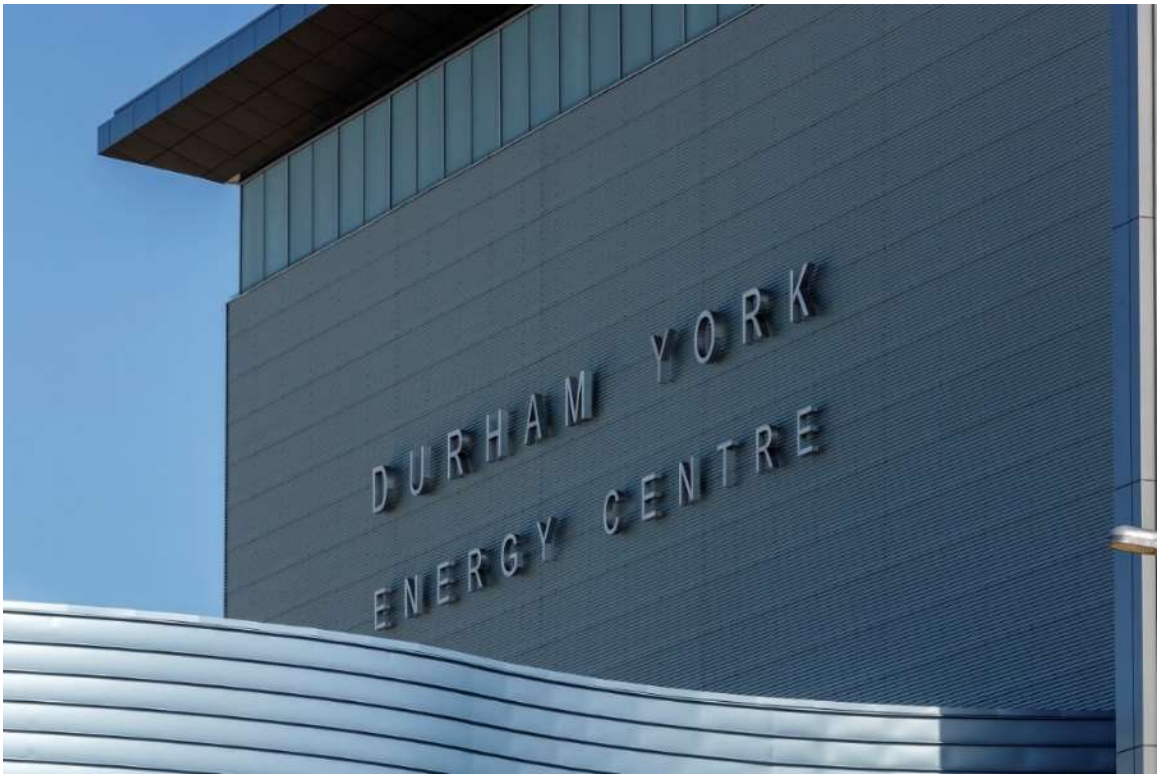
# Durham York Energy Centre

# ECA 7306-8FDKNX

# Annual Report

# 2018



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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 2018 Durham York Energy Centre ("DYEC") Annual Report, covering operations during the 2018 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: ECA 7306-8FDKNX Condition 15(1) Reporting Requirements-Annual Report**

| 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: | | NA |
| (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<br>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; | NA |
| 14.(3) **Daily Activities**<br>The Owner shall maintain an on-Site written or digital record of activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. As a minimum, the record shall include the following: | | NA |
| 14.(3)(a) | date of record and the name and signature of the person completing the report; | Onsite records |
| 14.(3)(b) | quantity and source of the incoming Waste received at the Site; | 2.2, 2.3 |

| ECA Condition 15 | | Section |
|---|---|---|
| 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<br>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**<br>The Owner shall maintain an on-Site written or digital record of activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. As a minimum, the record shall include the following: | | NA |
| 14.(4)(a) | day and time of the activity; | Onsite 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: | 5.1 |

| ECA Condition 15 | | Section |
|---|---|---|
| | (i) the daily minimum and maximum 4-hour average readings for carbon monoxide;<br>(ii) the daily minimum and maximum one-hour average readings for oxygen;<br>(iii) the daily minimum and maximum 10-minute average readings for organic matter;<br>(iv) the daily minimum and maximum 24-hour average readings for sulphur dioxide;<br>(v) the daily minimum and maximum 24-hour average readings for nitrogen oxides;<br>(vi) the daily minimum and maximum 24-hour average readings for hydrogen chloride;<br>(vii) the daily minimum and maximum 6-minute average and 2-hour average opacity readings; and<br>(viii) the daily minimum and maximum one-hour average readings for temperature measurements. | |
| 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<br>Appendix 3<br>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<br>Appendix 2 |
| 14.(4)(i) | all records produced during the Soil Testing; | 8 |

| ECA Condition 15 | | Section |
|---|---|---|
| 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<br>Appendix 5 |
| 14.(4)(l) | all records associated with radiation monitoring of the incoming Waste, including but not limited to:<br>(i) transaction number;<br>(ii) hauler;<br>(iii) vehicle ID;<br>(iv) alarm level;<br>(v) maximum CPS;<br>(vi) µSv/hr;<br>(vii) comment;<br>(viii) background CPS;<br>(ix) driver time in and out; and<br>(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 of the negative pressure in the Tipping Building carried out, as required. | 10.2 |
| 14.(5) **Inspections/Maintenance/Repairs**<br>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:<br>(a) the name and signature of the Trained Personnel that conducted the inspection;<br>(b) the date and time of the inspection; | | 10<br>Appendix 6 |

| ECA Condition 15 | Section |
|---|---|
| (c) the list of any deficiencies discovered, including the need for a maintenance or repair activity;<br>(d) the recommendations for remedial action;<br>(e) the date, time and description of actions (repair or maintenance) undertaken;<br>(f) the name and signature of the Trained Personnel who undertook the remedial action; and<br>(g) an estimate of the quantity of any materials removed during cleaning of the Works. | |
| 14.(6) **Emergency Situations**<br>The Owner shall maintain an on-Site written or digital record of the emergency situations. As a minimum, the record shall include the following:<br>(a) the type of an emergency situation<br>(b) description of how the emergency situation was handled;<br>(c) the type and amount of material spilled, if applicable;<br>(d) a description of how the material was cleaned up and stored, if generated; and<br>(e) the location and time of final disposal, if applicable; and<br>(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**<br>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 | 15 |

| ECA Condition 15 | Section |
|---|---|
| The Owner shall maintain an on-Site written or digital record of training as required by this Certificate. As a minimum, the record shall include the following:<br>(a) date of training;<br>(b) name and signature of person who has been trained; and<br>(c) description of the training provided | |
| **Condition 15 (1)**<br>(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<br>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 |

| ECA Condition 15 | | Section |
|---|---|---|
| (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 composition 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 2018 reporting year, refer *to* **Appendix 1: MECP 2018 EA/ECA Report Submittals.**

## 1.1. Statement of Compliance

During the 2018 calendar year, the DYEC operated in full compliance with the ECA except for one event 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 11.84 MJ/kg and 13.35 MJ/kg with an average of 12.67 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 was collected and inspected at the following transfer stations prior to reloading and transport to DYEC.

<u>Regional Municipality of Durham</u>

Miller Waste Systems - Pickering

Miller Waste Systems – Whitby

Waste Management - Courtice

<u>Regional Municipality of York</u>

York Region Waste Management Centre

Earl Turcott Waste Management Centre

In November of 2018, the Region of Durham began waste excavation from the Blackstock Landfill located at Concession 4, Scugog Township. During 2018, the DYEC processed 1,663 tonnes of this waste, which was mixed in a 5:1 ratio with other MSW at Durham's transfer station prior to delivery to the facility.

## 2.3. Waste Quantity

The Facility's maximum waste thermal treatment rate is 140,000 tonnes per year of waste. In 2018, DYEC received 140,775 tonnes of waste. Refer to **Table 2.**

**Table 2: MSW Material Balance**

| Month/ Total | Durham | York | Total MSW Received | Rejected / Unacceptable MSW | Net MSW Received | Est. Max Daily Onsite Storage |
|---|---|---|---|---|---|---|
| Jan | 10,036 | 3,475 | 13,511 | 0.00 | 13,511 | 2,209 |
| Feb | 7,855 | 1,690 | 9,545 | 0.96 | 9,544 | 2,378 |
| Mar | 7,659 | 1,775 | 9,434 | 0.00 | 9,434 | 2,711 |
| Apr | 9,007 | 2,753 | 11,760 | 0.00 | 11,760 | 2,532 |
| May | 11,692 | 3,048 | 14,741 | 0.48 | 14,740 | 2,825 |
| Jun | 8,606 | 2,428 | 11,035 | 0.00 | 11,035 | 2,718 |
| Jul | 9,153 | 2,864 | 12,017 | 0.51 | 12,016 | 2,420 |
| Aug | 9,813 | 3,255 | 13,068 | 1.05 | 13,067 | 2,417 |
| Sep | 8,495 | 2,219 | 10,714 | 0.00 | 10,714 | 2,325 |
| Oct | 8,282 | 1,920 | 10,202 | 0.94 | 10,201 | 2,584 |
| Nov | 9,841 | 2,550 | 12,390 | 0.00 | 12,390 | 1,876 |
| Dec | 10,336 | 2,027 | 12,363 | 1.24 | 12,361 | 2,445 |
| Total | **110,775** | **30,005** | **140,780** | **5.18** | **140,775** | **-** |

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

The quantity of waste thermally treated in the Boilers during 2018 was 140,000 tonnes. The remaining tonnage received was accumulated as inventory in the waste storage pit.

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 910.48 tonnes on September 5th, 2018.

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 2,825 tonnes (approximately 6,807 $m^3$) on May 18th, 2018. (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 Nonprocessable Items and Unacceptable Waste.

Unacceptable Waste

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

The DYEC truck scale is equipped with an LFM-3 Radiation Detection System. It is a multipurpose, modular system with two remote radiation detector assemblies. The detector assemblies oppose each other so that incoming vehicles can pass between them. Radiation detected includes low, medium and high energy gammas and X-rays. (>20keV). A handheld alarming Personal Radiation Detector (PRD) is also available for use when the mounted detectors are being serviced/calibrated and to precisely locate any radioactive material within the truck. All records associated with the radiation monitoring of incoming waste are stored and available at the DYEC. One load was rejected from the Facility on December 21st due to radiation. It was returned to its transfer station of origin.

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. 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. 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 as per Regulation 347 General – Waste Management, made under the Environmental Protection Act, R.S.O. 1990. During 2018, four (4) shipments of Unacceptable Waste were removed from the Facility within 90 days of generation. These shipments included items such as compressed gas tanks (i.e. propane and helium).

Bulky Nonprocessable Items

Bulky Nonprocessable Items means the incoming Waste received at the Site that cannot be processed in the Equipment. One shipment of Nonprocessable Items was removed from the Facility on December 28th, 2018. 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 2018.

**Table 3: Rejected Waste**

| Date | Category | Manifest No. | Tonnes |
|---|---|---|---|
| **Feb 2** | Unacceptable | YH12357-8 | 0.96 |
| **May 1** | Unacceptable | SA05939-2 | 0.48 |
| **July 20** | Unacceptable | YH11480-9 | 0.51 |
| **Aug 23** | Nonprocessable | N/A | 1.05 |
| **Oct 17** | Unacceptable | CE46197-9 | 0.94 |
| **Dec 28** | Nonprocessable | N/A | 1.24 |
| **Total** | N/A | N/A | 5.18 |

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

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

# 3. Residual Waste

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

## 3.1. Ash

In accordance with ECA Condition 7(7)(d), the 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 Niagara Falls, Ontario. Both bottom and conditioned fly ash are mixed with soil and used as daily/interim cover.

### 3.1.1. Bottom Ash

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

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

In addition, to ensure consistent bottom ash quality between the conduct of the subsequent CASTPs, on a quarterly basis, a one-day sample program was

performed. The results were "rolled up" with the data collected subsequently to and including the last CASTP and evaluated in accordance with statistical procedures. The last CASTP was November 11th to November 15th, 2017. The quarterly sample dates for 2018 were January 31st, May 15th, July 17th and November 10th.

The results in 2018 demonstrated that the bottom ash met the "incinerator ash" definition from Regulation 347 and that it could be managed as a non-hazardous solid waste.

The next CASTP is targeted for fall 2020.

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

### 3.1.2. Fly Ash

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

During 2018, 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 2018.

## 3.2. Metals

Ferrous and non-ferrous metals are 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

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**

| MONTH | BOTTOM ASH | FLY ASH | FERROUS | NON-FERROUS |
|---|---|---|---|---|
| Jan | 2,390 | 1,220 | 266 | 32 |
| Feb | 1,906 | 996 | 210 | 17 |
| Mar | 1,783 | 1,055 | 145 | 30 |
| Apr | 2,276 | 1,099 | 268 | 32 |
| May | 2,948 | 1,270 | 279 | 35 |
| Jun | 2,249 | 1,263 | 209 | 36 |
| Jul | 2,492 | 1,348 | 265 | 49 |
| Aug | 2,374 | 1,454 | 347 | 32 |
| Sep | 1,990 | 1,044 | 321 | 45 |
| Oct | 1,975 | 1,074 | 313 | 32 |
| Nov | 2,241 | 1,090 | 396 | 32 |
| Dec | 2,509 | 1,091 | 20 | 38 |
| **TOTAL** | **27,134** | **14,004** | **3,440** | **408** |

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

**Table 5: Residual Waste Daily Maximum Storage**

| LIMIT/ MONTH | BOTTOM ASH | FLY ASH | FERROUS | NON-FERROUS |
|---|---|---|---|---|
| **LIMIT** | **630** | **700** | **77** | **120** |
| Jan | 221 | 146 | 42 | 17 |
| Feb | 217 | 77 | 37 | 17 |
| Mar | 151 | 113 | 50 | 16 |
| Apr | 196 | 103 | 29 | 17 |
| May | 268 | 109 | 31 | 20 |
| Jun | 210 | 146 | 27 | 18 |
| Jul | 224 | 113 | 27 | 18 |
| Aug | 186 | 108 | 44 | 17 |
| Sep | 272 | 145 | 50 | 16 |
| Oct | 221 | 112 | 35 | 19 |
| Nov | 190 | 105 | 72 | 17 |
| Dec | 223 | 106 | 36 | 18 |

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

# 4. Utilities

## 4.1. Water

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

During 2018, approximately 35,371 $m^3$ of water was drawn from the municipal water system.

## 4.2. Electricity

During 2018, the turbine generated 102,192 MWh of electricity of which 85,412 MWh were exported to the grid.

# 5. Air Emissions

## 5.1. Continuous Emission Monitoring System (CEMS)

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

The CEMS and Data Acquisition System ("DAS") measure and record concentrations on a dry-basis for carbon monoxide (CO), oxygen ($O_2$), sulphur dioxide ($SO_2$), nitrogen oxides ($NO_x$), ammonia ($NH_3$), hydrogen chloride (HCl), hydrogen fluoride (HF), total hydrocarbons (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.

A Relative Accuracy Test Audit ("RATA") and associated system bias evaluations were completed July 31$^{st}$ to August 1$^{st}$, 2018. The RATA was completed under the Facility's normal operating conditions of approximately 100% of the full thermal capacity. Based on the RATA and associated system bias evaluation, all parameters met the performance specifications criteria of the ECA and/or EPS 1/PG/7.

## 5.2. Analyzer Reliability

Schedule "F" of the ECA specifies the continuous monitoring and recording systems used to measure and record the temperature and emissions from the Boilers. The monitors for carbon monoxide, oxygen, hydrogen chloride, nitrogen oxides, sulphur dioxide, total hydrocarbons, opacity and combustion zone temperature are required to be operated and maintained so that accurate data is obtained during a minimum of 95 percent of the valid hours for each unit for each calendar quarter in accordance

with EPS 1/PG/7. For the purposes of reliability calculations, EPS 1/PG/7 defines a valid hour to be an hour during which the generating unit burned fuel and the associated continuous emission monitoring system produced a minimum of 30 minutes of valid data.

Based on the definition above, reliability for 2018 was calculated for each unit for each calendar quarter and confirmed to be greater than 95%. Refer to **Table 6**.

