If this information is required in an accessible format, please contact 1-800-372-1102 ext. 3540.

The Regional Municipality of Durham
Information Report

From:	Commissioner of Works
Report:	#2025-INFO-79
Date:	October 24, 2025

Subject:

Durham York Energy Centre 2025 Compliance Source Test Update

Recommendation:

Receive for information.

Report:

1. Purpose

1.1 The purpose of this report is to provide an update on the 2025 Compliance Source Test results at the Durham York Energy Centre (DYEC).

2. Background

2.1 As required by the DYEC Environmental Compliance Approval (ECA), the Owners are to perform an annual Compliance Source Test in accordance with the procedures and schedules outlined in Schedule “E” of the ECA. The Compliance Source Test measures the rate of emission of the test contaminants from the stack.

3. Previous Reports and Decisions

3.1 There are no previous reports and/or decisions.

4. Compliance Source Test

4.1 The Compliance Source Test was conducted between May 10, 2025, and July 12, 2025, for all test contaminants on Boiler 1 and Boiler 2.

4.2 The results summary of the Compliance Source Test demonstrated that all emissions were within the limits detailed in the ECA (Attachment #1).

4.3 Alliance reported that the aldehyde samples collected on May 14, 2025, showed high background levels of acetone. These elevated acetone levels may have interfered with detecting and measuring the target contaminants. The source of the contamination could not be identified. A repeat aldehyde test was completed on July 10, 2025, along with volumetric flow rate and moisture testing to support emission rate calculations. Aldehydes are part of the total volatile organic compounds (VOC) testing group. While neither aldehydes nor total VOCs have emission limits under Schedule “C” of the ECA, both must be tested under Schedule “D” to meet quantification requirements.

4.4 The full Compliance Source Test Report was sent to the Ministry of Environment, Conservation and Parks (MECP) and subsequently posted to the project website (www.durhamyorkwaste.ca).

4.5 The DYEC emissions dispersion was modeled utilizing the Compliance Source Test data and the MECP approved CALPUFF model. The results of the contaminant concentrations at the maximum point of impingement were then compared to the limits within the Ontario Regulation (O. Reg.) 419/05 Air Pollution – Local Air Quality which are set to be protective of human health and the environment.

4.6 All of the calculated impingement concentrations were well below the regulatory limits.

5. Owners’ Consultant Reviews

5.1 Stantec, the Source Test peer reviewer, provided their Final Report (Attachment #2) to the Owners on September 25, 2025. Stantec’s report concluded:

> “Stantec is satisfied that the conduct of the source testing, the analytical analysis, and the analytical calculations were carried out in a professional manner and followed all relevant guidelines, protocols, and best practices.”
>
> “Stantec is satisfied that the modelling was completed in accordance with the facility’s ECA (Condition 6.1 and Schedule B), as well as O. Reg. 419/05.”

5.2 HDR personnel were also present during the Source Tests. In their report (Attachment #3), HDR provided the following conclusion:

"HDR observed Alliance following the approved stack sampling procedures and test methods. HDR also observed ReWorld's plant personnel operating the DYEC under normal operating conditions and in accordance with acceptable industry operating standards."

And

"Based on the results summarized in ORTECH's test report (dated August 3, 2025), the air emission results of the Spring 2025 Compliance Test demonstrated that the DYEC operated below the ECA's Schedule "C" limits."

6. Continued Demonstrated Performance

6.1 DYEC demonstrates consistent performance with the appropriate controls and monitoring in place which provide a level of safety and protection to human health and the environment.

6.2 The results of testing completed from 2020 to 2025 are presented in Attachment #4. The data presented indicates that the DYEC has consistently demonstrated that it operates safely and effectively within the ECA Schedule "C" limits.

6.3 A comparison table of the latest source testing results against the ECA limits and A-7 guideline is presented in Attachment #5 which shows the DYEC consistently operates and performs below regulatory limits.

7. Relationship to Strategic Plan

7.1 This report aligns with/addresses the following Strategic Direction(s) and Pathway(s) in Durham Region's 2025-2035 Strategic Plan:

a. Environmental Sustainability and Climate Action

- E4. Lead the transition to sustainable living through waste management, diversion, and the circular economy.

7.2 This report aligns with/addresses the following Foundation(s) in Durham Region's 2025-2035 Strategic Plan:

a. Technology: Keeping pace with technological change to ensure efficient and effective service delivery.

8. Conclusion

8.1 The Owners' technical consultants and peer reviewers have confirmed that the Compliance Source Test was conducted in accordance with the Ministry of the Environment, Conservation and Parks' guidelines.

8.2 All results of the Compliance Source Test were below the concentration limits prescribed in Schedule "C" of the Environmental Compliance Approval.

8.3 Using CALPUFF dispersion modeling techniques, the predicted maximum point of impingement concentrations, based on the average test results for both boilers, show Durham York Energy Centre to be operating well below all current standards in Ontario Regulation 419/05 under the Environmental Protection Act and other Ministry of the Environment, Conservation and Parks criteria, including guidelines and upper-risk thresholds.

8.4 For additional information, contact: Andrew Evans, Director, Waste Management Services, at 905-668-4113 extension 4102, or Lipika Saha, Manager, Waste Services, at 365-688-6042.

9. Attachments

Attachment 1: Compliance Source Test Results Summary

Attachment 2: Stantec 2025 Compliance Source Test Final Report

Attachment 3: HDR Inc. 2025 Compliance Source Test Technical Memorandum

Attachment 4: Source Test Results 2020-2025

Attachment 5: Comparison Table: 2025 Compliance Source Test Results Compared to ECA limits and Ontario A-7 Guideline

Respectfully submitted,

Original signed by:

Ramesh Jagannathan, MBA, M.Eng., P.Eng., PTOE
Commissioner of Works

AST-2025-2049

Report:

Reworld Durham York Renewable Energy L.P.
Durham York Energy Centre 2025 Compliance Source Testing in Accordance with Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX

Date: August 15, 2025



Report:

Reworld Durham York Renewable Energy L.P.
Durham York Energy Centre 2025 Compliance Source Testing in Accordance with Amended ECA No. 7306-8FDKNX

Submitted to: Mr. Andrew Evans
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Report No.: AST-2025-2049
55 pages, 29 Appendices

Revision History

Version	Date	Summary Changes/Purpose of Revision
1	August 15, 2025	None

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EXECUTIVE SUMMARY

Alliance Technical Group North, Inc. (Alliance) completed the annual compliance source testing program at the Durham York Energy Centre (DYEC) located in Courtice, Ontario between May 12 and July 10, 2025. The source 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". A list of the test programs conducted by Alliance (formerly ORTECH) to date is provided below:

Test Program	Test Date	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
2019 Voluntary	June 2019	21936
2019 Compliance	September 2019	21960
2020 Voluntary	June 2020	22001
2020 Compliance	November 2020	22050
2021 Voluntary	June 2021	22081
2021 Compliance	November/December 2021	22085
2022 Voluntary	May 2022	22158
2022 Compliance	November/December 2022	22160
2023 Voluntary	April 2023	22230
2023 Compliance	September/October 2023	22235
2024 Compliance	March 2024	22327
2024 Voluntary	December 2024	AST-2024-4547
2025 Compliance	May/July 2025	AST-2025-2049

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 source 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 Method TO-15
Aldehydes	NCASI Method ISS/FP-A105.01
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	Alliance per US EPA Method 25A

Note due to acetone contamination, the aldehyde testing was repeated on July 10, 2025. Volumetric flowrate measurements were also conducted to facilitate emission rate calculations.

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 August 2024, 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 12 to May 15, 2025) was used to determine the minimum, average and maximum concentrations of the combustion gases listed in the ECA. Concentration data measured by Alliance on May 12 and May 13, 2025, was used to assess 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 source 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", 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)*	-	-	-	376	-
Average Combustion Zone Temp. (°C)*	-	-	-	1232	-
Steam (tonnes/day)*	-	-	-	800	-
MSW Combusted (tonnes/day)*	-	-	-	193	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	455	-
Carbon Injection (kg/day)*	-	-	-	113	-
Lime Injection (kg/day)*	-	-	-	3412	-
Filterable Particulate (mg/Rm^3) (1)	<0.24	<0.34	<0.29	<0.29	9
PM_{10} with Condensable (mg/Rm^3) (1)	<3.23	<2.72	<3.69	<3.21	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<2.94	<2.43	<3.40	<2.92	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.11	<0.11	<0.12	<0.11	-
Ammonia (mg/Rm^3) (1)	0.59	0.58	0.49	0.55	-
Cadmium (µg/Rm^3) (1)	0.031	0.041	0.014	0.029	7
Lead (µg/Rm^3) (1)	0.32	0.28	0.19	0.26	50
Mercury (µg/Rm^3) (1)	<0.13	<0.12	<0.14	<0.13	15
Antimony (µg/Rm^3) (1)	<0.048	<0.049	<0.049	<0.048	-
Arsenic (µg/Rm^3) (1)	<0.12	<0.12	<0.12	<0.12	-
Barium (µg/Rm^3) (1)	2.41	2.39	2.43	2.41	-
Beryllium (µg/Rm^3) (1)	<0.048	<0.049	<0.049	<0.048	-
Chromium (µg/Rm^3) (1)	0.55	1.42	0.66	0.88	-
Cobalt (µg/Rm^3) (1)	0.029	0.044	<0.049	<0.040	-
Copper (µg/Rm^3) (1)	2.63	1.69	1.68	2.00	-
Molybdenum (µg/Rm^3) (1)	4.22	4.14	4.05	4.14	-
Nickel (µg/Rm^3) (1)	0.51	0.87	0.63	0.67	-
Selenium (µg/Rm^3) (1)	0.48	<0.24	<0.24	<0.32	-
Silver (µg/Rm^3) (1)	<0.048	<0.049	<0.049	<0.048	-
Thallium (µg/Rm^3) (1)	<0.048	<0.049	<0.049	<0.048	-
Vanadium (µg/Rm^3) (1)	<0.12	<0.12	<0.12	<0.12	-
Zinc (µg/Rm^3) (1)	4.07	4.04	4.44	4.18	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<2.60	<2.55	<2.53	<2.56	60
Total Chlorobenzenes (ng/Rm^3) (1)	<350	<374	<287	<337	-
Total Chlorophenols (ng/Rm^3) (1)	<168	<168	<171	<169	-
Total PAHs (ng/Rm^3) (1)	<860	<164	<648	<557	-
VOCs (µg/Rm^3) (1)	<69.1	<46.4	<65.1	<60.2	-
Aldehydes (µg/Rm^3) (1)	<239	<138	<135	<171	-
Total VOCs (µg/Rm^3) (1) (4)	<308	<184	<200	<231	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.65	1.33	0.03	0.67	50

