Durham York Energy Centre

ECA 7306-8FDKNX

2019 Annual Report

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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 2019 Durham York Energy Centre ("DYEC") Annual Report, covering operations during the 2019 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** 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: Annual Report Requirements

ECA Condition 15	Section
By March 31st following the end of each operating year, the Owner shall prepare and submit to the District Manager and to the Advisory Committee, an Annual Report summarizing the operation of the Site covering the previous calendar year. This Annual Report shall include, as a minimum, the following information:	N/A
(a) a summary of the quality and the quantity of the Wastes accepted at the Site, including the maximum amount of the Waste received annually and daily and the sources of the Waste;	2
(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
(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;	N/A
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:	N/A
14.(3)(a) date of record and the name and signature of the person	Onsite

	completing the report;	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
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:		N/A
14.(4)(a)	day and time of the activity;	Onsite 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 3, Appendix 4
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
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 Appendix 5
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; (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.	2.4
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		10 Appendix 6

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.	
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 Certificate.	13
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	15

the following: (a) date of training; (b) name and signature of person who has been trained; and (c) description of the training provided	
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 3, Appendix 4
(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;	5.6
(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;	11
(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
(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, Conservation and Parks (MECP) for the 2019 reporting year, refer *to* Appendix 1: MECP 2019 EA/ECA Report Submittals.

1.1. Statement of Compliance

During the 2019 calendar year, the DYEC operated in full compliance with the ECA except for two events described in Section 5.3 Excursions from Performance Requirements (Schedule C).

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 at the curb and then sent to a transfer station for inspecting and reloading into a 53-foot highway hauler. The following transfer stations then deliver the waste to the DYEC.

Regional Municipality of Durham

Miller Waste Systems - Pickering

Miller Waste Systems – Whitby

Waste Management - Courtice

Regional Municipality of York

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 2019, DYEC received 139,271 net tonnes of waste. Refer to **Table 2.**

Table 2: Municipal Solid Waste (MSW) Material Balance (Tonnes)

Month	Durham	York	Total MSW Received	Rejected / Unacceptable MSW	Net MSW Received	Estimated Maximum Daily Onsite Storage
January	10739	2998	13737	0.36	13737	2518
February	8038	2787	10826	0.00	10826	1708
March	4981	1758	6739	0.23	6739	1691
April	9338	2671	12009	0.00	12009	2592
May	10810	2827	13636	0.00	13636	2883
June	8532	2756	11288	0.08	11288	2405
July	9770	2899	12669	0.00	12669	2300
August	9461	2784	12246	0.00	12246	2648
September	7147	2206	9353	0.17	9353	2395
October	9660	2817	12477	0.00	12477	2412

Month	Durham	York	Total MSW Received	Rejected / Unacceptable MSW	Net MSW Received	Estimated Maximum Daily Onsite Storage
November	9723	2585	12309	0.00	12309	2593
December	9208	2777	11985	2.27	11983	1963
Total	**107407**	**31867**	**139274**	**3.11**	**139271**	**-**

Note: All weights are recorded in tonnes and rounded to whole numbers except for Rejected/Unnacceptable MSW

The quantity of waste thermally treated in the Boilers during 2019 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 1,047.57 tonnes on December 27th, 2019.

Condition 2(5)(a) limits the maximum amount of waste that can be stored in the Waste pit to 7,350 cubic metres. The greatest amount of waste stored in the Waste Pit was approximately 2,883 tonnes (approximately 6,947 m^3) on May 24th, 2019. (MSW density = 415 kg/m^3)

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 Unprocessable Items and Unacceptable Waste

2.4.1. 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 when the LFM-3 system detects elevated radiation. All records associated with the radiation monitoring of incoming waste are stored and available at the DYEC. There were no loads rejected from the Facility due to radiation during 2019.

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) and a dedicated tote outside the Tipping Floor. On June 11th, 2018, the MECP was notified that a recently completed external fire safety inspection required that compressed gas cylinders removed from the incoming waste be stored outside of the Tipping Floor in a secure cage. On June 13th, 2018, the local Environmental Officer attended the site to review the location of the secure cage. 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 MECP District Manager dated January 9th, 2015, allows the DYEC to extend this storage to 90 days per Reg 347 made under the Environmental Protection Act, R.S.O. 1990. During 2019, five (5) 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).

2.4.2. Bulky Unprocessable Items

Bulky Unprocessable Items mean the incoming Waste received at the Site that cannot be processed in the Equipment. One shipment of Bulky Unprocessable

Items was removed from the Facility on December 23rd, 2019. This shipment included oversized items such as hot tubs, plastic totes and pipes. Refer to **Table 3** for tonnages, manifest numbers and shipment dates for 2019.

Table 3: Rejected Waste

Date	Category	Manifest Number	Tonnes
Jan 4, 2019	Unacceptable	CE45250-7	0.36
Mar 29, 2019	Unacceptable	CE64885-6	0.23
June 21, 2019	Unacceptable	N/A	0.08
Sept 17, 2019	Unacceptable	CF075369-3	0.17
Dec 20, 2019	Unacceptable	CF074960-0	0.4
Dec 23, 2019	Bulky Unprocessable	N/A	1.87
Total	N/A	N/A	3.11

Note: June 21, 2109 removal of Unacceptable Waste did not require a manifest. Items were not hazardous.

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

Bulky Unprocessable Items 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 MECP 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 Walker Industries, South 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) 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 process was repeated on an annual basis, until the compliance testing results indicated that the bottom ash met the "incinerator ash" definition from Reg 347 for three (3) consecutive years. In 2017, the annual CASTP entered the triennial phase. The next CASTP is targeted for fall 2020.

A statistical analysis of the data is used to determine if the bottom ash has less than 10% combustible materials. This statistical evaluation 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 is performed. The results are "rolled up" with the data collected subsequently to and including the last CASTP and evaluated in accordance with statistical procedures. The last CASTP was November 11th to November 15th, 2017. The quarterly sample dates for 2019 were February 5th, May 14th, July 16th, and November 6th.

The results in 2019 demonstrated that the bottom ash met the "incinerator ash" definition from Reg 347 and that it could be managed as a non-hazardous solid waste.

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

3.1.2. Fly Ash

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

During 2019, the DYEC was in the post commissioning triennial phase of fly ash testing. The last CASTP was October 28th to November 1st, 2017 inclusive. The next CASTP is targeted for fall 2020.

There were no shipments of untreated fly ash from the Facility during 2019.

3.2. Metals

Ferrous and non-ferrous metals were sent for recycling at 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 4.**

3.3. Residual Waste – Material Balance

ECA 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 4** and **Table 5.**

Table 4: Residual Waste Shipments (Tonnes)

Limit/Month	Bottom Ash	Fly Ash	Ferrous	Non-Ferrous
January	2873	1121	424	48
February	2014	868	326	44
March	1405	594	177	31
April	1993	1079	274	34
May	2313	1078	387	36
June	2336	1065	309	34
July	2367	1210	283	50
August	2131	1150	289	13
September	1740	1002	290	59
October	2127	1101	323	43
November	2201	1269	342	36
December	2278	1061	308	48
Total	**25778**	**12598**	**3732**	**476**

Note: All weights are rounded to whole numbers.

Table 5: Residual Waste Daily Maximum Storage (Tonnes)

Limit/Month	Bottom Ash	Fly Ash	Ferrous	Non-Ferrous
January	220	156	35	18
February	208	137	54	16
March	173	72	39	16
April	223	135	32	18
May	193	102	44	20
June	221	117	34	34
July	228	139	38	18
August	178	106	46	13
September	197	79	33	40
October	233	140	34	23
November	219	127	60	19
December	247	78	29	17
Total	**630**	**700**	**77**	**120**

Note: All weights are 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. Wastewater 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 2019, approximately 31,351 m^3 of water was drawn from the municipal water system.

4.2. Electricity

During 2019, the turbine generated 114,066 MWh of electricity of which 96,734 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, perform 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), oxygen (O_2), sulphur dioxide (SO_2), nitrogen oxides (NO_x), ammonia (NH_3), hydrogen chloride (HCl), hydrogen fluoride (HF), total hydrocarbons / organic matter (THC), temperature 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 (induced draft) Fan inlet duct for each Boiler. Records of daily minimum and maximum average readings for CO (4-hour average); O_2 and temperature (one-hour average); organic matter (10-minute average); SO_2, NO_x, and HCl (24-hour average); and opacity (6-minute and 2-hour average) are available at the site. Refer to Table 6 and Table 7 for Annual Emission Summaries.

A Relative Accuracy Test Audit ("RATA") and associated system bias evaluations were completed July 17th and July 18th, 2019 for Boiler 1 and Boiler 2 respectively. 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.

Table 6: Boiler 1 Annual Emission Summary

Parameters	Averaging Periods	Units	Approval Limit	Minimum	Maximum	Average
Carbon Monoxide	4-hour rolling	mg/Rm^3	40	0	37	12
Opacity	2-hour rolling	%	5	0	1	0
Opacity	6-minute rolling	%	10	0	2	0
Oxygen	1-hour	%	>6	7	22	8
Sulphur Dioxide	24-hour	mg/Rm^3	35	0	9	0
Nitrogen Oxides	24-hour	mg/Rm^3	121	107	115	111
Hydrogen Chloride	24-hour	mg/Rm^3	9	0	5	2
Combustion Temperature	1-hour	ºC	>1000	1056	1425	1217
Baghouse Temperature	1-hour	ºC	>120 and <185	130	155	143
Organic Matter (THC)	10-minute	mg/Rm^3	NA	0	23	0

NOTE: Compliance of Organic Matter (THC) is monitored during source testing.

Table 7: Boiler 2 Annual Emission Summary

Parameters	Averaging Periods	Units	Approval Limit	Minimum	Maximum	Average
Carbon Monoxide	4-hour rolling	mg/Rm^3	40	3	55	13
Opacity	2-hour rolling	%	5	0	2	0
Opacity	6-minute rolling	%	10	0	3	0
Oxygen	1-hour	%	>6	6	12	8
Sulphur Dioxide	24-hour	mg/Rm^3	35	0	13	1
Nitrogen Oxides	24-hour	mg/Rm^3	121	102	116	111
Hydrogen Chloride	24-hour	mg/Rm^3	9	0	7	3
Combustion Temperature	1-hour	ºC	>1000	1068	1534	1251
Baghouse Temperature	1-hour	ºC	>120 and <185	131	155	143
Organic Matter (THC)	10-minute	mg/Rm^3	NA	0	33	0

NOTE: Compliance of Organic Matter (THC) is monitored during source testing

[1] See Section 5.3 Excursions from Performance Requirements (Schedule C) for discussion.

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 boiler 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 2019 was calculated for each Boiler for each calendar quarter and confirmed to be greater than 95%. Refer to **Table 8**.

Table 8: Continuous Emissions Monitoring Systems Analyzer Availability (%)

Boiler 1	O_2e	SO_2	HCl	NO_x	CO	Opacity	THC	Combustion Temperature
Quarter 1	96	99	100	100	100	100	99	100
Quarter 2	100	99	99	99	99	100	99	100
Quarter 3	100	100	100	100	100	100	99	100
Quarter 4	100	100	99	100	100	100	99	100

Boiler 2	O_2e	SO_2	HCl	NO_x	CO	Opacity	THC	Combustion Temperature
Quarter 1	100	100	100	100	100	100	99	100
Quarter 2	100	99	99	99	99	100	97	100
Quarter 3	100	97	97	96	97	100	96	100
Quarter 4	100	98	98	98	98	100	98	100

Note: O_2e means O_2 measured at the Economizer Outlet.

5.3. Excursions from Performance Requirements (Schedule C)

Schedule C of the ECA states the In-Stack Emission Limit for carbon monoxide is 40 mg/Rm^3 calculated as the rolling arithmetic average of four (4) hours of data measured by a CEM System that provides data at least once every fifteen minutes, in accordance with Condition 6(2)(c).

On May 4th, 2019 during the 3:00 am hour, the four-hour carbon monoxide (CO) rolling average on Boiler 2 was recorded as 45 mg/Rm^3. Boiler 2 experienced a temperature and steam flow reduction followed by an over-feeding condition due to wet refuse.

On July 20th, 2019 during the 11:00 pm hour, the four-hour carbon monoxide (CO) rolling average on Boiler 2 was recorded as 55 mg/Rm^3. A power fault at the Wilson Road substation lead to a site wide power outage at the DYEC. Both boilers tripped as a direct result, leading to poor combustion conditions before they could be taken off-line. Boiler 2 exceeded its approval limit during this time.

5.4. Excursions from Performance Requirements (Condition 6)

During 2019, there were no excursions to Performance Requirements as listed in Condition 6.

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 June 25th and June 28th, 2019 to satisfy the requirement put forth by Durham Region Council to perform emission testing twice per year.

Voluntary source testing was performed on the Baghouse Outlets of both Boiler 1 and Boiler 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**.

Table 9: Voluntary Source Test Summary

Parameter	Limit	Boiler 1	Boiler 2
Total Suspended Particulate Matter (filterable)	9 mg/Rm^3	<0.62	<0.38
Cadmium	7 µg/Rm^3	0.10	0.083
Lead	50 µg/Rm^3	0.59	0.46
Mercury	15 µg/Rm^3	0.35	<0.097

Parameter	Limit	Boiler 1	Boiler 2
Dioxins and Furans	60 pg/Rm^3	<4.55	<4.58
Organic Matter	50 ppmdv	1.8	0.5
Hydrochloric Acid	9 mg/Rm^3	1.9	4.2
Sulphur Dioxide	35 mg/Rm^3	0.03	0.02
Nitrogen Dioxinde	121 mg/Rm^3	110	110
Carbon Monoxide	40 mg/Rm^3	13.1	12.2

Note: 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 3.

5.5.2. Compliance Source Test

Ortech Consulting Inc. completed an emission testing program at the DYEC between September 9th and September 13th, 2019 to satisfy the requirements of ECA Condition 7(1).

Source testing was performed on the Baghouse Outlets of both Boiler 1 and Boiler 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 10.**

Table 10: Compliance Source Test Summary

Parameter	Limit	Boiler 1	Boiler 2
Total Suspended Particulate Matter	9 mg/Rm^3	<0.61	<0.54

Parameter	Limit	Boiler 1	Boiler 2
Cadmium	7 µg/Rm^3	0.18	0.080
Lead	50 µg/Rm^3	0.54	0.57
Mercury	15 µg/Rm^3	0.29	<0.097
Dioxins and Furans	60 pg/Rm^3	<1.51	<3.24
Organic Matter	50 ppmdv	0.8	0.3
Hydrochloric Acid	9 mg/Rm^3	3.0	5.1
Sulphur Dioxide	35 mg/Rm^3	0.0	0.01
Nitrogen Dioxinde	121 mg/Rm^3	111	110
Carbon Monoxide	40 mg/Rm^3	11.2	12.1

Note: 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 4.

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

The long-term Dioxin and Furan sampling system, referred to as the AMESA (Adsorption Method for the Sampling of dioxins and furans) samplers, were installed as required by ECA Condition 7(3)(a). During 2019, these AMESA samplers were operated to collect additional validation data during short-term sampling periods as well as to collect data for performance evaluation during long term sampling (28 +/- day periods) as DYEC operations allow.

On September 9th through September 13th, 2019, the DYEC conducted its annual stack testing, as required by the ECA. As part of this testing scope, sampling was performed for Dioxin and Furans using Reference Method Environment Canada Method EPS 1/RM/2. In order to continue the evaluation of the AMESA continuous

Dioxin / Furan sampler, in accordance with the AMESA Work Plan 2018, the AMESA was operated concurrently with the above noted reference method sampling. One AMESA sampling run was completed concurrently during the full duration of performing three reference method sampling runs, on each Boiler. This allows for the comparison of the average of the three reference method runs, to the single AMESA sampling run result for each Boiler. A summary of this AMESA evaluation data for Boiler 1 and Boiler 2 is provided below in **Table 11.** Note that reference method results for both Boilers are very consistent between runs. In comparison, the deviation of AMESA results to the reference method fall far short of BSI CEN/TS 1948-5 standard referenced by the Work Plan.

Table 11: AMESA Results in Comparison to Reference Method

Sampling Location and Methods		pg TEQ/Rm^3 @11% O2 [(a)]	Deviation Percentage
Boiler 1	Reference Method Mean	<1.51	319
	AMESA Monitor	6.33	
Boiler 2	Reference Method Mean	<3.24	829
	AMESA Monitor	30.1	

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)

From September 13th to November 18th there were no traps in the system due to a series of mechanical failures, consisting of a malfunctioned AMESA control board on Unit 1 and failures on both sample chillers. Replacement parts were sourced and both AMESA units were returned to operation on November 18th.

