



Durham York Energy Centre
Long-Term Sampling System
Quarterly (Q4) Report
October 2021 to December 2021

Prepared by

The Regional Municipality of Durham

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1. Introduction

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

This report covers the fourth quarter of 2021 and includes AMESA data collected from October 13, 2021, to January 17, 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 boilers 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.

3. Cartridge Replacement Schedule

Boiler #	Run #	Start Date	End Date	Duration (days)
1	66	13-Oct-21	10-Nov-21	21
2	66	13-Oct-21	10-Nov-21	28
1	67	10-Nov-21	1-Dec-21	20
2	67	10-Nov-21	30-Nov-21	19
1	69	2-Dec-21	5-Jan-22	33
2	69	13-Dec-21	17-Jan-22	21

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

Note 2: Run 68 not shown; run coincided with source testing program.

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 Durham and 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.

Events regarding Boiler #1, described further in section 7 of this report, triggered the AMESA investigation checklist. The results of the investigation were shared with York Region and the Owners Engineer, HDR. See section 7 below for a description of the event, investigation and corrective actions.

6. Oversight of AMESA Results

Durham and 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 2020 Annual Report as posted via this link: [MECP Review of the DYEC 2020 Annual Report](#).

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, and the calculated result.

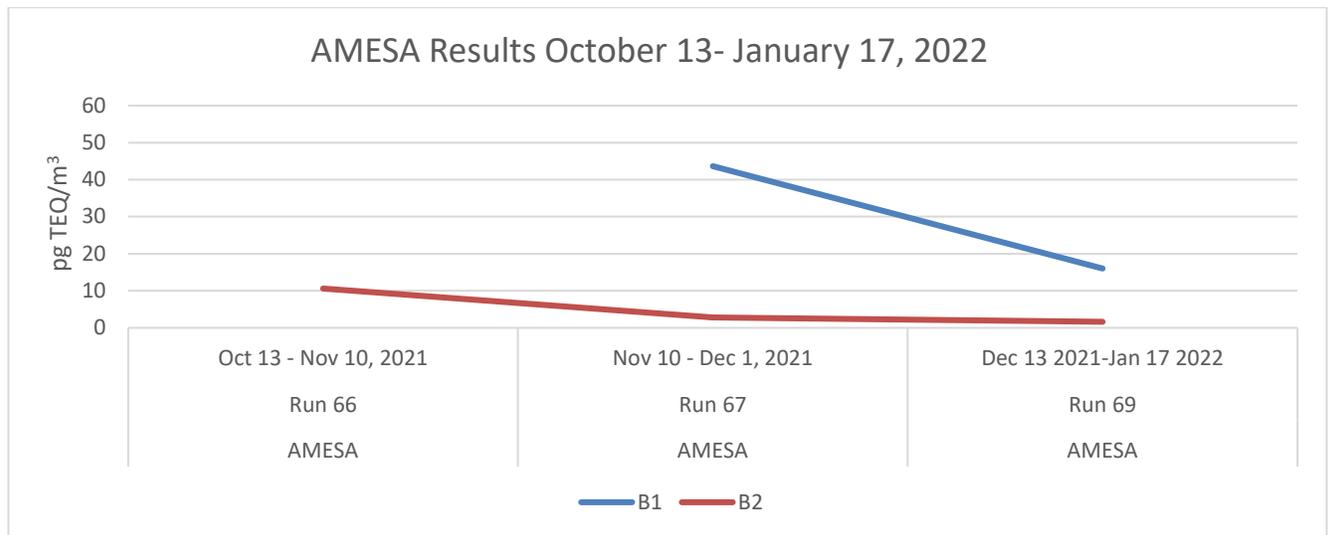
Unit #	Run #	Start Date	End Date	Calculated Result (pg TEQ/Rm ³)
1	66	13-Oct-21	10-Nov-21	Invalidated
2	66	13-Oct-21	10-Nov-21	10.609
1	67	10-Nov-21	1-Dec-21	43.647
2	67	10-Nov-21	30-Nov-21	2.837

Unit #	Run #	Start Date	End Date	Calculated Result (pg TEQ/Rm ³)
1	69	2-Dec-21	5-Jan-22	16.017
2	69	13-Dec-21	17-Jan-22	1.629

Note 3: Run 68 not shown; run coincided with source testing program.

Several incidents were identified during Run #66 which were determined to have a high potential for adverse effects on sample integrity. As a result, the graph below does not include a sample result for Boiler #1, Run 66.

While AMESA has no regulatory limit associated for compliance as it is used to supplement stack 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.



Note 4: Run 68 not shown; run coincided with source testing program.

Note 5: Boiler #1 Run 66 AMESA result invalidated.