* based on process data provided by Reworld

(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)*	-	-	-	376	-
Average Combustion Zone Temp. (°C)*	-	-	-	1229	-
Steam (tonnes/day)*	-	-	-	801	-
MSW Combusted (tonnes/day)*	-	-	-	197	-
NO_X Reagent Injection Rate (liters/day)*	-	-	-	466	-
Carbon Injection (kg/day)*	-	-	-	113	-
Lime Injection (kg/day)*	-	-	-	3523	-
Filterable Particulate (mg/Rm^3) (1)	<0.31	<0.41	<0.31	<0.34	9
PM_{10} with Condensable (mg/Rm^3) (1)	<2.89	<4.17	<3.52	<3.53	-
$PM_{2.5}$ with Condensable (mg/Rm^3) (1)	<2.61	<3.89	<3.24	<3.25	-
Hydrogen Fluoride (mg/Rm^3) (1)	<0.11	<0.11	<0.12	<0.11	-
Ammonia (mg/Rm^3) (1)	0.46	0.48	0.50	0.48	-
Cadmium (µg/Rm^3) (1)	<0.022	0.027	<0.022	<0.024	7
Lead (µg/Rm^3) (1)	0.25	0.23	0.29	0.26	50
Mercury (µg/Rm^3) (1)	<0.13	<0.13	<0.12	<0.13	15
Antimony (µg/Rm^3) (1)	<0.045	<0.046	<0.044	<0.045	-
Arsenic (µg/Rm^3) (1)	<0.11	<0.11	<0.11	<0.11	-
Barium (µg/Rm^3) (1)	1.99	2.19	2.08	2.08	-
Beryllium (µg/Rm^3) (1)	<0.045	<0.046	<0.044	<0.045	-
Chromium (µg/Rm^3) (1)	0.49	0.48	0.46	0.48	-
Cobalt (µg/Rm^3) (1)	<0.045	<0.046	<0.044	<0.045	-
Copper (µg/Rm^3) (1)	1.43	1.67	1.33	1.48	-
Molybdenum (µg/Rm^3) (1)	3.73	3.83	3.71	3.76	-
Nickel (µg/Rm^3) (1)	0.39	0.51	0.34	0.41	-
Selenium (µg/Rm^3) (1)	<0.22	<0.23	<0.22	<0.22	-
Silver (µg/Rm^3) (1)	<0.045	<0.046	<0.044	<0.045	-
Thallium (µg/Rm^3) (1)	<0.045	<0.046	<0.044	<0.045	-
Vanadium (µg/Rm^3) (1)	<0.11	<0.11	<0.11	<0.11	-
Zinc (µg/Rm^3) (1)	2.61	3.08	1.79	2.49	-
Dioxins and Furans (pg TEQ/Rm^3) (3)	<2.31	<2.52	<3.00	<2.61	60
Total Chlorobenzenes (ng/Rm^3) (1)	<280	<307	<334	<307	-
Total Chlorophenols (ng/Rm^3) (1)	<161	<164	<163	<163	-
Total PAHs (ng/Rm^3) (1)	<800	<1028	<684	<838	-
VOCs (µg/Rm^3) (1)	<50.9	<69.7	<44.8	<55.1	-
Aldehydes (µg/Rm^3) (1)	<197	<131	<149	<159	-
Total VOCs (µg/Rm^3) (1) (4)	<248	<201	<194	<214	-
Quench Inlet Organic Matter (THC) (ppm, dry) (2)	0.47	0	0.02	0.16	50

* based on process data provided by Reworld

(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)	4.8	10.6	20.5	40
	Hydrogen Chloride (mg/Rm^3) (2)	1.2	2.1	2.6	9
	Nitrogen Oxides (mg/Rm^3) (2)	108	109	110	121
	Sulphur Dioxide (mg/Rm^3) (2)	0.4	2.6	5.5	35
Boiler No. 2	Carbon Monoxide (mg/Rm^3) (1)	8.5	13.6	24.5	40
	Hydrogen Chloride (mg/Rm^3) (2)	2.7	3.3	3.8	9
	Nitrogen Oxides (mg/Rm^3) (2)	107	109	110	121
	Sulphur Dioxide (mg/Rm^3) (2)	3.8	5.2	6.6	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.

Dispersion modelling was completed using the CALPUFF model (using Version 7.2.1 level 150618 as approved by the MECP in May 2021) by WSP Canada Inc. A summary of the results are provided in the tables appended to this report (Appendix 28) 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 the contaminants were well below the relevant MECP standards.

In summary, the key results of the source 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 795 tonnes of steam per day for each Boiler (approximately 98.5% 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.

Oversight of May 2025 Compliance Air Emission Source Testing at the Durham York Energy Centre

Final Report

September 25, 2025

Prepared for:
Regional Municipality of Durham

Prepared by:
Stantec Consulting Ltd.

Project/File:
160901213

Stantec

Revision Record

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date

Limitations and Sign-off

The conclusions in the Report titled Oversight of May 2025 Compliance Air Emission Source Testing at the Durham Energy Centre are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Regional Municipality of Durham (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by _____
(signature)
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Senior Atmospheric Scientist

Reviewed by _____
(signature)

Boris Chen, M.A., P.Eng.
Project Manager, Air Quality

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Acronyms / Abbreviations

ADMP	Air Dispersion Modelling Plan
ATG	Alliance Technical Group
CARB	California Air Resources Board
CB	chlorobenzenes
CEM	Continuous Emissions Monitoring
CO	carbon monoxide
CP	chlorophenols
D/F	dioxins and furans
DYEC	Durham York Energy Centre
ECA	Environmental Compliance Approval
LCS	laboratory control sample
MECP	Ministry of the Environment, Conservation and Parks
MSW	municipal solid waste
NOx	nitrogen oxides
O_2	molecular oxygen
O. Reg. 419/05	Ontario Regulation 419/05
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
POI	Point of Impingement
QA/QC	Quality Assurance/Quality Control
Region	Regional Municipality of Durham
SO_2	sulphur dioxide

Stantec	Stantec Consulting Ltd.
SVOCs	semi-volatile organic compounds
TEQ	toxic equivalents
THC	total hydrocarbons
US EPA	United States Environmental Protection Agency

List of Symbols and Units of Measure

Term	Definition
dscm/h	dry standard cubic metre per hour
g/s	gram per second
hr	hour
kg/hr	kilogram per hour
m^3/hour	cubic metre per hour
min	minutes
mg/m^3	milligram per cubic metre
$\mu g/m^3$	microgram per cubic metre
ppm	parts per million
tonnes/hr	tonnes per hour
µg/s	microgram per second
ng/s	nanogram per second
ng TEQ/s	nanogram of toxic equivalents per second
°F	degrees Fahrenheit
°C	degrees Celsius
%	percent

1 Introduction

The Durham York Energy Centre (DYEC) is a thermal treatment facility with a maximum thermal treatment rate of 140,000 tonnes/year of municipal solid waste (MSW). The facility was built to operate 24 hours/day, seven days/weeks, 365 days/year. MSW may be delivered to the facility six days per week between 7:00 am to 7:00 pm.

The facility performs annual source testing as required per the facility's Amended Environmental Compliance Approval (ECA) (No. 7306-8FDKNX) issued on June 28, 2011. 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 subject stack refers to the stack that discharges emissions from the Boilers after those emissions have been controlled by the associated Air Pollution Control Equipment.

Stantec Consulting Ltd. (Stantec) was retained by The Regional Municipality of Durham (the Region) to provide oversight services of the air emission source testing campaign conducted at the DYEC between May 12th to May 15th, 2025, by Alliance Technical Group (ATG), formerly ORTECH Consulting Inc.

