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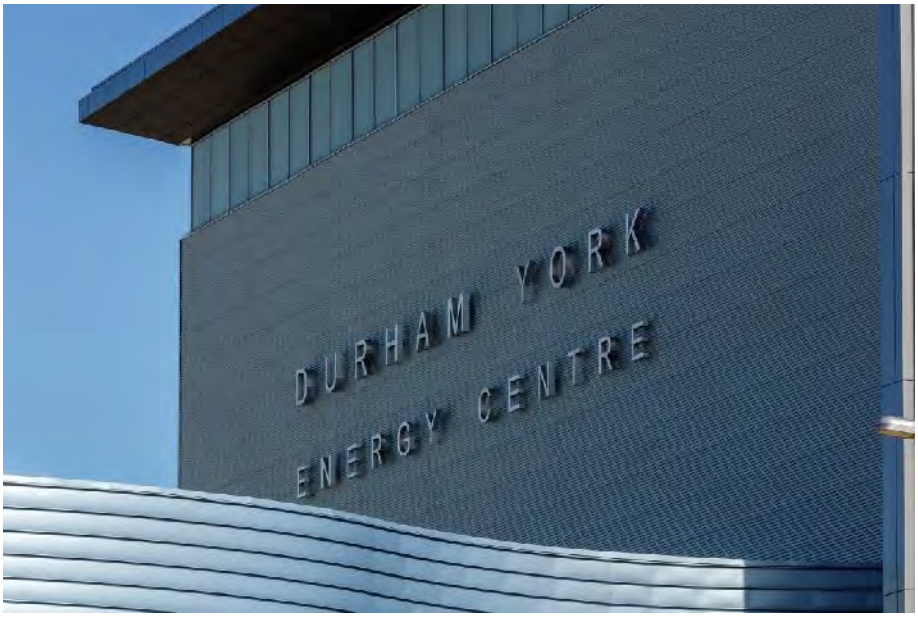
Durham York Energy Centre

ECA 7306-8FDKNX

Annual Report

2017



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1. Introduction

The Regional Municipality of Durham, the Regional Municipality of York (collectively referred to as "the Regions"), and Covanta Durham York Renewable Energy Limited Partnership ("Covanta") respectfully submit the 2017 Durham York Energy Centre ("DYEC") Annual Report, covering operations during the 2017 calendar year.

This report is being submitted in accordance with Condition 15(1) of the Environmental Compliance Approval ("ECA") 7306-8FDKNX, which states the following:

> ***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.***

The reporting requirements in Condition 15(1) of the ECA are listed in *Table 1: ECA 7306-8FDKNX Condition 15(1) Reporting Requirements – Annual Report* together with references to the sections of this report where those reporting requirements are addressed.

The DYEC is a thermal treatment facility used for the receipt 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. The nominal electricity generation rate is 17.5 Megawatts and the nominal steam generation rate is approximately 67,200 kilograms per hour.

The Facility was built to operate on a continuous basis, 24 hours/day, seven days/week, except during periods of regularly scheduled maintenance. Waste may be delivered Monday through Saturday between 7:00 am to 7:00 pm. This operating schedule may be adjusted depending on demand and facility needs within the established protocol indicated in the ECA. The ECA was originally issued on June 28th, 2011 and amended on August 12th, 2014, October 24th, 2014, February 24th, 2015, December 23rd, 2015 and March 14th, 2016.

Table 1: ECA 7306-8FDKNX Condition 15(1) Reporting Requirements – Annual Report

ECA Condition 15		Section
(a)	a summary of the quality and the quantity of the Wastes accepted at the Site, including the maximum amount of the	2

ECA Condition 15		Section
	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;	3 Appendix 2 Appendix 3
(c)	estimated material balance for each month documenting the maximum amount of wastes stored at the Site;	3.3
(d)	annual water usage;	4.1
(e)	annual amount of the electricity produced and the annual amount of the electricity exported to the electrical grid;	4.2
(f)	summaries and conclusions from the records required by Conditions 14.(3) through 14.(8) of this Certificate;	NA
14.(3) **Daily Activities** 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:		NA
14.(3)(a)	date of record and the name and signature of the person completing the report;	Onsite records
14.(3)(b)	quantity and source of the incoming Waste received at the Site;	2.2, 2.3
14.(3)(c)	records of the estimated quantity of Waste thermally treated in the Boilers;	2.3
14.(3)(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;	2.4
14.(3)(e)	quantity and type of the Residual Waste shipped from the Site, including any required outgoing Residual Waste characterization results;	3.3 Appendix 2 Appendix 3
14.(3)(f)	destination and/or receiving site(s) for the Residual Waste shipped from the Site;	3.1, 3.2
14.(3)(g)	quantity and type of any Rejected Waste accepted at the Site;	2.4
14.(3)(h)	destination and/or receiving site(s) for the Rejected Waste shipped from the Site;	2.4
14.(3)(i)	housekeeping activities, including litter collection and washing/cleaning activities, etc.	10.4
14.(3)(j)	amount of electricity produced	4.2
14.(3)(k)	amount of excess electricity exported to the electrical grid	4.2
14.(4) **Monitoring and Testing Records** 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:		NA
14.(4)(a)	day and time of the activity;	Onsite

ECA Condition 15		Section
		records
14.(4)(b)	all original records produced by the recording devices associated with the CEM Systems;	Onsite records
14.(4)(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.	5.1
14.(4)(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;	5.3, 5.4
14.(4)(e)	all records produced during any Acoustic Audit;	7
14.(4)(f)	all records produced during any Source Testing;	5.5 Appendix 4 Appendix 5
14.(4)(g)	all records produced by the long-term sampling program for Dioxins and Furans required by this Certificate;	5.6
14.(4)(h)	all records produced during the Residual Waste compliance testing;	3.1 Appendix 2 Appendix 3
14.(4)(i)	all records produced during the Soil Testing;	8
14.(4)(j)	all records produced during the Groundwater and Surface Water Monitoring required by this Certificate;	9
14.(4)(k)	all records produced during the Ambient Air Monitoring required by this Certificate;	6
14.(4)(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;	2.4

ECA Condition 15		Section
	(v) maximum CPS; (vi) µSv/hr; (vii) comment; (viii) background CPS; (ix) driver time in and out; and (x) name of the Trainer Personnel that carried out the monitoring.	
14.(4)(m)	results of the containment testing carried out in the buildings, conveyors, tanks and silos, as required;	10.1
14.(4)(n)	results the negative pressure in the Tipping Building carried out, as required.	10.2
14.(5) **Inspections/Maintenance/Repairs** 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.	10
14.(6) **Emergency Situations** 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.	12
14.(7) **Complaints Response Records** The Owner shall establish and maintain a written or digital record of complaints received and the responses made as required by this		13

ECA Condition 15	Section
Certificate.	
14.(8) Training 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	15
Condition 15 (1) (g) the Emission Summary Table and the Acoustic Assessment Summary Table for the Facility as of December 31st from the previous calendar year;	Appendix 4 Appendix 5
(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;	11
(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;	5.3, 5.4
(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;	5.4
(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;	13
(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;	10.4
(m) a summary of any emergency situations that have occurred at the Site and how they were handled;	12
(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;	9
(o) summaries of the Advisory Committee meetings, including the issues raised by the public and their current status;	14
(p) any recommendations to improve the environmental and process performance of the Site in the future;	17

ECA Condition 15	Section
(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	1.1, 5.5, 6
(r) interpretation of the results and comparison to the results from previous Annual Reports to demonstrate the Facility's impact on the environment.	16

For a summary of the Environmental Assessment Notice of Approval (EA)/Environmental Compliance Approval(ECA) reports submitted to the Ministry of the Environment and Climate Change (MOECC) for the 2017 reporting year, refer to ***Appendix 1: MOECC 2017 EA/ECA Report Submittals.***

1.1.Statement of Compliance

During the 2017 calendar year, the DYEC operated in full compliance with the ECA except for two events described in Section 5.4 Excursions from Performance Requirements (Condition 6).

2. Municipal Solid Waste

2.1. Waste Quality

The high quality of waste received at the Facility is achieved by implementing the following procedures:

- robust regional promotion and education programs to inform the public on how to source separate at the household level;
- the provision of multiple receptacles to each household;
- regionally enforced By-Laws that restrict generators from placing recyclable or hazardous materials in the waste stream;
- regional waste contractors are required under contract to inspect and reject unacceptable waste if necessary at the curbside;
- waste collected at the curbside is inspected at transfer stations before being repacked into highway haulers for delivery to DYEC; and
- during each hour of operation at DYEC, a truck, if present, is unloaded onto the Tipping Hall floor for a visual inspection before being pushed into the pit.

The design heat content of the waste is 13 MJ/kg. Due to the variability of waste, the actual estimated heat content varied throughout the year between 11.82 MJ/kg and 13.07 MJ/kg with an average of 12.78 MJ/kg. The waste received is relatively homogenous with low moisture content regardless of weather conditions. Refuse HHV (higher heating value or gross calorific/energy value energy) is monitored using a specific steam correlation equation that was developed during the acceptance tests completed in October 2015. In general, the refuse is well sorted, homogenous and has good combustion qualities.

2.2. Waste Source

Waste is collected and inspected at the following transfer stations prior to reloading and transport to DYEC.

<u>Regional Municipality of Durham</u>

Miller Waste Systems - Pickering

Miller Waste Systems – Whitby

Waste Management - Courtice

<u>Regional Municipality of York</u>

York Region Waste Management Centre

Earl Turcott Waste Management Centre

2.3. Waste Quantity

The Facility's maximum waste thermal treatment rate is 140,000 tonnes per year of waste. In 2017, DYEC received 139,756 tonnes of waste. Refer to *Table 2: MSW Material Balance.*

Table 2: MSW Material Balance

	Durham	York	Total MSW Received	Rejected / Unacceptable MSW	Net MSW Received	Est. Max Daily Onsite Storage
Jan	9,138	3,093	12,231	0.00	12,231	2,520
Feb	1,094	372	1,466	1.19	1,465	2,342
Mar	4,457	1,094	5,552	0.00	5,552	2,790
Apr	9,863	2,633	12,496	0.00	12,496	2,420
May	11,535	3,386	14,922	0.00	14,922	2,720
Jun	11,106	2,881	13,987	0.81	13,986	2,627
Jul	10,012	2,978	12,990	0.00	12,990	2,290
Aug	8,705	2,294	10,999	0.00	10,999	2,708
Sep	9,722	2,583	12,305	0.96	12,304	2,751
Oct	10,538	3,424	13,962	0.00	13,962	2,458
Nov	10,336	4,547	14,883	0.90	14,882	2,125
Dec	8,392	5,579	13,971	1.53	13,970	2,614
Total	**104,900**	**34,863**	**139,763**	**5.39**	**139,758**	**-**

Note: All weights in tonnes. All weights rounded to whole numbers except for Rejected / Unacceptable MSW.

The estimated quantity of waste thermally treated in the Boilers was 140,000 tonnes.

Condition 2(4) of the ECA limits the amount of waste that can be accepted at the Facility to 1,520 tonnes per day. The maximum amount of waste received in one day was 986.12 tonnes on August 8th, 2017.

Condition 2(5)(a) limits the maximum amount of waste that can be stored in the Waste pit to 7,350 cubic metres. The most amount of waste stored in the Waste Pit was approximately 2,790 tonnes (approximately 6,723 m3) on March 24th, 2017. (MSW density = 415 kg/m3)

2.4.Rejected Waste

Rejected waste refers to either municipal waste that cannot be processed at the Facility or waste which the site is not approved to accept. Rejected waste includes, but is not limited to, Bulky Nonprocessable Items and Unacceptable Waste.

Unacceptable Waste

Unacceptable Waste refers to incoming waste which does not meet the incoming waste quality criteria, is of hazardous nature and requires caution when handling.

The DYEC truck scale is equipped with an LFM-3 Radiation Detection System. It is a multipurpose, modular system with two remote radiation detector assemblies. The detector assemblies oppose each other so that incoming vehicles can pass between them. Radiation detected includes low, medium and high energy gammas and X-rays. (>20keV). A handheld alarming Personal Radiation Detector (PRD) is also available for use when the mounted detectors are being serviced/calibrated and to precisely locate any radioactive material within the truck. All records associated with the radiation monitoring of incoming waste are stored at and available at the DYEC. There were no hazardous loads rejected from the Facility during 2017 due to radiation.

Daily waste screening by the Equipment Operator segregates these infrequent Unacceptable Wastes and stores them in a secure bermed area which ensures no adverse effects from their storage. Condition 4(3)(a)(iv) requires the removal of Unacceptable Waste from the Facility within 4 days of its receipt or as acceptable to the District Manager. A letter from the MOECC District Manager dated January 9th, 2015, allows the DYEC to extend this storage to 90 days as per Regulation 347 General – Waste Management, made under the Environmental Protection Act, R.S.O. 1990. During 2017, four (4) shipments of Unacceptable Waste were removed from the Facility within 90 days of generation. These shipments included items such as compressed gas tanks (i.e. propane and helium).

Bulky Nonprocessable Items

Bulky Nonprocessable Items means the incoming Waste received at the Site that cannot be processed in the Equipment. One shipment of Nonprocessable Items was removed from the Facility on December 28, 2017. This shipment included oversized items such as hot tubs, plastic totes and pipes.

Refer to *Table 3: Rejected Waste* for tonnages, ECA/manifest numbers and shipment dates for 2017.

Table 3: Rejected Waste

Date	Category	Manifest No.	Tonnes
17-Feb	Unacceptable	CD98731-3	1.19
13-Jun	Unacceptable	ZM39709-0	0.81
1-Sep	Unacceptable	ZM19322-6	0.96
17-Nov	Unacceptable	YH23066-2	0.90
28-Dec	Nonprocessable	NA	1.53
TOTAL			**5.39**

Unacceptable waste was removed by Photech Environmental Solutions Inc. (Waste Management System ECA – A841604, Waste Disposal Site ECA - 6173-9UBLDJ)

Nonprocessable waste was removed by Waste Management of Canada Corporation. (Waste Management System ECA – A840311, Waste Disposal Site ECA – A680243)

3. Residual Waste

Residual waste refers to waste resulting from the waste processing activities at the Site and is limited to the recovered ferrous metals, the recovered non-ferrous metals, the bottom ash and the fly ash (untreated and following conditioning). All residual waste is temporarily stored in an enclosed building prior to being removed from the Facility.

3.1.Ash

In accordance with ECA Condition 7(7)(d), the MOECC approved Ash Sampling and Testing Protocol dated June 2014 (the "Protocol"), was implemented on the Commencement Date of Operation, February 9th, 2015. The objectives of the sampling plans within the Protocol are listed below.

1. To confirm that the bottom ash generated by DYEC contains by weight less than 10% of combustible materials following ASTM D 5468 Standard Test Method for Gross Calorific and Ash Value of Waste Materials.
2. To confirm that the fly ash sent for disposal is not leachate toxic after conditioning using the Toxicity Characteristic Leaching Procedure (TCLP), as defined in Regulation 347 and the EPA Method 1311.

Bottom ash and conditioned fly ash were transported to either the South Landfill owned and operated by Walker Industries located in Niagara Falls, Ontario or to the Walker Environmental Group Atlas Landfill located in Thorold, Ontario. Both bottom and conditioned fly ash are mixed with soil and used as daily/interim cover.

