Memorandum

Date: **March 22, 2024**

To: **Regional Chair Henry and Members of Regional Council**

From: **Ramesh Jagannathan, M.B.A, P.Eng. Acting Commissioner of Works**

Copy: **Elaine Baxter-Trahair, Chief Administrative Officer**
Andrew Evans, M.A.Sc., P.Eng., Director, Waste Management Services

Subject: **Durham York Energy Centre**
Quarterly (Q3 - 2023) Long-Term Sampling System Report

The Regional Municipality of Durham
Works Department

The attached report for the third quarter (Q3) of 2023 provides details with respect to data related to the Long-Term Sampling System (LTSS) at the Durham York Energy Centre (DYEC), referred to as the AMESA system.

This report includes AMESA data collected from July 17, 2023, to October 17, 2023, and is structured as follows:

1. Sections 1 and 2 provide background,
2. Sections 3 to 8 provide specific quarterly AMESA data,
3. Section 9 provides ambient air data for the same time period, and
4. Section 10 responds to inquiries received during the quarter.

End of Memo

Attachment: DYEC LTSS Quarterly (Q3 - 2023) Report
(July 17 to October 17, 2023)

Durham York Energy Centre

Long-Term Sampling System

Quarterly (Q3) Report

July - October

Prepared by

The Regional Municipality of Durham

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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 2023 and includes AMESA data collected from July 17 to October 17, 2023.

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.

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 suggested to provide more frequent updates. Council provided direction 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.

Table 1: AMESA Cartridge Replacement Schedule

Unit #	Run #	Start Date	End Date	Duration (days)
1	86	17-Jul-23	10-Aug-23	18
2	86	17-Jul-23	10-Aug-23	18
1	87	11-Aug-23	8-Sept-23	28
2	87	11-Aug-23	14-Sept-23	28
1	88	8-Sept-23	6-Oct-23	28
2	88	14-Sept-23	17-Oct-23	19

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

Regional staff 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 had 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 2022 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 cubic metre of gas at reference conditions. 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.

Table 2: AMESA Calculated Results

Unit #	Run #	Start Date	End Date	Calculated Result (pg TEQ/Rm^3)
1	86	17-Jul-23	10-Aug-23	0.247
2	86	17-Jul-23	10-Aug-23	4.221

Unit #	Run #	Start Date	End Date	Calculated Result (pg TEQ/Rm^3)
1	87	11-Aug-23	8-Sept-23	55.129
2	87	11-Aug-23	14-Sept-23	0.332
1	88	8-Sept-23	6-Oct-23	9.342
2	88	14-Sept-23	17-Oct-23	1.318

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 conducted in the third quarter (Q3) of 2023.