7.1 Investigation

AMESA Run 66 result for Boiler #1 was invalidated and triggered the AMESA investigation checklist. The investigation determined there were multiple events during the time the sample cartridge was in-situ which could have contributed, to varying degrees, a potential effect on the sample value. These events include the following:

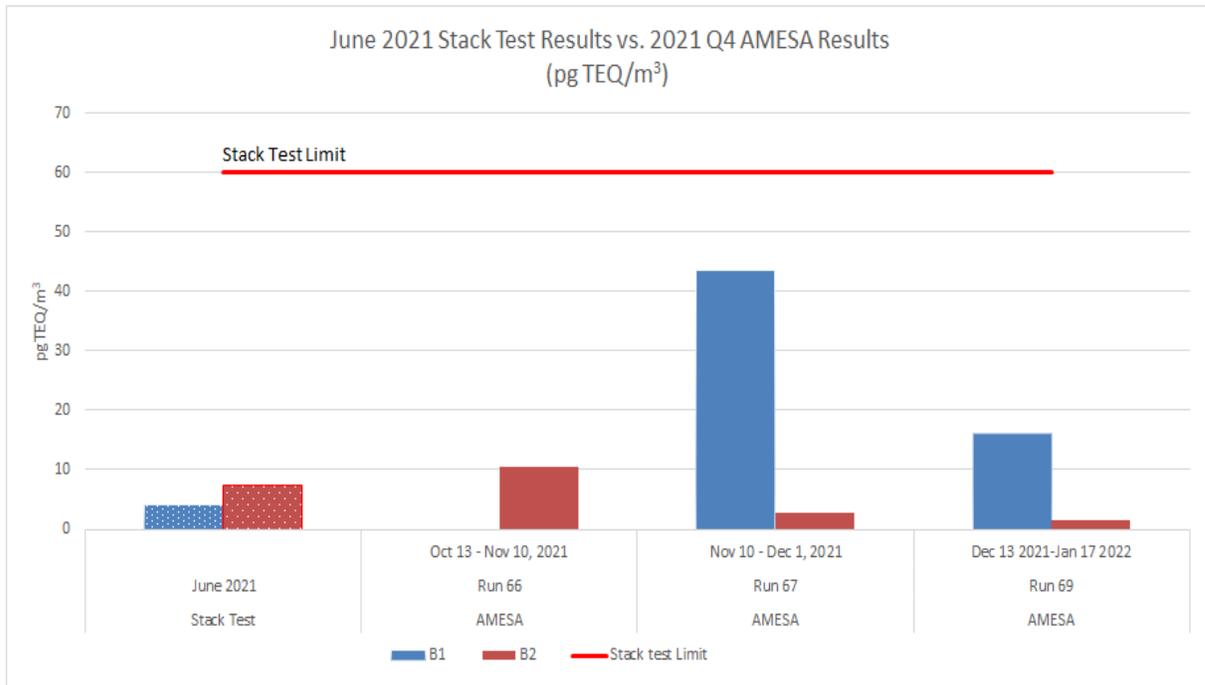
- Low internal gas recirculation (IGR) air flow occurred on October 13. When the internal gas recirculation flow rate is low, there is a higher possibility of the ash being carried over instead of “falling out” from the flue gas stream. The excess ash carryover coupled with different factors can lead to higher AMESA sample results. However, there is no way to quantify the influence on the AMESA sample result based on this situation.
- A ruptured economizer tube on October 21, 2021 which tripped the combustion air fan and resulted in non-isokinetic sampling periods.
- A fan damper failure on November 5, 2021 which tripped the combustion air fan and resulted in non-isokinetic sampling periods.
- A plugged economizer hopper was noted on November 8, 2021. A plugged economizer can lead to a temperature drop that has the potential to support de novo synthesis of Dioxins and Furans due to desorption and lead to a higher AMESA sampling result.

7.2 Opportunities for Improvement

A replacement of sections of Boiler #1 economizer tubes is planned to take place during the spring maintenance outage. A full reliability inspection will be performed on the surrounding tubes.

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

As AMESA is not a compliance tool, it is presented in the chart below to show how the Q4 calculated values compare to the most current stack testing results. The stack test compliance limit for Dioxins and Furans is 60 pgTEQ/m³. The chart below shows the AMESA Q4 results as compared to the 2021 Spring stack test results. Preliminary results from the recent Fall stack test also indicate the Dioxins and Furans result was below the regulatory compliance limit.



Note 6: Boiler #1 Run 66 AMESA result invalidated.