**Table 6: Analyzer Reliability (%)**

| UNIT 1 | $O_2e$ | $SO_2$ | HCl | NOx | CO | Opacity | THC | Comb Temp |
|---|---|---|---|---|---|---|---|---|
| Q1 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 |
| Q2 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 |
| Q3 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Q4 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 |

| UNIT 2 | $O_2e$ | $SO_2$ | HCl | NOx | CO | Opacity | THC | Comb Temp |
|---|---|---|---|---|---|---|---|---|
| Q1 | 100 | 99 | 99 | 99 | 99 | 100 | 99 | 100 |
| Q2 | 100 | 99 | 99 | 99 | 99 | 98 | 99 | 100 |
| Q3 | 100 | 98 | 98 | 98 | 98 | 99 | 97 | 100 |
| Q4 | 100 | 99 | 99 | 99 | 99 | 99 | 99 | 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/Rm3 calculated as the rolling arithmetic average of four (4) hours of data measured by a CEM System that provides data at least once every fifteen minutes, in accordance with condition 6 (2) (c).

On March 2nd, 2018 during the 7:00pm hour, the four-hour carbon monoxide (CO) rolling average on Unit 2 was recorded as 48 mg/$Rm^3$.

Unit 2 had recently completed its scheduled Spring Major Outage. During the subsequent boiler start-up, the trash bed was overly thin, leading to elevated levels of CO. While thickening the trash bed, there was a CO spike that lead directly to the exceedance. Trash feed to the boiler was stopped, combustion parameters were stabilized, and trash was refed to the boiler without further issue. To prevent a

reoccurrence, standard operating procedure was revised to improve trash bed depth control during start-up in accordance with findings from the root cause analysis.

## 5.4. Excursions from Performance Requirements (Condition 6)

During 2018, 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 May 29th and June 1st, 2018 to satisfy the requirement put forth by Durham Region Council to perform emission testing twice per year during the first three years of operation.

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

The average results for the tests conducted along with the respective in-stack emission limits are summarized in **Table 7.**

**Table 7: Voluntary Source Test Summary**

| PARAMETER | LIMIT | UNIT 1 | UNIT 2 |
|---|---|---|---|
| **Total Suspended Particulate Matter (filterable)** | 9 mg/Rm$^3$ | 1.11 | 0.96 |
| **Cadmium** | 7 µg/Rm$^3$ | 0.14 | 0.12 |
| **Lead** | 50 µg/Rm$^3$ | 0.45 | 0.29 |
| **Mercury** | 15 µg/Rm$^3$ | 0.22 | 0.77 |
| **Dioxins and Furans** | 60 pg/Rm$^3$ | 10.4 | 10.5 |
| **Organic Matter** | 50 ppmdv | 0.8 | 1.2 |

| PARAMETER | LIMIT | UNIT 1 | UNIT 2 |
|---|---|---|---|
| **Hydrochloric Acid (HCl)** | 9 mg/Rm$^3$ | 2.0 | 3.8 |
| **Sulphur Dioxide (SO2)** | 35 mg/Rm$^3$ | 0.02 | 0 |
| **Nitrogen Oxide (NOx)** | 121 mg/Rm$^3$ | 109 | 109 |
| **Carbon Monoxide (CO)** | 40 mg/Rm$^3$ | 19.7 | 13.0 |

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 11$^{th}$ and September 14$^{th}$, 2018 to satisfy the requirements of ECA Condition 7(1).

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

The average results for the tests conducted along with the respective in-stack emission limits are summarized in **Table 8.**

**Table 8: Compliance Source Test Summary**

| PARAMETER | LIMIT | UNIT 1 | UNIT 2 |
|---|---|---|---|
| **Total Suspended Particulate Matter (filterable)** | 9 mg/Rm$^3$ | 0.34 | 0.32 |
| **Cadmium** | 7 µg/Rm$^3$ | 0.14 | 0.035 |
| **Lead** | 50 µg/Rm$^3$ | 0.18 | 0.22 |
| **Mercury** | 15 µg/Rm$^3$ | 0.30 | 0.13 |
| **Dioxins and Furans** | 60 pg/Rm$^3$ | 5.05 | 3.22 |
| **Organic Matter** | 50 ppmdv | 0.7 | 1.0 |

| PARAMETER | LIMIT | UNIT 1 | UNIT 2 |
|---|---|---|---|
| **Hydrochloric Acid (HCl)** | 9 mg/Rm$^3$ | 2.9 | 4.1 |
| **Sulphur Dioxide (SO2)** | 35 mg/Rm$^3$ | 0 | 0.1 |
| **Nitrogen Oxide (NOx)** | 121 mg/Rm$^3$ | 109 | 111 |
| **Carbon Monoxide (CO)** | 40 mg/Rm$^3$ | 13.0 | 13.4 |

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 Condition 7(3)(a) of the ECA. During 2018, 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.

ORTECH completed a voluntary compliance emission testing program at the DYEC between May 29th and June 1st, 2018. In conformance with the 2018 AMESA Work Plan, the average velocity measured during the isokinetic particulate and metals, and 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. Six time periods were compared for Unit 1; three particulate and metal tests and three SVOC test periods. Five time periods were compared for Unit 2; two particulate and metal tests and three SVOC test periods.

This velocity comparison demonstrated that the AMESA system continues to collect samples in conformance with isokinetic standards. The isokinetic ratio for Boiler No. 1 and No. 2, was determined to be 102.7% and 101.5% respectively, well within the required range of 95 to 115%.

ORTECH completed the compliance emission testing program at the DYEC between September 11th and September 14th, 2018. During this program, the AMESA samplers were operated to collect validation data for a total short-term sampling period of

approximately 12 hours coincident with the three Reference Method (RM) testing runs for dioxin/furans. This test program procedure was implemented as a continuation of a best efforts approach to evaluate the performance of the AMESA LTSS in accordance with ECA Condition 7.

A summary of this AMESA evaluation data for Unit 1 and Unit 2 is provided below in **Table 9.**

**Table 9: AMESA Results in Comparison to Reference Method**

| Sampling Location and Method | | pg TEQ/Rm$^3$ @11% O2 [(a)] | DEVIATION PERCENTAGE [(b)] |
|---|---|---|---|
| **UNIT 1** | Reference Method Mean | 5.05 | 231 |
| | AMESA Monitor | 16.9 | |
| **UNIT 2** | Reference Method Mean | 3.22 | 58 |
| | AMESA Monitor | 5.04 | |

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)

The dioxin and furan TEQ concentrations as reported by the AMESA system and by the standard Reference Method test were both well below the maximum ECA in-stack emission limit of 60 pg TEQ/Rm$^3$ for both units. However, the deviation between the mean of the three RM tests and the single AMESA monitor sample for Unit 1 was 231%, which exceeds the maximum deviation criterion of 100% listed in BSI Standards Publication - Stationary source emissions – Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs – Part 5: Long-term sampling of PCDDs/PCDFs and PCBs - PD CEN/TS 1948-5:2015 (Table I.1). The percentage deviation between the AMESA and RM test results for Unit 2 were within the limit in the BSI Standard.

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.

# 6. Ambient Air Monitoring

Ambient air monitoring is a requirement of Condition 11 of the Environmental Assessment (EA) and Condition 7(4) of the ECA. Ambient air monitoring is undertaken in accordance with the Ambient Air Monitoring Plan approved by the MECP in May 2012. There are three ambient air monitoring stations. An upwind station located in close proximity to the southwest of the DYEC at the Courtice Water Pollution Control Plant (Courtice WPCP) collects potential contaminant data at a predominantly upwind location. A downwind station located northeast of the DYEC near the intersection of Baseline Road and Rundle Road, collects contaminant data in the most dominant wind direction. A property line station at the northeast corner of the DYEC collects contaminant data from fugitive site emissions from equipment operation on site and operated from January 1 to December 4th, 2018. For a summary list of the ambient air monitoring stations and monitoring parameters, refer to **Table 10.** See **Appendix 5** for ambient air monitoring station locations.

**Table 10: Ambient Air Monitoring Program Summary**

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

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 2018 Annual Ambient Air Monitoring report is due to the MECP by May 15th, 2019. 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. Refer to **Table 11.**

**Table 11: 2018 Ambient Air Monitoring Quarterly Summary of Exceedances**

| 2018 Quarter 1 | 2018 Quarter 2 | 2018 Quarter 3 | 2018 Quarter 4 |
|---|---|---|---|
| Benzo(a)pyrene exceedances occurred on January 2 and February 7, 2018 at the Courtice Road station and January 2, January 26 and February 7, 2018 at the Rundle Road station. | Benzo(a)pyrene exceedances occurred on May 2 and May 26, 2018 at both Courtice and Rundle Road. Total suspended particulate exceedances occurred on May 2, May 14, June 1 and June 19, 2018 at Rundle Road station.<br>Dioxin and Furan exceedance occurred on May 26, 2018 at Courtice station. | There were no exceedances in the third quarter of 2018. | Benzo(a)pyrene exceedances occurred on December 4, 2018 at both Courtice and Rundle Road stations and December 16, 2018 at Rundle Road station. |

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

Measured ambient dioxin and furan concentrations on May 26, 2018 were below the O. Reg 419/05 Schedule 6 Upper Risk Threshold, and a toxicologist's review concluded that the event was not expected to have resulted in an adverse effect on human health or the environment. Further, winds were generally southwesterly over the 24-hour measurement period, for which the Courtice station is upwind of the DYEC. Dioxin and furan

concentrations were also elevated at the Rundle Road station (but below the Ambient Air Quality Criterion), which suggests that elevated concentrations on that day were likely due to a regional emission sources and not the DYEC.

Exceedances of the ambient air standard for total suspended particulate (TSP) in 2018 are attributed to heavy truck and construction activity in the immediate vicinity of the Rundle Road monitoring station.

# 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. The requirement to conduct annual acoustic measurements per the ECA 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.

# 8. Soil Testing

Soil testing is required under Condition 7(10), 13(4) and 15(4) of the ECA and is undertaken in accordance with the Durham York Energy Centre Soils Testing Plan approved by the 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 Condition 13(4)(a) of the ECA and the approved Soils Testing Plan. Soil testing is performed once during each of the first three years of operation, and every three years thereafter until notification is received from the 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.

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 in 2017. Monitoring requirements will be reevaluated after the completion of the 401/418 interchange construction activities. Construction of the 401/418 interchange is anticipated to be completed in 2019-2020.

Groundwater Monitoring Results

Groundwater samples are collected annually in the spring, summer and fall through a series of dedicated on-site monitoring wells. Preliminary data for 2018 suggests the groundwater analytical results for the DYEC have consistently satisfied their respective Ontario Drinking Water Standard (ODWS) since monitoring began at each monitoring well, with the exception of chloride from the deicing salt influence. The groundwater analytical results suggest that DYEC operations have not had an adverse effect on groundwater quality at the Site.

An interpretive analysis for the 2018 groundwater and surface water monitoring activities will be discussed in the pending groundwater and surface water annual report. This report, covering the 2018 monitoring period, will be submitted to the MECP by April 30th, 2019, 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 12** for the groundwater well and in-situ surface water sonde locations and parameters tested.

**Table 12: 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 2018 groundwater and surface water monitoring activities meet the compliance requirements of the EA, the ECA and the approved Groundwater and Surface Water Monitoring Plan. Groundwater and surface water monitoring results and correspondence available to date are posted on the DYEC website in accordance with ECA Condition 16 – Public Access to Documentation.

# 10. Inspections, Maintenance and Repairs

## 10.1. Containment Protocol Inspections

The ECA outlines requirements to confirm the effectiveness of the containment of conveyors, tanks and silos in various 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 13.**

**Table 13: Containment Periodic Inspections**

| CONTAINMENT ENCLOSURE | PERIODIC INSPECTION |
|---|---|
| Tipping Building | • Calibration of Boiler Combustion Air Flow Venturi Transmitter<br>• Daily Inspection for Dust/Odour Leaks |
| Refuse Pit | • Groundwater Monitoring |
| Grizzly and Residue Bldgs. | • Daily General Inspections<br>• Quarterly USEPA Method 22 |
| Ammonia Tank | • Daily General Inspection<br>• Annual calibration of alarm systems |
| Cement and Pozzolan Silos | • Daily General Inspections<br>• Quarterly USEPA Method 22 |
| Lime and Carbon Silos | • Daily General Visual Inspection<br>• Quarterly USEPA Method 22 |
| Diesel Fueling Station | • Daily General Visual Inspections |
| Fire Pump Diesel Tanks | • Daily General Visual Inspections |
| Exterior Bottom and Fly Ash Conveyors | • Daily General Inspection<br>• Quarterly USEPA Method 22 |
| Settling Basin | • Daily General Visual Inspections<br>• 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 2018, 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, as per ECA Condition 14 (2).

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

## 10.5. Sewage Works

In accordance with ECA Condition 5, Inspections and Maintenance of the Works, (7), the Owner shall inspect the Works at least once a year and, if necessary, clean and maintain the Works to prevent the excessive build-up of sediments and/or vegetation.

The annual sewage works inspection was performed in December 2018. No deficiencies were found.

# 11. Operational Issues and Mitigation Measures

Condition 6(2)(h) of the ECA, states:

> The inlet temperature into each baghouse of the APC Equipment of the Boilers shall not be less than 120°C and not more than 185°C.

Schedule "F" states:

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

On September 29th, 2018 during the 11:00pm hour, the one-hour average inlet baghouse temperature on Unit 1 was recorded as 115°C.

The root cause was determined to be evaporative cooling of the baghouse inlet thermocouples due to excessive water addition at the wetting mixer pugmill. This evaporative cooling caused the erroneously low temperature reading. An independent check of the baghouse outlet thermocouple during this time frame showed no temperature readings below 136°C which is well above the minimum baghouse inlet compliance temperature of 120°C.

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

The DYEC entered a cold iron outage (both units offline) on the following occasions during 2018.

| DATE | CAUSE |
|---|---|
| April 4 | Turbine trip |
| April 6 – April 7 | Boiler safety valve adjustments |
| April 15 – April 16 | Wilson Road Transfer Station breaker trip |
| April 19 | Turbine steam valve repair |
| May 2 | Turbine trip |
| June 20 | Turbine trip |
| July 19 | Turbine steam bypass line rupture disc failure |

| DATE | CAUSE |
|---|---|
| September 21 to September 22 | Storm related facility outage |

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 2018 with potential to impact the environment.

# 12. Emergency Situations

There were no reportable spills to air, land or water during 2018.

There were no other emergency situations during 2018.

# 13. Complaints and Inquiries

The monitoring of complaints and inquiries is a requirement of Condition 6 of the EA and Condition 10 of the ECA. A Complaint and Inquiry Log submission is provided to the 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 2018 complaints and inquiries is listed in the **Table 14.**

**Table 14: Complaint and Inquiry Summary**

| 2018 | DURHAM | YORK | COVANTA | TOTAL |
|---|---|---|---|---|
| **Complaints to DYEC directly** | 5 | 0 | 0 | **5** |
| **Complaints to Regional Councils** | 0 | 0 | 0 | **0** |
| **Inquiries to DYEC directly** | 12 | 1 | 0 | **13** |
| **Inquiries to Regional Councils** | 0 | 0 | 0 | **0** |

Of the five (5) complaints received in 2018, no complaints were related to suspected emissions from the DYEC.

# 14. Energy from Waste Advisory Committee

The Energy from Waste Advisory Committee (EFWAC) is a requirement of Condition 8 of the EA and Condition 17 of the ECA for the DYEC. The committee was established in 2011 with membership outlined in EA Condition 8. The meetings are advertised on the DYEC website in advance of upcoming meetings. The EFWAC is governed by their Terms of Reference which outlines the role of the EFWAC, presents guidelines for how the committee will operate, the membership composition, and when meetings will take place. The committee is chaired by a facilitator hired by the Regions of Durham and York. A summary of the 2018 EFWAC Committee meeting is provided in **Table 15.**

**Table 15: EFWAC Meeting Summary**

| EFWAC MEETING # | DATE | TIME | AGENDA TOPICS |
|---|---|---|---|
| 15 | November 28, 2018 | 2:30-4:30PM | Durham York Energy Centre (DYEC) 2017 Annual Compliance Report (ECA) |

The minutes from the meeting held November 28, 2018 will be posted to the DYEC website following acceptance of the draft minutes by the members at the next meeting.