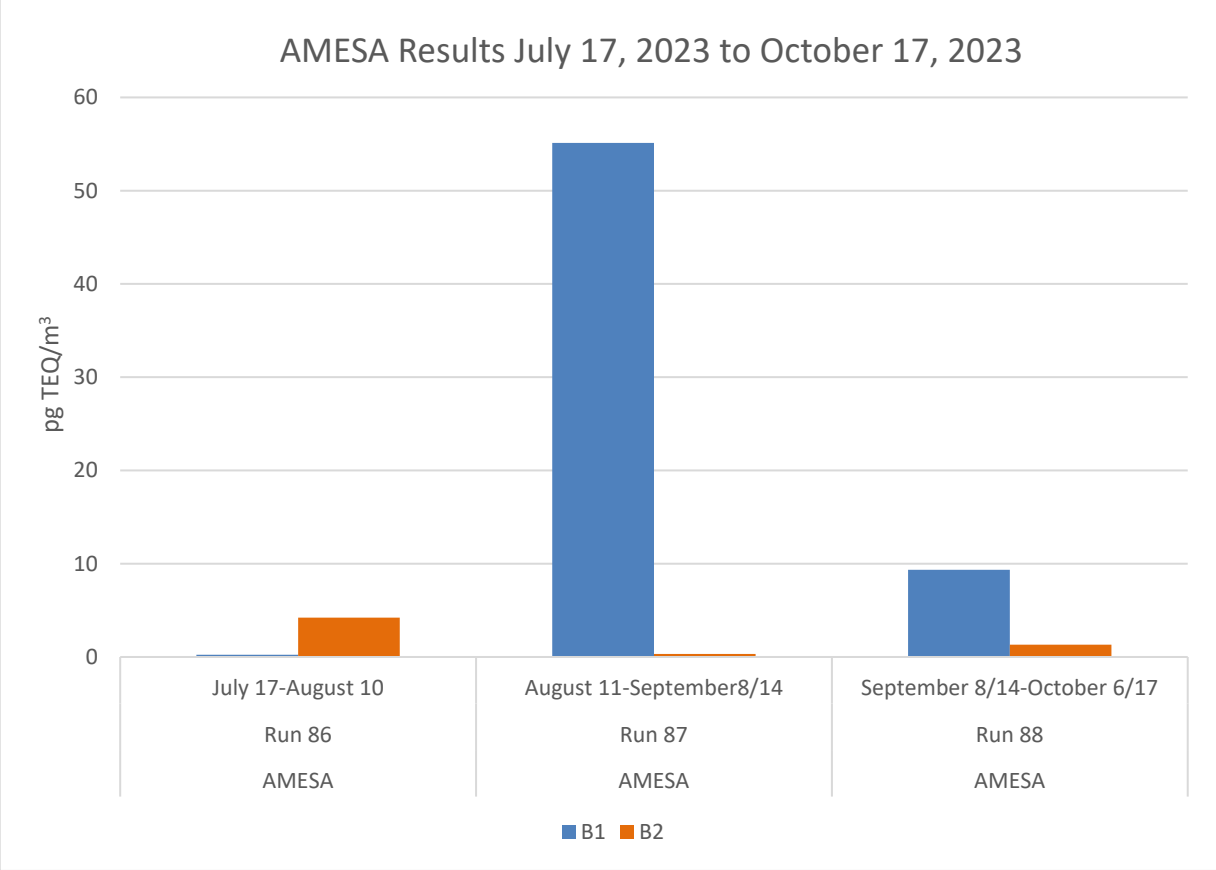

Figure 1: AMESA Results July 17 to October 17, 2023

7.1 Investigation

There were no results that formally triggered the AMESA Investigation Checklist during the third quarter (Q3) of 2023 as described in the AMESA workplan. However, given the anomalous value, the AMESA checklist was undertaken as a due diligence exercise to investigate the result received for boiler unit #1, Run 87, due to the elevated sample result. The investigation found no unusual operational events which may have led to the elevated sample result. However, it is noteworthy that subsequent to the sample being completed, for Boiler #1, Run 88, the AMESA unit experienced a failure and required a number of components to be repaired or replaced. This suggests that the AMESA system may have been experiencing operational issues during this period. Given the following system problems, and the fact that the results of the source test fell within normal ranges; the system will continue to be monitored and assessed for any potential trends.

7.2 Corrective Action

As a result of the AMESA checklist and due diligence investigation results, there were no findings which required that corrective actions be undertaken during the third quarter (Q3) of 2023. Further discussion of the AMESA system failure will be discussed in the Q4 report.

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 Figure 2 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, 2023 results as compared to the 2023 September source test results. Results from the September source test also indicated the dioxins and furans result is below the regulatory compliance limit.

