635!X=680,  4860.21,  86.07,  0.000!!END!
1636!X=680.05,  4860.21,  87.62,  0.000!!END!
1637!X=680.1,  4860.21,  89.73,  0.000!!END!
1638!X=681,  4860.21,  99.4,  0.000!!END!
1639!X=681.05,  4860.21,  98.89,  0.000!!END!
1640!X=681.1,  4860.21,  97.2,  0.000!!END!
1641!X=681.15,  4860.21,  97.02,  0.000!!END!
1642!X=681.2,  4860.21,  97.07,  0.000!!END!
1643!X=681.25,  4860.21,  96.64,  0.000!!END!
1644!X=679.85,  4860.26,  84.95,  0.000!!END!
1645!X=679.9,  4860.26,  84.75,  0.000!!END!
1646!X=679.95,  4860.26,  86.45,  0.000!!END!
1647!X=680,  4860.26,  88.11,  0.000!!END!
1648!X=680.05,  4860.26,  89.49,  0.000!!END!
1649!X=680.1,  4860.26,  90.88,  0.000!!END!
1650!X=681,  4860.26,  100.12,  0.000!!END!
1651!X=681.05,  4860.26,  98.8,  0.000!!END!
1652!X=681.1,  4860.26,  96.72,  0.000!!END!
1653!X=681.15,  4860.26,  97.1,  0.000!!END!
1654!X=681.2,  4860.26,  97.93,  0.000!!END!
1655!X=681.25,  4860.26,  98.3,  0.000!!END!
1656!X=679.85,  4860.31,  88.09,  0.000!!END!
1657!X=679.9,  4860.31,  87.49,  0.000!!END!
1658!X=679.95,  4860.31,  88.48,  0.000!!END!
1659!X=680,  4860.31,  89.54,  0.000!!END!
1660!X=680.05,  4860.31,  90.51,  0.000!!END!
1661!X=680.1,  4860.31,  91.51,  0.000!!END!
1662!X=681,  4860.31,  100.56,  0.000!!END!
1663!X=681.05,  4860.31,  99.56,  0.000!!END!
1664!X=681.1,  4860.31,  98.28,  0.000!!END!
1665!X=681.15,  4860.31,  97.97,  0.000!!END!
1666!X=681.2,  4860.31,  98.33,  0.000!!END!
1667!X=681.25,  4860.31,  99.12,  0.000!!END!
1668!X=679.85,  4860.36,  90.14,  0.000!!END!
1669!X=679.9,  4860.36,  89.71,  0.000!!END!
1670!X=679.95,  4860.36,  90.33,  0.000!!END!
1671!X=680,  4860.36,  90.86,  0.000!!END!
1672!X=680.05,  4860.36,  91.37,  0.000!!END!
1673!X=680.1,  4860.36,  92.1,  0.000!!END!
1674!X=681,  4860.36,  100.93,  0.000!!END!
1675!X=681.05,  4860.36,  100.84,  0.000!!END!
1676!X=681.1,  4860.36,  101.18,  0.000!!END!
1677!X=681.15,  4860.36,  99.25,  0.000!!END!
1678!X=681.2,  4860.36,  98.35,  0.000!!END!
1679!X=681.25,  4860.36,  99.26,  0.000!!END!
1680!X=679.85,  4860.41,  90.91,  0.000!!END!
1681!X=679.9,  4860.41,  91.28,  0.000!!END!
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1682!X=679.95,  4860.41,  91.97,  0.000!!END!
1683!X=680,  4860.41,  91.99,  0.000!!END!
1684!X=680.05,  4860.41,  91.93,  0.000!!END!
1685!X=680.1,  4860.41,  92.66,  0.000!!END!
1686!X=681,  4860.41,  100.56,  0.000!!END!
1687!X=681.05,  4860.41,  100.76,  0.000!!END!
1688!X=681.1,  4860.41,  101.83,  0.000!!END!
1689!X=681.15,  4860.41,  100.75,  0.000!!END!
1690!X=681.2,  4860.41,  99.87,  0.000!!END!
1691!X=681.25,  4860.41,  99.75,  0.000!!END!
1692!X=679.85,  4860.46,  91.96,  0.000!!END!
1693!X=679.9,  4860.46,  92.91,  0.000!!END!
1694!X=679.95,  4860.46,  93.83,  0.000!!END!
1695!X=680,  4860.46,  93.63,  0.000!!END!
1696!X=680.05,  4860.46,  93.28,  0.000!!END!
1697!X=680.1,  4860.46,  93.97,  0.000!!END!
1698!X=681,  4860.46,  100.02,  0.000!!END!
1699!X=681.05,  4860.46,  100.33,  0.000!!END!
1700!X=681.1,  4860.46,  101.8,  0.000!!END!
1701!X=681.15,  4860.46,  102.45,  0.000!!END!
1702!X=681.2,  4860.46,  101.93,  0.000!!END!
1703!X=681.25,  4860.46,  100.24,  0.000!!END!
1704!X=679.85,  4860.51,  93.21,  0.000!!END!
1705!X=679.9,  4860.51,  94.56,  0.000!!END!
1706!X=679.95,  4860.51,  95.88,  0.000!!END!
1707!X=680,  4860.51,  95.77,  0.000!!END!
1708!X=680.05,  4860.51,  95.46,  0.000!!END!
1709!X=680.1,  4860.51,  96.15,  0.000!!END!
1710!X=681,  4860.51,  100.52,  0.000!!END!
1711!X=681.05,  4860.51,  100.77,  0.000!!END!
1712!X=681.1,  4860.51,  101.88,  0.000!!END!
1713!X=681.15,  4860.51,  103.3,  0.000!!END!
1714!X=681.2,  4860.51,  103.3,  0.000!!END!
1715!X=681.25,  4860.51,  101.57,  0.000!!END!
1716!X=679.85,  4860.56,  93.63,  0.000!!END!
1717!X=679.9,  4860.56,  94.3,  0.000!!END!
1718!X=679.95,  4860.56,  96.09,  0.000!!END!
1719!X=680,  4860.56,  96.68,  0.000!!END!
1720!X=680.05,  4860.56,  97.04,  0.000!!END!
1721!X=680.1,  4860.56,  97.99,  0.000!!END!
1722!X=681,  4860.56,  100.89,  0.000!!END!
1723!X=681.05,  4860.56,  101.21,  0.000!!END!
1724!X=681.1,  4860.56,  101.88,  0.000!!END!
1725!X=681.15,  4860.56,  104.03,  0.000!!END!
1726!X=681.2,  4860.56,  104.57,  0.000!!END!
1727!X=681.25,  4860.56,  103.08,  0.000!!END!
1728!X=679.85,  4860.61,  93.69,  0.000!!END!
1729!X=679.9,  4860.61,  93.29,  0.000!!END!
1730!X=679.95,  4860.61,  95.49,  0.000!!END!
1731!X=680,  4860.61,  97.02,  0.000!!END!
1732!X=680.05,  4860.61,  98.31,  0.000!!END!
1733!X=680.1,  4860.61,  99.61,  0.000!!END!
1734!X=681,  4860.61,  99.99,  0.000!!END!
1735!X=681.05,  4860.61,  101.43,  0.000!!END!
1736!X=681.1,  4860.61,  100.88,  0.000!!END!
1737!X=681.15,  4860.61,  103.39,  0.000!!END!
1738!X=681.2,  4860.61,  104.5,  0.000!!END!
1739!X=681.25,  4860.61,  103.96,  0.000!!END!
1740!X=679.85,  4860.66,  95.76,  0.000!!END!
1741!X=679.9,  4860.66,  95.51,  0.000!!END!
1742!X=679.95,  4860.66,  97.34,  0.000!!END!
1743!X=680,  4860.66,  97.89,  0.000!!END!
1744!X=680.05,  4860.66,  98.62,  0.000!!END!
1745!X=680.1,  4860.66,  100.04,  0.000!!END!
1746!X=681,  4860.66,  99.94,  0.000!!END!
1747!X=681.05,  4860.66,  101.7,  0.000!!END!
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1748!X=681.1,  4860.66,  99.93,  0.000!!END!
1749!X=681.15,  4860.66,  102.8,  0.000!!END!
1750!X=681.2,  4860.66,  104.35,  0.000!!END!
1751!X=681.25,  4860.66,  104.64,  0.000!!END!
1752!X=679.85,  4860.71,  97.99,  0.000!!END!
1753!X=679.9,  4860.71,  98.17,  0.000!!END!
1754!X=679.95,  4860.71,  99.64,  0.000!!END!
1755!X=680,  4860.71,  98.8,  0.000!!END!
1756!X=680.05,  4860.71,  98.66,  0.000!!END!
1757!X=680.1,  4860.71,  100.14,  0.000!!END!
1758!X=681,  4860.71,  101.91,  0.000!!END!
1759!X=681.05,  4860.71,  102.32,  0.000!!END!
1760!X=681.1,  4860.71,  99.35,  0.000!!END!
1761!X=681.15,  4860.71,  102.35,  0.000!!END!
1762!X=681.2,  4860.71,  103.56,  0.000!!END!
1763!X=681.25,  4860.71,  103.54,  0.000!!END!
1764!X=679.85,  4860.76,  97.8,  0.000!!END!
1765!X=679.9,  4860.76,  97.55,  0.000!!END!
1766!X=679.95,  4860.76,  98.27,  0.000!!END!
1767!X=680,  4860.76,  97.87,  0.000!!END!
1768!X=680.05,  4860.76,  98.37,  0.000!!END!
1769!X=680.1,  4860.76,  100.14,  0.000!!END!
1770!X=681,  4860.76,  103.15,  0.000!!END!
1771!X=681.05,  4860.76,  102.59,  0.000!!END!
1772!X=681.1,  4860.76,  99.46,  0.000!!END!
1773!X=681.15,  4860.76,  102.01,  0.000!!END!
1774!X=681.2,  4860.76,  102.92,  0.000!!END!
1775!X=681.25,  4860.76,  102.82,  0.000!!END!
1776!X=679.85,  4860.81,  97.86,  0.000!!END!
1777!X=679.9,  4860.81,  97.26,  0.000!!END!
1778!X=679.95,  4860.81,  97.21,  0.000!!END!
1779!X=680,  4860.81,  97.2,  0.000!!END!
1780!X=680.05,  4860.81,  98.26,  0.000!!END!
1781!X=680.1,  4860.81,  100.19,  0.000!!END!
1782!X=680.15,  4860.81,  100.87,  0.000!!END!
1783!X=680.2,  4860.81,  101,  0.000!!END!
1784!X=680.25,  4860.81,  101.36,  0.000!!END!
1785!X=680.3,  4860.81,  101.97,  0.000!!END!
1786!X=680.35,  4860.81,  101.95,  0.000!!END!
1787!X=680.4,  4860.81,  102.53,  0.000!!END!
1788!X=680.45,  4860.81,  103.26,  0.000!!END!
1789!X=680.5,  4860.81,  103.99,  0.000!!END!
1790!X=680.55,  4860.81,  104.64,  0.000!!END!
1791!X=680.6,  4860.81,  105.41,  0.000!!END!
1792!X=680.65,  4860.81,  104.94,  0.000!!END!
1793!X=680.7,  4860.81,  102.98,  0.000!!END!
1794!X=680.75,  4860.81,  102.73,  0.000!!END!
1795!X=680.8,  4860.81,  101.92,  0.000!!END!
1796!X=680.85,  4860.81,  101.64,  0.000!!END!
1797!X=680.9,  4860.81,  102.28,  0.000!!END!
1798!X=680.95,  4860.81,  103.29,  0.000!!END!
1799!X=681,  4860.81,  103.37,  0.000!!END!
1800!X=681.05,  4860.81,  102.44,  0.000!!END!
1801!X=681.1,  4860.81,  100.54,  0.000!!END!
1802!X=681.15,  4860.81,  101.89,  0.000!!END!
1803!X=681.2,  4860.81,  102.67,  0.000!!END!
1804!X=681.25,  4860.81,  103.11,  0.000!!END!
1805!X=679.85,  4860.86,  99.13,  0.000!!END!
1806!X=679.9,  4860.86,  98.88,  0.000!!END!
1807!X=679.95,  4860.86,  98.83,  0.000!!END!
1808!X=680,  4860.86,  99.17,  0.000!!END!
1809!X=680.05,  4860.86,  100.27,  0.000!!END!
1810!X=680.1,  4860.86,  101.61,  0.000!!END!
1811!X=680.15,  4860.86,  101.08,  0.000!!END!
1812!X=680.2,  4860.86,  101,  0.000!!END!
1813!X=680.25,  4860.86,  101.37,  0.000!!END!
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1814!X=680.3,  4860.86,  101.94,  0.000!!END!
1815!X=680.35,  4860.86,  101.57,  0.000!!END!
1816!X=680.4,  4860.86,  102.13,  0.000!!END!
1817!X=680.45,  4860.86,  103.06,  0.000!!END!
1818!X=680.5,  4860.86,  104.11,  0.000!!END!
1819!X=680.55,  4860.86,  104.85,  0.000!!END!
1820!X=680.6,  4860.86,  105.35,  0.000!!END!
1821!X=680.65,  4860.86,  104.98,  0.000!!END!
1822!X=680.7,  4860.86,  103.64,  0.000!!END!
1823!X=680.75,  4860.86,  102.49,  0.000!!END!
1824!X=680.8,  4860.86,  101.53,  0.000!!END!
1825!X=680.85,  4860.86,  101.67,  0.000!!END!
1826!X=680.9,  4860.86,  103.05,  0.000!!END!
1827!X=680.95,  4860.86,  103.55,  0.000!!END!
1828!X=681,  4860.86,  102.96,  0.000!!END!
1829!X=681.05,  4860.86,  101.79,  0.000!!END!
1830!X=681.1,  4860.86,  100.56,  0.000!!END!
1831!X=681.15,  4860.86,  101.92,  0.000!!END!
1832!X=681.2,  4860.86,  102.93,  0.000!!END!
1833!X=681.25,  4860.86,  103.69,  0.000!!END!
1834!X=679.85,  4860.91,  100.13,  0.000!!END!
1835!X=679.9,  4860.91,  99.89,  0.000!!END!
1836!X=679.95,  4860.91,  100.13,  0.000!!END!
1837!X=680,  4860.91,  100.89,  0.000!!END!
1838!X=680.05,  4860.91,  102.01,  0.000!!END!
1839!X=680.1,  4860.91,  102.83,  0.000!!END!
1840!X=680.15,  4860.91,  101.45,  0.000!!END!
1841!X=680.2,  4860.91,  101.18,  0.000!!END!
1842!X=680.25,  4860.91,  101.54,  0.000!!END!
1843!X=680.3,  4860.91,  102.01,  0.000!!END!
1844!X=680.35,  4860.91,  101.24,  0.000!!END!
1845!X=680.4,  4860.91,  101.68,  0.000!!END!
1846!X=680.45,  4860.91,  102.76,  0.000!!END!
1847!X=680.5,  4860.91,  104.13,  0.000!!END!
1848!X=680.55,  4860.91,  104.87,  0.000!!END!
1849!X=680.6,  4860.91,  105.02,  0.000!!END!
1850!X=680.65,  4860.91,  104.99,  0.000!!END!
1851!X=680.7,  4860.91,  104.45,  0.000!!END!
1852!X=680.75,  4860.91,  101.69,  0.000!!END!
1853!X=680.8,  4860.91,  101.08,  0.000!!END!
1854!X=680.85,  4860.91,  102.28,  0.000!!END!
1855!X=680.9,  4860.91,  104.47,  0.000!!END!
1856!X=680.95,  4860.91,  103.37,  0.000!!END!
1857!X=681,  4860.91,  102.07,  0.000!!END!
1858!X=681.05,  4860.91,  100.67,  0.000!!END!
1859!X=681.1,  4860.91,  99.65,  0.000!!END!
1860!X=681.15,  4860.91,  102.21,  0.000!!END!
1861!X=681.2,  4860.91,  103.81,  0.000!!END!
1862!X=681.25,  4860.91,  104.61,  0.000!!END!
1863!X=679.85,  4860.96,  100.48,  0.000!!END!
1864!X=679.9,  4860.96,  99.56,  0.000!!END!
1865!X=679.95,  4860.96,  100.6,  0.000!!END!
1866!X=680,  4860.96,  101.82,  0.000!!END!
1867!X=680.05,  4860.96,  102.9,  0.000!!END!
1868!X=680.1,  4860.96,  103.52,  0.000!!END!
1869!X=680.15,  4860.96,  102.95,  0.000!!END!
1870!X=680.2,  4860.96,  102.44,  0.000!!END!
1871!X=680.25,  4860.96,  102.87,  0.000!!END!
1872!X=680.3,  4860.96,  103.7,  0.000!!END!
1873!X=680.35,  4860.96,  103.33,  0.000!!END!
1874!X=680.4,  4860.96,  103.16,  0.000!!END!
1875!X=680.45,  4860.96,  103.45,  0.000!!END!
1876!X=680.5,  4860.96,  104.07,  0.000!!END!
1877!X=680.55,  4860.96,  104.43,  0.000!!END!
1878!X=680.6,  4860.96,  104.82,  0.000!!END!
1879!X=680.65,  4860.96,  105,  0.000!!END!
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1880!X=680.7,  4860.96,  104.66,  0.000!!END!
1881!X=680.75,  4860.96,  102.69,  0.000!!END!
1882!X=680.8,  4860.96,  102.32,  0.000!!END!
1883!X=680.85,  4860.96,  103.44,  0.000!!END!
1884!X=680.9,  4860.96,  105.23,  0.000!!END!
1885!X=680.95,  4860.96,  104.01,  0.000!!END!
1886!X=681,  4860.96,  102.55,  0.000!!END!
1887!X=681.05,  4860.96,  101.42,  0.000!!END!
1888!X=681.1,  4860.96,  101.13,  0.000!!END!
1889!X=681.15,  4860.96,  103.8,  0.000!!END!
1890!X=681.2,  4860.96,  104.91,  0.000!!END!
1891!X=681.25,  4860.96,  105.31,  0.000!!END!
1892!X=679.85,  4861.01,  101.9,  0.000!!END!
1893!X=679.9,  4861.01,  100.49,  0.000!!END!
1894!X=679.95,  4861.01,  101.4,  0.000!!END!
1895!X=680,  4861.01,  102.53,  0.000!!END!
1896!X=680.05,  4861.01,  103.54,  0.000!!END!
1897!X=680.1,  4861.01,  104.15,  0.000!!END!
1898!X=680.15,  4861.01,  104.01,  0.000!!END!
1899!X=680.2,  4861.01,  103.42,  0.000!!END!
1900!X=680.25,  4861.01,  103.95,  0.000!!END!
1901!X=680.3,  4861.01,  105.02,  0.000!!END!
1902!X=680.35,  4861.01,  105.1,  0.000!!END!
1903!X=680.4,  4861.01,  104.49,  0.000!!END!
1904!X=680.45,  4861.01,  104.17,  0.000!!END!
1905!X=680.5,  4861.01,  104.1,  0.000!!END!
1906!X=680.55,  4861.01,  103.96,  0.000!!END!
1907!X=680.6,  4861.01,  104.62,  0.000!!END!
1908!X=680.65,  4861.01,  105,  0.000!!END!
1909!X=680.7,  4861.01,  104.86,  0.000!!END!
1910!X=680.75,  4861.01,  104.09,  0.000!!END!
1911!X=680.8,  4861.01,  103.94,  0.000!!END!
1912!X=680.85,  4861.01,  104.71,  0.000!!END!
1913!X=680.9,  4861.01,  105.81,  0.000!!END!
1914!X=680.95,  4861.01,  105,  0.000!!END!
1915!X=681,  4861.01,  103.59,  0.000!!END!
1916!X=681.05,  4861.01,  103.09,  0.000!!END!
1917!X=681.1,  4861.01,  103.84,  0.000!!END!
1918!X=681.15,  4861.01,  106.1,  0.000!!END!
1919!X=681.2,  4861.01,  106.09,  0.000!!END!
1920!X=681.25,  4861.01,  105.85,  0.000!!END!
1921!X=679.85,  4861.06,  104.54,  0.000!!END!
1922!X=679.9,  4861.06,  102.84,  0.000!!END!
1923!X=679.95,  4861.06,  102.55,  0.000!!END!
1924!X=680,  4861.06,  102.86,  0.000!!END!
1925!X=680.05,  4861.06,  103.82,  0.000!!END!
1926!X=680.1,  4861.06,  104.57,  0.000!!END!
1927!X=680.15,  4861.06,  104.03,  0.000!!END!
1928!X=680.2,  4861.06,  103.79,  0.000!!END!
1929!X=680.25,  4861.06,  104.28,  0.000!!END!
1930!X=680.3,  4861.06,  105.13,  0.000!!END!
1931!X=680.35,  4861.06,  105.62,  0.000!!END!
1932!X=680.4,  4861.06,  105.39,  0.000!!END!
1933!X=680.45,  4861.06,  105.25,  0.000!!END!
1934!X=680.5,  4861.06,  104.88,  0.000!!END!
1935!X=680.55,  4861.06,  103.53,  0.000!!END!
1936!X=680.6,  4861.06,  104.1,  0.000!!END!
1937!X=680.65,  4861.06,  104.92,  0.000!!END!
1938!X=680.7,  4861.06,  105.57,  0.000!!END!
1939!X=680.75,  4861.06,  105.6,  0.000!!END!
1940!X=680.8,  4861.06,  105.91,  0.000!!END!
1941!X=680.85,  4861.06,  106.64,  0.000!!END!
1942!X=680.9,  4861.06,  107.24,  0.000!!END!
1943!X=680.95,  4861.06,  106.1,  0.000!!END!
1944!X=681,  4861.06,  105.52,  0.000!!END!
1945!X=681.05,  4861.06,  105.45,  0.000!!END!
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1946!X=681.1,  4861.06,  105.85,  0.000!!END!
1947!X=681.15,  4861.06,  106.48,  0.000!!END!
1948!X=681.2,  4861.06,  107.24,  0.000!!END!
1949!X=681.25,  4861.06,  107.55,  0.000!!END!
1950!X=679.35,  4859.16,  73,  0.000!!END!
1951!X=679.45,  4859.16,  73,  0.000!!END!
1952!X=679.55,  4859.16,  73,  0.000!!END!
1953!X=679.65,  4859.16,  73,  0.000!!END!
1954!X=679.75,  4859.16,  73,  0.000!!END!
1955!X=679.85,  4859.16,  73,  0.000!!END!
1956!X=679.95,  4859.16,  73,  0.000!!END!
1957!X=680.05,  4859.16,  73,  0.000!!END!
1958!X=680.15,  4859.16,  73,  0.000!!END!
1959!X=680.25,  4859.16,  73,  0.000!!END!
1960!X=680.35,  4859.16,  73,  0.000!!END!
1961!X=680.45,  4859.16,  73,  0.000!!END!
1962!X=680.55,  4859.16,  73,  0.000!!END!
1963!X=680.65,  4859.16,  73,  0.000!!END!
1964!X=680.75,  4859.16,  73,  0.000!!END!
1965!X=680.85,  4859.16,  73,  0.000!!END!
1966!X=680.95,  4859.16,  73,  0.000!!END!
1967!X=681.05,  4859.16,  73,  0.000!!END!
1968!X=681.15,  4859.16,  73,  0.000!!END!
1969!X=681.25,  4859.16,  73,  0.000!!END!
1970!X=681.35,  4859.16,  73,  0.000!!END!
1971!X=681.45,  4859.16,  73,  0.000!!END!
1972!X=681.55,  4859.16,  73,  0.000!!END!
1973!X=681.65,  4859.16,  73,  0.000!!END!
1974!X=681.75,  4859.16,  73,  0.000!!END!
1975!X=679.35,  4859.26,  73,  0.000!!END!
1976!X=679.45,  4859.26,  73,  0.000!!END!
1977!X=679.55,  4859.26,  73,  0.000!!END!
1978!X=679.65,  4859.26,  73,  0.000!!END!
1979!X=679.75,  4859.26,  73,  0.000!!END!
1980!X=679.85,  4859.26,  73,  0.000!!END!
1981!X=679.95,  4859.26,  73,  0.000!!END!
1982!X=680.05,  4859.26,  73,  0.000!!END!
1983!X=680.15,  4859.26,  73,  0.000!!END!
1984!X=680.25,  4859.26,  73,  0.000!!END!
1985!X=680.35,  4859.26,  73,  0.000!!END!
1986!X=680.45,  4859.26,  73,  0.000!!END!
1987!X=680.55,  4859.26,  73,  0.000!!END!
1988!X=680.65,  4859.26,  73,  0.000!!END!
1989!X=680.75,  4859.26,  73,  0.000!!END!
1990!X=680.85,  4859.26,  73,  0.000!!END!
1991!X=680.95,  4859.26,  73,  0.000!!END!
1992!X=681.05,  4859.26,  73,  0.000!!END!
1993!X=681.15,  4859.26,  73,  0.000!!END!
1994!X=681.25,  4859.26,  73,  0.000!!END!
1995!X=681.35,  4859.26,  73,  0.000!!END!
1996!X=681.45,  4859.26,  73,  0.000!!END!
1997!X=681.55,  4859.26,  73,  0.000!!END!
1998!X=681.65,  4859.26,  73,  0.000!!END!
1999!X=681.75,  4859.26,  73,  0.000!!END!
2000!X=679.35,  4859.36,  73,  0.000!!END!
2001!X=679.45,  4859.36,  73,  0.000!!END!
2002!X=679.55,  4859.36,  73,  0.000!!END!
2003!X=679.65,  4859.36,  73,  0.000!!END!
2004!X=679.75,  4859.36,  73,  0.000!!END!
2005!X=679.85,  4859.36,  73,  0.000!!END!
2006!X=679.95,  4859.36,  73,  0.000!!END!
2007!X=680.05,  4859.36,  73,  0.000!!END!
2008!X=680.15,  4859.36,  73,  0.000!!END!
2009!X=680.25,  4859.36,  73,  0.000!!END!
2010!X=680.35,  4859.36,  73,  0.000!!END!
2011!X=680.45,  4859.36,  73,  0.000!!END!
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2012!X=680.55,  4859.36,  73,  0.000!!END!
2013!X=680.65,  4859.36,  73,  0.000!!END!