2 On-Site Source Testing Observations

The on-site review of the Stack Sampling Protocol was conducted to check that the testing follows sampling methods described in the Ontario Source Testing Code, and includes a review of:

- Sampling Locations
- Sampling Procedures
- Sample Recovery and Analysis
- Process Parameter Review

Stantec has assumed information received from the Regional Municipality of Durham (the “Region”), Reworld Durham York Renewable Energy L.P. (Reworld), and any other relevant third parties in the preparation of this memorandum to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

3 Testing Schedule

The Spring 2025 Source test was conducted during the week of May 12th, 2025, with sampling of semi-volatile organic compounds (SVOCs) occurring on May 14th and 15th. One Stantec staff member observed sampling of SVOCs conducted by Alliance Technical Group (ATG), formerly ORTECH Consulting Inc., on both days, with another Stantec staff member completing observations of the Process Operations Centre ("Control Room") on May 14th. Per the Source Test Plan, a total of three samples were collected on each boiler. ATG began the first set of SVOC tests shortly after 8:00 AM on the 14th and concluded the testing at approximately 12:20 PM. The final set of tests on the 14th began shortly after 1:00 PM and were completed at approximately 5:20 PM. The final test for both boilers was conducted on May 15th from 7:50 AM to 12:00 PM.

4 Process Operations Centre Observations

One Stantec auditor was stationed in the Control Room with Reworld staff to observe the real-time data related to parameters being monitored. The on-site auditors monitored the real-time display of trending data, took notes of process anomalies and discussed any deviations, and any corrective measures taken, with facility staff. The SVOCs emission sampling process and the incineration operations were generally stable throughout.

In addition, Excel files containing one-minute data of real-time in-stack measurements were provided to the auditors following completion of the source testing. The data summarized the various system parameters for Boiler 1 and Boiler 2 lines discussed below. The baghouse temperatures, moisture data, lime injection rate, and carbon injection rate were provided separately as one-hour averaged values.

Various monitoring parameters in the Excel files were examined for comparison against the facility's reporting limits. These parameters are summarized in Table 1, which includes oxygen (O_2), carbon monoxide (CO), nitrogen oxides (NOx), sulphur dioxide (SO_2), combustion temperatures, and steam production. These parameters were examined by the auditors for both May 14th and 15th when the dioxin and furan sampling was conducted. Table 1 also includes the emissions criteria for these parameters, as provided in the facility's Environmental Compliance Approval (ECA).

Table 1 Summary of System Monitoring Parameters (May 14th - 15th)

Boiler 1	O_2 1-Hr Average Data (%)	CO 4-Hr Average Data (mg/Rm^3)	SO_2 24-Hr Average Data (mg/Rm^3)	NOx 24-Hr Average Data (mg/Rm^3)	Combustion Temperature 1-Hr Average Data (°C)	Steam Production 1-Hr Average Data (10^3 kg/hour)
Minimum	9	4	2	100	1049	32.6
Maximum	10	10	4	102	1141	33.8
Average	9	7	3	102	1090	33.3

Boiler 2	O_2 1-Hr Average Data (%)	CO 4-Hr Average Data (mg/Rm^3)	SO_2 24-Hr Average Data (mg/Rm^3)	NOx 24-Hr Average Data (mg/Rm^3)	Combustion Temperature 1-Hr Average Data (°C)	Steam Production 1-Hr Average Data (10^3 kg/hour)
Minimum	8	7	5	97	1057	32.4
Maximum	9	13	5	100	1112	34.3
Average	9	10	5	99	1081	33.3
Compliance Criteria	> 6	< 40	< 35	< 121	> 1000	33.6 (maximum continuous rating)

The following conclusions of the Process Operations Center observations and review of the monitoring parameters were made for the stack testing period.

1. Oxygen concentrations (calculated as the rolling arithmetic average of one hour of data) ranged from 9% to 10% at Boiler 1, and 8% to 9% at Boiler 2 during source sampling. The ECA specifies that the oxygen concentration shall not be less than 6%. The operation complied with this requirement during the testing period.
2. CO concentrations (calculated as the rolling arithmetic average of four hours of data) at Boiler 1 ranged between 4 and 10 milligram per cubic metre (mg/m3). CO concentrations at Boiler 2 ranged between 7 and 13 mg/m3 (calculated as the rolling arithmetic average of four hours of data). Occasional spikes in the one-minute CO concentration were observed and likely due to cold CO spikes that may be attributed to incomplete combustion. These were typical of previous tests and generally did not persist beyond one minute. The occurrence of CO spikes is normal, and the immediate suppression of spikes indicate that the systems are operating effectively. The recorded CO levels for the recorded averaging time meet the compliance criteria as shown in Table 1.
3. The rolling average 24-hour SO2 concentrations over two days during testing was relatively stable, ranging between 2 and 4 mg/m3 for Boiler 1 and averaging 5 mg/m3 for Boiler 2, below the in-stack emission limit of 35 mg/m3. The SO2 concentrations throughout the monitoring period had 1-min values between 0.0 and 41 ug/m3 for both units. The system responded effectively during peak events of SO2 by increasing the lime injection rate and reducing SO2 levels.
4. The rolling average 24-hour NOx concentrations over two days during testing was stable, ranging between 100 and 102 mg/m3 for Boiler 1 and between 97 and 100 mg/m3 for Boiler 2, below the in-stack emission limit of 121 mg/m3.
5. The combustion zone temperatures for each boiler were maintained above the minimum temperature of 1000°C, which is required by the ECA for record keeping and compliance for one hour averaging time (ECA Schedule F).
6. Production at the facility is often evaluated in terms of steam flow. The target was 33.6 thousand kg/hour (103 kg/hour). Steam flow for both Boiler 1 and Boiler 2 averaged 33.3x103 kg/hour over the course of the two days of testing. All 1-hour averages of steam flow were within 5% of the target. The range of the nominal steam generation is within the 72 thousand kg/hour of steam listed in the ECA.

7. The moisture content (provided to Stantec as the rolling arithmetic average of one hour of data) ranged from 13.7% to 17.8% at Boiler 1, and 14.3% to 19.6% at Boiler 2 during source sampling. The average moisture level for Boiler 1 (16.5%) was in line with the measured gravimetric moistures reported by ATG (~16%). Boiler 2 had slightly elevated moisture levels (17.5%). However, it is the understanding of the auditors that the monitored moisture levels are not used in either dry flow rates or emission rates calculations, for use in the source testing results. Consequently, the data is only reviewed for consistency with ATG's calculated moisture levels.
8. The average carbon feed rate remained stable at 4.7 kg/hour, based on 1-hour averaging, for both Boiler 1 and Boiler 2 during both days of testing. This is in line with the facility's set point for carbon at 4.7 kg/hour. Carbon is used to control emissions of dioxin and furans and, therefore, consistent concentrations are required. Long term averages of ~4.7 kg/hour have shown to be an effective control measure based on experience with this facility.
9. The baghouse inlet temperatures showed consistent control throughout both days of testing. Boiler 1 baghouse inlet temperatures remained steady between 136°C to 146°C, near the midpoint of the performance requirement of 120°C to 185°C set out in the ECA (Section 6(2)(h)). Boiler 2 baghouse inlet temperatures also remained steady between 140°C to 144°C. Therefore, the system was operating in compliance with the conditions in the ECA.

5 Observations of the Stack Testing Operations

Observations of the stack testing procedures were undertaken during the SVOC sampling. The field observations are provided in a series of tables in Appendix A.

1. Where possible, leak checks were observed at both the start, traverse change, and at the conclusion of SVOC tests conducted. When the leak checks were successful, the tests could be regarded as valid. Leak checks were performed in a systematic and non-rushed manner. The summary of auditor field observations is provided in Appendix A.
2. Impinger/adsorbent temperatures were spot checked at each sampling train. ATG supplied sufficient ice to the crews for use in keeping temperatures as per method criteria. The temperatures were maintained in the range of 4.4°C to 9.4°C (40°F to 49°F). Maintaining low adsorbent temperatures improves adsorption of dioxins/furans on the sampling media. The temperatures were maintained at reasonably low levels and were deemed acceptable.
3. The audit team also recorded dry gas meter corrections and pitot factors for comparison with the stack testing report. The recorded dry gas meter corrections and pitot factors were compared to Appendix 6 of the source testing report. No discrepancies were found.
4. As per standard operating procedures, sampling trains operating at the baghouse outlet locations were inserted and withdrawn from the stack while the sampling train was running.
5. Observation of the sample recovery procedures conducted by ATG staff was performed by Stantec. Sample recovery procedures were completed per the pre-test plan.

Based on audit staff observations, ATG staff followed appropriate sampling and recovery procedures as noted by the sampling methods approved in the pre-test plan]

6 Report Review

ATG's draft source sampling report was provided to Stantec on August 5th, 2025. ATG's final source sampling report (the "Report") was provided to Stantec on August 18th, 2025. Stantec conducted a review of the Report, with focus given to a detailed review of SVOC-related sections.