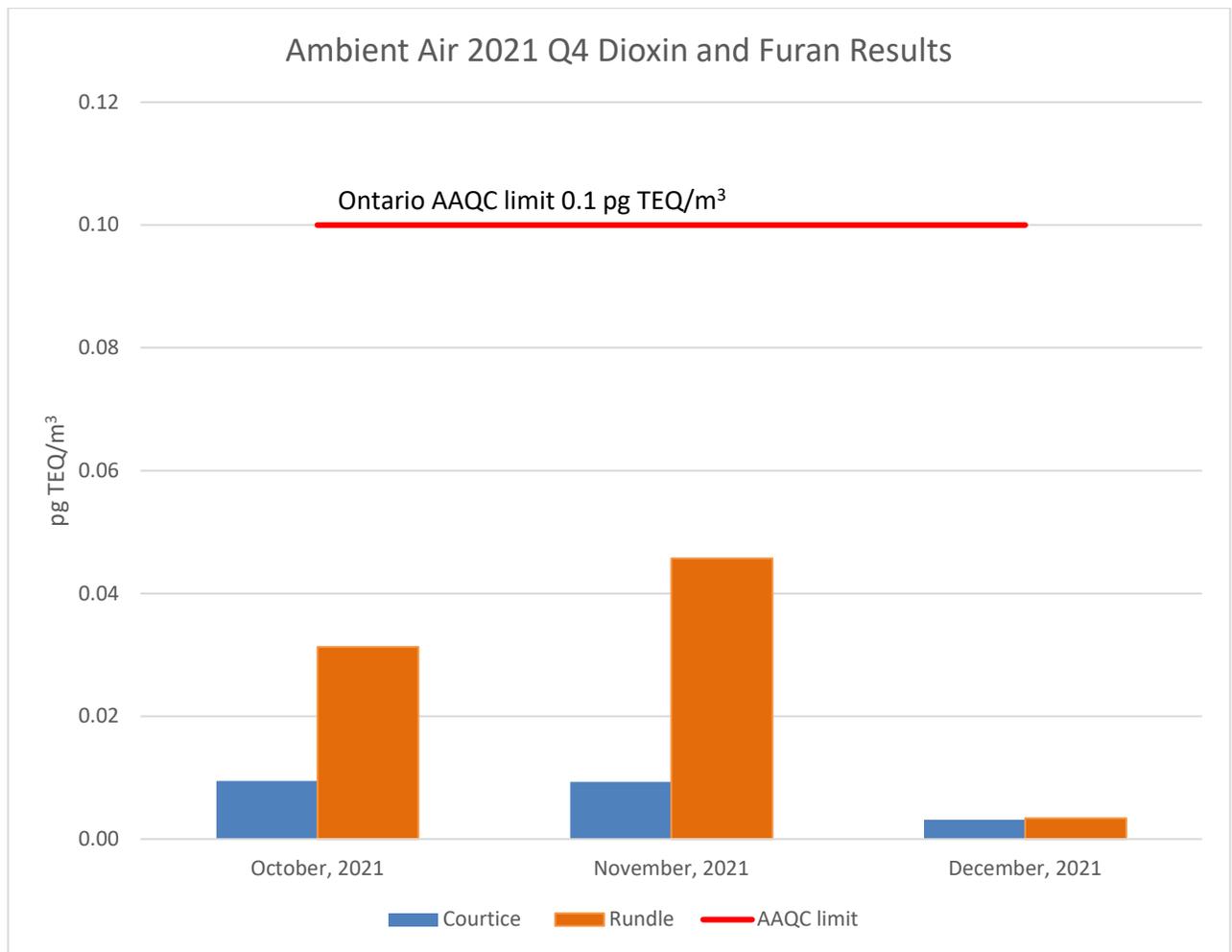
Note 7: Run 68 not shown; run coincided with source testing program.

9. Ambient Air Dioxin and Furan Results – Fourth Quarter (Q4)

The Ambient Air Monitoring Program samples for Dioxins and Furans. The units of measurement and the reporting limits are prescribed differently and cannot be compared directly. Ambient Air does not measure point source emissions. The equipment samples air capturing ambient air emissions from a variety of emissions sources in the area. The results of this monitoring advise 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 in the program are well below the Ontario Ambient Air Quality Criteria of 0.1 picogram Toxic Equivalency per cubic metre (pgTEQ/m³) during the fourth quarter (Q4) of 2021.

Note: 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.



10. Durham York Energy Centre Inquiries

A letter dated June 11, 2021, addressed to Lisa Trevisan, MECP Director, Central Region and copied to Durham Region Council was received from three residents with concerns around the AMESA Long-Term Sampling System.

A response has not been received from the MECP to date.

At a meeting held on July 5, 2021, the Council of the Municipality of Clarington passed Resolution #C-266-21 in relation to the Long-Term Sampling System for the monitoring of Dioxin and Furan emissions (AMESA) from the DYEC. As a result of the Resolution, a letter dated July 9, 2021, was sent to the MECP York Durham District Manager.

A response has not been received from the MECP to date.

End of Report