Durham York Energy Centre

Long-Term Sampling System

Quarterly (Q3) Report

July 2022 to September 2022

Prepared by

The Regional Municipality of Durham

Table of Contents

1. Introduction

This report provides additional details with respect to the reporting of operational data related to the AMESA Long-Term Sampling System (LTSS) for Dioxin and Furans at the Durham York Energy Centre (DYEC).

This report covers the third quarter (Q3) of 2022 and includes AMESA data collected from June 24, 2022, to September 25, 2022.

2. Background

To meet the requirements of Environmental Compliance Approval (ECA) Condition 7(3), a continuous sampling system (the Adsorption Method for Sampling Dioxins and Furans (AMESA) LTSS), is installed on each of the two boiler units at the DYEC to sample Dioxins and Furans.

The operation of the AMESA system was initiated in 2015 and has been maintained in accordance with current guidance from the AMESA manufacturer, the North American vendor ENVEA, and the AMESA Technical Manual.

The AMESA system is used only for the purpose stated in ECA Condition 7(3), which relates to Dioxins and Furans emissions trend analysis and evaluation of Air Pollution Control equipment performance. The AMESA results themselves do not constitute a compliance point for the facility operations.

ECA Condition 7(3), Testing, Monitoring and Auditing Long-Term Sampling for Dioxins and Furans, states:

(a) The Owner shall develop, install, maintain, and update as necessary a long-term sampling system, with a minimum monthly sampling frequency, to measure the concentration of Dioxins and Furans in the Undiluted Gases leaving the Air Pollution Control (APC) Equipment associated with each Boiler. The performance of this sampling system will be evaluated during the annual Source Testing programs in accordance with the principles outlined by 40 CFR 60, Appendix B, Specification 4.1

[1] 40 CFR Part 60 refers to the Code of Federal Regulations – Standards of Performance for New Stationary Sources

(b) The Owner shall evaluate the performance of the long-term sampling system in determining Dioxins and Furans emission trends and/or fluctuations as well as demonstrating the ongoing performance of the APC Equipment associated with the Boilers.

AMESA results are available at the site when requested by the Ministry of Environment, Conservation and Parks (MECP) and reported to the MECP as part of the Annual Report required by ECA Approval Condition 15 and posted to the DYEC website.

As the results of the LTSS AMESA sampling are reported annually as a 12-month rolling average to the MECP and contained in the Annual Report, a request from the public was granted in 2021 to provide more frequent updates. Quarterly reports containing validated, calculated results for each AMESA sampling run for both boiler units are prepared for Council and subsequently posted to the website.

3. Cartridge Replacement Schedule

The AMESA sampling cartridge duration is approximately 30 days before it is removed and sent to the laboratory for analysis. As each boiler unit is independent, the duration may differ due to such things as alternating maintenance activities.

AMESA Cartridge Replacement Schedule

Unit #	Run #	Start Date	End Date	Duration (days)
1	75	27-Jun-22	25-Jul-22	25
2	75	24-Jun-22	25-Jul-22	29
1	76	25-Jul-22	26-Aug-22	25
2	76	25-Jul-22	26-Aug-22	19
1	77	26-Aug-22	26-Sept-22	31
2	77	26-Aug-22	26-Sept-22	31

Note 1: The cartridge duration times may differ even though the start and end dates are the same for both boiler units.

4. Laboratory Analysis

There were no issues identified with the AMESA sample cartridges or the analysis at the laboratory; however, the laboratory continues to experience delays in analysis and reporting.

5. Durham and York Regions and Covanta Monthly Data and Operations Review

Staff from The Regional Municipality of Durham and the Regional Municipality of York Regions meet with Covanta both weekly and monthly on an established schedule to discuss facility operations, and to review environmental monitoring results, trends and calculations where required for all monitoring programs, and the available AMESA results.

6. Oversight of AMESA Results

The Regional Municipality of Durham and the Regional Municipality of York Region staff and Covanta meet with the MECP on a quarterly basis to discuss all items pertinent to the ECA and the Environmental Monitoring Programs and facility operations. Any concerns which are not determined to be reportable incidents in accordance with the ECA are discussed along with day-to-day operations and monitoring.

Any events which the ECA deems reportable are done in accordance with the appropriate ECA condition.

Results of the AMESA LTSS are reported to the MECP in the DYEC Annual Reports and posted to the DYEC website. AMESA trends of validated data are presented as a 12-month rolling average together with an analysis to demonstrate the ongoing performance of the APC Equipment. The MECP has no concerns with the AMESA results detailed in the 2021 Annual Report as posted via this link: MECP Review of the DYEC 2021 Annual Report. The 2021 Annual Report has been posted to the website.