6.1 Review of Source Testing Protocols

Stantec has conducted a review of the source testing report for dioxins and furans and has found no discrepancies between the methods described in the report compared to the observations made during testing. A further review of the dioxin/furan emission results at Boiler 1 compared to that of Boiler 2 was also undertaken. A comparison of the speciated dioxins and furans concentrations showed similar characteristics between the two boilers with minor exceptions. This is inline with expectations given that both boilers are processing a similar waste stream, and both boilers used similar combustion practices. Stantec has no concerns over the validity of collected samples, and the dioxin and furan results.

6.2 Review of Analytical Reporting

Stantec has conducted a review of the source testing report. While the source testing report was reviewed in its entirety, focus was given to a detailed review of SVOC-related sections. As per the contract with the Region, the project did not include the oversight and audit review of actual laboratory work. Therefore, no statement of efficacy is provided regarding the processing, handling, and analysis of laboratory samples.

Based on this review, Stantec provides the following comments:

1. Dioxins and Furans
    a. The recoveries of Field Spike Standards of all D/F samples were within the acceptable range of recoveries provided in Environment Canada Reference

Method EPS 1/RM/2 (EPS 1/RM/2) (70% – 130%), for all but one sample (TEST #3 APC OUTLET #2).

b. The recoveries of Extraction Standards for all D/F samples are within the acceptable range of recoveries provided in EPS 1/RM/2, which is either 40% – 130% or 25 – 130%, depending on the specific D/F.

c. The recoveries of Cleanup Standards of all D/F samples were within the acceptable range of recoveries provided in EPS 1/RM/2 (40% – 130%).

d. Stantec was able to trace and confirm the D/F congener group emission rate calculations (ng/s) presented by ATG provided in Section 7.9.1 (Pages 43). However, the emission rate for Boiler No. 1 BH Outlet appears to be transcribed improperly by an order of magnitude.

e. Stantec was able to trace and confirm the D/F and dioxin-like PCB toxic equivalents (TEQ's) emission rate calculations (ng TEQ/s) presented by ATG provided in Section 7.9.1 (Page 44).

f. Stantec was able to trace and confirm the in-stack TEQ concentration calculations presented by ATG (see Section 7.9.1, Page 45) and confirm that the D/F TEQ concentrations are below the maximum in-stack limit of 60 pgTEQ/Rm3.

2. PCBs

a. The recoveries of Field Spike Standards of all PCB samples were within the acceptable range of recoveries provided in US EPA Method 1668C (10% – 145%).

b. The recoveries of the Extraction Standards for PCBs are within the acceptable range of recoveries provided in US EPA Method 1668C (10% – 145%).

c. The recoveries of Cleanup Standards of all PCB samples were within the acceptable range of recoveries provided in US EPA Method 1668C (5% – 145%, or 10% – 145%).

d. PCB samples were not blank corrected based on the blank sampling train and laboratory blank results. This is an acceptable methodology and will provide an over-estimate of the true concentrations within the samples.

3. Chlorobenzenes
    a. The analytical reports indicate that the recoveries of many of the surrogates were below the method control limits. However, no significant bias to the sample results is expected given that the target analyte recoveries are all in control for the laboratory control sample (LCS). This is a valid assumption; therefore, the poor recoveries of labelled standards in these samples will not impact the conclusions of the report.
    b. Chlorobenzene samples were not blank corrected based on the blank sampling train and laboratory blank results. This is an acceptable methodology and will provide an over-estimate of the true concentrations within the samples.
    c. Stantec was able to trace and confirm the chlorobenzene emission rate calculations (µg/s) presented by ATG provided in Section 7.9.2 (Page 45).
4. Chlorophenols
    a. The analytical reports indicate that the recoveries of many of the surrogates were below the method control limits. However, no significant bias to the sample results is expected given that the target analyte recoveries are all in control for the laboratory control sample (LCS). This is a valid assumption; therefore, the poor recoveries of labelled standards in these samples will not impact the conclusions of the report.
    b. CP samples were not blank corrected based on the blank sampling train and laboratory blank results. This is an acceptable methodology and will provide an estimate of worst-case concentrations within the samples.
    c. Stantec was able to trace and confirm the chlorophenol emission rate calculations (µg/s) presented by ATG provided in Section 7.9.2 (Page 46).
5. Polycyclic Aromatic Hydrocarbons
    a. The analytical reports indicate that there were significant levels of PAHs in the blank trains. However, PAH samples were not blank corrected based on the blank sampling train and laboratory blank results. This is an acceptable methodology and will provide an estimate of worst-case concentrations within the samples.
    b. Stantec was able to trace and confirm the PAH emission rate calculations (µg/s) presented by ATG provided in Section 7.9.3 (Page 47).

7 Review of Dispersion Modelling

Appendix 28 of the Report presents the results of dispersion modelling based on results of the source testing program. The dispersion modelling provided in the appendix was completed by WSP, who provided Stantec with all relevant modelling files (e.g., input files, output files, etc.) for review.

Based on this review, Stantec provides the following comments:

1. Stantec confirmed that the CALPUFF and CALPOST version numbers and level numbers used in the model (as indicated in the corresponding input file) matched those provided in WSP's memorandum.
2. Stantec reviewed the CALPUFF options outlined in Table 2 of WSP's memorandum. These options match those in the supplied input files for modelling years 2015, and 2018. Note that the model was run for meteorological years 2014 to 2018.
3. Stantec reviewed the source parameters provided in Table 3 of WSP's memorandum and confirmed that the parameters match those determined from the source testing. These source parameters also match those in the supplied input files for modelling years 2015, and 2018.
4. Stantec reviewed the Dispersion Factors (without meteorological anomaly removed) provided in Table 4 of WSP's memorandum to confirm that they matched the maximum value provided in the CALPOST output files for all five years modelled. The values provided in the report equalled those in the output files. Minor discrepancies are expected to be the result of number rounding.
5. Stantec reviewed the Site-Wide Emission Inventory provided in Appendix A of WSP's memorandum. The following SVOCs were reviewed, and emission rates were found to match those calculated in ATG's report, which also equalled those calculated by Stantec.
    a. 1,3-dichlorobenzene
    b. 2,6-dichlorophenol
    c. Pyrene

6. The emission rate for Dioxins, Furans and Dioxin-like PCBs is listed as 0.00011 µg TEQ/s. This number does not match the values listed in Table 50 in Appendix 1 and Appendix 2, which sum to a value of 0.000069 µg TEQ/s. A review of the D/F data from Table 39 in Appendix 1 and Appendix 2 indicates that the value of 0.00011 µg TEQ/s is calculated using the WHO toxicity equivalence factors and the full detection limit value. However, since the value used in the assessment is larger than the value determined from the laboratory data, the current assessment can be considered a conservative estimate of the POI value for Dioxins, Furans and Dioxin-like PCBs.
7. Stantec reviewed key SVOCs from the Emission Summary Table (Appendix B of WSP's memorandum) to ensure that Maximum POI Concentrations were estimated appropriately from the Dispersion Factors shown in Table 4. The list of substances reviewed were:
    a. 1,2-dichlorobenzene
    b. 2,4-dichlorophenol
    c. Dioxins, Furans, and Dioxin-like PCBs (assuming an emission rate of 0.00011 µg TEQ/s)

As summarized in the above discussion, there were minor concerns with some aspects of the modelling. However, the POI values presented in Appendix 27 of the Report provide a conservative estimate of potential impacts and are well below MECP criteria. The minor concerns discussed do not materially affect the conclusions of the overall dispersion modelling work.

8 Conclusion

Based on a review of the Source Testing Report, and the on-site observations, there are no concerns about the validity of the source testing data reported by ATG. Stantec is satisfied that the conduct of the source testing, the analytical analysis, and the analytical calculations were carried out in a professional manner and followed all relevant guidelines, protocols, and best practices.

Based on a review of the CALPUFF Modelling (Appendix 27), Stantec is satisfied that the modelling was completed in accordance with the facility's ECA (Condition 6.1 and Schedule B), as well as O. Reg. 419/05. However, some minor discrepancies were found between the model input files and the source testing data. We recommend that WSP should be provided our comments for their consideration and be given the opportunity to decide if revisions may be warranted. These revisions, however, are not expected to change the compliance status of the facility, as the facility's POI values are well below the specified MECP standards, based on the provided analysis.