2014!X=680.75,  4859.36,  73,  0.000!!END!
2015!X=680.85,  4859.36,  73,  0.000!!END!
2016!X=680.95,  4859.36,  73,  0.000!!END!
2017!X=681.05,  4859.36,  73,  0.000!!END!
2018!X=681.15,  4859.36,  73,  0.000!!END!
2019!X=681.25,  4859.36,  73,  0.000!!END!
2020!X=681.35,  4859.36,  73,  0.000!!END!
2021!X=681.45,  4859.36,  73,  0.000!!END!
2022!X=681.55,  4859.36,  73,  0.000!!END!
2023!X=681.65,  4859.36,  73,  0.000!!END!
2024!X=681.75,  4859.36,  73,  0.000!!END!
2025!X=679.35,  4859.46,  73,  0.000!!END!
2026!X=679.45,  4859.46,  73,  0.000!!END!
2027!X=679.55,  4859.46,  73,  0.000!!END!
2028!X=679.65,  4859.46,  73,  0.000!!END!
2029!X=679.75,  4859.46,  73,  0.000!!END!
2030!X=679.85,  4859.46,  73,  0.000!!END!
2031!X=679.95,  4859.46,  73,  0.000!!END!
2032!X=680.05,  4859.46,  73,  0.000!!END!
2033!X=680.15,  4859.46,  73,  0.000!!END!
2034!X=680.25,  4859.46,  73,  0.000!!END!
2035!X=680.35,  4859.46,  73,  0.000!!END!
2036!X=680.45,  4859.46,  73,  0.000!!END!
2037!X=680.55,  4859.46,  73,  0.000!!END!
2038!X=680.65,  4859.46,  73,  0.000!!END!
2039!X=680.75,  4859.46,  73,  0.000!!END!
2040!X=680.85,  4859.46,  73,  0.000!!END!
2041!X=680.95,  4859.46,  73,  0.000!!END!
2042!X=681.05,  4859.46,  73,  0.000!!END!
2043!X=681.15,  4859.46,  73,  0.000!!END!
2044!X=681.25,  4859.46,  73,  0.000!!END!
2045!X=681.35,  4859.46,  73,  0.000!!END!
2046!X=681.45,  4859.46,  73,  0.000!!END!
2047!X=681.55,  4859.46,  73,  0.000!!END!
2048!X=681.65,  4859.46,  73,  0.000!!END!
2049!X=681.75,  4859.46,  73,  0.000!!END!
2050!X=679.35,  4859.56,  73,  0.000!!END!
2051!X=679.45,  4859.56,  73,  0.000!!END!
2052!X=679.55,  4859.56,  73,  0.000!!END!
2053!X=679.65,  4859.56,  73,  0.000!!END!
2054!X=679.75,  4859.56,  73,  0.000!!END!
2055!X=679.85,  4859.56,  73,  0.000!!END!
2056!X=679.95,  4859.56,  73,  0.000!!END!
2057!X=680.05,  4859.56,  73,  0.000!!END!
2058!X=680.15,  4859.56,  73,  0.000!!END!
2059!X=680.25,  4859.56,  73,  0.000!!END!
2060!X=680.35,  4859.56,  73,  0.000!!END!
2061!X=680.45,  4859.56,  73,  0.000!!END!
2062!X=680.55,  4859.56,  74.46,  0.000!!END!
2063!X=680.65,  4859.56,  73.34,  0.000!!END!
2064!X=680.75,  4859.56,  73,  0.000!!END!
2065!X=680.85,  4859.56,  73,  0.000!!END!
2066!X=680.95,  4859.56,  73,  0.000!!END!
2067!X=681.05,  4859.56,  73,  0.000!!END!
2068!X=681.15,  4859.56,  73,  0.000!!END!
2069!X=681.25,  4859.56,  73,  0.000!!END!
2070!X=681.35,  4859.56,  73,  0.000!!END!
2071!X=681.45,  4859.56,  73,  0.000!!END!
2072!X=681.55,  4859.56,  73,  0.000!!END!
2073!X=681.65,  4859.56,  73,  0.000!!END!
2074!X=681.75,  4859.56,  73,  0.000!!END!
2075!X=679.35,  4859.66,  76.32,  0.000!!END!
2076!X=679.45,  4859.66,  74.68,  0.000!!END!
2077!X=679.55,  4859.66,  74.11,  0.000!!END!
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2078!X=679.65,  4859.66,  75.18,  0.000!!END!
2079!X=679.75,  4859.66,  74.43,  0.000!!END!
2080!X=681.35,  4859.66,  73,  0.000!!END!
2081!X=681.45,  4859.66,  73,  0.000!!END!
2082!X=681.55,  4859.66,  73,  0.000!!END!
2083!X=681.65,  4859.66,  73,  0.000!!END!
2084!X=681.75,  4859.66,  73,  0.000!!END!
2085!X=679.35,  4859.76,  82.46,  0.000!!END!
2086!X=679.45,  4859.76,  82.05,  0.000!!END!
2087!X=679.55,  4859.76,  81.77,  0.000!!END!
2088!X=679.65,  4859.76,  79.33,  0.000!!END!
2089!X=679.75,  4859.76,  77.43,  0.000!!END!
2090!X=681.35,  4859.76,  73,  0.000!!END!
2091!X=681.45,  4859.76,  73,  0.000!!END!
2092!X=681.55,  4859.76,  73,  0.000!!END!
2093!X=681.65,  4859.76,  73,  0.000!!END!
2094!X=681.75,  4859.76,  73,  0.000!!END!
2095!X=679.35,  4859.86,  86.05,  0.000!!END!
2096!X=679.45,  4859.86,  87.75,  0.000!!END!
2097!X=679.55,  4859.86,  84.33,  0.000!!END!
2098!X=679.65,  4859.86,  81.79,  0.000!!END!
2099!X=679.75,  4859.86,  79.73,  0.000!!END!
2100!X=681.35,  4859.86,  79.3,  0.000!!END!
2101!X=681.45,  4859.86,  78.28,  0.000!!END!
2102!X=681.55,  4859.86,  77.13,  0.000!!END!
2103!X=681.65,  4859.86,  76.51,  0.000!!END!
2104!X=681.75,  4859.86,  75.75,  0.000!!END!
2105!X=679.35,  4859.96,  89.4,  0.000!!END!
2106!X=679.45,  4859.96,  87.7,  0.000!!END!
2107!X=679.55,  4859.96,  84.27,  0.000!!END!
2108!X=679.65,  4859.96,  80.91,  0.000!!END!
2109!X=679.75,  4859.96,  79.04,  0.000!!END!
2110!X=681.35,  4859.96,  91.96,  0.000!!END!
2111!X=681.45,  4859.96,  90.26,  0.000!!END!
2112!X=681.55,  4859.96,  88.39,  0.000!!END!
2113!X=681.65,  4859.96,  87.25,  0.000!!END!
2114!X=681.75,  4859.96,  86.39,  0.000!!END!
2115!X=679.35,  4860.06,  88.47,  0.000!!END!
2116!X=679.45,  4860.06,  83.64,  0.000!!END!
2117!X=679.55,  4860.06,  80.67,  0.000!!END!
2118!X=679.65,  4860.06,  79.06,  0.000!!END!
2119!X=679.75,  4860.06,  79.62,  0.000!!END!
2120!X=681.35,  4860.06,  96.1,  0.000!!END!
2121!X=681.45,  4860.06,  95.09,  0.000!!END!
2122!X=681.55,  4860.06,  93.28,  0.000!!END!
2123!X=681.65,  4860.06,  92.06,  0.000!!END!
2124!X=681.75,  4860.06,  94.07,  0.000!!END!
2125!X=679.35,  4860.16,  86.31,  0.000!!END!
2126!X=679.45,  4860.16,  82.72,  0.000!!END!
2127!X=679.55,  4860.16,  79.58,  0.000!!END!
2128!X=679.65,  4860.16,  80.28,  0.000!!END!
2129!X=679.75,  4860.16,  80.71,  0.000!!END!
2130!X=681.35,  4860.16,  96.83,  0.000!!END!
2131!X=681.45,  4860.16,  97.84,  0.000!!END!
2132!X=681.55,  4860.16,  94.97,  0.000!!END!
2133!X=681.65,  4860.16,  93.12,  0.000!!END!
2134!X=681.75,  4860.16,  94.91,  0.000!!END!
2135!X=679.35,  4860.26,  86.47,  0.000!!END!
2136!X=679.45,  4860.26,  82.89,  0.000!!END!
2137!X=679.55,  4860.26,  80.84,  0.000!!END!
2138!X=679.65,  4860.26,  82.26,  0.000!!END!
2139!X=679.75,  4860.26,  82.1,  0.000!!END!
2140!X=681.35,  4860.26,  100.38,  0.000!!END!
2141!X=681.45,  4860.26,  97.54,  0.000!!END!
2142!X=681.55,  4860.26,  95.67,  0.000!!END!
2143!X=681.65,  4860.26,  95.27,  0.000!!END!
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2144!X=681.75,  4860.26,  95.72,  0.000!!END!
2145!X=679.35,  4860.36,  85.38,  0.000!!END!
2146!X=679.45,  4860.36,  83.44,  0.000!!END!
2147!X=679.55,  4860.36,  82.83,  0.000!!END!
2148!X=679.65,  4860.36,  84.42,  0.000!!END!
2149!X=679.75,  4860.36,  86.5,  0.000!!END!
2150!X=681.35,  4860.36,  100.54,  0.000!!END!
2151!X=681.45,  4860.36,  94.71,  0.000!!END!
2152!X=681.55,  4860.36,  96,  0.000!!END!
2153!X=681.65,  4860.36,  96.81,  0.000!!END!
2154!X=681.75,  4860.36,  97.85,  0.000!!END!
2155!X=679.35,  4860.46,  88.75,  0.000!!END!
2156!X=679.45,  4860.46,  86.96,  0.000!!END!
2157!X=679.55,  4860.46,  85.37,  0.000!!END!
2158!X=679.65,  4860.46,  86.97,  0.000!!END!
2159!X=679.75,  4860.46,  90.03,  0.000!!END!
2160!X=681.35,  4860.46,  97.04,  0.000!!END!
2161!X=681.45,  4860.46,  97.42,  0.000!!END!
2162!X=681.55,  4860.46,  97.18,  0.000!!END!
2163!X=681.65,  4860.46,  98.63,  0.000!!END!
2164!X=681.75,  4860.46,  98.86,  0.000!!END!
2165!X=679.35,  4860.56,  93.99,  0.000!!END!
2166!X=679.45,  4860.56,  90.85,  0.000!!END!
2167!X=679.55,  4860.56,  85.95,  0.000!!END!
2168!X=679.65,  4860.56,  87.79,  0.000!!END!
2169!X=679.75,  4860.56,  92.54,  0.000!!END!
2170!X=681.35,  4860.56,  98.91,  0.000!!END!
2171!X=681.45,  4860.56,  97.85,  0.000!!END!
2172!X=681.55,  4860.56,  97.62,  0.000!!END!
2173!X=681.65,  4860.56,  100.26,  0.000!!END!
2174!X=681.75,  4860.56,  104.53,  0.000!!END!
2175!X=679.35,  4860.66,  96.76,  0.000!!END!
2176!X=679.45,  4860.66,  93.9,  0.000!!END!
2177!X=679.55,  4860.66,  90.31,  0.000!!END!
2178!X=679.65,  4860.66,  90.97,  0.000!!END!
2179!X=679.75,  4860.66,  94.33,  0.000!!END!
2180!X=681.35,  4860.66,  101.28,  0.000!!END!
2181!X=681.45,  4860.66,  98.27,  0.000!!END!
2182!X=681.55,  4860.66,  98.98,  0.000!!END!
2183!X=681.65,  4860.66,  100.56,  0.000!!END!
2184!X=681.75,  4860.66,  110.12,  0.000!!END!
2185!X=679.35,  4860.76,  97.11,  0.000!!END!
2186!X=679.45,  4860.76,  94.54,  0.000!!END!
2187!X=679.55,  4860.76,  93.42,  0.000!!END!
2188!X=679.65,  4860.76,  94.91,  0.000!!END!
2189!X=679.75,  4860.76,  96.85,  0.000!!END!
2190!X=681.35,  4860.76,  104.31,  0.000!!END!
2191!X=681.45,  4860.76,  105.05,  0.000!!END!
2192!X=681.55,  4860.76,  105.63,  0.000!!END!
2193!X=681.65,  4860.76,  105.07,  0.000!!END!
2194!X=681.75,  4860.76,  110.77,  0.000!!END!
2195!X=679.35,  4860.86,  97.95,  0.000!!END!
2196!X=679.45,  4860.86,  96.18,  0.000!!END!
2197!X=679.55,  4860.86,  94.73,  0.000!!END!
2198!X=679.65,  4860.86,  97.52,  0.000!!END!
2199!X=679.75,  4860.86,  98.27,  0.000!!END!
2200!X=681.35,  4860.86,  105.47,  0.000!!END!
2201!X=681.45,  4860.86,  108.46,  0.000!!END!
2202!X=681.55,  4860.86,  108.39,  0.000!!END!
2203!X=681.65,  4860.86,  107.91,  0.000!!END!
2204!X=681.75,  4860.86,  110.88,  0.000!!END!
2205!X=679.35,  4860.96,  99.74,  0.000!!END!
2206!X=679.45,  4860.96,  97.81,  0.000!!END!
2207!X=679.55,  4860.96,  95.05,  0.000!!END!
2208!X=679.65,  4860.96,  97.09,  0.000!!END!
2209!X=679.75,  4860.96,  101.6,  0.000!!END!
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2210!X=681.35,  4860.96,  109.08,  0.000!!END!
2211!X=681.45,  4860.96,  111.67,  0.000!!END!
2212!X=681.55,  4860.96,  113.22,  0.000!!END!
2213!X=681.65,  4860.96,  115.88,  0.000!!END!
2214!X=681.75,  4860.96,  118.54,  0.000!!END!
2215!X=679.35,  4861.06,  100,  0.000!!END!
2216!X=679.45,  4861.06,  99.36,  0.000!!END!
2217!X=679.55,  4861.06,  96.76,  0.000!!END!
2218!X=679.65,  4861.06,  97.86,  0.000!!END!
2219!X=679.75,  4861.06,  105.45,  0.000!!END!
2220!X=681.35,  4861.06,  111.11,  0.000!!END!
2221!X=681.45,  4861.06,  114.82,  0.000!!END!
2222!X=681.55,  4861.06,  120.94,  0.000!!END!
2223!X=681.65,  4861.06,  125.15,  0.000!!END!
2224!X=681.75,  4861.06,  122.68,  0.000!!END!
2225!X=679.35,  4861.16,  99.05,  0.000!!END!
2226!X=679.45,  4861.16,  99.55,  0.000!!END!
2227!X=679.55,  4861.16,  99.85,  0.000!!END!
2228!X=679.65,  4861.16,  100.98,  0.000!!END!
2229!X=679.75,  4861.16,  104.19,  0.000!!END!
2230!X=679.85,  4861.16,  104.63,  0.000!!END!
2231!X=679.95,  4861.16,  103.02,  0.000!!END!
2232!X=680.05,  4861.16,  104.42,  0.000!!END!
2233!X=680.15,  4861.16,  104.79,  0.000!!END!
2234!X=680.25,  4861.16,  104.12,  0.000!!END!
2235!X=680.35,  4861.16,  105.98,  0.000!!END!
2236!X=680.45,  4861.16,  104.96,  0.000!!END!
2237!X=680.55,  4861.16,  103.7,  0.000!!END!
2238!X=680.65,  4861.16,  105.58,  0.000!!END!
2239!X=680.75,  4861.16,  106.98,  0.000!!END!
2240!X=680.85,  4861.16,  108.98,  0.000!!END!
2241!X=680.95,  4861.16,  108.75,  0.000!!END!
2242!X=681.05,  4861.16,  109.81,  0.000!!END!
2243!X=681.15,  4861.16,  109.52,  0.000!!END!
2244!X=681.25,  4861.16,  111.21,  0.000!!END!
2245!X=681.35,  4861.16,  111.39,  0.000!!END!
2246!X=681.45,  4861.16,  115.91,  0.000!!END!
2247!X=681.55,  4861.16,  118.75,  0.000!!END!
2248!X=681.65,  4861.16,  118.25,  0.000!!END!
2249!X=681.75,  4861.16,  119.17,  0.000!!END!
2250!X=679.35,  4861.26,  101.3,  0.000!!END!
2251!X=679.45,  4861.26,  101.24,  0.000!!END!
2252!X=679.55,  4861.26,  102.32,  0.000!!END!
2253!X=679.65,  4861.26,  104.18,  0.000!!END!
2254!X=679.75,  4861.26,  105.69,  0.000!!END!
2255!X=679.85,  4861.26,  100.48,  0.000!!END!
2256!X=679.95,  4861.26,  102.24,  0.000!!END!
2257!X=680.05,  4861.26,  105.45,  0.000!!END!
2258!X=680.15,  4861.26,  104.99,  0.000!!END!
2259!X=680.25,  4861.26,  105.29,  0.000!!END!
2260!X=680.35,  4861.26,  105.99,  0.000!!END!
2261!X=680.45,  4861.26,  105.26,  0.000!!END!
2262!X=680.55,  4861.26,  104.77,  0.000!!END!
2263!X=680.65,  4861.26,  106.74,  0.000!!END!
2264!X=680.75,  4861.26,  108.39,  0.000!!END!
2265!X=680.85,  4861.26,  111.47,  0.000!!END!
2266!X=680.95,  4861.26,  112.55,  0.000!!END!
2267!X=681.05,  4861.26,  113.01,  0.000!!END!
2268!X=681.15,  4861.26,  111.89,  0.000!!END!
2269!X=681.25,  4861.26,  111.7,  0.000!!END!
2270!X=681.35,  4861.26,  110.99,  0.000!!END!
2271!X=681.45,  4861.26,  116.05,  0.000!!END!
2272!X=681.55,  4861.26,  118.11,  0.000!!END!
2273!X=681.65,  4861.26,  115.18,  0.000!!END!
2274!X=681.75,  4861.26,  116.28,  0.000!!END!
2275!X=679.35,  4861.36,  104.65,  0.000!!END!
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2276!X=679.45,  4861.36,  104.81,  0.000!!END!
2277!X=679.55,  4861.36,  107.11,  0.000!!END!
2278!X=679.65,  4861.36,  105.2,  0.000!!END!
2279!X=679.75,  4861.36,  103.52,  0.000!!END!
2280!X=679.85,  4861.36,  100.46,  0.000!!END!
2281!X=679.95,  4861.36,  106.11,  0.000!!END!
2282!X=680.05,  4861.36,  107.55,  0.000!!END!
2283!X=680.15,  4861.36,  106.82,  0.000!!END!
2284!X=680.25,  4861.36,  106.5,  0.000!!END!
2285!X=680.35,  4861.36,  105.17,  0.000!!END!
2286!X=680.45,  4861.36,  105.92,  0.000!!END!
2287!X=680.55,  4861.36,  105.05,  0.000!!END!
2288!X=680.65,  4861.36,  107.98,  0.000!!END!
2289!X=680.75,  4861.36,  111.37,  0.000!!END!
2290!X=680.85,  4861.36,  114.09,  0.000!!END!
2291!X=680.95,  4861.36,  116.15,  0.000!!END!
2292!X=681.05,  4861.36,  115.7,  0.000!!END!
2293!X=681.15,  4861.36,  112.32,  0.000!!END!
2294!X=681.25,  4861.36,  112.88,  0.000!!END!
2295!X=681.35,  4861.36,  110.61,  0.000!!END!
2296!X=681.45,  4861.36,  114.39,  0.000!!END!
2297!X=681.55,  4861.36,  115.4,  0.000!!END!
2298!X=681.65,  4861.36,  115.97,  0.000!!END!
2299!X=681.75,  4861.36,  116.52,  0.000!!END!
2300!X=679.35,  4861.46,  109.45,  0.000!!END!
2301!X=679.45,  4861.46,  108.27,  0.000!!END!
2302!X=679.55,  4861.46,  107.8,  0.000!!END!
2303!X=679.65,  4861.46,  105.62,  0.000!!END!
2304!X=679.75,  4861.46,  101.9,  0.000!!END!
2305!X=679.85,  4861.46,  102.44,  0.000!!END!
2306!X=679.95,  4861.46,  107.48,  0.000!!END!
2307!X=680.05,  4861.46,  105.9,  0.000!!END!
2308!X=680.15,  4861.46,  106.92,  0.000!!END!
2309!X=680.25,  4861.46,  107.62,  0.000!!END!
2310!X=680.35,  4861.46,  107.92,  0.000!!END!
2311!X=680.45,  4861.46,  106.75,  0.000!!END!
2312!X=680.55,  4861.46,  105.27,  0.000!!END!
2313!X=680.65,  4861.46,  109.08,  0.000!!END!
2314!X=680.75,  4861.46,  112.29,  0.000!!END!
2315!X=680.85,  4861.46,  115.78,  0.000!!END!
2316!X=680.95,  4861.46,  116.26,  0.000!!END!
2317!X=681.05,  4861.46,  116.01,  0.000!!END!
2318!X=681.15,  4861.46,  114.6,  0.000!!END!
2319!X=681.25,  4861.46,  116.83,  0.000!!END!
2320!X=681.35,  4861.46,  115.04,  0.000!!END!
2321!X=681.45,  4861.46,  114.67,  0.000!!END!
2322!X=681.55,  4861.46,  114.63,  0.000!!END!
2323!X=681.65,  4861.46,  115.42,  0.000!!END!
2324!X=681.75,  4861.46,  114.89,  0.000!!END!
2325!X=679.35,  4861.56,  113.53,  0.000!!END!
2326!X=679.45,  4861.56,  110.59,  0.000!!END!
2327!X=679.55,  4861.56,  107.42,  0.000!!END!
2328!X=679.65,  4861.56,  105.55,  0.000!!END!
2329!X=679.75,  4861.56,  103.68,  0.000!!END!
2330!X=679.85,  4861.56,  104.2,  0.000!!END!
2331!X=679.95,  4861.56,  105,  0.000!!END!
2332!X=680.05,  4861.56,  104.61,  0.000!!END!
2333!X=680.15,  4861.56,  104.93,  0.000!!END!
2334!X=680.25,  4861.56,  109.3,  0.000!!END!
2335!X=680.35,  4861.56,  110.96,  0.000!!END!
2336!X=680.45,  4861.56,  108.85,  0.000!!END!
2337!X=680.55,  4861.56,  107.26,  0.000!!END!
2338!X=680.65,  4861.56,  110.83,  0.000!!END!
2339!X=680.75,  4861.56,  112.74,  0.000!!END!
2340!X=680.85,  4861.56,  114.26,  0.000!!END!
2341!X=680.95,  4861.56,  117.86,  0.000!!END!
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2342!X=681.05,  4861.56,  118.5,  0.000!!END!
2343!X=681.15,  4861.56,  118.39,  0.000!!END!
2344!X=681.25,  4861.56,  119.57,  0.000!!END!
2345!X=681.35,  4861.56,  120.75,  0.000!!END!
2346!X=681.45,  4861.56,  119.68,  0.000!!END!
2347!X=681.55,  4861.56,  115.65,  0.000!!END!
2348!X=681.65,  4861.56,  115.37,  0.000!!END!
2349!X=681.75,  4861.56,  114.69,  0.000!!END!
2350!X=678.35,  4858.16,  73,  0.000!!END!
2351!X=678.55,  4858.16,  73,  0.000!!END!
2352!X=678.75,  4858.16,  73,  0.000!!END!
2353!X=678.95,  4858.16,  73,  0.000!!END!
2354!X=679.15,  4858.16,  73,  0.000!!END!
2355!X=679.35,  4858.16,  73,  0.000!!END!
2356!X=679.55,  4858.16,  73,  0.000!!END!
2357!X=679.75,  4858.16,  73,  0.000!!END!
2358!X=679.95,  4858.16,  73,  0.000!!END!
2359!X=680.15,  4858.16,  73,  0.000!!END!
2360!X=680.35,  4858.16,  73,  0.000!!END!
2361!X=680.55,  4858.16,  73,  0.000!!END!
2362!X=680.75,  4858.16,  73,  0.000!!END!
2363!X=680.95,  4858.16,  73,  0.000!!END!
2364!X=681.15,  4858.16,  73,  0.000!!END!
2365!X=681.35,  4858.16,  73,  0.000!!END!
2366!X=681.55,  4858.16,  73,  0.000!!END!
2367!X=681.75,  4858.16,  73,  0.000!!END!
2368!X=681.95,  4858.16,  73,  0.000!!END!
2369!X=682.15,  4858.16,  73,  0.000!!END!
2370!X=682.35,  4858.16,  73,  0.000!!END!
2371!X=682.55,  4858.16,  73,  0.000!!END!
2372!X=682.75,  4858.16,  73,  0.000!!END!
2373!X=678.35,  4858.36,  73,  0.000!!END!
2374!X=678.55,  4858.36,  73,  0.000!!END!
2375!X=678.75,  4858.36,  73,  0.000!!END!
2376!X=678.95,  4858.36,  73,  0.000!!END!
2377!X=679.15,  4858.36,  73,  0.000!!END!
2378!X=679.35,  4858.36,  73,  0.000!!END!
2379!X=679.55,  4858.36,  73,  0.000!!END!
2380!X=679.75,  4858.36,  73,  0.000!!END!
2381!X=679.95,  4858.36,  73,  0.000!!END!
2382!X=680.15,  4858.36,  73,  0.000!!END!
2383!X=680.35,  4858.36,  73,  0.000!!END!
2384!X=680.55,  4858.36,  73,  0.000!!END!
2385!X=680.75,  4858.36,  73,  0.000!!END!
2386!X=680.95,  4858.36,  73,  0.000!!END!
2387!X=681.15,  4858.36,  73,  0.000!!END!
2388!X=681.35,  4858.36,  73,  0.000!!END!
2389!X=681.55,  4858.36,  73,  0.000!!END!
2390!X=681.75,  4858.36,  73,  0.000!!END!
2391!X=681.95,  4858.36,  73,  0.000!!END!
2392!X=682.15,  4858.36,  73,  0.000!!END!
