



The Regional  
Municipality of  
Durham

Works Department

# Memorandum

**Date:** December 6, 2024

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

**From:** Ramesh Jagannathan, MBA, M.Eng., P.Eng., PTOE,  
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 (Q2 – 2024) Long-Term Sampling System Report

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The attached report for the second quarter (Q2) of 2024 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 May 10, 2024, to August 1, 2024, 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 period.

**End of Memo**

**Attachment:** DYEC LTSS Quarterly (Q2 – 2024) Report  
(May 2024 to August 2024)



**Durham York Energy Centre  
Long-Term Sampling System  
Quarterly (Q2) Report  
May 2024 – August 2024**

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 dioxins and furans at the Durham York Energy Centre (DYEC).

This report covers the second quarter (Q2) of 2024 and includes AMESA data collected from May 10, 2024, to August 1, 2024.

## **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 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 alone 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. In 2021, Regional Council issued a directive to enhance the frequency of updates. Hence, verified and calculated results for the AMESA sampling runs across both boiler units are prepared quarterly. These reports are prepared and subsequently published on the website.

### 3. Cartridge Replacement Schedule

The AMESA sampling cartridge is placed in situ for approximately 30 days in each boiler unit before it is removed and sent to the laboratory for analysis. As each boiler unit AMESA system is independent, the cartridge duration may differ between the two units due to alternating maintenance activities.

**Table 1: AMESA Cartridge Replacement Schedule**

Unit	Run	Start Date	End Date	Duration (days)
1	95	May 10, 2024	June 7, 2024	28
2	95	May 10, 2024	June 7, 2024	28
1	96	June 7, 2024	July 2, 2024	24
2	96	June 7, 2024	July 2, 2024	24
1	97	July 2, 2024	August 1, 2024	14
2	97	July 2, 2024	August 1, 2024	6

\*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

No issues were 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 Reworld Monthly Data and Operations Review

Regional staff meet with Reworld on an established schedule to discuss facility operations and review environmental monitoring results, trends, and calculations where required for all monitoring programs, including the available AMESA results.

## 6. Oversight of AMESA Results

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

Any events 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 [2022 Annual Report](#) as posted via this link: [MECP Review of the DYEC 2022 Annual Report](#). [The 2023 Annual Report](#) has been posted to the website.

## 7. AMESA Performance

The measured concentrations for each of the 17 dioxins and furans congeners identified in the laboratory certificate of analysis are applied to established computations to obtain a result. These calculations quantify the dioxins and furans per cubic metre of gas at reference conditions. 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 dioxins and furans congeners is multiplied by their respective toxic equivalency factor (TEF) and added to obtain total dioxins and furans total toxic equivalence (TEQ). The ECA for the DYEC specifies the use of the NATO classification scheme for dioxins and furans; therefore, the NATO TEF factors are applied to obtain the TEQ calculation. Table 2 shows each AMESA sampling run, the start and end time the cartridge was in-situ for each boiler unit, and the calculated result.