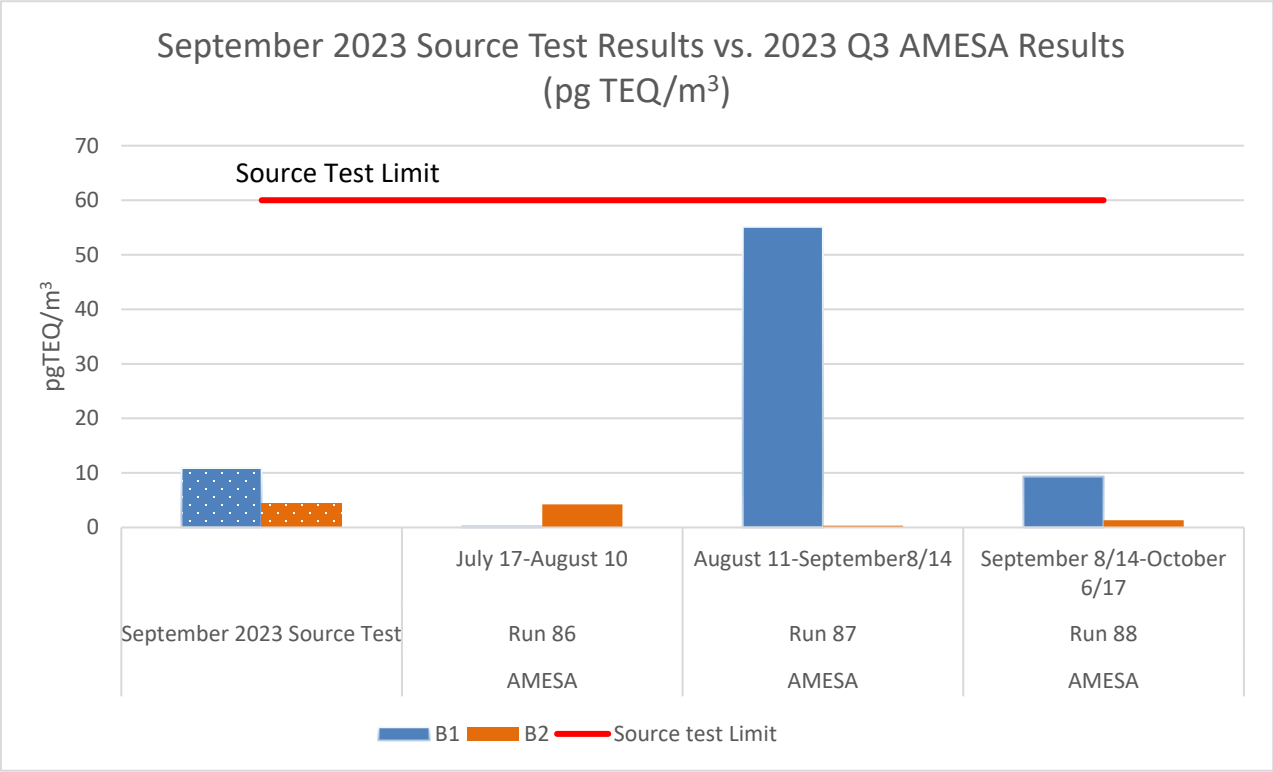

Figure 2: September 2023 Source Test Results vs. 2023 Q3 AMESA Results (pg TEQ/m^3)

9. Ambient Air Dioxin and Furan Results – Third Quarter (Q3) 2023

The Ambient Air Monitoring Program samples for dioxins and furans. The sampling methodology, units of measurement and 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 2023.

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.

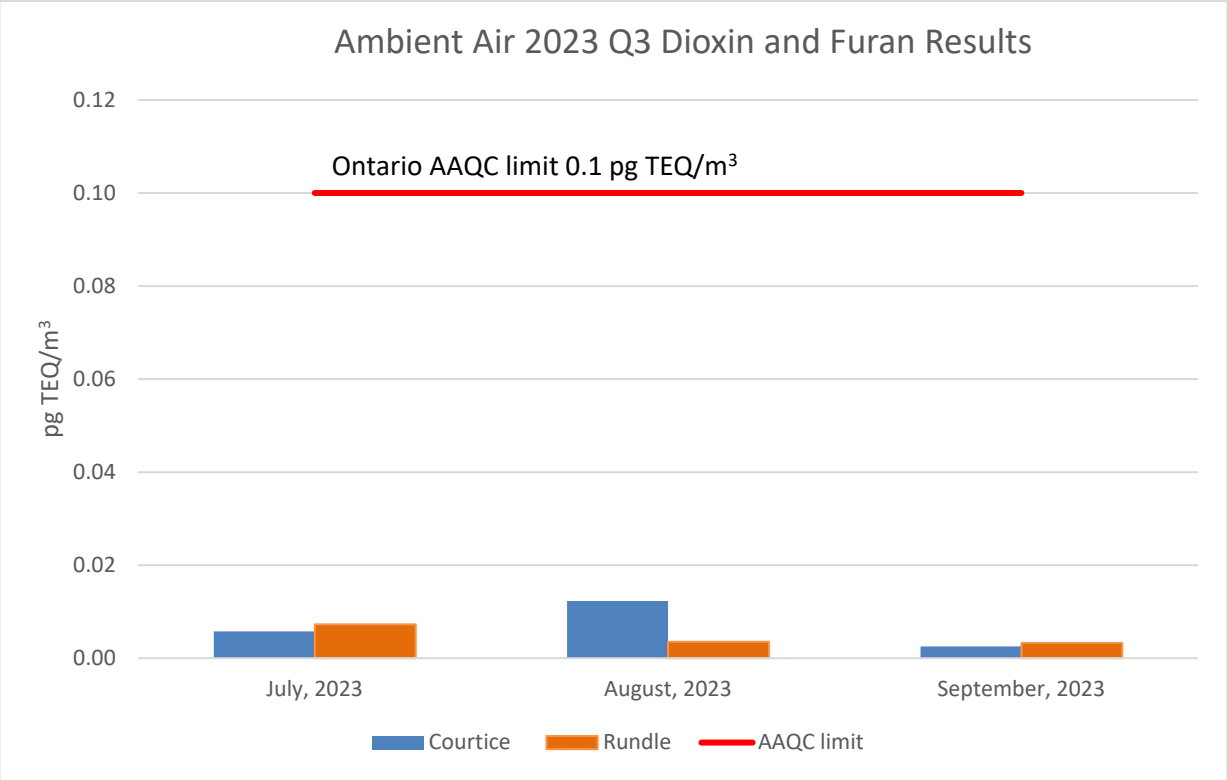

Figure 3: Ambient Air 2023 Q3 Dioxin and Furan Results

10. Durham York Energy Centre Inquiries

There are no outstanding inquires related to the AMESA Long-Term Sampling System (LTSS) for dioxin and furans at the Durham York Energy Centre (DYEC).

End of Report