2393!X=682.35,  4858.36,  73,  0.000!!END!
2394!X=682.55,  4858.36,  73,  0.000!!END!
2395!X=682.75,  4858.36,  73,  0.000!!END!
2396!X=678.35,  4858.56,  73,  0.000!!END!
2397!X=678.55,  4858.56,  73,  0.000!!END!
2398!X=678.75,  4858.56,  73,  0.000!!END!
2399!X=678.95,  4858.56,  73,  0.000!!END!
2400!X=679.15,  4858.56,  73,  0.000!!END!
2401!X=679.35,  4858.56,  73,  0.000!!END!
2402!X=679.55,  4858.56,  73,  0.000!!END!
2403!X=679.75,  4858.56,  73,  0.000!!END!
2404!X=679.95,  4858.56,  73,  0.000!!END!
2405!X=680.15,  4858.56,  73,  0.000!!END!
2406!X=680.35,  4858.56,  73,  0.000!!END!
2407!X=680.55,  4858.56,  73,  0.000!!END!
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2408!X=680.75,  4858.56,  73,  0.000!!END!
2409!X=680.95,  4858.56,  73,  0.000!!END!
2410!X=681.15,  4858.56,  73,  0.000!!END!
2411!X=681.35,  4858.56,  73,  0.000!!END!
2412!X=681.55,  4858.56,  73,  0.000!!END!
2413!X=681.75,  4858.56,  73,  0.000!!END!
2414!X=681.95,  4858.56,  73,  0.000!!END!
2415!X=682.15,  4858.56,  73,  0.000!!END!
2416!X=682.35,  4858.56,  73,  0.000!!END!
2417!X=682.55,  4858.56,  73,  0.000!!END!
2418!X=682.75,  4858.56,  73,  0.000!!END!
2419!X=678.35,  4858.76,  73,  0.000!!END!
2420!X=678.55,  4858.76,  73,  0.000!!END!
2421!X=678.75,  4858.76,  73,  0.000!!END!
2422!X=678.95,  4858.76,  73,  0.000!!END!
2423!X=679.15,  4858.76,  73,  0.000!!END!
2424!X=679.35,  4858.76,  73,  0.000!!END!
2425!X=679.55,  4858.76,  73,  0.000!!END!
2426!X=679.75,  4858.76,  73,  0.000!!END!
2427!X=679.95,  4858.76,  73,  0.000!!END!
2428!X=680.15,  4858.76,  73,  0.000!!END!
2429!X=680.35,  4858.76,  73,  0.000!!END!
2430!X=680.55,  4858.76,  73,  0.000!!END!
2431!X=680.75,  4858.76,  73,  0.000!!END!
2432!X=680.95,  4858.76,  73,  0.000!!END!
2433!X=681.15,  4858.76,  73,  0.000!!END!
2434!X=681.35,  4858.76,  73,  0.000!!END!
2435!X=681.55,  4858.76,  73,  0.000!!END!
2436!X=681.75,  4858.76,  73,  0.000!!END!
2437!X=681.95,  4858.76,  73,  0.000!!END!
2438!X=682.15,  4858.76,  73,  0.000!!END!
2439!X=682.35,  4858.76,  73,  0.000!!END!
2440!X=682.55,  4858.76,  73,  0.000!!END!
2441!X=682.75,  4858.76,  73,  0.000!!END!
2442!X=678.35,  4858.96,  73,  0.000!!END!
2443!X=678.55,  4858.96,  73,  0.000!!END!
2444!X=678.75,  4858.96,  73,  0.000!!END!
2445!X=678.95,  4858.96,  73,  0.000!!END!
2446!X=679.15,  4858.96,  73,  0.000!!END!
2447!X=679.35,  4858.96,  73,  0.000!!END!
2448!X=679.55,  4858.96,  73,  0.000!!END!
2449!X=679.75,  4858.96,  73,  0.000!!END!
2450!X=679.95,  4858.96,  73,  0.000!!END!
2451!X=680.15,  4858.96,  73,  0.000!!END!
2452!X=680.35,  4858.96,  73,  0.000!!END!
2453!X=680.55,  4858.96,  73,  0.000!!END!
2454!X=680.75,  4858.96,  73,  0.000!!END!
2455!X=680.95,  4858.96,  73,  0.000!!END!
2456!X=681.15,  4858.96,  73,  0.000!!END!
2457!X=681.35,  4858.96,  73,  0.000!!END!
2458!X=681.55,  4858.96,  73,  0.000!!END!
2459!X=681.75,  4858.96,  73,  0.000!!END!
2460!X=681.95,  4858.96,  73,  0.000!!END!
2461!X=682.15,  4858.96,  73,  0.000!!END!
2462!X=682.35,  4858.96,  73,  0.000!!END!
2463!X=682.55,  4858.96,  73,  0.000!!END!
2464!X=682.75,  4858.96,  73,  0.000!!END!
2465!X=678.35,  4859.16,  73,  0.000!!END!
2466!X=678.55,  4859.16,  73,  0.000!!END!
2467!X=678.75,  4859.16,  73,  0.000!!END!
2468!X=678.95,  4859.16,  73,  0.000!!END!
2469!X=679.15,  4859.16,  73,  0.000!!END!
2470!X=681.95,  4859.16,  73,  0.000!!END!
2471!X=682.15,  4859.16,  73,  0.000!!END!
2472!X=682.35,  4859.16,  73,  0.000!!END!
2473!X=682.55,  4859.16,  73,  0.000!!END!
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2474!X=682.75,  4859.16,  73,  0.000!!END!
2475!X=678.35,  4859.36,  73,  0.000!!END!
2476!X=678.55,  4859.36,  73,  0.000!!END!
2477!X=678.75,  4859.36,  73,  0.000!!END!
2478!X=678.95,  4859.36,  73,  0.000!!END!
2479!X=679.15,  4859.36,  73,  0.000!!END!
2480!X=681.95,  4859.36,  73,  0.000!!END!
2481!X=682.15,  4859.36,  73,  0.000!!END!
2482!X=682.35,  4859.36,  73,  0.000!!END!
2483!X=682.55,  4859.36,  73,  0.000!!END!
2484!X=682.75,  4859.36,  73,  0.000!!END!
2485!X=678.35,  4859.56,  73,  0.000!!END!
2486!X=678.55,  4859.56,  73,  0.000!!END!
2487!X=678.75,  4859.56,  73,  0.000!!END!
2488!X=678.95,  4859.56,  73,  0.000!!END!
2489!X=679.15,  4859.56,  73,  0.000!!END!
2490!X=681.95,  4859.56,  73,  0.000!!END!
2491!X=682.15,  4859.56,  73,  0.000!!END!
2492!X=682.35,  4859.56,  73,  0.000!!END!
2493!X=682.55,  4859.56,  73,  0.000!!END!
2494!X=682.75,  4859.56,  75.25,  0.000!!END!
2495!X=678.35,  4859.76,  75.24,  0.000!!END!
2496!X=678.55,  4859.76,  79.96,  0.000!!END!
2497!X=678.75,  4859.76,  88.47,  0.000!!END!
2498!X=678.95,  4859.76,  88.93,  0.000!!END!
2499!X=679.15,  4859.76,  84.72,  0.000!!END!
2500!X=681.95,  4859.76,  73,  0.000!!END!
2501!X=682.15,  4859.76,  73,  0.000!!END!
2502!X=682.35,  4859.76,  77.74,  0.000!!END!
2503!X=682.55,  4859.76,  78.61,  0.000!!END!
2504!X=682.75,  4859.76,  82.56,  0.000!!END!
2505!X=678.35,  4859.96,  83.25,  0.000!!END!
2506!X=678.55,  4859.96,  87.03,  0.000!!END!
2507!X=678.75,  4859.96,  96.42,  0.000!!END!
2508!X=678.95,  4859.96,  92.49,  0.000!!END!
2509!X=679.15,  4859.96,  87.7,  0.000!!END!
2510!X=681.95,  4859.96,  84.53,  0.000!!END!
2511!X=682.15,  4859.96,  86.54,  0.000!!END!
2512!X=682.35,  4859.96,  84.38,  0.000!!END!
2513!X=682.55,  4859.96,  79.25,  0.000!!END!
2514!X=682.75,  4859.96,  91.34,  0.000!!END!
2515!X=678.35,  4860.16,  88.76,  0.000!!END!
2516!X=678.55,  4860.16,  95.49,  0.000!!END!
2517!X=678.75,  4860.16,  99.96,  0.000!!END!
2518!X=678.95,  4860.16,  91.1,  0.000!!END!
2519!X=679.15,  4860.16,  89.56,  0.000!!END!
2520!X=681.95,  4860.16,  99.03,  0.000!!END!
2521!X=682.15,  4860.16,  97.93,  0.000!!END!
2522!X=682.35,  4860.16,  98.3,  0.000!!END!
2523!X=682.55,  4860.16,  92.73,  0.000!!END!
2524!X=682.75,  4860.16,  85.16,  0.000!!END!
2525!X=678.35,  4860.36,  98.46,  0.000!!END!
2526!X=678.55,  4860.36,  99.95,  0.000!!END!
2527!X=678.75,  4860.36,  94.74,  0.000!!END!
2528!X=678.95,  4860.36,  88.61,  0.000!!END!
2529!X=679.15,  4860.36,  88.5,  0.000!!END!
2530!X=681.95,  4860.36,  100.1,  0.000!!END!
2531!X=682.15,  4860.36,  99.62,  0.000!!END!
2532!X=682.35,  4860.36,  102.25,  0.000!!END!
2533!X=682.55,  4860.36,  104.29,  0.000!!END!
2534!X=682.75,  4860.36,  107.88,  0.000!!END!
2535!X=678.35,  4860.56,  92.83,  0.000!!END!
2536!X=678.55,  4860.56,  93.57,  0.000!!END!
2537!X=678.75,  4860.56,  91.28,  0.000!!END!
2538!X=678.95,  4860.56,  90.53,  0.000!!END!
2539!X=679.15,  4860.56,  91.06,  0.000!!END!
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2540!X=681.95,  4860.56,  123.19,  0.000!!END!
2541!X=682.15,  4860.56,  107.95,  0.000!!END!
2542!X=682.35,  4860.56,  106.58,  0.000!!END!
2543!X=682.55,  4860.56,  107.19,  0.000!!END!
2544!X=682.75,  4860.56,  111.25,  0.000!!END!
2545!X=678.35,  4860.76,  98.99,  0.000!!END!
2546!X=678.55,  4860.76,  97.82,  0.000!!END!
2547!X=678.75,  4860.76,  95.6,  0.000!!END!
2548!X=678.95,  4860.76,  94.07,  0.000!!END!
2549!X=679.15,  4860.76,  96.23,  0.000!!END!
2550!X=681.95,  4860.76,  127.55,  0.000!!END!
2551!X=682.15,  4860.76,  113.42,  0.000!!END!
2552!X=682.35,  4860.76,  109.82,  0.000!!END!
2553!X=682.55,  4860.76,  114.22,  0.000!!END!
2554!X=682.75,  4860.76,  121.29,  0.000!!END!
2555!X=678.35,  4860.96,  102.41,  0.000!!END!
2556!X=678.55,  4860.96,  97.43,  0.000!!END!
2557!X=678.75,  4860.96,  99,  0.000!!END!
2558!X=678.95,  4860.96,  99.91,  0.000!!END!
2559!X=679.15,  4860.96,  102.69,  0.000!!END!
2560!X=681.95,  4860.96,  130.36,  0.000!!END!
2561!X=682.15,  4860.96,  120.44,  0.000!!END!
2562!X=682.35,  4860.96,  121.93,  0.000!!END!
2563!X=682.55,  4860.96,  121.43,  0.000!!END!
2564!X=682.75,  4860.96,  125.96,  0.000!!END!
2565!X=678.35,  4861.16,  108.08,  0.000!!END!
2566!X=678.55,  4861.16,  106.06,  0.000!!END!
2567!X=678.75,  4861.16,  102.76,  0.000!!END!
2568!X=678.95,  4861.16,  101.72,  0.000!!END!
2569!X=679.15,  4861.16,  102.01,  0.000!!END!
2570!X=681.95,  4861.16,  126.29,  0.000!!END!
2571!X=682.15,  4861.16,  124.2,  0.000!!END!
2572!X=682.35,  4861.16,  127.17,  0.000!!END!
2573!X=682.55,  4861.16,  126.75,  0.000!!END!
2574!X=682.75,  4861.16,  133.26,  0.000!!END!
2575!X=678.35,  4861.36,  117.15,  0.000!!END!
2576!X=678.55,  4861.36,  115.97,  0.000!!END!
2577!X=678.75,  4861.36,  112.65,  0.000!!END!
2578!X=678.95,  4861.36,  110.03,  0.000!!END!
2579!X=679.15,  4861.36,  107.25,  0.000!!END!
2580!X=681.95,  4861.36,  117.77,  0.000!!END!
2581!X=682.15,  4861.36,  122.58,  0.000!!END!
2582!X=682.35,  4861.36,  123.82,  0.000!!END!
2583!X=682.55,  4861.36,  126.73,  0.000!!END!
2584!X=682.75,  4861.36,  127.61,  0.000!!END!
2585!X=678.35,  4861.56,  117.49,  0.000!!END!
2586!X=678.55,  4861.56,  120.28,  0.000!!END!
2587!X=678.75,  4861.56,  117.56,  0.000!!END!
2588!X=678.95,  4861.56,  117.05,  0.000!!END!
2589!X=679.15,  4861.56,  111.99,  0.000!!END!
2590!X=681.95,  4861.56,  116.42,  0.000!!END!
2591!X=682.15,  4861.56,  116.86,  0.000!!END!
2592!X=682.35,  4861.56,  116.49,  0.000!!END!
2593!X=682.55,  4861.56,  130.35,  0.000!!END!
2594!X=682.75,  4861.56,  116.06,  0.000!!END!
2595!X=678.35,  4861.76,  118.88,  0.000!!END!
2596!X=678.55,  4861.76,  123.13,  0.000!!END!
2597!X=678.75,  4861.76,  124.46,  0.000!!END!
2598!X=678.95,  4861.76,  118.51,  0.000!!END!
2599!X=679.15,  4861.76,  115.92,  0.000!!END!
2600!X=679.35,  4861.76,  117,  0.000!!END!
2601!X=679.55,  4861.76,  109.5,  0.000!!END!
2602!X=679.75,  4861.76,  107.43,  0.000!!END!
2603!X=679.95,  4861.76,  105.6,  0.000!!END!
2604!X=680.15,  4861.76,  111.28,  0.000!!END!
2605!X=680.35,  4861.76,  112.44,  0.000!!END!
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2606!X=680.55,  4861.76,  119.18,  0.000!!END!
2607!X=680.75,  4861.76,  116.37,  0.000!!END!
2608!X=680.95,  4861.76,  117.84,  0.000!!END!
2609!X=681.15,  4861.76,  130.51,  0.000!!END!
2610!X=681.35,  4861.76,  126.03,  0.000!!END!
2611!X=681.55,  4861.76,  115.73,  0.000!!END!
2612!X=681.75,  4861.76,  114.9,  0.000!!END!
2613!X=681.95,  4861.76,  113.58,  0.000!!END!
2614!X=682.15,  4861.76,  114.32,  0.000!!END!
2615!X=682.35,  4861.76,  119.75,  0.000!!END!
2616!X=682.55,  4861.76,  122.64,  0.000!!END!
2617!X=682.75,  4861.76,  112.5,  0.000!!END!
2618!X=678.35,  4861.96,  125.33,  0.000!!END!
2619!X=678.55,  4861.96,  124.63,  0.000!!END!
2620!X=678.75,  4861.96,  126.83,  0.000!!END!
2621!X=678.95,  4861.96,  119.96,  0.000!!END!
2622!X=679.15,  4861.96,  117,  0.000!!END!
2623!X=679.35,  4861.96,  114.04,  0.000!!END!
2624!X=679.55,  4861.96,  111.68,  0.000!!END!
2625!X=679.75,  4861.96,  114.3,  0.000!!END!
2626!X=679.95,  4861.96,  116.87,  0.000!!END!
2627!X=680.15,  4861.96,  119.66,  0.000!!END!
2628!X=680.35,  4861.96,  118.41,  0.000!!END!
2629!X=680.55,  4861.96,  118.82,  0.000!!END!
2630!X=680.75,  4861.96,  122.11,  0.000!!END!
2631!X=680.95,  4861.96,  125.71,  0.000!!END!
2632!X=681.15,  4861.96,  128.32,  0.000!!END!
2633!X=681.35,  4861.96,  116.23,  0.000!!END!
2634!X=681.55,  4861.96,  116.3,  0.000!!END!
2635!X=681.75,  4861.96,  113.75,  0.000!!END!
2636!X=681.95,  4861.96,  112.18,  0.000!!END!
2637!X=682.15,  4861.96,  115.01,  0.000!!END!
2638!X=682.35,  4861.96,  119.81,  0.000!!END!
2639!X=682.55,  4861.96,  112.8,  0.000!!END!
2640!X=682.75,  4861.96,  114.34,  0.000!!END!
2641!X=678.35,  4862.16,  126.71,  0.000!!END!
2642!X=678.55,  4862.16,  130.07,  0.000!!END!
2643!X=678.75,  4862.16,  138.47,  0.000!!END!
2644!X=678.95,  4862.16,  117.89,  0.000!!END!
2645!X=679.15,  4862.16,  115.64,  0.000!!END!
2646!X=679.35,  4862.16,  112.69,  0.000!!END!
2647!X=679.55,  4862.16,  109.97,  0.000!!END!
2648!X=679.75,  4862.16,  118.49,  0.000!!END!
2649!X=679.95,  4862.16,  125.46,  0.000!!END!
2650!X=680.15,  4862.16,  133.06,  0.000!!END!
2651!X=680.35,  4862.16,  125.2,  0.000!!END!
2652!X=680.55,  4862.16,  121.03,  0.000!!END!
2653!X=680.75,  4862.16,  124.88,  0.000!!END!
2654!X=680.95,  4862.16,  129.35,  0.000!!END!
2655!X=681.15,  4862.16,  128.32,  0.000!!END!
2656!X=681.35,  4862.16,  124.14,  0.000!!END!
2657!X=681.55,  4862.16,  118.2,  0.000!!END!
2658!X=681.75,  4862.16,  117.72,  0.000!!END!
2659!X=681.95,  4862.16,  114.05,  0.000!!END!
2660!X=682.15,  4862.16,  113.47,  0.000!!END!
2661!X=682.35,  4862.16,  111.9,  0.000!!END!
2662!X=682.55,  4862.16,  112.3,  0.000!!END!
2663!X=682.75,  4862.16,  109.86,  0.000!!END!
2664!X=678.35,  4862.36,  125.65,  0.000!!END!
2665!X=678.55,  4862.36,  131.7,  0.000!!END!
2666!X=678.75,  4862.36,  126.69,  0.000!!END!
2667!X=678.95,  4862.36,  119.56,  0.000!!END!
2668!X=679.15,  4862.36,  118.31,  0.000!!END!
2669!X=679.35,  4862.36,  115.43,  0.000!!END!
2670!X=679.55,  4862.36,  114.84,  0.000!!END!
2671!X=679.75,  4862.36,  116.01,  0.000!!END!
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2672!X=679.95,  4862.36,  122.82,  0.000!!END!
2673!X=680.15,  4862.36,  128.49,  0.000!!END!
2674!X=680.35,  4862.36,  125.11,  0.000!!END!
2675!X=680.55,  4862.36,  125.31,  0.000!!END!
2676!X=680.75,  4862.36,  123.72,  0.000!!END!
2677!X=680.95,  4862.36,  126.56,  0.000!!END!
2678!X=681.15,  4862.36,  130.9,  0.000!!END!
2679!X=681.35,  4862.36,  126.54,  0.000!!END!
2680!X=681.55,  4862.36,  119.87,  0.000!!END!
2681!X=681.75,  4862.36,  120.54,  0.000!!END!
2682!X=681.95,  4862.36,  120.49,  0.000!!END!
2683!X=682.15,  4862.36,  113.93,  0.000!!END!
2684!X=682.35,  4862.36,  112.89,  0.000!!END!
2685!X=682.55,  4862.36,  112.53,  0.000!!END!
2686!X=682.75,  4862.36,  109.12,  0.000!!END!
2687!X=678.35,  4862.56,  129.65,  0.000!!END!
2688!X=678.55,  4862.56,  129.63,  0.000!!END!
2689!X=678.75,  4862.56,  126.1,  0.000!!END!
2690!X=678.95,  4862.56,  121.4,  0.000!!END!
2691!X=679.15,  4862.56,  117.38,  0.000!!END!
2692!X=679.35,  4862.56,  118.19,  0.000!!END!
2693!X=679.55,  4862.56,  116.31,  0.000!!END!
2694!X=679.75,  4862.56,  116.84,  0.000!!END!
2695!X=679.95,  4862.56,  124.8,  0.000!!END!
2696!X=680.15,  4862.56,  128.77,  0.000!!END!
2697!X=680.35,  4862.56,  128.66,  0.000!!END!
2698!X=680.55,  4862.56,  125.52,  0.000!!END!
2699!X=680.75,  4862.56,  122.95,  0.000!!END!
2700!X=680.95,  4862.56,  126.39,  0.000!!END!
2701!X=681.15,  4862.56,  131.22,  0.000!!END!
2702!X=681.35,  4862.56,  128.28,  0.000!!END!
2703!X=681.55,  4862.56,  124.51,  0.000!!END!
2704!X=681.75,  4862.56,  121.34,  0.000!!END!
2705!X=681.95,  4862.56,  116.57,  0.000!!END!
2706!X=682.15,  4862.56,  116.08,  0.000!!END!
2707!X=682.35,  4862.56,  113.53,  0.000!!END!
2708!X=682.55,  4862.56,  108.71,  0.000!!END!
2709!X=682.75,  4862.56,  115.47,  0.000!!END!
2710!X=675.3,  4855.11,  73,  0.000!!END!
2711!X=675.8,  4855.11,  73,  0.000!!END!
2712!X=676.3,  4855.11,  73,  0.000!!END!
2713!X=676.8,  4855.11,  73,  0.000!!END!
2714!X=677.3,  4855.11,  73,  0.000!!END!
2715!X=677.8,  4855.11,  73,  0.000!!END!
2716!X=678.3,  4855.11,  73,  0.000!!END!
2717!X=678.8,  4855.11,  73,  0.000!!END!
2718!X=679.3,  4855.11,  73,  0.000!!END!
2719!X=679.8,  4855.11,  73,  0.000!!END!
2720!X=680.3,  4855.11,  73,  0.000!!END!
2721!X=680.8,  4855.11,  73,  0.000!!END!
2722!X=681.3,  4855.11,  73,  0.000!!END!
2723!X=681.8,  4855.11,  73,  0.000!!END!
2724!X=682.3,  4855.11,  73,  0.000!!END!
2725!X=682.8,  4855.11,  73,  0.000!!END!
2726!X=683.3,  4855.11,  73,  0.000!!END!
2727!X=683.8,  4855.11,  73,  0.000!!END!
2728!X=684.3,  4855.11,  73,  0.000!!END!
2729!X=684.8,  4855.11,  73,  0.000!!END!
2730!X=685.3,  4855.11,  73,  0.000!!END!
2731!X=685.8,  4855.11,  73,  0.000!!END!
2732!X=675.3,  4855.61,  73,  0.000!!END!
2733!X=675.8,  4855.61,  73,  0.000!!END!
2734!X=676.3,  4855.61,  73,  0.000!!END!
2735!X=676.8,  4855.61,  73,  0.000!!END!
2736!X=677.3,  4855.61,  73,  0.000!!END!
2737!X=677.8,  4855.61,  73,  0.000!!END!
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2738!X=678.3,  4855.61,  73,  0.000!!END!
2739!X=678.8,  4855.61,  73,  0.000!!END!
2740!X=679.3,  4855.61,  73,  0.000!!END!
2741!X=679.8,  4855.61,  73,  0.000!!END!
2742!X=680.3,  4855.61,  73,  0.000!!END!
2743!X=680.8,  4855.61,  73,  0.000!!END!
2744!X=681.3,  4855.61,  73,  0.000!!END!
2745!X=681.8,  4855.61,  73,  0.000!!END!
2746!X=682.3,  4855.61,  73,  0.000!!END!
2747!X=682.8,  4855.61,  73,  0.000!!END!
2748!X=683.3,  4855.61,  73,  0.000!!END!
2749!X=683.8,  4855.61,  73,  0.000!!END!
2750!X=684.3,  4855.61,  73,  0.000!!END!
2751!X=684.8,  4855.61,  73,  0.000!!END!
2752!X=685.3,  4855.61,  73,  0.000!!END!
2753!X=685.8,  4855.61,  73,  0.000!!END!
2754!X=675.3,  4856.11,  73,  0.000!!END!
2755!X=675.8,  4856.11,  73,  0.000!!END!
2756!X=676.3,  4856.11,  73,  0.000!!END!
2757!X=676.8,  4856.11,  73,  0.000!!END!
2758!X=677.3,  4856.11,  73,  0.000!!END!
2759!X=677.8,  4856.11,  73,  0.000!!END!
2760!X=678.3,  4856.11,  73,  0.000!!END!
2761!X=678.8,  4856.11,  73,  0.000!!END!
2762!X=679.3,  4856.11,  73,  0.000!!END!
2763!X=679.8,  4856.11,  73,  0.000!!END!
2764!X=680.3,  4856.11,  73,  0.000!!END!
2765!X=680.8,  4856.11,  73,  0.000!!END!
2766!X=681.3,  4856.11,  73,  0.000!!END!
2767!X=681.8,  4856.11,  73,  0.000!!END!
2768!X=682.3,  4856.11,  73,  0.000!!END!
2769!X=682.8,  4856.11,  73,  0.000!!END!
2770!X=683.3,  4856.11,  73,  0.000!!END!
2771!X=683.8,  4856.11,  73,  0.000!!END!
2772!X=684.3,  4856.11,  73,  0.000!!END!
2773!X=684.8,  4856.11,  73,  0.000!!END!
2774!X=685.3,  4856.11,  73,  0.000!!END!
2775!X=685.8,  4856.11,  73,  0.000!!END!
2776!X=675.3,  4856.61,  73,  0.000!!END!