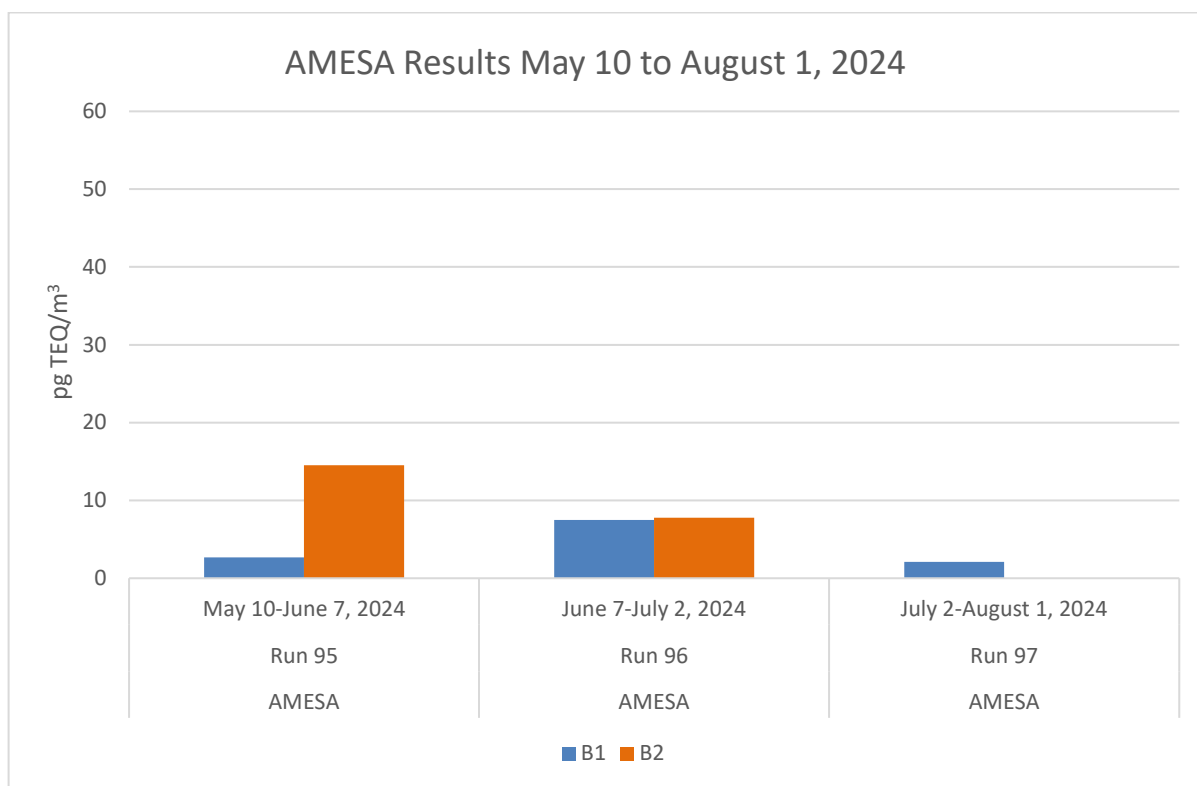
**Table 2: AMESA Calculated Results**

Unit	Run	Start Date	End Date	Calculated Result (pg TEQ/Rm <sup>3</sup> )
1	95	May 10, 2024	June 7, 2024	2.672
2	95	May 10, 2024	June 7, 2024	14.536
1	96	June 7, 2024	July 2, 2024	7.509

Unit	Run	Start Date	End Date	Calculated Result (pg TEQ/Rm <sup>3</sup> )
2	96	June 7, 2024	July 2, 2024	7.796
1	97	July 2, 2024	August 1, 2024	2.124
2	97	July 2, 2024	August 1, 2024	invalidated

**Note 1: AMESA run 97 for Boiler 2 was invalidated.**

While AMESA has no regulatory limit associated with 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 Reworld will continue to monitor DYEC performance in relation to AMESA results and trends. Figure 1 displays the results of the AMESA sampling runs conducted in the second quarter (Q2) of 2024.