3.1.1. Bottom Ash

During post commissioning operations, the Comprehensive Ash Sampling Test Program (CASTP) consists of sampling for five days yielding 4 daily composite samples for a total of 20 samples for submission to the laboratory for analysis. This process is repeated on an annual basis, until the compliance testing results indicate that the bottom ash meets the "incinerator ash" definition from Regulation 347 for three (3) consecutive years.

A statistical analysis of the data is used to determine if the bottom ash has less than 10% combustible materials. The statistical evaluation to determine that the bottom ash meets the applicable criteria follows the calculation procedures specified by US EPA, SW-846, *"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods".*

In addition, to ensure consistent bottom ash quality between the conduct of the subsequent CASTPs, on a quarterly basis, a one-day sample program was performed. The results were "rolled up" with the data collected subsequently to and including the last CASTP, and evaluated in accordance with statistical procedures. Refer to *Table 4: Bottom Ash Sampling Dates.*

Table 4: Bottom Ash Sampling Dates

Dates	Annual	Quarterly
November 26th to November 30th, 2016 (CASTP)	X	
March 26th, 2017		X
May 28th, 2017		X
July 30th, 2017		X
November 11th to November 15th, 2017 (CASTP)	X	

The results in 2017 demonstrate that the bottom ash meets the "incinerator ash" definition from Regulation 347 and that it can be managed as a non-hazardous solid waste. Each set of analyses were reviewed and approved by the receiving landfill and it was released for disposal as daily cover.

With the completion of the third annual CASTP from November 11th to November 15th, 2017, the triennial test phase commences. The next CASTP is targeted for fall 2020.

Refer to ***Appendix 2: Bottom Ash Sampling*** for sampling results, statistical summaries and plant operating conditions.

3.1.2. Fly Ash

Fly ash is treated onsite with Pozzolan, cement and water as part of the conditioning process before being shipped off site. All reported weights for this material are inclusive of these reagents.

During the 2017 post commissioning operations, the DYEC was in the annual phase of fly ash testing which consisted of sampling for five days, yielding 4 daily composite samples for a total of 20 samples for submission to the laboratory for analysis. This annual sampling took place between October 28th to November 1st, 2017 inclusive.

A statistical evaluation utilizing the calculation procedures specified by US EPA, SW-846, *"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"* was used to determine if the fly ash exhibited Leachate Toxicity Criteria. The characterizations confirmed that all fly ash met the criteria for a solid non-hazardous material. Each set of analyses were reviewed and approved by the receiving landfill and it was released for disposal as daily cover. Refer to ***Appendix 3: Fly Ash Sampling*** for sampling results, statistical summaries and plant operating conditions.

There were no shipments of untreated fly ash from the Facility during 2017.

3.2. Metals

Ferrous and non-ferrous metals are sent for recycling to the Gerdau AmeriSteel foundry located in Whitby, Ontario. There are no analytical requirements for the ferrous and non-ferrous metal streams leaving the DYEC. Ferrous and non-ferrous tonnages are summarized in Table 5: Residual Waste Shipments

3.3. Residual Waste – Material Balance

Condition 2(5) (c to f) describes maximum storage restrictions for residual wastes. Amended by Notice 5 dated March 14th, 2016, the maximum storage durations were removed. The maximum storage limit for bottom ash is 630 tonnes, for fly ash is 700 tonnes, for ferrous metal is 77 tonnes and for non-ferrous metal is 120 tonnes.

A material balance was prepared showing the amount of residual wastes shipped per month and daily maximum amount of waste stored on site per month. Refer to *Table 5: Residual Waste Shipments* and *Table 6: Residual Waste Daily Maximum Storage*

Table 5: Residual Waste Shipments

	BOTTOM ASH	FLY ASH	FERROUS	NON-FERROUS
Jan	2,333	1,170	260	41
Feb	287	242	48	0
Mar	855	475	94	15
Apr	2,428	1,398	255	16
May	3,093	1,562	330	68
Jun	2,687	1,449	334	14
Jul	2,866	1,488	292	47
Aug	2,030	1,443	207	35
Sep	2,781	1,391	253	46
Oct	2,932	1,283	309	31
Nov	3,090	1,329	254	28
Dec	2,516	1,183	307	91
TOTAL	**27,899**	**14,412**	**2,944**	**432**

Note: All weights in tonnes. All weights rounded to whole numbers.

Table 6: Residual Waste Daily Maximum Storage

	BOTTOM ASH	FLY ASH	FERROUS	NON-FERROUS
LIMIT	**630**	**700**	**77**	**120**
Jan	195	114	34	18
Feb	108	66	23	12
Mar	203	180	21	15
Apr	211	143	43	16
May	234	15	48	20
Jun	212	145	26	14
Jul	259	138	45	18
Aug	193	147	28	19
Sep	189	140	50	17
Oct	232	107	48	18
Nov	258	139	25	15
Dec	218	146	43	20

Note: All weights in tonnes. All weights rounded to whole numbers.

4. Utilities

4.1. Water

The DYEC is a zero-process water discharge facility, and as such, no water from the process is sent to the sanitary sewer system or discharged into the environment. Under normal operations, the DYEC operates at a water deficit and requires a water supply from the Region of Durham's municipal water system. Waste water generated by the Facility (except for sanitary discharges) is re-used in the process to cool flue gas and condition bottom and fly ash. Make up water is required to replenish these processes.

During 2017, approximately 32,559 m3 of water was drawn from the municipal water system.

4.2. Electricity

During 2017, the turbine generated 114,412 MWh of electricity of which 98,578 MWh were exported to the grid.

5. Air Emissions

5.1. Continuous Emission Monitoring System (CEMS)

The CEMS installed at the DYEC meets the Installation and Performance Parameters listed in Schedule "F" of the ECA. The purpose of the CEMS is to continuously monitor flue gas to maximize boiler combustion efficiency and minimize emissions. The system is equipped to display current values, make calibration checks, generate daily reports showing minimum, maximum and average readings, and display system status and emissions alarms. Data collected from this system is available to the public via the Region of Durham's website in accordance with ECA Condition 16 – Public Access to Documentation and is also displayed on the LED display board on the front of the DYEC Visitors Centre.

The CEMS and Data Acquisition System ("DAS") measure and record concentrations on a dry-basis for carbon monoxide (CO), carbon dioxide (CO_2), oxygen (O_2), sulphur dioxide (SO_2), nitrogen oxides (NO_x), ammonia (NH_3), hydrogen chloride (HCl), hydrogen fluoride (HF), total hydrocarbons (THC) and Mass Flow. The DAS also measures and records concentrations for moisture (H_2O) and opacity. Analysis sampling points are located so that the efficiency of the air pollution control system can be closely monitored. Flue gas is analyzed prior to entering the Air Pollution Control (APC) evaporative cooler (economizer outlet) and in the APC outlet/ ID Fan inlet duct for each boiler. Records of daily minimum and maximum average readings for carbon monoxide (4-hour average); oxygen and temperature (one-hour average); organic matter (10-minute average); sulphur dioxide, nitrogen oxides, and hydrogen chloride (24-hour average); and opacity (6-minute and 2-hour average) are available at the site.

A Relative Accuracy Test Audit ("RATA") and associated system bias evaluations were completed on September 27th to September 28th, 2017. The RATA was completed under the Facility's normal operating conditions of approximately 100% of the full thermal capacity. Based on the RATA and associated system bias evaluation, all parameters met the performance specifications criteria of the ECA and/or EPS 1/PG/7.

5.2. Analyzer Reliability

Schedule "F" of the ECA specifies the continuous monitoring and recording systems used to measure and record the temperature and emissions from the Boilers. The monitors for carbon monoxide, oxygen, hydrogen chloride, nitrogen oxides, sulphur dioxide, total hydrocarbons, opacity and combustion zone temperature are required to be operated and maintained so that accurate data is obtained during a minimum of 95 percent of the valid hours for each unit for each calendar quarter in accordance with EPS 1/PG/7. For the purposes of reliability calculations, EPS 1/PG/7 defines a valid hour to be an hour during which the generating unit burned fuel and the

associated continuous emission monitoring system produced a minimum of 30 minutes of valid data.

Based on the definition above, reliability for 2017 was calculated for each unit for each calendar quarter and confirmed to be greater than 95%. Refer to *Table 7: Analyzer Reliability.*

Table 7: Analyzer Reliability

UNIT 1	O_2e	SO_2	HCl	NOx	CO	Opacity	THC	Comb Temp
Q1	100	99	99	99	99	99	99	100
Q2	99	100	100	100	100	100	99	100
Q3	100	100	100	100	100	99	99	100
Q4	100	100	100	100	100	100	100	100
UNIT 2	**O_2e**	**SO_2**	**HCl**	**NOx**	**CO**	**Opacity**	**THC**	**Comb Temp**
Q1	100	100	100	100	100	99	99	100
Q2	99	99	99	99	99	100	95	100
Q3	100	100	100	100	100	100	99	100
Q4	100	100	100	100	100	100	99	100

Note: O_2e means O_2 measured at the Economizer Outlet.

5.3. Excursions from Performance Requirements (Schedule C)

There were no excursions from the Performance Requirements stipulated in Schedule C of the ECA during 2017.

5.4. Excursions from Performance Requirements (Condition 6)

During 2017, there was one excursion to Performance Requirements as listed in Condition 6.

Condition 6(2)(b) of the ECA states:

> 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.

On December 14th, 2017, the Unit 2 economizer outlet O_2 concentration was <6% for one hour due to a combustion issue. Standard Operating Procedures were reviewed and improvements were made to minimize the risk of future reoccurrence.

There were no excursions to Schedule C Performance Requirements (In-stack emission limits) associated with this event.

5.5.Source Testing

Source testing refers to 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. The results of these programs are summarized below. Full reports are available on the DYEC website, in accordance with the ECA.

5.5.1. Voluntary Source Test (VST)

Ortech Consulting Inc. completed a VST at the DYEC between May 23rd and May 26th, 2017 to satisfy the requirement put forth by Durham Region Council to perform emission testing twice per year during the first three years of operation.

Voluntary source testing was performed on the Baghouse Outlets of both Unit 1 and Unit 2 for the test contaminants listed in Schedule “D” of the ECA.

The average results for the tests conducted along with the respective in-stack emission limits are summarized in *Table 8: Voluntary Source Test Summary (May 2017)*

Table 8: Voluntary Source Test Summary (May 2017)

PARAMETER	LIMIT	UNIT 1	UNIT 2
Total Suspended Particulate Matter (filterable)	9 mg/Rm^3	1.03	1.17
Cadmium	7 µg/Rm^3	0.12	0.069
Lead	50 µg/Rm^3	0.28	0.28
Mercury	15 µg/Rm^3	0.16	0.099
Dioxins and Furans	60 pg/Rm^3	5.32	7.67
Organic Matter	50 ppmdv	0.3	0.8
Hydrochloric Acid (HCl)	9 mg/Rm^3	2.1	3.1
Sulphur Dioxide (SO2)	35 mg/Rm^3	0	0
Nitrogen Oxide (NOx)	121 mg/Rm^3	110	112
Carbon Monoxide (CO)	40 mg/Rm^3	12.9	15.8

Reference Conditions are dry and 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.

These test results indicate that the DYEC demonstrated compliance with all respective in-stack ECA limits. Point of impingement concentrations (maximum ground level values) were calculated using the CALPUFF model, and were well below the allowable limits for all the contaminants.

Refer to ***Appendix 4: May 2017 Voluntary Compliance Emission Testing Program - Executive Summary and Emission Summary Table***.

5.5.2. Compliance Source Test

Ortech Consulting Inc. completed an emission testing program at the DYEC between October 10th and October 13th, 2017 to satisfy the requirements of ECA Condition 7(1).

Source testing was performed on the Baghouse Outlets of both Unit 1 and Unit 2 for the test contaminants listed in Schedule "D" of the ECA.

The average results for the tests conducted along with the respective in-stack emission limits are summarized in *Table 9: Compliance Source Test Summary (October 2017).*

Table 9: Compliance Source Test Summary (October 2017)

PARAMETER	LIMIT	UNIT 1	UNIT 2
Total Suspended Particulate Matter	9 mg/Rm^3	1.40	0.66
Cadmium	7 µg/Rm^3	0.053	0.031
Lead	50 µg/Rm^3	0.34	0.48
Mercury	15 µg/Rm^3	0.22	0.18
Dioxins and Furans	60 pg/Rm^3	5.94	10.1
Organic Matter	50 ppmdv	0.3	0.03
Hydrochloric Acid (HCl)	9 mg/Rm^3	2.0	5.1
Sulphur Dioxide (SO2)	35 mg/Rm^3	2.4	1.7
Nitrogen Oxide (NOx)	121 mg/Rm^3	112	111
Carbon Monoxide (CO)	40 mg/Rm^3	11.5	12.2

Reference Conditions are dry and 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.

These test results indicate that the DYEC demonstrated compliance with all respective in-stack ECA limits. Point of impingement concentrations were calculated using the CALPUFF model, and were well below the allowable limits for all the contaminants.

Refer to ***Appendix 5: 2017 Compliance Emission Testing in Accordance with Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX – Executive Summary and Emission Summary Table.***

5.6. Long Term Dioxin and Furan Sampling System (LTSS)

The long-term D&F (dioxin and furan) sampling system, referred to as the AMESA (Adsorption Method for Sampling of dioxins and furans) sampler, was installed as required by Condition 7(3)(a) of the ECA. In addition to ongoing monthly sampling as required by the ECA, the AMESA sampler collected a 40-hour sample during the voluntary spring source testing program to compare the results to results obtained with the standard testing method.

ORTECH Consulting Inc. (ORTECH) completed a 40-hour dioxin and furan emission testing program in conformance with the AMESA Work Plan dated April 11th, 2017 as submitted to the MOECC, to determine the deviation of the DYEC AMESA dioxin and furan sampler results from Reference Method (RM) test results. This test program procedure was implemented as a best efforts approach to evaluate the performance of the AMESA LTSS in accordance with ECA Condition 7(3). A summary of this AMESA evaluation data for Unit 1 and Unit 2 is provided below in *Table 10: AMESA Results in Comparison to Reference Method*

Table 10: AMESA Results in Comparison to Reference Method

Sampling Location and Method		pg TEQ/Rm^3 @11% O_2 [(a)]	DEVIATION PERCENTAGE [(b)]
UNIT 1	Reference Method Mean	6.14	7.2
	AMESA Monitor	5.70	
UNIT 2	Reference Method Mean	7.59	64.7
	Amesa Monitor	12.5	

Notes:
[(a)] NATO/CCMS (1989) toxicity equivalency factors with full detection limit.
[(b)] Calculated using the Dry Adjusted TEQ Concentration data (Deviation = [(RM-AMESA)/RM]*100)

During the conduct of the 40-hour test program, the deviation from the mean of the five eight-hour RM tests in comparison to the single AMESA monitor sample result was within the maximum deviation criterion listed in BSI Standards Publication - Stationary source emissions – Determination of the mass concentration of

PCDDs/PCDFs and dioxin-like PCBs – Part 5: Long-term sampling of PCDDs/PCDFs and PCBs - PD CEN/TS 1948-5:2015 (Table I.1) of ± 100%. Also, the dioxin and furan dry adjusted TEQ concentration for each of the five RM tests and for the AMESA test at the BH Outlet of each Unit was well below the maximum in-stack emission limit stated in Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX of 60 pg TEQ/Rm^3, adjusted to 11% oxygen. While the AMESA appeared to report consistent results during this limited 2017 test program, the overall history of AMESA results obtained concurrently with source tests shows that the results are not well correlated. Results of long term monthly samples during 2017 also demonstrated continued variability. Additional long-term sampling is required to complete the AMESA performance evaluation, and the Regions and Covanta are developing a work program with the goal of improving the correlation. Once the AMESA sampler generates more consistent data, long term data will be used to assess the ongoing performance of the air pollution control system. All measurements obtained from the AMESA sampler, whether short term or long-term sampling periods, are not meant to be used for verifying compliance with the approval limit for D&F as stated in “Schedule C” of the ECA.