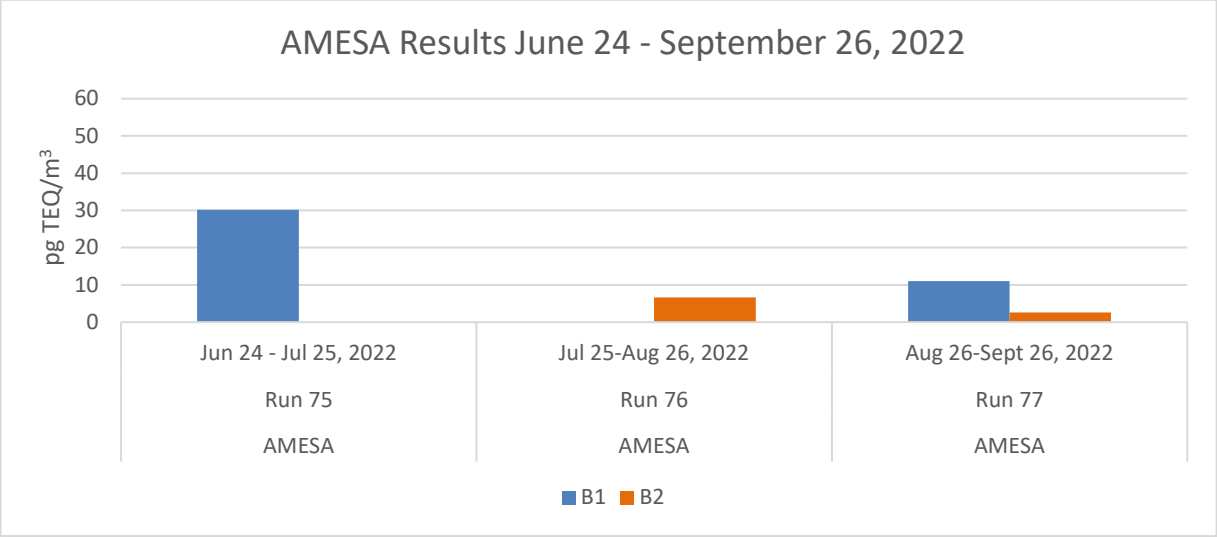
7. AMESA Performance

The measured concentrations for each of the 17 dioxin and furan congeners identified in the laboratory certificate of analysis are applied to established calculations to obtain a Calculated Result. These calculations quantify the Dioxins and Furans per reference metre cube of flue gas. Additionally, standard temperature, pressure and oxygen correction factors are also applied to the measured concentration to obtain a value for regulatory comparison. Finally, each of the 17 dioxin and furan congeners are multiplied by their respective toxic equivalency factor (TEF) and added together to obtain a total dioxin and furan total toxic equivalence (TEQ). The ECA for the DYEC specifies the use of the NATO classification scheme for Dioxins and Furans and therefore the NATO TEF factors are applied to obtain the TEQ calculation. The Table below shows each of the AMESA sampling Runs, the start and end time the cartridge was in-situ for each boiler unit, and the calculated result.

AMESA Calculated Results				
Unit #	**Run #**	**Start Date**	**End Date**	**Calculated Result (pg TEQ/Rm^3)**
1	75	27-Jun-22	25-Jul-22	30.139
2	75	24-Jun-22	25-Jul-22	invalidated
1	76	25-Jul-22	26-Aug-22	invalidated
2	76	25-Jul-22	26-Aug-22	6.61
1	77	26-Aug-22	26-Sept-22	11.022
2	77	26-Aug-22	26-Sept-22	2.601

Note 2: Boiler Unit #2 Run 75 and Boiler Unit #1 Run 76 AMESA results were invalidated.

While AMESA has no regulatory limit associated for compliance as it is used to supplement source testing, the ECA directs that, "The Owner shall evaluate the performance of the long-term sampling system in determining Dioxins and Furans emission trends and/or fluctuations as well as demonstrating the ongoing performance of the APC Equipment associated with the Boilers." The Regions, their Engineering and Air Emissions oversight consultants and Covanta will continue to monitor DYEC performance as it relates to AMESA results and trends. The Table below displays the results of the AMESA sampling runs carried out in the third quarter (Q3) of 2022.



Note 3: Boiler Unit #2 Run 75 and Boiler Unit #1 Run 76 AMESA results were invalidated.

7.1 Investigation

There were two results which triggered the AMESA Investigation Checklist during the third quarter (Q3) of 2022.

The laboratory analysis of Boiler Unit #2, AMESA Run #75, which commenced service June 24, 2022, prompted a comprehensive evaluation of operations and maintenance activities and/or conditions that occurred during the time the AMESA sampling cartridge was in-situ. On July 16 and July 23, 2022, there were incidents where the AMESA system was sampling during non-isokinetic conditions due to a burner reliability issue which had the potential to adversely affect the sample integrity.