Appendices

Appendix A Summary of Stantec Field Notes

Table A-1 Summary of Stantec Field Notes

	Semi-Volatiles-2	Semin-Volatiles-2
Date	May 14, 2025	May 14, 2025
Observation	Boiler #1	Boiler #2
Nozzle Size/Type	0.2462	0.2442 (Glass)
Meter Cal/ID	MB18 (У: o.990, ΔH: 1.978)	MB17 (У: 0.983, ΔH: 1.980)
Pitot Cal	0.840	0.840
Calc Moisture	16.0%	16.0%
Static	-9.10	-11.90
Pitot Leak Check	Pass	Pass
Pre-Traverse Leak Check		0.002 @ - 15” Hg
SVOC Test Start Time	13:09	13.04
Running on Insertion	Yes	Yes
Stack Temperature °F		278, 276, 274, 266
Trap Temperature °F		46, 48, 49, 49, 49
Traverse Completed		15:04
Post-Traverse Leak Check		0.005 @ 15” Hg
Running on Removal	Yes	Yes
Pre-Traverse Start Time		0.005 @ 15” Hg
Running on Insertion	Yes	Yes

	Semi-Volatiles-2	**Semin-Volatiles-2**
Stack Temperature °F		281, 281, 281, 280, 252
Trap Temperature °F		44, 45, 46, 43, 43, 43
Traverse Completed	17:23	17:17
Final Leak Check		0.004 @ 15” Hg
Running on Removal	Yes	Yes

	Semi-Volatiles-3	**Semin-Volatiles-3**
Date	May 15, 2025	May 15, 2025
Observation	Boiler #1	Boiler #2
Nozzle Size/Type	0.2462	0.2442 (Glass)
Meter Cal/ID	MB18 (У: o.990, ΔH: 1.978)	MB17 (У: 0.983, ΔH: 1.980)
Pitot Cal	0.840	0.840
Calc Moisture	16.0%	16.0%
Static	-9.10	-11.90
Pitot Leak Check	Pass	Pass
Pre-Traverse Leak Check	0.003 @ -15” Hg	
SVOC Test Start Time	7:51	
Running on Insertion	Yes	Yes
Stack Temperature °F	280, 282, 281, 281, 282	
Trap Temperature °F	49, 49, 48, 44, 43	

	Semi-Volatiles-3	**Semin-Volatiles-3**
Traverse Completed	9:51	
Post-Traverse Leak Check	0.004 @ -15” Hg	
Running on Removal	Yes	Yes
Pre-Traverse Start Time	0.004 @ -15” Hg	
Running on Insertion	Yes	Yes
Stack Temperature °F	284, 285, 284, 284, 284	
Trap Temperature °F	45, 45, 45, 42, 44, 43	
Traverse Completed	11:59	
Final Leak Check	0.001 @ -15” Hg	
Running on Removal	Yes	Yes

Technical Memorandum

To: Lipika Saha, P.Eng (Region of Durham)
Nicia Williams, P.Eng (Region of Durham)
Lyndsay Waller (Region of Durham)
Muneeb Farid, P.Eng (Region of York)

Cc: John Clark, PE, Alan Cremen, P.Eng, Kirk Dunbar, Abigail Fleming, PE (HDR)

From: Bruce Howie, PE

Date: October 9, 2025

Re: **Durham York Energy Centre: Spring 2025 Compliance Stack Test**
HDR Observations During Testing and Summary of Results

Introduction

During the period from May 12th through May 15th, 2025, Alliance Technical Group (Alliance) (formerly Ortech Consulting Inc) conducted the Compliance Source Test at the Durham York Energy Center (DYEC) for the Regions of Durham and York. This mandatory testing has been performed annually at the DYEC since the start of Commercial Operation in 2016. Testing was performed in accordance with the reference methods required under Section 7(1) of the Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX, originally issued by the Ontario Ministry of Environment, Conservation and Parks (MECP) on June 29, 2011. HDR personnel were on-site to observe DYEC operations and stack sampling procedures during the testing on May 13th through May 15th. The purpose of this technical memorandum is to summarize the observations made by HDR personnel during the testing, as well as to summarize our review of the results of the Compliance Source Test based on the information provided in the Alliance Test Report dated August 4, 2025.

HDR Observations during the Compliance Source Test

The testing schedule and start/stop times for each parameter tested during the May 2025 Compliance Source Test is included in Attachment A to this Technical Memorandum. Also included in Attachment A is a summary of the testing observed by HDR. HDR's role on-site was to observe Reworld's operations of the DYEC boilers and APC systems during test sampling, observe Alliance's sampling procedures and activities, to report any deviations from the testing schedule and procedures, and to identify any operating upsets or abnormalities.

During our time on-site between May 13th through May 15th, HDR observed the real-time operations of the boilers and air pollution control systems and reviewed the one-minute DYEC operating data recorded by Reworld's distributive control system (or DCS) during the emissions tests to observe the DYEC was being operated under normal operating conditions. Following is a summary of the key events and observations made by HDR during the sampling days at the DYEC. Attachment B includes the average operating data recorded by the DCS for the periods associated with the Dioxin/Furan (D/F) testing that occurred on May 14 and 15, 2025.

Day 2: Tuesday, May 13th

Stack testing commenced at 07:56 and was completed at 18:18. Tests on Unit 1 included Runs 1-3 for particulate matter less than 10 and 2.5 microns (PM10/2.5) and Run 3 PM/Metals. Tests on Unit 2 included Runs 2&3 for PM/Metals and Runs 1-3 for Acid Gases.

- HDR observed 3 leak tests:
    - Unit 2 Acid Gases
        - Run 3 Port Removal: 11:54
    - Unit 2 PM/Metals
        - Run 3 Port Change: 13:16
    - Unit 1 PM/Metals
        - Run 3 Port Change: 16:42
- The parameters below represent an average of the data (taken approximately an hour apart) on May 13th during testing. Operation parameters were observed to be in the normal range and no upsets were reported.

Parameter	Normal Range	Unit 1	Unit 2
Steam Load (kg/hr)	32,000-35,000	32,966	33,809
Ammonia (L/hr)	25-80	23.1	24.3
Carbon (kg/hr)	4.5-5.5	4.7	4.7
Steam Outlet Temp (°C)	495-510	506	502
Steam Pressure (bar)	86-90	90	90
Combustion Temps (°C)	>1,000	1,235	1,240

Day 3: Wednesday, May 14th

Stack testing commenced at 08:10 and was completed at 17:23. Tests on Units 1 included Runs 1&2 for D/F and Runs 1-3 for volatile organic compounds (VOC). Tests on Unit 2 included Runs 1&2 for D/F and Runs 1-3 for VOC.

- HDR observed 8 leak tests:
    - Unit 1 DF Runs 1&2 during port change and at the end of each test
        - Run 1 Port Change: 10:15
        - Run 2 Port Change: 15:09
    - Unit 2 DF Runs 1&2 during port change and at the end of each test
        - Run 1 Port Change: 10:10
        - Run 2 Port Change: 15:04
- The parameters below represent an average of the data (taken approximately an hour apart) on May 14th during testing. Operation parameters were observed to be in the normal range and no upsets were reported.

Parameter	Normal Range	Unit 1	Unit 2
Steam Load (kg/hr)	32,000-35,000	33,693	33515
Ammonia (L/hr)	25-80	18.6	26.1
Carbon (kg/hr)	4.5-5.5	4.7	4.7
Steam Outlet Temp (°C)	495-510	502	500
Steam Pressure (bar)	86-90	90	90
Combustion Temps (°C)	>1,000	1,249	1,225
Baghouse dp (mBar)	10-20	15.9	10.7

Day 4: Thursday, May 15th

Stack testing commenced at 07:46 and was completed at 11:59. Tests included Run 3 for D/F on both Units 1 and 2.

- HDR observed 4 leak tests:
  - Unit 1 DF Run 3 during the port change and at the end of the test
    - Run 3 Port Change: 09:51
  - Unit 2 DF Run 3 during the port change and at the end of the test
    - Run 3 Port Change: 09:46

- The parameters below represent an average of the data (five readings taken approximately an hour apart) on May 15th during testing. Operation parameters were observed to be in normal range.

Parameter	Normal Range	Unit 1	Unit 2
Steam Load (kg/hr)	32,000-35,000	33,027	33,344
Ammonia (L/hr)	25-80	19.2	19.9
Carbon (kg/hr)	4.5-5.5	4.7	4.7
Steam Outlet Temp (°C)	495-510	518	508
Steam Pressure (bar)	86-90	90	90
Combustion Temps (°C)	>1,000	1,209	1,212
Baghouse dp (mBar)	10-20	15.8	11.5

HDR noted that Reworld's Project Engineer, Rick Koehler, was on-site throughout the testing period to assist the local DYEC personnel with test coordination with Alliance, and to observe the Compliance Source Testing.

Based on HDR's observations of the Compliance Source Testing, Alliance conducted the testing in accordance with the applicable standards and procedures. Alliance was careful during each port change observed to ensure that the probe was not scraped inside the port during insertion and removal of the probe. In addition, sampling equipment was assembled properly, the ice used in the sample box was replenished in a timely manner, and all required leak checks were conducted and passed. After each completed test, the sampling trains were transported to a trailer located outside the boiler building for recovery and clean up to avoid potential contamination at the test location. It should be noted that the actual clock times associated with each run, are slightly longer than the run lengths indicated in the test plan. This difference is due to the time required for Alliance to pull the probe out of the first port, leak check the sampling equipment and insert the probe into the second port. This is typical of stack sampling practices and is done in accordance with the test plan and approved procedures.

Alliance stated that the aldehyde samples collected on May 14, 2025, showed high background levels of acetone. The presence of high levels of acetone in the samples could potentially mask the target contaminant peaks and affect the accuracy and the quantities measured. Alliance stated the source of the contamination is unknown since the samples were prepared and recovered in a separate trailer that did not contain any solvents. Alliance performed a repeat test for aldehydes on July 10, 2025, where volumetric flowrate and moisture tests were conducted in conjunction with the sampling to facilitate emission rate calculations. Aldehydes are a subset of

the total VOC. Neither is subject to an emission limit in Schedule C, but they are both required to be included in the testing by Schedule D to uphold the quantification requirement.