**Figure 1: AMESA Results May 10, 2024, to August 1, 2024.**

**Note 1: AMESA run 97 for Boiler 2 was invalidated.**

## 7.1 Investigation

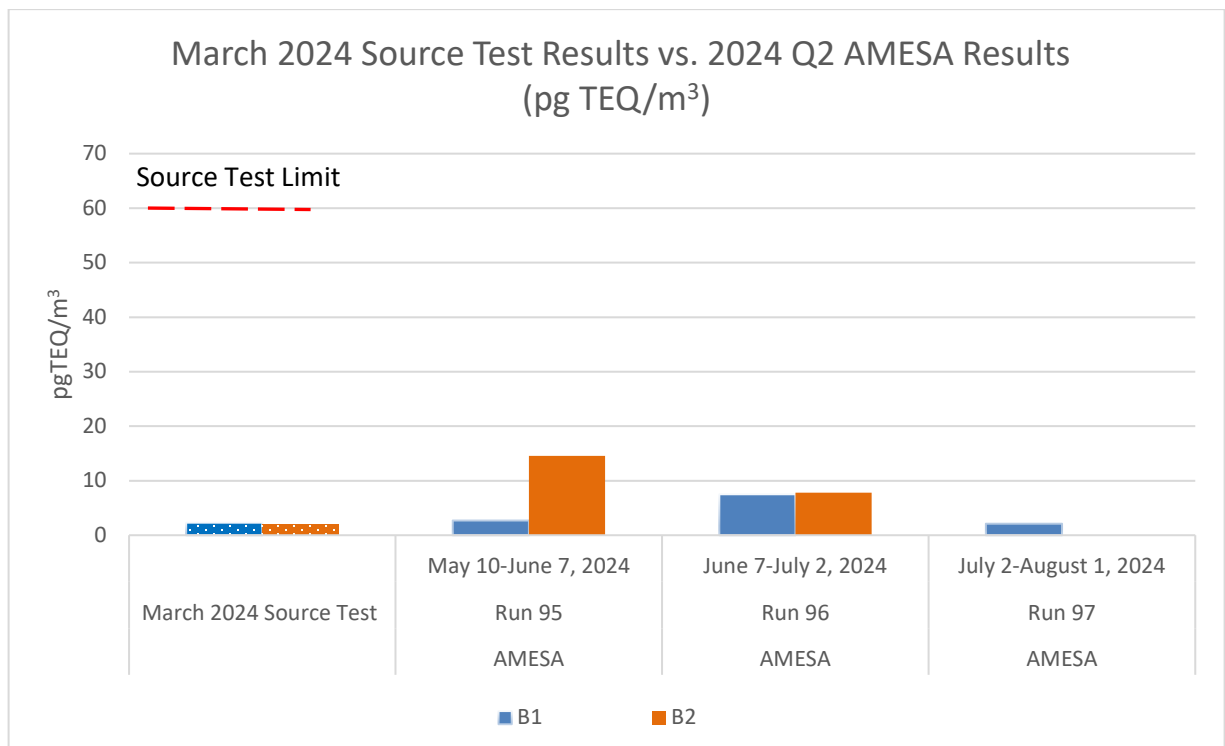
In the second quarter (Q2) of 2024, the AMESA Investigation Checklist was initiated to review the results for boiler unit 2, run 97. The Regions reviewed the data with Reworld, and it was understood that Boiler 2 experienced several operational issues during the testing period, including a black plant event. These disruptions led to non-isokinetic conditions, which means the sample velocity does not align with the air velocity, resulting in a sample that may not accurately represent the actual composition or content of the stack's emissions. Operational temperature readings were also reviewed for run 97, including surrounding the periods of expected non-isokinetic conditions. The temperature profile readings observed were consistent with normal operational conditions (i.e. furnace temperatures were sufficient to destroy dioxins in the incoming waste, and temperature profiles within the plant were consistent with minimal times spent in the range associated with reformation). Consequently, the non-isokinetic conditions are expected to have contributed to the AMESA result inconsistent with typical operations.

## 8. AMESA relative to most current Source Testing Dioxins and Furans Results

AMESA is not used to assess compliance and should not be evaluated against Ministry standards, such as the dioxins and furans 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 Q2 calculated values compare to the most current source testing results. The source test compliance limit for dioxins and furans is 60 pgTEQ/m<sup>3</sup>. The chart below shows the AMESA Q2 2024 results compared to the 2024 March source test results. Results from the March source test also indicated that the dioxins and furans results are below the regulatory compliance limit.