2777!X=675.8,  4856.61,  73,  0.000!!END!
2778!X=676.3,  4856.61,  73,  0.000!!END!
2779!X=676.8,  4856.61,  73,  0.000!!END!
2780!X=677.3,  4856.61,  73,  0.000!!END!
2781!X=677.8,  4856.61,  73,  0.000!!END!
2782!X=678.3,  4856.61,  73,  0.000!!END!
2783!X=678.8,  4856.61,  73,  0.000!!END!
2784!X=679.3,  4856.61,  73,  0.000!!END!
2785!X=679.8,  4856.61,  73,  0.000!!END!
2786!X=680.3,  4856.61,  73,  0.000!!END!
2787!X=680.8,  4856.61,  73,  0.000!!END!
2788!X=681.3,  4856.61,  73,  0.000!!END!
2789!X=681.8,  4856.61,  73,  0.000!!END!
2790!X=682.3,  4856.61,  73,  0.000!!END!
2791!X=682.8,  4856.61,  73,  0.000!!END!
2792!X=683.3,  4856.61,  73,  0.000!!END!
2793!X=683.8,  4856.61,  73,  0.000!!END!
2794!X=684.3,  4856.61,  73,  0.000!!END!
2795!X=684.8,  4856.61,  73,  0.000!!END!
2796!X=685.3,  4856.61,  73,  0.000!!END!
2797!X=685.8,  4856.61,  73,  0.000!!END!
2798!X=675.3,  4857.11,  73,  0.000!!END!
2799!X=675.8,  4857.11,  73,  0.000!!END!
2800!X=676.3,  4857.11,  73,  0.000!!END!
2801!X=676.8,  4857.11,  73,  0.000!!END!
2802!X=677.3,  4857.11,  73,  0.000!!END!
2803!X=677.8,  4857.11,  73,  0.000!!END!
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2804!X=678.3,  4857.11,  73,  0.000!!END!
2805!X=678.8,  4857.11,  73,  0.000!!END!
2806!X=679.3,  4857.11,  73,  0.000!!END!
2807!X=679.8,  4857.11,  73,  0.000!!END!
2808!X=680.3,  4857.11,  73,  0.000!!END!
2809!X=680.8,  4857.11,  73,  0.000!!END!
2810!X=681.3,  4857.11,  73,  0.000!!END!
2811!X=681.8,  4857.11,  73,  0.000!!END!
2812!X=682.3,  4857.11,  73,  0.000!!END!
2813!X=682.8,  4857.11,  73,  0.000!!END!
2814!X=683.3,  4857.11,  73,  0.000!!END!
2815!X=683.8,  4857.11,  73,  0.000!!END!
2816!X=684.3,  4857.11,  73,  0.000!!END!
2817!X=684.8,  4857.11,  73,  0.000!!END!
2818!X=685.3,  4857.11,  73,  0.000!!END!
2819!X=685.8,  4857.11,  73,  0.000!!END!
2820!X=675.3,  4857.61,  73,  0.000!!END!
2821!X=675.8,  4857.61,  73,  0.000!!END!
2822!X=676.3,  4857.61,  73,  0.000!!END!
2823!X=676.8,  4857.61,  73,  0.000!!END!
2824!X=677.3,  4857.61,  73,  0.000!!END!
2825!X=677.8,  4857.61,  73,  0.000!!END!
2826!X=678.3,  4857.61,  73,  0.000!!END!
2827!X=678.8,  4857.61,  73,  0.000!!END!
2828!X=679.3,  4857.61,  73,  0.000!!END!
2829!X=679.8,  4857.61,  73,  0.000!!END!
2830!X=680.3,  4857.61,  73,  0.000!!END!
2831!X=680.8,  4857.61,  73,  0.000!!END!
2832!X=681.3,  4857.61,  73,  0.000!!END!
2833!X=681.8,  4857.61,  73,  0.000!!END!
2834!X=682.3,  4857.61,  73,  0.000!!END!
2835!X=682.8,  4857.61,  73,  0.000!!END!
2836!X=683.3,  4857.61,  73,  0.000!!END!
2837!X=683.8,  4857.61,  73,  0.000!!END!
2838!X=684.3,  4857.61,  73,  0.000!!END!
2839!X=684.8,  4857.61,  73,  0.000!!END!
2840!X=685.3,  4857.61,  73,  0.000!!END!
2841!X=685.8,  4857.61,  73,  0.000!!END!
2842!X=675.3,  4858.11,  73,  0.000!!END!
2843!X=675.8,  4858.11,  73,  0.000!!END!
2844!X=676.3,  4858.11,  73,  0.000!!END!
2845!X=676.8,  4858.11,  73,  0.000!!END!
2846!X=677.3,  4858.11,  73,  0.000!!END!
2847!X=677.8,  4858.11,  73,  0.000!!END!
2848!X=678.3,  4858.11,  73,  0.000!!END!
2849!X=678.8,  4858.11,  73,  0.000!!END!
2850!X=679.3,  4858.11,  73,  0.000!!END!
2851!X=679.8,  4858.11,  73,  0.000!!END!
2852!X=680.3,  4858.11,  73,  0.000!!END!
2853!X=680.8,  4858.11,  73,  0.000!!END!
2854!X=681.3,  4858.11,  73,  0.000!!END!
2855!X=681.8,  4858.11,  73,  0.000!!END!
2856!X=682.3,  4858.11,  73,  0.000!!END!
2857!X=682.8,  4858.11,  73,  0.000!!END!
2858!X=683.3,  4858.11,  73,  0.000!!END!
2859!X=683.8,  4858.11,  73,  0.000!!END!
2860!X=684.3,  4858.11,  73,  0.000!!END!
2861!X=684.8,  4858.11,  73,  0.000!!END!
2862!X=685.3,  4858.11,  73,  0.000!!END!
2863!X=685.8,  4858.11,  73,  0.000!!END!
2864!X=675.3,  4858.61,  73,  0.000!!END!
2865!X=675.8,  4858.61,  73,  0.000!!END!
2866!X=676.3,  4858.61,  73,  0.000!!END!
2867!X=676.8,  4858.61,  73,  0.000!!END!
2868!X=677.3,  4858.61,  73,  0.000!!END!
2869!X=677.8,  4858.61,  73,  0.000!!END!
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2870!X=678.3,  4858.61,  73,  0.000!!END!
2871!X=682.8,  4858.61,  73,  0.000!!END!
2872!X=683.3,  4858.61,  73,  0.000!!END!
2873!X=683.8,  4858.61,  73,  0.000!!END!
2874!X=684.3,  4858.61,  73,  0.000!!END!
2875!X=684.8,  4858.61,  73,  0.000!!END!
2876!X=685.3,  4858.61,  73,  0.000!!END!
2877!X=685.8,  4858.61,  73,  0.000!!END!
2878!X=675.3,  4859.11,  73,  0.000!!END!
2879!X=675.8,  4859.11,  73,  0.000!!END!
2880!X=676.3,  4859.11,  73,  0.000!!END!
2881!X=676.8,  4859.11,  73,  0.000!!END!
2882!X=677.3,  4859.11,  73,  0.000!!END!
2883!X=677.8,  4859.11,  73,  0.000!!END!
2884!X=678.3,  4859.11,  73,  0.000!!END!
2885!X=682.8,  4859.11,  73,  0.000!!END!
2886!X=683.3,  4859.11,  73,  0.000!!END!
2887!X=683.8,  4859.11,  73,  0.000!!END!
2888!X=684.3,  4859.11,  73,  0.000!!END!
2889!X=684.8,  4859.11,  73,  0.000!!END!
2890!X=685.3,  4859.11,  73,  0.000!!END!
2891!X=685.8,  4859.11,  73,  0.000!!END!
2892!X=675.3,  4859.61,  77.38,  0.000!!END!
2893!X=675.8,  4859.61,  73,  0.000!!END!
2894!X=676.3,  4859.61,  73.48,  0.000!!END!
2895!X=676.8,  4859.61,  74.05,  0.000!!END!
2896!X=677.3,  4859.61,  73,  0.000!!END!
2897!X=677.8,  4859.61,  73,  0.000!!END!
2898!X=678.3,  4859.61,  73,  0.000!!END!
2899!X=682.8,  4859.61,  77.61,  0.000!!END!
2900!X=683.3,  4859.61,  78.36,  0.000!!END!
2901!X=683.8,  4859.61,  73,  0.000!!END!
2902!X=684.3,  4859.61,  73,  0.000!!END!
2903!X=684.8,  4859.61,  73,  0.000!!END!
2904!X=685.3,  4859.61,  73,  0.000!!END!
2905!X=685.8,  4859.61,  73,  0.000!!END!
2906!X=675.3,  4860.11,  76.06,  0.000!!END!
2907!X=675.8,  4860.11,  73,  0.000!!END!
2908!X=676.3,  4860.11,  74.69,  0.000!!END!
2909!X=676.8,  4860.11,  73.92,  0.000!!END!
2910!X=677.3,  4860.11,  85.67,  0.000!!END!
2911!X=677.8,  4860.11,  93.69,  0.000!!END!
2912!X=678.3,  4860.11,  88.05,  0.000!!END!
2913!X=682.8,  4860.11,  78.66,  0.000!!END!
2914!X=683.3,  4860.11,  85.8,  0.000!!END!
2915!X=683.8,  4860.11,  87.88,  0.000!!END!
2916!X=684.3,  4860.11,  97.92,  0.000!!END!
2917!X=684.8,  4860.11,  73,  0.000!!END!
2918!X=685.3,  4860.11,  73,  0.000!!END!
2919!X=685.8,  4860.11,  73,  0.000!!END!
2920!X=675.3,  4860.61,  77.07,  0.000!!END!
2921!X=675.8,  4860.61,  74.71,  0.000!!END!
2922!X=676.3,  4860.61,  89.27,  0.000!!END!
2923!X=676.8,  4860.61,  99.36,  0.000!!END!
2924!X=677.3,  4860.61,  104.02,  0.000!!END!
2925!X=677.8,  4860.61,  97.08,  0.000!!END!
2926!X=678.3,  4860.61,  93.68,  0.000!!END!
2927!X=682.8,  4860.61,  111.62,  0.000!!END!
2928!X=683.3,  4860.61,  112.14,  0.000!!END!
2929!X=683.8,  4860.61,  99.69,  0.000!!END!
2930!X=684.3,  4860.61,  91.28,  0.000!!END!
2931!X=684.8,  4860.61,  77.95,  0.000!!END!
2932!X=685.3,  4860.61,  73.65,  0.000!!END!
2933!X=685.8,  4860.61,  82.19,  0.000!!END!
2934!X=675.3,  4861.11,  79.42,  0.000!!END!
2935!X=675.8,  4861.11,  82.66,  0.000!!END!
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2936!X=676.3,  4861.11,  99.58,  0.000!!END!
2937!X=676.8,  4861.11,  107.29,  0.000!!END!
2938!X=677.3,  4861.11,  95.8,  0.000!!END!
2939!X=677.8,  4861.11,  93.69,  0.000!!END!
2940!X=678.3,  4861.11,  107.21,  0.000!!END!
2941!X=682.8,  4861.11,  129.87,  0.000!!END!
2942!X=683.3,  4861.11,  116.72,  0.000!!END!
2943!X=683.8,  4861.11,  106.95,  0.000!!END!
2944!X=684.3,  4861.11,  93.98,  0.000!!END!
2945!X=684.8,  4861.11,  100.56,  0.000!!END!
2946!X=685.3,  4861.11,  92.95,  0.000!!END!
2947!X=685.8,  4861.11,  91.7,  0.000!!END!
2948!X=675.3,  4861.61,  80.02,  0.000!!END!
2949!X=675.8,  4861.61,  91.18,  0.000!!END!
2950!X=676.3,  4861.61,  106.97,  0.000!!END!
2951!X=676.8,  4861.61,  107.58,  0.000!!END!
2952!X=677.3,  4861.61,  113.61,  0.000!!END!
2953!X=677.8,  4861.61,  110.16,  0.000!!END!
2954!X=678.3,  4861.61,  118.11,  0.000!!END!
2955!X=682.8,  4861.61,  112.07,  0.000!!END!
2956!X=683.3,  4861.61,  103.45,  0.000!!END!
2957!X=683.8,  4861.61,  95.57,  0.000!!END!
2958!X=684.3,  4861.61,  87.41,  0.000!!END!
2959!X=684.8,  4861.61,  81.54,  0.000!!END!
2960!X=685.3,  4861.61,  17.07,  0.000!!END!
2961!X=685.8,  4861.61,  82.85,  0.000!!END!
2962!X=675.3,  4862.11,  88.41,  0.000!!END!
2963!X=675.8,  4862.11,  117.27,  0.000!!END!
2964!X=676.3,  4862.11,  125.65,  0.000!!END!
2965!X=676.8,  4862.11,  121.24,  0.000!!END!
2966!X=677.3,  4862.11,  119.4,  0.000!!END!
2967!X=677.8,  4862.11,  116.05,  0.000!!END!
2968!X=678.3,  4862.11,  126.49,  0.000!!END!
2969!X=682.8,  4862.11,  110.45,  0.000!!END!
2970!X=683.3,  4862.11,  108.55,  0.000!!END!
2971!X=683.8,  4862.11,  109.66,  0.000!!END!
2972!X=684.3,  4862.11,  91.22,  0.000!!END!
2973!X=684.8,  4862.11,  85.07,  0.000!!END!
2974!X=685.3,  4862.11,  73.14,  0.000!!END!
2975!X=685.8,  4862.11,  81.37,  0.000!!END!
2976!X=675.3,  4862.61,  94.57,  0.000!!END!
2977!X=675.8,  4862.61,  117.44,  0.000!!END!
2978!X=676.3,  4862.61,  125.44,  0.000!!END!
2979!X=676.8,  4862.61,  128.58,  0.000!!END!
2980!X=677.3,  4862.61,  114.93,  0.000!!END!
2981!X=677.8,  4862.61,  128,  0.000!!END!
2982!X=678.3,  4862.61,  130.9,  0.000!!END!
2983!X=678.8,  4862.61,  125.42,  0.000!!END!
2984!X=679.3,  4862.61,  119.36,  0.000!!END!
2985!X=679.8,  4862.61,  117.63,  0.000!!END!
2986!X=680.3,  4862.61,  129.3,  0.000!!END!
2987!X=680.8,  4862.61,  125.18,  0.000!!END!
2988!X=681.3,  4862.61,  128.91,  0.000!!END!
2989!X=681.8,  4862.61,  119.59,  0.000!!END!
2990!X=682.3,  4862.61,  113.42,  0.000!!END!
2991!X=682.8,  4862.61,  117.66,  0.000!!END!
2992!X=683.3,  4862.61,  112.07,  0.000!!END!
2993!X=683.8,  4862.61,  107.02,  0.000!!END!
2994!X=684.3,  4862.61,  112.23,  0.000!!END!
2995!X=684.8,  4862.61,  86,  0.000!!END!
2996!X=685.3,  4862.61,  84.79,  0.000!!END!
2997!X=685.8,  4862.61,  85.43,  0.000!!END!
2998!X=675.3,  4863.11,  131.09,  0.000!!END!
2999!X=675.8,  4863.11,  132.6,  0.000!!END!
3000!X=676.3,  4863.11,  118.52,  0.000!!END!
3001!X=676.8,  4863.11,  128.45,  0.000!!END!
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3002!X=677.3,  4863.11,  131.85,  0.000!!END!
3003!X=677.8,  4863.11,  133.71,  0.000!!END!
3004!X=678.3,  4863.11,  133.81,  0.000!!END!
3005!X=678.8,  4863.11,  132.47,  0.000!!END!
3006!X=679.3,  4863.11,  122.81,  0.000!!END!
3007!X=679.8,  4863.11,  125.95,  0.000!!END!
3008!X=680.3,  4863.11,  132.54,  0.000!!END!
3009!X=680.8,  4863.11,  123.67,  0.000!!END!
3010!X=681.3,  4863.11,  127.02,  0.000!!END!
3011!X=681.8,  4863.11,  120.93,  0.000!!END!
3012!X=682.3,  4863.11,  119.04,  0.000!!END!
3013!X=682.8,  4863.11,  127.5,  0.000!!END!
3014!X=683.3,  4863.11,  116.62,  0.000!!END!
3015!X=683.8,  4863.11,  118.44,  0.000!!END!
3016!X=684.3,  4863.11,  104.7,  0.000!!END!
3017!X=684.8,  4863.11,  88.37,  0.000!!END!
3018!X=685.3,  4863.11,  94.51,  0.000!!END!
3019!X=685.8,  4863.11,  81.69,  0.000!!END!
3020!X=675.3,  4863.61,  132.56,  0.000!!END!
3021!X=675.8,  4863.61,  130.49,  0.000!!END!
3022!X=676.3,  4863.61,  119.83,  0.000!!END!
3023!X=676.8,  4863.61,  126.55,  0.000!!END!
3024!X=677.3,  4863.61,  132.25,  0.000!!END!
3025!X=677.8,  4863.61,  132.99,  0.000!!END!
3026!X=678.3,  4863.61,  138.31,  0.000!!END!
3027!X=678.8,  4863.61,  134.69,  0.000!!END!
3028!X=679.3,  4863.61,  131.84,  0.000!!END!
3029!X=679.8,  4863.61,  131.33,  0.000!!END!
3030!X=680.3,  4863.61,  127.24,  0.000!!END!
3031!X=680.8,  4863.61,  124.73,  0.000!!END!
3032!X=681.3,  4863.61,  122.84,  0.000!!END!
3033!X=681.8,  4863.61,  126.13,  0.000!!END!
3034!X=682.3,  4863.61,  123.21,  0.000!!END!
3035!X=682.8,  4863.61,  126.94,  0.000!!END!
3036!X=683.3,  4863.61,  121.01,  0.000!!END!
3037!X=683.8,  4863.61,  119.66,  0.000!!END!
3038!X=684.3,  4863.61,  108.97,  0.000!!END!
3039!X=684.8,  4863.61,  116.49,  0.000!!END!
3040!X=685.3,  4863.61,  92.09,  0.000!!END!
3041!X=685.8,  4863.61,  80.93,  0.000!!END!
3042!X=675.3,  4864.11,  124.36,  0.000!!END!
3043!X=675.8,  4864.11,  135.14,  0.000!!END!
3044!X=676.3,  4864.11,  135.49,  0.000!!END!
3045!X=676.8,  4864.11,  131.36,  0.000!!END!
3046!X=677.3,  4864.11,  135.3,  0.000!!END!
3047!X=677.8,  4864.11,  137.35,  0.000!!END!
3048!X=678.3,  4864.11,  137.97,  0.000!!END!
3049!X=678.8,  4864.11,  134.03,  0.000!!END!
3050!X=679.3,  4864.11,  134.5,  0.000!!END!
3051!X=679.8,  4864.11,  136.74,  0.000!!END!
3052!X=680.3,  4864.11,  133.99,  0.000!!END!
3053!X=680.8,  4864.11,  136.04,  0.000!!END!
3054!X=681.3,  4864.11,  133.9,  0.000!!END!
3055!X=681.8,  4864.11,  132.81,  0.000!!END!
3056!X=682.3,  4864.11,  130.39,  0.000!!END!
3057!X=682.8,  4864.11,  122.86,  0.000!!END!
3058!X=683.3,  4864.11,  125.22,  0.000!!END!
3059!X=683.8,  4864.11,  119.66,  0.000!!END!
3060!X=684.3,  4864.11,  116.2,  0.000!!END!
3061!X=684.8,  4864.11,  114.5,  0.000!!END!
3062!X=685.3,  4864.11,  101.41,  0.000!!END!
3063!X=685.8,  4864.11,  87.37,  0.000!!END!
3064!X=675.3,  4864.61,  138.21,  0.000!!END!
3065!X=675.8,  4864.61,  136.95,  0.000!!END!
3066!X=676.3,  4864.61,  137.78,  0.000!!END!
3067!X=676.8,  4864.61,  133.64,  0.000!!END!
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3068!X=677.3,  4864.61,  133.16,  0.000!!END!
3069!X=677.8,  4864.61,  134.19,  0.000!!END!
3070!X=678.3,  4864.61,  135.64,  0.000!!END!
3071!X=678.8,  4864.61,  135.51,  0.000!!END!
3072!X=679.3,  4864.61,  136.63,  0.000!!END!
3073!X=679.8,  4864.61,  137.29,  0.000!!END!
3074!X=680.3,  4864.61,  141.35,  0.000!!END!
3075!X=680.8,  4864.61,  142.08,  0.000!!END!
3076!X=681.3,  4864.61,  138.4,  0.000!!END!
3077!X=681.8,  4864.61,  136.59,  0.000!!END!
3078!X=682.3,  4864.61,  131.87,  0.000!!END!
3079!X=682.8,  4864.61,  129.49,  0.000!!END!
3080!X=683.3,  4864.61,  124.49,  0.000!!END!
3081!X=683.8,  4864.61,  122.87,  0.000!!END!
3082!X=684.3,  4864.61,  120.68,  0.000!!END!
3083!X=684.8,  4864.61,  114.58,  0.000!!END!
3084!X=685.3,  4864.61,  97.77,  0.000!!END!
3085!X=685.8,  4864.61,  107.28,  0.000!!END!
3086!X=675.3,  4865.11,  140.43,  0.000!!END!
3087!X=675.8,  4865.11,  147.52,  0.000!!END!
3088!X=676.3,  4865.11,  138.51,  0.000!!END!
3089!X=676.8,  4865.11,  137.16,  0.000!!END!
3090!X=677.3,  4865.11,  133.03,  0.000!!END!
3091!X=677.8,  4865.11,  141.45,  0.000!!END!
3092!X=678.3,  4865.11,  139.12,  0.000!!END!
3093!X=678.8,  4865.11,  139.59,  0.000!!END!
3094!X=679.3,  4865.11,  141.43,  0.000!!END!
3095!X=679.8,  4865.11,  144.09,  0.000!!END!
3096!X=680.3,  4865.11,  147.39,  0.000!!END!
3097!X=680.8,  4865.11,  146.89,  0.000!!END!
3098!X=681.3,  4865.11,  150.31,  0.000!!END!
3099!X=681.8,  4865.11,  140.71,  0.000!!END!
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3103!X=683.8,  4865.11,  123.65,  0.000!!END!
3104!X=684.3,  4865.11,  117.68,  0.000!!END!
3105!X=684.8,  4865.11,  115.27,  0.000!!END!
3106!X=685.3,  4865.11,  118.73,  0.000!!END!
3107!X=685.8,  4865.11,  110.81,  0.000!!END!
3108!X=675.3,  4865.61,  145.69,  0.000!!END!
3109!X=675.8,  4865.61,  143.59,  0.000!!END!
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3111!X=676.8,  4865.61,  138.96,  0.000!!END!
3112!X=677.3,  4865.61,  140.22,  0.000!!END!
3113!X=677.8,  4865.61,  145.09,  0.000!!END!
3114!X=678.3,  4865.61,  143.86,  0.000!!END!
3115!X=678.8,  4865.61,  145.85,  0.000!!END!
3116!X=679.3,  4865.61,  147.63,  0.000!!END!
3117!X=679.8,  4865.61,  144.97,  0.000!!END!
3118!X=680.3,  4865.61,  153.17,  0.000!!END!
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3121!X=681.8,  4865.61,  153.14,  0.000!!END!
3122!X=682.3,  4865.61,  154.3,  0.000!!END!
3123!X=682.8,  4865.61,  144.67,  0.000!!END!
3124!X=683.3,  4865.61,  137.33,  0.000!!END!
3125!X=683.8,  4865.61,  136.76,  0.000!!END!
3126!X=684.3,  4865.61,  123.02,  0.000!!END!
3127!X=684.8,  4865.61,  122.33,  0.000!!END!
3128!X=685.3,  4865.61,  124.7,  0.000!!END!
3129!X=685.8,  4865.61,  110.21,  0.000!!END!
3130!X=662.55,  4850.36,  73,  0.000!!END!
3131!X=663.55,  4850.36,  73,  0.000!!END!
3132!X=664.55,  4850.36,  73,  0.000!!END!
3133!X=665.55,  4850.36,  73,  0.000!!END!
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3136!X=668.55,  4850.36,  73,  0.000!!END!
3137!X=669.55,  4850.36,  73,  0.000!!END!
3138!X=670.55,  4850.36,  73,  0.000!!END!
3139!X=671.55,  4850.36,  73,  0.000!!END!
3140!X=672.55,  4850.36,  73,  0.000!!END!
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3144!X=676.55,  4850.36,  73,  0.000!!END!
3145!X=677.55,  4850.36,  73,  0.000!!END!
3146!X=678.55,  4850.36,  73,  0.000!!END!
3147!X=679.55,  4850.36,  73,  0.000!!END!
3148!X=680.55,  4850.36,  73,  0.000!!END!
3149!X=681.55,  4850.36,  73,  0.000!!END!
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3152!X=684.55,  4850.36,  73,  0.000!!END!
3153!X=685.55,  4850.36,  73,  0.000!!END!
3154!X=686.55,  4850.36,  73,  0.000!!END!
3155!X=687.55,  4850.36,  73,  0.000!!END!
3156!X=688.55,  4850.36,  73,  0.000!!END!
3157!X=689.55,  4850.36,  73,  0.000!!END!
3158!X=690.55,  4850.36,  73,  0.000!!END!
3159!X=691.55,  4850.36,  73,  0.000!!END!
3160!X=692.55,  4850.36,  73,  0.000!!END!
3161!X=693.55,  4850.36,  73,  0.000!!END!
3162!X=694.55,  4850.36,  73,  0.000!!END!
3163!X=695.55,  4850.36,  73,  0.000!!END!
3164!X=696.55,  4850.36,  73,  0.000!!END!
3165!X=697.55,  4850.36,  73,  0.000!!END!
3166!X=698.55,  4850.36,  73,  0.000!!END!
3167!X=699.55,  4850.36,  73,  0.000!!END!
3168!X=700.55,  4850.36,  73,  0.000!!END!
3169!X=662.55,  4851.36,  73,  0.000!!END!
3170!X=663.55,  4851.36,  73,  0.000!!END!
3171!X=664.55,  4851.36,  73,  0.000!!END!