Once the AMESA sampler generates more consistent data, long term data will be used to assess trends and the ongoing performance of the air pollution control

system. All measurements obtained from the AMESA sampler, whether from short term or long-term sampling periods, are not used for verifying compliance with the approval limit for dioxins and furans in conformance with "Schedule C" of the ECA.

5.6.1. Isokinetic Testing

During the Compliance Source Test in September, isokinetic tests were performed in accordance with the AMESA Workplan 2018. This testing is performed to compare the velocity of the gas in the stack to the velocity of the gas entering the AMESA probe nozzle tip. The average velocity measured during six semi-volatile organic compounds (SVOC) tests was compared to the velocity recorded by the AMESA Dioxin and Furan sampling monitor for approximately the same time period for both Boiler 1 and Boiler 2.

This velocity comparison demonstrated that the AMESA system continues to collect samples in conformance with isokinetic standards. The isokinetic ratio for Boiler 1 and Boiler 2 was determined to be 104.6% and 101.3% respectively, well within the required range of 95 to 115%.

6. Ambient Air Monitoring

Ambient air monitoring is a requirement of the EA Condition 11 and the ECA Condition 7(4). Ambient air monitoring is undertaken in accordance with the Ambient Air Monitoring Plan approved by the MECP in May 2012. There are two 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. For a summary list of the ambient air monitoring stations and monitoring parameters, refer to **Table 12**. See Appendix 5 for ambient air monitoring station locations.

Table 12: Ambient Air Monitoring Program Summary

Monitoring Station	Meteorological Data	Continuous Parameters	Non-Continuous Parameters
Upwind (Courtice (WPCP)	• Wind speed and direction (@20 metres) • Ambient temperature • Relative humidity • Rainfall • Barometric Pressure	• Sulfur Dioxide (SO_2) • Nitrogen Dioxide (NO_2) • Particulate Matter ($PM_{2.5}$)	• Metals • Total Suspended Particulate Matter (TSP) • Polycyclic Aromatic Hydrocarbons (PAH's) • Dioxins and Furans
Downwind (Baseline and Rundle Road)	• Wind speed and direction (@20 metres) • Ambient temperature • Relative humidity • Rainfall	• Sulfur Dioxide (SO_2) • Nitrogen Dioxide (NO_2) • Particulate Matter ($PM_{2.5}$)	• Metals • Total Suspended Particulate Matter (TSP) • Polycyclic Aromatic Hydrocarbons (PAH's) • Dioxins and Furans

Quarterly and annual ambient air reports have been submitted to the MECP 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 2019 Annual Ambient Air Monitoring report is due to the MECP by May 15th, 2020. All reports are publicly available on the DYEC website in accordance with ECA Condition 7(4)(c).

All contaminants were below their applicable MECP criteria as well as applicable Human Health Risk Assessment (HHRA) health-based standards with exceptions listed below in **Table 13.**

Table 13: Ambient Air Monitoring Quarterly Summary of Exceedances

2019 Quarter 1	2019 Quarter 2	2019 Quarter 3	2019 Quarter 4
There were no exceedances in the first quarter of 2019.	May 9, 2019 at Courtice Station – Total Suspended Particulate Matter (TSP)	There were no exceedances in the third quarter of 2019.	November 17, 2019 at Courtice and Rundle – Benzo(a)pyrene December 23, 2019 at Courtice and Rundle – Benzo(a)pyrene

A review of the stack continuous emissions monitoring data on May 9, 2019, indicated that there were no unusual emission levels from the DYEC and it was determined that the elevated ambient TSP concentration was unlikely the result of emissions from the DYEC.

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 above were well below the MECP Schedule 6 Upper Risk Threshold and the MECP 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 MECP. Acknowledgement was received from the MECP on September 21st, 2017.

The revised report recommended the removal of the requirement to conduct annual acoustic measurements. This requirement was revoked by the MECP 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 MECP.

An annual review of the Noise Monitoring and Reporting Plan was completed in July 2019. No modifications to the Plan were required.

8. Soil Testing

Soil testing is required under ECA Conditions 7(10), 13(4) and 15(4) and is undertaken in accordance with the Durham York Energy Centre Soils Testing Plan approved by the MECP 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 ECA Condition 13(4)(a) 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 MECP Regional Director advising that soil monitoring is no longer required.

The most recent soils testing event was carried out on August 23rd, 2017. The next soil testing event is scheduled to be undertaken in August 2020.

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 MECP in October 2011. The monitoring program started in December 2011, prior to the commencement of facility operations to collect background water quality data.

9.1. 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 MECP 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 from 2017-2019. Monitoring requirements will be reevaluated after the completion of the 401/418 interchange construction activities and in consultation with the MECP.

9.2. Groundwater Monitoring Results

Groundwater samples are collected through a series of dedicated on-site monitoring wells. For the 2019 monitoring events, the groundwater analytical results for the required parameters of analysis satisfied their respective Ontario Drinking Water Standard, except for select salt-related parameters chloride and sodium within the groundwater at monitoring well MW4. Based on the interpreted groundwater flow direction and the analytical results for chloride and sodium at downgradient monitoring wells in closer proximity to the DYEC facility, there is no indication that the elevated 2019 concentrations of chloride and sodium within the groundwater at MW4 migrated downgradient as a result of DYEC waste treatment operations. The elevated concentrations of chloride and sodium detected at MW4 in 2019 are

interpreted to be attributed to the exfiltration of seasonally impacted salt-related runoff collected at the east stormwater management pond.

An interpretive analysis for the 2019 groundwater and surface water monitoring activities will be discussed in the pending groundwater and surface water annual report. This report, covering the 2019 monitoring period, will be submitted to the MECP by April 30th, 2020, in accordance with the "Submission of Groundwater Well Development" letter dated January 28th, 2013 and the MECP acknowledgment letter dated March 4th, 2013.

Further discussion on the assessment of the monitoring plan and the need for amendments for 2019 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 MECP. Refer to **Table 14** for the groundwater well and in-situ surface water sonde locations and parameters tested.

Table 14: Groundwater and Surface Water Monitoring Program Summary

Groundwater Well ID	Groundwater Well Location	Monitoring Parameters
MW1	Northwest corner of site	Field Measurements, Major Anions, Major Cations, Metals
MW2A & 2B (nested)	Northeast corner of site	Field Measurements, Major Anions, Major Cations, Metals
MW3A & 3B (nested)	Southwest corner of site	Field Measurements, Major Anions, Major Cations, Metals
MW4	Southeast corner of site	Field Measurements, Major Anions, Major Cations, Metals
MW5 & 5B (nested)	Centre of site	Field Measurements, Major Anions, Major Cations, Metals

Surface Water Sonde ID	Sonde Location	Monitoring Parameters
SW01	Upstream in Tooley Creek	Field Measurements
SW02	Downstream in Tooley Creek	Field Measurements

The 2019 groundwater monitoring activities met the compliance requirements of the EA, the ECA and the approved Groundwater and Surface Water Monitoring Plan. The surface water monitoring activities continued to be suspended in 2019 as a result of on-going construction and the re-alignment of Tooley Creek. 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 buildings 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 15.**

Table 15: Containment Periodic Inspections

Containment Enclosure	Periodic Inspection
Tipping Building	• Calibration of boiler combustion air flow venturi transmitter • Daily inspections for dust odour leaks
Refuse Pit	• Groundwater monitoring
Grizzly and Residue Buildings	• Daily general inspections • Quarterly USEPA Method 22
Ammonia Tank	• Daily general inspections • Annual calibration of alarms
Cement and Pozzolan Silos	• Daily general inspections • Quarterly USEPA Method 22
Diesel Fueling Station	• Daily general visual inspections
Fire Pump Diesel Tanks	• Daily general visual inpsections
Exterior Bottom and Fly Ash Conveyors	• Daily general inspections • Quarterly USEPA Method 22
Settling Basin	• Daily general visual inpsections • Groundwater monitoring

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 2019, scheduled preventative maintenance activities were completed on the Boilers, APC equipment, CEMS and other auxiliary systems. See Appendix 6 for details.

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 (7) years from the date of their creation, 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 2019. No deficiencies were found.

11. Operational Issues and Mitigation Measures

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 Boilers 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 Boilers offline) on the following occasions during 2019.

Date	Duration	Cause
March 18 to April 2	372 hours	Spring Major Outage
April 18	3 hours	Black plant due to Turbine Generator
July 21	15 hours	Utility Power bump leading to black plant
September 21 to September	227 hours	Fall Minor Outage
October 16	15 hours	Utility Power bump leading to black plant
November 12 to November 13	32 hours	Steam line repair

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 2019 with potential to impact the environment.

12. Emergency Situations

There were no reportable spills to land or water during 2019.

Carbon monoxide exceedances to the ECA (spills to air) were reported to the Spills Action Centre on May 4 and July 20. See 5.3 Excursions from Performance Requirements (Schedule C)

There were no other emergency situations during 2019.

13. Complaints and Inquiries

The monitoring of complaints and inquiries is a requirement of the EA Condition 6 and the ECA Condition 10. A Complaint and Inquiry Log submission is provided to the MECP York Durham District Office District Manager monthly in accordance with the "Waste Complaint Protocol for Design, Construction & Operations" approved by the MECP 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 2019 complaints and inquiries is listed in the **Table 16.**

Table 16: Complaint and Inquiry Summary

Year	Durham	York	Covanta	Total
Complaints to DYEC directly	4	0	0	4
Complaints to Regional Councils	12	0	0	12
Inquiries to DYEC directly	23	0	0	23
Inquiries to Regional Councils	6	0	0	6

In conjunction with the local MECP Office, it was determined that all four (4) complaints received directly from the public in 2019 were not related to emissions from the DYEC.

14. Energy from Waste Advisory Committee (EFWAC)

The Energy from Waste Advisory Committee (EFWAC) is a requirement of the EA Condition 8 and the ECA Condition 17. The committee was established in 2011 with membership outlined in the EA Condition 8. The meetings were 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 2019 EFWAC Committee meeting is provided in **Table 17.**

Table 17: EFWAC Meeting Summary

EFWAC Meeting #	Date	Time	Agenda Topics
16	July 10, 2019	2:00-4:00 PM	• Durham York Energy Centre 2018 Annual Compliance Report • Permit Amendment for 160,000 tonnes per year capacity. • Terms of Reference for Possible Future Expansion to 250,000 Tonnes per Year Capacity.

The minutes from the meeting held July 10, 2019 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, 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 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 Boiler 1 dioxin and furan stack test exceedance, there have been 7 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 and 2018, 2019 bottom ash testing results continued to meet the definition of a solid non-hazardous material. The last fly ash testing program was completed between October 28th and November 1st, 2017 inclusive. The next testing program will occur in fall 2020.

Ambient Air

Similar to previous operating years, all contaminants were below their applicable MECP criteria as well as applicable HHRA health-based standards with the exception of benzo(a)pyrene and Total Suspended Particulate (TSP). In 2019, one TSP exceedance was reported at the Courtice station compared to four dates in 2018 recorded at the Rundle Road Station. TSP exceedances in both 2018 and 2019 occurred in May to June timeframe. Benzo(a)pyrene exceeded criteria on two dates in the fourth quarter of

2019 at both the Courtice Road and Rundle Road monitoring stations compared to six days in 2018 in which benzo(a)pyrene exceedances were noted.

Groundwater and Surface Water

Similar to previous years, the 2019 groundwater monitoring activities meet the compliance requirements of the EA, the ECA and the approved Groundwater and Surface Water Monitoring Plan. There were no changes to the surface water monitoring program as it has been suspended since the spring of 2016 as a result of construction activities and the re-alignment of Tooley Creek.

Soil

The most recent soil testing event was carried out in 2017. The next soil testing event is scheduled to be undertaken in August 2020.

Complaints and Inquiries

Complaints were received through Regional Council, the DYEC website and through direct communication. Compared to 2018, complaints increased by 31% and inquires increased by 45% in 2019. Complaints and inquiries continue to be recorded. The increase from 2018 to 2019 results from concerns and inquiries submitted to Durham Regional Council by members of the public related to the proposed DYEC waste capacity increase to process 160,000 tonnes per year.

17. Recommendations for Improvement

17.1. Status of Recommendations from the 2016 Annual Report

Recommendations for 2019

1) Achieve ISO14001:2015 Environmental Management System certification

Status: The DYEC achieved ISO14001:2015 Environmental Management System certification on January 28th, 2018

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

   Status: On December 12th, the 2018 AMESA Long Term Sampling System Work Plan was submitted to the MECP.

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

   Status: The focus for 2019 was overall (net) facility power production, rather than only site power usage. Significant gains were achieved in 2019 and further improvements are expected in 2020. Ammonia usage was successfully reduced without impacting NOX reduction performance. Optimization of reagent usage is continuing into 2020.

17.2. Recommendations for 2020

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

- Maintain ISO14001:2015 Environmental Management System certification.
- Continue to execute the AMESA Work Plan 2018.
- Continue to execute plans to improve overall (net) facility power production.
- Continue to optimize facility operations to decrease reagent consumption while maintaining full compliance with all regulatory limits

Appendix 1

MECP EA/ECA Report Submittals

Appendix 1: MECP EA/ECA Report Submittals

MECP 2019 EA/ECA Report Submittals	
Report Type	**Submission Date**
Ambient Air Monitoring Reports per ECA 7(4)(b), EA 11.7, Operations Manual for AQ Monitoring in Ontario	
2018 Ambient Air Q4 Report	February 14th, 2019
2018 Ambient Air Annual Report	May 15th, 2019
2019 Ambient Air Q1 Report	May 15th, 2019
2019 Ambient Air Q2 Report	August 14th, 2019
2019 Ambient Air Q3 Report	November 14th, 2019
2019 Ambient Air Q4 Report	February 14th, 2020
Annual Report per ECA (15)(1)	
2018 Annual Report	March 29th, 2019
Complaint and Inquiry Logs per ECA 10(1), ECA 10(2), 14(7)	
January Complaint & Inquiry Log	March 25th, 2019
February Complaint & Inquiry Log	July 16th, 2019
March Complaint & Inquiry Log	July 16th, 2019
April Complaint & Inquiry Log	July 16th, 2019
May Complaint & Inquiry Log	July 16th, 2019
June Complaint & Inquiry Log	July 16th, 2019
July Complaint & Inquiry Log	January 16th, 2020
August Complaint & Inquiry Log	January 16th, 2020

September Complaint & Inquiry Log	January 16th, 2020
October Complaint & Inquiry Log	January 16th, 2020
November Complaint & Inquiry Log	February 24th, 2020
December Complaint & Inquiry Log	February 24th, 2020
Compliance Monitoring Report per EA 5.4	
2019 Compliance Monitoring Report	October 31st, 2019
Groundwater and Surface Water Monitoring Reports per ECA 7(14)(b), EA 20.8	
2018 Annual Groundwater and Surface Water Reports	April 30th, 2019
Noise Monitoring and Mitigation Reports- Acoustic Audit Reports per Noise Monitoring Plan	
2019 Acoustic Audit	N/A
Odour Management and Mitigation Monitoring Report per ECA 8(9)(b)	
2019 Odour Management and Mitigation Monitoring Report	November 26th, 2019
Soil Testing Report per ECA 15(4)	
2019 Soil Test Report	N/A
Source Test per ECA 7(1), Schedule E (1), ECA Schedule E (7) and Schedule E (8) respectively	
2019 Source Test Pre-test Plan	July 26th, 2019
2019 Notification to MECP 15 days prior to Source test	July 26th, 2019 (included in pre-test plan submission)
2019 Source Test Report	December 9th, 2019

Third Party Audit Report per ECA 15(3), EA 16	
2019 Third Party Operations Audit	April 30th, 2019
Waste Diversion Monitoring Report per EA 10.4	
2018 Annual Waste Diversion Reports	Durham-October 31st, 2019 York-October 15th, 2019

Appendix 2

Bottom Ash Sampling

COVANTA
Powering Today. Protecting Tomorrow

DURHAM YORK ENERGY CENTRE
SUMMARY OF LABORATORY RESULTS:
BOTTOM ASH - LOSS ON IGNITION (ASTMD5468)
2019

SAMPLE ID NUMBER	SAMPLE DATE	MOISTURE TOTAL (%)	LOSS ON IGNITION (Wt %)
DYEC/BA/190205/SGS-1	5-Feb-19	23.43	0.13
DYEC/BA/190205/SGS-2	5-Feb-19	23.32	0.57
DYEC/BA/190205/SGS-3	5-Feb-19	23.55	0.73
DYEC/BA/190205/SGS-4	5-Feb-19	23.10	0.38
DYEC/BA/190514/SGS-1	14-May-19	13.19	0.90
DYEC/BA/190514/SGS-2	14-May-19	13.08	0.76
DYEC/BA/190514/SGS-3	14-May-19	13.11	0.60
DYEC/BA/190514/SGS-4	14-May-19	13.02	0.43
DYEC/BA/190716/SGS-1	16-Jul-19	12.00	0.68
DYEC/BA/190716/SGS-2	16-Jul-19	11.98	0.63
DYEC/BA/190716/SGS-3	16-Jul-19	12.19	0.62
DYEC/BA/190716/SGS-4	16-Jul-19	11.84	0.66
DYEC/BA/191105/SGS-1	6-Nov-19	15.69	1.59
DYEC/BA/191105/SGS-2	6-Nov-19	15.58	1.57
DYEC/BA/191105/SGS-3	6-Nov-19	15.84	2.41
DYEC/BA/191105/SGS-4	6-Nov-19	15.80	1.77

CONSOLIDATED COMPOSITE SAMPLE STATISTICAL RESULTS

NUMBER OF SAMPLES	16
DEGREES OF FREEDOM	15
SAMPLE MEAN (XBAR)	0.90
SAMPLE VARIANCE (S^2)	0.37
STANDARD DEVIATION (S)	0.61
STD ERROR (S XBAR)	0.15
80% CI Upper Limit (actual)	**1.11**
MAXIMUM	2.41
MINIMUM	0.13
REGULATORY THRESHOLD	**10**

NOTES:

(a) Less than symbol (<) indicates laboratory result below the detection limit.
The value used in this table is the detection limit provided by the laboratory.