# 15. Training

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

# 16. Comparison to Report Results from Prior Years

Stack Emissions

Since the May 2016 Unit 1 dioxin and furan stack test exceedance, there have been 5 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 and 2017, 2018 bottom ash testing results continue 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) and one instance where Dioxin and Furans exceeded the 24-hour Ambient Air Quality Criteria (AAQC) by 9%. Benzo(a)pyrene exceeded criteria on several occasions at the Courtice Road and Rundle Road monitoring stations. Additionally, the Rundle Road station, which is located near the construction activities for the development of the 418, exceeded criteria for TSP. The dioxin and furan exceedance occurred at the Courtice station, however, the Rundle and Crago Road stations also experienced elevated dioxin and furan emissions. The elevated dioxin and furan values were still well below the MECP Upper Risk Threshold. Coincidentally, the DYEC stack testing was carried out several days later with results showing DYEC emissions well below their respective limits. Further, wind direction during the time of the exceedance showed that the Courtice station, which recorded the highest dioxin and furan concentration also had winds blowing from the DYEC to the Courtice station the least amount of time.

Groundwater and Surface Water

Similar to previous years, the 2018 groundwater and surface water monitoring activities meet the compliance requirements of the EA, the ECA and the approved Groundwater and Surface Water Monitoring Plan.

Soil

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 2017, complaints decreased by 17%. Similarly, inquires decreased by 62%. Complaints and inquiries continue to be recorded. There has been an overall decrease in complaints in 2018 compared to previous years. This is likely due to the fact that the facility has been operating at a steady state and there has been no cause for concern delivered through Regional Council reports related to the DYEC. The results to date, as shown in the required report submittals, have shown no adverse effects, anomalies or impacts on the environment.

# 17. Recommendations for Improvement

## 17.1. Status of Recommendations from the 2017 Annual Report

Recommendations for 2018

1) Achieve ISO14001:2015 Environmental Management System certification

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

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: Turbine energy production rather than site power usage was the focus for 2018. A plan was developed to improve power production. These plans will be initiated during the scheduled March 2019 turbine maintenance outage.

Ammonia usage was successfully reduced without impacting NOX reduction performance.

Optimization of reagent usage is continuing into 2019.

## 17.2. Recommendations for 2019

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

- Maintain ISO14001:2015 Environmental Management System certification
- Execute the AMESA Work Plan 2018.
- Execute plans to improve turbine generator power production during March 2019 scheduled outage.

- Continue to optimize facility operations to decrease reagent consumption while maintaining full compliance with all regulatory limits

# Appendix 1

## MECP 2018 EA/ECA Report Submittals

| MECP 2018 EA/ECA Report Submittals | |
|---|---|
| **Report Type** | **Submission Date** |
| **Ambient Air Monitoring Reports as per ECA 7(4)(b), EA 11.7, Operations Manual for AQ Monitoring in Ontario** | |
| 2017 Ambient Air Q4 Report | February 14th, 2018 |
| 2017 Ambient Air Annual Report | May 15th, 2018 |
| 2018 Ambient Air Q1 Report | May 15th, 2018 |
| 2018 Ambient Air Q2 Report | August 10th, 2010 |
| 2018 Ambient Air Q3 Report | November 14th, 2018 |
| 2018 Ambient Air Q4 Report | February 14th, 2019 |
| **Annual Report as per ECA (15)(1)** | |
| 2017 Annual Report | March 28th, 2018 |
| **Complaint and Inquiry Logs as per ECA 10(1), ECA 10(2), 14(7)** | |
| January Complaint & Inquiry Log | March 9th, 2018 |
| February Complaint & Inquiry Log | May 16th, 2018 |
| March Complaint & Inquiry Log | May 16th, 2018 |
| April Complaint & Inquiry Log | May 16th, 2018 |
| May Complaint & Inquiry Log | August 15th, 2018 |
| June Complaint & Inquiry Log | September 24th, 2018 |
| July Complaint & Inquiry Log | September 24th,2018 |
| August Complaint & Inquiry Log | September 24th, 2018 |
| September Complaint & Inquiry Log | January 4th, 2019 |
| October Complaint & Inquiry Log | January 4th, 2019 |
| November Complaint & Inquiry Log | January 4th, 2019 |
| December Complaint & Inquiry Log | |
| **Compliance Monitoring Report as per EA 5.4** | |
| 2018 Compliance Monitoring Report | November 2nd, 2018 |

| **MECP 2018 EA/ECA Report Submittals** | |
|---|---|
| **Report Type** | **Submission Date** |
| **Groundwater and Surface Water Monitoring Reports as per ECA 7(14)(b), EA 20.8** | |
| 2017 Annual Groundwater and Surface Water Reports | April 30th, 2018 |
| **Noise Monitoring and Mitigation Reports- Acoustic Audit Reports as per Noise Monitoring Plan** | |
| 2018 Acoustic Audit | N/A |
| **Odour Management and Mitigation Monitoring Report as per ECA 8(9)(b)** | |
| 2018 Odour Management and Mitigation Monitoring Report | November 26th, 2018 |
| **Soil Testing Report as per ECA 15(4)** | |
| 2018 Soil Test Report | N/A |
| **Source Test as per ECA 7(1), Schedule E(1), ECA Schedule E(7) and Schedule E(8) respectively** | |
| Source Test Pre-test Plan | July 25th, 2018 |
| Notification to MECP 15 days prior to Source test | July 25th, 2018 (included in pre-test plan submission) |
| Source Test Report | December 5th, 2018 |
| **Third Party Audit Report as per ECA 15(3), EA 16** | |
| 2018 Third Party Operations Audit | April 30th, 2018 |
| **Waste Diversion Monitoring Report as per EA 10.4** | |
| 2017 Annual Waste Diversion Reports | Durham-November 2nd, 2018 |

# Appendix 2

Bottom Ash Sampling

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**DURHAM YORK ENERGY CENTRE**
**SUMMARY OF LABORATORY RESULTS:**
**BOTTOM ASH - LOSS ON IGNITION (ASTMD5865)**
**Q4 2017 CASTP plus Q1 to Q4 Q2 2018**

| 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 | 16-May-18 | 13.07 | 0.31 |
| DYEC/BA/180515/2SGS | 16-May-18 | 12.78 | 0.35 |
| DYEC/BA/180515/3SGS | 16-May-18 | 13.06 | 0.38 |
| DYEC/BA/180515/4SGS | 16-May-18 | 12.64 | 0.77 |
| DYEC/BA/180717/SGS-1 | 17-Jul-18 | 12.99 | < 0.60 |
| DYEC/BA/180717/SGS-2 | 17-Jul-18 | 10.65 | < 0.62 |
| DYEC/BA/180717/SGS-3 | 17-Jul-18 | 10.45 | < 0.62 |
| DYEC/BA/180717/SGS-4 | 17-Jul-18 | 10.63 | < 0.62 |
| DYEC/BA/181110/SGS-1 | 18-Nov-18 | 17.69 | 0.57 |
| DYEC/BA/181110/SGS-2 | 18-Nov-18 | 17.56 | 0.57 |
| DYEC/BA/181110/SGS-3 | 18-Nov-18 | 17.58 | 0.57 |
| DYEC/BA/181110/SGS-4 | 18-Nov-18 | 17.74 | 0.57 |

**CONSOLIDATED COMPOSITE SAMPLE STATISTICAL RESULTS**

| | |
|---|---|
| NUMBER OF SAMPLES | 36 |
| DEGREES OF FREEDOM | 35 |
| SAMPLE MEAN (XBAR) | 0.62 |
| SAMPLE VARIANCE (S^2) | 0.03 |
| STANDARD DEVIATION (S) | 0.16 |
| STD ERROR (S XBAR) | 0.03 |
| **80% CI Upper Limit (actual)** | **0.66** |
| | |
| MAXIMUM | 1.23 |
| MINIMUM | 0.31 |
| | |
| **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 (ASTMD5865)
## 2018

| SAMPLE ID NUMBER | SAMPLE DATE | MOISTURE TOTAL (%) | LOSS ON IGNITION (Wt %) |
|---|---|---|---|
| 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 | 16-May-18 | 13.07 | 0.31 |
| DYEC/BA/180515/2SGS | 16-May-18 | 12.78 | 0.35 |
| DYEC/BA/180515/3SGS | 16-May-18 | 13.06 | 0.38 |
| DYEC/BA/180515/4SGS | 16-May-18 | 12.64 | 0.77 |
| DYEC/BA/180717/SGS-1 | 17-Jul-18 | 12.99 | < 0.60 |
| DYEC/BA/180717/SGS-2 | 17-Jul-18 | 10.65 | < 0.62 |
| DYEC/BA/180717/SGS-3 | 17-Jul-18 | 10.45 | < 0.62 |
| DYEC/BA/180717/SGS-4 | 17-Jul-18 | 10.63 | < 0.62 |
| DYEC/BA/181110/SGS-1 | 18-Nov-18 | 17.69 | 0.57 |
| DYEC/BA/181110/SGS-2 | 18-Nov-18 | 17.56 | 0.57 |
| DYEC/BA/181110/SGS-3 | 18-Nov-18 | 17.58 | 0.57 |
| DYEC/BA/181110/SGS-4 | 18-Nov-18 | 17.74 | 0.57 |

## CONSOLIDATED COMPOSITE SAMPLE STATISTICAL RESULTS

| | |
|---|---|
| NUMBER OF SAMPLES | 16 |
| DEGREES OF FREEDOM | 15 |
| SAMPLE MEAN (XBAR) | 0.55 |
| SAMPLE VARIANCE (S^2) | 0.01 |
| STANDARD DEVIATION (S) | 0.11 |
| STD ERROR (S XBAR) | 0.03 |
| **80% CI Upper Limit (actual)** | **0.59** |
| | |
| MAXIMUM | 0.77 |
| MINIMUM | 0.31 |
| | |
| **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 2018

| 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 |

# Appendix 3

Covanta Durham York Renewable Energy Limited partnership, Durham York Energy Centre, Spring 2018 Voluntary Compliance Emission Testing Program

- Executive Summary
- CalPuff Modelling for May 2018 Voluntary Source Testing at Durham York Energy Centre (Emission Summary Table)

## EXECUTIVE SUMMARY

ORTECH Consulting Inc. (ORTECH) completed a voluntary compliance emission testing program at the Durham York Energy Centre (DYEC) located in Courtice, Ontario between May 29 and June 1, 2018. The emission testing program was performed to satisfy the agreement the facility has with the Regions of Durham and York to conduct emission testing twice per year.

Ontario Ministry of 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". This program is the sixth comprehensive Schedule E source testing program conducted at the facility; the initial source testing program was conducted in September/October 2015, a voluntary test program was conducted in May 2016, the second compliance test program was conducted in October/November 2016, a voluntary test program was conducted in May 2017, and the third compliance test program was conducted in October 2017.

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

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 Fall of 2017, the data recorded by the DYEC CEMS was used to assess against the in-stack emissions limits detailed in Schedule C of the ECA for hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide. Note the DYEC CEMS data for the days when isokinetic testing was performed at each unit (May 29 to June 1, 2018) was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA. Concentration data measured by ORTECH on May 29, 2018 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)* | - | - | - | 375 | - |
| Average Combustion Zone Temp. (°C)* | - | - | - | 1242 | - |
| Steam (tonnes/day)* | - | - | - | 799 | - |
| MSW Combusted (tonnes/day)* | - | - | - | 214 | - |
| $NO_X$ Reagent Injection Rate (liters/day)* | - | - | - | 502 | - |
| Carbon Injection (kg/day)* | - | - | - | 126 | - |
| Lime Injection (kg/day)* | - | - | - | 4179 | - |
| Filterable Particulate (mg/Rm$^3$) (1) | 0.78 | 1.16 | 1.39 | 1.11 | 9 |
| $PM_{10}$ with Condensable (mg/Rm$^3$) (1) | <3.84 | <3.97 | <3.54 | <3.79 | - |
| $PM_{2.5}$ with Condensable (mg/Rm$^3$) (1) | <3.77 | <3.77 | <3.47 | <3.67 | - |
| Hydrogen Fluoride (mg/Rm$^3$) (1) | <0.10 | <0.11 | <0.11 | <0.11 | - |
| Ammonia (mg/Rm$^3$) (1) | 1.06 | 0.89 | 0.72 | 0.89 | - |
| Cadmium (µg/Rm$^3$) (1) | 0.13 | 0.14 | 0.14 | 0.14 | 7 |
| Lead (µg/Rm$^3$) (1) | 0.44 | 0.38 | 0.53 | 0.45 | 50 |
| Mercury (µg/Rm$^3$) (1) | 0.20 | 0.24 | 0.20 | 0.22 | 15 |
| Antimony (µg/Rm$^3$) (1) | 0.055 | 0.077 | 0.24 | 0.12 | - |
| Arsenic (µg/Rm$^3$) (1) | 0.051 | <0.048 | <0.049 | <0.049 | - |
| Barium (µg/Rm$^3$) (1) | 2.74 | 2.90 | 2.86 | 2.84 | - |
| Beryllium (µg/Rm$^3$) (1) | <0.046 | <0.048 | <0.049 | <0.048 | - |
| Chromium (µg/Rm$^3$) (1) | 0.79 | 1.33 | 1.53 | 1.22 | - |
| Cobalt (µg/Rm$^3$) (1) | 0.12 | 0.13 | 0.16 | 0.14 | - |
| Copper (µg/Rm$^3$) (1) | 0.97 | 0.98 | 0.95 | 0.97 | - |
| Molybdenum (µg/Rm$^3$) (1) | 5.14 | 5.63 | 5.50 | 5.42 | - |
| Nickel (µg/Rm$^3$) (1) | 3.57 | 2.98 | 3.15 | 3.23 | - |
| Selenium (µg/Rm$^3$) (1) | <0.23 | <0.24 | <0.24 | <0.24 | - |
| Silver (µg/Rm$^3$) (1) | <0.046 | 0.062 | <0.049 | <0.052 | - |
| Thallium (µg/Rm$^3$) (1) | <0.046 | <0.048 | <0.049 | <0.048 | - |
| Vanadium (µg/Rm$^3$) (1) | 0.048 | 0.10 | 0.060 | 0.069 | - |
| Zinc (µg/Rm$^3$) (1) | 3.85 | 4.40 | 7.49 | 5.25 | - |
| Dioxins and Furans (pg TEQ/Rm$^3$) (3) | <11.4 | <9.91 | <9.84 | <10.4 | 60 |
| Total Chlorobenzenes (ng/Rm$^3$) (1) | <516 | <515 | <472 | <501 | - |
| Total Chlorophenols (ng/Rm$^3$) (1) | <334 | <327 | <318 | <326 | - |
| Total PAHs (ng/Rm$^3$) (1) | <787 | <360 | <316 | <488 | - |
| VOCs (µg/Rm$^3$) (1) | <61.7 | <48.3 | <76.6 | <62.2 | - |
| Aldehydes (µg/Rm$^3$) (1) | <493 | <527 | <882 | <634 | - |
| Total VOCs (µg/Rm$^3$) (1) (4) | <555 | <575 | <959 | <696 | - |
| Quench Inlet Organic Matter (THC) (ppm, dry) (2) | 0.6 | 0.9 | 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)* | - | - | - | 375 | - |
| Average Combustion Zone Temp. (°C)* | - | - | - | 1318 | - |
| Steam (tonnes/day)* | - | - | - | 800 | - |
| MSW Combusted (tonnes/day)* | - | - | - | 211 | - |
| $NO_X$ Reagent Injection Rate (liters/day)* | - | - | - | 565 | - |
| Carbon Injection (kg/day)* | - | - | - | 125 | - |
| Lime Injection (kg/day)* | - | - | - | 4242 | - |
| Filterable Particulate (mg/Rm$^3$) [1] | 1.00 | 1.04 | 0.85 | 0.96 | 9 |
| $PM_{10}$ with Condensable (mg/Rm$^3$) [1] | <6.45 | <4.09 | <3.63 | <4.72 | - |
| $PM_{2.5}$ with Condensable (mg/Rm$^3$) [1] | <6.39 | <4.02 | 3.56 | <4.66 | - |
| Hydrogen Fluoride (mg/Rm$^3$) [1] | <0.10 | <0.11 | <0.11 | <0.11 | - |
| Ammonia (mg/Rm$^3$) [1] | 0.54 | 0.50 | 0.40 | 0.48 | - |
| Cadmium (µg/Rm$^3$) [1] | 0.20 | 0.082 | 0.065 | 0.12 | 7 |
| Lead (µg/Rm$^3$) [1] | 0.38 | 0.29 | 0.20 | 0.29 | 50 |
| Mercury (µg/Rm$^3$) [1] | 1.20 | 0.81 | 0.30 | 0.77 | 15 |
| Antimony (µg/Rm$^3$) [1] | <0.045 | 0.049 | <0.045 | <0.047 | - |
| Arsenic (µg/Rm$^3$) [1] | <0.045 | <0.044 | <0.045 | <0.045 | - |
| Barium (µg/Rm$^3$) [1] | 2.63 | 2.49 | 2.48 | 2.53 | - |
| Beryllium (µg/Rm$^3$) [1] | <0.045 | <0.044 | <0.045 | <0.045 | - |
| Chromium (µg/Rm$^3$) [1] | 1.63 | 2.86 | 3.12 | 2.54 | - |
| Cobalt (µg/Rm$^3$) [1] | 0.16 | 0.17 | 0.28 | 0.20 | - |
| Copper (µg/Rm$^3$) [1] | 1.00 | 1.28 | 2.59 | 1.63 | - |
| Molybdenum (µg/Rm$^3$) [1] | 5.63 | 5.29 | 5.20 | 5.37 | - |
| Nickel (µg/Rm$^3$) [1] | 4.94 | 5.70 | 12.2 | 7.63 | - |
| Selenium (µg/Rm$^3$) [1] | <0.23 | <0.22 | <0.22 | <0.22 | - |
| Silver (µg/Rm$^3$) [1] | 0.079 | 0.19 | <0.045 | <0.10 | - |
| Thallium (µg/Rm$^3$) [1] | <0.045 | <0.044 | <0.045 | <0.045 | - |
| Vanadium (µg/Rm$^3$) [1] | 0.043 | 0.039 | 0.049 | 0.044 | - |
| Zinc (µg/Rm$^3$) [1] | 4.47 | 13.7 | 8.27 | 8.83 | - |
| Dioxins and Furans (pg TEQ/Rm$^3$) [3] | <10.5 | <10.1 | <10.9 | <10.5 | 60 |
| Total Chlorobenzenes (ng/Rm$^3$) [1] | <494 | <471 | <481 | <482 | - |
| Total Chlorophenols (ng/Rm$^3$) [1] | <281 | <274 | <282 | <279 | - |
| Total PAHs (ng/Rm$^3$) [1] | <390 | <275 | <373 | <346 | - |
| VOCs (µg/Rm$^3$) [1] | <86.3 | <79.2 | <85.0 | <83.5 | - |
| Aldehydes (µg/Rm$^3$) [1] | <509 | <700 | <579 | <596 | - |
| Total VOCs (µg/Rm$^3$) [1] [4] | <595 | <779 | <664 | <680 | - |
| Quench Inlet Organic Matter (THC) (ppm, dry) [2] | 0.8 | 0.9 | 1.8 | 1.2 | 50 |