6. Ambient Air Monitoring

Ambient air monitoring is a requirement of Condition 11 of the Environmental Assessment (EA) and Condition 7(4) of the ECA. Ambient air monitoring is undertaken in accordance with the Ambient Air Monitoring Plan approved by the MOECC in May 2012. There are three ambient air monitoring stations. An upwind station located in close proximity to the southwest of the DYEC at the Courtice Water Pollution Control Plant (Courtice WPCP) collects potential contaminant data at a predominantly upwind location. A downwind station located northeast of the DYEC near the intersection of Baseline Road and Rundle Road, collects contaminant data in the most dominant wind direction. A property line station at the northeast corner of the DYEC collects contaminant data from fugitive site emissions from equipment operation on site. For a summary list of the ambient air monitoring stations and monitoring parameters, refer to *Table 11: Ambient Air Monitoring Program Summary*.

Table 11: Ambient Air Monitoring Program Summary

Monitoring Station	Meteorological Data	Continuous Parameters	Non-Continuous Parameters
Upwind (Courtice WPCP)	Wind Speed & direction (@20m) Ambient temperature Relative humidity Rainfall Barometric pressure	Sulfur dioxide (SO_2) Nitrogen dioxide (NO_x) Particulate Matter ($PM_{2.5}$)	Metals Total Particulate Matter PAHs Dioxins & Furans
Downwind (Baseline & Rundle Rd.)	Wind Speed & direction (@7.5m) Ambient temperature Relative humidity Rainfall	Sulfur dioxide (SO_2) Nitrogen dioxide (NO_x) Particulate Matter ($PM_{2.5}$)	Metals Total Particulate Matter PAHs Dioxins & Furans
Property Line (Northeast corner of DYEC property)	N/A	N/A	Metals Total Particulate Matter

Quarterly and annual ambient air reports have been submitted to the MOECC since the start of the monitoring program in 2013 per their respective due dates outlined in the Operations Manual for Air Quality Monitoring in Ontario (MOE, March 2008). The 2017 Annual Ambient Air Monitoring report is due to the MOECC by May 15th, 2018. All reports are publicly available on the DYEC website in accordance with ECA Condition 7(4)(c). All contaminates were below their applicable MOECC criteria as well as applicable Human Health Risk Assessment (HHRA) health-based standards with exceptions listed below. Refer to *Table 12: 2017 Ambient Air Monitoring Quarterly Summary of Exceedances*

Table 12: 2017 Ambient Air Monitoring Quarterly Summary of Exceedances

2017 Q1	2017 Q2	2017 Q3	2017 Q4
Benzo(a)pyrene January 7th and March 20th, 2017 at the Courtice Water Pollution Control Plant Station and January 7th, 19th, 31st, February 12th and March 20th, 2017 at the Rundle Road Station.	**Total suspended particulate (TSP)** June 12th, 2017 at the Rundle Road station. A root cause analysis of the TSP exceedance determined the probable cause of the exceedance was high background levels of TSP combined with Highway 418 construction activities.	**Benzo(a)pyrene** September 16th, 2017 at both the Courtice Water Pollution Control Plant Station and the Rundle Road Station.	**Benzo(a)pyrene** December 9th, 2017 at the Courtice Water Pollution Control Station and November 15th, and December 9th, 2017 at the Rundle Road Station **Total suspended particulate (TSP)** November 27th, 2017 at the Rundle Road Station. A root cause analysis of the TSP exceedance determined the probable cause of the exceedance was truck activity occurring adjacent to the Rundle Road Station.

The current Ontario 24-hour Ambient Air Quality Criterion for benzo(a)pyrene was introduced in 2011 and levels above this threshold are commonly measured throughout Ontario. However, the benzo(a)pyrene measurements noted in Table 12: 2017 Ambient Air Monitoring Quarterly Summary of Exceedances are well below the MOECC Schedule 6 Upper Risk Threshold and the MOECC O.Reg. 419/05 24-hour average guideline.

7. Noise Monitoring

On June 27th, 2017, a revised Noise Monitoring and Reporting Plan was submitted to the MOECC. Acknowledgement was received from the MOECC on September 21st, 2017. The revised report recommended the removal of the requirement to conduct annual acoustic measurements. The requirement to conduct annual acoustic measurements per the ECA was revoked by the MOECC on February 24th, 2016, by Amendment Notice Number 4. The requirement for undertaking acoustic auditing could be reinstated if significant changes to facility operations with the potential to alter noise generation are proposed, or at the request of the MOECC.

8. Soil Testing

Soil testing is required under Condition 7(10), 13(4) and 15(4) of the ECA and is undertaken in accordance with the Durham York Energy Centre Soils Testing Plan approved by the MOECC in March 2013. In accordance with the approved plan, the parameters tested include metals, polycyclic aromatic hydrocarbons (PAHs), and dioxins and furans (PCDDs/PCDFs). Soil samples are evaluated against Table 1 Full Depth Background Site Condition Standards-Soil, of the Ground Water and Sediment Standards for Use Under part XV.1 of the *Environmental Protection Act*.

Soil testing commenced in August 2013 to quantify baseline contaminant concentrations prior to DYEC operations. Soil sampling and ambient air monitoring occur at the same locations, as required by Condition 13(4)(a) of the ECA and the approved Soils Testing Plan. Soil testing is performed once during each of the first three years of operation, and every three years thereafter until notification is received from the MOECC Regional Director advising that soil monitoring is no longer required.

Monitoring locations include the following:

- An upwind site at the Courtice Water Pollution Control Plant, approximately 1 kilometre from the Facility.
- A downwind site near Baseline Road and Rundle Road in Clarington, approximately 2.5 kilometres from the Facility and
- A third station located inside the property line

The most current soils testing event was carried out on August 23rd, 2017. The 2017 Soil Testing Report was submitted to the MOECC York Durham District Manager on November 24th, 2017, within one month of the completed laboratory analysis as required by the Soils Testing Plan. Soil samples were submitted to a Canadian Accredited Laboratory for analysis.

Results from the 2017 soils testing event were generally comparable to historical concentrations. There was an observed soil concentration of benzo(a)pyrene (0.61 µg/g) noted at the downwind soil sampling site for the August 2017 sampling event which exceeded the Table 1 criteria of the MOECC Standards (0.3 µg/g). Due to the exceedance, a resampling event occurred on October 18th, 2017. The benzo(a)pyrene concentration (0.28 µg/g) observed for the soil resample satisfied the Table 1 criteria of the MOECC Standards. The inconsistency of parameter concentrations in soil is indicative of native soil's inherent natural heterogeneity, which is common in soils and is similarly observed for other tested constituents in soils.

The 2017 DYEC source tests confirm that the DYEC is not a significant contributor of benzo(a)pyrene. Given this evidence, the benzo(a)pyrene concentrations noted in the soil for the August sampling event should not be attributed to DYEC operations.

Results from the 2013, 2015, 2016 and 2017 soils testing events are available to the public on the DYEC website.

9. Groundwater and Surface Water Monitoring

Groundwater and surface water monitoring is a requirement of the EA Condition 20 and the ECA Condition 7(14). Monitoring is conducted in accordance with the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan approved by the MOECC in October 2011. The monitoring program started in December 2011, prior to the commencement of facility operations to collect background water quality data.

Surface Water Monitoring Results

In April 2016, the Regions requested a suspension of the surface water monitoring due to construction of the Courtice Road and Highway 401 interchange and the Tooley Creek realignment activities undertaken by the Ministry of Transportation. This has caused significant disruption and prevents the placement of sondes in Tooley Creek. In a response letter dated May 17th, 2016, the MOECC granted the request and concurred with the interpretation of the surface water results to date. As a result, no in-situ surface water sampling occurred in the upstream or downstream locations within Tooley Creek in 2017. Monitoring requirements will be reevaluated after the completion of the 401/418 interchange construction activities. Construction of the 401/418 interchange is anticipated to be completed in 2019-2020.

Groundwater Monitoring Results

Groundwater samples are collected annually in the spring, summer and fall through a series of dedicated on-site monitoring wells. Preliminary data for 2017 suggests the groundwater analytical results for the DYEC have consistently satisfied their respective Ontario Drinking Water Standard (ODWS) since monitoring began at each monitoring well, with the exception of chloride from the deicing salt influence at during November 2017. The groundwater analytical results suggest that DYEC operations have not had an adverse effect on groundwater quality at the Site.

An interpretive analysis for the 2017 groundwater and surface water monitoring activities will be discussed in the pending groundwater and surface water annual report. This report, covering the 2017 monitoring period, will be submitted to the MOECC by April 30th, 2017, in accordance with the “Submission of Groundwater Well Development” letter dated January 28th, 2013 and the MOECC acknowledgment letter dated March 4th, 2013.

Further discussion on the assessment of the monitoring plan and the need for amendments for 2018 will be included in the annual groundwater and surface water report with supporting documentation. If any amendments are recommended, it will be discussed with the MOECC. Refer to *Table 13: Groundwater and Surface Water Monitoring Program Summary* for the groundwater well and in-situ surface water sonde locations and parameters tested.

Table 13: Groundwater and Surface Water Monitoring Program Summary

Groundwater Well ID	**Groundwater Well Location**
MW1	Northwest corner of site
MW2A & 2B (nested)	Northeast corner of site
MW3A & 3B (nested)	Southwest corner of site
MW4	Southeast corner of site
MW5 & 5B (nested)	Centre of site
Surface Water Sonde ID	**Sonde Location**
SW01	Upstream in Tooley Creek
SW02	Downstream in Tooley Creek
Monitoring Parameters	
Field Measurements	Water level, temperature, pH, conductivity, oxidation reduction potential
Major Anions (groundwater only)	Carbonate, bicarbonate, chloride, sulphate
Major Cations (groundwater only)	Calcium, magnesium, potassium, sodium
Metals (groundwater only)	Boron, cadmium, cobalt, lead, mercury

The 2017 groundwater and surface water monitoring activities meet the compliance requirements of the EA, the ECA and the approved Groundwater and Surface Water Monitoring Plan. Groundwater and surface water monitoring results and correspondence available to date are posted on the DYEC website in accordance with ECA Condition 16 – Public Access to Documentation.

10. Inspections, Maintenance and Repairs

10.1. Containment Protocol Inspections

The ECA outlines requirements to confirm the effectiveness of the containment of conveyors, tanks and silos in various building on site, by conducting inspections, testing and/or engineering reviews. Initial containment testing (including negative pressure/smoke test of the Tipping Building) was conducted in 2014. The DYEC Containment Test Protocol, revised in September 2014, lists additional subsequent periodic inspections to be conducted.

All subsequent periodic inspections were conducted in accordance with the requirements outlined in *Table 14: Containment Periodic Inspections.*

Table 14: Containment Periodic Inspections

CONTAINMENT ENCLOSURE	PERIODIC INSPECTION
Tipping Building	• Calibration of Boiler Combustion Air Flow Venturi Transmitter • Daily Inspection for Dust/Odour Leaks
Refuse Pit	• Groundwater Monitoring
Grizzly and Residue Bldgs.	• Daily General Inspections • Quarterly USEPA Method 22
Ammonia Tank	• Daily General Inspection • Annual calibration of alarm systems
Cement and Pozzolan Silos	• Daily General Inspections • Quarterly USEPA Method 22
Lime and Carbon Silos	• Daily General Visual Inspection • Quarterly USEPA Method 22
Diesel Fueling Station & Fire Pump Diesel Tanks	• Daily General Visual Inspections • Daily General Visual Inspections
Exterior Bottom and Fly Ash Conveyors	• Daily General Inspection • Quarterly USEPA Method 22
Settling Basin	• Daily General Visual Inspections • Groundwater Monitoring

On July 14th, 2017 during a USEPA Method 22 Observation of carbon offloading, a release of carbon to air was recorded. See Section 12.0 Emergency Situations.

10.2. Combustion Air Flow – Negative Pressure

While the boilers are in operation, combustion air flow is maintained through the Tip Hall and pit area. The Facility induces airflow through the Tipping Building and across the pit by combustion air fans that pull the combustion air through the intake ducts located above the hoppers on the charging deck. A system of louvers is adjusted according to prevailing operating conditions, such as the number of boilers in operation and if MSW is being delivered. Louver positions for various boiler operating scenarios were developed during the 2014 containment (smoke) test. To ensure this works effectively, regular maintenance and inspection activities are performed to ensure that doors and roof vents are closed and that the building envelope remains in good condition. The doors and louvers are inspected for proper operation daily. These activities ensure that louver adjustments effectively contain odours within the Tip Hall and pit.

The continuous monitoring of the combustion airflow rate through the Tipping Building is a surrogate for confirming that an induced air flow is being maintained within the building. Temperatures, pressures and flow rates are monitored throughout the combustion air and flue gas path. Combustion airflows (Combustion Air Flow Transmitters: 1/2-FIT-4202) in each of the two thermal treatment units are monitored continuously to ensure proper airflow (odour containment) in the Tipping Building is maintained. As operating conditions change (i.e., shutdowns, non-delivery times), the airflow is adjusted with the use of louvers on the north wall of the Tipping Building to maintain sufficient airflow to prevent the odours from leaving the building. An alarm indicator in the DCS will alert the control room operator of low combustion air flows requiring possible louver repositioning. Periodic inspection and annual verification of the combustion air flow transmitters is conducted in accordance with the Containment Test Protocol.

10.3. Maintenance Review

Planned maintenance and inspection activities are an important part of maintaining all plant processes and equipment. Covanta uses the PeopleSoft Asset Lifecycle Management system to track all maintenance and preventative maintenance activities at the DYEC. These activities include work identification, planning, scheduling, execution, detailing and cost-control, inventory management, preventive maintenance, purchasing, and equipment asset management. All critical equipment is systematically and repetitively inspected and tested. Critical equipment is also subjected to a systematic and detailed program of preventive maintenance repair and replacement. The system auto-generates work orders for all scheduled maintenance activities.

In 2017, scheduled preventative maintenance activities were completed on the boilers, APC equipment, CEMS and other auxiliary systems.

10.4. Inspection Summaries

Records of activities are written or digital and include the date of record and the name and/or signature of the person completing the written record.

An outside environmental checklist is completed by an operator daily to fulfill the requirements of ECA Condition 5 (5) - Inspections. A weekly environmental checklist is also completed by the Facility's Environmental Specialist. A facility wide housekeeping initiative is also in place. Once per month all available employees participate in a clean-up (washing, cleaning, litter pick up etc.) and note any environmental/operational issues.

All records are available at the site and will be retained on site for a minimum of seven years from the date of their creation, as per ECA Condition 14 (2).

No environmental or operational problems that could have negatively impacted the environment were identified during these inspections.

10.5. Sewage Works

In accordance with ECA Condition 5, 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.

The annual sewage works inspection was performed in October 2017. No deficiencies were found.

11. Operational Issues and Mitigation Measures

Condition 6(2)(a)(i) of the ECA, states

> 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.

Schedule "F" states:

> Temperature readings for record keeping and reporting purposes shall be kept as one-hour average values.