The laboratory analysis of Boiler Unit #1, AMESA Run #76, which commenced service July 25, 2022, prompted a comprehensive evaluation of operations and maintenance activities and/or conditions that occurred during the time the AMESA sampling cartridge was in-situ. On July 25, 2022, work was undertaken related to a plugged economizer. Due to the corrective maintenance being completed for the plugged economizer during this period there was a high probability the AMESA system was sampling during non-isokinetic conditions.

7.2 Corrective Action

Following investigations into both events triggering the AMESA Investigation Checklist during Q3, Covanta has proposed the following actions moving forward.

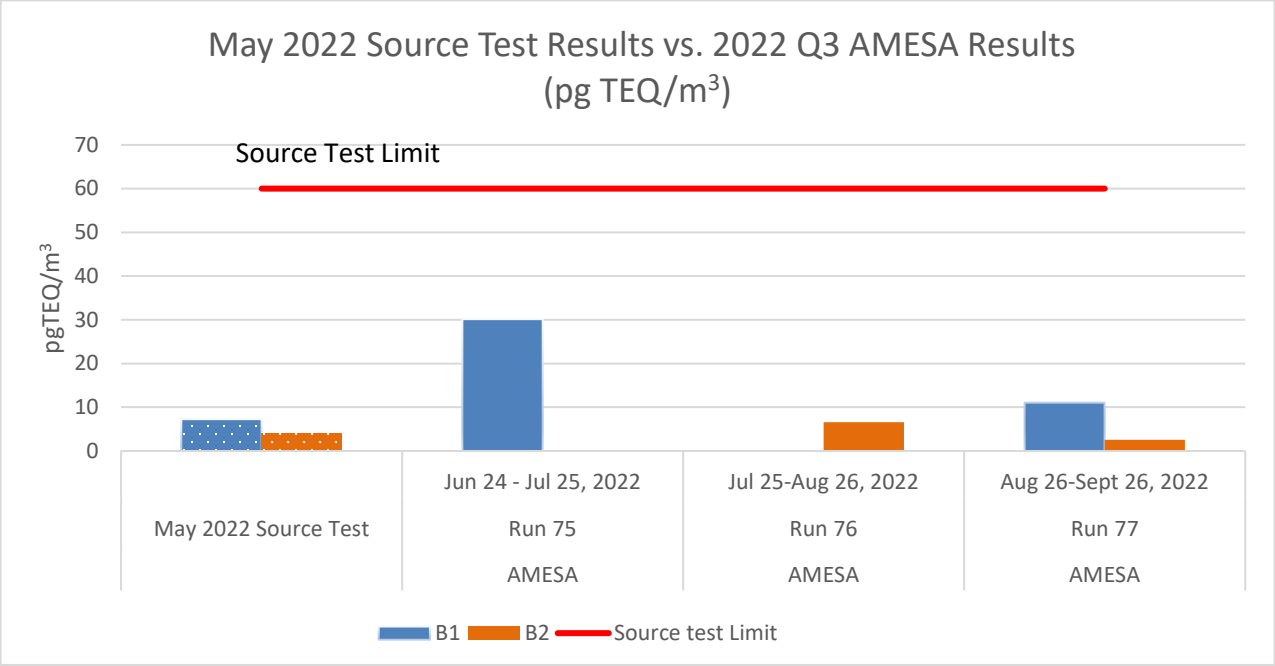
- A monthly review of the flue gas zone temperatures to allow for expediated actions for temperature drops or outliers that could lead to conducive formation of dioxins and furans.
- Periodic walk downs of the entire system to ensure no leakage of oxygen that could contribute to de novo synthesis in critical locations.
- A third-party inspection of Boiler Unit #2 burner as part of the upcoming minor outage scope to resolve the burner reliability issues.
- Exploring the option of an addition to the trigger input coupled with the set steam flow requirement. This will allow the integrity of the AMESA sample to be protected by isolating the AMESA system from the process during an operating condition that has high potential to be non-isokinetic.

8. AMESA relative to most current Source Testing Dioxin and Furan Results

AMESA is not used to assess compliance and should not be evaluated against Ministry standards, such as the Dioxin and Furan Source testing limit. The testing

methodology for AMESA and Source testing sampling and analysis are different and are set out within their prescribed sampling method and manufacturer guidelines.

The AMESA results are presented in the chart below to show how the Q3 calculated values compare to the most current source testing results. The source test compliance limit for Dioxins and Furans is 60 pgTEQ/m3. The chart below shows the AMESA Q3, 2022 results as compared to the 2022 Spring source test results. Results from the Spring source test also indicated the Dioxins and Furans result is below the regulatory compliance limit.



Note 4: Boiler Unit #2 Run 75 and Boiler Unit #1 Run 76 AMESA results were invalidated.