3172!X=665.55,  4851.36,  73,  0.000!!END!
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3174!X=667.55,  4851.36,  73,  0.000!!END!
3175!X=668.55,  4851.36,  73,  0.000!!END!
3176!X=669.55,  4851.36,  73,  0.000!!END!
3177!X=670.55,  4851.36,  73,  0.000!!END!
3178!X=671.55,  4851.36,  73,  0.000!!END!
3179!X=672.55,  4851.36,  73,  0.000!!END!
3180!X=673.55,  4851.36,  73,  0.000!!END!
3181!X=674.55,  4851.36,  73,  0.000!!END!
3182!X=675.55,  4851.36,  73,  0.000!!END!
3183!X=676.55,  4851.36,  73,  0.000!!END!
3184!X=677.55,  4851.36,  73,  0.000!!END!
3185!X=678.55,  4851.36,  73,  0.000!!END!
3186!X=679.55,  4851.36,  73,  0.000!!END!
3187!X=680.55,  4851.36,  73,  0.000!!END!
3188!X=681.55,  4851.36,  73,  0.000!!END!
3189!X=682.55,  4851.36,  73,  0.000!!END!
3190!X=683.55,  4851.36,  73,  0.000!!END!
3191!X=684.55,  4851.36,  73,  0.000!!END!
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3193!X=686.55,  4851.36,  73,  0.000!!END!
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3196!X=689.55,  4851.36,  73,  0.000!!END!
3197!X=690.55,  4851.36,  73,  0.000!!END!
3198!X=691.55,  4851.36,  73,  0.000!!END!
3199!X=692.55,  4851.36,  73,  0.000!!END!
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3205!X=698.55,  4851.36,  73,  0.000!!END!
3206!X=699.55,  4851.36,  73,  0.000!!END!
3207!X=700.55,  4851.36,  73,  0.000!!END!
3208!X=662.55,  4852.36,  73,  0.000!!END!
3209!X=663.55,  4852.36,  73,  0.000!!END!
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3214!X=668.55,  4852.36,  73,  0.000!!END!
3215!X=669.55,  4852.36,  73,  0.000!!END!
3216!X=670.55,  4852.36,  73,  0.000!!END!
3217!X=671.55,  4852.36,  73,  0.000!!END!
3218!X=672.55,  4852.36,  73,  0.000!!END!
3219!X=673.55,  4852.36,  73,  0.000!!END!
3220!X=674.55,  4852.36,  73,  0.000!!END!
3221!X=675.55,  4852.36,  73,  0.000!!END!
3222!X=676.55,  4852.36,  73,  0.000!!END!
3223!X=677.55,  4852.36,  73,  0.000!!END!
3224!X=678.55,  4852.36,  73,  0.000!!END!
3225!X=679.55,  4852.36,  73,  0.000!!END!
3226!X=680.55,  4852.36,  73,  0.000!!END!
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3229!X=683.55,  4852.36,  73,  0.000!!END!
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3232!X=686.55,  4852.36,  73,  0.000!!END!
3233!X=687.55,  4852.36,  73,  0.000!!END!
3234!X=688.55,  4852.36,  73,  0.000!!END!
3235!X=689.55,  4852.36,  73,  0.000!!END!
3236!X=690.55,  4852.36,  73,  0.000!!END!
3237!X=691.55,  4852.36,  73,  0.000!!END!
3238!X=692.55,  4852.36,  73,  0.000!!END!
3239!X=693.55,  4852.36,  73,  0.000!!END!
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3243!X=697.55,  4852.36,  73,  0.000!!END!
3244!X=698.55,  4852.36,  73,  0.000!!END!
3245!X=699.55,  4852.36,  73,  0.000!!END!
3246!X=700.55,  4852.36,  73,  0.000!!END!
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3248!X=663.55,  4853.36,  73,  0.000!!END!
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3259!X=674.55,  4853.36,  73,  0.000!!END!
3260!X=675.55,  4853.36,  73,  0.000!!END!
3261!X=676.55,  4853.36,  73,  0.000!!END!
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3263!X=678.55,  4853.36,  73,  0.000!!END!
3264!X=679.55,  4853.36,  73,  0.000!!END!
3265!X=680.55,  4853.36,  73,  0.000!!END!
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3268!X=683.55,  4853.36,  73,  0.000!!END!
3269!X=684.55,  4853.36,  73,  0.000!!END!
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3274!X=689.55,  4853.36,  73,  0.000!!END!
3275!X=690.55,  4853.36,  73,  0.000!!END!
3276!X=691.55,  4853.36,  73,  0.000!!END!
3277!X=692.55,  4853.36,  73,  0.000!!END!
3278!X=693.55,  4853.36,  73,  0.000!!END!
3279!X=694.55,  4853.36,  73,  0.000!!END!
3280!X=695.55,  4853.36,  73,  0.000!!END!
3281!X=696.55,  4853.36,  73,  0.000!!END!
3282!X=697.55,  4853.36,  73,  0.000!!END!
3283!X=698.55,  4853.36,  73,  0.000!!END!
3284!X=699.55,  4853.36,  73,  0.000!!END!
3285!X=700.55,  4853.36,  73,  0.000!!END!
3286!X=662.55,  4854.36,  73,  0.000!!END!
3287!X=663.55,  4854.36,  73,  0.000!!END!
3288!X=664.55,  4854.36,  73,  0.000!!END!
3289!X=665.55,  4854.36,  73,  0.000!!END!
3290!X=666.55,  4854.36,  73,  0.000!!END!
3291!X=667.55,  4854.36,  73,  0.000!!END!
3292!X=668.55,  4854.36,  73,  0.000!!END!
3293!X=669.55,  4854.36,  73,  0.000!!END!
3294!X=670.55,  4854.36,  73,  0.000!!END!
3295!X=671.55,  4854.36,  73,  0.000!!END!
3296!X=672.55,  4854.36,  73,  0.000!!END!
3297!X=673.55,  4854.36,  73,  0.000!!END!
3298!X=674.55,  4854.36,  73,  0.000!!END!
3299!X=675.55,  4854.36,  73,  0.000!!END!
3300!X=676.55,  4854.36,  73,  0.000!!END!
3301!X=677.55,  4854.36,  73,  0.000!!END!
3302!X=678.55,  4854.36,  73,  0.000!!END!
3303!X=679.55,  4854.36,  73,  0.000!!END!
3304!X=680.55,  4854.36,  73,  0.000!!END!
3305!X=681.55,  4854.36,  73,  0.000!!END!
3306!X=682.55,  4854.36,  73,  0.000!!END!
3307!X=683.55,  4854.36,  73,  0.000!!END!
3308!X=684.55,  4854.36,  73,  0.000!!END!
3309!X=685.55,  4854.36,  73,  0.000!!END!
3310!X=686.55,  4854.36,  73,  0.000!!END!
3311!X=687.55,  4854.36,  73,  0.000!!END!
3312!X=688.55,  4854.36,  73,  0.000!!END!
3313!X=689.55,  4854.36,  73,  0.000!!END!
3314!X=690.55,  4854.36,  73,  0.000!!END!
3315!X=691.55,  4854.36,  73,  0.000!!END!
3316!X=692.55,  4854.36,  73,  0.000!!END!
3317!X=693.55,  4854.36,  73,  0.000!!END!
3318!X=694.55,  4854.36,  73,  0.000!!END!
3319!X=695.55,  4854.36,  73,  0.000!!END!
3320!X=696.55,  4854.36,  73,  0.000!!END!
3321!X=697.55,  4854.36,  73,  0.000!!END!
3322!X=698.55,  4854.36,  73,  0.000!!END!
3323!X=699.55,  4854.36,  73,  0.000!!END!
3324!X=700.55,  4854.36,  73,  0.000!!END!
3325!X=662.55,  4855.36,  81,  0.000!!END!
3326!X=663.55,  4855.36,  73,  0.000!!END!
3327!X=664.55,  4855.36,  73,  0.000!!END!
3328!X=665.55,  4855.36,  73,  0.000!!END!
3329!X=666.55,  4855.36,  73,  0.000!!END!
3330!X=667.55,  4855.36,  73,  0.000!!END!
3331!X=668.55,  4855.36,  73,  0.000!!END!
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3332!X=669.55,  4855.36,  73,  0.000!!END!
3333!X=670.55,  4855.36,  73,  0.000!!END!
3334!X=671.55,  4855.36,  73,  0.000!!END!
3335!X=672.55,  4855.36,  73,  0.000!!END!
3336!X=673.55,  4855.36,  73,  0.000!!END!
3337!X=674.55,  4855.36,  73,  0.000!!END!
3338!X=686.55,  4855.36,  73,  0.000!!END!
3339!X=687.55,  4855.36,  73,  0.000!!END!
3340!X=688.55,  4855.36,  73,  0.000!!END!
3341!X=689.55,  4855.36,  73,  0.000!!END!
3342!X=690.55,  4855.36,  73,  0.000!!END!
3343!X=691.55,  4855.36,  73,  0.000!!END!
3344!X=692.55,  4855.36,  73,  0.000!!END!
3345!X=693.55,  4855.36,  73,  0.000!!END!
3346!X=694.55,  4855.36,  73,  0.000!!END!
3347!X=695.55,  4855.36,  73,  0.000!!END!
3348!X=696.55,  4855.36,  73,  0.000!!END!
3349!X=697.55,  4855.36,  73,  0.000!!END!
3350!X=698.55,  4855.36,  73,  0.000!!END!
3351!X=699.55,  4855.36,  73,  0.000!!END!
3352!X=700.55,  4855.36,  73,  0.000!!END!
3353!X=662.55,  4856.36,  82.15,  0.000!!END!
3354!X=663.55,  4856.36,  73,  0.000!!END!
3355!X=664.55,  4856.36,  73,  0.000!!END!
3356!X=665.55,  4856.36,  73,  0.000!!END!
3357!X=666.55,  4856.36,  73,  0.000!!END!
3358!X=667.55,  4856.36,  73,  0.000!!END!
3359!X=668.55,  4856.36,  73,  0.000!!END!
3360!X=669.55,  4856.36,  73,  0.000!!END!
3361!X=670.55,  4856.36,  73,  0.000!!END!
3362!X=671.55,  4856.36,  73,  0.000!!END!
3363!X=672.55,  4856.36,  73,  0.000!!END!
3364!X=673.55,  4856.36,  73,  0.000!!END!
3365!X=674.55,  4856.36,  73,  0.000!!END!
3366!X=686.55,  4856.36,  73,  0.000!!END!
3367!X=687.55,  4856.36,  73,  0.000!!END!
3368!X=688.55,  4856.36,  73,  0.000!!END!
3369!X=689.55,  4856.36,  73,  0.000!!END!
3370!X=690.55,  4856.36,  73,  0.000!!END!
3371!X=691.55,  4856.36,  73,  0.000!!END!
3372!X=692.55,  4856.36,  73,  0.000!!END!
3373!X=693.55,  4856.36,  73,  0.000!!END!
3374!X=694.55,  4856.36,  73,  0.000!!END!
3375!X=695.55,  4856.36,  73,  0.000!!END!
3376!X=696.55,  4856.36,  73,  0.000!!END!
3377!X=697.55,  4856.36,  73,  0.000!!END!
3378!X=698.55,  4856.36,  73,  0.000!!END!
3379!X=699.55,  4856.36,  73,  0.000!!END!
3380!X=700.55,  4856.36,  73,  0.000!!END!
3381!X=662.55,  4857.36,  84.31,  0.000!!END!
3382!X=663.55,  4857.36,  79.12,  0.000!!END!
3383!X=664.55,  4857.36,  83.17,  0.000!!END!
3384!X=665.55,  4857.36,  82.37,  0.000!!END!
3385!X=666.55,  4857.36,  73,  0.000!!END!
3386!X=667.55,  4857.36,  82.05,  0.000!!END!
3387!X=668.55,  4857.36,  83.35,  0.000!!END!
3388!X=669.55,  4857.36,  73,  0.000!!END!
3389!X=670.55,  4857.36,  73,  0.000!!END!
3390!X=671.55,  4857.36,  73,  0.000!!END!
3391!X=672.55,  4857.36,  73,  0.000!!END!
3392!X=673.55,  4857.36,  73,  0.000!!END!
3393!X=674.55,  4857.36,  73,  0.000!!END!
3394!X=686.55,  4857.36,  73,  0.000!!END!
3395!X=687.55,  4857.36,  73,  0.000!!END!
3396!X=688.55,  4857.36,  73,  0.000!!END!
3397!X=689.55,  4857.36,  73,  0.000!!END!
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3398!X=690.55,  4857.36,  73,  0.000!!END!
3399!X=691.55,  4857.36,  73,  0.000!!END!
3400!X=692.55,  4857.36,  73,  0.000!!END!
3401!X=693.55,  4857.36,  73,  0.000!!END!
3402!X=694.55,  4857.36,  73,  0.000!!END!
3403!X=695.55,  4857.36,  73,  0.000!!END!
3404!X=696.55,  4857.36,  73,  0.000!!END!
3405!X=697.55,  4857.36,  73,  0.000!!END!
3406!X=698.55,  4857.36,  73,  0.000!!END!
3407!X=699.55,  4857.36,  73,  0.000!!END!
3408!X=700.55,  4857.36,  73,  0.000!!END!
3409!X=662.55,  4858.36,  81.66,  0.000!!END!
3410!X=663.55,  4858.36,  80.57,  0.000!!END!
3411!X=664.55,  4858.36,  80.3,  0.000!!END!
3412!X=665.55,  4858.36,  77.7,  0.000!!END!
3413!X=666.55,  4858.36,  79.49,  0.000!!END!
3414!X=667.55,  4858.36,  84.88,  0.000!!END!
3415!X=668.55,  4858.36,  91.61,  0.000!!END!
3416!X=669.55,  4858.36,  79.02,  0.000!!END!
3417!X=670.55,  4858.36,  88.59,  0.000!!END!
3418!X=671.55,  4858.36,  87.61,  0.000!!END!
3419!X=672.55,  4858.36,  96,  0.000!!END!
3420!X=673.55,  4858.36,  74.8,  0.000!!END!
3421!X=674.55,  4858.36,  73,  0.000!!END!
3422!X=686.55,  4858.36,  73,  0.000!!END!
3423!X=687.55,  4858.36,  73,  0.000!!END!
3424!X=688.55,  4858.36,  73,  0.000!!END!
3425!X=689.55,  4858.36,  73,  0.000!!END!
3426!X=690.55,  4858.36,  73,  0.000!!END!
3427!X=691.55,  4858.36,  73,  0.000!!END!
3428!X=692.55,  4858.36,  73,  0.000!!END!
3429!X=693.55,  4858.36,  73,  0.000!!END!
3430!X=694.55,  4858.36,  73,  0.000!!END!
3431!X=695.55,  4858.36,  73,  0.000!!END!
3432!X=696.55,  4858.36,  73,  0.000!!END!
3433!X=697.55,  4858.36,  73,  0.000!!END!
3434!X=698.55,  4858.36,  73,  0.000!!END!
3435!X=699.55,  4858.36,  73,  0.000!!END!
3436!X=700.55,  4858.36,  73,  0.000!!END!
3437!X=662.55,  4859.36,  86.7,  0.000!!END!
3438!X=663.55,  4859.36,  79.08,  0.000!!END!
3439!X=664.55,  4859.36,  84.07,  0.000!!END!
3440!X=665.55,  4859.36,  91.27,  0.000!!END!
3441!X=666.55,  4859.36,  84.13,  0.000!!END!
3442!X=667.55,  4859.36,  96.24,  0.000!!END!
3443!X=668.55,  4859.36,  97.47,  0.000!!END!
3444!X=669.55,  4859.36,  92.26,  0.000!!END!
3445!X=670.55,  4859.36,  106.2,  0.000!!END!
3446!X=671.55,  4859.36,  106.57,  0.000!!END!
3447!X=672.55,  4859.36,  100.46,  0.000!!END!
3448!X=673.55,  4859.36,  86.02,  0.000!!END!
3449!X=674.55,  4859.36,  74.07,  0.000!!END!
3450!X=686.55,  4859.36,  73,  0.000!!END!
3451!X=687.55,  4859.36,  73,  0.000!!END!
3452!X=688.55,  4859.36,  73,  0.000!!END!
3453!X=689.55,  4859.36,  73,  0.000!!END!
3454!X=690.55,  4859.36,  73,  0.000!!END!
3455!X=691.55,  4859.36,  73,  0.000!!END!
3456!X=692.55,  4859.36,  73,  0.000!!END!
3457!X=693.55,  4859.36,  73,  0.000!!END!
3458!X=694.55,  4859.36,  73,  0.000!!END!
3459!X=695.55,  4859.36,  73,  0.000!!END!
3460!X=696.55,  4859.36,  73,  0.000!!END!
3461!X=697.55,  4859.36,  73,  0.000!!END!
3462!X=698.55,  4859.36,  73,  0.000!!END!
3463!X=699.55,  4859.36,  73,  0.000!!END!
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3464!X=700.55,  4859.36,  73,  0.000!!END!
3465!X=662.55,  4860.36,  92.18,  0.000!!END!
3466!X=663.55,  4860.36,  85.15,  0.000!!END!
3467!X=664.55,  4860.36,  95.28,  0.000!!END!
3468!X=665.55,  4860.36,  94.98,  0.000!!END!
3469!X=666.55,  4860.36,  89.07,  0.000!!END!
3470!X=667.55,  4860.36,  85.72,  0.000!!END!
3471!X=668.55,  4860.36,  99.95,  0.000!!END!
3472!X=669.55,  4860.36,  96.59,  0.000!!END!
3473!X=670.55,  4860.36,  105.75,  0.000!!END!
3474!X=671.55,  4860.36,  105.16,  0.000!!END!
3475!X=672.55,  4860.36,  95.58,  0.000!!END!
3476!X=673.55,  4860.36,  104.31,  0.000!!END!
3477!X=674.55,  4860.36,  84.82,  0.000!!END!
3478!X=686.55,  4860.36,  73,  0.000!!END!
3479!X=687.55,  4860.36,  73,  0.000!!END!
3480!X=688.55,  4860.36,  73,  0.000!!END!
3481!X=689.55,  4860.36,  73,  0.000!!END!
3482!X=690.55,  4860.36,  73,  0.000!!END!
3483!X=691.55,  4860.36,  73,  0.000!!END!
3484!X=692.55,  4860.36,  73,  0.000!!END!
3485!X=693.55,  4860.36,  73,  0.000!!END!
3486!X=694.55,  4860.36,  73,  0.000!!END!
3487!X=695.55,  4860.36,  73,  0.000!!END!
3488!X=696.55,  4860.36,  73,  0.000!!END!
3489!X=697.55,  4860.36,  73,  0.000!!END!
3490!X=698.55,  4860.36,  73,  0.000!!END!
3491!X=699.55,  4860.36,  73,  0.000!!END!
3492!X=700.55,  4860.36,  73,  0.000!!END!
3493!X=662.55,  4861.36,  102.26,  0.000!!END!
3494!X=663.55,  4861.36,  97.06,  0.000!!END!
3495!X=664.55,  4861.36,  96.49,  0.000!!END!
3496!X=665.55,  4861.36,  91.84,  0.000!!END!
3497!X=666.55,  4861.36,  96.5,  0.000!!END!
3498!X=667.55,  4861.36,  113.47,  0.000!!END!
3499!X=668.55,  4861.36,  125.62,  0.000!!END!
3500!X=669.55,  4861.36,  106.72,  0.000!!END!
3501!X=670.55,  4861.36,  102.38,  0.000!!END!
3502!X=671.55,  4861.36,  100.71,  0.000!!END!
3503!X=672.55,  4861.36,  98.49,  0.000!!END!
3504!X=673.55,  4861.36,  98.91,  0.000!!END!
3505!X=674.55,  4861.36,  81.86,  0.000!!END!
3506!X=686.55,  4861.36,  73,  0.000!!END!
3507!X=687.55,  4861.36,  73,  0.000!!END!
3508!X=688.55,  4861.36,  73,  0.000!!END!
3509!X=689.55,  4861.36,  73,  0.000!!END!
3510!X=690.55,  4861.36,  73,  0.000!!END!
3511!X=691.55,  4861.36,  73,  0.000!!END!
3512!X=692.55,  4861.36,  73,  0.000!!END!
3513!X=693.55,  4861.36,  73,  0.000!!END!
3514!X=694.55,  4861.36,  73,  0.000!!END!
3515!X=695.55,  4861.36,  73,  0.000!!END!
3516!X=696.55,  4861.36,  73,  0.000!!END!
3517!X=697.55,  4861.36,  73,  0.000!!END!
3518!X=698.55,  4861.36,  73,  0.000!!END!
3519!X=699.55,  4861.36,  73,  0.000!!END!
3520!X=700.55,  4861.36,  73,  0.000!!END!
3521!X=662.55,  4862.36,  103.51,  0.000!!END!
3522!X=663.55,  4862.36,  95.48,  0.000!!END!
3523!X=664.55,  4862.36,  101.33,  0.000!!END!
3524!X=665.55,  4862.36,  107.4,  0.000!!END!
3525!X=666.55,  4862.36,  103.68,  0.000!!END!
3526!X=667.55,  4862.36,  131.44,  0.000!!END!
3527!X=668.55,  4862.36,  106.09,  0.000!!END!
3528!X=669.55,  4862.36,  109.87,  0.000!!END!
3529!X=670.55,  4862.36,  116.32,  0.000!!END!
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3530!X=671.55,  4862.36,  108.15,  0.000!!END!
3531!X=672.55,  4862.36,  105.86,  0.000!!END!
3532!X=673.55,  4862.36,  94.28,  0.000!!END!
3533!X=674.55,  4862.36,  88.01,  0.000!!END!
3534!X=686.55,  4862.36,  78.82,  0.000!!END!
3535!X=687.55,  4862.36,  76.06,  0.000!!END!
3536!X=688.55,  4862.36,  73,  0.000!!END!
3537!X=689.55,  4862.36,  73,  0.000!!END!
3538!X=690.55,  4862.36,  73,  0.000!!END!
3539!X=691.55,  4862.36,  73,  0.000!!END!
3540!X=692.55,  4862.36,  73,  0.000!!END!
3541!X=693.55,  4862.36,  73,  0.000!!END!
3542!X=694.55,  4862.36,  73,  0.000!!END!
3543!X=695.55,  4862.36,  73,  0.000!!END!
3544!X=696.55,  4862.36,  73,  0.000!!END!
3545!X=697.55,  4862.36,  73,  0.000!!END!
3546!X=698.55,  4862.36,  73,  0.000!!END!
3547!X=699.55,  4862.36,  73,  0.000!!END!
3548!X=700.55,  4862.36,  73,  0.000!!END!
3549!X=662.55,  4863.36,  114.99,  0.000!!END!
3550!X=663.55,  4863.36,  108.99,  0.000!!END!
3551!X=664.55,  4863.36,  131.79,  0.000!!END!
3552!X=665.55,  4863.36,  112.01,  0.000!!END!
3553!X=666.55,  4863.36,  112.77,  0.000!!END!
3554!X=667.55,  4863.36,  123.78,  0.000!!END!
3555!X=668.55,  4863.36,  133.55,  0.000!!END!
3556!X=669.55,  4863.36,  131.17,  0.000!!END!
3557!X=670.55,  4863.36,  110.16,  0.000!!END!
3558!X=671.55,  4863.36,  125.01,  0.000!!END!
3559!X=672.55,  4863.36,  110.61,  0.000!!END!
3560!X=673.55,  4863.36,  98.19,  0.000!!END!
3561!X=674.55,  4863.36,  98.03,  0.000!!END!
3562!X=686.55,  4863.36,  84,  0.000!!END!
3563!X=687.55,  4863.36,  86.16,  0.000!!END!
3564!X=688.55,  4863.36,  87.35,  0.000!!END!
3565!X=689.55,  4863.36,  96.06,  0.000!!END!
3566!X=690.55,  4863.36,  87.88,  0.000!!END!
3567!X=691.55,  4863.36,  73.56,  0.000!!END!
3568!X=692.55,  4863.36,  82.22,  0.000!!END!
3569!X=693.55,  4863.36,  83.49,  0.000!!END!
3570!X=694.55,  4863.36,  77.24,  0.000!!END!
3571!X=695.55,  4863.36,  102.06,  0.000!!END!
3572!X=696.55,  4863.36,  100.48,  0.000!!END!
3573!X=697.55,  4863.36,  96.07,  0.000!!END!
3574!X=698.55,  4863.36,  73,  0.000!!END!
3575!X=699.55,  4863.36,  73,  0.000!!END!
3576!X=700.55,  4863.36,  73,  0.000!!END!
3577!X=662.55,  4864.36,  117.61,  0.000!!END!
3578!X=663.55,  4864.36,  122.3,  0.000!!END!
3579!X=664.55,  4864.36,  133.09,  0.000!!END!
3580!X=665.55,  4864.36,  119.97,  0.000!!END!
3581!X=666.55,  4864.36,  117.96,  0.000!!END!
3582!X=667.55,  4864.36,  126.14,  0.000!!END!
3583!X=668.55,  4864.36,  121.46,  0.000!!END!
3584!X=669.55,  4864.36,  135.65,  0.000!!END!
3585!X=670.55,  4864.36,  126.96,  0.000!!END!
3586!X=671.55,  4864.36,  119.05,  0.000!!END!
3587!X=672.55,  4864.36,  109.57,  0.000!!END!
3588!X=673.55,  4864.36,  108.8,  0.000!!END!
3589!X=674.55,  4864.36,  127.97,  0.000!!END!
3590!X=686.55,  4864.36,  95.2,  0.000!!END!
3591!X=687.55,  4864.36,  88.47,  0.000!!END!
3592!X=688.55,  4864.36,  96,  0.000!!END!
3593!X=689.55,  4864.36,  119.33,  0.000!!END!
3594!X=690.55,  4864.36,  103.28,  0.000!!END!
3595!X=691.55,  4864.36,  94.05,  0.000!!END!
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3596!X=692.55,  4864.36,  82.77,  0.000!!END!
3597!X=693.55,  4864.36,  89.79,  0.000!!END!
3598!X=694.55,  4864.36,  99.88,  0.000!!END!
3599!X=695.55,  4864.36,  103.91,  0.000!!END!