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DURHAM YORK ENERGY CENTRE
SUMMARY OF LABORATORY RESULTS:
BOTTOM ASH - LOSS ON IGNITION (ASTMD5468)
Q4 2017 CASTP to Q4 2019

SAMPLE ID NUMBER	SAMPLE DATE	MOISTURE TOTAL (%)	LOSS ON IGNITION (Wt %)
DYEC/BA/171111/SGS-1	13-Nov-17	15.36	< 0.58
DYEC/BA/171111/SGS-2	13-Nov-17	16.03	0.96
DYEC/BA/171111/SGS-3	13-Nov-17	15.78	< 0.58
DYEC/BA/171111/SGS-4	13-Nov-17	15.23	< 0.58
DYEC/BA/171112/SGS-1	13-Nov-17	14.61	< 0.59
DYEC/BA/171112/SGS-2	13-Nov-17	14.73	1.23
DYEC/BA/171112/SGS-3	13-Nov-17	15.03	< 0.59
DYEC/BA/171112/SGS-4	13-Nov-17	15.48	< 0.58
DYEC/BA/171113/SGS-1	14-Nov-17	12.11	0.82
DYEC/BA/171113/SGS-2	14-Nov-17	12.60	< 0.60
DYEC/BA/171113/SGS-3	14-Nov-17	15.06	< 0.59
DYEC/BA/171113/SGS-4	14-Nov-17	12.21	< 0.61
DYEC/BA/171114/SGS-1	15-Nov-17	13.86	< 0.59
DYEC/BA/171114/SGS-2	15-Nov-17	14.05	< 0.59
DYEC/BA/171114/SGS-3	15-Nov-17	14.40	< 0.59
DYEC/BA/171114/SGS-4	15-Nov-17	13.55	< 0.60
DYEC/BA/171115/SGS-1	16-Nov-17	13.65	< 0.60
DYEC/BA/171115/SGS-2	16-Nov-17	13.15	0.63
DYEC/BA/171115/SGS-3	16-Nov-17	13.89	0.99
DYEC/BA/171115/SGS-4	16-Nov-17	13.41	< 0.60
DYEC/BA/180131/SGS-1	1-Feb-18	16.65	< 0.57
DYEC/BA/180131/SGS-2	1-Feb-18	16.56	< 0.58
DYEC/BA/180131/SGS-3	1-Feb-18	16.39	< 0.58
DYEC/BA/180131/SGS-4	1-Feb-18	16.59	< 0.58
DYEC/BA/180515/1SGS	17-May-18	13.07	0.31
DYEC/BA/180515/2SGS	17-May-18	12.78	0.35
DYEC/BA/180515/3SGS	17-May-18	13.06	0.38
DYEC/BA/180515/4SGS	17-May-18	12.64	0.77
DYEC/BA/180717/SGS-1	18-Jul-18	12.99	< 0.60
DYEC/BA/180717/SGS-2	18-Jul-18	10.65	< 0.62
DYEC/BA/180717/SGS-3	18-Jul-18	10.45	< 0.62
DYEC/BA/180717/SGS-4	18-Jul-18	10.63	< 0.62
DYEC/BA/181110/SGS-1	13-Nov-18	17.69	0.57
DYEC/BA/181110/SGS-2	13-Nov-18	17.56	0.57
DYEC/BA/181110/SGS-3	13-Nov-18	17.58	0.57
DYEC/BA/181110/SGS-4	13-Nov-18	17.74	0.57

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DURHAM YORK ENERGY CENTRE
SUMMARY OF LABORATORY RESULTS:
BOTTOM ASH - LOSS ON IGNITION (ASTMD5468)
Q4 2017 CASTP to Q4 2019

SAMPLE ID NUMBER	SAMPLE DATE	MOISTURE TOTAL (%)	LOSS ON IGNITION (Wt %)
DYEC/BA/190205/SGS-1	5-Feb-19	23.43	0.13
DYEC/BA/190205/SGS-2	5-Feb-19	23.32	0.57
DYEC/BA/190205/SGS-3	5-Feb-19	23.55	0.73
DYEC/BA/190205/SGS-4	5-Feb-19	23.10	0.38
DYEC/BA/190514/SGS-1	14-May-19	13.19	0.90
DYEC/BA/190514/SGS-2	14-May-19	13.08	0.76
DYEC/BA/190514/SGS-3	14-May-19	13.11	0.60
DYEC/BA/190514/SGS-4	14-May-19	13.02	0.43
DYEC/BA/190716/SGS-1	16-Jul-19	12.00	0.68
DYEC/BA/190716/SGS-2	16-Jul-19	11.98	0.63
DYEC/BA/190716/SGS-3	16-Jul-19	12.19	0.62
DYEC/BA/190716/SGS-4	16-Jul-19	11.84	0.66
DYEC/BA/191105/SGS-1	6-Nov-19	15.69	1.59
DYEC/BA/191105/SGS-2	6-Nov-19	15.58	1.57
DYEC/BA/191105/SGS-3	6-Nov-19	15.84	2.41
DYEC/BA/191105/SGS-4	6-Nov-19	15.80	1.77

CONSOLIDATED COMPOSITE SAMPLE STATISTICAL RESULTS

NUMBER OF SAMPLES	52
DEGREES OF FREEDOM	51
SAMPLE MEAN (XBAR)	0.71
SAMPLE VARIANCE (S^2)	0.14
STANDARD DEVIATION (S)	0.38
STD ERROR (S XBAR)	0.05
80% CI Upper Limit (actual)	**0.78**
MAXIMUM	2.41
MINIMUM	0.13
REGULATORY THRESHOLD	**10**

NOTES:

(a) Less than symbol (<) indicates laboratory result below the detection limit. The value used in this table is the detection limit provided by the laboratory.

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Durham York Energy Centre
Summary of Plant Operating Conditions
Bottom Ash Sampling - Q4 2017 to Q4 2019

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 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
Q1 - Q4 2018										
Q1 - 31-Jan-18	514	405	1,373	8	5	1	8,135	252	2,634	76
Q2 - 15-May-18	771	455	1,245	8	18	0	8,232	250	1,522	88
Q3 - 17-Jul-18	482	348	1,257	9	19	0	7,962	253	1,234	39
Q4 - 10-Nov-18	0	424	1,250	9	18	0	8,517	252	1,001	36
Q1 - Q4 2019										
Q1 - 5-Feb-19	555	408	1,271	9	15	1	6,920	253	743	63
Q2 - 14-May-19	701	438	1,211	9	13	0	8,269	252	1,821	96
Q3 - 16-Jul-19	501	415	1,232	8	14	1	8,131	253	1,142	70
Q4 - 4-Nov-19	755	427	1,191	8	13	1	8,578	252	1,645	66

Appendix 3

Covanta Durham York Renewable Energy Limited Partnership, Durham York Energy Centre, 2019 Voluntary Compliance Emission Testing Program

Executive Summary

CalPuff Modelling for June 2019 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 June 25 and June 28, 2019. The voluntary emission testing program was performed at the request of the Regions of Durham and York. The facility had an agreement with the Regions of Durham and York to conduct emission testing twice per year for the first three years of operation. The current test program is the fourth voluntary test program conducted at the facility.

Ontario Ministry of the Environment, Conservation and Parks (MECP) 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". A list of the test programs conducted by ORTECH to date is provided below:

Test Program	Test Date	ORTECH Report No.
2015 Compliance	September/October 2015	21546
2016 Voluntary	May 2016	21656
2016 Compliance	October/November 2016	21698
2017 Voluntary	May 2017	21754
2017 Compliance	October 2017	21800
2018 Voluntary	May/June 2018	21840
2018 Compliance	September 2018	21880
2019 Voluntary	June 2019	21936

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

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

Test Groups	Reference Method
Particulate and Metals	US EPA Method 29
$PM_{2.5}$/PM_{10} and Condensable Particulate	US EPA Methods 201A and 202
Semi-Volatile Organic Compounds	Environment Canada Method EPS 1/RM/2
Volatile Organic Compounds	US EPA SW-846 Method 0030
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 Summer of 2018, 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 (June 25 to June 28, 2019) was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA. Concentration data measured by ORTECH on June 25, 2019 was used to assess against the total hydrocarbons (organic matter) in-stack emissions limit detailed in Schedule C of the ECA.

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

The MECP "Summary of Standards and Guidelines to Support Ontario Regulation 419/05 – Air Pollution – Local Air Quality", dated April 2012, provides an updated framework for calculating dioxin and furan toxicity equivalent concentrations which includes emission data for 12 dioxin-like PCBs. This document was replaced by "Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", with the most recent version published on April 27, 2018, 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)*	-	-	-	366	-
Average Combustion Zone Temp. (°C)*	-	-	-	1264	-
Steam (tonnes/day)*	-	-	-	801	-
MSW Combusted (tonnes/day)*	-	-	-	200	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	498	-
Carbon Injection (kg/day)*	-	-	-	126	-
Lime Injection (kg/day)*	-	-	-	4174	-
Filterable Particulate (mg/Rm^3) (1)	<0.51	<0.81	0.54	<0.62	9
PM_{10} with Condensable (mg/Rm^3) (1)	5.50	<4.05	<3.71	<4.42	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	5.23	<3.84	<3.51	<4.20	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.46	<0.43	<0.46	<0.45	-
Ammonia (mg/Rm^3) (1)	0.47	0.40	0.42	0.43	-
Cadmium (µg/Rm^3) (1)	0.088	0.088	0.14	0.10	7
Lead (µg/Rm^3) (1)	0.59	0.63	0.54	0.59	50
Mercury (µg/Rm^3) (1)	0.66	0.22	0.17	0.35	15
Antimony (µg/Rm^3) (1)	0.10	0.075	0.11	0.097	-
Arsenic (µg/Rm^3) (1)	<0.046	<0.045	<0.041	<0.044	-
Barium (µg/Rm^3) (1)	2.68	2.22	2.47	2.46	-
Beryllium (µg/Rm^3) (1)	<0.046	<0.045	<0.041	<0.044	-
Chromium (µg/Rm^3) (1)	1.37	1.46	0.79	1.21	-
Cobalt (µg/Rm^3) (1)	<0.046	<0.045	<0.041	<0.044	-
Copper (µg/Rm^3) (1)	1.13	1.17	0.60	0.97	-
Molybdenum (µg/Rm^3) (1)	8.51	8.08	4.77	7.12	-
Nickel (µg/Rm^3) (1)	1.66	1.66	1.17	1.50	-
Selenium (µg/Rm^3) (1)	<0.23	<0.23	<0.21	<0.22	-
Silver (µg/Rm^3) (1)	<0.046	<0.045	<0.041	<0.044	-
Thallium (µg/Rm^3) (1)	0.017	<0.045	<0.041	<0.034	-
Vanadium (µg/Rm^3) (1)	<0.023	<0.023	<0.021	<0.022	-
Zinc (µg/Rm^3) (1)	8.82	5.98	9.09	7.96	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<3.30	<7.42	<2.93	<4.55	60
Total Chlorobenzenes (ng/Rm^3) (1)	<586	<499	<626	<570	-
Total Chlorophenols (ng/Rm^3) (1)	<702	<683	NR	<693	-
Total PAHs (ng/Rm^3) (1)	<705	<605	<477	<596	-
VOCs (µg/Rm^3) (1)	<171	<299	<147	<206	-
Aldehydes (µg/Rm^3) (1)	<275	<381	<312	<321	-
Total VOCs (µg/Rm^3) (1) (4)	<446	<680	<459	<527	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	3.1	1.4	0.9	1.8	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 (i.e. Volatile Organic Sampling Train and Aldehyde Sampling train components).

NR No result. The field spike was not detected and the extraction standard had poor recoveries. The results could not be reliably quantified by the analytical laboratory.

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

Parameter	Test No. 1	Test No. 2	Test No. 3	Average	In-Stack Limit
Total Power Output (MWh/day)*	-	-	-	366	-
Average Combustion Zone Temp. (°C)*	-	-	-	1258	-
Steam (tonnes/day)*	-	-	-	798	-
MSW Combusted (tonnes/day)*	-	-	-	200	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	617	-
Carbon Injection (kg/day)*	-	-	-	127	-
Lime Injection (kg/day)*	-	-	-	4404	-
Filterable Particulate (mg/Rm^3) (1)	<0.46	<0.29	0.38	<0.38	9
PM_{10} with Condensable (mg/Rm^3) (1)	10.3	<6.37	5.97	<7.56	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	10.1	<6.11	5.84	<7.34	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.47	<0.44	<0.44	<0.45	-
Ammonia (mg/Rm^3) (1)	0.79	0.55	0.55	0.63	-
Cadmium (µg/Rm^3) (1)	0.094	0.10	0.050	0.083	7
Lead (µg/Rm^3) (1)	0.59	0.45	0.35	0.46	50
Mercury (µg/Rm^3) (1)	0.11	<0.094	0.092	<0.097	15
Antimony (µg/Rm^3) (1)	0.061	0.067	0.051	0.060	-
Arsenic (µg/Rm^3) (1)	<0.044	<0.045	<0.044	<0.044	-
Barium (µg/Rm^3) (1)	2.10	2.66	2.38	2.38	-
Beryllium (µg/Rm^3) (1)	<0.044	<0.045	<0.044	<0.044	-
Chromium (µg/Rm^3) (1)	1.23	0.97	0.68	0.96	-
Cobalt (µg/Rm^3) (1)	<0.044	<0.045	<0.044	<0.044	-
Copper (µg/Rm^3) (1)	0.75	0.94	1.30	1.00	-
Molybdenum (µg/Rm^3) (1)	6.76	5.07	4.88	5.57	-
Nickel (µg/Rm^3) (1)	1.58	1.49	0.99	1.35	-
Selenium (µg/Rm^3) (1)	1.06	<0.22	<0.22	<0.50	-
Silver (µg/Rm^3) (1)	<0.044	<0.045	<0.044	<0.044	-
Thallium (µg/Rm^3) (1)	0.012	<0.045	<0.044	<0.034	-
Vanadium (µg/Rm^3) (1)	<0.022	<0.022	<0.022	<0.022	-
Zinc (µg/Rm^3) (1)	7.78	6.33	6.91	7.01	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<2.80	<2.91	<8.02	<4.58	60
Total Chlorobenzenes (ng/Rm^3) (1)	<697	<570	<458	<575	-
Total Chlorophenols (ng/Rm^3) (1)	<699	<704	<732	<711	-
Total PAHs (ng/Rm^3) (1)	<308	<299	<779	<462	-
VOCs (µg/Rm^3) (1)	<125	<83.4	<60.2	<89.4	-
Aldehydes (µg/Rm^3) (1)	<292	<378	<226	<299	-
Total VOCs (µg/Rm^3) (1) (4)	<417	<461	<286	<388	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.6	0.5	0.5	0.5	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)	8.5	13.1	17.3	40
	Hydrogen Chloride (mg/Rm^3) (2)	1.7	1.9	2.1	9
	Nitrogen Oxides (mg/Rm^3) (2)	109	110	110	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	0.03	0.1	35
Boiler No. 2	Carbon Monoxide (mg/Rm^3) (1)	8.0	12.2	19.0	40
	Hydrogen Chloride (mg/Rm^3) (2)	3.5	4.2	5.0	9
	Nitrogen Oxides (mg/Rm^3) (2)	110	110	111	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	0.02	0.2	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 MECP) for the June 2019 emission testing program was performed by Golder Associates. A summary of the results are provided in the tables appended to this report (Appendix 27) based on calculated ground level Point of Impingement (POI) concentrations for the average total Main Stack emissions. As shown in the tables, the calculated impingement concentrations for all of the contaminants were well below the relevant MECP standards.