* based on process data provided by Covanta

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

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

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

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

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) | 11.3 | 19.7 | 27.8 | 40 |
| | Hydrogen Chloride ($mg/Rm^3$) (2) | 1.8 | 2.0 | 2.2 | 9 |
| | Nitrogen Oxides ($mg/Rm^3$) (2) | 108 | 109 | 110 | 121 |
| | Sulphur Dioxide ($mg/Rm^3$) (2) | 0 | 0.02 | 0.1 | 35 |
| Boiler No. 2 | Carbon Monoxide ($mg/Rm^3$) (1) | 8.3 | 13.0 | 30.3 | 40 |
| | Hydrogen Chloride ($mg/Rm^3$) (2) | 3.6 | 3.8 | 4.4 | 9 |
| | Nitrogen Oxides ($mg/Rm^3$) (2) | 108 | 109 | 110 | 121 |
| | Sulphur Dioxide ($mg/Rm^3$) (2) | 0 | 0 | 0 | 35 |

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

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

The CALPUFF dispersion modelling (using Version 6.263 as requested by the MECP) for the May/June 2018 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 794 tonnes of steam per day for each Boiler (approximately 98.3% of maximum continuous rating). The maximum continuous rating for the facility is 1614.7 tonnes of steam per day for the two Boilers combined (33.64 tonnes of steam per hour or 807.4 tonnes per day for each Boiler).
- The in-stack concentrations of the components listed in the ECA were all below the concentration limits provided in Schedule C of the ECA.
- Using CALPUFF dispersion modelling techniques, the predicted maximum point of impingement concentrations, based on the average test results for both boilers, show DYEC to be operating well below all current standards in Regulation 419/05 (Schedule 3) under the Ontario Environmental Protection Act and other 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 [µg/m³] | Averaging Period | MOECC POI Limit [µg/m³] | Limiting Effect | Schedule | Source | Benchmark | Percentage of MOECC Limit [%] | Notes | Version of Date of ACB List |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 – methylnaphthalene | 90-12-0 | 7.84E-07 | Calpuff | 8.09E-07 | 24-hour | 35.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 1,2,4 – Trichlorobenzene | 120-82-1 | 4.23E-07 | Calpuff | 4.37E-07 | 24-hour | 400 | Particulate | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| 1,2,4,5-Tetrachlorobenzene | 95-94-3 | 1.17E-07 | Calpuff | 1.21E-07 | 24-hour | 1 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 1,2-Dichlorobenzene | 95-50-1 | 9.90E-07 | Calpuff | 1.98E-05 | 1-hour | 30500 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| 2 – methylnaphthalene | 91-57-6 | 7.05E-07 | Calpuff | 7.29E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| 2,3,4,6-Tetrachlorophenol | 58-90-2 | 6.73E-07 | Calpuff | 6.95E-07 | 24-hour | 0.75 | Health | — | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 2,4,6-Trichlorophenol | 88-06-2 | 6.73E-07 | Calpuff | 6.95E-07 | 24-hour | 1.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 2,4-Dichlorophenol | 120-83-2 | 7.03E-07 | Calpuff | 7.26E-07 | 24-hour | 33.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 3-Methylchloranthene | 56-49-5 | 3.36E-07 | Calpuff | 3.47E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | | Apr-18 |
| 7,12-Dimethylbenz(a)anthracene | 57-97-6 | 6.73E-08 | Calpuff | 6.95E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | | Apr-18 |
| Acenaphthene | 83-32-9 | 1.43E-07 | Calpuff | 1.47E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Acenaphthylene | 208-96-8 | 1.56E-07 | Calpuff | 1.61E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Acetaldehyde | 75-07-0 | 2.40E-03 | Calpuff | 2.48E-03 | 24-hour | 500 | Health | Sch. 3 | Standard | B1 | <1% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Acetaldehyde | 75-07-0 | 2.40E-03 | Calpuff | 2.48E-03 | 24-hour | 5000 | — | Sch. 6 | URT | — | <1% | — | |
| Acrolein | 107-02-8 | 1.20E-02 | Calpuff | 1.24E-02 | 24-hour | 0.4 | Health | Sch. 3 | Standard | B1 | 3% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Acrolein | 107-02-8 | 1.20E-02 | Calpuff | 2.39E-01 | 1-hour | 4.5 | Health | Sch. 3 | Standard | B1 | 5% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Acrolein | 107-02-8 | 1.20E-02 | Calpuff | 1.24E-02 | 24-hour | 4 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Ammonia | 7664-41-7 | 2.48E-02 | Calpuff | 2.56E-02 | 24-hour | 100 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Ammonia | 7664-41-7 | 2.48E-02 | Calpuff | 2.56E-02 | 24-hour | 1000 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Anthracene | 120-12-7 | 1.05E-07 | Calpuff | 1.08E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Antimony | 7440-36-0 | 3.19E-06 | Calpuff | 3.29E-06 | 24-hour | 25 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Arsenic | 7440-38-2 | 1.74E-06 | Calpuff | 1.79E-06 | 24-hour | 0.3 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Barium | 7440-39-3 | 9.91E-05 | Calpuff | 1.02E-04 | 24-hour | 10 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Benzene | 71-43-2 | 1.63E-04 | Calpuff | 5.39E-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 | 1.63E-04 | Calpuff | 1.68E-04 | 24-hour | 100 | Health | Sch. 6 | URT/DAV | B1 | <1% | — | |
| Benzene | 71-43-2 | 1.63E-04 | Calpuff | 5.39E-06 | Annual | 4.5 | Health | — | AAV | — | <1% | — | Apr-18 |
| Benzo(a)anthracene | 56-55-3 | 6.73E-08 | Calpuff | 6.95E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(a)fluorene | 238-84-6 | 6.73E-08 | Calpuff | 6.95E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(a)pyrene | 50-32-8 | 6.73E-08 | Calpuff | 2.23E-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 | 6.73E-08 | Calpuff | 6.95E-08 | 24-hour | 0.005 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Benzo(a)pyrene | 50-32-8 | 6.73E-08 | Calpuff | 2.23E-09 | Annual | 0.0001 | Health | — | AAV | — | <1% | — | Apr-18 |
| Benzo(b)fluoranthene | 205-99-2 | 7.70E-08 | Calpuff | 7.96E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(b)fluorene | 243-17-4 | 6.73E-08 | Calpuff | 6.95E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(e)pyrene | 192-97-2 | 2.31E-07 | Calpuff | 2.38E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(g,h,i)perylene | 191-24-2 | 9.56E-07 | Calpuff | 9.87E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(k)fluoranthene | 207-08-9 | 8.25E-08 | Calpuff | 8.52E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Beryllium | 7440-41-7 | 1.71E-06 | Calpuff | 1.76E-06 | 24-hour | 0.01 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Biphenyl | 92-51-3 | 4.28E-07 | Calpuff | 4.42E-07 | 24-hour | 175 | Health | — | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Bromodichloromethane | 75-27-4 | 1.53E-05 | Calpuff | 1.58E-05 | 24-hour | 350 | Health | — | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Bromoform | 75-25-2 | 1.44E-05 | Calpuff | 1.49E-05 | 24-hour | 55 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Bromomethane | 74-83-9 | 1.30E-04 | Calpuff | 1.34E-04 | 24-hour | 1350 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Cadmium | 7440-43-9 | 4.69E-06 | Calpuff | 4.84E-06 | 24-hour | 0.025 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Cadmium | 7440-43-9 | 4.69E-06 | Calpuff | 4.84E-06 | 24-hour | 0.25 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Carbon Monoxide | 630-08-0 | 6.24E-01 | Calpuff | 1.49E+01 | 1/2-hour | 6000 | Health | Sch. 3 | Standard | B1 | <1% | Note 9 | Apr-18 |
| Carbon tetrachloride | 56-23-5 | 1.89E-05 | Calpuff | 1.95E-05 | 24-hour | 2.4 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Carbon tetrachloride | 56-23-5 | 1.89E-05 | Calpuff | 1.95E-05 | 24-hour | 24 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Chlorobenzene | 108-90-7 | 1.38E-05 | Calpuff | 2.75E-04 | 1-hour | 3500 | Health | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | |
| Chlorobenzene | 108-90-7 | 1.38E-05 | Calpuff | 4.54E-04 | 10-minute | 4500 | Odour | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | |
| Chloroform | 67-66-3 | 2.60E-05 | Calpuff | 2.69E-05 | 24-hour | 1 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Chloroform | 67-66-3 | 2.60E-05 | Calpuff | 2.69E-05 | 24-hour | 100 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Chromium (hexavalent) | 18540-29-9 | 6.98E-05 | Calpuff | 2.31E-06 | Annual | 0.00014 | Health | Sch. 3 | Standard | B1 | 2% | Notes 11, 19, Table 2, 3URT - Note 4, Table 4 | Apr-18 |
| Chromium (hexavalent) | 18540-29-9 | 6.98E-05 | Calpuff | 7.21E-05 | 24-hour | 0.07 | Health | Sch. 6 | URT | — | <1% | — | |
| Chrysene | 218-01-9 | 7.80E-08 | Calpuff | 8.06E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Cobalt | 7440-48-4 | 6.34E-06 | Calpuff | 6.55E-06 | 24-hour | 0.1 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Copper | 7440-50-8 | 4.80E-05 | Calpuff | 4.96E-05 | 24-hour | 50 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Dibenzo(a,c)anthracene | 215-58-7 | 7.46E-08 | Calpuff | 7.70E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Dibenzo(a,h)anthracene | 53-70-3 | 7.46E-08 | Calpuff | 7.70E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Dichlorodifluoromethane | 75-71-8 | 1.14E-04 | Calpuff | 1.18E-04 | 24-hour | 500000 | Health | Sch. 3 | Guideline | B1 | <1% | Note 10 | Apr-18 |
| Dichloroethene, 1,1 - | 75-34-3 | 1.50E-05 | Calpuff | 1.55E-05 | 24-hour | 165 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Dichloroethene, 1,1 - | 75-34-3 | 1.50E-05 | Calpuff | 1.55E-05 | 24-hour | 1650 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Dichloromethane | 75-09-2 | 1.09E-03 | Calpuff | 1.12E-03 | 24-hour | 220 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Dichloromethane | 75-09-2 | 1.09E-03 | Calpuff | 1.12E-03 | 24-hour | 22000 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Dioxins, Furans and Dioxin- like PCBs | N/A | 0.0004 µg TEQ/s | Calpuff | 0.0004 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 | 1.85E-05 | Calpuff | 1.91E-05 | 24-hour | 1000 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | Apr-18 |
| Ethylbenzene | 100-41-4 | 1.85E-05 | Calpuff | 6.10E-04 | 10-minute | 1900 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | Apr-18 |
| Ethylbenzene | 100-41-4 | 1.85E-05 | Calpuff | 1.91E-05 | 24-hour | 14000 | Not Applicable | Sch. 6 | URT | — | <1% | — | Apr-18 |