3600!X=696.55,  4864.36,  121.31,  0.000!!END!
3601!X=697.55,  4864.36,  132.88,  0.000!!END!
3602!X=698.55,  4864.36,  132.06,  0.000!!END!
3603!X=699.55,  4864.36,  131.33,  0.000!!END!
3604!X=700.55,  4864.36,  120.97,  0.000!!END!
3605!X=662.55,  4865.36,  143.72,  0.000!!END!
3606!X=663.55,  4865.36,  134.62,  0.000!!END!
3607!X=664.55,  4865.36,  139.58,  0.000!!END!
3608!X=665.55,  4865.36,  137.45,  0.000!!END!
3609!X=666.55,  4865.36,  137.71,  0.000!!END!
3610!X=667.55,  4865.36,  137.65,  0.000!!END!
3611!X=668.55,  4865.36,  135.36,  0.000!!END!
3612!X=669.55,  4865.36,  135.1,  0.000!!END!
3613!X=670.55,  4865.36,  136.81,  0.000!!END!
3614!X=671.55,  4865.36,  120.05,  0.000!!END!
3615!X=672.55,  4865.36,  117.38,  0.000!!END!
3616!X=673.55,  4865.36,  122.26,  0.000!!END!
3617!X=674.55,  4865.36,  138.99,  0.000!!END!
3618!X=686.55,  4865.36,  89.06,  0.000!!END!
3619!X=687.55,  4865.36,  94.06,  0.000!!END!
3620!X=688.55,  4865.36,  96.74,  0.000!!END!
3621!X=689.55,  4865.36,  113.22,  0.000!!END!
3622!X=690.55,  4865.36,  112.02,  0.000!!END!
3623!X=691.55,  4865.36,  94.14,  0.000!!END!
3624!X=692.55,  4865.36,  96.48,  0.000!!END!
3625!X=693.55,  4865.36,  102.28,  0.000!!END!
3626!X=694.55,  4865.36,  91.54,  0.000!!END!
3627!X=695.55,  4865.36,  120.59,  0.000!!END!
3628!X=696.55,  4865.36,  144.23,  0.000!!END!
3629!X=697.55,  4865.36,  134.66,  0.000!!END!
3630!X=698.55,  4865.36,  138.49,  0.000!!END!
3631!X=699.55,  4865.36,  140.02,  0.000!!END!
3632!X=700.55,  4865.36,  137.87,  0.000!!END!
3633!X=662.55,  4866.36,  146.91,  0.000!!END!
3634!X=663.55,  4866.36,  142.4,  0.000!!END!
3635!X=664.55,  4866.36,  146.81,  0.000!!END!
3636!X=665.55,  4866.36,  147.09,  0.000!!END!
3637!X=666.55,  4866.36,  151.76,  0.000!!END!
3638!X=667.55,  4866.36,  143.3,  0.000!!END!
3639!X=668.55,  4866.36,  143.22,  0.000!!END!
3640!X=669.55,  4866.36,  141.09,  0.000!!END!
3641!X=670.55,  4866.36,  142.35,  0.000!!END!
3642!X=671.55,  4866.36,  144.47,  0.000!!END!
3643!X=672.55,  4866.36,  143.15,  0.000!!END!
3644!X=673.55,  4866.36,  150.06,  0.000!!END!
3645!X=674.55,  4866.36,  151.65,  0.000!!END!
3646!X=675.55,  4866.36,  152.42,  0.000!!END!
3647!X=676.55,  4866.36,  146.63,  0.000!!END!
3648!X=677.55,  4866.36,  149.89,  0.000!!END!
3649!X=678.55,  4866.36,  151.54,  0.000!!END!
3650!X=679.55,  4866.36,  152.96,  0.000!!END!
3651!X=680.55,  4866.36,  153.36,  0.000!!END!
3652!X=681.55,  4866.36,  157.64,  0.000!!END!
3653!X=682.55,  4866.36,  155.99,  0.000!!END!
3654!X=683.55,  4866.36,  143,  0.000!!END!
3655!X=684.55,  4866.36,  130.2,  0.000!!END!
3656!X=685.55,  4866.36,  126.28,  0.000!!END!
3657!X=686.55,  4866.36,  0,  0.000!!END!
3658!X=687.55,  4866.36,  104.26,  0.000!!END!
3659!X=688.55,  4866.36,  100.71,  0.000!!END!
3660!X=689.55,  4866.36,  117.74,  0.000!!END!
3661!X=690.55,  4866.36,  108.54,  0.000!!END!
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3662!X=691.55,  4866.36,  102.74,  0.000!!END!
3663!X=692.55,  4866.36,  101.34,  0.000!!END!
3664!X=693.55,  4866.36,  113.33,  0.000!!END!
3665!X=694.55,  4866.36,  124.95,  0.000!!END!
3666!X=695.55,  4866.36,  131.81,  0.000!!END!
3667!X=696.55,  4866.36,  138.29,  0.000!!END!
3668!X=697.55,  4866.36,  152.01,  0.000!!END!
3669!X=698.55,  4866.36,  146.7,  0.000!!END!
3670!X=699.55,  4866.36,  148.76,  0.000!!END!
3671!X=700.55,  4866.36,  162.68,  0.000!!END!
3672!X=662.55,  4867.36,  157.04,  0.000!!END!
3673!X=663.55,  4867.36,  158.53,  0.000!!END!
3674!X=664.55,  4867.36,  149.54,  0.000!!END!
3675!X=665.55,  4867.36,  151.1,  0.000!!END!
3676!X=666.55,  4867.36,  152.75,  0.000!!END!
3677!X=667.55,  4867.36,  155.44,  0.000!!END!
3678!X=668.55,  4867.36,  143.52,  0.000!!END!
3679!X=669.55,  4867.36,  148,  0.000!!END!
3680!X=670.55,  4867.36,  148.41,  0.000!!END!
3681!X=671.55,  4867.36,  162.08,  0.000!!END!
3682!X=672.55,  4867.36,  180.91,  0.000!!END!
3683!X=673.55,  4867.36,  176.99,  0.000!!END!
3684!X=674.55,  4867.36,  167.03,  0.000!!END!
3685!X=675.55,  4867.36,  158.99,  0.000!!END!
3686!X=676.55,  4867.36,  174.89,  0.000!!END!
3687!X=677.55,  4867.36,  152.69,  0.000!!END!
3688!X=678.55,  4867.36,  160.62,  0.000!!END!
3689!X=679.55,  4867.36,  160.6,  0.000!!END!
3690!X=680.55,  4867.36,  155.5,  0.000!!END!
3691!X=681.55,  4867.36,  153.03,  0.000!!END!
3692!X=682.55,  4867.36,  165.74,  0.000!!END!
3693!X=683.55,  4867.36,  150.48,  0.000!!END!
3694!X=684.55,  4867.36,  143.58,  0.000!!END!
3695!X=685.55,  4867.36,  128.88,  0.000!!END!
3696!X=686.55,  4867.36,  101.86,  0.000!!END!
3697!X=687.55,  4867.36,  112.12,  0.000!!END!
3698!X=688.55,  4867.36,  107.41,  0.000!!END!
3699!X=689.55,  4867.36,  107.95,  0.000!!END!
3700!X=690.55,  4867.36,  118.8,  0.000!!END!
3701!X=691.55,  4867.36,  113.74,  0.000!!END!
3702!X=692.55,  4867.36,  112.91,  0.000!!END!
3703!X=693.55,  4867.36,  136.96,  0.000!!END!
3704!X=694.55,  4867.36,  139.33,  0.000!!END!
3705!X=695.55,  4867.36,  118.11,  0.000!!END!
3706!X=696.55,  4867.36,  137.93,  0.000!!END!
3707!X=697.55,  4867.36,  155.97,  0.000!!END!
3708!X=698.55,  4867.36,  159.07,  0.000!!END!
3709!X=699.55,  4867.36,  160.58,  0.000!!END!
3710!X=700.55,  4867.36,  149.61,  0.000!!END!
3711!X=662.55,  4868.36,  166.98,  0.000!!END!
3712!X=663.55,  4868.36,  163.61,  0.000!!END!
3713!X=664.55,  4868.36,  157.73,  0.000!!END!
3714!X=665.55,  4868.36,  169.21,  0.000!!END!
3715!X=666.55,  4868.36,  161.25,  0.000!!END!
3716!X=667.55,  4868.36,  153.72,  0.000!!END!
3717!X=668.55,  4868.36,  152.49,  0.000!!END!
3718!X=669.55,  4868.36,  151.33,  0.000!!END!
3719!X=670.55,  4868.36,  153.11,  0.000!!END!
3720!X=671.55,  4868.36,  179.49,  0.000!!END!
3721!X=672.55,  4868.36,  185.27,  0.000!!END!
3722!X=673.55,  4868.36,  188.96,  0.000!!END!
3723!X=674.55,  4868.36,  181.33,  0.000!!END!
3724!X=675.55,  4868.36,  169.3,  0.000!!END!
3725!X=676.55,  4868.36,  194.83,  0.000!!END!
3726!X=677.55,  4868.36,  165.52,  0.000!!END!
3727!X=678.55,  4868.36,  161.1,  0.000!!END!
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3728!X=679.55,  4868.36,  152.37,  0.000!!END!
3729!X=680.55,  4868.36,  165.07,  0.000!!END!
3730!X=681.55,  4868.36,  162.71,  0.000!!END!
3731!X=682.55,  4868.36,  155.39,  0.000!!END!
3732!X=683.55,  4868.36,  155.46,  0.000!!END!
3733!X=684.55,  4868.36,  155.35,  0.000!!END!
3734!X=685.55,  4868.36,  132.84,  0.000!!END!
3735!X=686.55,  4868.36,  107.88,  0.000!!END!
3736!X=687.55,  4868.36,  125.88,  0.000!!END!
3737!X=688.55,  4868.36,  119.26,  0.000!!END!
3738!X=689.55,  4868.36,  114.75,  0.000!!END!
3739!X=690.55,  4868.36,  119.44,  0.000!!END!
3740!X=691.55,  4868.36,  116.19,  0.000!!END!
3741!X=692.55,  4868.36,  136.51,  0.000!!END!
3742!X=693.55,  4868.36,  132.12,  0.000!!END!
3743!X=694.55,  4868.36,  146.81,  0.000!!END!
3744!X=695.55,  4868.36,  147.79,  0.000!!END!
3745!X=696.55,  4868.36,  131.73,  0.000!!END!
3746!X=697.55,  4868.36,  153.87,  0.000!!END!
3747!X=698.55,  4868.36,  162.82,  0.000!!END!
3748!X=699.55,  4868.36,  167.35,  0.000!!END!
3749!X=700.55,  4868.36,  170.52,  0.000!!END!
3750!X=662.55,  4869.36,  174.22,  0.000!!END!
3751!X=663.55,  4869.36,  164.78,  0.000!!END!
3752!X=664.55,  4869.36,  169.56,  0.000!!END!
3753!X=665.55,  4869.36,  172.89,  0.000!!END!
3754!X=666.55,  4869.36,  159.05,  0.000!!END!
3755!X=667.55,  4869.36,  166.95,  0.000!!END!
3756!X=668.55,  4869.36,  174.21,  0.000!!END!
3757!X=669.55,  4869.36,  156.68,  0.000!!END!
3758!X=670.55,  4869.36,  163.86,  0.000!!END!
3759!X=671.55,  4869.36,  195.27,  0.000!!END!
3760!X=672.55,  4869.36,  192.75,  0.000!!END!
3761!X=673.55,  4869.36,  200.53,  0.000!!END!
3762!X=674.55,  4869.36,  188.52,  0.000!!END!
3763!X=675.55,  4869.36,  193.06,  0.000!!END!
3764!X=676.55,  4869.36,  198.45,  0.000!!END!
3765!X=677.55,  4869.36,  182.18,  0.000!!END!
3766!X=678.55,  4869.36,  166.3,  0.000!!END!
3767!X=679.55,  4869.36,  164.45,  0.000!!END!
3768!X=680.55,  4869.36,  155.69,  0.000!!END!
3769!X=681.55,  4869.36,  158.86,  0.000!!END!
3770!X=682.55,  4869.36,  160.39,  0.000!!END!
3771!X=683.55,  4869.36,  174.38,  0.000!!END!
3772!X=684.55,  4869.36,  160.01,  0.000!!END!
3773!X=685.55,  4869.36,  142.94,  0.000!!END!
3774!X=686.55,  4869.36,  120.19,  0.000!!END!
3775!X=687.55,  4869.36,  130.7,  0.000!!END!
3776!X=688.55,  4869.36,  127.36,  0.000!!END!
3777!X=689.55,  4869.36,  129.56,  0.000!!END!
3778!X=690.55,  4869.36,  120.9,  0.000!!END!
3779!X=691.55,  4869.36,  131.29,  0.000!!END!
3780!X=692.55,  4869.36,  136.31,  0.000!!END!
3781!X=693.55,  4869.36,  144.52,  0.000!!END!
3782!X=694.55,  4869.36,  154.28,  0.000!!END!
3783!X=695.55,  4869.36,  149.71,  0.000!!END!
3784!X=696.55,  4869.36,  140.28,  0.000!!END!
3785!X=697.55,  4869.36,  159.92,  0.000!!END!
3786!X=698.55,  4869.36,  171.67,  0.000!!END!
3787!X=699.55,  4869.36,  163.62,  0.000!!END!
3788!X=700.55,  4869.36,  157.91,  0.000!!END!
3789!X=662.55,  4870.36,  178.03,  0.000!!END!
3790!X=663.55,  4870.36,  174.95,  0.000!!END!
3791!X=664.55,  4870.36,  180.27,  0.000!!END!
3792!X=665.55,  4870.36,  177.8,  0.000!!END!
3793!X=666.55,  4870.36,  178.52,  0.000!!END!
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3794!X=667.55,  4870.36,  181.07,  0.000!!END!
3795!X=668.55,  4870.36,  189.33,  0.000!!END!
3796!X=669.55,  4870.36,  168.43,  0.000!!END!
3797!X=670.55,  4870.36,  194.21,  0.000!!END!
3798!X=671.55,  4870.36,  203.16,  0.000!!END!
3799!X=672.55,  4870.36,  212.4,  0.000!!END!
3800!X=673.55,  4870.36,  208.7,  0.000!!END!
3801!X=674.55,  4870.36,  210.69,  0.000!!END!
3802!X=675.55,  4870.36,  205.97,  0.000!!END!
3803!X=676.55,  4870.36,  211.87,  0.000!!END!
3804!X=677.55,  4870.36,  188.75,  0.000!!END!
3805!X=678.55,  4870.36,  178.13,  0.000!!END!
3806!X=679.55,  4870.36,  173.91,  0.000!!END!
3807!X=680.55,  4870.36,  167,  0.000!!END!
3808!X=681.55,  4870.36,  160.66,  0.000!!END!
3809!X=682.55,  4870.36,  168.94,  0.000!!END!
3810!X=683.55,  4870.36,  172.21,  0.000!!END!
3811!X=684.55,  4870.36,  175.79,  0.000!!END!
3812!X=685.55,  4870.36,  155.2,  0.000!!END!
3813!X=686.55,  4870.36,  137.33,  0.000!!END!
3814!X=687.55,  4870.36,  151.27,  0.000!!END!
3815!X=688.55,  4870.36,  157.14,  0.000!!END!
3816!X=689.55,  4870.36,  145.31,  0.000!!END!
3817!X=690.55,  4870.36,  130.06,  0.000!!END!
3818!X=691.55,  4870.36,  140.86,  0.000!!END!
3819!X=692.55,  4870.36,  147.59,  0.000!!END!
3820!X=693.55,  4870.36,  155,  0.000!!END!
3821!X=694.55,  4870.36,  164.71,  0.000!!END!
3822!X=695.55,  4870.36,  165.93,  0.000!!END!
3823!X=696.55,  4870.36,  154.86,  0.000!!END!
3824!X=697.55,  4870.36,  149.82,  0.000!!END!
3825!X=698.55,  4870.36,  161.84,  0.000!!END!
3826!X=699.55,  4870.36,  161.42,  0.000!!END!
3827!X=700.55,  4870.36,  176.32,  0.000!!END!
3828!X=662.55,  4871.36,  183.67,  0.000!!END!
3829!X=663.55,  4871.36,  203.09,  0.000!!END!
3830!X=664.55,  4871.36,  193.11,  0.000!!END!
3831!X=665.55,  4871.36,  194.9,  0.000!!END!
3832!X=666.55,  4871.36,  190.96,  0.000!!END!
3833!X=667.55,  4871.36,  191.98,  0.000!!END!
3834!X=668.55,  4871.36,  191.36,  0.000!!END!
3835!X=669.55,  4871.36,  180.48,  0.000!!END!
3836!X=670.55,  4871.36,  198.66,  0.000!!END!
3837!X=671.55,  4871.36,  231.29,  0.000!!END!
3838!X=672.55,  4871.36,  225.67,  0.000!!END!
3839!X=673.55,  4871.36,  224.62,  0.000!!END!
3840!X=674.55,  4871.36,  213.82,  0.000!!END!
3841!X=675.55,  4871.36,  209.38,  0.000!!END!
3842!X=676.55,  4871.36,  198.55,  0.000!!END!
3843!X=677.55,  4871.36,  198.41,  0.000!!END!
3844!X=678.55,  4871.36,  192.52,  0.000!!END!
3845!X=679.55,  4871.36,  186.38,  0.000!!END!
3846!X=680.55,  4871.36,  170.41,  0.000!!END!
3847!X=681.55,  4871.36,  162.5,  0.000!!END!
3848!X=682.55,  4871.36,  179.86,  0.000!!END!
3849!X=683.55,  4871.36,  167.15,  0.000!!END!
3850!X=684.55,  4871.36,  176.44,  0.000!!END!
3851!X=685.55,  4871.36,  162.96,  0.000!!END!
3852!X=686.55,  4871.36,  154.21,  0.000!!END!
3853!X=687.55,  4871.36,  161.36,  0.000!!END!
3854!X=688.55,  4871.36,  158.41,  0.000!!END!
3855!X=689.55,  4871.36,  154.59,  0.000!!END!
3856!X=690.55,  4871.36,  152.89,  0.000!!END!
3857!X=691.55,  4871.36,  148.52,  0.000!!END!
3858!X=692.55,  4871.36,  156.21,  0.000!!END!
3859!X=693.55,  4871.36,  177.09,  0.000!!END!
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3860!X=694.55,  4871.36,  228.04,  0.000!!END!
3861!X=695.55,  4871.36,  206.26,  0.000!!END!
3862!X=696.55,  4871.36,  164.09,  0.000!!END!
3863!X=697.55,  4871.36,  178.13,  0.000!!END!
3864!X=698.55,  4871.36,  157,  0.000!!END!
3865!X=699.55,  4871.36,  155.32,  0.000!!END!
3866!X=700.55,  4871.36,  172.41,  0.000!!END!
3867!X=662.55,  4872.36,  205.56,  0.000!!END!
3868!X=663.55,  4872.36,  213.33,  0.000!!END!
3869!X=664.55,  4872.36,  205.68,  0.000!!END!
3870!X=665.55,  4872.36,  209.24,  0.000!!END!
3871!X=666.55,  4872.36,  201.75,  0.000!!END!
3872!X=667.55,  4872.36,  197.46,  0.000!!END!
3873!X=668.55,  4872.36,  202.03,  0.000!!END!
3874!X=669.55,  4872.36,  202.98,  0.000!!END!
3875!X=670.55,  4872.36,  218.74,  0.000!!END!
3876!X=671.55,  4872.36,  253.94,  0.000!!END!
3877!X=672.55,  4872.36,  252.19,  0.000!!END!
3878!X=673.55,  4872.36,  248.96,  0.000!!END!
3879!X=674.55,  4872.36,  237.24,  0.000!!END!
3880!X=675.55,  4872.36,  234.1,  0.000!!END!
3881!X=676.55,  4872.36,  225.34,  0.000!!END!
3882!X=677.55,  4872.36,  207.46,  0.000!!END!
3883!X=678.55,  4872.36,  218.2,  0.000!!END!
3884!X=679.55,  4872.36,  183.36,  0.000!!END!
3885!X=680.55,  4872.36,  177.31,  0.000!!END!
3886!X=681.55,  4872.36,  178.08,  0.000!!END!
3887!X=682.55,  4872.36,  180.13,  0.000!!END!
3888!X=683.55,  4872.36,  188.04,  0.000!!END!
3889!X=684.55,  4872.36,  172.74,  0.000!!END!
3890!X=685.55,  4872.36,  162.71,  0.000!!END!
3891!X=686.55,  4872.36,  149.59,  0.000!!END!
3892!X=687.55,  4872.36,  173.77,  0.000!!END!
3893!X=688.55,  4872.36,  168.72,  0.000!!END!
3894!X=689.55,  4872.36,  174.92,  0.000!!END!
3895!X=690.55,  4872.36,  175.36,  0.000!!END!
3896!X=691.55,  4872.36,  168.75,  0.000!!END!
3897!X=692.55,  4872.36,  191.54,  0.000!!END!
3898!X=693.55,  4872.36,  200.84,  0.000!!END!
3899!X=694.55,  4872.36,  215.98,  0.000!!END!
3900!X=695.55,  4872.36,  222.28,  0.000!!END!
3901!X=696.55,  4872.36,  195.07,  0.000!!END!
3902!X=697.55,  4872.36,  168.34,  0.000!!END!
3903!X=698.55,  4872.36,  160.35,  0.000!!END!
3904!X=699.55,  4872.36,  164.63,  0.000!!END!
3905!X=700.55,  4872.36,  168.47,  0.000!!END!
3906!X=662.55,  4873.36,  228.14,  0.000!!END!
3907!X=663.55,  4873.36,  225.59,  0.000!!END!
3908!X=664.55,  4873.36,  215.46,  0.000!!END!
3909!X=665.55,  4873.36,  219.78,  0.000!!END!
3910!X=666.55,  4873.36,  217.28,  0.000!!END!
3911!X=667.55,  4873.36,  220.99,  0.000!!END!
3912!X=668.55,  4873.36,  217.38,  0.000!!END!
3913!X=669.55,  4873.36,  223.32,  0.000!!END!
3914!X=670.55,  4873.36,  223.77,  0.000!!END!
3915!X=671.55,  4873.36,  253.86,  0.000!!END!
3916!X=672.55,  4873.36,  256.48,  0.000!!END!
3917!X=673.55,  4873.36,  259.08,  0.000!!END!
3918!X=674.55,  4873.36,  259.59,  0.000!!END!
3919!X=675.55,  4873.36,  247.67,  0.000!!END!
3920!X=676.55,  4873.36,  254.47,  0.000!!END!
3921!X=677.55,  4873.36,  227.58,  0.000!!END!
3922!X=678.55,  4873.36,  214.15,  0.000!!END!
3923!X=679.55,  4873.36,  190,  0.000!!END!
3924!X=680.55,  4873.36,  183.36,  0.000!!END!
3925!X=681.55,  4873.36,  187.69,  0.000!!END!
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3926!X=682.55,  4873.36,  182.64,  0.000!!END!
3927!X=683.55,  4873.36,  184.69,  0.000!!END!
3928!X=684.55,  4873.36,  186.63,  0.000!!END!
3929!X=685.55,  4873.36,  189.05,  0.000!!END!
3930!X=686.55,  4873.36,  161.66,  0.000!!END!
3931!X=687.55,  4873.36,  186,  0.000!!END!
3932!X=688.55,  4873.36,  171.09,  0.000!!END!
3933!X=689.55,  4873.36,  184.46,  0.000!!END!
3934!X=690.55,  4873.36,  186.22,  0.000!!END!
3935!X=691.55,  4873.36,  189.91,  0.000!!END!
3936!X=692.55,  4873.36,  201.85,  0.000!!END!
3937!X=693.55,  4873.36,  227.99,  0.000!!END!
3938!X=694.55,  4873.36,  243.59,  0.000!!END!
3939!X=695.55,  4873.36,  219.25,  0.000!!END!
3940!X=696.55,  4873.36,  250.03,  0.000!!END!
3941!X=697.55,  4873.36,  173.22,  0.000!!END!
3942!X=698.55,  4873.36,  161.43,  0.000!!END!
3943!X=699.55,  4873.36,  159.02,  0.000!!END!
3944!X=700.55,  4873.36,  164.02,  0.000!!END!
3945!X=662.55,  4874.36,  243.45,  0.000!!END!
3946!X=663.55,  4874.36,  236.95,  0.000!!END!
3947!X=664.55,  4874.36,  234.42,  0.000!!END!
3948!X=665.55,  4874.36,  224.3,  0.000!!END!
3949!X=666.55,  4874.36,  229.05,  0.000!!END!
3950!X=667.55,  4874.36,  232.34,  0.000!!END!
3951!X=668.55,  4874.36,  231.05,  0.000!!END!
3952!X=669.55,  4874.36,  233.33,  0.000!!END!
3953!X=670.55,  4874.36,  246.94,  0.000!!END!
3954!X=671.55,  4874.36,  270.37,  0.000!!END!
3955!X=672.55,  4874.36,  264,  0.000!!END!
3956!X=673.55,  4874.36,  270.52,  0.000!!END!
3957!X=674.55,  4874.36,  269.5,  0.000!!END!
3958!X=675.55,  4874.36,  272.32,  0.000!!END!
3959!X=676.55,  4874.36,  265.89,  0.000!!END!
3960!X=677.55,  4874.36,  254.17,  0.000!!END!
3961!X=678.55,  4874.36,  205.38,  0.000!!END!
3962!X=679.55,  4874.36,  200.42,  0.000!!END!
3963!X=680.55,  4874.36,  195.53,  0.000!!END!
3964!X=681.55,  4874.36,  194.34,  0.000!!END!
3965!X=682.55,  4874.36,  197.63,  0.000!!END!
3966!X=683.55,  4874.36,  202.61,  0.000!!END!
3967!X=684.55,  4874.36,  200.65,  0.000!!END!
3968!X=685.55,  4874.36,  194.37,  0.000!!END!
3969!X=686.55,  4874.36,  171.76,  0.000!!END!
3970!X=687.55,  4874.36,  193.19,  0.000!!END!
3971!X=688.55,  4874.36,  180.26,  0.000!!END!