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

- The facility was maintained within the operational parameters defined by the amended ECA that constitutes normal operation during the stack test periods. Testing was conducted at a steam production rate of greater than 778 tonnes of steam per day for each Boiler (approximately 96.4% of maximum continuous rating). The maximum continuous rating for the facility is 1614.7 tonnes of steam per day for the two Boilers combined (33.64 tonnes of steam per hour or 807.4 tonnes per day for each Boiler).
- The in-stack concentrations of the components listed in the ECA were all below the concentration limits provided in Schedule C of the ECA.
- Using CALPUFF dispersion modelling techniques, the predicted maximum point of impingement concentrations, based on the average test results for both boilers, show DYEC to be operating well below all current standards in Regulation 419/05 under the Ontario Environmental Protection Act and other MECP criteria including guidelines and upper risk thresholds.

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

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration Before Meteorological Anomaly Removal [µg/m³]	Maximum POI Concentration After Meeorological Anomaly Removal [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes	Version of Date of ACB List
1 – methylnaphthalene	90-12-0	3.93E-07	Calpuff	4.00E-07	3.74E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
1,2,4 – Trichlorobenzene	120-82-1	7.47E-07	Calpuff	7.61E-07	7.12E-07	24-hour	400	Particulate	Sch. 3	Guideline	B1	<1%	—	Apr-18
1,2,4,5-Tetrachlorobenzene	95-94-3	1.12E-07	Calpuff	1.14E-07	1.06E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
1,2-Dichlorobenzene	95-50-1	1.62E-06	Calpuff	3.12E-05	9.44E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
2 – methylnaphthalene	91-57-6	6.82E-07	Calpuff	6.94E-07	6.49E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
2,3,4,6-Tetrachlorophenol	58-90-2	1.61E-06	Calpuff	1.64E-06	1.53E-06	24-hour	0.75	Health	—	SL-JSL	B2	Below SL-JSL	—	Apr-18
2,4,6-Trichlorophenol	88-06-2	1.61E-06	Calpuff	1.64E-06	1.53E-06	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
2,4-Dichlorophenol	120-83-2	1.61E-06	Calpuff	1.64E-06	1.53E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
3-Methylcholanthrene	56-49-5	3.22E-07	Calpuff	3.28E-07	3.07E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Apr-18
7,12-Dimethylbenzo(a)anthracene	57-97-6	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Apr-18
Acenaphthene	83-32-9	5.52E-07	Calpuff	5.62E-07	5.26E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Acenaphthylene	208-96-8	1.21E-06	Calpuff	1.23E-06	1.15E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Acetaldehyde	75-07-0	3.83E-03	Calpuff	3.90E-03	3.65E-03	24-hour	500	Health	Sch. 3	Standard	B1	<1%	Note 2URT - Note 4, Table 4	Apr-18
Acetaldehyde	75-07-0	3.83E-03	Calpuff	3.90E-03	3.65E-03	24-hour	5000	—	Sch. 6	URT	—	<1%	—	
Acrolein	107-02-8	3.83E-03	Calpuff	3.90E-03	3.65E-03	24-hour	0.4	Health	Sch. 3	Standard	B1	<1%	Note 2URT - Note 4, Table 4	Apr-18
Acrolein	107-02-8	3.83E-03	Calpuff	7.36E-02	2.23E-02	1-hour	4.5	Health	Sch. 3	Standard	B1	<1%	Note 2URT - Note 4, Table 4	Apr-18
Acrolein	107-02-8	3.83E-03	Calpuff	3.90E-03	3.65E-03	24-hour	4	Health	Sch. 6	URT	—	<1%	—	Apr-18
Ammonia	7664-41-7	2.03E-02	Calpuff	2.07E-02	1.94E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Ammonia	7664-41-7	2.03E-02	Calpuff	2.07E-02	1.94E-02	24-hour	1000	Health	Sch. 6	URT	—	<1%	—	Apr-18
Anthracene	120-12-7	2.27E-07	Calpuff	2.31E-07	2.16E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Antimony	7440-36-0	3.07E-06	Calpuff	3.13E-06	2.93E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Arsenic	7440-38-2	1.73E-06	Calpuff	1.76E-06	1.65E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Barium	7440-39-3	9.48E-05	Calpuff	9.65E-05	9.03E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Benzene	71-43-2	1.06E-04	Calpuff	3.36E-06	3.36E-06	Annual	0.45	Health	Sch. 3	Standard	B1	<1%	Note 19, Table 2, 3 URT - Note 4, Table 4	Apr-18
Benzene	71-43-2	1.06E-04	Calpuff	1.08E-04	1.01E-04	24-hour	100	Health	Sch. 6	URT/DAV	B1	<1%	—	
Benzene	71-43-2	1.06E-04	Calpuff	3.36E-06	3.36E-06	Annual	4.5	Health	—	AAV	—	<1%	—	Apr-18
Benzo(a)anthracene	56-55-3	9.38E-08	Calpuff	9.55E-08	8.93E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(a)fluorene	238-84-6	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(a)pyrene	50-32-8	6.44E-08	Calpuff	2.03E-09	2.03E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Note 7, 19, Table 2, 3URT - Note 4, Table 4	Apr-18
Benzo(a)pyrene	50-32-8	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.005	Health	Sch. 6	URT	—	<1%	—	Apr-18
Benzo(a)pyrene	50-32-8	6.44E-08	Calpuff	2.03E-09	2.03E-09	Annual	0.0001	Health	—	AAV	—	<1%	—	Apr-18
Benzo(b)fluoranthene	205-99-2	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(b)fluorene	243-17-4	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(e)pyrene	192-97-2	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(g,h,i)perylene	191-24-2	1.17E-07	Calpuff	1.19E-07	1.11E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(k)fluoranthene	207-08-9	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Beryllium	7440-41-7	1.73E-06	Calpuff	1.76E-06	1.65E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Biphenyl	92-51-3	4.20E-07	Calpuff	4.27E-07	4.00E-07	24-hour	175	Health	—	SL-JSL	B2	Below SL-JSL	—	Apr-18
Bromodichloromethane	75-27-4	2.03E-05	Calpuff	2.07E-05	1.94E-05	24-hour	350	Health	—	SL-JSL	B2	Below SL-JSL	—	Apr-18
Bromoform	75-25-2	1.54E-05	Calpuff	1.57E-05	1.47E-05	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Bromomethane	74-83-9	1.54E-04	Calpuff	1.57E-04	1.47E-04	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Cadmium	7440-43-9	3.67E-06	Calpuff	3.74E-06	3.50E-06	24-hour	0.025	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Cadmium	7440-43-9	3.67E-06	Calpuff	3.74E-06	3.50E-06	24-hour	0.25	Health	Sch. 6	URT	—	<1%	—	Apr-18
Carbon Monoxide	630-08-0	4.82E-01	Calpuff	1.11E+01	3.36E+00	1/2-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 9	Apr-18
Carbon tetrachloride	56-23-5	1.81E-05	Calpuff	1.84E-05	1.72E-05	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Carbon tetrachloride	56-23-5	1.81E-05	Calpuff	1.84E-05	1.72E-05	24-hour	24	Health	Sch. 6	URT	—	<1%	—	Apr-18
Chlorobenzene	108-90-7	1.50E-05	Calpuff	2.88E-04	8.71E-05	1-hour	3500	Health	Sch. 3	Guideline	B1	<1%	Note 2, 3	
Chlorobenzene	108-90-7	1.50E-05	Calpuff	4.75E-04	1.44E-04	10-minute	4500	Odour	Sch. 3	Guideline	B1	<1%	Note 2, 3	
Chloroform	67-66-3	3.45E-05	Calpuff	3.51E-05	3.29E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Chloroform	67-66-3	3.45E-05	Calpuff	3.51E-05	3.29E-05	24-hour	100	Health	Sch. 6	URT	—	<1%	—	Apr-18
Chromium (hexavalent)	18540-29-9	4.22E-05	Calpuff	1.33E-06	1.33E-06	Annual	0.00014	Health	Sch. 3	Standard	B1	<1%	Notes 11, 19, Table 2, 3URT - Note 4, Table 4	Apr-18
Chromium (hexavalent)	18540-29-9	4.22E-05	Calpuff	4.30E-05	4.02E-05	24-hour	0.07	Health	Sch. 6	URT	—	<1%	—	
Chrysene	218-01-9	9.20E-08	Calpuff	9.37E-08	8.77E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Cobalt	7440-48-4	1.73E-06	Calpuff	1.76E-06	1.65E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Copper	7440-50-8	3.82E-05	Calpuff	3.89E-05	3.64E-05	24-hour	50	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Dibenzo(a,c)anthracene	215-58-7	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Dibenzo(a,h)anthracene	53-70-3	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Dichlorodifluoromethane	75-71-8	3.63E-05	Calpuff	3.69E-05	3.46E-05	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 10	Apr-18
Dichloroethene, 1,1 -	75-34-3	1.54E-05	Calpuff	1.57E-05	1.47E-05	24-hour	165	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Dichloroethene, 1,1 -	75-34-3	1.54E-05	Calpuff	1.57E-05	1.47E-05	24-hour	1650	Health	Sch. 6	URT	—	<1%	—	Apr-18
Dichloromethane	75-09-2	1.29E-03	Calpuff	1.31E-03	1.23E-03	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Dichloromethane	75-09-2	1.29E-03	Calpuff	1.31E-03	1.23E-03	24-hour	22000	Health	Sch. 6	URT	—	<1%	—	Apr-18
Dioxins, Furans and Dioxin- like PCBs	N/A	0.00019 µg TEQ/m³	Calpuff	0.00019 pg TEQ/m³	0.00018 pg TEQ/m³	24-hour	0.1 pg TEQ/m³	Health	Sch. 3	Guideline	B1	<1%	Note 8, 8a, Table 1URT - Note 4, Table 4	Apr-18
Ethylbenzene	100-41-4	1.47E-04	Calpuff	1.49E-04	1.40E-04	24-hour	1000	Not Applicable	Sch. 3	Guideline	B1	<1%	Note 2, 3	Apr-18
Ethylbenzene	100-41-4	1.47E-04	Calpuff	4.65E-03	1.41E-03	10-minute	1900	Not Applicable	Sch. 3	Guideline	B1	<1%	Note 2, 3	Apr-18
Ethylbenzene	100-41-4	1.47E-04	Calpuff	1.49E-04	1.40E-04	24-hour	14000	Not Applicable	Sch. 6	URT	—	<1%	—	Apr-18
Ethylene Dibromide	106-93-4	3.09E-05	Calpuff	3.14E-05	2.94E-05	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Fluoranthene	206-44-0	6.65E-07	Calpuff	6.77E-07	6.34E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Fluorides	7664-39-3	1.73E-02	Calpuff	1.76E-02	1.65E-02	24-hour	0.86	Vegetation	Sch. 3	Standard	B1	2%	Note 2, 20	Apr-18
Fluorides	7664-39-3	1.73E-02	Calpuff	1.97E-03	1.97E-03	30-day	0.34	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorides	7664-39-3	1.73E-02	Calpuff	1.76E-02	1.65E-02	24-hour	1.74	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorides	7664-39-3	1.73E-02	Calpuff	1.97E-03	1.97E-03	30-day	0.69	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorides	7664-39-3	1.73E-02	Calpuff	1.76E-02	1.65E-02	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorides	7664-39-3	1.73E-02	Calpuff	1.97E-03	1.97E-03	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration Before Meteorological Anomaly Removal [µg/m³]	Maximum POI Concentration After Meeorological Anomaly Removal [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes	Version of Date of ACB List
Fluorine	86-73-7	7.49E-07	Calpuff	7.63E-07	7.14E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Formaldehyde	50-00-0	4.65E-03	Calpuff	4.73E-03	4.43E-03	24-hour	65	Odour & Irritation	Sch. 3	Standard	B1	<1%	—	Apr-18
Hexachlorobenzene	118-74-1	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
Hydrogen Chloride	7647-01-0	1.67E-01	Calpuff	1.70E-01	1.59E-01	24-hour	20	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Hydrogen Chloride	7647-01-0	1.67E-01	Calpuff	1.70E-01	1.59E-01	24-hour	200	Health	Sch. 6	URT	—	<1%	—	Apr-18
Indeno(1,2,3 – cd)pyrene	193-39-5	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Lead	7439-92-1	2.06E-05	Calpuff	2.09E-05	1.96E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 2URT - Note 4, Table 4	Apr-18
Lead	7439-92-1	2.06E-05	Calpuff	2.35E-06	2.35E-06	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 2URT - Note 4, Table 4	Apr-18
Lead	7439-92-1	2.06E-05	Calpuff	2.09E-05	1.96E-05	24-hour	2	Health	Sch. 6	URT	—	<1%	Note 2URT - Note 4, Table 4	Apr-18
Mercury	7439-97-6	8.61E-06	Calpuff	8.76E-06	8.20E-06	24-hour	2	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Molybdenum	7439-98-7	2.47E-04	Calpuff	2.52E-04	2.36E-04	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	—	Apr-18
Naphthalene	91-20-3	3.47E-06	Calpuff	3.53E-06	3.30E-06	24-hour	22.5	Odour	Sch. 3	Guideline	B1	<1%	Note 2, 3	Apr-18
Naphthalene	91-20-3	3.47E-06	Calpuff	1.10E-04	3.32E-05	10-minute	50	Odour	Sch. 3	Guideline	B1	<1%	Note 2, 3	Apr-18
Nickel	7440-02-0	5.57E-05	Calpuff	1.76E-06	1.76E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 19, Table 2, 3URT - Note 4, Table 4	Apr-18
Nickel	7440-02-0	5.57E-05	Calpuff	5.67E-05	5.31E-05	24-hour	2	Health	Sch. 6	URT	—	<1%	—	Apr-18
Nickel	7440-02-0	5.57E-05	Calpuff	1.76E-06	1.76E-06	Annual	0.4	Health	—	AAV	—	<1%	—	Apr-18
Nitrogen Oxides	10102-44-0	4.24E+00	Calpuff	4.32E+00	4.04E+00	24-hour	200	Health	Sch. 3	Standard	B1	2%	Notes 2, 17	Apr-18
Nitrogen Oxides	10102-44-0	4.24E+00	Calpuff	8.15E+01	2.47E+01	1-hour	400	Health	Sch. 3	Standard	B1	6%	Notes 2, 17	Apr-18
O-terphenyl	84-15-1	8.69E-08	Calpuff	8.85E-08	8.28E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	
PM_{10} (Condensable and Filterable)	N/A	2.26E-01	Calpuff	4.76E-01	4.61E-01	24-hour	50	—	—	AAQC	—	<1%	—	
PM_{10} (Filterable Only)	N/A	6.05E-02	Calpuff	6.16E-02	3.04E-01	24-hour	50	—	—	AAQC	—	<1%	—	
$PM_{2.5}$ (Condensable and Filterable)	N/A	2.17E-01	Calpuff	2.21E-01	4.53E-01	24-hour	30	—	—	AAQC	—	2%	—	
$PM_{2.5}$ (Filterable Only)	N/A	5.20E-02	Calpuff	5.29E-02	2.96E-01	24-hour	30	—	—	AAQC	—	<1%	—	
Pentachlorobenzene	608-93-5	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
Pentachlorophenol	87-86-5	1.61E-06	Calpuff	1.64E-06	1.53E-06	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Perylene	198-55-0	6.44E-08	Calpuff	6.55E-08	6.13E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Phenanthrene	85-01-8	4.79E-06	Calpuff	4.87E-06	4.56E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Pyrene	129-00-0	5.12E-07	Calpuff	5.21E-07	4.88E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Selenium	7782-49-2	1.42E-05	Calpuff	1.45E-05	1.35E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Silver	7440-22-4	1.73E-06	Calpuff	1.76E-06	1.65E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Sulphur Dioxide	7446-09-5	3.27E-03	Calpuff	3.32E-03	3.11E-03	24-hour	275	Health	Sch. 3	Standard	B1	<1%	Effective until July 1, 2023Note 2URT - Note 4, Table 4	Apr-18
Sulphur Dioxide	7446-09-5	3.27E-03	Calpuff	6.27E-02	1.90E-02	1-hour	690	Health	Sch. 3	Standard	B1	<1%	Effective until July 1, 2023Note 2URT - Note 4, Table 4	Apr-18
Tetrachloroethene	127-18-4	2.78E-05	Calpuff	2.83E-05	2.65E-05	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Tetrachloroethene	127-18-4	2.78E-05	Calpuff	2.83E-05	2.65E-05	24-hour	3600	Health	Sch. 6	URT	—	<1%	—	
Tetralin	119-64-2	1.95E-06	Calpuff	1.99E-06	1.86E-06	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
Thallium	7440-28-0	1.34E-06	Calpuff	1.36E-06	1.27E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
Toluene	108-88-3	1.59E-03	Calpuff	1.62E-03	1.51E-03	24-hour	2000	Not Applicable	Sch. 3	Guideline	B1	<1%	To be updated - Note 5	Apr-18
Total Chromium (and compounds)	7440-47-3	4.22E-05	Calpuff	4.30E-05	4.02E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 11aURT - Note 4, Table 4	Apr-18
Total Chromium (and compounds)	7440-47-3	4.22E-05	Calpuff	4.30E-05	4.02E-05	24-hour	5	Health	Sch. 6	URT	—	<1%	—	Apr-18
Total Particulate Matter (Condensable and Filterable)	N/A	1.85E-01	Calpuff	1.88E-01	4.22E-01	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	—	Apr-18
Total Particulate Matter (Filterable only)	N/A	1.85E-01	Calpuff	1.88E-01	4.22E-01	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	—	Apr-18
Trichloroethane, 1,1,1 -	71-55-6	1.54E-05	Calpuff	1.57E-05	1.47E-05	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Trichloroethene	86-42-0	1.54E-05	Calpuff	1.57E-05	1.47E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Trichloroethylene, 1,1,2 -	79-01-6	2.78E-05	Calpuff	2.83E-05	2.65E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Trichloroethylene, 1,1,2 -	79-01-6	2.78E-05	Calpuff	2.83E-05	2.65E-05	24-hour	1200	Health	Sch. 6	URT	—	<1%	—	Apr-18
Trichlorofluoromethane	75-69-4	3.09E-05	Calpuff	3.14E-05	2.94E-05	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 10	Apr-18
Vanadium	7440-62-2	8.67E-07	Calpuff	8.82E-07	8.26E-07	24-hour	2	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Vinyl chloride	75-01-4	2.91E-05	Calpuff	2.96E-05	2.77E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Vinyl chloride	75-01-4	2.91E-05	Calpuff	2.96E-05	2.77E-05	24-hour	100	Health	Sch. 6	URT	—	<1%	—	Apr-18
Xylenes, m-, p- and o-	1330-20-7	1.21E-03	Calpuff	1.23E-03	1.15E-03	24-hour	730	Not Applicable	Sch. 3	Guideline	B1	<1%	Note 2, 3, 22	Apr-18
Xylenes, m-, p- and o-	1330-20-7	1.21E-03	Calpuff	3.83E-02	1.16E-02	10-minute	3000	Not Applicable	Sch. 3	Guideline	B1	<1%	Note 2, 3, 22	Apr-18
Xylenes, m-, p- and o-	1330-20-7	1.21E-03	Calpuff	1.23E-03	1.15E-03	24-hour	7300	Not Applicable	Sch. 6	URT	—	<1%	—	Apr-18
Zinc	7440-66-6	2.94E-04	Calpuff	2.99E-04	2.80E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	—	Apr-18