Attachment B provides a summary of the DYEC operating data recorded by Reworld's DCS during the D/F tests. Based on the operational data there appears to be an ongoing communication issue between the TRACE emissions monitoring system and the DCS. The TRACE system showed the carbon system was operating at a carbon flow rate in the 5-5.5 kg/hr rate while the DCS data showed a flow of zero throughout the testing period. Reworld has previously indicated that this is a communication error between the two control systems and continues to investigate the issue. This is not a compliance issue but should be resolved by Reworld. During the D/F testing, the hourly average flue gas temperatures were consistently above the minimum permit limit of 1,000 ^{o}C for both units. Graphs of the running 1-hour averages for the D/F test periods for Unit 1 and Unit 2 are provided in Attachment B.

As previously noted, HDR did not observe any other deviations from the approved test protocol or applicable stack test procedures and based on the operational data and HDR's observations, the boilers and APC equipment were generally operated under normal conditions during the testing.

Summary of Results

The results of the testing program, based on Alliance's March report, are summarized in Table 1 and Figures 2 and 3. Emissions of all pollutants are corrected to Reference conditions (25° C, 101.3 kP, dry basis, 11% oxygen), and as shown, were all below the ECA's Schedule "C" limits. As a part of HDR's review of the Alliance report, we completed a review of the data presented and calculations. There were no errors in calculations found during this review. HDR is also including the historical test results for PM, Mercury, Cadmium, and Lead from each voluntary and compliance test from 2017 to 2025 (Figures 3-6).

Table 1 - Summary of May 2025 Compliance Source Test Results

Parameter	Units(1)	ECA Limit	Unit 1		Unit 2	
			Result	% of Limit	Result	% of Limit
Particulate Matter (PM)(2)	mg/Rm^3	9	0.29	3%	0.34	4%
Mercury (Hg)(2)	µg/Rm^3	15	0.13	1%	0.13	1%
Cadmium (Cd)(2)	µg/Rm^3	7	0.029	0.4%	0.024	0.3%
Lead (Pb)(2)	µg/Rm^3	50	0.26	1%	0.26	1%
Hydrochloric Acid (HCl)(3)(4)	mg/Rm^3	9	2.1	23%	3.3	37%
Sulphur Dioxide (SO_2)(3)(4)	mg/Rm^3	35	2.6	7%	5.2	15%
Nitrogen Oxides (NO_x)(3)(4)	mg/Rm^3	121	109	90%	109	90%
Carbon Monoxide (CO)(3)(5)	mg/Rm^3	40	10.6	27%	13.6	34%
Total Hydrocarbons (THC)(6)	ppm	50	0.67	1%	0.16	0.3%
Dioxins and Furans(7)	pg TEQ/Rm^3	60	2.56	4%	2.61	4%

(1) R means the values are adjusted to reference conditions (i.e., dry basis, 25°C, 101.3 kPa, 11% O_2)
(2) average of three runs
(3) based on CEM data provided by Reworld
(4) maximum calculated 24-hour rolling arithmetic average measured by the DYEC CEMS during the period from May 12 to May 15, 2025.
(5) maximum calculated four-hour rolling arithmetic average measured by the DYEC CEMS during the period from May 12 to May 15, 2025.
(6) average of three one-hour tests measured at an undiluted location, reported on a dry basis expressed as equivalent methane
(7) average of three test runs for Unit 1 and two test runs for Unit 2 calculated using the NATO/CCMS (1989) toxicity equivalence factors and the full detection limit for those isomers below the analytical detection limit