3972!X=689.55,  4874.36,  199.01,  0.000!!END!
3973!X=690.55,  4874.36,  197.25,  0.000!!END!
3974!X=691.55,  4874.36,  212.26,  0.000!!END!
3975!X=692.55,  4874.36,  226.47,  0.000!!END!
3976!X=693.55,  4874.36,  261.33,  0.000!!END!
3977!X=694.55,  4874.36,  249.32,  0.000!!END!
3978!X=695.55,  4874.36,  264.24,  0.000!!END!
3979!X=696.55,  4874.36,  246.9,  0.000!!END!
3980!X=697.55,  4874.36,  232.65,  0.000!!END!
3981!X=698.55,  4874.36,  175.54,  0.000!!END!
3982!X=699.55,  4874.36,  184.96,  0.000!!END!
3983!X=700.55,  4874.36,  177.19,  0.000!!END!
3984!X=662.55,  4875.36,  264.53,  0.000!!END!
3985!X=663.55,  4875.36,  252.74,  0.000!!END!
3986!X=664.55,  4875.36,  255.66,  0.000!!END!
3987!X=665.55,  4875.36,  239.56,  0.000!!END!
3988!X=666.55,  4875.36,  243.09,  0.000!!END!
3989!X=667.55,  4875.36,  245.12,  0.000!!END!
3990!X=668.55,  4875.36,  246.01,  0.000!!END!
3991!X=669.55,  4875.36,  235.71,  0.000!!END!
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3992!X=670.55,  4875.36,  259.03,  0.000!!END!
3993!X=671.55,  4875.36,  275.64,  0.000!!END!
3994!X=672.55,  4875.36,  283.83,  0.000!!END!
3995!X=673.55,  4875.36,  274,  0.000!!END!
3996!X=674.55,  4875.36,  273,  0.000!!END!
3997!X=675.55,  4875.36,  280.69,  0.000!!END!
3998!X=676.55,  4875.36,  267.55,  0.000!!END!
3999!X=677.55,  4875.36,  218.29,  0.000!!END!
4000!X=678.55,  4875.36,  218.04,  0.000!!END!
4001!X=679.55,  4875.36,  229.35,  0.000!!END!
4002!X=680.55,  4875.36,  206.62,  0.000!!END!
4003!X=681.55,  4875.36,  203.95,  0.000!!END!
4004!X=682.55,  4875.36,  206.25,  0.000!!END!
4005!X=683.55,  4875.36,  212.63,  0.000!!END!
4006!X=684.55,  4875.36,  208.14,  0.000!!END!
4007!X=685.55,  4875.36,  190.18,  0.000!!END!
4008!X=686.55,  4875.36,  200.07,  0.000!!END!
4009!X=687.55,  4875.36,  223.16,  0.000!!END!
4010!X=688.55,  4875.36,  191.13,  0.000!!END!
4011!X=689.55,  4875.36,  219.23,  0.000!!END!
4012!X=690.55,  4875.36,  210.25,  0.000!!END!
4013!X=691.55,  4875.36,  230.18,  0.000!!END!
4014!X=692.55,  4875.36,  241.32,  0.000!!END!
4015!X=693.55,  4875.36,  269.81,  0.000!!END!
4016!X=694.55,  4875.36,  292.52,  0.000!!END!
4017!X=695.55,  4875.36,  288.26,  0.000!!END!
4018!X=696.55,  4875.36,  283.16,  0.000!!END!
4019!X=697.55,  4875.36,  270.6,  0.000!!END!
4020!X=698.55,  4875.36,  195.16,  0.000!!END!
4021!X=699.55,  4875.36,  194.18,  0.000!!END!
4022!X=700.55,  4875.36,  183.94,  0.000!!END!
4023!X=662.55,  4876.36,  283.64,  0.000!!END!
4024!X=663.55,  4876.36,  276.11,  0.000!!END!
4025!X=664.55,  4876.36,  267.08,  0.000!!END!
4026!X=665.55,  4876.36,  267.55,  0.000!!END!
4027!X=666.55,  4876.36,  264.66,  0.000!!END!
4028!X=667.55,  4876.36,  260.75,  0.000!!END!
4029!X=668.55,  4876.36,  265.69,  0.000!!END!
4030!X=669.55,  4876.36,  274.67,  0.000!!END!
4031!X=670.55,  4876.36,  286.12,  0.000!!END!
4032!X=671.55,  4876.36,  290.69,  0.000!!END!
4033!X=672.55,  4876.36,  273.09,  0.000!!END!
4034!X=673.55,  4876.36,  272.23,  0.000!!END!
4035!X=674.55,  4876.36,  253.12,  0.000!!END!
4036!X=675.55,  4876.36,  236.24,  0.000!!END!
4037!X=676.55,  4876.36,  226.22,  0.000!!END!
4038!X=677.55,  4876.36,  233.75,  0.000!!END!
4039!X=678.55,  4876.36,  266.12,  0.000!!END!
4040!X=679.55,  4876.36,  251.61,  0.000!!END!
4041!X=680.55,  4876.36,  222.18,  0.000!!END!
4042!X=681.55,  4876.36,  219.79,  0.000!!END!
4043!X=682.55,  4876.36,  228.77,  0.000!!END!
4044!X=683.55,  4876.36,  217.66,  0.000!!END!
4045!X=684.55,  4876.36,  217.47,  0.000!!END!
4046!X=685.55,  4876.36,  231.25,  0.000!!END!
4047!X=686.55,  4876.36,  250.41,  0.000!!END!
4048!X=687.55,  4876.36,  238.2,  0.000!!END!
4049!X=688.55,  4876.36,  210.68,  0.000!!END!
4050!X=689.55,  4876.36,  233.84,  0.000!!END!
4051!X=690.55,  4876.36,  236.78,  0.000!!END!
4052!X=691.55,  4876.36,  259.55,  0.000!!END!
4053!X=692.55,  4876.36,  264.83,  0.000!!END!
4054!X=693.55,  4876.36,  273.35,  0.000!!END!
4055!X=694.55,  4876.36,  295.23,  0.000!!END!
4056!X=695.55,  4876.36,  295.9,  0.000!!END!
4057!X=696.55,  4876.36,  255.82,  0.000!!END!
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4058!X=697.55,  4876.36,  236.38,  0.000!!END!
4059!X=698.55,  4876.36,  209.16,  0.000!!END!
4060!X=699.55,  4876.36,  188.5,  0.000!!END!
4061!X=700.55,  4876.36,  178.36,  0.000!!END!
4062!X=662.55,  4877.36,  319.7,  0.000!!END!
4063!X=663.55,  4877.36,  307.82,  0.000!!END!
4064!X=664.55,  4877.36,  306.81,  0.000!!END!
4065!X=665.55,  4877.36,  287.71,  0.000!!END!
4066!X=666.55,  4877.36,  282.65,  0.000!!END!
4067!X=667.55,  4877.36,  275.55,  0.000!!END!
4068!X=668.55,  4877.36,  290.01,  0.000!!END!
4069!X=669.55,  4877.36,  303.58,  0.000!!END!
4070!X=670.55,  4877.36,  304.03,  0.000!!END!
4071!X=671.55,  4877.36,  304.05,  0.000!!END!
4072!X=672.55,  4877.36,  287.65,  0.000!!END!
4073!X=673.55,  4877.36,  280.7,  0.000!!END!
4074!X=674.55,  4877.36,  293.2,  0.000!!END!
4075!X=675.55,  4877.36,  291.54,  0.000!!END!
4076!X=676.55,  4877.36,  288.67,  0.000!!END!
4077!X=677.55,  4877.36,  285.27,  0.000!!END!
4078!X=678.55,  4877.36,  274.71,  0.000!!END!
4079!X=679.55,  4877.36,  262.87,  0.000!!END!
4080!X=680.55,  4877.36,  245.52,  0.000!!END!
4081!X=681.55,  4877.36,  228.93,  0.000!!END!
4082!X=682.55,  4877.36,  242.58,  0.000!!END!
4083!X=683.55,  4877.36,  236.1,  0.000!!END!
4084!X=684.55,  4877.36,  283.15,  0.000!!END!
4085!X=685.55,  4877.36,  260.92,  0.000!!END!
4086!X=686.55,  4877.36,  260.63,  0.000!!END!
4087!X=687.55,  4877.36,  266.55,  0.000!!END!
4088!X=688.55,  4877.36,  236.8,  0.000!!END!
4089!X=689.55,  4877.36,  240.22,  0.000!!END!
4090!X=690.55,  4877.36,  264.64,  0.000!!END!
4091!X=691.55,  4877.36,  270.82,  0.000!!END!
4092!X=692.55,  4877.36,  256.48,  0.000!!END!
4093!X=693.55,  4877.36,  245.15,  0.000!!END!
4094!X=694.55,  4877.36,  264.24,  0.000!!END!
4095!X=695.55,  4877.36,  233.58,  0.000!!END!
4096!X=696.55,  4877.36,  226.77,  0.000!!END!
4097!X=697.55,  4877.36,  224.63,  0.000!!END!
4098!X=698.55,  4877.36,  189.65,  0.000!!END!
4099!X=699.55,  4877.36,  180.21,  0.000!!END!
4100!X=700.55,  4877.36,  176.62,  0.000!!END!
4101!X=662.55,  4878.36,  314.83,  0.000!!END!
4102!X=663.55,  4878.36,  305.73,  0.000!!END!
4103!X=664.55,  4878.36,  304.89,  0.000!!END!
4104!X=665.55,  4878.36,  294.34,  0.000!!END!
4105!X=666.55,  4878.36,  312.29,  0.000!!END!
4106!X=667.55,  4878.36,  318.08,  0.000!!END!
4107!X=668.55,  4878.36,  315.99,  0.000!!END!
4108!X=669.55,  4878.36,  312.01,  0.000!!END!
4109!X=670.55,  4878.36,  322.77,  0.000!!END!
4110!X=671.55,  4878.36,  324.85,  0.000!!END!
4111!X=672.55,  4878.36,  315.18,  0.000!!END!
4112!X=673.55,  4878.36,  309.74,  0.000!!END!
4113!X=674.55,  4878.36,  307.47,  0.000!!END!
4114!X=675.55,  4878.36,  318.22,  0.000!!END!
4115!X=676.55,  4878.36,  317.12,  0.000!!END!
4116!X=677.55,  4878.36,  304.97,  0.000!!END!
4117!X=678.55,  4878.36,  289.85,  0.000!!END!
4118!X=679.55,  4878.36,  260.22,  0.000!!END!
4119!X=680.55,  4878.36,  260.13,  0.000!!END!
4120!X=681.55,  4878.36,  255.23,  0.000!!END!
4121!X=682.55,  4878.36,  272.33,  0.000!!END!
4122!X=683.55,  4878.36,  276.11,  0.000!!END!
4123!X=684.55,  4878.36,  302.21,  0.000!!END!
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4124!X=685.55,  4878.36,  287.38,  0.000!!END!
4125!X=686.55,  4878.36,  290.16,  0.000!!END!
4126!X=687.55,  4878.36,  272.27,  0.000!!END!
4127!X=688.55,  4878.36,  263.02,  0.000!!END!
4128!X=689.55,  4878.36,  274.86,  0.000!!END!
4129!X=690.55,  4878.36,  272.75,  0.000!!END!
4130!X=691.55,  4878.36,  285.88,  0.000!!END!
4131!X=692.55,  4878.36,  259.83,  0.000!!END!
4132!X=693.55,  4878.36,  278.55,  0.000!!END!
4133!X=694.55,  4878.36,  240.79,  0.000!!END!
4134!X=695.55,  4878.36,  231.47,  0.000!!END!
4135!X=696.55,  4878.36,  218.2,  0.000!!END!
4136!X=697.55,  4878.36,  195.08,  0.000!!END!
4137!X=698.55,  4878.36,  194.21,  0.000!!END!
4138!X=699.55,  4878.36,  205.36,  0.000!!END!
4139!X=700.55,  4878.36,  183.36,  0.000!!END!
4140!X=662.55,  4879.36,  302.74,  0.000!!END!
4141!X=663.55,  4879.36,  296.86,  0.000!!END!
4142!X=664.55,  4879.36,  294.73,  0.000!!END!
4143!X=665.55,  4879.36,  270.38,  0.000!!END!
4144!X=666.55,  4879.36,  286.32,  0.000!!END!
4145!X=667.55,  4879.36,  289.56,  0.000!!END!
4146!X=668.55,  4879.36,  300.41,  0.000!!END!
4147!X=669.55,  4879.36,  314.5,  0.000!!END!
4148!X=670.55,  4879.36,  315.29,  0.000!!END!
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4151!X=673.55,  4879.36,  319.17,  0.000!!END!
4152!X=674.55,  4879.36,  314.11,  0.000!!END!
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4165!X=687.55,  4879.36,  290.32,  0.000!!END!
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4179!X=662.55,  4880.36,  288.33,  0.000!!END!
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4185!X=668.55,  4880.36,  274.32,  0.000!!END!
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4189!X=672.55,  4880.36,  331.34,  0.000!!END!
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4222!X=680.46,  4860.186,  96.4,  0.000!!END!
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4260!X=680.699,  4860.279,  100.2,  0.000!!END!
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4265!X=680.709,  4860.32,  100,  0.000!!END!
4266!X=680.706,  4860.33,  100,  0.000!!END!
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4279!X=680.667,  4860.454,  100.5,  0.000!!END!
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4338!X=680.378,  4860.346,  97.1,  0.000!!END!
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4346!X=680.401,  4860.269,  96.1,  0.000!!END!
4347!X=680.404,  4860.26,  96,  0.000!!END!
4348!X=680.407,  4860.25,  95.9,  0.000!!END!
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4350!X=680.413,  4860.231,  96.1,  0.000!!END!
4351!X=680.415,  4860.221,  96.1,  0.000!!END!
4352!X=680.418,  4860.212,  96.1,  0.000!!END!
4353!X=680.421,  4860.202,  96.1,  0.000!!END!
```

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a
 Data for each receptor are treated as a separate input subgroup
 and therefore must end with an input group terminator.

b
 Receptor height above ground is optional. If no value is entered,
 the receptor is placed on the ground.

c
 Receptors can be assigned using group names provided in 20b. If no
 group names are used (NRGRP=0) then the default assignment name X
 must be used.

From: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Sent: May 12, 2021 3:53 PM
To: Armstrong, Katherine
Cc: Andrew Evans; Martin, Paul (MECP); Wang, Patricia (MECP); Dugas, Celeste (MECP); Potter, Katy (MECP); Lee, Erinn (MECP); Gioseph Anello; Farid, Muneeb; Kwan,Lydia
Subject: RE: Files (4) from Katie Armstrong: CALMET_2016.zip,CALPUFF FILES.zip,CALMET_2014.zip,CALMET_2015.zip

EXTERNAL EMAIL

Hi Katie,

MECP has reviewed the revised SPM input file and Golder's responses below. We have no further comments and you can proceed with the modelling.

Thanks,
Trevor

From: Armstrong, Katherine <Katherine_Armstrong@golder.com>
Sent: May 12, 2021 9:55 AM
To: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Cc: Andrew Evans <Andrew.Evans@durham.ca>; Martin, Paul (MECP) <Paul.D.Martin@ontario.ca>; Wang, Patricia (MECP) <Patricia.Wang@ontario.ca>; Dugas, Celeste (MECP) <Celeste.Dugas@ontario.ca>; Potter, Katy (MECP) <Katy.Potter@ontario.ca>; Lee, Erinn (MECP) <Erinn.Lee2@ontario.ca>; Gioseph Anello <Gioseph.Anello@Durham.ca>; Farid, Muneeb <Muneeb.Farid@york.ca>; Kwan,Lydia <LKwan@covanta.com>
Subject: RE: Files (4) from Katie Armstrong: CALMET_2016.zip,CALPUFF FILES.zip,CALMET_2014.zip,CALMET_2015.zip

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

NOTE: This email chain appears to contain email from outside Golder

Trevor,

Thank you for your comments on the CALPUFF input files. An updated version of the SPM input file is attached with NSE set to 6.

With regards to comment 2, attached is a letter that was provided to MECP in 2017 from Stantec regarding the ozone concentrations that were used in the EA and ECA. The background concentrations that are included in the CALPUFF_spm.inp are therefore consistent with those used in the 2009 EA.

Lastly, the purpose of the SPM modelling is to account for Secondary Particulate Matter formation. The results of the SPM modelling will be added to the predicted concentrations of primary TSP/PM10/PM2.5 (generated from running the "CALPUFF.inp" model file and multiplying the dispersion factor by the corresponding emission rate of each contaminant) to estimate concentrations of total particulate matter. This is consistent with both the EA and ECA.

Based on the above, it is understood that there are no remaining comments regarding the CALPUFF input files. Please can we confirm whether the MECP has any questions regarding the CALMET output files provided and if we can commence using them for CALPUFF modelling.

Kind regards,

Katie

Katie Armstrong (BSc (Hons) MSc)
Air Quality Specialist
Golder Associates Ltd.
T: +1 905 567 4444 | **D:** +1 905 567-6100 x1558 | **C:** +1 289 795-7230

From: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Sent: May 11, 2021 4:14 PM
To: Armstrong, Katherine <Katherine_Armstrong@golder.com>
Cc: Andrew Evans <Andrew.Evans@durham.ca>; Martin, Paul (MECP) <Paul.D.Martin@ontario.ca>; Wang, Patricia (MECP) <Patricia.Wang@ontario.ca>; Dugas, Celeste (MECP) <Celeste.Dugas@ontario.ca>; Potter, Katy (MECP) <Katy.Potter@ontario.ca>; Lee, Erinn (MECP) <Erinn.Lee2@ontario.ca>
Subject: RE: Files (4) from Katie Armstrong: CALMET_2016.zip,CALPUFF FILES.zip,CALMET_2014.zip,CALMET_2015.zip

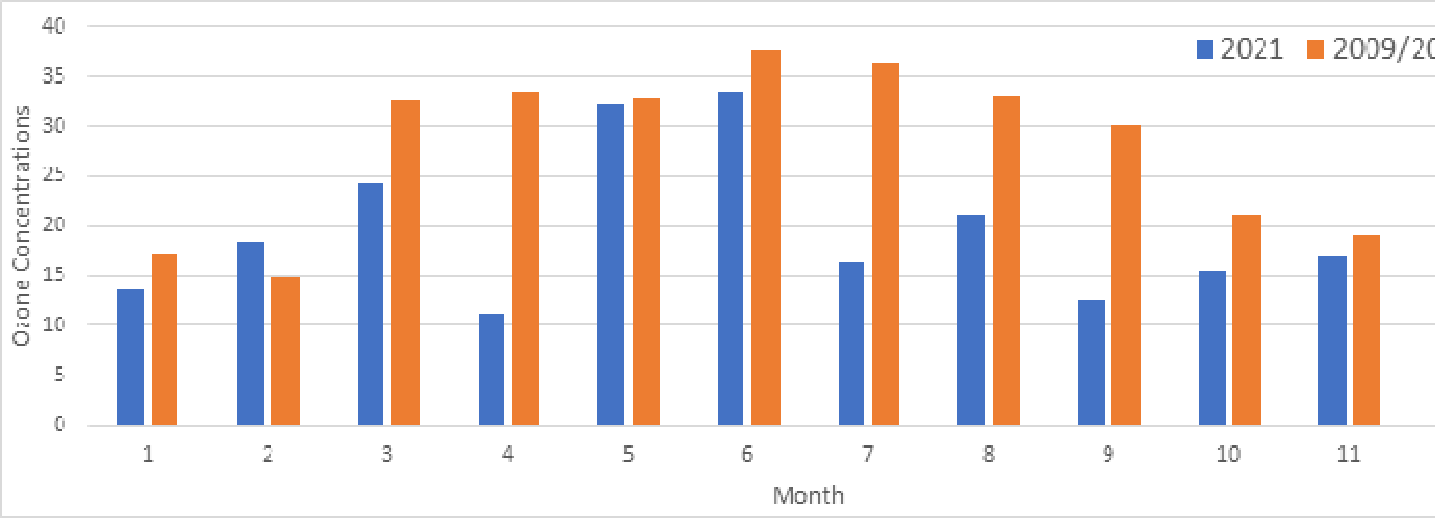
EXTERNAL EMAIL

Hi Katie,

Hoping all is well with you. Please see the following comments regarding the **CALPUFF_7_SPM.INP** file for DYEC air quality modeling:

MECP found the following inconsistencies in the **CALPUFF_7_SPM.INP** file:

1. The NSE was set to 1, while it should be 6 to make it consistent with the input in group 3a.
2. As for the monthly background ozone concentrations:
    - we were unable to locate a monthly ozone dataset **in a SPM model run INP file** associated with the 2009 EA; however
    - we were able to locate a monthly ozone dataset in a SPM model run INP file associated with the 2011 CofA, but it is inconsistent with the dataset in this 2021 submission – see the following bar chart demonstrating the inconsistency:



Please correct the above inconsistency and submit your final CALPUFF.INP files for our review before running CALPUFF.

Also, please provide more details on how you will make use of the model results based on CALPUFF_7_SPM.INP.

Feel free to contact me directly with any questions related to the above.

Best regards,
Trevor

Trevor Bell | Environmental Planner/Environmental Assessment Coordinator
Project Review Unit, Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
5775 Yonge Street, 8th floor, Toronto ON, M2M 4J1
New Phone: 437-770-3731 | trevor.bell@ontario.ca

From: Golder Secure Message Center <smc@golder.com> **On Behalf Of** Katie Armstrong
Sent: April 26, 2021 6:27 PM
To: Bell, Trevor (MECP) <Trevor.Bell@ontario.ca>
Subject: Files (4) from Katie Armstrong: CALMET_2016.zip,CALPUFF FILES.zip,CALMET_2014.zip,CALMET_2015.zip

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

EXTERNAL EMAIL - We could not verify the authenticity of this message. Please be cautious when clicking on links or opening attachments.

GOLDER
MEMBER OF WSP

Tracking ID: 20210426-133208-wntaGyOj

By clicking the links you agree to the **Terms of Use**.

Sender Name	**Katie Armstrong**
Phone	9055676100 x 1558
Email	ksarmstrong@golder.com

Download Files
Available until 26, May 2021

Reply
with Cryptshare

Password: No password required.

Email 1 of 2

Please find below a link to download CALMET output files to be used in the air quality modelling for Durham York Energy Centre for your review. In addition, calpuff input files are also provided for your consideration. Switches were identified as described in the Modelling Protocol document submitted by Golder in 2020. Two files are provided:

CALPUFF_7.0.INP assumes a unit emission rate and will be used for teh majority of contaminates

CALPUFF_7_SPM.INP will be used to generate concentrations of secondary particulate matter formulation

Please let us know if you have any issues downloading the files. Due to size requirements, these files are being sent in two emails.

Kind regards

Katie

Dear Sir or Madam,

Confidential data has been sent to you by Katie Armstrong. You can download the data until **26, May 2021**. After the expiration date has exceeded the data will be deleted automatically from the server.

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Transfer Details

To: trevor.bell@ontario.ca

CC: andrew.evans@durham.ca
lkwan@covanta.com
muneeb.farid@york.ca

Download Link:
https://smc.golder.com/download?id=78YiKhk8D6&password=%5D%21cPi%23e0

Files in this Transfer

CALPUFF FILES.zip
CALMET_2014.zip
CALMET_2015.zip
CALMET_2016.zip

For further information please follow this link: **Cryptshare Documentation**

This message has been generated automatically.

APPENDIX G

Model Files (Available Electronically)

APPENDIX H

Secondary Plans Modelling Screening Assessment

TECHNICAL MEMORANDUM

DATE July 8, 2025 **Project No.** CA0046793.6287

TO Andrew Evans, Director of Waste Management Services
The Regional Municipality of Durham

CC Poornitha Suresh, Nicia Williams, Lyndsay Waller, Lipika Saha

FROM Katie Armstrong, Mano Narayanan **EMAIL katherine.armstrong@wsp.com, mano.narayanan@wsp.com**

DYEC SECONDARY PLAN SCREENING MODELLING ASSESSMENT

1.0 BACKGROUND

WSP Canada Inc (WSP) previously supported the Region of Durham (Region) with the preparation of an Air Quality Impact Assessment (AQIA) to support the Environmental Screening Report (ESR) for a proposed increase in annual tonnage throughput of the Durham York Energy Centre (DYEC). As part of this scope of work, the Town of Clarington identified that there are proposed plans for the Major Transit Station Area (MTSA) around a proposed Courtice GO station which allow for tall developments in the surrounding area that should be included in the assessment. At the time of the AQIA, no detail was available regarding the design and layout of these buildings and therefore, it was identified that they would be assessed at a later stage once further information is available regarding the specific locations, heights and end use (e.g. residential or commercial) of future developments.

In January 2025, WSP was retained by the Region to prepare an Emission Summary and Dispersion Modelling (ESDM) report for the proposed future operating scenario of 160,000 tonnes per annum which would include an assessment of a ground-level receptor grid and above grade receptors on existing and future (approved) tall residential buildings in the surrounding area for developments for which site plans are available, in accordance with Ministry of Environment, Conservation and Parks (MECP) guidelines including the ESDM Procedure Document Version 4.1, dated March 2018 (ESDM Procedure Document) and Air Dispersion Modelling Guideline for Ontario Version 3.0, dated February 2017 (ADMGO). It is understood that Site Plan Approval for the MTSA buildings has not been approved and therefore it does not meet the requirement of a receptor to be included in an ESDM report.

In acknowledgement of the commitments made as part of the ESR, the Region has identified that an assessment of the proposed MTSA be completed. It is understood that no site plans are available for the MTSA and the precise location of buildings, building heights and potential air intakes (including openable windows and balconies) has not been identified. Furthermore, it is unclear whether residential locations could be constructed in this location without impacting the ability of the existing operations at DYEC to maintain compliance with the existing ECA. As a result, a screening assessment has been completed to identify the change in potential impacts at these locations from the proposed increase in annual tonnage (from 140 ktpa to 160 ktpa). This will also allow the Region and Reworld to comment on the proposed future re-development of the MTSA and provide input to be

incorporated into future Site Plans, which may include restrictions on the location of the tall buildings and/or air intakes.