Appendix 4

Covanta Durham York Renewable Energy Limited Partnership, Durham York Energy Centre 2019 Compliance Emission Testing in Accordance with Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX

Executive Summary

CalPuff Modelling for September 2019 Compliance Source Testing at 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 September 9 and September 13, 2019. The emission testing program was performed to satisfy the requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP) Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX. Section 7(1) of the ECA states that "the owner shall perform annual source testing, in accordance with the procedures and schedule outlined in the attached Schedule E, to determine the rates of emissions of the test contaminants from the stack. The program shall be conducted not later than six months after the commencement date of operation of the facility/equipment and subsequent source testing programs shall be conducted once every calendar year thereafter". This program is the ninth comprehensive Schedule E source testing program conducted at the facility. A list of the test programs conducted by ORTECH to date is provided below:

Test Program	Test Date	ORTECH Report No.
2015 Compliance	September/October 2015	21546
2016 Voluntary	May 2016	21656
2016 Compliance	October/November 2016	21698
2017 Voluntary	May 2017	21754
2017 Compliance	October 2017	21800
2018 Voluntary	May/June 2018	21840
2018 Compliance	September 2018	21880
2019 Voluntary	June 2019	21936
2019 Compliance	September 2019	21960

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

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

Test Groups	Reference Method
Particulate and Metals	US EPA Method 29
$PM_{2.5}$/PM_{10} and Condensable Particulate	US EPA Methods 201A and 202
Semi-Volatile Organic Compounds	Environment Canada Method EPS 1/RM/2
Volatile Organic Compounds	US EPA SW-846 Method 0030
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 July 2019, 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 (September 9 to September 13, 2019 for Boiler No. 1 and September 9 to September 12, 2019 for Boiler No. 2) was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA. Concentration data measured by ORTECH on September 9, 2019 was used to assess against the total hydrocarbons (organic matter) in-stack emissions limit detailed in Schedule C of the ECA.

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

The MECP "Summary of Standards and Guidelines to Support Ontario Regulation 419/05 – Air Pollution – Local Air Quality", dated April 2012, provides an updated framework for calculating dioxin and furan toxicity equivalent concentrations which includes emission data for 12 dioxin-like PCBs. This document was replaced by "Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", with the most recent version published on April 27, 2018, 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)*	-	-	-	369	-
Average Combustion Zone Temp. (°C)*	-	-	-	1239	-
Steam (tonnes/day)*	-	-	-	798	-
MSW Combusted (tonnes/day)*	-	-	-	210	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	624	-
Carbon Injection (kg/day)*	-	-	-	125	-
Lime Injection (kg/day)*	-	-	-	4279	-
Filterable Particulate (mg/Rm^3) (1)	0.78	0.46	<0.58	<0.61	9
PM_{10} with Condensable (mg/Rm^3) (1)	<1.29	<3.11	<1.60	<2.00	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<1.23	<2.99	<1.54	<1.92	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.076	<0.11	<0.12	<0.10	-
Ammonia (mg/Rm^3) (1)	0.33	0.40	0.34	0.36	-
Cadmium (µg/Rm^3) (1)	0.42	0.058	0.058	0.18	7
Lead (µg/Rm^3) (1)	0.41	0.41	0.82	0.54	50
Mercury (µg/Rm^3) (1)	0.44	0.25	0.19	0.29	15
Antimony (µg/Rm^3) (1)	0.048	0.063	<0.039	<0.050	-
Arsenic (µg/Rm^3) (1)	<0.040	<0.040	<0.039	<0.040	-
Barium (µg/Rm^3) (1)	1.81	1.41	1.75	1.66	-
Beryllium (µg/Rm^3) (1)	<0.040	<0.040	<0.039	<0.040	-
Chromium (µg/Rm^3) (1)	0.66	0.84	0.60	0.70	-
Cobalt (µg/Rm^3) (1)	0.096	<0.040	<0.039	<0.058	-
Copper (µg/Rm^3) (1)	1.18	0.69	0.55	0.81	-
Molybdenum (µg/Rm^3) (1)	1.87	1.89	1.90	1.89	-
Nickel (µg/Rm^3) (1)	1.05	1.15	0.93	1.04	-
Selenium (µg/Rm^3) (1)	<0.20	<0.20	<0.19	<0.20	-
Silver (µg/Rm^3) (1)	<0.040	<0.040	<0.039	<0.040	-
Thallium (µg/Rm^3) (1)	<0.040	<0.040	<0.039	<0.040	-
Vanadium (µg/Rm^3) (1)	<0.020	<0.020	<0.019	<0.020	-
Zinc (µg/Rm^3) (1)	5.67	7.89	5.44	6.33	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<1.53	<1.33	<1.67	<1.51	60
Total Chlorobenzenes (ng/Rm^3) (1)	<465	<610	<527	<534	-
Total Chlorophenols (ng/Rm^3) (1)	<367	<278	<251	<298	-
Total PAHs (ng/Rm^3) (1)	<358	<166	<233	<253	-
VOCs (µg/Rm^3) (1)	<325	<291	<337	<318	-
Aldehydes (µg/Rm^3) (1)	<753	<662	<855	<758	-
Total VOCs (µg/Rm^3) (1) (4)	<1078	<953	<1192	<1076	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.9	0.6	0.8	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 (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)*	-	-	-	369	-
Average Combustion Zone Temp. (°C)*	-	-	-	1240	-
Steam (tonnes/day)*	-	-	-	794	-
MSW Combusted (tonnes/day)*	-	-	-	207	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	535	-
Carbon Injection (kg/day)*	-	-	-	127	-
Lime Injection (kg/day)*	-	-	-	5175	-
Filterable Particulate (mg/Rm^3) (1)	0.89	<0.36	<0.37	<0.54	9
PM_{10} with Condensable (mg/Rm^3) (1)	<2.06	<3.55	<2.70	<2.77	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<1.99	<3.49	<2.63	<2.70	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.074	<0.11	<0.12	<0.10	-
Ammonia (mg/Rm^3) (1)	0.67	0.60	0.57	0.61	-
Cadmium (µg/Rm^3) (1)	0.15	0.054	0.040	0.080	7
Lead (µg/Rm^3) (1)	0.70	0.52	0.50	0.57	50
Mercury (µg/Rm^3) (1)	0.12	<0.087	<0.079	<0.097	15
Antimony (µg/Rm^3) (1)	0.075	<0.045	<0.047	<0.055	-
Arsenic (µg/Rm^3) (1)	<0.042	<0.045	<0.047	<0.045	-
Barium (µg/Rm^3) (1)	1.85	1.63	1.45	1.64	-
Beryllium (µg/Rm^3) (1)	<0.042	<0.045	<0.047	<0.045	-
Chromium (µg/Rm^3) (1)	0.72	0.61	2.08	1.14	-
Cobalt (µg/Rm^3) (1)	0.042	<0.045	<0.047	<0.044	-
Copper (µg/Rm^3) (1)	0.66	0.47	0.51	0.55	-
Molybdenum (µg/Rm^3) (1)	1.97	2.08	1.98	2.01	-
Nickel (µg/Rm^3) (1)	0.88	0.78	1.01	0.89	-
Selenium (µg/Rm^3) (1)	<0.21	<0.22	<0.23	<0.22	-
Silver (µg/Rm^3) (1)	<0.042	<0.045	<0.047	<0.045	-
Thallium (µg/Rm^3) (1)	<0.042	<0.045	<0.047	<0.045	-
Vanadium (µg/Rm^3) (1)	<0.021	<0.022	<0.023	<0.022	-
Zinc (µg/Rm^3) (1)	6.57	4.84	6.99	6.13	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<3.92	<3.74	<2.06	<3.24	60
Total Chlorobenzenes (ng/Rm^3) (1)	<901	<751	<677	<776	-
Total Chlorophenols (ng/Rm^3) (1)	<289	<357	<281	<309	-
Total PAHs (ng/Rm^3) (1)	<239	<185	<227	<217	-
VOCs (µg/Rm^3) (1)	<334	<239	<416	<330	-
Aldehydes (µg/Rm^3) (1)	<654	<581	<609	<614	-
Total VOCs (µg/Rm^3) (1) (4)	<988	<820	<1025	<944	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.2	0.2	0.4	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).

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)	7.0	11.2	19.3	40
	Hydrogen Chloride (mg/Rm^3) (2)	2.7	3.0	3.6	9
	Nitrogen Oxides (mg/Rm^3) (2)	110	111	112	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	0	0	35
Boiler No. 2	Carbon Monoxide (mg/Rm^3) (1)	7.3	12.1	19.5	40
	Hydrogen Chloride (mg/Rm^3) (2)	4.6	5.1	5.5	9
	Nitrogen Oxides (mg/Rm^3) (2)	109	110	111	121
	Sulphur Dioxide (mg/Rm^3) (2)	0	0.01	0.1	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 MECP) for the September 2019 emission testing program was performed by Golder Associates. A summary of the results are provided in the tables appended to this report (Appendix 27) based on calculated ground level Point of Impingement (POI) concentrations for the average total Main Stack emissions. As shown in the tables, the calculated impingement concentrations for all of the contaminants were well below the relevant MECP standards.

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

- The facility was maintained within the operational parameters defined by the amended ECA that constitutes normal operation during the stack test periods. Testing was conducted at a steam production rate of greater than 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 under the Ontario Environmental Protection Act and other MECP criteria including guidelines and upper risk thresholds.