Figure 1 - DYEC Test Results as a Percent of ECA Limit

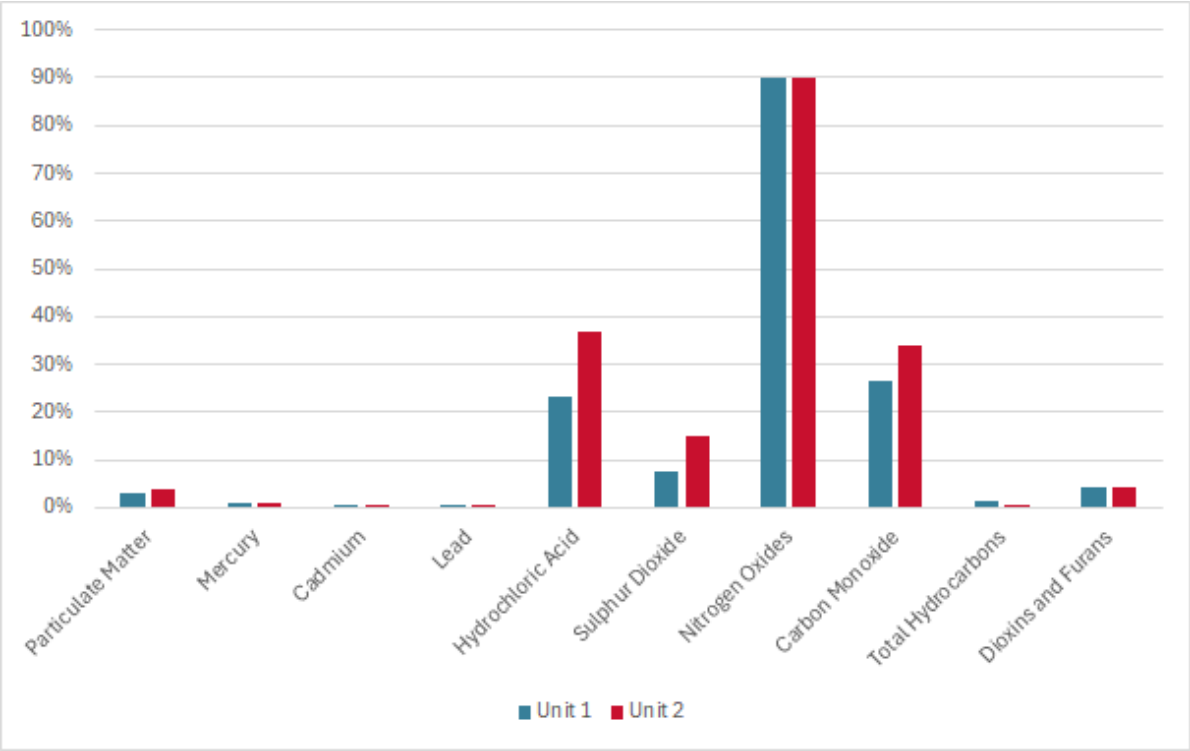


Figure 2 – 2025 Test Results for Dioxins and Furans

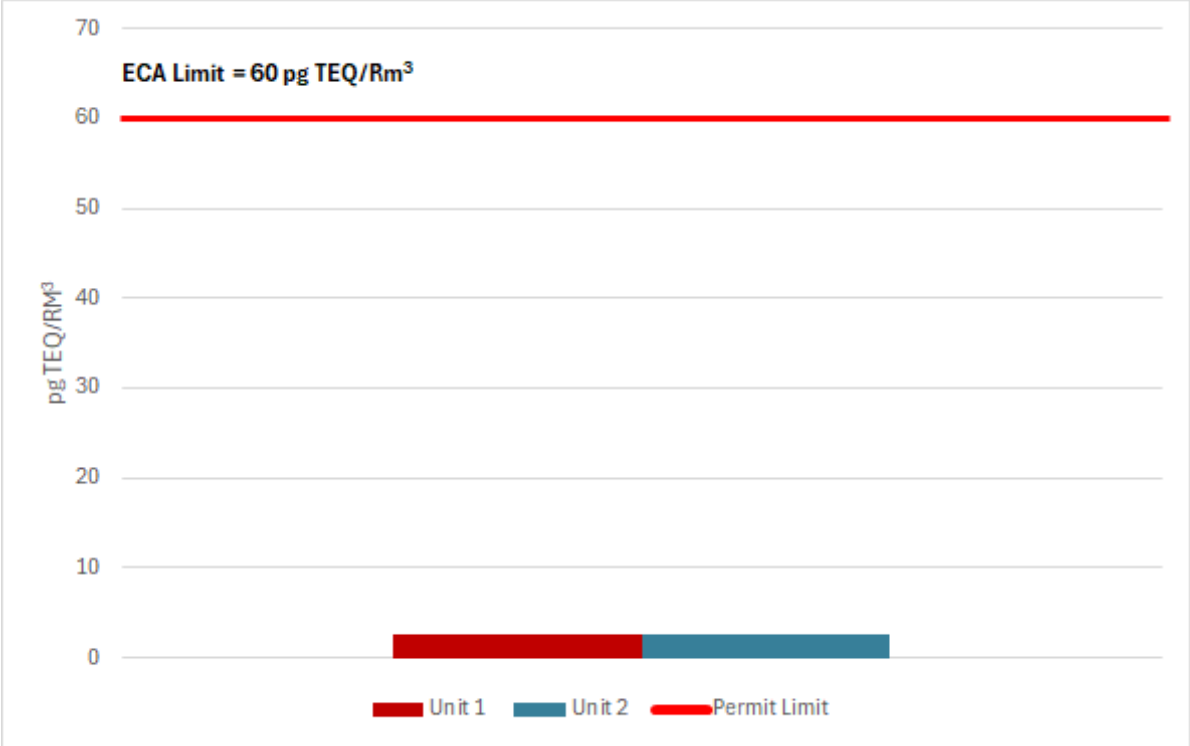


Figure 3 – Historical Particulate Matter Results

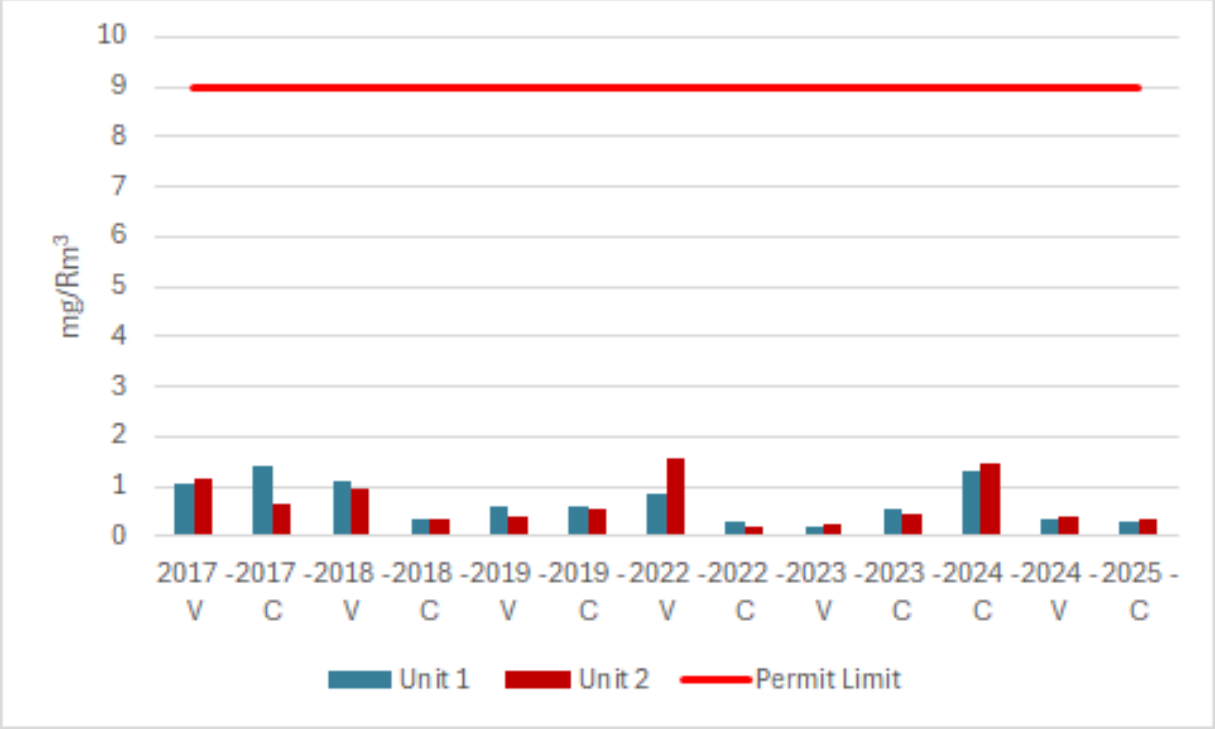


Figure 4 - Historical Mercury Results

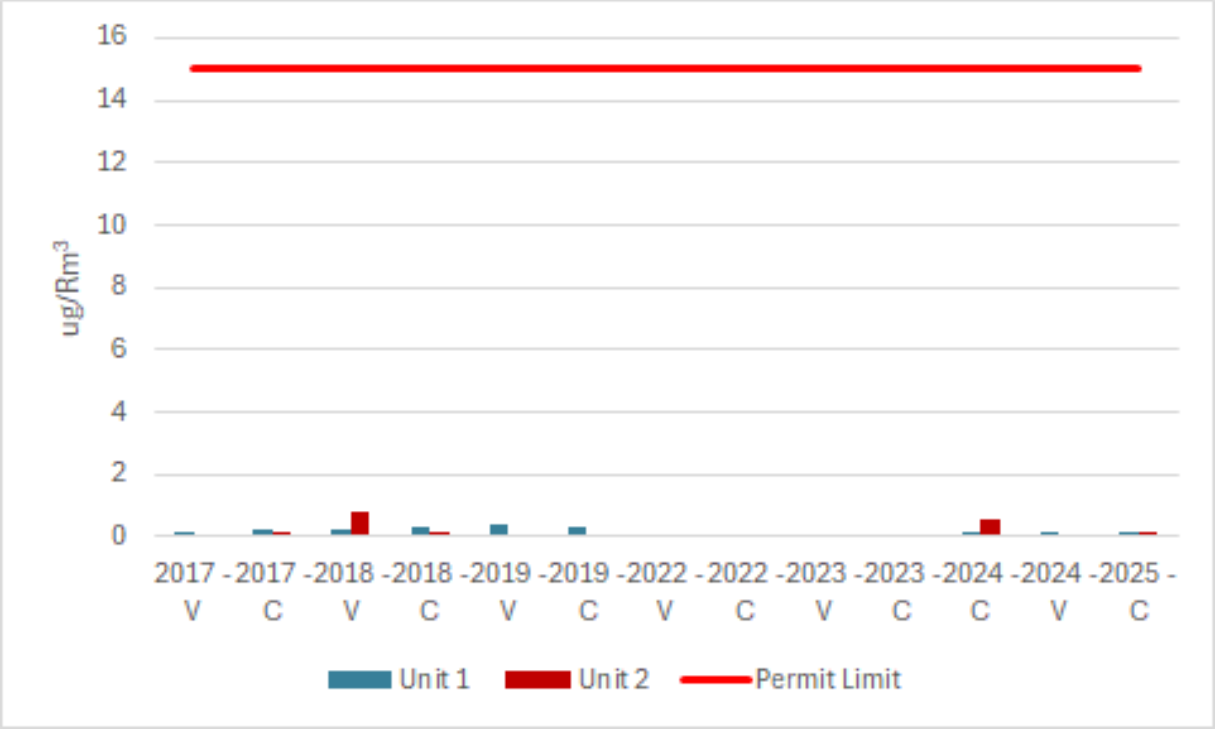


Figure 5 - Historical Cadmium Results

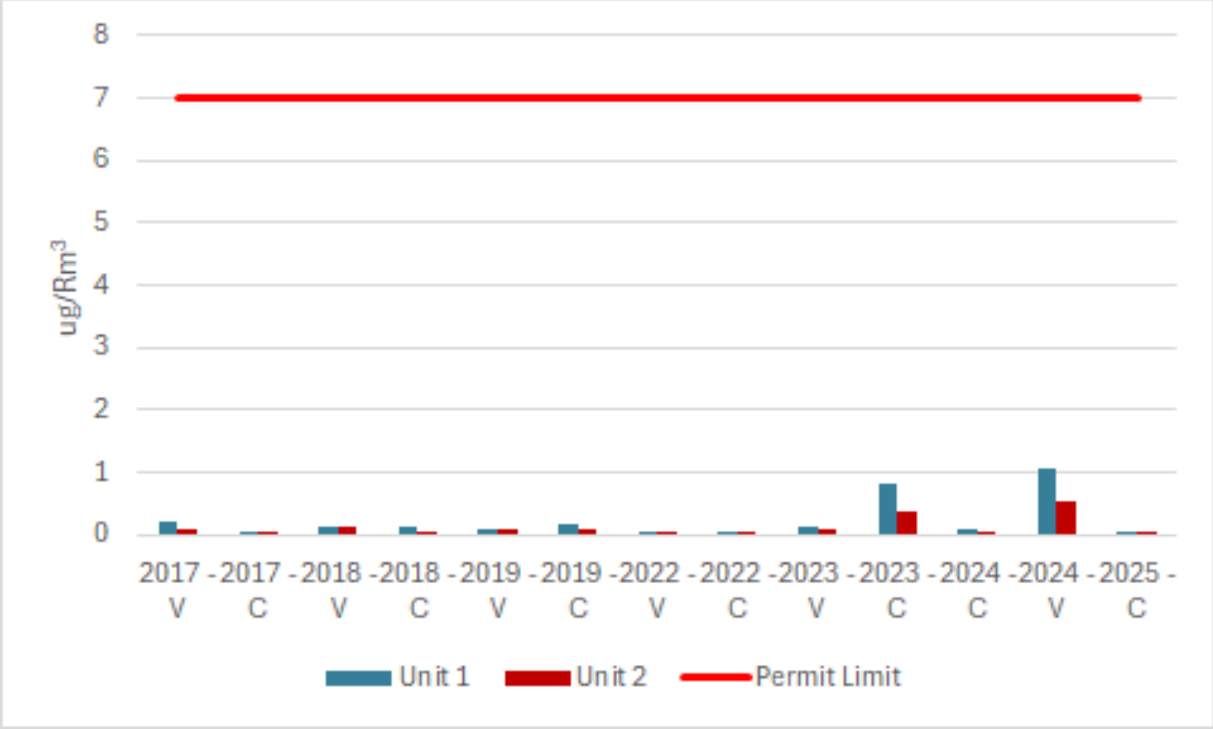
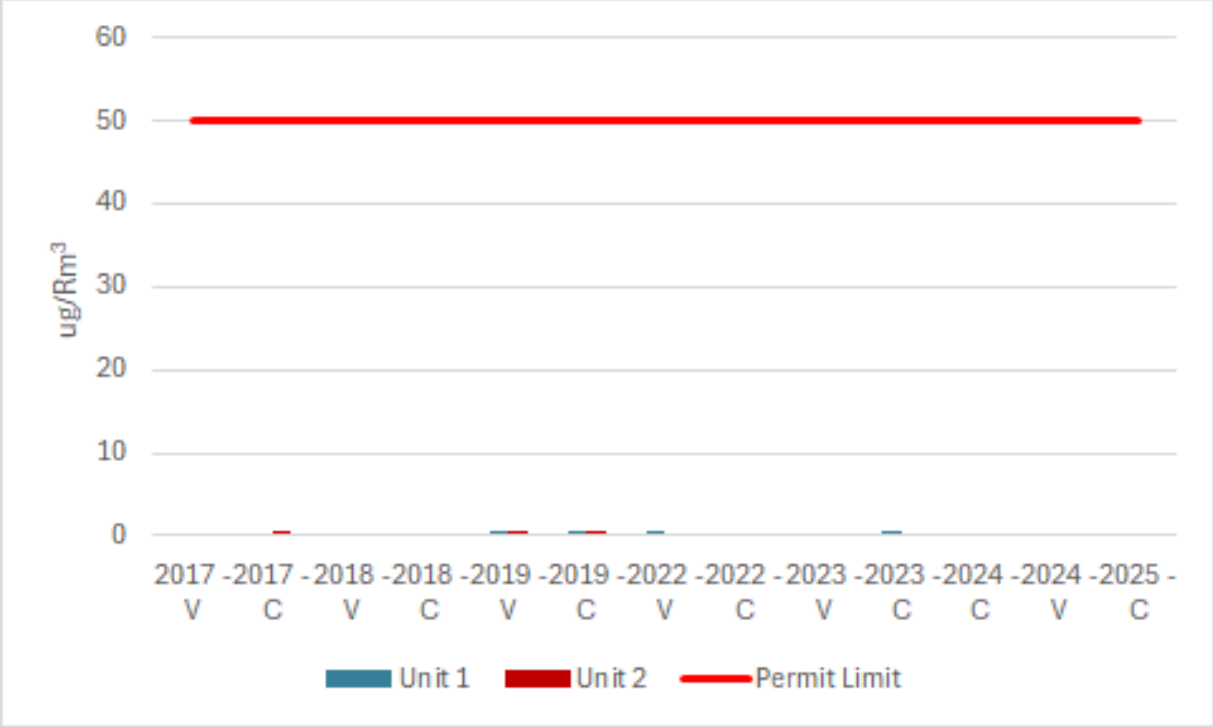