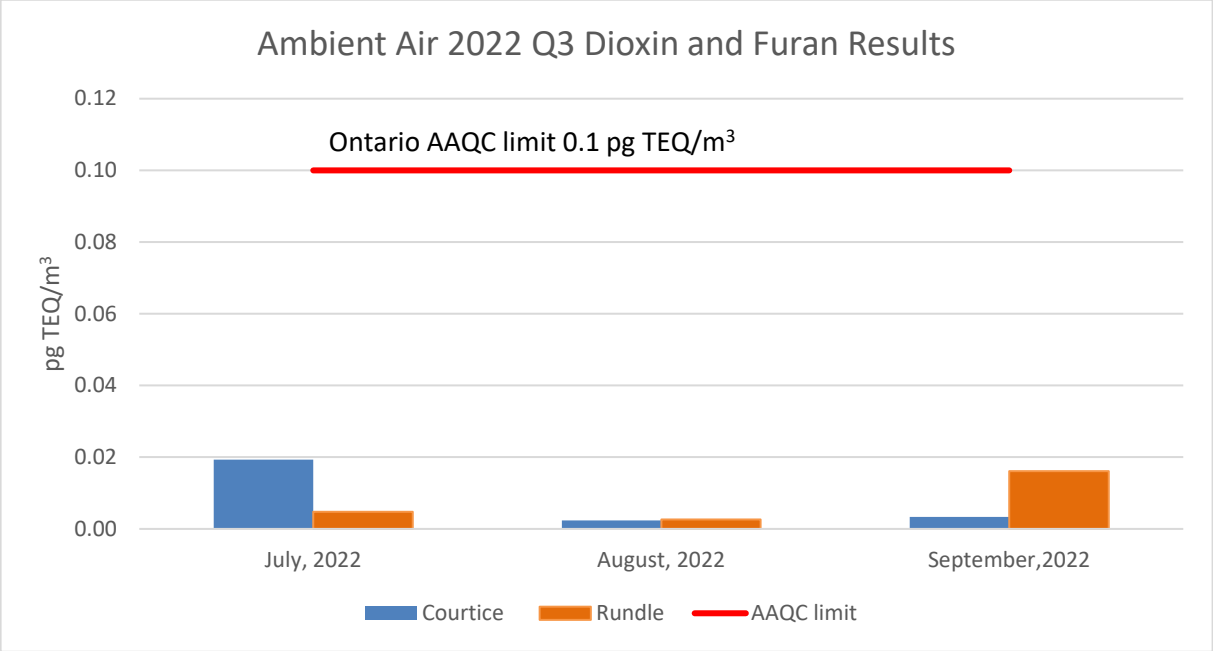
9. Ambient Air Dioxin and Furan Results – Third Quarter (Q3) 2022

The Ambient Air Monitoring Program samples for dioxins and furans. The sampling methodology, units of measurement and the reporting limits are prescribed differently and cannot be compared directly to the source testing or AMESA results. The Ambient Air monitoring program does not measure point source emissions, but it does provide an indication of local air quality. The monitoring equipment samples air, which captures ambient air emissions from a variety of emissions sources in the area. The results of ambient air monitoring assist in informing on local air quality and may suggest contributing factors based on meteorological conditions such as wind speed and direction.

As can be seen in the graph below, the dioxin and furan results measured from both ambient air stations monitored as part of the DYEC ambient air monitoring program

are below the Ontario Ambient Air Quality Criteria of 0.1 picogram Toxic Equivalency per cubic metre (pgTEQ/m^3) during the third quarter (Q3) of 2022.

Of additional note, the Ontario Ambient Air Quality Criteria is 10 times lower than the Ontario Regulation 419 Upper Risk Threshold of 1 pgTEQ/m^3 for dioxins and furans.



10. Durham York Energy Centre Inquiries

The MECP District Manager provided a response letter dated December 28, 2022 (Attachment #1), in relation to questions raised by the Council of the Municipality of Clarington through Resolution #C-266-21 on the Long-Term Sampling System for the monitoring of Dioxin and Furan emissions (AMESA) from the DYEC. The MECP provided the following statements in their letter:

- "The AMESA system is not used for the purpose of assessing compliance, nor should the system results be compared to ministry standards, limits, or criteria for the purpose of compliance."
- "The AMESA work plan was developed and revised by Covanta and the Regions with the assistance of the system manufacturer and input from the ministry. The ministry reviewed and accepted the evaluation and validation process outlined in the AMESA plan."
- "Covanta and the Regions are operating the AMESA system in compliance with the conditions of the Environmental Compliance Approval (ECA), including

Condition 7(3), and the ministry will continue to provide guidance regarding the evaluation and validation of the AMESA system.

- “Ongoing compliance monitoring programs indicate that Covanta and the Regions of York and Durham are operating the DYEC in compliance with ministry emission limits, which are protective of human health and the environment.”

End of Report