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

Appendix B
Emission Summary Table

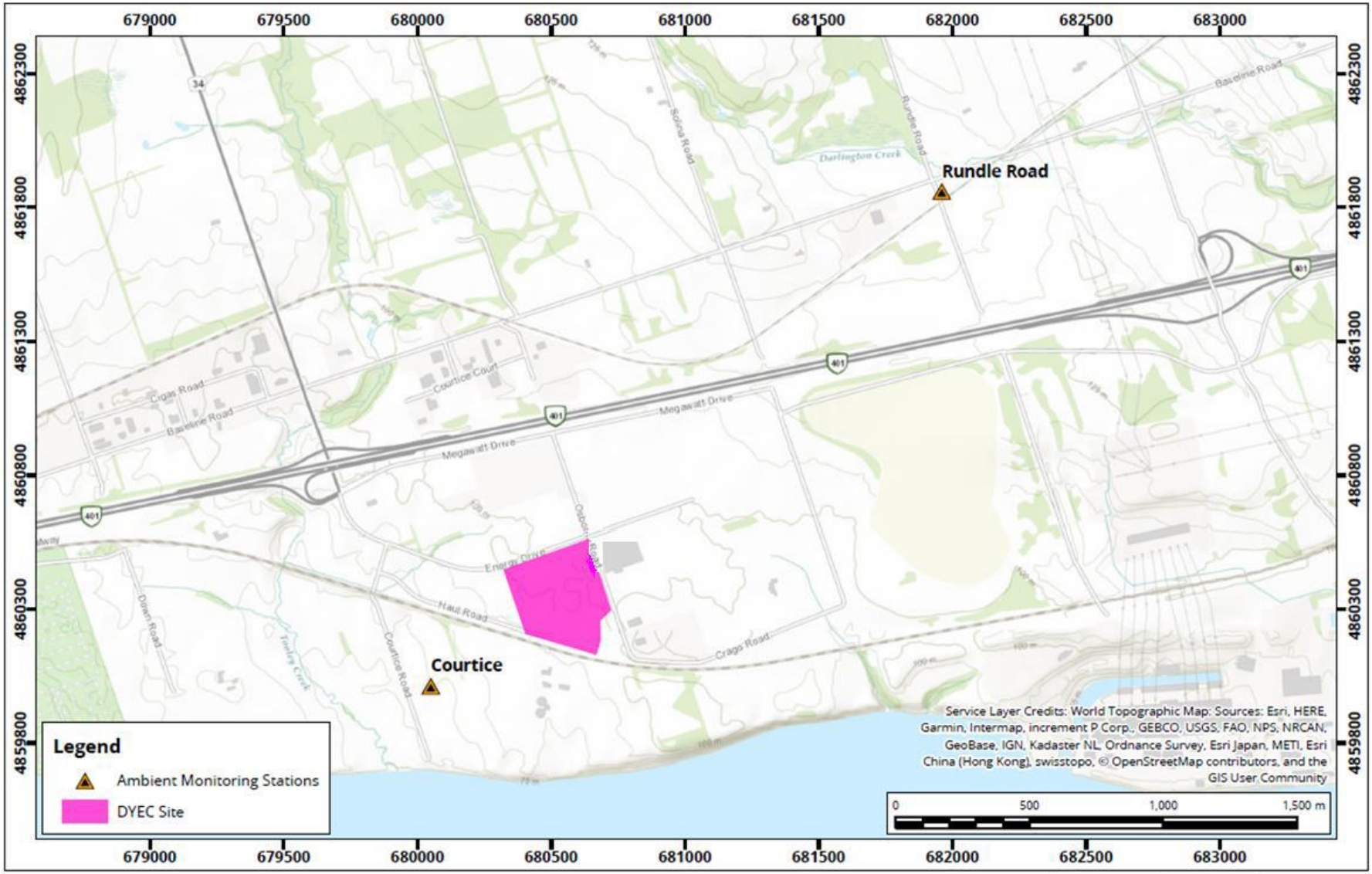
Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration Before Meteorological Anomaly Removal [µg/m³]	Maximum POI Concentration After Meteorological Anomaly Removal [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes	Version of Date of ACB List
1 – methylnaphthalene	90-12-0	1.70E-07	Calpuff	1.74E-07	1.65E-07	24-hour	35.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
1,2,4 – Trichlorobenzene	120-82-1	8.42E-07	Calpuff	8.66E-07	8.22E-07	24-hour	400	Particulate	Sch. 3	Guideline	B1	<1%	—	Apr-18
1,2,4,5-Tetrachlorobenzene	95-94-3	1.88E-07	Calpuff	1.94E-07	1.84E-07	24-hour	1	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
1,2-Dichlorobenzene	95-50-1	1.18E-06	Calpuff	2.32E-05	6.93E-06	1-hour	30500	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
2 – methylnaphthalene	91-57-6	3.13E-07	Calpuff	3.22E-07	3.05E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
2,3,4,6-Tetrachlorophenol	58-90-2	3.83E-07	Calpuff	3.94E-07	3.73E-07	24-hour	0.75	Health	—	SL-JSL	B2	Below SL-JSL	—	Apr-18
2,4,6-Trichlorophenol	88-06-2	3.83E-07	Calpuff	3.94E-07	3.73E-07	24-hour	1.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
2,4-Dichlorophenol	120-83-2	1.25E-06	Calpuff	1.29E-06	1.22E-06	24-hour	33.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
3-Methylcholanthrene	56-49-5	3.83E-07	Calpuff	3.94E-07	3.73E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Apr-18
7,12-Dimethylbenzo(a)anthracene	57-97-6	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus		Apr-18
Acenaphthene	83-32-9	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Acenaphthylene	208-96-8	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Acetaldehyde	75-07-0	4.37E-03	Calpuff	4.49E-03	4.26E-03	24-hour	500	Health	Sch. 3	Standard	B1	<1%	Note 2URT - Note 4, Table 4	Apr-18
Acetaldehyde	75-07-0	4.37E-03	Calpuff	4.49E-03	4.26E-03	24-hour	5000	—	Sch. 6	URT	—	<1%	—	
Acrolein	107-02-8	2.00E-02	Calpuff	2.06E-02	1.95E-02	24-hour	0.4	Health	Sch. 3	Standard	B1	5%	Note 2URT - Note 4, Table 4	Apr-18
Acrolein	107-02-8	2.00E-02	Calpuff	3.93E-01	1.17E-01	1-hour	4.5	Health	Sch. 3	Standard	B1	3%	Note 2URT - Note 4, Table 4	Apr-18
Acrolein	107-02-8	2.00E-02	Calpuff	2.06E-02	1.95E-02	24-hour	4	Health	Sch. 6	URT	—	<1%	—	Apr-18
Ammonia	7664-41-7	1.91E-02	Calpuff	1.96E-02	1.86E-02	24-hour	100	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Ammonia	7664-41-7	1.91E-02	Calpuff	1.96E-02	1.86E-02	24-hour	1000	Health	Sch. 6	URT	—	<1%	—	Apr-18
Anthracene	120-12-7	9.23E-08	Calpuff	9.48E-08	9.00E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Antimony	7440-36-0	2.07E-06	Calpuff	2.13E-06	2.02E-06	24-hour	25	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Arsenic	7440-38-2	1.65E-06	Calpuff	1.70E-06	1.61E-06	24-hour	0.3	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Barium	7440-39-3	6.49E-05	Calpuff	6.67E-05	6.33E-05	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Benzene	71-43-2	2.70E-04	Calpuff	8.74E-06	8.74E-06	Annual	0.45	Health	Sch. 3	Standard	B1	<1%	Note 19, Table 2, 3 URT - Note 4, Table 4	Apr-18
Benzene	71-43-2	2.70E-04	Calpuff	2.78E-04	2.63E-04	24-hour	100	Health	Sch. 6	URT/DAV	B1	<1%	—	
Benzene	71-43-2	2.70E-04	Calpuff	8.74E-06	8.74E-06	Annual	4.5	Health	—	AAV	—	<1%	—	Apr-18
Benzo(a)anthracene	56-55-3	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(a)fluorene	238-84-6	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(a)pyrene	50-32-8	7.66E-08	Calpuff	2.48E-09	2.48E-09	Annual	0.00001	Health	Sch. 3	Standard	B1	<1%	Note 7, 19, Table 2, 3URT - Note 4, Table 4	Apr-18
Benzo(a)pyrene	50-32-8	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.005	Health	Sch. 6	URT	—	<1%	—	Apr-18
Benzo(a)pyrene	50-32-8	7.66E-08	Calpuff	2.48E-09	2.48E-09	Annual	0.0001	Health	—	AAV	—	<1%	—	Apr-18
Benzo(b)fluoranthene	205-99-2	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(b)fluorene	243-17-4	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(e)pyrene	192-97-2	9.75E-08	Calpuff	1.00E-07	9.51E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(g,h,i)perylene	191-24-2	1.81E-07	Calpuff	1.86E-07	1.76E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Benzo(k)fluoranthene	207-08-9	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Beryllium	7440-41-7	1.65E-06	Calpuff	1.70E-06	1.61E-06	24-hour	0.01	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Biphenyl	92-51-3	4.37E-07	Calpuff	4.49E-07	4.26E-07	24-hour	175	Health	—	SL-JSL	B2	Below SL-JSL	—	Apr-18
Bromodichloromethane	75-27-4	5.12E-05	Calpuff	5.26E-05	5.00E-05	24-hour	350	Health	—	SL-JSL	B2	Below SL-JSL	—	Apr-18
Bromoform	75-25-2	1.42E-05	Calpuff	1.46E-05	1.38E-05	24-hour	55	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Bromomethane	74-83-9	1.28E-04	Calpuff	1.31E-04	1.25E-04	24-hour	1350	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Cadmium	7440-43-9	5.13E-06	Calpuff	5.27E-06	5.00E-06	24-hour	0.025	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Cadmium	7440-43-9	5.13E-06	Calpuff	5.27E-06	5.00E-06	24-hour	0.25	Health	Sch. 6	URT	—	<1%	—	Apr-18
Carbon Monoxide	630-08-0	4.43E-01	Calpuff	1.04E+01	3.12E+00	1/2-hour	6000	Health	Sch. 3	Standard	B1	<1%	Note 9	Apr-18
Carbon tetrachloride	56-23-5	1.34E-04	Calpuff	1.37E-04	1.30E-04	24-hour	2.4	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Carbon tetrachloride	56-23-5	1.34E-04	Calpuff	1.37E-04	1.30E-04	24-hour	24	Health	Sch. 6	URT	—	<1%	—	Apr-18
Chlorobenzene	108-90-7	9.78E-05	Calpuff	1.92E-03	5.75E-04	1-hour	3500	Health	Sch. 3	Guideline	B1	<1%	Note 2, 3	
Chlorobenzene	108-90-7	9.78E-05	Calpuff	3.17E-03	9.48E-04	10-minute	4500	Odour	Sch. 3	Guideline	B1	<1%	Note 2, 3	
Chloroform	67-66-3	9.78E-05	Calpuff	1.01E-04	9.54E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Chloroform	67-66-3	9.78E-05	Calpuff	1.01E-04	9.54E-05	24-hour	100	Health	Sch. 6	URT	—	<1%	—	Apr-18
Chromium (hexavalent)	18540-29-9	3.56E-05	Calpuff	1.15E-06	1.15E-06	Annual	0.00014	Health	Sch. 3	Standard	B1	<1%	Notes 11, 19, Table 2, 3URT - Note 4, Table 4	Apr-18
Chromium (hexavalent)	18540-29-9	3.56E-05	Calpuff	3.66E-05	3.47E-05	24-hour	0.07	Health	Sch. 6	URT	—	<1%	—	
Chrysene	218-01-9	1.40E-07	Calpuff	1.44E-07	1.36E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Cobalt	7440-48-4	2.02E-06	Calpuff	2.07E-06	1.97E-06	24-hour	0.1	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Copper	7440-50-8	2.66E-05	Calpuff	2.74E-05	2.60E-05	24-hour	50	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Dibenzo(a,c)anthracene	215-58-7	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Dibenzo(a,h)anthracene	53-70-3	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Dichlorodifluoromethane	75-71-8	4.78E-05	Calpuff	4.92E-05	4.66E-05	24-hour	500000	Health	Sch. 3	Guideline	B1	<1%	Note 10	Apr-18
Dichloroethene, 1,1 -	75-34-3	1.45E-05	Calpuff	1.49E-05	1.42E-05	24-hour	165	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Dichloroethene, 1,1 -	75-34-3	1.45E-05	Calpuff	1.49E-05	1.42E-05	24-hour	1650	Health	Sch. 6	URT	—	<1%	—	Apr-18
Dichloromethane	75-09-2	2.06E-03	Calpuff	2.12E-03	2.01E-03	24-hour	220	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Dichloromethane	75-09-2	2.06E-03	Calpuff	2.12E-03	2.01E-03	24-hour	22000	Health	Sch. 6	URT	—	<1%	—	Apr-18
Dioxins, Furans and Dioxin- like PCBs	N/A	1.06E-10	Calpuff	0.00011 pg TEQ/m³	0.0001 pg TEQ/m³	24-hour	0.1 pg TEQ/m³	Health	Sch. 3	Guideline	B1	<1%	Note 8, 8a, Table 1URT - Note 4, Table 4	Apr-18
Ethylbenzene	100-41-4	5.42E-04	Calpuff	5.57E-04	5.29E-04	24-hour	1000	Not Applicable	Sch. 3	Guideline	B1	<1%	Note 2, 3	Apr-18
Ethylbenzene	100-41-4	5.42E-04	Calpuff	1.76E-02	5.26E-03	10-minute	1900	Not Applicable	Sch. 3	Guideline	B1	<1%	Note 2, 3	Apr-18
Ethylbenzene	100-41-4	5.42E-04	Calpuff	5.57E-04	5.29E-04	24-hour	14000	Not Applicable	Sch. 6	URT	—	<1%	—	Apr-18
Ethylene Dibromide	106-93-4	2.84E-05	Calpuff	2.92E-05	2.77E-05	24-hour	3	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Fluoranthene	206-44-0	2.74E-07	Calpuff	2.82E-07	2.67E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Fluorides	7664-39-3	3.99E-03	Calpuff	4.10E-03	3.89E-03	24-hour	0.86	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorides	7664-39-3	3.99E-03	Calpuff	4.65E-04	4.65E-04	30-day	0.34	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorides	7664-39-3	3.99E-03	Calpuff	4.10E-03	3.89E-03	24-hour	1.74	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18

Appendix B
Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration Before Meteorological Anomaly Removal [µg/m³]	Maximum POI Concentration After Meteorological Anomaly Removal [µg/m³]	Averaging Period	MECP POI Limit [µg/m³]	Limiting Effect	Schedule	Source	Benchmark	Percentage of MECP Limit [%]	Notes	Version of Date of ACB List
Fluorides	7664-39-3	3.99E-03	Calpuff	4.65E-04	4.65E-04	30-day	0.69	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorides	7664-39-3	3.99E-03	Calpuff	4.10E-03	3.89E-03	24-hour	3.44	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorides	7664-39-3	3.99E-03	Calpuff	4.65E-04	4.65E-04	30-day	1.38	Vegetation	Sch. 3	Standard	B1	<1%	Note 2, 20	Apr-18
Fluorine	86-73-7	2.42E-07	Calpuff	2.49E-07	2.36E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Formaldehyde	50-00-0	2.00E-03	Calpuff	2.06E-03	1.95E-03	24-hour	65	Odour & Irritation	Sch. 3	Standard	B1	<1%	—	Apr-18
Hexachlorobenzene	118-74-1	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.011	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
Hydrogen Chloride	7647-01-0	1.81E-01	Calpuff	1.86E-01	1.76E-01	24-hour	20	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Hydrogen Chloride	7647-01-0	1.81E-01	Calpuff	1.86E-01	1.76E-01	24-hour	200	Health	Sch. 6	URT	—	<1%	—	Apr-18
Indeno(1,2,3 – cd)pyrene	193-39-5	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Lead	7439-92-1	2.21E-05	Calpuff	2.27E-05	2.15E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 2URT - Note 4, Table 4	Apr-18
Lead	7439-92-1	2.21E-05	Calpuff	2.57E-06	2.57E-06	30-day	0.2	Health	Sch. 3	Standard	B1	<1%	Note 2URT - Note 4, Table 4	Apr-18
Lead	7439-92-1	2.21E-05	Calpuff	2.27E-05	2.15E-05	24-hour	2	Health	Sch. 6	URT	—	<1%	Note 2URT - Note 4, Table 4	Apr-18
Mercury	7439-97-6	7.71E-06	Calpuff	7.92E-06	7.52E-06	24-hour	2	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Molybdenum	7439-98-7	7.65E-05	Calpuff	7.86E-05	7.46E-05	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	—	Apr-18
Naphthalene	91-20-3	1.42E-06	Calpuff	1.46E-06	1.38E-06	24-hour	22.5	Odour	Sch. 3	Guideline	B1	<1%	Note 2, 3	Apr-18
Naphthalene	91-20-3	1.42E-06	Calpuff	4.60E-05	1.37E-05	10-minute	50	Odour	Sch. 3	Guideline	B1	<1%	Note 2, 3	Apr-18
Nickel	7440-02-0	3.80E-05	Calpuff	1.23E-06	1.23E-06	Annual	0.04	Health	Sch. 3	Standard	B1	<1%	Note 19, Table 2, 3URT - Note 4, Table 4	Apr-18
Nickel	7440-02-0	3.80E-05	Calpuff	3.90E-05	3.70E-05	24-hour	2	Health	Sch. 6	URT	—	<1%	—	Apr-18
Nickel	7440-02-0	3.80E-05	Calpuff	1.23E-06	1.23E-06	Annual	0.4	Health	—	AAV	—	<1%	—	Apr-18
Nitrogen Oxides	10102-44-0	4.26E+00	Calpuff	4.37E+00	4.15E+00	24-hour	200	Health	Sch. 3	Standard	B1	2%	Notes 2, 17	Apr-18
Nitrogen Oxides	10102-44-0	4.26E+00	Calpuff	8.37E+01	2.50E+01	1-hour	400	Health	Sch. 3	Standard	B1	6%	Notes 2, 17	Apr-18
O-terphenyl	84-15-1	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	
PM_{10} (Condensable and Filterable)	N/A	9.01E-02	Calpuff	3.40E-01	3.35E-01	24-hour	50	—	—	AAQC	—	<1%	—	
PM_{10} (Filterable Only)	N/A	7.73E-03	Calpuff	7.95E-03	2.55E-01	24-hour	50	—	—	AAQC	—	<1%	—	
$PM_{2.5}$ (Condensable and Filterable)	N/A	8.73E-02	Calpuff	8.98E-02	3.32E-01	24-hour	30	—	—	AAQC	—	1%	—	
$PM_{2.5}$ (Filterable Only)	N/A	4.89E-03	Calpuff	5.03E-03	2.52E-01	24-hour	30	—	—	AAQC	—	<1%	—	
Pentachlorobenzene	608-93-5	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	80	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
Pentachlorophenol	87-86-5	3.83E-07	Calpuff	3.94E-07	3.73E-07	24-hour	20	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Perylene	198-55-0	7.66E-08	Calpuff	7.87E-08	7.47E-08	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Phenanthrene	85-01-8	1.39E-06	Calpuff	1.43E-06	1.36E-06	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Pyrene	129-00-0	2.98E-07	Calpuff	3.07E-07	2.91E-07	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Selenium	7782-49-2	8.26E-06	Calpuff	8.49E-06	8.05E-06	24-hour	10	Health	Sch. 3	Guideline	B1	<1%	—	Apr-18
Silver	7440-22-4	1.65E-06	Calpuff	1.70E-06	1.61E-06	24-hour	1	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Sulphur Dioxide	7446-09-5	3.80E-04	Calpuff	3.91E-04	3.71E-04	24-hour	275	Health	Sch. 3	Standard	B1	<1%	Effective until July 1, 2023Note 2URT - Note 4, Table 4	Apr-18
Sulphur Dioxide	7446-09-5	3.80E-04	Calpuff	7.47E-03	2.23E-03	1-hour	690	Health	Sch. 3	Standard	B1	<1%	Effective until July 1, 2023Note 2URT - Note 4, Table 4	Apr-18
Tetrachloroethene	127-18-4	1.56E-05	Calpuff	1.61E-05	1.52E-05	24-hour	360	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Tetrachloroethene	127-18-4	1.56E-05	Calpuff	1.61E-05	1.52E-05	24-hour	3600	Health	Sch. 6	URT	—	<1%	—	
Tetralin	119-64-2	6.69E-07	Calpuff	6.87E-07	6.52E-07	24-hour	151.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
Thallium	7440-28-0	1.65E-06	Calpuff	1.70E-06	1.61E-06	24-hour	0.5	Health	Sch. 3	SL-JSL	B2	Below SL-JSL	—	Apr-18
Toluene	108-88-3	1.61E-03	Calpuff	1.65E-03	1.57E-03	24-hour	2000	Not Applicable	Sch. 3	Guideline	B1	<1%	To be updated - Note 5	Apr-18
Total Chromium (and compounds)	7440-47-3	3.56E-05	Calpuff	3.66E-05	3.47E-05	24-hour	0.5	Health	Sch. 3	Standard	B1	<1%	Note 11aURT - Note 4, Table 4	Apr-18
Total Chromium (and compounds)	7440-47-3	3.56E-05	Calpuff	3.66E-05	3.47E-05	24-hour	5	Health	Sch. 6	URT	—	<1%	—	Apr-18
Total Particulate Matter (Condensable and Filterable)	N/A	1.05E-01	Calpuff	3.55E-01	3.50E-01	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	—	Apr-18
Total Particulate Matter (Filterable only)	N/A	2.27E-02	Calpuff	2.71E-01	2.69E-01	24-hour	120	Particulate	Sch. 3	Guideline	B1	<1%	—	Apr-18
Trichloroethane, 1,1,1 -	71-55-6	1.47E-05	Calpuff	1.51E-05	1.43E-05	24-hour	115000	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Trichloroethene	86-42-0	1.42E-05	Calpuff	1.46E-05	1.38E-05	24-hour	0.1	—	—	De Minimus	—	Below De Minimus	—	Apr-18
Trichloroethylene, 1,1,2 -	79-01-6	1.56E-05	Calpuff	1.61E-05	1.52E-05	24-hour	12	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Trichloroethylene, 1,1,2 -	79-01-6	1.56E-05	Calpuff	1.61E-05	1.52E-05	24-hour	1200	Health	Sch. 6	URT	—	<1%	—	Apr-18
Trichlorofluoromethane	75-69-4	2.84E-05	Calpuff	2.92E-05	2.77E-05	24-hour	6000	Health	Sch. 3	Guideline	B1	<1%	Note 10	Apr-18
Vanadium	7440-62-2	8.26E-07	Calpuff	8.49E-07	8.05E-07	24-hour	2	Health	Sch. 3	Standard	B1	<1%	—	Apr-18
Vinyl chloride	75-01-4	2.84E-05	Calpuff	2.92E-05	2.77E-05	24-hour	1	Health	Sch. 3	Standard	B1	<1%	URT - Note 4, Table 4	Apr-18
Vinyl chloride	75-01-4	2.84E-05	Calpuff	2.92E-05	2.77E-05	24-hour	100	Health	Sch. 6	URT	—	<1%	—	Apr-18
Xylenes, m-, p- and o-	1330-20-7	3.13E-03	Calpuff	3.21E-03	3.05E-03	24-hour	730	Not Applicable	Sch. 3	Guideline	B1	<1%	Note 2, 3, 22	Apr-18
Xylenes, m-, p- and o-	1330-20-7	3.13E-03	Calpuff	1.01E-01	3.03E-02	10-minute	3000	Not Applicable	Sch. 3	Guideline	B1	<1%	Note 2, 3, 22	Apr-18
Xylenes, m-, p- and o-	1330-20-7	3.13E-03	Calpuff	3.21E-03	3.05E-03	24-hour	7300	Not Applicable	Sch. 6	URT	—	<1%	—	Apr-18
Zinc	7440-66-6	2.45E-04	Calpuff	2.51E-04	2.39E-04	24-hour	120	Particulate	Sch. 3	Standard	B1	<1%	—	Apr-18