On April 14th, 2017, there was an erroneous one-hour average combustion zone temperature reading of <1000°C in Unit 1. The probe was removed, cleaned and reinstalled at which time the temperature immediately returned to normal levels. A routine preventative maintenance cleaning was initiated and no further instances have occurred.

Under normal circumstances with at least one boiler in operation, the Facility maintains odour containment within the waste storage area by drawing combustion air from inside the building, which prevents odours from escaping. In cold iron outage situations where both units were offline, odour control mitigation measures were implemented to minimize any potential offsite environmental impacts. Mitigation measures included diverting waste for disposal at alternate locations, misting micronutrients over the pit area and conducting regular on-site and off-site inspections to check for fugitive odours.

The DYEC entered a cold iron outage (both units offline) on the following occasions during 2017.

From February 6th to March 16th, 2017 both units were offline for repairs and maintenance.

On July 31st to August 1st, both units were briefly offline due to a severe thunderstorm causing a utility trip.

On August 20th, both units were briefly offline while Unit 1 was completing a minor outage and Unit 2 experienced a super heater tube leak.

No off-site odour concerns were noted during any of the cold-iron outages.

There were no CEM System malfunctions that may have negatively impacted the quality of the environment. Additional details on CEM System operational performance are provided in Section 5 Air Emissions.

There were no interruptions or problems with APC equipment that may have negatively impacted the quality of the environment.

There were no operational issues in 2017 with potential to impact the environment.

12. Emergency Situations

There were no reportable spills to land or water during 2017. On July 14th, 2017, at approximately 4pm, there was one spill to air reported to the MOECC Spills Action Centre (MOE Reference #: 4450-AP9R86). During an offload of a carbon delivery, (under a USEPA Method 22 Observation), an estimated 5-7 kg of fugitive carbon was observed exiting through the carbon silo hatch cover. The silo vent baghouse was adjusted and offloading resumed with no further issues. There were no environmental impacts associated with this spill. The preventative maintenance routine has been updated to include learnings from this incident.

13. Complaints and Inquiries

The monitoring of complaints and inquiries is a requirement of Condition 6 of the EA and Condition 10 of the ECA. A Complaint and Inquiry Log submission is provided to the MOECC York Durham District Office District Manager monthly in accordance with the "Waste Complaint Protocol for Design, Construction & Operations" approved by the MOECC in July 2011. Hard copies and digital records of complaints and the complaint investigation and responses are maintained on site. All Complaint and Inquiry Logs are available on the DYEC website. A summary of the number of the 2017 complaints and inquiries is listed in the *Table 15: Complaint and Inquiry Summary*.

Table 15: Complaint and Inquiry Summary

2017	DURHAM	YORK	COVANTA	TOTAL
Complaints to DYEC directly	3	0	0	3
Complaints to Regional Councils	3	0	0	3
Inquiries to DYEC directly	32	0	0	32
Inquiries to Regional Councils	2	0	0	2

Of the six (6) complaints received in 2017, no complaints were related to suspected odour emissions from the DYEC.

14. Energy from Waste Advisory Committee

The Energy from Waste Advisory Committee (EFWAC) is a requirement of Condition 8 of the EA and Condition 17 of the ECA for the DYEC. The committee was established in 2011 with membership outlined in EA Condition 8. The meetings are advertised on the DYEC website in advance of upcoming meetings. The EFWAC is governed by their Terms of Reference which outlines the role of the EFWAC, presents guidelines for how the committee will operate, the membership composition, and when meetings will take place. The committee is chaired by a facilitator hired by the Regions of Durham and York. A summary of the 2017 EFWAC Committee meeting is provided in *Table 16: EFWAC Meeting Summary*.

Table 16: EFWAC Meeting Summary

EFWAC MEETING #	DATE	TIME	AGENDA TOPICS
14	July 12th, 2017	2:00-4:00PM	Durham York Energy Centre (DYEC) 2016 Annual Compliance Report (ECA)

The minutes from the meeting held July 12th, 2017 will be posted to the DYEC website following acceptance of the draft minutes by the members at the next meeting.

15. Training

The operator training program for the DYEC was developed to be a comprehensive program to ensure the Facility has technically competent, safe and environmentally conscious operators. All operators are trained with respect to Condition 9 of the ECA, as per the specific job requirements of each individual operator. All written or digital records of training including date of training, name and signature of the person who was trained and a description of the training provided will be maintained on site for seven (7) years from the date of their creation as per Condition 14 (2). Training is ongoing including at commencement of employment, when procedures or equipment change and as a refresher.

16. Comparison to Report Results from Prior Years

Stack Emissions

Since the May 2016 Unit 1 dioxin and furan stack test exceedance, there have been 3 consecutive stack tests that have demonstrated full compliance to all ECA limits. All dispersion modelling performed in conjunction with the stack tests met the stipulated 24-hour average guideline limits within O.Reg. 419/05.

Ash Testing

Similar to 2016, 2017 bottom and fly ash testing results continue to meet the definition of a solid non-hazardous material.

Ambient Air

Similar to the 2016 operating year, all contaminants were below their applicable MOECC criteria as well as applicable HHRA health- based standards with the exception of benzo(a)pyrene and Total Suspended Particulate (TSP). Benzo(a)pyrene exceeded criteria on several occasions at the Courtice Road and Rundle Road monitoring stations. Additionally, on two occasions in 2017, the Rundle Road station, which is located near the construction activities for the development of the 418, exceeded criteria for TSP.

Groundwater and Surface Water

Similar to the 2016 operating year, the 2017 groundwater and surface water monitoring activities meet the compliance requirements of the EA, the ECA and the approved Groundwater and Surface Water Monitoring Plan.

Soil

Results from the 2017 soil testing event were generally comparable to historical concentrations, except for an exceedance of benzo(a)pyrene at the Rundle Road station. A resampling event occurred to which the result satisfied the criteria. The inconsistency of parameter concentrations in soil is indicative of native soil's inherent natural heterogeneity, which is common in soils and is similarly observed for other tested constituents in soils.

Complaints and Inquiries

Compared to 2016, complaints delivered through Regional Council, the DYEC website and through direct communication decreased by 21%. Similarly, inquires decreased by 34%.

The results to date, as shown in the required report submittals, have shown no adverse effects, anomalies or impacts on the environment.

17. Recommendations for Improvement

17.1. Status of Recommendations from the 2016 Annual Report

Recommendations for 2017

1) Continue to review the results from the baghouse leak detection system and other measures implemented through the Abatement Plan to assess their effectiveness and make any further recommendations for improvement;

Status: The baghouse leak detection system was found to be very effective and is a key part in ensuring superior baghouse performance.

2) Continue to refine operating and evaluation procedures to improve the correlation between results obtained from the Long-Term Dioxin and Furan Sampling System and results obtained through reference source testing methods.

Status: Operating and evaluation procedures to improve the correlation between results obtained from the long-term AMESA sampler and results obtained through reference source testing methods continue to be refined. While the AMESA appeared to report consistent results during this limited 2017 test program, the historical results of AMESA samples collected concurrently with source tests prior to 2017 are not well correlated. Results of long term samples collected monthly during 2017 demonstrated continued variability. The Regions and Covanta are developing a long-term work program with the goal of understanding and reducing the variability of the data collected.

3) Continue to perform a voluntary source test in each of the next two years to assess facility performance between mandatory annual source tests.

Status: A Voluntary Source Test was successfully performed in May 2017 demonstrating compliance with emissions limits between mandatory annual source tests. The last Voluntary Source Test is schedule for May 2018.

4) Revise the Noise Monitoring and Reporting Plan to carry out future annual acoustic audit measurements only when facility changes dictate or requested by the Director of the MOECC.

Status: The Noise Monitoring and Reporting Plan was revised as stated above.

17.2. Recommendations for 2018

Below is a summary of recommendations to improve the environmental and process performance of the site.

1) Achieve ISO14001:2015 Environmental Management System certification

2) Develop a new AMESA Work Plan that incorporates additional long-term sampling to complete the AMESA performance evaluation.

3) Continue to optimize facilty operations to achieve reductions in site power usage and decrease reagent consumption while maintaining full compliance with all regulatory limits

Appendix 1

MOECC 2017 EA/ECA Report Submittals

MOECC 2017 EA/ECA Report Submittals	
Report Type	**Submission Date**
Ambient Air Monitoring Reports as per ECA 7(4)(b), EA 11.7, Operations Manual for AQ Monitoring in Ontario	
2016 Ambient Air Q4 Report	February 14th, 2017
2016 Ambient Air Annual Report	May 12th, 2017
2017 Ambient Air Q1 Report	May 12th, 2017
2017 Ambient Air Q2 Report	August 14th, 2017
2017 Ambient Air Q3 Report	November 14th, 2017
2017 Ambient Air Q4 Report	February 14th, 2018
Annual Report as per ECA (15)(1)	
2016 Annual Report	March 31st, 2017
Complaint and Inquiry Logs as per ECA 10(1), ECA 10(2), 14(7)	
January Complaint & Inquiry Log	April 5th, 2017
February Complaint & Inquiry Log	April 5th, 2017
March Complaint & Inquiry Log	June 21st, 2017
April Complaint & Inquiry Log	June 21st, 2017
May Complaint & Inquiry Log	October 6th, 2017
June Complaint & Inquiry Log	October 6th, 2017
July Complaint & Inquiry Log	November 10th, 2017
August Complaint & Inquiry Log	November 10th, 2017
September Complaint & Inquiry Log	February 5th, 2018
October Complaint & Inquiry Log	February 5th, 2018
November Complaint & Inquiry Log	February 5th, 2018
December Complaint & Inquiry Log	February 5th, 2018
Compliance Monitoring Report as per EA 5.4	

MOECC 2017 EA/ECA Report Submittals	
Report Type	**Submission Date**
2017 Compliance Monitoring Report	November 3rd, 2017
Groundwater and Surface Water Monitoring Reports as per ECA 7(14)(b), EA 20.8	
2016 Annual Groundwater and Surface Water Reports	April 28th, 2017
Noise Monitoring and Mitigation Reports- Acoustic Audit Reports as per Noise Monitoring Plan	
2017 Acoustic Audit	N/A
Odour Management and Mitigation Monitoring Report as per ECA 8(9)(b)	
2017 Odour Management and Mitigation Monitoring Report	November 24th, 2017
Soil Testing Report as per ECA 15(4)	
2017 Soil Test Report	November 24th, 2017
Source Test as per ECA 7(1), Schedule E(1), ECA Schedule E(7) and Schedule E(8) respectively	
Source Test Pre-test Plan	July 27th, 2017
Notification to MOECC 15 days prior to Source test	July 27th, 2017 (included in pre-test plan submission)
Source Test Report	November 22nd, 2017
Third Party Audit Report as per ECA 15(3), EA 16	
2017 Third Party Operations Audit	April 28th, 2017
Waste Diversion Monitoring Report as per EA 10.4	
2016 Annual Waste Diversion Reports	Durham-November 3rd, 2017 York-October 24th, 2017

Appendix 2

Bottom Ash Sampling

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Durham York Energy Centre
Summary of Plant Operating Conditions
Bottom Ash Sampling - 2016 CASTP to 2017 CASTP

Bottom Ash	Scalehouse **Record of Waste Received** (tonnes)	Waste Processed (tonnes)	Combustion Temperature (avg °C)	Combustion O_2 Level (avg %)	Carbon Monoxide Level (4 hour - mg/Rm^3 @11% O_2 avg)	Opacity (avg %)	Lime Use (kg)	Carbon Use (kg)	Ammonia Use (L)	Generated Bottom Ash (tonnes)
Q4 2016										
Day 1 - 26-Nov-16	0	440	1,243	8	15	0	7,600	250	1,581	80.4
Day 2 - 27-Nov-16	0	464	1,237	8	13	0	7,575	251	1,985	82.6
Day 3 - 28-Nov-16	587	424	1,239	8	14	0	7,521	261	1,655	88.1
Day 4 - 29-Nov-16	679	386	1,242	9	18	0	6,826	254	1,503	87.2
Day 5 - 30-Nov-16	666	409	1,245	9	17	0	6,807	254	1,546	55.9
Q1 to Q3 2017										
Q1 - 26-Mar-17	0	401	1,167	9	16	0	7,222	250	4,569	106
Q2 - 28-May-17	0	440	1,118	8	13	0	8,367	251	2,032	86
Q3 - 30-Jul-17	0	429	1,212	8	12	0	7,045	251	1,026	82
Q4 2017										
Day 1 - 11-Nov-17	0	474	1,261	7	11	0	8,396	252	2,732	107
Day 2 - 12-Nov-17	0	496	1,268	7	7	0	8,646	251	2,763	74
Day 3 - 13-Nov-17	560	473	1,248	8	11	0	8,428	251	2,692	107
Day 4 - 14-Nov-17	682	459	1,259	8	13	0	8,370	252	2,408	94
Day 5 - 15-Nov-17	627	450	1,242	7	12	0	8,516	251	2,641	76

DURHAM YORK ENERGY CENTRE
Summary of Laboratory Results: Bottom Ash
2016 CASTP to Q3 2017

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SAMPLE ID	COMPOSITE DATE	LOSS ON IGNITION (Wt%)[a]
DYEC/BA/161126/1SGS	28-Nov-16	< 0.62
DYEC/BA/161126/2SGS	28-Nov-16	< 0.62
DYEC/BA/161126/3SGS	28-Nov-16	< 0.62
DYEC/BA/161126/4SGS	28-Nov-16	< 0.62
DYEC/BA/161127/1SGS	28-Nov-16	< 0.62
DYEC/BA/161127/2SGS	28-Nov-16	< 0.62
DYEC/BA/161127/3SGS	28-Nov-16	< 0.61
DYEC/BA/161127/4SGS	28-Nov-16	< 0.61
DYEC/BA/161128/1SGS	29-Nov-16	0.71
DYEC/BA/161128/2SGS	29-Nov-16	1.09
DYEC/BA/161128/3SGS	29-Nov-16	< 0.60
DYEC/BA/161128/4SGS	29-Nov-16	< 0.60
DYEC/BA/161129/1SGS	30-Nov-16	< 0.61
DYEC/BA/161129/2SGS	30-Nov-16	< 0.61
DYEC/BA/161129/3SGS	30-Nov-16	< 0.61
DYEC/BA/161129/4SGS	30-Nov-16	< 0.61
DYEC/BA/161130/1SGS	1-Dec-16	< 0.60
DYEC/BA/161130/2SGS	1-Dec-16	0.64
DYEC/BA/161130/3SGS	1-Dec-16	1.00
DYEC/BA/161130/4SGS	1-Dec-16	< 0.60
DYEC/BA/170326/1SGS	27-Mar-17	0.48
DYEC/BA/170326/2SGS	27-Mar-17	0.12
DYEC/BA/170326/3SGS	27-Mar-17	< 0.57
DYEC/BA/170326/4SGS	27-Mar-17	1.44
DYEC/BA/170528/1SGS	29-May-17	< 0.61
DYEC/BA/170528/2SGS	29-May-17	< 0.61
DYEC/BA/170528/3SGS	29-May-17	< 0.61
DYEC/BA/170528/4SGS	29-May-17	0.91
DYEC/BA/170730/1SGS	31-Jul-17	0.59
DYEC/BA/170730/2SGS	31-Jul-17	0.50
DYEC/BA/170730/3SGS	31-Jul-17	0.68
DYEC/BA/170730/4SGS	31-Jul-17	0.95

CONSOLIDATED COMPOSITE SAMPLE STATISTICAL RESULTS

NUMBER OF SAMPLES	32
DEGREES OF FREEDOM	31
SAMPLE MEAN (XBAR)	< 0.67
SAMPLE VARIANCE (S^2)	0.05
STANDARD DEVIATION (S)	0.22
STD ERROR (S XBAR)	0.04
80% CI Upper Limit (actual)	**< 0.72**
MAXIMUM	1.44
MINIMUM	0.12
REGULATORY THRESHOLD	**10**

NOTES:
(a) Less than symbol (<) indicates laboratory result below the detection limit.