Appendix B
Emission Summary Table

| Contaminant | CAS No. | Total Facility Emission Rate [g/s] | Air Dispersion Model Used | Maximum POI Concentration [µg/m³] | Averaging Period | MOECC POI Limit [µg/m³] | Limiting Effect | Schedule | Source | Benchmark | Percentage of MOECC Limit [%] | Notes | Version of Date of ACB List |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ethylene Dibromide | 106-93-4 | 2.88E-05 | Calpuff | 2.97E-05 | 24-hour | 3 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Fluoranthene | 206-44-0 | 2.93E-07 | Calpuff | 3.03E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Fluorides | 7664-39-3 | 3.90E-03 | Calpuff | 4.03E-03 | 24-hour | 0.86 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 3.90E-03 | Calpuff | 4.59E-04 | 30-day | 0.34 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 3.90E-03 | Calpuff | 4.03E-03 | 24-hour | 1.74 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 3.90E-03 | Calpuff | 4.59E-04 | 30-day | 0.69 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 3.90E-03 | Calpuff | 4.03E-03 | 24-hour | 3.44 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 3.90E-03 | Calpuff | 4.59E-04 | 30-day | 1.38 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorine | 86-73-7 | 3.26E-07 | Calpuff | 3.36E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Formaldehyde | 50-00-0 | 9.11E-03 | Calpuff | 9.41E-03 | 24-hour | 65 | Odour & Irritation | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Hexachlorobenzene | 118-74-1 | 1.06E-07 | Calpuff | 1.09E-07 | 24-hour | 0.011 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Hydrogen Chloride | 7647-01-0 | 1.54E-01 | Calpuff | 1.59E-01 | 24-hour | 20 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Hydrogen Chloride | 7647-01-0 | 1.54E-01 | Calpuff | 1.59E-01 | 24-hour | 200 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Indeno(1,2,3 – cd)pyrene | 193-39-5 | 1.61E-07 | Calpuff | 1.66E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Lead | 7439-92-1 | 1.38E-05 | Calpuff | 1.42E-05 | 24-hour | 0.5 | Health | Sch. 3 | Standard | B1 | <1% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Lead | 7439-92-1 | 1.38E-05 | Calpuff | 1.62E-06 | 30-day | 0.2 | Health | Sch. 3 | Standard | B1 | <1% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Lead | 7439-92-1 | 1.38E-05 | Calpuff | 1.42E-05 | 24-hour | 2 | Health | Sch. 6 | URT | — | <1% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Mercury | 7439-97-6 | 1.83E-05 | Calpuff | 1.89E-05 | 24-hour | 2 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Molybdenum | 7439-98-7 | 1.99E-04 | Calpuff | 2.06E-04 | 24-hour | 120 | Particulate | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Naphthalene | 91-20-3 | 4.10E-06 | Calpuff | 4.24E-06 | 24-hour | 22.5 | Odour | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | Apr-18 |
| Naphthalene | 91-20-3 | 4.10E-06 | Calpuff | 1.35E-04 | 10-minute | 50 | Odour | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | Apr-18 |
| Nickel | 7440-02-0 | 2.02E-04 | Calpuff | 6.68E-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 | 2.02E-04 | Calpuff | 2.08E-04 | 24-hour | 2 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Nickel | 7440-02-0 | 2.02E-04 | Calpuff | 6.68E-06 | Annual | 0.4 | Health | — | AAV | — | <1% | — | Apr-18 |
| Nitrogen Oxides | 10102-44-0 | 4.12E+00 | Calpuff | 4.26E+00 | 24-hour | 200 | Health | Sch. 3 | Standard | B1 | 2% | Notes 2, 17 | Apr-18 |
| Nitrogen Oxides | 10102-44-0 | 4.12E+00 | Calpuff | 8.23E+01 | 1-hour | 400 | Health | Sch. 3 | Standard | B1 | 21% | Notes 2, 17 | Apr-18 |
| O-terphenyl | 84-15-1 | 9.60E-08 | Calpuff | 9.92E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| $PM_{10}$ (Condensable and Filterable) | N/A | 1.63E-01 | Calpuff | 4.07E-01 | 24-hour | 50 | — | — | AAQC | — | <1% | — | Apr-18 |
| $PM_{10}$ (Filterable Only) | N/A | 1.14E-02 | Calpuff | 2.51E-01 | 24-hour | 50 | — | — | AAQC | — | <1% | — | Apr-18 |
| $PM_{2.5}$ (Condensable and Filterable) | N/A | 1.60E-01 | Calpuff | 4.04E-01 | 24-hour | 30 | — | — | AAQC | — | 1% | — | Apr-18 |
| $PM_{2.5}$ (Filterable Only) | N/A | 8.01E-03 | Calpuff | 2.47E-01 | 24-hour | 30 | — | — | AAQC | — | <1% | — | Apr-18 |
| Pentachlorobenzene | 608-93-5 | 7.97E-08 | Calpuff | 8.23E-08 | 24-hour | 80 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Pentachlorophenol | 87-86-5 | 6.73E-07 | Calpuff | 6.95E-07 | 24-hour | 20 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Perylene | 198-55-0 | 6.73E-08 | Calpuff | 6.95E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Phenanthrene | 85-01-8 | 1.30E-06 | Calpuff | 1.34E-06 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Pyrene | 129-00-0 | 4.30E-07 | Calpuff | 4.44E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Selenium | 7782-49-2 | 8.53E-06 | Calpuff | 8.81E-06 | 24-hour | 10 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Silver | 7440-22-4 | 2.90E-06 | Calpuff | 2.99E-06 | 24-hour | 1 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Sulphur Dioxide | 7446-09-5 | 7.50E-04 | Calpuff | 7.75E-04 | 24-hour | 275 | Health | Sch. 3 | Standard | B1 | <1% | ffective until July 1, 2023Note 2URT - Note 4, Table 4 | Apr-18 |
| Sulphur Dioxide | 7446-09-5 | 7.50E-04 | Calpuff | 1.50E-02 | 1-hour | 690 | Health | Sch. 3 | Standard | B1 | <1% | ffective until July 1, 2023Note 2URT - Note 4, Table 4 | Apr-18 |
| Tetrachloroethene | 127-18-4 | 5.62E-05 | Calpuff | 5.80E-05 | 24-hour | 360 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Tetrachloroethene | 127-18-4 | 5.62E-05 | Calpuff | 5.80E-05 | 24-hour | 3600 | Health | Sch. 6 | URT | — | <1% | — | |
| Tetralin | 119-64-2 | 2.01E-06 | Calpuff | 2.08E-06 | 24-hour | 151.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Thallium | 7440-28-0 | 1.71E-06 | Calpuff | 1.76E-06 | 24-hour | 0.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Toluene | 108-88-3 | 3.60E-04 | Calpuff | 3.72E-04 | 24-hour | 2000 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | To be updated - Note 5 | Apr-18 |
| Total Chromium (and compounds) | 7440-47-3 | 6.98E-05 | Calpuff | 7.21E-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 | 6.98E-05 | Calpuff | 7.21E-05 | 24-hour | 5 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Total Particulate Matter (Condensable and Filterable) | N/A | 1.90E-01 | Calpuff | 4.35E-01 | 24-hour | 120 | Particulate | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Total Particulate Matter (Filterable only) | N/A | 3.83E-02 | Calpuff | 2.78E-01 | 24-hour | 120 | Particulate | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Trichloroethane, 1,1,1 - | 71-55-6 | 1.44E-05 | Calpuff | 1.49E-05 | 24-hour | 115000 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Trichloroethene | 86-42-0 | 1.46E-05 | Calpuff | 1.51E-05 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Trichloroethylene, 1,1,2 - | 79-01-6 | 5.62E-05 | Calpuff | 5.80E-05 | 24-hour | 12 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Trichloroethylene, 1,1,2 - | 79-01-6 | 5.62E-05 | Calpuff | 5.80E-05 | 24-hour | 1200 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Trichlorofluoromethane | 75-69-4 | 2.98E-05 | Calpuff | 3.08E-05 | 24-hour | 6000 | Health | Sch. 3 | Guideline | B1 | <1% | Note 10 | Apr-18 |
| Vanadium | 7440-62-2 | 2.07E-06 | Calpuff | 2.14E-06 | 24-hour | 2 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Vinyl chloride | 75-01-4 | 2.88E-05 | Calpuff | 2.97E-05 | 24-hour | 1 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Vinyl chloride | 75-01-4 | 2.88E-05 | Calpuff | 2.97E-05 | 24-hour | 100 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Xylenes, m-, p- and o- | 1330-20-7 | 8.71E-05 | Calpuff | 9.00E-05 | 24-hour | 730 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | Note 2, 3, 22 | Apr-18 |
| Xylenes, m-, p- and o- | 1330-20-7 | 8.71E-05 | Calpuff | 2.87E-03 | 10-minute | 3000 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | Note 2, 3, 22 | Apr-18 |
| Xylenes, m-, p- and o- | 1330-20-7 | 8.71E-05 | Calpuff | 9.00E-05 | 24-hour | 7300 | Not Applicable | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Zinc | 7440-66-6 | 2.62E-04 | Calpuff | 2.71E-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 2018 Compliance Emission Testing in Accordance with Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX

- Executive Summary

- CalPuff Modelling of 2018 Compliance Source Testing Results from the Durham York Energy Centre (Emission Summary Table)

## EXECUTIVE SUMMARY

ORTECH Consulting Inc. (ORTECH) completed an emission testing program at the Durham York Energy Centre (DYEC) located in Courtice, Ontario between September 11 and September 14, 2018. 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 seventh 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 |

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 (September 11 to September 14, 2018) 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 11, 2018 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)* | - | - | - | 361 | - |
| Average Combustion Zone Temp. (°C)* | - | - | - | 1226 | - |
| Steam (tonnes/day)* | - | - | - | 787 | - |
| MSW Combusted (tonnes/day)* | - | - | - | 205 | - |
| $NO_X$ Reagent Injection Rate (liters/day)* | - | - | - | 606 | - |
| Carbon Injection (kg/day)* | - | - | - | 125 | - |
| Lime Injection (kg/day)* | - | - | - | 4248 | - |
| Filterable Particulate (mg/Rm$^3$) [1] | <0.23 | 0.59 | 0.21 | <0.34 | 9 |
| $PM_{10}$ with Condensable (mg/Rm$^3$) [1] | <4.67 | <6.81 | <4.21 | <5.23 | - |
| $PM_{2.5}$ with Condensable (mg/Rm$^3$) [1] | <4.47 | <6.61 | <3.95 | <5.01 | - |
| Hydrogen Fluoride (mg/Rm$^3$) [1] | <0.11 | <0.10 | <0.11 | <0.11 | - |
| Ammonia (mg/Rm$^3$) [1] | 0.57 | 0.48 | 0.46 | 0.50 | - |
| Cadmium (µg/Rm$^3$) [1] | 0.068 | 0.30 | 0.050 | 0.14 | 7 |
| Lead (µg/Rm$^3$) [1] | 0.19 | 0.14 | 0.22 | 0.18 | 50 |
| Mercury (µg/Rm$^3$) [1] | 0.31 | 0.27 | 0.31 | 0.30 | 15 |
| Antimony (µg/Rm$^3$) [1] | <0.035 | 0.069 | 0.038 | <0.047 | - |
| Arsenic (µg/Rm$^3$) [1] | 0.085 | 0.061 | <0.035 | <0.060 | - |
| Barium (µg/Rm$^3$) [1] | 1.22 | 1.33 | 1.40 | 1.32 | - |
| Beryllium (µg/Rm$^3$) [1] | 0.018 | 0.028 | <0.035 | <0.027 | - |
| Chromium (µg/Rm$^3$) [1] | 1.11 | 1.77 | 1.24 | 1.38 | - |
| Cobalt (µg/Rm$^3$) [1] | 0.028 | <0.036 | <0.035 | <0.033 | - |
| Copper (µg/Rm$^3$) [1] | 0.93 | 1.04 | 0.44 | 0.81 | - |
| Molybdenum (µg/Rm$^3$) [1] | 7.38 | 8.07 | 7.42 | 7.62 | - |
| Nickel (µg/Rm$^3$) [1] | 3.29 | 3.61 | 3.20 | 3.37 | - |
| Selenium (µg/Rm$^3$) [1] | <0.18 | <0.18 | <0.17 | <0.18 | - |
| Silver (µg/Rm$^3$) [1] | <0.035 | 0.018 | <0.035 | <0.029 | - |
| Thallium (µg/Rm$^3$) [1] | 0.11 | 0.016 | 0.0088 | 0.043 | - |
| Vanadium (µg/Rm$^3$) [1] | <0.018 | 0.042 | 0.032 | <0.031 | - |
| Zinc (µg/Rm$^3$) [1] | 3.85 | 5.33 | 3.06 | 4.08 | - |
| Dioxins and Furans (pg TEQ/Rm$^3$) [3] | <5.66 | <4.74 | <4.75 | <5.05 | 60 |
| Total Chlorobenzenes (ng/Rm$^3$) [1] | <560 | <432 | <436 | <476 | - |
| Total Chlorophenols (ng/Rm$^3$) [1] | <181 | <176 | <183 | <180 | - |
| Total PAHs (ng/Rm$^3$) [1] | <288 | <316 | <226 | <277 | - |
| VOCs (µg/Rm$^3$) [1] | <74.3 | <99.8 | <123 | <98.9 | - |
| Aldehydes (µg/Rm$^3$) [1] | <325 | <307 | <303 | <312 | - |
| Total VOCs (µg/Rm$^3$) [1] [4] | <399 | <407 | <426 | <411 | - |
| Quench Inlet Organic Matter (THC) (ppm, dry) [2] | 0.9 | 0.5 | 0.6 | 0.7 | 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)* | - | - | - | 361 | - |
| Average Combustion Zone Temp. (°C)* | - | - | - | 1252 | - |
| Steam (tonnes/day)* | - | - | - | 786 | - |
| MSW Combusted (tonnes/day)* | - | - | - | 205 | - |
| $NO_X$ Reagent Injection Rate (liters/day)* | - | - | - | 735 | - |
| Carbon Injection (kg/day)* | - | - | - | 126 | - |
| Lime Injection (kg/day)* | - | - | - | 4447 | - |
| Filterable Particulate (mg/Rm$^3$) (1) | 0.46 | <0.27 | <0.24 | <0.32 | 9 |
| $PM_{10}$ with Condensable (mg/Rm$^3$) (1) | 4.09 | <4.89 | <4.13 | <4.37 | - |
| $PM_{2.5}$ with Condensable (mg/Rm$^3$) (1) | 3.78 | <4.39 | <3.63 | <3.93 | - |
| Hydrogen Fluoride (mg/Rm$^3$) (1) | <0.11 | <0.10 | <0.10 | <0.10 | - |
| Ammonia (mg/Rm$^3$) (1) | 1.05 | 0.91 | 0.70 | 0.89 | - |
| Cadmium (µg/Rm$^3$) (1) | 0.013 | 0.035 | 0.057 | 0.035 | 7 |
| Lead (µg/Rm$^3$) (1) | 0.25 | 0.099 | 0.30 | 0.22 | 50 |
| Mercury (µg/Rm$^3$) (1) | 0.15 | 0.12 | 0.13 | 0.13 | 15 |
| Antimony (µg/Rm$^3$) (1) | <0.036 | <0.034 | 0.038 | <0.036 | - |
| Arsenic (µg/Rm$^3$) (1) | 0.037 | 0.047 | <0.037 | <0.040 | - |
| Barium (µg/Rm$^3$) (1) | 1.15 | 1.01 | 1.80 | 1.32 | - |
| Beryllium (µg/Rm$^3$) (1) | 0.022 | 0.032 | <0.037 | <0.030 | - |
| Chromium (µg/Rm$^3$) (1) | 0.79 | 0.42 | 1.13 | 0.78 | - |
| Cobalt (µg/Rm$^3$) (1) | 0.28 | <0.034 | <0.037 | <0.12 | - |
| Copper (µg/Rm$^3$) (1) | 0.45 | 0.73 | 0.65 | 0.61 | - |
| Molybdenum (µg/Rm$^3$) (1) | 4.03 | 3.88 | 7.89 | 5.27 | - |
| Nickel (µg/Rm$^3$) (1) | 0.91 | 0.39 | 3.29 | 1.53 | - |
| Selenium (µg/Rm$^3$) (1) | <0.18 | <0.17 | <0.18 | <0.18 | - |
| Silver (µg/Rm$^3$) (1) | <0.036 | <0.034 | <0.037 | <0.036 | - |
| Thallium (µg/Rm$^3$) (1) | <0.036 | <0.034 | <0.037 | <0.036 | - |
| Vanadium (µg/Rm$^3$) (1) | <0.018 | <0.017 | <0.018 | <0.018 | - |
| Zinc (µg/Rm$^3$) (1) | 2.97 | 1.84 | 3.13 | 2.65 | - |
| Dioxins and Furans (pg TEQ/Rm$^3$) (3) | <3.33 | <3.43 | <2.89 | <3.22 | 60 |
| Total Chlorobenzenes (ng/Rm$^3$) (1) | <596 | <462 | <355 | <471 | - |
| Total Chlorophenols (ng/Rm$^3$) (1) | <168 | <163 | <162 | <165 | - |
| Total PAHs (ng/Rm$^3$) (1) | <194 | <282 | <171 | <216 | - |
| VOCs (µg/Rm$^3$) (1) | <70.1 | <74.3 | <96.8 | <80.4 | - |
| Aldehydes (µg/Rm$^3$) (1) | <489 | <377 | <346 | <404 | - |
| Total VOCs (µg/Rm$^3$) (1)(4) | <559 | <451 | <443 | <484 | - |
| Quench Inlet Organic Matter (THC) (ppm, dry) (2) | 1.2 | 0.8 | 0.9 | 1.0 | 50 |

* based on process data provided by Covanta

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

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

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

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

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) | 8.0 | 13.0 | 20.0 | 40 |
| | Hydrogen Chloride ($mg/Rm^3$) (2) | 2.6 | 2.9 | 3.3 | 9 |
| | Nitrogen Oxides ($mg/Rm^3$) (2) | 109 | 109 | 110 | 121 |
| | Sulphur Dioxide ($mg/Rm^3$) (2) | 0 | 0 | 0 | 35 |
| Boiler No. 2 | Carbon Monoxide ($mg/Rm^3$) (1) | 8.8 | 13.4 | 27.0 | 40 |
| | Hydrogen Chloride ($mg/Rm^3$) (2) | 2.6 | 4.1 | 5.3 | 9 |
| | Nitrogen Oxides ($mg/Rm^3$) (2) | 110 | 111 | 111 | 121 |
| | Sulphur Dioxide ($mg/Rm^3$) (2) | 0 | 0.1 | 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 September 2018 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 763 tonnes of steam per day for each Boiler (approximately 94.5% 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**