Appendix 5

DYEC Site and Ambient Monitoring Station Locations



DYEC Site and Ambient Monitoring Station Locations

True North

Drawn by: DJH | Figure: 1

Approx. Scale: 1:20,000

Date Revised: Oct 25, 2018

Map Projection: NAD 1983 UTM Zone 17N

DYEC - Region of Durham, Ontario

Project #: 1803743

Appendix 6

Maintenance Summary

Type	W/O Issued	W/O Completed
CMSAF	74	67
CMENV	75	68
CM	608	536
PMSAF	202	201
PM	639	616
CMOUT	05	05

CMSAF – Corrective Maintenance Safety
CMENV – Corrective Maintenance Environmental
CM – Corrective Maintenance
PMSAF – Preventative Maintenance Safety
PM – Preventative Maintenance
CMOUT – Corrective Maintenance Outage

Breakdown by Month

January

- Visitor Center heating boiler annual maintenance completed, and ignitor replaced.
- Glycol leak repaired and heating restored in visitor center walkway.
- Heater repaired for scale house water heater.
- PM's and inspection completed on both refuse cranes including grapples.
- Replaced wire rope on West crane.
- Replaced the Power cable on west crane.
- Martin PM's completed for both boilers
- PM's were completed on IGR and CA fans.
- Replaced packing for soot blower.
- PM's performed on APC conveyors and gearboxes.
- PM's on vibratory conveyor and all the vibratory pans completed.
- Replaced Lighting in APC.
- ECS (electrical control system) switch replaced
- Program logic to have boiler main steam temperature blended rate visible on DCS screen to allow increased awareness and shorten bypassing steam time. Also include a degrees superheat window in the same location.
- Replaced defective heat tracing in ash residue building.
- Replaced temperature probe on boiler 1.
- Repaired furnace pressure switch.
- Replaced Air solenoid for APC recirculation hopper.
- Annual Maintenance on air compressor A.
- Inspection of all CEMS probes and filters replacements.
- AMESA chiller repaired on unit 2 for compressor issue.
- Monthly AMESA PM's performed.
- Monthly CEMS PM's performed.

February

- Continued to blow down the Visitor Center glycol system to remove sedimentation.
- Repaired various drywall cracks in the Visitor's Center bridge
- Repaired crack in linoleum at expansion joint on Visitor's Center bridge
- Glycol leak repaired and heating restored in visitor center walkway.
- PM's and inspection completed on both refuse cranes including grapples.
- Replace control cable on West Refuse crane.
- Martin PM's completed for both boilers
- PM's were completed on IGR and CA fans.
- Repaired #2 boiler leaking drum level gauge
- Repaired broken spring on bottom ash vibratory conveyor
- Repaired 2 broken diaphragms on Unit 2 202 baghouse pulse system
- Preparation for March/19 boiler spring major outages
- Preparation for March/19 turbine outage
- PM's on vibratory conveyor and all the vibratory pans completed.
- Repaired Eddy current separator diverter plate
- Repaired eyewash on cement/pozzolan upper deck
- Repaired heat tracing in various plant areas
- Repaired cement silo vibrator
- Filter changed on Air Compressor A
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.

March

- Lights replaced in washrooms.
- PM's and inspection completed on both refuse cranes including grapples.
- Replaced wire rope on East crane.
- Replaced the power cable on East crane.
- Rebuild/relining of first of three refuse crane grapples completed.
- Replaced housing and bearings for Vibratory conveyor 12.
- Replaced paddles for pug mill B.
- Replaced spring on no 7 main vibratory conveyor.
- Extensive cleaning completed during the March outages.
- Replaced Lighting in Ash residue.
- ECS PLC module replaced and reprogrammed.
- Replaced batteries for emergency lights in boiler building.
- Maintenance on air compressor A.
- Inspection of all probe and filters replacements.

- AMESA PM's complete.
- Monthly CEMS PM's performed.
- Unit 1 outlet MIR 9000 optical bench replaced.

Boiler #1 Major Outage (Mar 17 – Apr 2)

- Cleaning of furnace and rest of the boiler completed.
- Sand Blast cleaning completed on heating surfaces to allow NDT and visual inspections.
- UT grid readings taken throughout the boiler.
- Inconel tube overlay and membrane repairs to original furnace Inconel
- Minor repairs to 2nd pass left and rear water walls; application of new protective Inconel to portions of the rear wall.
- # 3 Super heater – inspected and repaired.
- #2 Super heater - inspected and repaired.
- #4 Super heater tube repairs and Inconel overlay completed.
- Balance of super heaters were inspected.
- Economizer stack was cleaned and inspected.
- Under fire air heaters were cleaned.
- Annual steam drum inspection completed.
- Evaporator jumper tube shields replaced with Inconel overlay.
- Refractory tiles replaced in furnace.
- Various other furnace refractory repaired: chill tube header, burner zone, over fire air nozzle zone and feed table to side wall transition areas.
- Soot blower lance tube nozzles re-drilled and indexing checked as well as PM's completed.
- Secondary and tertiary air nozzles inspected.
- Martin grate and feed table inspections completed; 2 rows of bars removed as well as center division blocks and peripheral castings; PM checks completed to grate and under grate. Several bars replaced.
- Ash discharger cleaned and inspected. No wear plate or ram maintenance required.
- Feed chute water jacket leak repaired. Extensive re-plating to the front wall of the feed chute.
- Furnace IR camera Port cleaning completed.
- Combustion air and IGR fans inspected (gas path, bearings and coupling).
- Replaced packing for soot blower 206.
- Gauge Glass Replaced on Unit 1.
- Boiler safety valves were serviced.
- Boiler main stop valve was rebuilt.
- Boiler hydro tested and proved tight.

Boiler #1 Air Pollution Control Plant Major Outage (Mar 17 – Apr 2)

- Carbon silo PM's completed including blower inspection.
- Lime system PM's completed.
- Quench tower cleaned.
- Improved the recirculation hopper air pulse header system and replaced check valves.
- PM's performed on wetting mixer and reactor.
- PM's performed on APC conveyors and gearboxes.
- Baghouse bags inspected by visolite testing.
- Baghouse hopper inspections completed.
- ID fan inspected (gas path, bearings and coupling).
- Corroded baghouse hopper slide gate was replaced.

Boiler #2 Major Outage (Mar 18 – Apr 3)

- Cleaning of furnace and rest of the boiler completed.
- Sand Blast cleaning completed on heating surfaces to allow NDT and visual inspections.
- UT grid readings taken throughout the boiler.
- Inconel tube overlay and membrane repairs to original furnace Inconel
- Minor repairs to 2nd pass left and rear water walls; application of new protective Inconel to portions of the rear wall.
- # 3 Super heater – inspected and repaired.
- #2 Super heater - inspected and repaired.
- #4 Super heater tube repairs and Inconel overlay completed.
- Balance of super heaters were inspected.
- Economizer stack was cleaned and inspected.
- Under fire air heaters were cleaned.
- Annual steam drum inspection completed.
- Evaporator jumper tube shields replaced with Inconel overlay.
- Refractory tiles replaced in furnace.
- Various other furnace refractory repaired: chill tube header, burner zone, over fire air nozzle zone and feed table to side wall transition areas.
- Soot blower lance tube nozzles re-drilled and indexing checked as well as PM's completed.
- Secondary and tertiary air nozzles inspected.
- Martin grate and feed table inspections completed; Center division blocks and peripheral castings were removed; PM checks completed to grate and under grate. Several bars replaced.
- Ash discharger cleaned and inspected. No wear plate or ram maintenance required.
- Feed chute water jacket leak repaired. Significant re-plating to the front wall of the feed chute was completed.
- Furnace IR camera Port cleaning completed.
- Combustion air and IGR fans inspected (gas path, bearings and coupling).
- Boiler safety valves were serviced.

- Boiler main stop valve was rebuilt.
- Boiler hydro tested and proved tight.

Boiler #2 Air Pollution Control Plant Major Outage (Mar 18 – Apr 3)

- Carbon silo PM's completed including blower inspection.
- Lime system PM's completed.
- Quench tower cleaned.
- PM's performed on wetting mixer and reactor.
- PM's performed on APC conveyors and gearboxes.
- Baghouse bags inspected by visolite testing.
- Baghouse hopper inspections completed.
- ID fan inspected (gas path, bearings and coupling).
- Three (3) corroded baghouse hopper slide gates were replaced.
- Replaced Air solenoid for APC recirculation hopper Unit 2.

Common Steam System (Completed while #1 and #2 Boiler in outage)

- Leaking PCV-002 medium steam pressure reducing valve was opened and repaired.
- Leaking TCV-001 (supplied de-superheating water to PCV-002) was replaced
- Several high pressure drain valves; steam traps and isolation valves were replaced.

Turbine/Generator (Minor Outage, Mar 17 – Apr 3)

- The turbine casing was opened
- Rotor and diaphragms were removed for sandblasting and inspection.
- Turbine bearings removed dissembled and inspected.
- Main stop valve was removed, dissembled and inspected.
- Non-return valves were removed and factory rebuilt.
- Generator exciter, bearings and main junction box were inspected.
- Turbine gearbox was inspected.
- Steam path audit was performed to collect data for reverse engineering.
- #1 control valve stem and lower shaft bushing were found severely worn. Lower bushing had come loose and was spinning on stem causing wear to stem and bushing. New bushing and stem was installed.
- 1st stage spill strips were missing on approximately ½ of diameter. New strips were cut and rolled.
- Packing found to be in good shape throughout turbine.
- Unable to remove 1st stage nozzle block locks from turbine. Removal requires special tooling that was not available at this time and there was a significant risk

of damage if removal was attempted. Drawing for removal tools has been developed.
- Generator air cooler was cleaned and pressure tested.
- #10 main turbine isolation valve mechanism was entirely rebuilt
- #19 turbine isolation valve live packing installed; frozen bypass line was replaced.
- Replaced new GE Cimplicity viewer for TG screen.
- Replaced thermocouple on TG.

April

- Ceiling tiles replaced in Visitor center and scale house.
- PM's and inspection completed on both refuse cranes including grapples.
- Rebuild/relining of spare grapple.
- Martin PM's completed for both boilers
- PM's were completed on IGR and CA fans.
- Replaced packing for soot blower 106.
- Gauge Glass Replaced on Unit 2
- Replaced ECS belt.
- Replaced Lighting in Ash residue.
- Replaced lighting in pug mill area.
- Troubleshooting for TG trips for island mode.
- Replaced thermocouple on TG.
- Replaced Air solenoid for APC recirculation hopper Unit 1.
- Maintenance on air compressor B.
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.

May

- PM's and inspection completed on both refuse cranes and grapples.
- Rebuild/relining of spare grapple ongoing.
- Martin PM's completed for both boilers
- PM's were completed on both IGR and CA fans.
- Replaced packing for soot blower 206.
- Steam drum gauge glass replaced on Unit 1.
- Unit 2 unplanned outage (May 6-9)
    - Grate bar repairs completed (2 bars replaced)
    - Feed table repaired (missing feed bars re-attached)
    - Unit 2 lower furnace scaffolded to top of refractory line, de-clinkered and several tiles repaired.
    - Offline cleaning completed

- Unit 2 unplanned outage (May 18-20)
    - Leak repaired on trailing edge of #3 super heater
    - APC recirculation hopper repaired (fluidizing air and internal baffling)
- Unit 1 on-line cleaning completed May 23.
- PM's completed on conveyors and magnet.
- Replaced Lighting in Ash residue.
- Air solenoid replaced in APC
- Level probe replaced on recirculation hopper
- Replaced lighting in pug mill area.
- Completed maintenance on air compressor A.
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.
- Quarterly CGA and Opacity audits completed.

June

- CEM's Unit 1 MIR 9000 pump replaced as well as probe outlet filter replaced and cleaned
- Residue building doors repaired (both doors are working now)
- Maintenance shop door handle repaired
- Added settling basin pump shaft guarding (safety snapshot item)
- New cover made for ECT lance cover on boiler #1
- Swing gates installed on Ammonia dyke
- Adjust west refuse crane limit switch bracket
- Purged plugged grease nipples in residue loader
- Removed and repaired side plate from dust collector rotary valve in residue
- PM's completed on outside incline conveyor
- West refuse crane limit switch bracket adjusted
- ECS belt re-tracked
- ACC fans 3&4 gearbox oil change completed
- APC emergency lighting repairs
- Lighting and setup for baghouse work ongoing
- Trailer connection for baghouse work completed
- Troubleshooting medium pressure extraction valve issue not opening; replaced defective solenoid
- Unit 1 ECT crusher inspected for mechanical issues (noisy); Cleaning completed.
- Leak repaired for water feature for Visitor Center
- Rebuild of vibrator for ash room conveyor (new housing and bearing)
- Incline conveyor PM's completed
- New door closer installed and repaired the door going to carbon silo
- APC work prep for bag change
- PMs on screw conveyors completed; changed 6 drive belts

- PMs on carbon knife gates completed
- Changed belt on # 2 carbon blower
- Sealed water leaks on carbon silo roof
- Trouble shooting remote fire cannon operation.
- Tested baghouse solenoid valves
- PMs on screw conveyors completed
- Replaced 3 striped studs on bag house 107 lids
- Removed rear covers from #1 Unit Martin grate and completed feed table PM
- Replaced back up alarm on skid steer
- West Crane moved power cable restraint up a foot or so, it found to be too loose
- Pug Mill A motor meggered in junction box; overload was tripped at MCC reset and winding checked
- All wetting mixer water solenoids trigged with 24 V DC from PLC cabinet found okay after water valve replaced on the single nozzle array
- Three baghouse Poppet valve diaphragms replaced with body including coils
- Replaced bulbs in men's washroom at Visitors centre
- Replaced check valves at CEMS probes (inlet #1, inlet #2, outlet #2)
- Cleaned lenses and purge air filters on both CEMS opacity monitors
- Furnace IR cameras cleaned
- Replaced defective solenoids on baghouse pulse system
- Completed PMs on both Unit 1 and Unit 2 Martin grates
- Refuse crane spare grapple overhaul progressed
- ECS new adjustment arm on east side replaced
- Ash discharger Unit 1 and Unit 2 level probe cleaned and back in service
- Unit 1 baghouse thermocouple changed
- Unit 1 west and Unit 2 west gauge glasses replaced
- Spare ECT spray lance repaired (re-welded outer protective cover)
- Ash Discharger work on both units. Level probes were cleaned. #2 was drained down past the lower limit of the probe to reset it. Auto-fill back in service and running as programmed
- Unit 1 APC lime feeder - motor replaced
- Replaced APC Quench tower thermocouple 1-TT-4736-1
- Received new vibrionic switches and ordered ash discharger transmitter
- Changed out Unit 1 steam drum east side gauge glass
- Rebuilt spare gauge glass
- Cleaned IGR and CA fans
- Prepared for service on "B" Air Compressor
- Changed belts on conveyor AH-CV-103
- Assisted Ops to remove cover on #9 conveyor for cleaning
- Unit 2 CEM Inlet MIR 9000 IR source replaced
- Leak repaired on Biocide pump fitting
- Spare grapple overhaul on going
- All 575 to 120/208 volt power supplies for stack testing connected for Ortech
- Re-establish the data link after reboot on HMI for Unit 1 APC Lime feeder

- Triggered 101 and 102 solenoids on APC recirculation hopper (PM checks)
- Trane on site for scheduled PM's on HVAC system
- Repaired CEMS trailer east side air conditioner fault
- Spare grapple overhaul on going
- Unit 1 Reactor differential pressure transmitter cleaned and re-calibrated
- Inspected solenoid for baghouse which were suspected faulty
- Unit 2 opacity filter cleaned
- Repairs to APC emergency lighting completed
- Ammonia containment electrical work ongoing; Wiring in sump pump per safety snapshot finding
- Spare grapple cylinders sent out for rebuild/testing
- West refuse grapple power cable slack adjusted
- ECT lance repair work completed
- Worked on Unit 1 and 2 CEMS wet O2 analyzers
- Replaced the control screen for weather monitoring
- APC emergency light battery replacement complete.
- Replaced thermocouple on unit 2 quench system
- Roof fan overload trips were reset from previous night
- Unit 2 APC baghouse 204 pulse system solenoid replaced with new body
- Grapple overhaul ongoing
- Yard sweeper repaired (filter unplugged)
- Unit 2 CEMS permeation dryer flushed out
- Installed permanent electrical outlet at settling basin
- Rebuilt power supply for emergency lighting
- Trane on site for Visitor Center and main building air conditioner PM's
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.