DURHAM YORK ENERGY CENTRE
Summary of Laboratory Results: Bottom Ash
2017

SAMPLE ID	COMPOSITE DATE	LOSS ON IGNITION (Wt%)[a]
DYEC/BA/170326/1SGS	27-Mar-17	0.48
DYEC/BA/170326/2SGS	27-Mar-17	0.12
DYEC/BA/170326/3SGS	27-Mar-17	< 0.57
DYEC/BA/170326/4SGS	27-Mar-17	1.44
DYEC/BA/170528/1SGS	29-May-17	< 0.61
DYEC/BA/170528/2SGS	29-May-17	< 0.61
DYEC/BA/170528/3SGS	29-May-17	< 0.61
DYEC/BA/170528/4SGS	29-May-17	0.91
DYEC/BA/170730/1SGS	31-Jul-17	0.59
DYEC/BA/170730/2SGS	31-Jul-17	0.50
DYEC/BA/170730/3SGS	31-Jul-17	0.68
DYEC/BA/170730/4SGS	31-Jul-17	0.95
DYEC/BA/171111/SGS-1	13-Nov-17	< 0.58
DYEC/BA/171111/SGS-2	13-Nov-17	0.96
DYEC/BA/171111/SGS-3	13-Nov-17	< 0.58
DYEC/BA/171111/SGS-4	13-Nov-17	< 0.58
DYEC/BA/171112/SGS-1	13-Nov-17	< 0.59
DYEC/BA/171112/SGS-2	13-Nov-17	1.23
DYEC/BA/171112/SGS-3	13-Nov-17	< 0.59
DYEC/BA/171112/SGS-4	13-Nov-17	< 0.58
DYEC/BA/171113/SGS-1	14-Nov-17	0.82
DYEC/BA/171113/SGS-2	14-Nov-17	< 0.60
DYEC/BA/171113/SGS-3	14-Nov-17	< 0.59
DYEC/BA/171113/SGS-4	14-Nov-17	< 0.61
DYEC/BA/171114/SGS-1	15-Nov-17	< 0.59
DYEC/BA/171114/SGS-2	15-Nov-17	< 0.59
DYEC/BA/171114/SGS-3	15-Nov-17	< 0.59
DYEC/BA/171114/SGS-4	15-Nov-17	< 0.60
DYEC/BA/171115/SGS-1	16-Nov-17	< 0.60
DYEC/BA/171115/SGS-2	16-Nov-17	0.63
DYEC/BA/171115/SGS-3	16-Nov-17	0.99
DYEC/BA/171115/SGS-4	16-Nov-17	< 0.60

CONSOLIDATED COMPOSITE SAMPLE STATISTICAL RESULTS

NUMBER OF SAMPLES	32
DEGREES OF FREEDOM	31
SAMPLE MEAN (XBAR)	< 0.67
SAMPLE VARIANCE (S^2)	0.06
STANDARD DEVIATION (S)	0.24
STD ERROR (S XBAR)	0.04
80% CI Upper Limit (actual)	**< 0.73**
MAXIMUM	1.44
MINIMUM	0.12
REGULATORY THRESHOLD	**10**

NOTES:
(a) Less than symbol (<) indicates laboratory result below the detection limit.

Appendix 3

Fly Ash Sampling

Durham York Energy Centre
Summary of Plant Operating Conditions
Fly Ash Sampling - 2017

Fly Ash	Scalehouse **Record of Waste Received** (tonnes)	Waste Processed (tonnes)	Combustion Temperature (avg °C)	Combustion O_2 Level (avg %)	Carbon Monoxide Level (4 hour - mg/Rm^3 @11% O_2 avg)	Opacity (avg %)	Lime Use (kg)	Carbon Use (kg)	Ammonia Use (L)	Pozzolan (kg)	Cement (kg)	Generated Fly Ash (tonnes)
Q4 2017												
Day 1 - 28-Oct-17	0	461	1,255	7	12	0	8,686	251	2,293	8,295	2,139	41
Day 2 - 29-Oct-17	0	451	1,236	7	13	0	8,509	251	1,835	6,669	4,705	47
Day 3 - 30-Oct-17	593	465	1,249	7	13	0	8,882	251	1,768	4,717	6,736	31
Day 4 - 31-Oct-17	630	448	1,242	8	15	0	8,686	251	1,867	9,759	2,139	46
Day 5 - 1-Nov-17	652	459	1,249	8	13	0	8,489	251	1,812	8,132	2,139	38

Note: All values rounded to whole numbers

DURHAM YORK ENERGY CENTRE
Summary of Laboratory Results: Conditioned Fly Ash
2017 (October 28 to November 1, 2017)

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			Arsenic (As) Leachable		Barium (Ba) Leachable		Boron (B) Leachable		Cadmium (Cd) Leachable		Chromium (Cr) Leachable		Lead (Pb) Leachable		Mercury (Hg) Leachable		Selenium (Se) Leachable		Silver (Ag) Leachable		Uranium (U) Leachable
INDIVIDUAL RESULTS	**Units**		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L
Sample ID	**LOR[a]**		0.050		0.50		2.5		0.0050		0.050		0.050		0.00010		0.025		0.0050		0.25
	REG 347 Limit (mg/L)		2.5		100		500		0.5		5		5		0.1		1		5		10
	Composite Date																				
DYEC/FA/171028/1	30-Oct-17	<	0.050		1.62	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171028/2	30-Oct-17	<	0.050		1.34	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171028/3	30-Oct-17	<	0.050		1.49	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171028/4	30-Oct-17	<	0.050		1.53	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171029/1	30-Oct-17	<	0.050		1.36	<	2.5	<	0.0050	<	0.050		0.057	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171029/2	30-Oct-17	<	0.050		1.59	<	2.5	<	0.0050	<	0.050		0.068	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171029/3	30-Oct-17	<	0.050		1.33	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171029/4	30-Oct-17	<	0.050		1.39	<	2.5	<	0.0050	<	0.050		0.064	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171030/1	31-Oct-17	<	0.050		1.67	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171030/2	31-Oct-17	<	0.050		1.76	<	2.5	<	0.0050	<	0.050		0.051	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171030/3	31-Oct-17	<	0.050		1.50	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171030/4	31-Oct-17	<	0.050		1.54	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171031/1	1-Nov-17	<	0.050		1.21	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171031/2	1-Nov-17	<	0.050		1.28	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171031/3	1-Nov-17	<	0.050		1.16	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171031/4	1-Nov-17	<	0.050		1.31	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171101/1	2-Nov-17	<	0.050		1.27	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171101/2	2-Nov-17	<	0.050		1.25	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171101/3	2-Nov-17	<	0.050		1.26	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25
DYEC/FA/171101/4	2-Nov-17	<	0.050		1.27	<	2.5	<	0.0050	<	0.050	<	0.050	<	0.00010	<	0.025	<	0.0050	<	0.25

CONSOLIDATED COMPOSITE SAMPLE STATISTICAL RESULTS

NUMBER OF SAMPLES	20	20	20	20	20	20	20	20	20	20
DEGREES OF FREEDOM	19	19	19	19	19	19	19	19	19	19
SAMPLE MEAN (XBAR)	< 0.050	1.41	< 2.5	< 0.0050	< 0.050	< 0.052	< 0.00010	< 0.025	< 0.0050	< 0.25
SAMPLE VARIANCE (S^2)	0.000	0.03	0.0	0.0000	0.000	0.000	0.00000	0.000	0.0000	0.00
STANDARD DEVIATION (S)	0.000	0.17	0.0	0.0000	0.000	0.005	0.00000	0.000	0.0000	0.00
STD ERROR (S XBAR)	0.000	0.04	0.0	0.0000	0.000	0.001	0.00000	0.000	0.0000	0.00
80% Confidence Level	**< 0.050**	**1.46**	**< 2.5**	**< 0.0050**	**< 0.050**	**< 0.054**	**< 0.00010**	**< 0.025**	**< 0.0050**	**< 0.25**
MAXIMUM	< 0.050	1.76	< 2.5	< 0.0050	< 0.050	0.068	< 0.00010	< 0.025	< 0.0050	< 0.25
MINIMUM	< 0.050	1.16	< 2.5	< 0.0050	< 0.050	< 0.050	< 0.00010	< 0.025	< 0.0050	< 0.25
REGULATORY THRESHOLD	**2.5**	**100**	**500**	**0.5**	**5**	**5**	**0.1**	**1**	**5**	**10**

NOTES:
[a] Limit of Reporting, Less than symbol (<) indicates laboratory result below the detection limit. The value used in this table is provided by ALS Environmental.

Appendix 4

May 2017 Voluntary Compliance Emission Testing Program

- Executive Summary

- CalPuff Modelling for May 2017 Voluntary Source Testing at Durham York Energy Centre (Emission Summary Table)

EXECUTIVE SUMMARY

ORTECH Consulting Inc. (ORTECH) completed a voluntary compliance emission testing program at the Durham York Energy Centre (DYEC) located in Courtice, Ontario between May 23 and May 26, 2017. The emission testing program was performed to satisfy the agreement the facility has with the Regions of Durham and York to conduct emission testing twice per year.

Ontario Ministry of the Environment and Climate Change (MOECC) Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX Section 7(1) 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." This program is the fourth comprehensive Schedule E source testing program conducted at the facility; the initial source testing program was conducted in September/October 2015, a voluntary compliance test program was conducted in May 2016, and a compliance test program was conducted in October/November 2016.

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. Although not a requirement of the ECA, at the request of Covanta and per the Pre-Test Plan letter submitted to the MOECC by the Durham and York Regions, additional dioxin and furan testing was conducted at the Quench Inlet to the air pollution control (APC) system concurrently with the dioxin and furan tests performed at the Baghouse Outlet on each unit.

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 dioxins, furans and dioxin-like PCBs 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
Aldehydes	CARB Method 430 with Ashland Modification
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 performed in the Fall of 2016 demonstrated that the DYEC CEMS met the performance parameters detailed in Schedule F of the ECA, 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 was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA. Concentration data measured by ORTECH between May 23 and May 24, 2017 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 MOECC 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 MOECC "Summary of Standards and Guidelines to Support Ontario Regulation 419/05 – Air Pollution – Local Air Quality", dated April 2012, provides 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", published on January 4, 2017, 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)*	-	-	-	385	-
Average Combustion Zone Temp. (°C)*	-	-	-	1171	-
Steam (tonnes/day)*	-	-	-	801	-
MSW Combusted (tonnes/day)*	-	-	-	217	-
NOx Reagent Injection Rate (liters/day)*	-	-	-	1205	-
Carbon Injection (kg/day)*	-	-	-	125	-
Lime Injection (kg/day)*	-	-	-	4233	-
Filterable Particulate (mg/Rm^3) (1)	1.32	0.83	0.94	1.03	9
PM_{10} with Condensable (mg/Rm^3) (1)	<6.73	<6.86	<7.29	<6.96	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<6.65	<6.72	<6.89	<6.75	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.14	<0.12	<0.13	<0.13	-
Ammonia (mg/Rm^3) (1)	1.11	0.89	0.94	0.98	-
Cadmium (µg/Rm^3) (1)	0.11	0.17	0.074	0.12	7
Lead (µg/Rm^3) (1)	0.30	0.32	0.22	0.28	50
Mercury (µg/Rm^3) (1)	0.16	0.15	0.16	0.16	15
Antimony (µg/Rm^3) (1)	0.057	0.073	<0.044	<0.058	-
Arsenic (µg/Rm^3) (1)	<0.044	<0.044	<0.044	<0.044	-
Barium (µg/Rm^3) (1)	2.27	2.85	2.84	2.65	-
Beryllium (µg/Rm^3) (1)	<0.044	<0.044	<0.044	<0.044	-
Chromium (µg/Rm^3) (1)	1.04	1.31	0.70	1.02	-
Cobalt (µg/Rm^3) (1)	0.15	0.24	0.18	0.19	-
Copper (µg/Rm^3) (1)	1.38	1.55	0.64	1.19	-
Molybdenum (µg/Rm^3) (1)	4.04	4.46	4.10	4.20	-
Nickel (µg/Rm^3) (1)	1.43	1.71	0.93	1.36	-
Selenium (µg/Rm^3) (1)	<0.22	<0.22	<0.22	<0.22	-
Silver (µg/Rm^3) (1)	<0.044	<0.044	<0.044	<0.044	-
Thallium (µg/Rm^3) (1)	0.044	<0.044	<0.044	<0.044	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.022	<0.022	<0.022	-
Zinc (µg/Rm^3) (1)	4.09	4.16	3.73	4.00	-
Dioxins and Furans (pg TEQ/Rm^3)(3)	<5.17	<4.93	<5.85	<5.32	60
Total Chlorobenzenes (ng/Rm^3)(1)	<476	<392	<492	<454	-
Total Chlorophenols (ng/Rm^3)(1)	<175	<144	<155	<158	-
Total PAHs (ng/Rm^3)(1)	<230	<265	<274	<256	-
Total VOCs (µg/Rm^3) (1)(4)	<50.3	<42.4	<46.6	<46.4	-
Quench Inlet Dioxins and Furans (pg TEQ/Rm^3)(3)	1702	2067	2204	1991	-
Quench Inlet Organic Matter (THC) (ppm, dry)(2)	1.4	0.9	0.8	1.0	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).

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)*	-	-	-	385	-
Average Combustion Zone Temp. (°C)*	-	-	-	1209	-
Steam (tonnes/day)*	-	-	-	798	-
MSW Combusted (tonnes/day)*	-	-	-	215	-
NOx Reagent Injection Rate (liters/day)*	-	-	-	682	-
Carbon Injection (kg/day)*	-	-	-	125	-
Lime Injection (kg/day)*	-	-	-	4287	-
Filterable Particulate (mg/Rm^3) (1)	1.35	1.33	0.84	1.17	9
PM_{10} with Condensable (mg/Rm^3) (1)	<3.34	<1.78	<1.75	<2.28	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<3.28	<1.64	<1.69	<2.19	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.13	<0.12	<0.14	<0.13	-
Ammonia (mg/Rm^3) (1)	0.82	0.65	0.72	0.73	-
Cadmium (µg/Rm^3) (1)	0.068	0.070	0.070	0.069	7
Lead (µg/Rm^3) (1)	0.17	0.33	0.33	0.28	50
Mercury (µg/Rm^3) (1)	0.10	0.10	0.099	0.099	15
Antimony (µg/Rm^3) (1)	<0.044	0.10	0.059	<0.068	-
Arsenic (µg/Rm^3) (1)	<0.044	<0.044	<0.043	<0.044	-
Barium (µg/Rm^3) (1)	2.58	2.50	2.26	2.45	-
Beryllium (µg/Rm^3) (1)	<0.044	<0.044	<0.043	<0.044	-
Chromium (µg/Rm^3) (1)	1.00	1.03	0.92	0.99	-
Cobalt (µg/Rm^3) (1)	0.14	0.16	0.17	0.16	-
Copper (µg/Rm^3) (1)	1.03	0.55	0.50	0.69	-
Molybdenum (µg/Rm^3) (1)	4.25	4.00	3.92	4.06	-
Nickel (µg/Rm^3) (1)	1.21	1.52	1.26	1.33	-
Selenium (µg/Rm^3) (1)	<0.22	<0.22	<0.21	<0.22	-
Silver (µg/Rm^3) (1)	<0.044	<0.044	<0.043	<0.044	-
Thallium (µg/Rm^3) (1)	<0.044	<0.044	<0.043	<0.044	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.022	<0.021	<0.022	-
Zinc (µg/Rm^3) (1)	2.77	4.78	2.03	3.19	-
Dioxins and Furans (pg TEQ/Rm^3)(3)	<7.52	<7.01	<8.47	<7.67	60
Total Chlorobenzenes (ng/Rm^3)(1)	<452	<571	<420	<481	-
Total Chlorophenols (ng/Rm^3)(1)	<156	<144	<137	<146	-
Total PAHs (ng/Rm^3)(1)	<390	<242	<278	<303	-
Total VOCs (µg/Rm^3) (1) (4)	<44.4	<38.0	<50.4	<47.4	-
Quench Inlet Dioxins and Furans (pg TEQ/Rm^3)(3)	1792	2090	1639	1841	-
Quench Inlet Organic Matter (THC) (ppm, dry)(2)	0.6	0.9	0.9	0.8	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. The aldehyde sample for Test No. 2 was broken after the samples were delivered to the analytical laboratory. Results displayed are from the Volatile Organic Sampling Train only (i.e. excludes acetaldehyde, formaldehyde and acrolein). Test No. 2 was excluded from the average results.