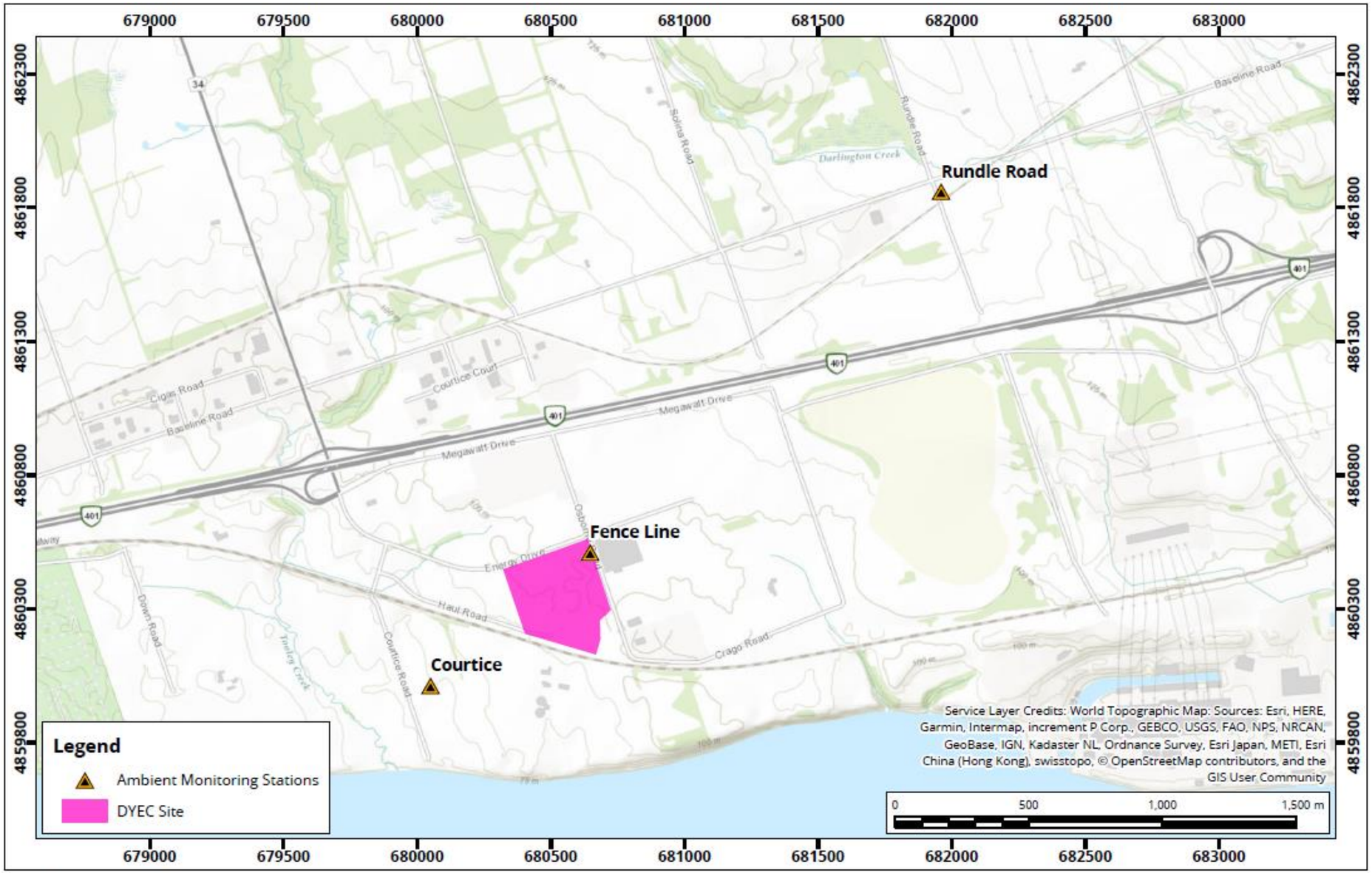
| Contaminant | CAS No. | Total Facility Emission Rate [g/s] | Air Dispersion Model Used | Maximum POI Concentration [µg/m³] | Averaging Period | MECP POI Limit [µg/m³] | Limiting Effect | Schedule | Source | Benchmark | Percentage of MECP Limit [%] | Notes | Version of Date of ACB List |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 – methylnaphthalene | 90-12-0 | 1.61E-07 | Calpuff | 1.63E-07 | 24-hour | 35.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 1,2,4 – Trichlorobenzene | 120-82-1 | 3.18E-07 | Calpuff | 3.23E-07 | 24-hour | 400 | Particulate | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| 1,2,4,5-Tetrachlorobenzene | 95-94-3 | 1.23E-07 | Calpuff | 1.25E-07 | 24-hour | 1 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 1,2-Dichlorobenzene | 95-50-1 | 1.15E-06 | Calpuff | 2.21E-05 | 1-hour | 30500 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| 2 – methylnaphthalene | 91-57-6 | 2.32E-07 | Calpuff | 2.36E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| 2,3,4,6-Tetrachlorophenol | 58-90-2 | 3.95E-07 | Calpuff | 4.02E-07 | 24-hour | 0.75 | Health | — | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 2,4,6-Trichlorophenol | 88-06-2 | 4.79E-07 | Calpuff | 4.88E-07 | 24-hour | 1.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 2,4-Dichlorophenol | 120-83-2 | 3.95E-07 | Calpuff | 4.02E-07 | 24-hour | 33.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| 3-Methylchloranthene | 56-49-5 | 3.95E-07 | Calpuff | 4.02E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | | Apr-18 |
| 7,12-Dimethylbenz(a)anthracene | 57-97-6 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | | Apr-18 |
| Acenaphthene | 83-32-9 | 1.08E-07 | Calpuff | 1.10E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Acenaphthylene | 208-96-8 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Acetaldehyde | 75-07-0 | 1.02E-03 | Calpuff | 1.04E-03 | 24-hour | 500 | Health | Sch. 3 | Standard | B1 | <1% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Acetaldehyde | 75-07-0 | 1.02E-03 | Calpuff | 1.04E-03 | 24-hour | 5000 | — | Sch. 6 | URT | — | <1% | — | |
| Acrolein | 107-02-8 | 9.16E-03 | Calpuff | 9.32E-03 | 24-hour | 0.4 | Health | Sch. 3 | Standard | B1 | 2% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Acrolein | 107-02-8 | 9.16E-03 | Calpuff | 1.76E-01 | 1-hour | 4.5 | Health | Sch. 3 | Standard | B1 | 4% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Acrolein | 107-02-8 | 9.16E-03 | Calpuff | 9.32E-03 | 24-hour | 4 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Ammonia | 7664-41-7 | 2.72E-02 | Calpuff | 2.76E-02 | 24-hour | 100 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Ammonia | 7664-41-7 | 2.72E-02 | Calpuff | 2.76E-02 | 24-hour | 1000 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Anthracene | 120-12-7 | 1.03E-07 | Calpuff | 1.05E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Antimony | 7440-36-0 | 1.66E-06 | Calpuff | 1.69E-06 | 24-hour | 25 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Arsenic | 7440-38-2 | 2.00E-06 | Calpuff | 2.03E-06 | 24-hour | 0.3 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Barium | 7440-39-3 | 5.25E-05 | Calpuff | 5.34E-05 | 24-hour | 10 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Benzene | 71-43-2 | 9.21E-05 | Calpuff | 2.91E-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 | 9.21E-05 | Calpuff | 9.38E-05 | 24-hour | 100 | Health | Sch. 6 | URT/DAV | B1 | <1% | — | |
| Benzene | 71-43-2 | 9.21E-05 | Calpuff | 2.91E-06 | Annual | 4.5 | Health | — | AAV | — | <1% | — | Apr-18 |
| Benzo(a)anthracene | 56-55-3 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(a)fluorene | 238-84-6 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(a)pyrene | 50-32-8 | 7.91E-08 | Calpuff | 2.49E-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 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.005 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Benzo(a)pyrene | 50-32-8 | 7.91E-08 | Calpuff | 2.49E-09 | Annual | 0.0001 | Health | — | AAV | — | <1% | — | Apr-18 |
| Benzo(b)fluoranthene | 205-99-2 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(b)fluorene | 243-17-4 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(e)pyrene | 192-97-2 | 1.31E-07 | Calpuff | 1.33E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(g,h,i)perylene | 191-24-2 | 3.31E-07 | Calpuff | 3.37E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Benzo(k)fluoranthene | 207-08-9 | 2.19E-07 | Calpuff | 2.23E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Beryllium | 7440-41-7 | 1.15E-06 | Calpuff | 1.17E-06 | 24-hour | 0.01 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Biphenyl | 92-51-3 | 4.24E-07 | Calpuff | 4.31E-07 | 24-hour | 175 | Health | — | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Bromodichloromethane | 75-27-4 | 2.17E-05 | Calpuff | 2.21E-05 | 24-hour | 350 | Health | — | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Bromoform | 75-25-2 | 1.55E-05 | Calpuff | 1.58E-05 | 24-hour | 55 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Bromomethane | 74-83-9 | 1.49E-04 | Calpuff | 1.52E-04 | 24-hour | 1350 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Cadmium | 7440-43-9 | 3.47E-06 | Calpuff | 3.53E-06 | 24-hour | 0.025 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Cadmium | 7440-43-9 | 3.47E-06 | Calpuff | 3.53E-06 | 24-hour | 0.25 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Carbon Monoxide | 630-08-0 | 5.15E-01 | Calpuff | 1.19E+01 | 1/2-hour | 6000 | Health | Sch. 3 | Standard | B1 | <1% | Note 9 | Apr-18 |
| Carbon tetrachloride | 56-23-5 | 1.57E-05 | Calpuff | 1.60E-05 | 24-hour | 2.4 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Carbon tetrachloride | 56-23-5 | 1.57E-05 | Calpuff | 1.60E-05 | 24-hour | 24 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Chlorobenzene | 108-90-7 | 1.33E-05 | Calpuff | 2.56E-04 | 1-hour | 3500 | Health | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | |
| Chlorobenzene | 108-90-7 | 1.33E-05 | Calpuff | 4.22E-04 | 10-minute | 4500 | Odour | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | |
| Chloroform | 67-66-3 | 5.40E-05 | Calpuff | 5.49E-05 | 24-hour | 1 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Chloroform | 67-66-3 | 5.40E-05 | Calpuff | 5.49E-05 | 24-hour | 100 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Chromium (hexavalent) | 18540-29-9 | 4.29E-05 | Calpuff | 1.35E-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 | 4.29E-05 | Calpuff | 4.36E-05 | 24-hour | 0.07 | Health | Sch. 6 | URT | — | <1% | — | |
| Chrysene | 218-01-9 | 8.86E-08 | Calpuff | 9.01E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Cobalt | 7440-48-4 | 2.93E-06 | Calpuff | 2.98E-06 | 24-hour | 0.1 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Copper | 7440-50-8 | 2.82E-05 | Calpuff | 2.87E-05 | 24-hour | 50 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Dibenzo(a,c)anthracene | 215-58-7 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Dibenzo(a,h)anthracene | 53-70-3 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Dichlorodifluoromethane | 75-71-8 | 3.89E-05 | Calpuff | 3.96E-05 | 24-hour | 500000 | Health | Sch. 3 | Guideline | B1 | <1% | Note 10 | Apr-18 |
| Dichloroethene, 1,1 - | 75-34-3 | 1.60E-05 | Calpuff | 1.63E-05 | 24-hour | 165 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Dichloroethene, 1,1 - | 75-34-3 | 1.60E-05 | Calpuff | 1.63E-05 | 24-hour | 1650 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Dichloromethane | 75-09-2 | 1.68E-03 | Calpuff | 1.71E-03 | 24-hour | 220 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Dichloromethane | 75-09-2 | 1.68E-03 | Calpuff | 1.71E-03 | 24-hour | 22000 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Dioxins, Furans and Dioxin- like PCBs | N/A | 0.0002 µg TEQ/s | Calpuff | 0.0003 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 | 1.55E-05 | Calpuff | 1.58E-05 | 24-hour | 1000 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | Apr-18 |
| Ethylbenzene | 100-41-4 | 1.55E-05 | Calpuff | 4.91E-04 | 10-minute | 1900 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | Apr-18 |
| Ethylbenzene | 100-41-4 | 1.55E-05 | Calpuff | 1.58E-05 | 24-hour | 14000 | Not Applicable | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Ethylene Dibromide | 106-93-4 | 3.10E-05 | Calpuff | 3.15E-05 | 24-hour | 3 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Fluoranthene | 206-44-0 | 3.03E-07 | Calpuff | 3.08E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Fluorides | 7664-39-3 | 4.10E-03 | Calpuff | 4.17E-03 | 24-hour | 0.86 | 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 [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 | 4.10E-03 | Calpuff | 4.68E-04 | 30-day | 0.34 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 4.10E-03 | Calpuff | 4.17E-03 | 24-hour | 1.74 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 4.10E-03 | Calpuff | 4.68E-04 | 30-day | 0.69 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 4.10E-03 | Calpuff | 4.17E-03 | 24-hour | 3.44 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorides | 7664-39-3 | 4.10E-03 | Calpuff | 4.68E-04 | 30-day | 1.38 | Vegetation | Sch. 3 | Standard | B1 | <1% | Note 2, 20 | Apr-18 |
| Fluorine | 86-73-7 | 2.46E-07 | Calpuff | 2.50E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Formaldehyde | 50-00-0 | 4.09E-03 | Calpuff | 4.16E-03 | 24-hour | 65 | Odour & Irritation | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Hexachlorobenzene | 118-74-1 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.011 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Hydrogen Chloride | 7647-01-0 | 1.66E-01 | Calpuff | 1.69E-01 | 24-hour | 20 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Hydrogen Chloride | 7647-01-0 | 1.66E-01 | Calpuff | 1.69E-01 | 24-hour | 200 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Indeno(1,2,3 – cd)pyrene | 193-39-5 | 8.41E-08 | Calpuff | 8.56E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Lead | 7439-92-1 | 7.98E-06 | Calpuff | 8.13E-06 | 24-hour | 0.5 | Health | Sch. 3 | Standard | B1 | <1% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Lead | 7439-92-1 | 7.98E-06 | Calpuff | 9.11E-07 | 30-day | 0.2 | Health | Sch. 3 | Standard | B1 | <1% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Lead | 7439-92-1 | 7.98E-06 | Calpuff | 8.13E-06 | 24-hour | 2 | Health | Sch. 6 | URT | — | <1% | Note 2URT - Note 4, Table 4 | Apr-18 |
| Mercury | 7439-97-6 | 8.56E-06 | Calpuff | 8.71E-06 | 24-hour | 2 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Molybdenum | 7439-98-7 | 2.57E-04 | Calpuff | 2.61E-04 | 24-hour | 120 | Particulate | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Naphthalene | 91-20-3 | 1.28E-06 | Calpuff | 1.30E-06 | 24-hour | 22.5 | Odour | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | Apr-18 |
| Naphthalene | 91-20-3 | 1.28E-06 | Calpuff | 4.06E-05 | 10-minute | 50 | Odour | Sch. 3 | Guideline | B1 | <1% | Note 2, 3 | Apr-18 |
| Nickel | 7440-02-0 | 9.76E-05 | Calpuff | 3.08E-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 | 9.76E-05 | Calpuff | 9.93E-05 | 24-hour | 2 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Nickel | 7440-02-0 | 9.76E-05 | Calpuff | 3.08E-06 | Annual | 0.4 | Health | — | AAV | — | <1% | — | Apr-18 |
| Nitrogen Oxides | 10102-44-0 | 4.36E+00 | Calpuff | 4.44E+00 | 24-hour | 200 | Health | Sch. 3 | Standard | B1 | 2% | Notes 2, 17 | Apr-18 |
| Nitrogen Oxides | 10102-44-0 | 4.36E+00 | Calpuff | 8.37E+01 | 1-hour | 400 | Health | Sch. 3 | Standard | B1 | 21% | Notes 2, 17 | Apr-18 |
| O-terphenyl | 84-15-1 | 7.91E-08 | Calpuff | 8.05E-08 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| $PM_{10}$ (Condensable and Filterable) | N/A | 1.88E-01 | Calpuff | 4.43E-01 | 24-hour | 50 | — | — | AAQC | — | <1% | — | Apr-18 |
| $PM_{10}$ (Filterable Only) | N/A | 3.91E-02 | Calpuff | 2.92E-01 | 24-hour | 50 | — | — | AAQC | — | <1% | — | Apr-18 |
| $PM_{2.5}$ (Condensable and Filterable) | N/A | 1.75E-01 | Calpuff | 4.30E-01 | 24-hour | 30 | — | — | AAQC | — | 1% | — | Apr-18 |
| $PM_{2.5}$ (Filterable Only) | N/A | 2.61E-02 | Calpuff | 2.78E-01 | 24-hour | 30 | — | — | AAQC | — | <1% | — | Apr-18 |
| Pentachlorobenzene | 608-93-5 | 1.00E-07 | Calpuff | 1.02E-07 | 24-hour | 80 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Pentachlorophenol | 87-86-5 | 3.95E-07 | Calpuff | 4.02E-07 | 24-hour | 20 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Perylene | 198-55-0 | 1.85E-07 | Calpuff | 1.88E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Phenanthrene | 85-01-8 | 1.04E-06 | Calpuff | 1.06E-06 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Pyrene | 129-00-0 | 3.30E-07 | Calpuff | 3.36E-07 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Selenium | 7782-49-2 | 7.07E-06 | Calpuff | 7.20E-06 | 24-hour | 10 | Health | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Silver | 7440-22-4 | 1.30E-06 | Calpuff | 1.32E-06 | 24-hour | 1 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Sulphur Dioxide | 7446-09-5 | 1.40E-03 | Calpuff | 1.42E-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 | 1.40E-03 | Calpuff | 2.69E-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 | 3.31E-05 | Calpuff | 3.36E-05 | 24-hour | 360 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Tetrachloroethene | 127-18-4 | 3.31E-05 | Calpuff | 3.36E-05 | 24-hour | 3600 | Health | Sch. 6 | URT | — | <1% | — | |
| Tetralin | 119-64-2 | 1.33E-06 | Calpuff | 1.35E-06 | 24-hour | 151.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Thallium | 7440-28-0 | 1.57E-06 | Calpuff | 1.60E-06 | 24-hour | 0.5 | Health | Sch. 3 | SL-JSL | B2 | Below SL-JSL | — | Apr-18 |
| Toluene | 108-88-3 | 1.73E-04 | Calpuff | 1.76E-04 | 24-hour | 2000 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | To be updated - Note 5 | Apr-18 |
| Total Chromium (and compounds) | 7440-47-3 | 4.29E-05 | Calpuff | 4.36E-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 | 4.29E-05 | Calpuff | 4.36E-05 | 24-hour | 5 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Total Particulate Matter (Condensable and Filterable) | N/A | 1.62E-01 | Calpuff | 4.16E-01 | 24-hour | 120 | Particulate | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Total Particulate Matter (Filterable only) | N/A | 1.32E-02 | Calpuff | 2.65E-01 | 24-hour | 120 | Particulate | Sch. 3 | Guideline | B1 | <1% | — | Apr-18 |
| Trichloroethane, 1,1,1 - | 71-55-6 | 1.58E-05 | Calpuff | 1.60E-05 | 24-hour | 115000 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Trichloroethene | 86-42-0 | 1.55E-05 | Calpuff | 1.58E-05 | 24-hour | 0.1 | — | — | De Minimus | — | Below De Minimus | — | Apr-18 |
| Trichloroethylene, 1,1,2 - | 79-01-6 | 3.31E-05 | Calpuff | 3.36E-05 | 24-hour | 12 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Trichloroethylene, 1,1,2 - | 79-01-6 | 3.31E-05 | Calpuff | 3.36E-05 | 24-hour | 1200 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Trichlorofluoromethane | 75-69-4 | 3.21E-05 | Calpuff | 3.27E-05 | 24-hour | 6000 | Health | Sch. 3 | Guideline | B1 | <1% | Note 10 | Apr-18 |
| Vanadium | 7440-62-2 | 9.65E-07 | Calpuff | 9.82E-07 | 24-hour | 2 | Health | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |
| Vinyl chloride | 75-01-4 | 3.10E-05 | Calpuff | 3.15E-05 | 24-hour | 1 | Health | Sch. 3 | Standard | B1 | <1% | URT - Note 4, Table 4 | Apr-18 |
| Vinyl chloride | 75-01-4 | 3.10E-05 | Calpuff | 3.15E-05 | 24-hour | 100 | Health | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Xylenes, m-, p- and o- | 1330-20-7 | 6.33E-05 | Calpuff | 6.44E-05 | 24-hour | 730 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | Note 2, 3, 22 | Apr-18 |
| Xylenes, m-, p- and o- | 1330-20-7 | 6.33E-05 | Calpuff | 2.00E-03 | 10-minute | 3000 | Not Applicable | Sch. 3 | Guideline | B1 | <1% | Note 2, 3, 22 | Apr-18 |
| Xylenes, m-, p- and o- | 1330-20-7 | 6.33E-05 | Calpuff | 6.44E-05 | 24-hour | 7300 | Not Applicable | Sch. 6 | URT | — | <1% | — | Apr-18 |
| Zinc | 7440-66-6 | 1.34E-04 | Calpuff | 1.36E-04 | 24-hour | 120 | Particulate | Sch. 3 | Standard | B1 | <1% | — | Apr-18 |