**Figure 2 March 2024 Source Test Results vs. 2024 Q2 AMESA Results (pg TEQ/m3).**

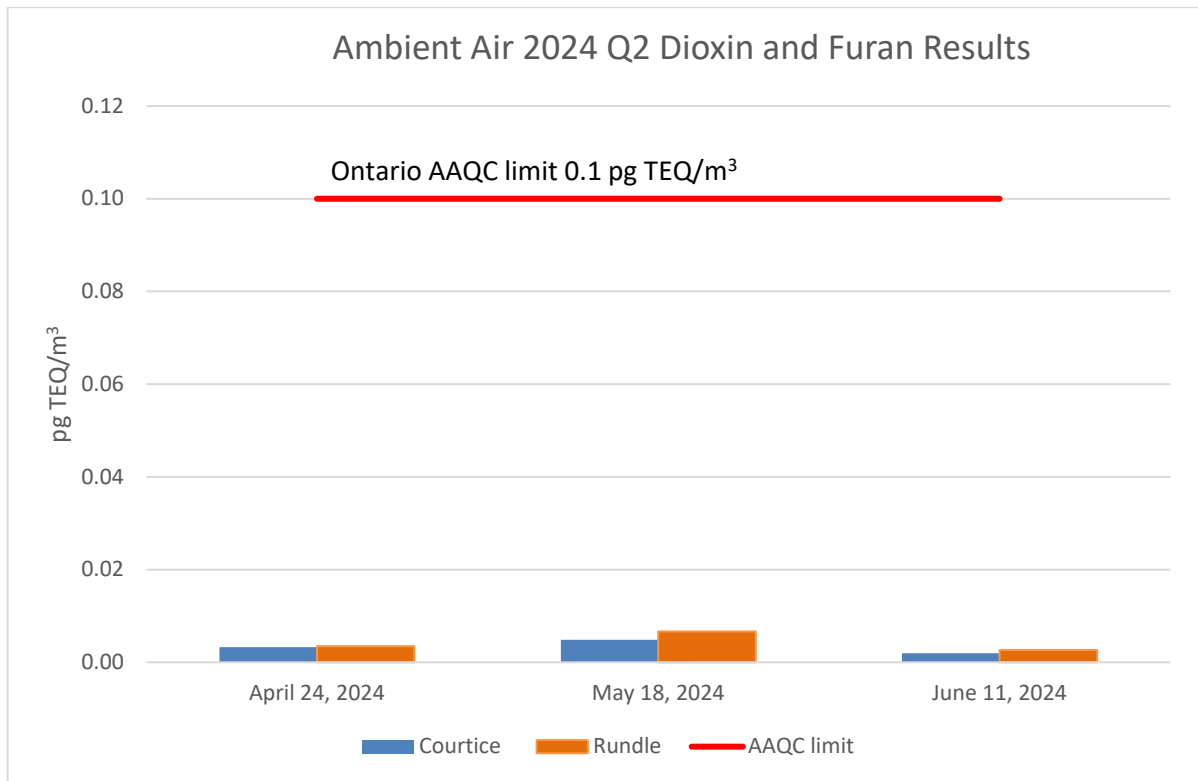
**Note 2: AMESA run 97 for Boiler 2 was invalidated.**

## **9. Ambient Air Dioxins and Furans Results—Second Quarter (Q2) 2024**

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 provides an indication of local air quality. The monitoring equipment collects air samples, capturing ambient air emissions from various sources within the vicinity. The results from the ambient air monitoring provide insights into local air quality and may indicate potential factors influenced by meteorological conditions, including wind speed and direction.

Figure 3 illustrates the results of the second quarter (Q2) at the two ambient air stations near the DYEC. The dioxins and furans levels consistently remain below the Ontario Ambient Air Quality Criteria of 0.1 picogram Toxic Equivalency per cubic meter (pgTEQ/m³).

Additionally, the Ontario Ambient Air Quality Criteria is 10 times lower than the Ontario Regulation 419 Upper Risk Threshold of 1 pgTEQ/m³ for dioxins and furans.



**Figure 3: Ambient Air 2024 Q2 Dioxins and Furan Results**

**End of Report**