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)	9.3	12.9	17.0	40
	Hydrogen Chloride (mg/Rm^3)(2)	2.0	2.1	2.5	9
	Nitrogen Oxides (mg/Rm^3)(2)	108	110	110	121
	Sulphur Dioxide (mg/Rm^3)(2)	0	0	0	35
Boiler No. 2	Carbon Monoxide (mg/Rm^3)(1)	9.8	15.8	22.8	40
	Hydrogen Chloride (mg/Rm^3)(2)	0.5	3.1	4.5	9
	Nitrogen Oxides (mg/Rm^3)(2)	111	112	113	121
	Sulphur Dioxide (mg/Rm^3)(2)	0	0	0	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.

The CALPUFF dispersion modelling (using Version 6.263 as requested by the MOECC) for the May 2017 emission testing program was performed by Golder Associates. A summary of the results are provided in the tables appended to this report (Appendix 29) based on calculated ground level point of impingement concentrations for the average total Main Stack emissions. As shown in the tables, the calculated impingement concentrations were well below the allowable impingement concentrations for all of the contaminants.

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 796 tonnes of steam per day for each Boiler (approximately 98.6% 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 (Schedule 3) under the Ontario Environmental Protection Act and other MOECC criteria including guidelines and upper risk thresholds.

Tables referenced in this report for the tests conducted at Boiler No. 1 BH Outlet and Boiler No. 2 BH Outlet are provided in Appendix 1 and Appendix 2, respectively. Tables for the additional testing conducted at the Boiler No. 1 Quench Inlet and Boiler No. 2 Quench Inlet are provided in Appendix 3 and Appendix 4, respectively.

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MOECC POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MOECC Limit [%]	Notes	Version of Date of ACB List
1 – methylnaphthalene	90-12-0	1.22E-07	Calpuff	1.24E-07	24-hour	12	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
1,2,4 – Trichlorobenzene	120-82-1	4.51E-07	Calpuff	4.57E-07	24-hour	400	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
1,2,4,5-Tetrachlorobenzene	95-94-3	1.14E-07	Calpuff	1.16E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
1,2-Dichlorobenzene	95-50-1	1.08E-06	Calpuff	2.06E-05	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
2 – methylnaphthalene	91-57-6	2.17E-07	Calpuff	2.20E-07	24-hour	10	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
2,3,4,6-Tetrachlorophenol	58-90-2	3.13E-07	Calpuff	3.17E-07	24-hour	0.1	—	—	De Minimus	—	<1%		
2,4,6-Trichlorophenol	88-06-2	5.27E-07	Calpuff	5.34E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
2,4-Dichlorophenol	120-83-2	3.29E-07	Calpuff	3.34E-07	24-hour	77	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
3-Methylchloranthene	56-49-5	3.13E-07	Calpuff	3.17E-07	24-hour	0.1	—	—	De Minimus	—	<1%		
7,12-Dimethylbenz(a)anthracene	57-97-6	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Acenaphthene	83-32-9	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Acenaphthylene	208-96-8	8.62E-08	Calpuff	8.74E-08	24-hour	3.5	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
Acetaldehyde	75-07-0	4.90E-05	Calpuff	4.97E-05	24-hour	500	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Acetaldehyde	75-07-0	4.90E-05	Calpuff	1.12E-03	1/2-hour	500	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Acetaldehyde	75-07-0	4.90E-05	Calpuff	4.97E-05	24-hour	5000	—	Sch. 6	URT	—	<1%		
Acrolein	107-02-8	1.55E-04	Calpuff	1.57E-04	24-hour	0.4	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Acrolein	107-02-8	1.55E-04	Calpuff	2.96E-03	1-hour	4.5	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Acrolein	107-02-8	1.55E-04	Calpuff	1.57E-04	24-hour	4	—	Sch. 6	URT	—	<1%		
Ammonia	7664-41-7	3.31E-02	Calpuff	3.36E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Ammonia	7664-41-7	3.31E-02	Calpuff	3.36E-02	24-hour	1000	—	Sch. 6	URT	—	<1%		
Anthracene	120-12-7	6.87E-08	Calpuff	6.97E-08	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
Antimony	7440-36-0	2.42E-06	Calpuff	2.46E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%		13/12/2016
Arsenic	7440-38-2	1.69E-06	Calpuff	1.71E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
Barium	7440-39-3	9.84E-05	Calpuff	9.99E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
Benzene	71-43-2	9.01E-05	Calpuff	2.83E-06	Annual	0.45	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 19, Table 2, 3, URT - Note 4, Table 4)	13/12/2016
Benzene	71-43-2	9.01E-05	Calpuff	9.14E-05	24-hour	100	—	Sch. 6	URT	—	<1%		
Benzene	71-43-2	9.01E-05	Calpuff	9.14E-05	24-hour	4.5	—	—	AAV	—	<1%		
Benzo(a)anthracene	56-55-3	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Benzo(a)fluorene	238-84-6	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Benzo(a)pyrene	50-32-8	8.28E-08	Calpuff	2.60E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 7, 19, Table 2, 3, URT - Note 4, Table 4)	13/12/2016
Benzo(a)pyrene	50-32-8	8.28E-08	Calpuff	8.40E-08	24-hour	0.005	—	Sch. 6	URT	—	<1%		
Benzo(a)pyrene	50-32-8	8.28E-08	Calpuff	8.40E-08	24-hour	0.0001	—	—	AAV	—	<1%		
Benzo(b)fluoranthene	205-99-2	6.74E-08	Calpuff	6.84E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Benzo(b)fluorene	243-17-4	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Benzo(e)pyrene	192-97-2	2.99E-07	Calpuff	3.03E-07	24-hour	0.1	—	—	De Minimus	—	<1%		
Benzo(g,h,i)perylene	191-24-2	1.25E-06	Calpuff	1.27E-06	24-hour	1.2	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
Benzo(k)fluoranthene	207-08-9	1.02E-07	Calpuff	1.03E-07	24-hour	0.1	—	—	De Minimus	—	<1%		
Beryllium	7440-41-7	1.69E-06	Calpuff	1.71E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%		13/12/2016
Biphenyl	92-51-3	1.28E-06	Calpuff	1.30E-06	24-hour	0.1	—	—	De Minimus	—	<1%		
Bromodichloromethane	75-27-4	1.51E-05	Calpuff	1.53E-05	24-hour	0.01	—	—	De Minimus	—	<1%		
Bromoform	75-25-2	1.51E-05	Calpuff	1.53E-05	24-hour	55	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
Bromomethane	74-83-9	1.36E-04	Calpuff	1.38E-04	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
Cadmium	7440-43-9	3.65E-06	Calpuff	3.70E-06	24-hour	0.025	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Cadmium	7440-43-9	3.65E-06	Calpuff	3.70E-06	24-hour	0.25	—	Sch. 6	URT	—	<1%		
Carbon Monoxide	630-08-0	5.68E-01	Calpuff	1.30E+01	1/2-hour	6000	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 9)	13/12/2016
Carbon tetrachloride	56-23-5	1.51E-05	Calpuff	1.53E-05	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	ACB List (Note URT - Note 4, Table 4)	13/12/2016
Carbon tetrachloride	56-23-5	1.51E-05	Calpuff	1.53E-05	24-hour	24	—	Sch. 6	URT	—	<1%		
Chloroform	67-66-3	1.67E-05	Calpuff	1.70E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Chloroform	67-66-3	1.67E-05	Calpuff	1.70E-05	24-hour	100	—	Sch. 6	URT	—	<1%		
Chromium (hexavalent)	18540-29-9	3.87E-05	Calpuff	3.93E-05	24-hour	0.1	—	—	De Minimus	—	<1%		
Chrysene	218-01-9	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Cobalt	7440-48-4	6.74E-06	Calpuff	6.83E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
Copper	7440-50-8	3.65E-05	Calpuff	3.70E-05	24-hour	50	Health	Sch. 3	Standard	B1	<1%		13/12/2016
Dibenzo(a,c)anthracene	215-58-7	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Dibenzo(a,h)anthracene	53-70-3	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Dichlorodifluoromethane	75-71-8	7.54E-05	Calpuff	7.65E-05	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	ACB List (Note 10)	13/12/2016

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MOECC POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MOECC Limit [%]	Notes	Version of Date of ACB List
Dichloroethene, 1,1 -	75-34-3	1.51E-05	Calpuff	1.53E-05	24-hour	165	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Dichloroethene, 1,1 -	75-34-3	1.51E-05	Calpuff	1.53E-05	24-hour	1650	—	Sch. 6	URT	—	<1%		
Dichloromethane	75-09-2	1.62E-04	Calpuff	1.64E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Dichloromethane	75-09-2	1.62E-04	Calpuff	1.64E-04	24-hour	22000	—	Sch. 6	URT	—	<1%		
Dioxins, Furans and Dioxin- like PCBs	N/A	2.30E-10	Calpuff	2.33E-10	24-hour	0.0000001	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 8, 8a, Table 1, URT - Note 4, Table 4)	13/12/2016
Ethylbenzene	100-41-4	1.51E-05	Calpuff	1.53E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Ethylbenzene	100-41-4	1.51E-05	Calpuff	4.74E-04	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	ACB List (Note 2, 3)	13/12/2016
Ethylbenzene	100-41-4	1.51E-05	Calpuff	1.53E-05	24-hour	10000	—	Sch. 6	URT	—	<1%		
Ethylene Dibromide	106-93-4	3.02E-05	Calpuff	3.06E-05	24-hour	3	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
Fluoranthene	206-44-0	3.03E-07	Calpuff	3.07E-07	24-hour	140	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
Fluorides	7664-39-3	5.06E-03	Calpuff	5.13E-03	24-hour	0.86	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	5.06E-03	Calpuff	5.75E-04	30-day	0.34	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	5.06E-03	Calpuff	5.13E-03	24-hour	1.72	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	5.06E-03	Calpuff	5.75E-04	30-day	0.69	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	5.06E-03	Calpuff	5.13E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	5.06E-03	Calpuff	5.75E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorine	86-73-7	1.42E-07	Calpuff	1.44E-07	24-hour	0.1	—	—	De Minimus	—	<1%		
Formaldehyde	50-00-0	1.99E-04	Calpuff	2.02E-04	24-hour	65	Health	Sch. 3	Standard	B1	<1%		13/12/2016
Hexachlorobenzene	118-74-1	6.25E-08	Calpuff	6.34E-08	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
Hexachlorobenzene	118-74-1	6.25E-08	Calpuff	6.34E-08	24-hour	0.01	—	—	De Minimus	—	<1%		
Hydrogen Chloride	7647-01-0	1.52E-01	Calpuff	1.54E-01	24-hour	20	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Hydrogen Chloride	7647-01-0	1.52E-01	Calpuff	1.54E-01	24-hour	200	—	Sch. 6	URT	—	<1%		
Indeno(1,2,3 – cd)pyrene	193-39-5	1.77E-07	Calpuff	1.80E-07	24-hour	0.1	—	—	De Minimus	—	<1%		
Lead	7439-92-1	1.07E-05	Calpuff	1.09E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Lead	7439-92-1	1.07E-05	Calpuff	1.22E-06	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Lead	7439-92-1	1.07E-05	Calpuff	1.09E-05	24-hour	2	—	Sch. 6	URT	—	<1%		
Manganese	7439-96-5	2.90E-05	Calpuff	2.94E-05	24-hour	0.4	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Manganese	7439-96-5	2.90E-05	Calpuff	2.94E-05	24-hour	4	—	Sch. 6	URT	—	<1%		
Mercury	7439-97-6	4.92E-06	Calpuff	4.99E-06	24-hour	2	Health	Sch. 3	Standard	B1	<1%		13/12/2016
Molybdenum	7439-98-7	1.59E-04	Calpuff	1.62E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%		13/12/2016
Naphthalene	91-20-3	7.80E-07	Calpuff	7.91E-07	24-hour	22.5	Health	Sch. 3	Guideline	B1	<1%	ACB List (Note 2, 3)	13/12/2016
Naphthalene	91-20-3	7.80E-07	Calpuff	2.45E-05	10-minute	50	Odour	Sch. 3	Guideline	B1	<1%	ACB List (Note 2, 3)	13/12/2016
Nickel	7440-02-0	5.19E-05	Calpuff	1.63E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 19, Table 2, 3, URT - Note 4, Table 4)	13/12/2016
Nickel	7440-02-0	5.19E-05	Calpuff	5.27E-05	24-hour	2	—	Sch. 6	URT	—	<1%		
Nickel	7440-02-0	5.19E-05	Calpuff	5.27E-05	24-hour	0.4	—	—	AAV	—	<1%		
Nitrogen Oxides	10102-44-0	4.33E+00	Calpuff	4.39E+00	24-hour	200	Health	Sch. 3	Standard	B1	<1%	ACB List (Notes 2, 17)	13/12/2016
Nitrogen Oxides	10102-44-0	4.33E+00	Calpuff	8.25E+01	1-hour	400	Health	Sch. 3	Standard	B1	21%	ACB List (Notes 2, 17)	13/12/2016
O-terphenyl	84-15-1	6.96E-08	Calpuff	7.06E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
PM_{10} (Condensable and Filterable)	N/A	1.86E-01	Calpuff	0.44	24-hour	50	—	—	AAQC	—	<1%		
PM_{10} (Filterable Only)	N/A	1.95E-02	Calpuff	0.27	24-hour	50	—	—	AAQC	—	<1%		
$PM_{2.5}$ (Condensable and Filterable)	N/A	1.81E-01	Calpuff	0.43	24-hour	30	—	—	AAQC	—	<1%		
$PM_{2.5}$ (Filterable Only)	N/A	1.36E-02	Calpuff	0.26	24-hour	30	—	—	AAQC	—	<1%		
Pentachlorobenzene	608-93-5	7.36E-08	Calpuff	7.46E-08	24-hour	3	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
Pentachlorophenol	87-86-5	3.13E-07	Calpuff	3.17E-07	24-hour	20	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
Perylene	198-55-0	6.25E-08	Calpuff	6.34E-08	24-hour	0.1	—	—	De Minimus	—	<1%		
Phenanthrene	85-01-8	7.50E-07	Calpuff	7.61E-07	24-hour	0.1	—	—	De Minimus	—	<1%		
Pyrene	129-00-0	5.40E-07	Calpuff	5.48E-07	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
Selenium	7782-49-2	8.43E-06	Calpuff	8.55E-06	24-hour	10	Health	Sch. 3	Guideline	B1	<1%		13/12/2016
Silver	7440-22-4	1.69E-06	Calpuff	1.71E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%		13/12/2016
Sulphur Dioxide	7446-09-5	6.00E-02	Calpuff	6.08E-02	24-hour	275	Health & Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2)	13/12/2016
Sulphur Dioxide	7446-09-5	6.00E-02	Calpuff	1.14E+00	1-hour	690	Health & Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2)	13/12/2016
Tetrachloroethene	127-18-4	2.66E-05	Calpuff	2.70E-05	24-hour	360	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Tetrachloroethene	127-18-4	2.66E-05	Calpuff	2.70E-05	24-hour	3600	—	Sch. 6	URT	—	<1%		
Tetralin	119-64-2	9.74E-07	Calpuff	9.87E-07	24-hour	1200	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MOECC POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MOECC Limit [%]	Notes	Version of Date of ACB List
Thallium	7440-28-0	1.69E-06	Calpuff	1.71E-06	24-hour	0.24	Health	Sch. 3	SL-JSL	B2	<1%		13/12/2016
Toluene	108-88-3	1.54E-04	Calpuff	1.56E-04	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	ACB List (To be updated - Note 5)	13/12/2016
Total Chromium (and compounds)	7440-47-3	3.87E-05	Calpuff	1.21E-06	Annual	0.00014	Health	Sch. 3	Standard	B1	<1%	ACB List (Notes 11, 19, Table 2, 3, URT - Note 4, Table 4)	13/12/2016
Total Chromium (and compounds)	7440-47-3	3.87E-05	Calpuff	3.93E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 11a, URT - Note 4, Table 4)	13/12/2016
Total Chromium (and compounds)	7440-47-3	3.87E-05	Calpuff	3.93E-05	24-hour	5	—	Sch. 6	URT	—	<1%		
Total Chromium (and compounds)	7440-47-3	3.87E-05	Calpuff	3.93E-05	24-hour	0.07	—	Sch. 6	URT	—	<1%		
Total Chromium (and compounds)	7440-47-3	3.87E-05	Calpuff	3.93E-05	24-hour	0.0014	—	—	AAV	—	<1%		
Total Particulate Matter (Condensable and Filterable)	N/A	2.09E-01	Calpuff	0.46	24-hour	120	Visibility	Sch. 3	Standard	B1	<1%		13/12/2016
Total Particulate Matter (Filterable only)	N/A	4.25E-02	Calpuff	0.29	24-hour	120	Visibility	Sch. 3	Standard	B1	<1%		
Trichloroethane, 1,1,1 -	71-55-6	1.51E-05	Calpuff	1.53E-05	24-hour	115000	Health	Sch. 3	Standard	B1	<1%		13/12/2016
Trichloroethene	86-42-0	1.53E-05	Calpuff	1.55E-05	24-hour	0.1	—	—	De Minimus	—	<1%		
Trichloroethylene, 1,1,2 -	79-01-6	2.66E-05	Calpuff	2.70E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Trichloroethylene, 1,1,2 -	79-01-6	2.66E-05	Calpuff	2.70E-05	24-hour	1200	—	Sch. 6	URT	—	<1%		
Trichlorofluoromethane	75-69-4	3.02E-05	Calpuff	3.06E-05	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	ACB List (Note 10)	13/12/2016
Vanadium	7440-62-2	8.43E-07	Calpuff	8.55E-07	24-hour	2	Health	Sch. 3	Standard	B1	<1%		13/12/2016
Vinyl chloride	75-01-4	3.02E-05	Calpuff	3.06E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Vinyl chloride	75-01-4	3.02E-05	Calpuff	3.06E-05	24-hour	100	—	Sch. 6	URT	—	<1%		
Xylenes, m-, p- and o-	1330-20-7	6.03E-05	Calpuff	6.12E-05	24-hour	730	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Xylenes, m-, p- and o-	1330-20-7	6.03E-05	Calpuff	1.90E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	ACB List (Note 2, 3)	13/12/2016
Xylenes, m-, p- and o-	1330-20-7	6.03E-05	Calpuff	6.12E-05	24-hour	7300	—	Sch. 6	URT	—	<1%		
Zinc	7440-66-6	1.39E-04	Calpuff	1.41E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%		13/12/2016