# Appendix 5

## Ambient Monitoring Station Locations




**DYEC Site and Ambient Monitoring Station Locations**

True North

Map Projection: NAD 1983 UTM Zone 17N
DYEC - Region of Durham, Ontario

Project #: 1803743

| | |
|---|---|
| Drawn by: DJH | Figure: 1 |
| Approx. Scale: | 1:20,000 |
| Date Revised: | Oct 25, 2018 |

# Appendix 6

Maintenance Summary

| Type | W/O Issued | W/O Completed |
|---|---|---|
| **CMSAF** | 94 | 73 |
| **CM** | 661 | 575 |
| **PMSAF** | 179 | 154 |
| **PM** | 527 | 473 |

*CMSAF – Corrective Maintenance Safety*
*CM – Corrective Maintenance*
*PMSAF – Preventative Maintenance Safety*
*PM – Preventative Maintenance*

## Breakdown by Component

### Scale house

- (Jan) Weigh scale computer #2 replaced with spare.
- (Feb) Monthly fire system checks
- (Feb) Annual optimization of the LFM-3 Radiation Detectors was completed.
- (Mar) Monthly fire system checks
- (Apr) Monthly fire system checks completed.
- (May) Scale house water leak repaired.

### Visitor's Center

- (Jan) Lighting maintenance completed.
- (Feb) Monthly fire system checks.
- (Mar) Monthly fire system checks.
- (Apr) Monthly fire system checks completed.
- (May) HVAC issue for high temperature resolved for office area.
- (Jun) Fire Safety audit finding work completed.
- (Jun) Lights replaced in washrooms.
- (Jun) Main staircase treads dyed and sealed.
- (Jun) Water feature maintenance and cleaning
- (Jul) Service call initiated for HVAC issue in office area.
- (Jul) Lights replaced in visitor center walkway.
- (Aug) Sensors replaced for HVAC temp controller.
- (Aug) Lights replaced in bridge walkway.
- (Sept) Lights replaced in washrooms.

### Refuse Cranes and Pit

- (Jan) PM's and inspection completed on both refuse cranes including grapples.
- (Jan) PM's completed on loader.
- (May) PM's and inspection completed on both refuse cranes including grapples.
- (May) Replaced the damage wire rope.

- (May) Replaced the power cable.
- (Jun) PM's and inspection completed on both refuse cranes including grapples.
- (Jun) Spare grapple cylinder overhaul completed.
- (Jul) PM's and inspection completed on both refuse cranes including grapples.
- (Jul) Rebuild of spare grapple on going.
- (Aug) PM's and inspection completed on both refuse cranes including grapples.
- (Aug) Reconnected the east grapple power cable.
- (Sept) PM's and inspection completed on both refuse cranes including grapples.
- (Oct) PM's and inspection completed on both refuse cranes including grapples.
- (Nov) PM's and inspection completed on both refuse cranes including grapples.
- (Dec) PM's and inspection completed on both refuse cranes including grapples.
- (Dec) Replaced wire rope on West crane.
- (Dec) Repaired the drum on East crane.
- (Dec) Replaced power cable on West crane.

**Boilers/TG**

- (Jan) Soot blower assembly PM's completed and replaced three leaking lance packing seals.
- (Jan) Furnace IR camera Port cleaning on weekly PM's completed.
- (Jan) Installed newly supplied aluminum weather covers over the air intakes for the activated carbon blower system to prevent inlet filter plugging.
- (Jan) Built and located portable fabricated aluminum stairs/platforms for boiler doors.
- (Jan) Repaired #1 Boiler weir plate adjustment screw.
- (Jan) Purchased water testing lab benchtop photo spectrometer
- (Jan) Shutdown preparation
- (Feb) Explosive cleaning of furnace and rest of the boiler completed.
- (Feb) Sand Blasting cleaning completed on heating surfaces to allow NDT ad visual inspections.
- (Feb) UT grid readings taken throughout the boiler.
- (Feb) Minor Inconel membrane repairs to original furnace Inconel
- (Feb) Right and left furnace bullnose corner seal repair
- (Feb) Minor repairs to 2nd pass left and rear water walls
- (Feb) # 3 Super heater - 22 leading edge loops replaced; Weld metal build-up where required due to wear.
- (Feb) #2 Super heater soot blower bearing brackets adjusted.
- (Feb) #4 Super heater Inconel overlay completed.
- (Feb) Metal thermal spray was applied to top 3 meters of the 2nd pass rear wall and top 4.6 meters of the rear #4 Super heater pendants; Ceramic paint was applied to the non-thermal sprayed remainder of the 2nd pass walls (top 3 meters of the left and right walls, bottom of #4 super heater rear pendants and all of the front pendants).
- (Feb) Under fire air heaters were cleaned.
- (Feb) Annual steam drum inspection completed by ChemTreat.

- (Feb) Evaporator jumper tube shields replaced (16 total).
- (Feb) 255 refractory tiles replaced in furnace.
- (Feb) Various furnace refractory replaced/repaired: chill tube header, burner zone, over fire air nozzle zone and feed table to side wall transition areas.
- (Feb) All Soot blower lance tube nozzles re-drilled and indexing checked as well as PM's completed.
- (Feb) Secondary and tertiary air nozzles inspected.
- (Feb) Martin grate and feed table inspections completed.
- (Feb) Ash discharger cleaned and inspected.
- (Feb) Feed chute water jacket leak repaired.
- (Feb) Furnace IR camera Port cleaning weekly PM's completed.
- (Feb) Various plant lighting replaced.
- (Feb) Various emergency lighting battery packs replaced during the outage.
- (Feb) Combustion air and IGR fans inspected (gas path, bearings and coupling).
- (Mar) Explosive cleaning of furnace and rest of the boiler completed.
- (Mar) Sand Blasting cleaning completed on heating surfaces to allow NDT ad visual inspections.
- (Mar) UT grid readings taken throughout the boiler.
- (Mar) Minor Inconel membrane repairs to original furnace Inconel
- (Mar) Minor repairs to 2nd pass left and rear water walls
- (Mar) # 3 Super heater - 18 leading edge loops replaced; Weld metal build-up where required due to wear.
- (Mar) #2 Super heater soot blower bearing brackets adjusted.
- (Mar) #4 Super heater Inconel overlay completed.
- (Mar) Metal thermal spray was applied to top 3 meters of the 2nd pass rear wall and top 4.6 meters of the rear #4 Super heater pendants; Ceramic paint was applied to the non-thermal sprayed remainder of the 2nd pass walls (top 3 meters of the left and right walls, bottom of #4 super heater rear pendants and all of the front pendants).
- (Mar) Under fire air heaters were cleaned.
- (Mar) Annual steam drum inspection completed by ChemTreat.
- (Mar) Evaporator jumper tube shields replaced.
- (Mar) 253 refractory tiles replaced in furnace.
- (Mar) Various furnace refractory replaced/repaired: chill tube header, burner zone, over fire air nozzle zone and feed table to side wall transition areas.
- (Mar) All Soot blower lance tube nozzles re-drilled and indexing checked as well as PM's completed.
- (Mar) Secondary and tertiary air nozzles inspected.
- (Mar) Martin grate and feed table inspections completed.
- (Mar) Ash discharger cleaned and inspected.
- (Mar) Feed chute water jacket leak repaired.
- (Mar) Furnace IR camera Port cleaning weekly PM's completed.
- (Mar) Various plant lighting replaced.
- (Mar) Various emergency lighting battery packs replaced during the outage.

- (Mar) Combustion air and IGR fans inspected (gas path, bearings and coupling).
- (Apr) Unit 2 IGR damper right side repaired.
- (Apr) Rebuilt 2nd pass Plattco valve.
- (Apr) Replaced wire rope on East Crane.
- (Apr) Turbine drain pot level switch (C-LSH-0190) repaired.
- (Apr) TG - Replaced defective Bentley Nevada card.
- (Apr) TG - Completed Governor and inlet control valve servo troubleshooting and repair.
- (Apr) Turbine - MSV-0019 (TG isolation) valve repacked with high temperature packing. Valve operator gearbox was overhauled and new wheel chain installed.
- (May) Martin hydraulics filter pump motor replaced with rebuild pump.
- (May) Soot blower assembly rebuild and replaced on Unit 2- 2 assembly and Unit 1 – 1.
- (May) Settling basin pump suction strainer replaced.
- (May) Furnace IR camera Port cleaning completed.
- (May) Various plant lighting replaced.
- (Jun) Cleaning outages completed on both boilers (2$^{nd}$ pass hoppers, SH3 and SH2 super heaters).
- (Jun) Repaired leaking Unit #2 boiler furnace left wall lower header drain line during cleaning outage (leak noted while re-filling boiler water after cleaning outage completed). TSSA informed. Spool piece welded in. Hydrostatic test successfully completed.
- (Jun) Martin hydraulics filter pump motor replaced with rebuilt pump.
- (Jun) Soot blower assembly rebuild and replaced on Unit 2- 202 and Unit 1–102.
- (Jun) Settling basin pump suction strainer replaced.
- (Jun) Furnace IR camera port cleaning completed.
- (Jun) Plant lighting replacement.
- (Jul) Settling basin pump suction strainer replaced.
- (Jul) PM’s on dampers completed.
- (Jul) Furnace IR camera Port cleaning completed.
- (Jul) Various plant lighting replaced.
- (Aug) Steam drum gauge glass rebuild and replace for Unit 1 & 2.
- (Aug) Soot blower assembly rebuild and replaced on Unit 1-1 assembly and Unit 2 – 1.
- (Aug) Furnace IR camera Port cleaning completed.
- (Aug) Various plant lighting replaced.
- (Sept) Boiler #1 Minor outage work.
    - Boiler was thoroughly cleaned
    - SH4, 2$^{nd}$ pass upper walls and SH3/SH2 tubes were scaffolded and inspected
    - One 3-foot section of trailing edge tube was replaced in SH4; Inconel overlay repairs were made to SH4 and the leading edge tubes in SH3; Inconel was applied to several areas of the upper 2$^{nd}$ pass rear wall.

    - Run 1 feed table rebuild complete (replaced 4 bars and the connecting rod).
    - Unit 1 steam drum gauge glass was rebuilt and replaced during the minor outage
    - Soot blower PM's completed during the outage.
    - Fan PM's complete during #1 outage.
    - Feed ram and under grates PM's complete during the outage for unit 1.
    - Furnace MICC camera replaced for unit 1 during the outage.
    - Hydraulic oil replaced during the outage as per oil analysis for unit 1.
- (Sept) Various plant lighting replaced.
- (Oct) Boiler #2 Minor outage work completed Oct 9-19:
    - Re-plated feed chute hopper with AR400 plate.
    - Re-plated thin areas of the feed chute; leaks repaired.
    - Gauge glass rebuilt and replaced.
    - Soot blower PM's completed.
    - Fan PM's complete.
    - Feed ram and under grates PM's completed.
    - Grates inspection completed, and one grate bar replaced.
    - Furnace MICC camera replaced.
    - Various plant lighting replaced.
    - 52 tiles replaced in lower furnace.
    - SH4 overlay work completed (approximately 320 square feet of Inconel) and 8 spool pieces installed.
- (Nov) Martin PM's completed for both boilers
- (Nov) Gauge glass replaced for unit 1 and spare one rebuilt.
- (Nov) PM's were completed on IGR and CA fans.
- (Nov) Soot Blower repair done on flange leak.
- (Nov) Replaced packing for soot blower.
- (Nov) B2 cleaning outage completed – SH3/SH2 and 2nd pass hopper blast cleaning.
- (Dec) Martin PM's completed for both boilers
- (Dec) Gauge glass replaced for unit 2 and spare one rebuilt.
- (Dec) PM's were completed on IGR and CA fans.
- (Dec) Soot Blower repair done on flange leak and unit 2 repair on left wall lower header drain leak repaired.
- (Dec) Replaced packing for soot blower.