In addition to the above, WSP has identified four (4) Courtice secondary plans for locations near DYEC that have the potential to include tall developments that will be factored into the assessment at the same time. The screening assessment modelling includes the following secondary plans and the respective maximum potential height of the potential developments:

- Southeast Courtice (SEC), up to 12 storeys high,
- Southwest Courtice (SWC), up to 12 storeys high,
- Courtice Waterfront Energy Park, up to 15 storeys high,
- Major Transit Station Area, up to 40 storeys high.

Land use maps obtained from Clarington website for the above Courtice secondary plans are included in Appendix A.

2.0 EMISSION RATES

For this screening assessment, six contaminants of greatest concern were identified, based on the 2025 ESDM report: Dioxins and Furans, Hydrogen Chloride, Nitrogen Oxides, Sulphur Dioxide, $PM_{2.5}$ and Odour.

Emission rates were calculated for three different scenarios:

1. Current operating conditions (140 ktpa)
2. Proposed future operating conditions (160 ktpa)
3. Odour Upset Scenario (all combustion sources offline with waste on the tipping floor)

For the 140 ktpa operating scenario, emission rates of all contaminants, except for $PM_{2.5}$, were taken from Scenario 1A as described in the AQIA.

For the 160 ktpa scenario, emission rates for all the contaminants of concern were based on Scenario A as described in the 2025 ESDM.

Maximum odour emissions are not dependent on the annual waste processed as they are based on an upset condition where all combustion equipment is off-line but waste is present on the tipping room floor and is vented through the stack. This is not a typical operational scenario but represents a potential upset condition. Emission rates for this scenario were based on the 2015 Odour testing report (Appendix D) of the 2025 ESDM from within the tipping room and it was conservatively assumed all emissions are vented through the stack with no combustion occurring. This is consistent with Scenario E described in the 2025 ESDM Report.

For the purpose of this assessment, only emissions from the main stack were considered as all other sources have much lower emission rates and release emissions from release points which are much lower in elevation. As a result, maximum concentrations from these ancillary sources are expected to occur at lower elevations, closer to the point of emission and are not expected to be impacted by the potential taller buildings introduced by the secondary plans.

3.0 MODELLING

The following models and pre- and post-processors were used in the assessment:

- CALMET diagnostic meteorological model (v. 6.5.0, level 150223);
- CALPUFF dispersion model (v. 7.2.1, level 150618);
- CALPOST post processor (v. 7.1.0, Level 141010);
- BPIP building downwash pre-processor (v. 04274); and
- POSTUTIL post processor (v.7.0.0, Level 150207)

3.1 Model Domain

The Model domain used in this assessment only encompassed the receptor grid created based on the secondary plans.

3.2 Meteorology, Land Use and Terrain Data

Meteorological data is based on observation data from surface stations and large-scale mesoscale meteorological data from the Weather Research and Forecasting (WRF) model between 2014 – 2018, inclusive. The CALMET output files were submitted to MECP for review and approval prior to use in the modelling and are consistent with those used in the AQIA.

Terrain data was downloaded from the MECP's database of regional terrain data for modelling (MECP, 2017b) and processed using the CALPUFF pre-processor, TERREL.

3.3 Receptors

A series of receptor grids were generated that encompass the above secondary plans, based on the proposed land use maps (contained in Appendix A). Receptor grids were placed to represent the locations of potential developments within each secondary plan area at a resolution of 100m horizontally. Vertically, each receptor grid was repeated at height intervals of 3 m to represent potential air intakes at each storey. For each secondary plan, the receptor grid was repeated to the maximum storey height plus an additional story was added to represent a mechanical penthouse. For example, to represent a 12 storey building a receptor would be placed starting at 0m elevation to represent the base of the building, and then additional receptors were added at 3m increments up to 12 stories, plus an additional 3m for the mechanical penthouse. Therefore, receptors from 0m to 39m are included to represent a 12 storey building. It should be noted that receptor locations that were placed as part of this screening assessment do not represent actual developments since no official development plans have been submitted. Furthermore, the final building design may not include mechanical air intakes at all storeys, therefore this screening represents a conservative or 'worst case' assessment.

3.4 Building Downwash

The buildings used in this assessment to represent building downwash are the same as the buildings used in the 2025 ESDM Report and AQIA. Building wake effects were considered in this assessment using the U.S. EPA's Building Profile Input Program (BPIP-ISC). The inputs into this pre-processor include the coordinates and heights

of the buildings and stacks. The output data from BPIP is used in the building wake effect calculations. No changes were made to the BPIP input or output file for this assessment.

3.5 Deposition

CALPUFF has the capability to account for wet and dry deposition of substances that would reduce ground level concentrations at POIs. However, the deposition algorithm has not been implemented for conservatism and to maintain consistency with the 2025 ESDM report and the AQIA for maximum POI predictions.

3.6 Dispersion Modelling Options

All modelling options used in this assessment are consistent with both the AQIA and 2025 ESDM report.

3.7 Source Parameters

The source parameters modelled are provided in Table 1, below:

Table 1: Modelled Source Parameters for Main Stack

Scenario	Stack Height [m]	Stack Diameter [m]	Flow Rate [m³/s]	Exit Velocity [m/s]	Exhaust Temperature [K]
Current (140 ktpa)	87.6	1.7	52.31	23.02	405.4
Future (160 ktpa)	87.6	1.7	54.56	24.04	411.0
Odour upset conditions	87.6	1.7	23.61	10.40	293.2

4.0 MODELLING RESULTS

Modelling was completed for emissions from the main stack only, under each of the three operating scenarios using the receptor grids representing potential tall buildings in each of the four secondary plans. In Ontario, MECP guidance allows for the removal of meteorological anomalies to account for extreme, rare and transient conditions that may be present in the datasets and considered outliers. As such, for air quality assessments that require 24-hour average concentrations, the highest predicted 24-hr concentration in each year of meteorological data may be removed. Similarly, for assessments that use shorter 1-hour average concentrations, the eight highest predicted concentrations in each year may be removed, as per the MECP guidance listed in ADMGO. No predicted results are removed for assessment against annual averaging periods. Elimination of these anomalies is optional but both methodologies are considered acceptable for the demonstration of compliance with Ontario Regulation 419/05 standards.

Maximum predicted concentrations (with meteorological anomalies removed) at any of the four secondary plan locations are presented in Tables 2 through 4 below. The modelled POI concentrations were compared to the 2023 Schedule 3 standards listed in O.Reg. 419/05 and in the case of $PM_{2.5}$ and PM_{10}, the Ontario Ambient Air Quality Criteria (AAQC).

Table 2: Maximum predicted concentrations at potential new receptors in 140 ktpa Scenario

Contaminant	Averaging Period	MECP POI Limit [µg/m³]	Maximum POI Concentration [µg/m³]	Percentage of MECP Limit
Dioxins, Furans and Dioxin-like PCBs	24-hour	0.1 pg TEQ/m3	0.0069 pg TEQ/m3	7%
Hydrogen Chloride	24-hour	20	1.04	5%
Hydrogen Chloride	24-hour	200	1.04	Below URT*
Nitrogen Oxides	24-hour	200	13.93	7%
Nitrogen Oxides	1-hour	400	96.14	24%
Sulphur Dioxide	1-hour	100	27.84	28%
Sulphur Dioxide	Annual	10	0.17	2%
Particulate matter (< 2.5 µm diameter)	24-hour	27	0.49	2%
Particulate matter (< 2.5 µm diameter)	Annual	8.8	0.06	1%

*Upper Risk Threshold as set out in Schedule 6 of O.Reg 419/05

Table 3: Maximum predicted concentrations at potential new receptors in 160 ktpa Scenario

Contaminant	Averaging Period	MECP POI Limit [µg/m³]	Maximum POI Concentration [µg/m³]	Percentage of MECP Limit
Dioxins, Furans and Dioxin-like PCBs	24-hour	0.1 pg TEQ/m3	0.0066 pg TEQ/m3	7%
Hydrogen Chloride	24-hour	20	1.00	5%
Hydrogen Chloride	24-hour	200	1.00	Below URT*
Nitrogen Oxides	24-hour	200	13.39	7%

Contaminant	Averaging Period	MECP POI Limit [µg/m³]	Maximum POI Concentration [µg/m³]	Percentage of MECP Limit
Nitrogen Oxides	1-hour	400	95.39	24%
Sulphur Dioxide	1-hour	100	27.62	28%
Sulphur Dioxide	Annual	10	0.13	1%
Particulate matter (< 2.5 µm diameter)	24-hour	27	0.66	2%
Particulate matter (< 2.5 µm diameter)	Annual	8.8	0.09	1%

*Upper Risk Threshold as set out in Schedule 6 of O.Reg 419/05

Table 4: Maximum predicted concentrations at potential new receptors under Odour Upset Scenario at 99.5%ile

Contaminant	Averaging Period	MECP POI Limit [OU/m³]	Maximum POI Concentration [OU/m³]	Percentage of MECP Guideline
Odour	10-minute	1	2.10	210%

Overall, the results of the modelling indicate that the maximum predicted concentrations of the assessed contaminants would be below the respective MECP limits under both the current and proposed future operating scenarios with no significant change in the predicted concentrations as a result of the proposed increase in annual waste processing. The maximum concentrations occur on buildings proposed on the MTSA within the Mixed Use Core area at heights over 110 m above grade. The Mixed Use Core area has the potential to include buildings up to 40 storeys high.

For the odour upset scenario, maximum predicted concentrations have the potential to exceed the odour guideline (greater than 0.5% of the time) at receptors located on the MTSA buildings within the Mixed Use Core area, at heights 84 m and above (Appendix A). Under this scenario “at receptor” mitigation could be required depending on building configuration and location. Mitigation could be in the form of restrictions on the locations of openable windows/ balconies or other options. This scenario represents an upset conditions scenario only, however, and is not part of routine operations. It would only occur if there is waste on the tipping floor and all combustion equipment is off-line.

5.0 CONCLUSIONS

This screening assessment was completed to assess the potential impact of future tall building locations identified in secondary plans in areas in close proximity to DYEC. The assessment considered the potential impacts of these potential future buildings on both the current operating scenario, proposed future operating scenario and a potential upset condition. Overall, the results of the assessment indicate that the potential developments would not impact the ability of DYEC to maintain compliance with O.Reg. 419/05 air quality limits, however, there may be the potential for odour impacts at the potential developments during upset conditions. Mitigation strategies to reduce potential odour impacts should be considered as part of the design phase of future developments. It should also be noted that since actual building plans are not available for any potential development, representative buildings were not added to the modelling domain in CALPUFF. Therefore, once actual building plans are available, it is recommended that this assessment be revised accordingly.

6.0 CLOSURE

The assessment was completed for the Region of Durham to assess potential impacts associated with air quality related to the potential tall building developments in close proximity to the DYEC. It is based on current air quality guidelines and the secondary plans available at the time this assessment was completed. The conclusions and recommendations presented in this report may change pending any new land use compatibility guidelines and/or air quality regulations introduced by the province.

We trust that the above technical memorandum meets your needs at this time. Should you have any questions please contact the undersigned.

WSP Canada Inc.

Katherine Armstrong, M.Sc.
Associate Director, Air Quality

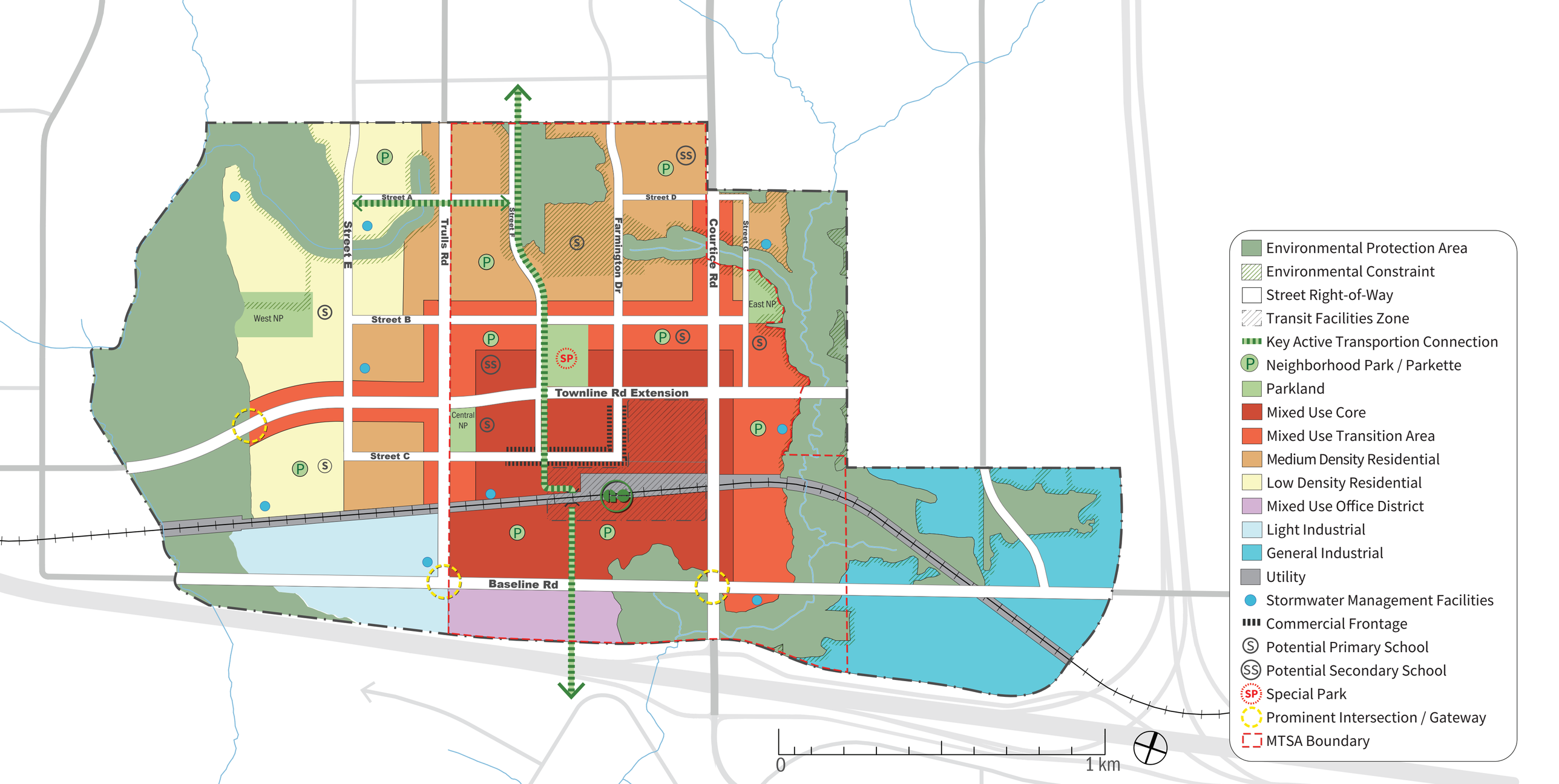
Mano Narayanan, P.Eng.
Senior Lead Environmental Engineer, Air Quality and GHGs

PS/KSA/ps/cg

This memo was prepared exclusively for The Regional Municipality of Durham (Client) by WSP Canada Inc (WSP). The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in WSP's services and based on: (i) information available at the time of preparation; (ii) data supplied by outside sources; and (iii) the assumptions, conditions and qualifications set forth in this report. While it is believed that the information contained herein is reliable under the conditions and subject to the limitations set forth herein, this memo is based in part on information not within the control of WSP and WSP therefore cannot and does not guarantee its accuracy. WSP provides no warranty, guarantee or other assurances to the Client, express or implied, of any kind, nor assumes liability of any kind, whether in tort, contract or otherwise, relative to the observations, conclusions, and recommendations set out in this memo. This memo is intended to be used by The Regional Municipality of Durham. only, subject to the terms and conditions of its contract with WSP. Any use of, or reliance on, this report by any third party is at that party's sole risk.

APPENDIX A

Courtice Secondary Plans and Receptors


Street A
Street B
Street C
Street D
Street E
Street F
Street G
Trulls Rd
Farmington Dr
Courtice Rd
Townline Rd Extension
Baseline Rd
West NP
East NP
Central NP
0
1 km
Environmental Protection Area
Environmental Constraint
Street Right-of-Way
Transit Facilities Zone
Key Active Transportion Connection
Neighborhood Park / Parkette
Parkland
Mixed Use Core
Mixed Use Transition Area
Medium Density Residential
Low Density Residential
Mixed Use Office District
Light Industrial
General Industrial
Utility
Stormwater Management Facilities
Commercial Frontage
Potential Primary School
Potential Secondary School
Special Park
Prominent Intersection / Gateway
MTSA Boundary

Legend

- SECSP Boundary
- High Density/Mixed Use
- Medium Density Regional Corridor
- Low Density Residential
- Neighbourhood Park
- Parkette
- Environmental Protection Area
- Environmental Constraint
- Environmental Study Area**
- Watercourse
- Elementary School
- Prominent Intersection
- Stormwater Management Facility (SWF)*

N

Adopted

Schedule A – Land Use

- Southeast Courtice Secondary Plan -

Note: *Final SWF locations to be determined by Robinson Tooley Subwatershed Study / Landowners
**Area subject to further environmental study

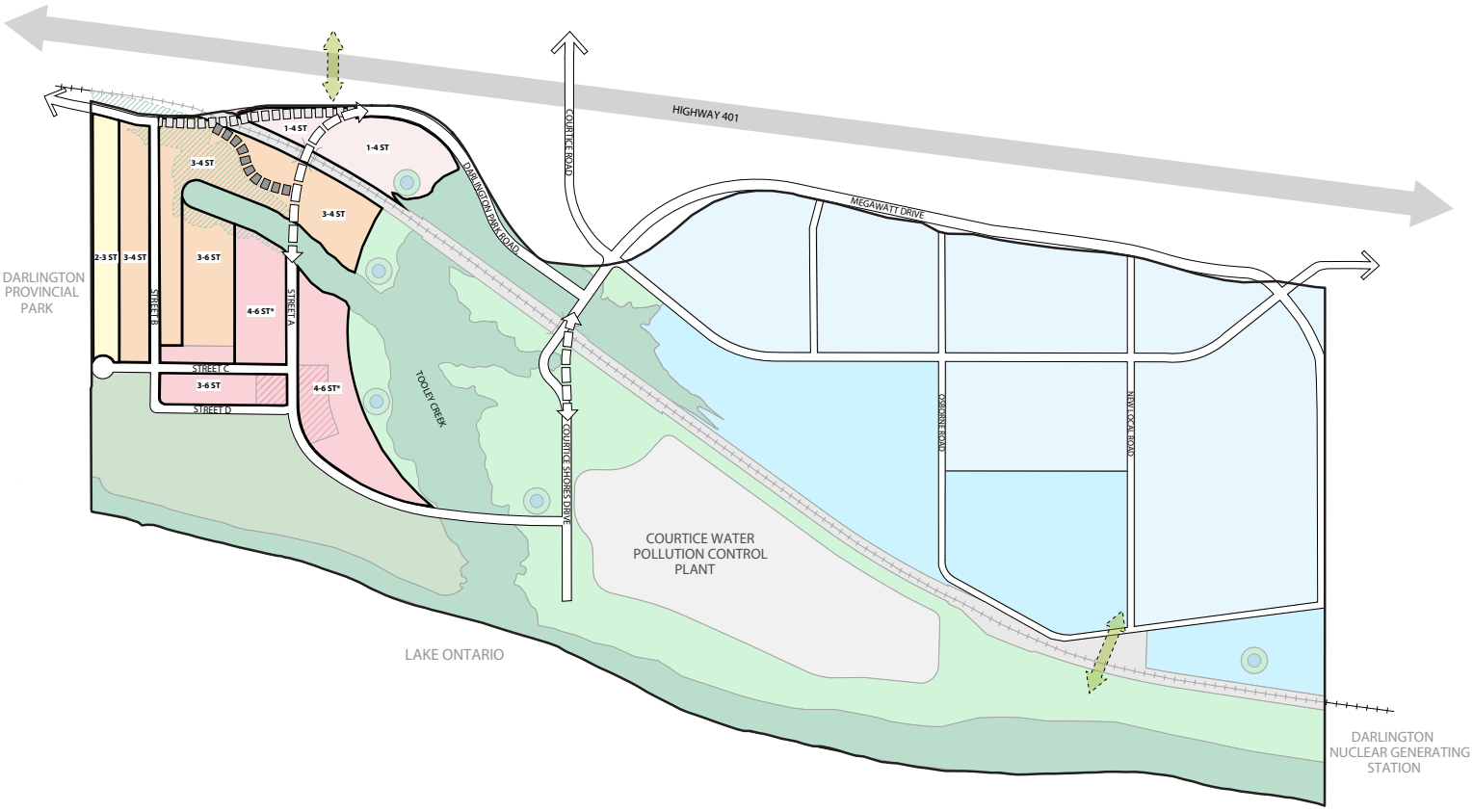
Community Park
Neighbourhood Park
Parkette
Stormwater Managment Facility
Green Space
Utility
Low Density Residential
Medium Density Residential
High Density/Mixed Use Residential
Neighbourhood Commercial
Environmental Protection Area
SWC SP Boundary
Special Study Area
Preferred School Site
Key View Corridors
Prominent Intersection
Former Employment Lands
(Area designated PSEZ and proposed for conversion to permit residential uses)
Deferred by the Region of Durham

N

Schedule A - Land Use

- Bayview (Southwest Courtice) Secondary Plan -

OCTOBER, 2023
OFFICE CONSOLIDATION



LEGEND:

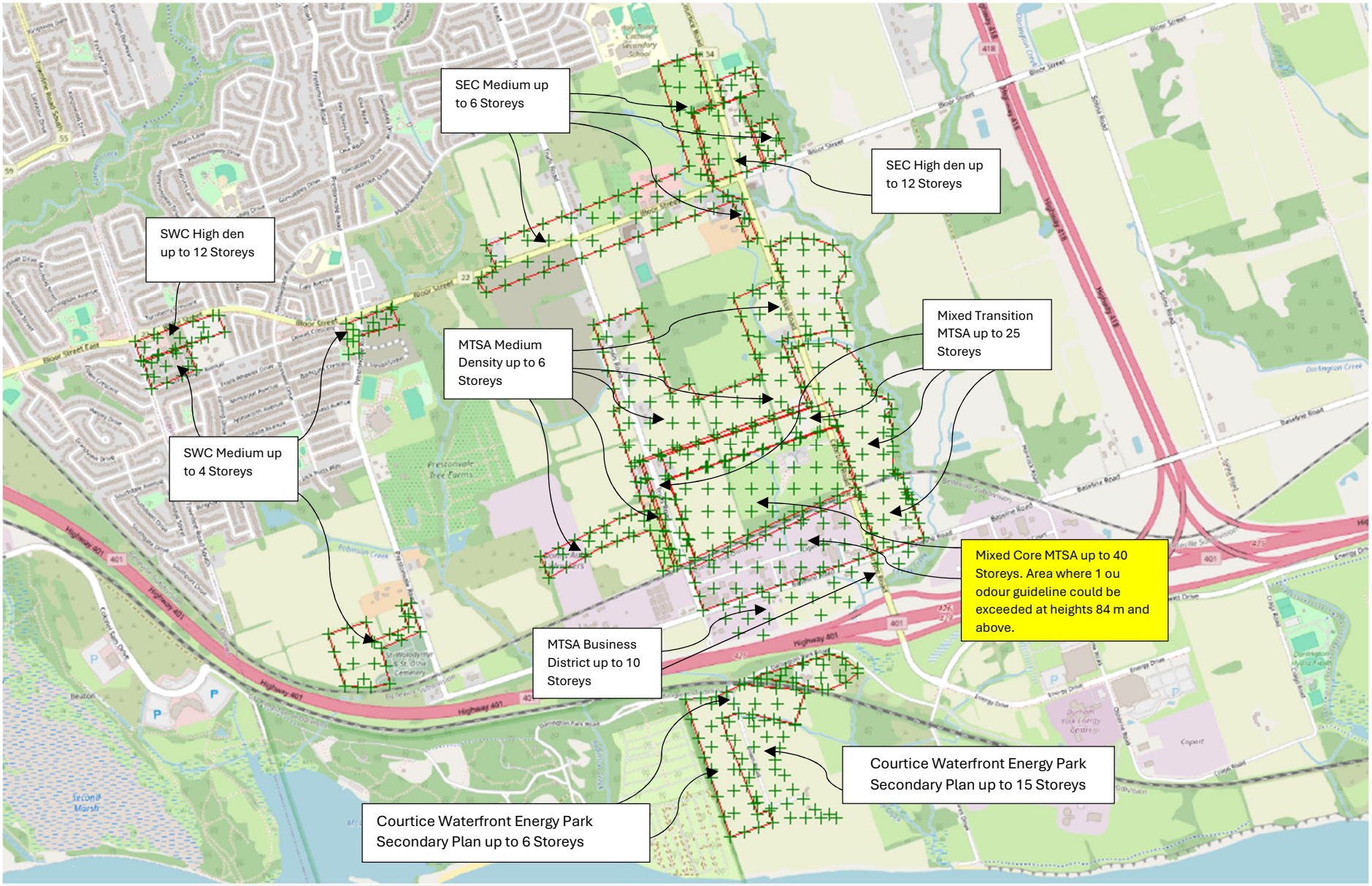
- Low Density Residential
- Medium Density Residential
- Mixed Use Area
- Municipal Wide Park
- Storm Water Management Facilities
- Environmental Protection Area
- Waterfront Greenway
- Light Industrial
- General Industrial
- Gateway Commercial
- Utility

** Buildings up to 15 storeys may be permitted subject to Policy 5.5.8.*
Note: The minimum height of standalone commercial uses (excluding hotels) shall be 2 storeys.

Courtice Waterfront and Energy Park Seconday Plan

Schedule B - Heights Plan

DRAFT



Courtice Secondary Plan Receptor Locations