Appendix 5

2017 Compliance Emission Testing in Accordance with Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX

- Executive Summary

- CalPuff Modelling of 2017 Compliance Source Testing Results from the Durham York Energy Centre (Emission Summary Table)

EXECUTIVE SUMMARY

ORTECH Consulting Inc. (ORTECH) completed an emission testing program at the Durham York Energy Centre (DYEC) located in Courtice, Ontario between October 10 and October 13, 2017. The emission testing program was performed to satisfy the requirements of the Ontario Ministry of the Environment and Climate Change (MOECC) 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". This program is the fifth comprehensive Schedule E source testing program conducted at the facility; the initial source testing program was conducted in September/October 2015, a voluntary test program was conducted in May 2016, the second compliance test program was conducted in October/November 2016, and a voluntary test program was conducted in May 2017.

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. Although not a requirement of the ECA, at the request of Covanta and per the Pre-Test Plan submitted to and approved by the MOECC additional dioxin and furan testing was conducted at the Quench Inlet to the air pollution control (APC) system concurrently with the dioxin and furan tests performed at the Baghouse Outlet on each unit.

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 dioxins, furans and dioxin-like PCBs 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
Aldehydes	CARB Method 430 with Ashland Modification
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 the Fall of 2017, 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 (October 10 to October 13, 2017) was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA. Concentration data measured by ORTECH between October 10 and October 11, 2017 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 MOECC 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 MOECC "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", published on January 4, 2017, 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)*	-	-	-	385	-
Average Combustion Zone Temp. (°C)*	-	-	-	1222	-
Steam (tonnes/day)*	-	-	-	803	-
MSW Combusted (tonnes/day)*	-	-	-	212	-
NOx Reagent Injection Rate (liters/day)*	-	-	-	674	-
Carbon Injection (kg/day)*	-	-	-	126	-
Lime Injection (kg/day)*	-	-	-	4283	-
Filterable Particulate (mg/Rm^3) (1)	1.43	2.32	0.45	1.40	9
PM_{10} with Condensable (mg/Rm^3) (1)	<5.03	<4.23	<7.39	<5.55	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<4.97	4.17	<7.19	<5.44	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.11	<0.11	<0.11	<0.11	-
Ammonia (mg/Rm^3) (1)	<0.27	0.30	0.33	<0.30	-
Cadmium (µg/Rm^3) (1)	0.060	0.071	0.030	0.053	7
Lead (µg/Rm^3) (1)	0.36	0.40	0.27	0.34	50
Mercury (µg/Rm^3) (1)	0.25	0.23	0.19	0.22	15
Antimony (µg/Rm^3) (1)	0.099	0.068	0.062	0.076	-
Arsenic (µg/Rm^3) (1)	<0.045	<0.046	<0.045	<0.045	-
Barium (µg/Rm^3) (1)	1.97	1.90	1.47	1.78	-
Beryllium (µg/Rm^3) (1)	<0.045	<0.046	<0.045	<0.045	-
Chromium (µg/Rm^3) (1)	1.19	0.85	0.48	0.84	-
Cobalt (µg/Rm^3) (1)	0.11	0.14	<0.045	<0.097	-
Copper (µg/Rm^3) (1)	1.40	1.35	0.95	1.24	-
Molybdenum (µg/Rm^3) (1)	4.15	4.53	5.11	4.60	-
Nickel (µg/Rm^3) (1)	1.44	1.34	0.63	1.14	-
Selenium (µg/Rm^3) (1)	<0.22	<0.23	<0.23	<0.23	-
Silver (µg/Rm^3) (1)	<0.045	<0.046	<0.045	<0.045	-
Thallium (µg/Rm^3) (1)	<0.045	<0.046	<0.045	<0.045	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.023	<0.023	<0.023	-
Zinc (µg/Rm^3) (1)	4.93	4.24	3.14	4.10	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<5.63	<6.60	<5.57	<5.94	60
Total Chlorobenzenes (ng/Rm^3) (1)	<240	<206	<311	<252	-
Total Chlorophenols (ng/Rm^3) (1)	<153	<152	<167	<157	-
Total PAHs (ng/Rm^3) (1)	<255	<254	<342	<284	-
Total VOCs (µg/Rm^3) (1) (4)	<353	<352	<373	<359	-
Quench Inlet Dioxins and Furans (pg TEQ/Rm^3) (3)	1018	1149	1242	1136	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.6	0.1	0.1	0.3	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).

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)*	-	-	-	385	-
Average Combustion Zone Temp. (°C)*	-	-	-	1266	-
Steam (tonnes/day)*	-	-	-	800	-
MSW Combusted (tonnes/day)*	-	-	-	213	-
NOx Reagent Injection Rate (liters/day)*	-	-	-	722	-
Carbon Injection (kg/day)*	-	-	-	126	-
Lime Injection (kg/day)*	-	-	-	4433	-
Filterable Particulate (mg/Rm^3) (1)	1.34	<0.25	<0.38	<0.66	9
PM_{10} with Condensable (mg/Rm^3) (1)	<4.31	4.47	<3.74	<4.18	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<4.18	4.27	<3.55	<4.00	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.10	<0.11	<0.11	<0.11	-
Ammonia (mg/Rm^3) (1)	0.28	0.34	0.30	0.31	-
Cadmium (µg/Rm^3) (1)	0.049	<0.021	0.024	<0.031	7
Lead (µg/Rm^3) (1)	0.61	0.59	0.22	0.48	50
Mercury (µg/Rm^3) (1)	0.19	0.19	0.15	0.18	15
Antimony (µg/Rm^3) (1)	0.099	0.066	<0.045	<0.070	-
Arsenic (µg/Rm^3) (1)	<0.043	<0.042	<0.045	<0.043	-
Barium (µg/Rm^3) (1)	2.72	0.32	0.24	1.09	-
Beryllium (µg/Rm^3) (1)	<0.043	<0.042	<0.045	<0.043	-
Chromium (µg/Rm^3) (1)	1.11	1.03	0.51	0.88	-
Cobalt (µg/Rm^3) (1)	0.12	0.074	<0.045	<0.078	-
Copper (µg/Rm^3) (1)	2.76	1.89	0.63	1.76	-
Molybdenum (µg/Rm^3) (1)	4.51	4.84	5.11	4.82	-
Nickel (µg/Rm^3) (1)	1.44	0.80	0.48	0.91	-
Selenium (µg/Rm^3) (1)	<0.22	<0.21	<0.22	<0.22	-
Silver (µg/Rm^3) (1)	<0.043	<0.042	<0.045	<0.043	-
Thallium (µg/Rm^3) (1)	<0.043	<0.042	<0.045	<0.043	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.021	<0.022	<0.022	-
Zinc (µg/Rm^3) (1)	8.76	2.83	1.11	4.23	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<10.7	<9.41	<10.2	<10.1	60
Total Chlorobenzenes (ng/Rm^3) (1)	<287	<183	<447	<306	-
Total Chlorophenols (ng/Rm^3) (1)	<140	<144	<142	<142	-
Total PAHs (ng/Rm^3) (1)	<418	<358	<276	<350	-
Total VOCs (µg/Rm^3) (1) (4)	<349	<316	<351	<339	-
Quench Inlet Dioxins and Furans (pg TEQ/Rm^3) (3)	1052	871	1457	1127	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.1	0	0	0.03	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).

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)	6.3	11.5	16.8	40
	Hydrogen Chloride (mg/Rm^3) (2)	1.6	2.0	2.3	9
	Nitrogen Oxides (mg/Rm^3) (2)	110	112	113	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	2.4	5.4	35
Boiler No. 2	Carbon Monoxide (mg/Rm^3) (1)	7.5	12.2	19.0	40
	Hydrogen Chloride (mg/Rm^3) (2)	4.6	5.1	5.5	9
	Nitrogen Oxides (mg/Rm^3) (2)	111	111	112	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	1.7	3.8	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.

The CALPUFF dispersion modelling (using Version 6.263 as requested by the MOECC) for the October 2017 emission testing program was performed by Golder Associates. A summary of the results are provided in the tables appended to this report (Appendix 29) 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 of the contaminants were well below the relevant MOECC 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 791 tonnes of steam per day for each Boiler (approximately 98.0% 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 (Schedule 3) under the Ontario Environmental Protection Act and other MOECC criteria including guidelines and upper risk thresholds.

Tables referenced in this report for the tests conducted at Boiler No. 1 BH Outlet and Boiler No. 2 BH Outlet are provided in Appendix 1 and Appendix 2, respectively. Tables for the additional testing conducted at the Boiler No. 1 Quench Inlet and Boiler No. 2 Quench Inlet are provided in Appendix 3 and Appendix 4, respectively.