**APC**

- (Jan) PM's completed on both trains.
- (Jan) PM's performed on APC conveyors and gearboxes.
- (Jan) Inspection of baghouse hoppers completed.
- (Jan) Replaced leaking fittings on #2 Boiler carbon feeder.
- (Jan) Motor on #2 fresh lime screw conveyor feed to Reactor changed out.

- (Jan) Shutdown preparation.
- (Feb) Carbon silo PM's completed including blower inspection.
- (Feb) Lime system PM's completed.
- (Feb) Quench tower cleaned.
- (Feb) Repaired recirculation hopper air pulse header and replaced 4 check valves.
- (Feb) Baghouse outlet dampers repaired to eliminate a corrosion issue.
- (Feb) Baghouse bags inspected by visolite testing.
- (Feb) Pulse header sealing O-rings replaced.
- (Feb) PM's performed on wetting mixer and reactor.
- (Feb) PM's performed on APC conveyors and gearboxes.
- (Feb) Progressed the bag house hopper level switch relocation project.
- (Feb) Baghouse hopper inspections completed.
- (Feb) ID fan inspected (gas path, bearings and coupling).
- (Mar) Carbon silo PM's completed including blower inspection.
- (Mar) Lime system PM's completed.
- (Mar) Quench tower cleaned.
- (Mar) Repaired recirculation hopper air pulse header and inspected check valves.
- (Mar) Baghouse outlet dampers repaired to eliminate corrosion.
- (Mar) PM's performed on wetting mixer and reactor.
- (Mar) PM's performed on APC conveyors and gearboxes.
- (Mar) Baghouse bags inspected by visolite testing.
- (Mar) Pulse header sealing O-rings replaced.
- (Mar) Progressed the bag house hopper level switch relocation project.
- (Mar) Baghouse hopper inspections completed.
- (Mar) ID fan inspected (gas path, bearings and coupling).
- (Apr) Carbon silo PM's completed including blower inspection.
- (Apr) Lime system PM's completed.
- (Apr) Lime feed screw inspected for both units.
- (Apr) Unit 1&2 pulse jet solenoid PM's completed. One solenoid replaced on each baghouse.
- (Apr) Leaking air fluidizing regulator repaired for unit 2 Recirc hopper.
- (May) PM's performed on APC conveyors and gearboxes.
- (Jun) PM's performed on APC conveyors and gearboxes.
- (Jun) #1 and #2 APC inspected and cleaned during boiler cleaning outages.
- (Aug) PM's performed on APC conveyors and gearboxes.
- (Aug) Baghouse hopper isolation gates temporary repaired (to be replaced during Fall Minor outages)
- (Aug) Bag house hopper crack repaired for Unit 2.
- (Sept) PM's performed on APC conveyors and gearboxes.
- (Sept) Outage Inspection and PM's completed for APC unit 1.
- (Sept) Replaced 4 isolation damper assemblies below baghouse with new stainless steel on unit 1.

- (Sept) Unit 2 bag house hopper crack was repaired.
- (Sept) Unit 1 recirculation hopper fluidizing air baffles were inspected and cleaned.
- (Oct) Residue loader EGR valve replaced and cabin filters.
- (Oct) PM's performed on APC conveyors and gearboxes.
- (Oct) Outage Inspection and PM's completed for APC unit 2.
- (Oct) Replaced 3 corroded isolation dampers below baghouse with new SS damper in unit 2.
- (Oct) Bag house hopper crack repaired for unit 2.
- (Nov) PM's performed on APC conveyors and gearboxes.
- (Nov) B2 recirculation hopper fluidizing air system repairs
- (Dec) PM's performed on APC conveyors and gearboxes.

**Residue Building**

- (Jan) PM's completed on loader.
- (Jan) Replaced cutting edge on loader bucket
- (Feb) Repaired Non-ferrous Diverter gate.
- (Feb) PM's on inclined conveyor and vibratory conveyor completed.
- (Mar) PM's on inclined conveyor and vibratory conveyor completed.
- (Apr) PM's on inclined conveyor and vibratory conveyor completed.
- (Apr) Surge Bin A & B Rotary feeder rebuilt, repaired and replaced.
- (Apr) Replaced Solenoid on pug mill water lines.
- (Apr) Replaced bearing on Train A cement silo rotary feeder.
- (May) Rebuild both rotary feeders for fly ash surge Bins.
- (Jun) PM's performed on APC conveyors and gearboxes.
- (Jun) Rebuilt fly ash surge bin rotary air lock.
- (Jul) PM's performed on APC conveyors and gearboxes.
- (Jul) Repaired both rotary air locks for surge bin.
- (Jul) Water line solenoid replaced and valve repaired.
- (Jul) PM's performed on both lime screws.
- (Jul) Replaced carbon silo feed screw venturi ports.
- (Aug) Magnet for ferrous metal recovery annual testing & inspection completed as well as modification completed for better efficiency.
- (Aug) Ongoing Pugmill B rebuild.
- (Aug) Screens replaced for vibratory conveyor before ECS.
- (Sept) ECS rotor rebuilt completed including high speed balancing.

**E&I/DCS**

- (Jan) Repaired fault in stack PDC air conditioner. Installed metal rain hood for better weather protection
- (Jan) Pug mill water supply solenoid replaced.
- (Jan) Repaired Atmospheric drain tank level transmitter

- (Feb) LED Lighting array on level 29 North of Boiler Drum installed and powered from an existing 120V AC circuit.
- (Feb) Crucial Instrument checks on those that are not going to be calibration/certified.
- (Feb) Super-heater #4 thermocouple 2-TE-4306 was repaired.
- (Feb) Replaced Cement Unloading Blower limit switch.
- (Feb) Replaced solenoid valve on A2 hopper Plattco valve.
- (Feb) Facility lighting: bulbs and ballasts replaced/ installed.
- (Feb) Boiler #2 Drum Level probes were inspected/cleaned and replaced where needed.
- (Feb) Drum level probe to relay panel high temperature wiring was replaced.
- (Feb) MICC Camera: replaced high temp flex conduit and ethernet communication cable.
- (Feb) Removal and replacement of the MICC cooling system flex hoses.
- (Feb) General boiler instrument Inspection and calibration.
- (Feb) Grate Thermocouple 2-TE-G2S8B9 inspection and re-terminated.
- (Feb) Cleaned DCS Cabinet for Boiler #2 in 4th floor drive room.
- (Feb) #2 Feed Hopper Microwave Level Sensor Array repaired.
- (Feb) Critical instrumentation was re-calibrated/recertified by Grace Instrument Services.
- (Mar) Improved LED Lighting array installed on level 29 North of #1 Boiler Drum.
- (Mar) Completed Instrument checks on those devices that are not going to be calibration/certified.
- (Mar) Super-heater #4 thermocouple 2-TE-4306 was repaired.
- (Mar) Replaced Cement Unloading Blower limit switch.
- (Mar) Facility lighting: HPS bulbs and ballasts replaced/ installed.
- (Mar) Boiler #1 Drum Level probes were inspected/cleaned and replaced where needed.
- (Mar) Drum level probe to relay panel high temperature wiring was replaced.
- (Mar) MICC Camera: replaced high temp flex conduit and ethernet communication cable.
- (Mar) Removal and replacement of the MICC cooling system flex hoses.
- (Mar) General boiler instrument Inspection and calibration.
- (Mar) Grate Thermocouple inspections.
- (Mar) Cleaned DCS Cabinet for Boiler #1 in 4th floor drive room.
- (Mar) #2 Feed Hopper Microwave Level Sensor Array inspected and re-aligned.
- (Mar) Critical instrumentation was re-calibrated/recertified by Grace Instrument Services.
- (Apr) Replaced power cable for east crane.
- (Apr) ACC fan trip troubleshooting and repair.
- (Apr) Replaced breaker on APC heat tracing.
- (May) Vibrionic level switch replaced on various baghouse hopper and recirculation hopper -4 nos.
- (May) Thermocouples replaced in 101 and 102 recirculation hoppers.

- (May) Heat tracing repaired in APC.
- (Jun) Thermocouples replaced on 201 recirculation hopper.
- (Jun) Lights replaced in ACC area.
- (Jun) Defective TG Bentley Nevada Relay board replaced.
- (Jun) Re-stroke and calibration completed for TG HP steam inlet control valve actuator. #2 HP steam inlet valve adjusted.
- (Jun) Hydro One Telemetry/tele-protection issue resolved by re-loading the software on SEL RTAC's in TG control room.
- (Jul) Level Probe replaced on bag house hopper 201.
- (Jul) Lights replaced in ACC and rest of the plant.
- (Jul) Solenoid replaced for martin UFA damper unit 2.
- (Jul) TG and control room monitors on going troubleshooting for freezing issues.
- (Jul) Turbine gland steam condenser fan motor replaced
- (Aug) Thermocouples replaced in recirculation hopper 102.
- (Aug) 2-TE 4318, 2-TE 5014-1, 2-TE4215, 2-TE4216, 2-TE 4305 thermocouples repaired for Unit 2.
- (Aug) Lights replaced in ACC.
- (Aug) Vibrator replaced on unit 2.
- (Sept) Bi-annual AMESA maintenance: probe, sample line, sample box, and main cabinet
- (Sept) APC thermocouple 2-TT-4763-1 replaced
- (Sept) Martin grate thermocouple repaired 2-TE-G1-S6B9
- (Sept) Lights on charging deck above cranes replaced, first few done at west side of building
- (Sept) Red laser on tipping floor installed
- (Sept) Boiler 2 Inlet probe cleaned and filters replaced with cleaned ones. Replaced main flange gasket at probe
- (Sept) Servomex O2 probe removed and cleaned
- (Sept) Portable power supply level 23 hooked up to welding plug supply on west side
- (Sept) Bay lighting in residue building to be replaced: removing existing lighting due to damage and corrosion. Taken back to the broken OCAL junction and repaired with stainless junction box.
- (Sept) Received Endress & Hauser 700mm level switches for APC; to be installed once damaged switch is removed. (Damaged unit removed from port, replaced with new.)
- (Sept) Performed a preliminary startup check on both inlet and outlet analyzers after both probes and lines had maintenance performed
- (Sept) Replaced timer relay on Air cannon #2
- (Sept) Bulbs above scaffolding behind Martin near the west cage have been replaced
- (Sept) LED lighting in front of barn doors have been swapped with the correct fixtures
- (Oct) Bi-annual AMESA maintenance: probe, sample line, sample box, and main cabinet

- (Oct) APC thermocouple replaced and level probe.
- (Oct) Martin grate thermocouple found with burned wiring repaired.
- (Oct) Boiler 2 Inlet probe cleaned and filters replaced with cleaned ones. Replaced main flange gasket at probe.
- (Oct) Servomex O2 probe removed and cleaned.
- (Oct) Portable power supply level 23 hooked up to welding plug supply on west side.
- (Oct) Bay lighting in residue building was replaced.
- (Oct) Performed a preliminary startup check on both inlet and outlet analyzers after both probes and lines had maintenance performed.
- (Oct) Bulbs above scaffolding behind Martin near the west cage have been replaced.
- (Oct) LED lighting in front of barn doors have been swapped with the correct fixtures.
- (Nov) Replaced West Crane Power cable and repaired east crane power cable.
- (Nov) Replaced TC for APC recirculation hopper.
- (Dec) Replaced Lighting in APC.
- (Dec) Replaced heat tracing in ash residue building.
- (Dec) Replaced Air solenoid for APC recirculation hopper.

**Auxiliary Systems (Air, Water, Gas)**

- (Jan) PM's and greasing completed on air compressors.
- (Jan) Monthly pump PM's completed.
- (Feb) Filters replaced on air compressor A.
- (Mar) Filters replaced on air compressor B.
- (Apr) Air Dryer annual service completed and desiccant replaced.
- (May) Filters replaced on air compressor B.
- (Jun) Filters replaced on air compressor A.
- (Jul) Filters replaced on air compressors A and B.
- (Aug) Filters replaced on air compressor B.
- (Sept) Filters replaced on air compressor A.
- (Oct) Filters replaced on air compressor B.
- (Nov) Filters replaced on air compressor A.
- (Dec) Filters replaced on air compressor B.

**CEMS**

- (Jan) Inspection of all probe and filters replacements.
- (Jan) 1st quarter Cylinder Gas Audits and Opacity meter audits completed.
- (Jan) Changed out AMESA traps on both boilers on Jan 26
- (Feb) Probe inspection and filter replacements.
- (Feb) #1 Boiler AMESA LTSS annual maintenance.
- (Feb) Flushed and cleaned all four inlet and outlet sample lines from probes down to CEMS trailer.

- (Feb) Outlet probe on # 2 extracted and cleaned and probe tip filter replaced.
- (Mar) Probe inspection and filter replacements.
- (Mar) #1 Boiler AMESA LTSS annual maintenance.
- (Mar) Flushed and cleaned all four inlet and outlet sample lines from probes down to CEMS trailer.
- (Mar) Outlet probe on # 2 removed and cleaned and probe tip filter replaced.
- (Mar) New sample traps installed in AMESA.
- (Apr) Probe inspection and filter replacements.
- (Apr) #1 & #2 Boiler AMESA sample traps installed. Sampling probes were swapped between boilers.
- (Apr) Rebuilt THC sampling pump.
- (Apr) Rebuilt ammonia sampling pump.
- (May) Inspection of all probe and filters replacements.
- (May) Monthly PM's performed.
- (May) West side AC unit compressor motor repaired
- (May) Unit 1 & 2 AMESA probe and new sampling trap installed.
- (Jun) Inspection of all probe and filter replacements.
- (Jun) Monthly PM's performed.
- (Jul) AMESA trap installed Unit 1 & 2.
- (Jul) GHG sampling completed on Unit 2.
- (Jul) Inspection of all probes and required filters replacements.
- (Jul) Monthly PM's performed.
- (Jul) Quarterly Cylinder Gas and Opacity Audits completed and passed.
- (Jul) Annual CEMS third party Audit completed successfully by CEMS Specialties. Report is expected in September.
- (Jul) Annual RATA completed successfully on both Units.
- (Aug) Inspection of all probe and filters replacements.
- (Aug) Monthly PM's performed.
- (Aug) Annual RATA completed.
- (Aug) Annual Audit Completed.
- (Sept) Inspection of all probe and filters replacements.
- (Sept) Monthly PM's performed.
- (Oct) Inspection of all probe and filters replacements.
- (Oct) Monthly PM's performed.
- (Nov) Inspection of all probe and filters replacements.
- (Nov) Monthly PM's performed.
- (Dec) Q4 CGA and opacity audits completed.
- (Dec) Inspection of all probe and filters replacements.
- (Dec) Monthly PM's performed.

**Rolling Stock**

- (Apr) Replaced EGR valve and body for tipping floor loader.
- (Apr) 250 hr maintenance complete on tipping floor and ash residue loaders.
- (Apr) PM's completed on forklift.

- (Sept) Residue loader EGR valve replaced and cabin filters.

**ACC**

- (Apr) Repaired leak on LP and HP air ejectors.
- (Apr) Replaced 8” rupture disc after black plant outage.

Major Maintenance work for 2018 was focused on outage activities; specifically, inspection and repairs to both Boilers and associated waste handling equipment (MSW and ash) and Air Pollution Control equipment.

**2018 Outage Schedule**

| | | Major Outage | Minor Outage |
|---|---|---|---|
| #1 Boiler | Planned | Feb 11 - 25 | Aug 13 – 18 |
| | Actual | Mar 11 - 29 | Sept 24 - 29 |
| #2 Boiler | Planned | Mar 11 – 25 | Aug 27 – Sept 1 |
| | Actual | Feb 11 – Mar 01 | Oct 9 - 19 |
| Turbine | Planned | None | |
| | Actual | None | |