July

- Weekly inspect and grease on ECS.
- Cleaned IGR fan and checked oil.
- Fabricate guard for settling basin pump.
- Re-hung fire extinguisher at visitor's center.
- Ordered 12 bushing and 6 pins for spare grapple.
- Send out grapple tines.
- Cleaned inside compressor housing.
- Replaced power supply on unit 1 NH3 and back in service.
- West Crane should be in normal operations till next time.
- Weekly inspect and grease on ECS.
- Pug mill Heat Trace; Removed faulty End of line indicator. EOL unit to be replaced when pipe insulated and capped.

- Air cannon; Air valve/Control solenoid block replaced with new MAC unit.
- Ash Discharger level probe replaced with new one and reprogrammed. Probe losing power when faulty connection moved.
- Soot blower pressure setting adjustments
- Recirculation hopper checks for solenoid pulse timing and re-adjustment between each solenoid.
- Hard drive replacement on plant camera drives.
- PM's on fly ash conveyors.
- Pug Mill A Rotary valve not turning on in Manual or Auto; found the VFD had lost its Ethernet link to the PLC and that it would not go even when forced in the logic. Refreshed the Ethernet link and switched PLC processor between run and program mode then back again.
- Air Cannon on Boiler #2; removed the connector from the timer and connected 120 Volts AC directly from closest outlet to find that it would not trigger. Opened connector to find that the white neutral wire loose. Put all back together and triggered okay.
- PM's on conveyors and vibration checks.
- Replaced O/P module for Unit 2 martin.
- Remounted the charging deck camera and installed repaired one with help of spotter security.
- Unit 2 FTUV ongoing troubleshooting did pressure and flow calibration as suggested by Altech and replaced the pressure sensor as well flushed the lines.
- Received rebuild cylinders for the grapple.
- Service tech from SPX on site for air dryer LCD screen troubleshooting.
- Replaced 3 screens on ECS vibratory conveyor.
- Cleaning area under TG to make room for martin parts.
- Soot blower pressure adjustment completed
- Replaced Baghouse Solenoid diaphragm on #206/5 and #205/2.
- Motor disconnected for spare grapple pump.
- Replaced internal cover plate and screws for truck gate control cabinet.
- ACC MCC AC unit repair found bad capacitor and washed both condenser coils still high condensing pressure.
- Removed motor, pump and all hoses from spare grapple, Cleaned oil reservoir, Reassembled pump and hoses, Installed rebuilt cylinders and flushed hoses
- Continued with clean up to move refractory and Martin parts
- Completed clean up in APC between ID fans, under economizer #2 and underneath turbine, Moved all refractory from under turbine to under economizer #2, Moved all martin grate bars to below turbine
- Installed new crane chair in control room
- Flushed sample line on outlet #2.
- Changed secondary filter for a new one at CEMS probe.
- Changed filter inside Sec-C box.
- Replaced all three Millex filters in Mir9000.
- Replaced pump diaphragm in FTUV analyzer.
- Troubleshooting CCW fan 001A vibration switch.

- Belt replacement done for ACC fan.
- Crane Chair Wires crimped terminated labelled and tested in right direction.
- Filter inlet Chamber Ash Discharge Chute High level switch 1-LSH-4859 changed.
- East crane full load weight block strain/ weight transmitter inspection found a loose push on terminal block and a Ty-Rap® that was too tightly bound on the sensor itself. All wires terminations re-tightened and blocks pushed and reseated into position.
- Extensive weld repair done on ash room loader bucket.
- IRIS testing done on Turbine Generator
- Reviewed 600 V distribution breakers in all three MCC's to determine what size Spare Square D masterpact to be purchased.
- Water washed the coils for roof top units for control room and main building.
- Picked up parts for settling basin pump.
- Re-assembled pump for settling basin.
- Re-tapped studs on boiler #1 2nd pass Plattco.
- Topped up the oil for #1 martin.
- Level switch for recirc hopper and replaced #1.
- Check PLC for Pozzolan RAL for any issue.
- CGA audit inlet and outlet completed.
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.

August

- Inspection and adjustment on settling basin pump with new packing.
- Repaired A/C unit in E&I office (new filter coil cleaning done)
- Replaced contactors on Stack PDU A/C unit and back in service.
- Lime silo PLC removed for testing and program reloaded.
- PM's on fly ash conveyors
- PM's on carbon silo.
- Inspected Unit 2 zone 4 run 1 for broken grate bar. None found.
- PM's on overhead cranes completed
- PM's on conveyors completed and APC.
- TG control oil initial testing completed.
- Both CEM's outlet unit permeation dryers flushed. Permeation dryers replaced with new
- Carbon Silo PLC PM check completed.
- CEMS Sec-C box ceramic filter cartridge replaced with new
- CEMS sampling probe secondary filters replaced with new (ceramic filters at back of probes)
- Calibration gas line check valves at probes replaced with cleaned units
- All Millex filters inside MIR9000 replaced

- Vibrator 107 and 108 repaired and returned to service.
- Thermocouple 2-TT-4748 replaced.
- APC Level probe 1-TY-4783-1 replaced
- Recirc hopper HI –level switch replaced 1-LSH-4782-2
- Quench water shut off valve 1-HXV-4758 reconnected.
- Safety shower repair completed for pozzolan and carbon silo.
- PM's on APC completed
- Fly ash screw conveyor 003B replaced (horizontal screw at top of tower next to Residue Building)
- Swing gate fixed as per safety audit service request.
- Speed-pickup adjusted for 003B fly ash screw conveyor
- 003B run ongoing and few adjustment done fully back in service.
- Light change in ladies' washroom.
- SEL on site for black plant investigation – reviewing event files from protective relays
- Lakeland on site for A/C unit service for APC MCC unit 2
- Troubleshooting ash discharger vibrator unit.
- Troubleshooting heat tracing for 003A fly ash conveyor.
- Replaced IR sensor, sec-c box and permeation dryer in CEM's.
- APC Baghouse 203 solenoid diaphragm replaced.
- Repaired U2 broken grate bar (run 2, step 5, bar 7 from boiler RHS); furnace wall tiles were also repaired.
- Repaired leak on U2 main steam line warm up line during start-up from grate bar repairs.
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.

September

- ECS and fly ash conveyor PM's done.
- Lime feed screw spare rebuild complete.
- Ash discharger level probes removed and cleaned with OPS found #2 was in port too close to ram and moved it to the right spot.
- Fluorescent lights changed in stairwell/elevator landings.
- CEM's Unit 2 MIR9000 motor changed for optical bench.
- CEM's Unit 2 MIR9000 motor speed readjusted for optical bench.
- Both units' opacity monitors cleaned.
- TG room computer repair.
- CEM's Unit 2 Permeation dryer replaced on O/L.
- Power cable repaired for vibratory conveyor.
- Conveyor 003B check for pulse encoder signal and repaired.

- West Refuse Crane issue - Re-terminated the cable and tested grapple open close work through few cycles and again stalled. Replaced with new pins for any loose connection.
- Ongoing troubleshooting and found coil burnt for contactor for grapple hydraulic motor LC1F265.
- Front black gate repaired (lifted).
- Office admin door repaired.
- Forklift PM's completed.
- Door PM's completed.
- Outage prep completed.
- Conveyor 003b inspected for trips.
- Reset done on East grapple due to overload trip on east crane.
- CEM's unit 2 Sec-C box fitting changed.
- CEM's OOC NH3 resolved.
- Lights rebuild for outage.
- LOTO/EWP for HV work for outage ongoing.
- West crane limit switch adjustment completed.
- Level probe replaced for Recirc hopper 102.
- Soot blower repaired unit 1.
- Foot valve repaired and rebuild for settling basin pump.
- Drive belt replaced on Pug mill A.
- One of the two Scale house Radiation detectors replaced with new one and old one sent for repair/calibration.
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.

Boiler #1 Minor outage work (Sept 20 – 30):

- Boiler was thoroughly cleaned
- SH4, 2nd pass upper walls and SH3/SH2 tubes were scaffolded and inspected
- Inconel overlay repairs were made to SH4. Several SH4 tubes were replaced due to erosion/corrosion. New tubes were coated with spiral wound Colmonoy.
- Feed table inspection and repairs completed.
- Changed out steam drum gauge glasses
- Feed chute leaks repaired
- APC recirculation hopper fluidizing air system repairs were completed
- APC quench tower, reactor and baghouse cleaning completed
- 1st pass was scaffolded to the top of the tile line. After de-scaling, tile repairs were completed.
- Burner inspection completed.

Boiler #2 Minor outage work (Sept 21 – Oct 1):

- Boiler was thoroughly cleaned
- SH4, 2nd pass upper walls and SH3/SH2 tubes were scaffolded and inspected
- Inconel overlay repairs were made to SH4. Several SH4 tubes were replaced due to erosion/corrosion. New tubes were coated with spiral wound comoloy.
- Feed table inspection and repairs completed.
- Martin grate bars (peripheral) removed for inspection. Side castings removed for inspection and cleaning.
- Changed out steam drum gauge glasses
- APC recirculation hopper fluidizing air system repairs were completed
- APC quench tower, reactor and baghouse cleaning completed
- 1st pass was scaffolded to the top of the tile line. After de-scaling, tile repairs were completed.
- Burner inspection completed.

Turbine work done during cold iron outage period (Sept 21-Oct 1):

- Replaced high pressure valve rack servo valve
- Flushed and replaced control system hydraulic oil
- Replaced “B” control oil pump
- Installed new flow transmitter for extraction steam flow measurement

October

- Rebuild CEMS CPP with new power supply.
- Ordered parts for spare sec-c box.
- RO ORP and PH lines flushed.
- Cable for PH probe replaced.
- Mechanical room door in visitor center fixed.
- Flooring fixed in visitor center.
- Exhaust fan rebuilt and replaced on the admin roof.
- PM’s on conveyors completed.
- CEM’s Wet O2 orifices cleaned, lines flushed, and analyzer calibrated.
- Lights replacement for feed water pump area completed.
- Unit 2 drum level column leak repaired.
- 104 conveyor inspected for noise and repaired
- Spare grapple hooked up to east crane
- Continued with boiler repair and system flushing for Visitor Center heating system.
- Spare Sec-C box rebuilt complete.

- RO solenoid checked for proper operation.
- Martin boiler 1 zone 4 solenoid ordered for replacement.
- Heat tracing repaired in pug mill area.
- Ammonia sensor replacement work started (ammonia containment dyke).
- Boiler Burner inspections completed
- PM's on #7 conveyor, #9 conveyor, vibrators (all), vibration checks for complete plant.
- PM's on ID fans, IGR fans, CA fans and all pumps and motors.
- PM's completed on baghouse pulse jet solenoids; 5 replaced.
- 6 safety work orders completed.
- Unit 2 wetting mixer water solenoids inspected and repaired.
- Boiler MICC camera PM's completed.
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.

November

- CEM's quarterly CGA and Opacity Audits completed.
- Light bulbs change in visitor center.
- Parking lot lights replacement and repair.
- APC pressure transmitter on unit 1 recalibrated.
- Replaced filter on TG lube oil demister.
- ACC A1 fan inspected for oil level and vibration.
- PM's on soot blower completed.
- Signs repaired and reinstalled in main parking lot.
- Inspected the visitor center heating plant recirc pump for glycol.
- Inspected the RO caustic pump and replaced the check valve.
- Inspected the drive overload setting for the ACC fans.
- ACC pressure transmitter LP side troubleshooting.
- Settling Basin Pump overhauled including cleaning the suction line, check valve and new foot valve.
- ECS pickup sensor re-checked.
- Cement unloading switch inspected and resealed for water ingression.
- West crane - all electrical cabinet vacuumed and sensors cleaned on the bridge.
- Dosing pump for RO caustic pump rebuild.
- ECS inspected for belt alignment.
- Unplanned Cold Iron Outage Nov 12 – Repair leak on steam line to turbine.
- #2 Boiler under fire air-preheater cleaned
- Pugmill A rotary feeder taken out for rebuild.
- Tip Floor overhead door repaired.
- AMESA chillers were repaired (new chiller control boards installed). Traps were then installed and both AMESA's were put back in services.

- Inspected safety Edge/Bottom bar for east side overhead door on tipping floor - found ok.
- Replaced batteries on emergency lights in Admin area.
- PM's on fly ash conveyor completed.
- Safety WO's for guarding work completed.
- NH3 Pump found seized – bearings changed out.
- Replaced lights in 13.8KV electrical room.
- Fire water tank cladding repaired.
- Carbon Silo PM's completed.
- Carbon feeder eductor inspected and parts ordered for replacement.
- PM's on refuse crane completed.
- Trap on MICC IR camera repaired.
- Took measurement and ordered shear pins for lime rotary feeder.
- Planned Switch Yard Maintenance completed on Nov 20
- Replaced existing parking lot HPS fitting with trial LED light fixture. If successful, will replace other HPS road lighting fixtures with LED as they require replacement.
- CEMs Permeation dryer flushed and cleaned for all inlet and outlets.
- Took measurement and ordered shear pins for lime rotary feeder.
- Bag house pulse system: 8 solenoids repaired and rebuilt.
- Ammonia sensor calibration for Boiler 1 & 2.
- North and east side ACC curtains installed.
- Replaced belt on lime feed system.
- Lights replaced in ACC and boiler building.
- Inspected EDG transfer switch for elevator issue found and repaired loose wire.
- Completed flushing out the cleaning chemicals in visitor center heating plant and installed new glycol in the system and restoring back to normal.
- Inspection of all probe and filters replacements.
- AMESA PM's complete.
- Monthly CEMS PM's performed.

December

- Light bulb changed in lobby and washrooms.
- Mechanical Seal for glycol pump replaced.
- High noise issue from HVAC system resolved for conference room.
- PM's and inspection completed on both refuse cranes including grapples.
- East Crane power cable repaired.
- Martin PM's completed for both boilers
- PM's were completed on IGR and CA fans.
- Replaced packing for soot blower 202, 106.
- Replaced coupler for HP hydraulic pump B.
- PM's on ECS completed.
- Replaced Motor for Pugmill B.

- Rebuild rotary feeder for Surge bin B.
- Replaced Lighting in Ash residue.
- Replaced lighting in pug mill area.
- Troubleshooting for TG trips for island mode.
- Replaced thermocouple on TG.
- Replaced Air solenoid for APC recirculation hopper Unit 1.
- Maintenance on air compressor B.
- Inspection of all probe and filters replacements.
- Inspection of all probe and filters replacements.
- AMESA PM’s complete.
- Monthly CEMS PM’s performed.