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MOECC POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark*	Percentage of MOECC Limit [%]	Notes	Version of Date of ACB List
1 – methylnaphthalene	90-12-0	1.08E-06	Calpuff	1.11E-06	24-hour	12	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
1,2,4 – Trichlorobenzene	120-82-1	2.84E-07	Calpuff	2.92E-07	24-hour	400	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
1,2,4,5-Tetrachlorobenzene	95-94-3	6.28E-08	Calpuff	6.45E-08	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
1,2-Dichlorobenzene	95-50-1	7.44E-07	Calpuff	1.46E-05	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
2 – methylnaphthalene	91-57-6	2.27E-07	Calpuff	2.33E-07	24-hour	10	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
2,3,4,6-Tetrachlorophenol	58-90-2	3.12E-07	Calpuff	3.20E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
2,4,6-Trichlorophenol	88-06-2	4.59E-07	Calpuff	4.71E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
2,4-Dichlorophenol	120-83-2	3.22E-07	Calpuff	3.30E-07	24-hour	77	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
3-Methylchloranthene	56-49-5	3.12E-07	Calpuff	3.20E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
7,12-Dimethylbenz(a)anthracene	57-97-6	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Acenaphthene	83-32-9	8.63E-08	Calpuff	8.86E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Acenaphthylene	208-96-8	1.94E-07	Calpuff	1.99E-07	24-hour	3.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Acetaldehyde	75-07-0	9.30E-04	Calpuff	9.55E-04	24-hour	500	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Acetaldehyde	75-07-0	9.30E-04	Calpuff	2.19E-02	1/2-hour	500	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Acetaldehyde	75-07-0	9.30E-04	Calpuff	9.55E-04	24-hour	5000	—	Sch. 6	URT	—	<1%	—	13/12/2016
Acrolein	107-02-8	9.56E-03	Calpuff	9.81E-03	24-hour	0.4	Health	Sch. 3	Standard	B1	2%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Acrolein	107-02-8	9.56E-03	Calpuff	1.88E-01	1-hour	4.5	Health	Sch. 3	Standard	B1	4%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Acrolein	107-02-8	9.56E-03	Calpuff	9.81E-03	24-hour	4	—	Sch. 6	URT	—	<1%	—	13/12/2016
Aluminum	91728-14-2	—	Calpuff	#VALUE!	24-hour	0.1	—	—	De Minimus	—	#VALUE!	—	13/12/2016
Ammonia	7664-41-7	1.18E-02	Calpuff	1.21E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Ammonia	7664-41-7	1.18E-02	Calpuff	1.21E-02	24-hour	1000	—	Sch. 6	URT	—	<1%	—	13/12/2016
Anthracene	120-12-7	1.38E-07	Calpuff	1.41E-07	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Antimony	7440-36-0	2.82E-06	Calpuff	2.90E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	—	13/12/2016
Arsenic	7440-38-2	1.71E-06	Calpuff	1.76E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
Barium	7440-39-3	5.53E-05	Calpuff	5.68E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
Benzene	71-43-2	1.23E-04	Calpuff	3.95E-06	Annual	0.45	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 19, Table 2, 3, URT - Note 4, Table 4)	13/12/2016
Benzene	71-43-2	1.23E-04	Calpuff	1.26E-04	24-hour	100	—	Sch. 6	URT	—	<1%	—	13/12/2016
Benzene	71-43-2	1.23E-04	Calpuff	3.95E-06	Annual	4.5	—	—	AAV	—	<1%	—	13/12/2016
Benzo(a)anthracene	56-55-3	7.56E-08	Calpuff	7.76E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Benzo(a)fluorene	238-84-6	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Benzo(a)pyrene	50-32-8	1.05E-07	Calpuff	3.38E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 7, 19, Table 2, 3, URT - Note 4, Table 4)	13/12/2016
Benzo(a)pyrene	50-32-8	1.05E-07	Calpuff	1.08E-07	24-hour	0.005	—	Sch. 6	URT	—	<1%	—	13/12/2016
Benzo(a)pyrene	50-32-8	1.05E-07	Calpuff	3.38E-09	Annual	0.0001	—	—	AAV	—	<1%	—	13/12/2016
Benzo(b)fluoranthene	205-99-2	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Benzo(b)fluorene	243-17-4	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Benzo(e)pyrene	192-97-2	4.98E-07	Calpuff	5.11E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Benzo(g,h,i)perylene	191-24-2	1.60E-06	Calpuff	1.65E-06	24-hour	1.2	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Benzo(k)fluoranthene	207-08-9	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Beryllium	7440-41-7	1.71E-06	Calpuff	1.76E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	—	13/12/2016
Biphenyl	92-51-3	2.55E-07	Calpuff	2.62E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Boron	7440-42-8	—	Calpuff	#VALUE!	24-hour	120	Particulate	Sch. 3	Standard	B1	#VALUE!	—	13/12/2016
Bromodichloromethane	75-27-4	1.51E-05	Calpuff	1.55E-05	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Bromoform	75-25-2	1.51E-05	Calpuff	1.55E-05	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
Bromomethane	74-83-9	1.36E-04	Calpuff	1.39E-04	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
Cadmium	7440-43-9	1.63E-06	Calpuff	1.67E-06	24-hour	0.025	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Cadmium	7440-43-9	1.63E-06	Calpuff	1.67E-06	24-hour	0.25	—	Sch. 6	URT	—	<1%	—	13/12/2016
Carbon Monoxide	630-08-0	4.62E-01	Calpuff	1.09E+01	1/2-hour	6000	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 9)	13/12/2016
Carbon tetrachloride	56-23-5	1.51E-05	Calpuff	1.55E-05	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	ACB List (Note URT - Note 4, Table 4)	13/12/2016
Carbon tetrachloride	56-23-5	1.51E-05	Calpuff	1.55E-05	24-hour	24	—	Sch. 6	URT	—	<1%	—	13/12/2016
Chloroform	67-66-3	1.51E-05	Calpuff	1.55E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Chloroform	67-66-3	1.51E-05	Calpuff	1.55E-05	24-hour	100	—	Sch. 6	URT	—	<1%	—	13/12/2016
Chromium (hexavalent)	18540-29-9	3.34E-05	Calpuff	3.43E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Chrysene	218-01-9	9.33E-08	Calpuff	9.58E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Cobalt	7440-48-4	3.38E-06	Calpuff	3.47E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MOECC POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark*	Percentage of MOECC Limit [%]	Notes	Version of Date of ACB List
Copper	7440-50-8	5.83E-05	Calpuff	5.98E-05	24-hour	50	Health	Sch. 3	Standard	B1	<1%	—	13/12/2016
Dibenzo(a,c)anthracene	215-58-7	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Dibenzo(a,h)anthracene	53-70-3	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Dichlorodifluoromethane	75-71-8	3.02E-05	Calpuff	3.10E-05	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	ACB List (Note 10)	13/12/2016
Dichloroethene, 1,1 -	75-34-3	2.81E-05	Calpuff	2.89E-05	24-hour	165	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Dichloroethene, 1,1 -	75-34-3	2.81E-05	Calpuff	2.89E-05	24-hour	1650	—	Sch. 6	URT	—	<1%	—	13/12/2016
Dichloromethane	75-09-2	9.04E-04	Calpuff	9.28E-04	24-hour	220	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Dichloromethane	75-09-2	9.04E-04	Calpuff	9.28E-04	24-hour	22000	—	Sch. 6	URT	—	<1%	—	13/12/2016
Dioxins, Furans and Dioxin- like PCBs	N/A	3.40E-10	Calpuff	3.49E-10	24-hour	0.0000001	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 8, 8a, Table 1, URT - Note 4, Table 4)	13/12/2016
Ethylbenzene	100-41-4	1.52E-05	Calpuff	1.56E-05	24-hour	1000	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Ethylbenzene	100-41-4	1.52E-05	Calpuff	4.92E-04	10-minute	1900	Odour	Sch. 3	Guideline	B1	<1%	ACB List (Note 2, 3)	13/12/2016
Ethylbenzene	100-41-4	1.52E-05	Calpuff	1.56E-05	24-hour	10000	—	Sch. 6	URT	—	<1%	—	13/12/2016
Ethylene Dibromide	106-93-4	3.02E-05	Calpuff	3.10E-05	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
Fluoranthene	206-44-0	5.13E-07	Calpuff	5.26E-07	24-hour	140	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Fluorides	7664-39-3	4.16E-03	Calpuff	4.27E-03	24-hour	0.86	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	4.16E-03	Calpuff	4.85E-04	30-day	0.34	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	4.16E-03	Calpuff	4.27E-03	24-hour	1.72	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	4.16E-03	Calpuff	4.85E-04	30-day	0.69	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	4.16E-03	Calpuff	4.27E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorides	7664-39-3	4.16E-03	Calpuff	4.85E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2, 20)	13/12/2016
Fluorine	86-73-7	1.88E-07	Calpuff	1.93E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Formaldehyde	50-00-0	1.36E-03	Calpuff	1.40E-03	24-hour	65	Health	Sch. 3	Standard	B1	<1%	—	13/12/2016
Hexachlorobenzene	118-74-1	6.23E-08	Calpuff	6.40E-08	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Hexachlorobenzene	118-74-1	6.23E-08	Calpuff	6.40E-08	24-hour	0.01	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Hydrogen Chloride	7647-01-0	1.53E-01	Calpuff	1.57E-01	24-hour	20	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Hydrogen Chloride	7647-01-0	1.53E-01	Calpuff	1.57E-01	24-hour	200	—	Sch. 6	URT	—	<1%	—	13/12/2016
Indeno(1,2,3 – cd)pyrene	193-39-5	4.67E-07	Calpuff	4.80E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Lead	7439-92-1	1.59E-05	Calpuff	1.63E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Lead	7439-92-1	1.59E-05	Calpuff	1.85E-06	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Lead	7439-92-1	1.59E-05	Calpuff	1.63E-05	24-hour	2	—	Sch. 6	URT	—	<1%	—	13/12/2016
Manganese	7439-96-5	4.66E-05	Calpuff	4.79E-05	24-hour	0.4	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Manganese	7439-96-5	4.66E-05	Calpuff	4.79E-05	24-hour	4	—	Sch. 6	URT	—	<1%	—	13/12/2016
Mercury	7439-97-6	7.74E-06	Calpuff	7.95E-06	24-hour	2	Health	Sch. 3	Standard	B1	<1%	—	13/12/2016
Molybdenum	7439-98-7	1.82E-04	Calpuff	1.87E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	—	13/12/2016
Naphthalene	91-20-3	1.10E-06	Calpuff	1.13E-06	24-hour	22.5	Health	Sch. 3	Guideline	B1	<1%	ACB List (Note 2, 3)	13/12/2016
Naphthalene	91-20-3	1.10E-06	Calpuff	3.57E-05	10-minute	50	Odour	Sch. 3	Guideline	B1	<1%	ACB List (Note 2, 3)	13/12/2016
Nickel	7440-02-0	3.95E-05	Calpuff	1.27E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 19, Table 2, 3, URT - Note 4, Table 4)	13/12/2016
Nickel	7440-02-0	3.95E-05	Calpuff	4.06E-05	24-hour	2	—	Sch. 6	URT	—	<1%	—	13/12/2016
Nickel	7440-02-0	3.95E-05	Calpuff	1.27E-06	Annual	0.4	—	—	AAV	—	<1%	—	13/12/2016
Nitrogen Oxides	10102-44-0	4.27E+00	Calpuff	4.39E+00	24-hour	200	Health	Sch. 3	Standard	B1	2%	ACB List (Notes 2, 17)	13/12/2016
Nitrogen Oxides	10102-44-0	4.27E+00	Calpuff	8.39E+01	1-hour	400	Health	Sch. 3	Standard	B1	21%	ACB List (Notes 2, 17)	13/12/2016
O-terphenyl	84-15-1	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
PM_{10} (Condensable and Filterable)	N/A	1.82E-01	Calpuff	1.21	24-hour	50	—	—	AAQC	—	2%	—	13/12/2016
PM_{10} (Filterable Only)	N/A	9.54E-03	Calpuff	1.04	24-hour	50	—	—	AAQC	—	2%	—	13/12/2016
$PM_{2.5}$ (Condensable and Filterable)	N/A	1.76E-01	Calpuff	1.21	24-hour	30	—	—	AAQC	—	4%	—	13/12/2016
$PM_{2.5}$ (Filterable Only)	N/A	4.13E-03	Calpuff	1.03	24-hour	30	—	—	AAQC	—	3%	—	13/12/2016
Pentachlorobenzene	608-93-5	6.23E-08	Calpuff	6.40E-08	24-hour	3	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Pentachlorophenol	87-86-5	3.12E-07	Calpuff	3.20E-07	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
Perylene	198-55-0	6.23E-08	Calpuff	6.40E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Phenanthrene	85-01-8	1.03E-06	Calpuff	1.05E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Pyrene	129-00-0	8.37E-07	Calpuff	8.60E-07	24-hour	0.2	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Selenium	7782-49-2	8.56E-06	Calpuff	8.78E-06	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	—	13/12/2016
Silver	7440-22-4	1.71E-06	Calpuff	1.76E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	—	13/12/2016

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period	MOECC POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark*	Percentage of MOECC Limit [%]	Notes	Version of Date of ACB List
Sulphur Dioxide	7446-09-5	5.73E-02	Calpuff	5.88E-02	24-hour	275	Health & Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2)	13/12/2016
Sulphur Dioxide	7446-09-5	5.73E-02	Calpuff	1.12E+00	1-hour	690	Health & Vegetation	Sch. 3	Standard	B1	<1%	ACB List (Note 2)	13/12/2016
Tetrachloroethene	127-18-4	1.78E-05	Calpuff	1.83E-05	24-hour	360	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Tetrachloroethene	127-18-4	1.78E-05	Calpuff	1.83E-05	24-hour	3600	—	Sch. 6	URT	—	<1%	—	13/12/2016
Tetralin	119-64-2	1.68E-06	Calpuff	1.72E-06	24-hour	1200	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Thallium	7440-28-0	1.71E-06	Calpuff	1.76E-06	24-hour	0.24	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	13/12/2016
Toluene	108-88-3	8.47E-05	Calpuff	8.70E-05	24-hour	2000	Odour	Sch. 3	Guideline	B1	<1%	ACB List (To be updated - Note 5)	13/12/2016
Total Chromium (and compounds)	7440-47-3	3.34E-05	Calpuff	1.08E-06	Annual	0.00014	Health	Sch. 3	Standard	B1	<1%	ACB List (Notes 11, 19, Table 2, 3, URT - Note 4, Table 4)	13/12/2016
Total Chromium (and compounds)	7440-47-3	3.34E-05	Calpuff	3.43E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 11a, URT - Note 4, Table 4)	13/12/2016
Total Chromium (and compounds)	7440-47-3	3.34E-05	Calpuff	3.43E-05	24-hour	5	—	Sch. 6	URT	—	<1%	—	13/12/2016
Total Chromium (and compounds)	7440-47-3	3.34E-05	Calpuff	3.43E-05	24-hour	0.07	—	Sch. 6	URT	—	<1%	—	13/12/2016
Total Chromium (and compounds)	7440-47-3	3.34E-05	Calpuff	1.08E-06	Annual	0.0014	—	—	AAV	—	<1%	—	13/12/2016
Total Particulate Matter (Condensable and Filterable)	N/A	2.11E-01	Calpuff	1.24	24-hour	120	Visibility	Sch. 3	Standard	B1	1%	—	13/12/2016
Total Particulate Matter (Filterable only)	N/A	3.93E-02	Calpuff	1.07	24-hour	120	Visibility	Sch. 3	Standard	B1	<1%	—	13/12/2016
Trichloroethane, 1,1,1 -	71-55-6	2.53E-05	Calpuff	2.59E-05	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	—	13/12/2016
Trichloroethene	86-42-0	1.51E-05	Calpuff	1.55E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	13/12/2016
Trichloroethylene, 1,1,2 -	79-01-6	1.78E-05	Calpuff	1.83E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Trichloroethylene, 1,1,2 -	79-01-6	1.78E-05	Calpuff	1.83E-05	24-hour	1200	—	Sch. 6	URT	—	<1%	—	13/12/2016
Trichlorofluoromethane	75-69-4	3.02E-05	Calpuff	3.10E-05	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	ACB List (Note 10)	13/12/2016
Vanadium	7440-62-2	8.56E-07	Calpuff	8.78E-07	24-hour	2	Health	Sch. 3	Standard	B1	<1%	—	13/12/2016
Vinyl chloride	75-01-4	3.02E-05	Calpuff	3.10E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	ACB List (URT - Note 4, Table 4)	13/12/2016
Vinyl chloride	75-01-4	3.02E-05	Calpuff	3.10E-05	24-hour	100	—	Sch. 6	URT	—	<1%	—	13/12/2016
Xylenes, m-, p- and o-	1330-20-7	6.20E-05	Calpuff	6.36E-05	24-hour	730	Health	Sch. 3	Standard	B1	<1%	ACB List (Note 2, URT - Note 4, Table 4)	13/12/2016
Xylenes, m-, p- and o-	1330-20-7	6.20E-05	Calpuff	2.01E-03	10-minute	3000	Odour	Sch. 3	Guideline	B1	<1%	ACB List (Note 2, 3)	13/12/2016
Xylenes, m-, p- and o-	1330-20-7	6.20E-05	Calpuff	6.36E-05	24-hour	7300	—	Sch. 6	URT	—	<1%	—	13/12/2016
Zinc	7440-66-6	1.61E-04	Calpuff	1.66E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	—	13/12/2016

*The MOECC has recently updated the list of standards and guidelines for facilities to assess their emissions against, namely the Air Contaminants Benchmark (ACB) List, dated December 2016, which includes standards and guidelines (Benchmark 1 or B1) and screening levels (Benchmark 2 or B2)