Figure 6 - Historical Lead Results



Conclusions and Recommendations

HDR has completed our review of the results of the air emissions testing performed during the DYEC Spring 2025 Compliance Test that occurred between May 12th and 15th, 2025. Representatives from HDR were present at the DYEC on May 13th through May 15th, 2025, to observe the sampling procedures and facility operations during emissions testing. HDR observed Alliance following the approved stack sampling procedures and test methods. HDR also observed Reworld's plant personnel operating the DYEC under normal operating conditions and in accordance with acceptable industry operating standards. There were no significant upsets or malfunctions reported that affected the successful completion of the 2025 Compliance Test, except for a contaminated aldehyde sample on May 14. The aldehyde sample was retaken in July and no other issues were identified. Based on the results summarized in Alliance's test report (dated August 3, 2025), the air emission results of the Spring 2025 Compliance Test demonstrated that the DYEC operated below the ECA's Schedule "C" limits.

Attachments:

Attachment A – Stack Test Schedule and Summary of Testing Observed by HDR

Attachment B – Summary of Operating Data During Dioxins/Furans Tests

Attachment A: Final Stack Test Schedule & Summary of Testing Observed by HDR.

Summary of Testing Schedule

Day 1: Monday, May 12th

Unit	Test	Run 1		Run 2		Run 3	
		Start	Stop	Start	Stop	Start	Stop
1	Metals/Particulates	09:32	12:41	13:24	16:31	-	-
	Acid Gases (HF/Ammonia)	09:34	10:34	11:15	12:15	13:07	14:07
2	Metals/Particulates	16:39	19:47	-	-	-	-
	PM10/2.5	09:40	11:41	12:30	14:33	15:10	17:10

Day 2: Tuesday, May 13th

Unit	Test	Run 1		Run 2		Run 3	
		Start	Stop	Start	Start	Stop	Stop
Unit 1	PM/Metals	-	-	-	-	15:12	18:18
	PM10/2.5	08:02	10:06	10:50	12:54	13:35	15:38
Unit 2	PM/Metals	-	-	07:56	11:06	11:46	14:53
	Acid Gases (HF/Ammonia)	07:57	08:57	09:38	10:38	10:51	11:51

Day 3: Wednesday, May 14th

Unit	Test	Run 1		Run 2		Run 3	
		Start	Stop	Start	Start	Stop	Stop
Unit 1	Dioxin/Furans	08:15	12:24	13:09	17:23	-	-
	VOCs	08:14	10:06	10:08	12:20	14:16	16:13
Unit 2	Dioxin/Furans	08:10	12:20	13:04	17:17	-	-
	VOCs	08:12	10:20	10:45	13:06	13:07	16:14

Day 4: Thursday, May 15th

Unit	Test	Run 1		Run 2		Run 3	
		Start	Stop	Start	Start	Stop	Stop
Unit 1	Dioxin/Furans	-	-	-	-	07:51	11:59
Unit 2	Dioxin/Furans	-	-	-	-	07:46	11:55

Retest: Thursday, July 10th

Unit	Test	Run 1		Run 2		Run 3	
		Start	Stop	Start	Start	Stop	Stop
Unit 1	Aldehydes	10:30	11:30	11:51	12:51	13:14	14:14
Unit 2	Aldehydes	10:29	11:29	11:51	12:51	13:17	14:17

Attachment B: Summary of Operating Data During the Dioxins/Furans Tests

May 2025 Voluntary Dioxins Testing
Operations Data and Results[1]

	Boiler 1			Boiler 2		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Operating Parameter	14-May	14-May	15-May	14-May	14-May	15-May
Steam (kg/hr)	33,430	33,381	33,386	33,549	33,079	33,380
Steam Temperature °C	502	500	500	504	498	496
Steam Pressure (bar)	90	90	90	90	90	90
Primary Air Flow	30,487	31,346	31,467	34,263	35,302	32,138
Overfire Air Flow	7,006	8,159	8,173	6,206	6,675	6,632
Tertiary Air (Fresh LN Air)	8,484	8,541	8,441	8,669	8,699	8,670
Tertiary air temperature °C	42.8	42.3	41.8	41.9	41.9	41.8
Lime Injection (kg/hr)	134.2	140.1	135.0	134.1	142.4	134.2
Ammonia Injection Rate (liters/hr)	0.3	0.3	0.3	0.6	0.5	0.4
Carbon Injection (kg/hr)[2]	0.0	0.0	0.0	4.8	4.6	4.7
Combustion air preheat temp	120	114	120	123	115	120
Average Combustion Zone Temp °C	1,101	1,112	1,061	1,094	1,084	1,074
Superheater #3 Flue gas inlet Temp °C	497	495	499	517	518	519
Economizer Flue Gas Inlet Temp °C	339	340	338	339	340	337
Economize Flue Gas Outlet Temp °C	170	173	170	172	176	170
Quench Reactor Outlet Temp °C	153	153	153	153	155	153
Dry Scrubber Outlet (BH Inlet) Temp °C	143	142	142	135	135	134
Baghouse Outlet Temp °C	139	139	139	138	138	138
Tertiary Air Header Pressure mbar	60	60	59	60	60	60
Tertiary Air Left mbar	27	27	26	28	28	28
Tertiary air Right mbar	28	28	27	28	28	28
Baghouse Differential Pressure mbar	16	16	16	11	11	11
Oxygen (%) - Boiler Outlet	7.1	7.2	7.0	7.5	8.1	7.2
Oxygen (%) - Baghouse Outlet	9.4	9.0	8.8	9.4	8.9	9.0
CO -Boiler Outlet - mg/Rm^3	10.5	8.5	7.9	9.9	11.5	40.3
CO - Baghouse Outlet - mg/Rm^3	7.7	6.9	5.6	8.0	9.1	11.9
NOx - mg/Rm^3	109.8	109.5	108.0	109.6	108.8	109.4
NH3 mg/Rm^3	6.9	7.0	6.5	9.7	10.2	9.1
Flue gas moisture	16.3%	16.7%	16.6%	16.8%	16.3%	16.6%
Outlet Stack Outlet/Stack Dioxin - NATO - (pg TEQ/Rm^3)	**<2.60**	**<2.55**	**<2.53**	**<2.31**	**<2.51**	**<3.00**

[1]Average Unit data for the periods corresponding to the test run times.

[2] Communication error between TRACE and DCS: Unit 1 Carbon flow

Figure 7 – Unit 1 D/F Runs 1 and 2 Furnace Temperature 1-Hour Averages

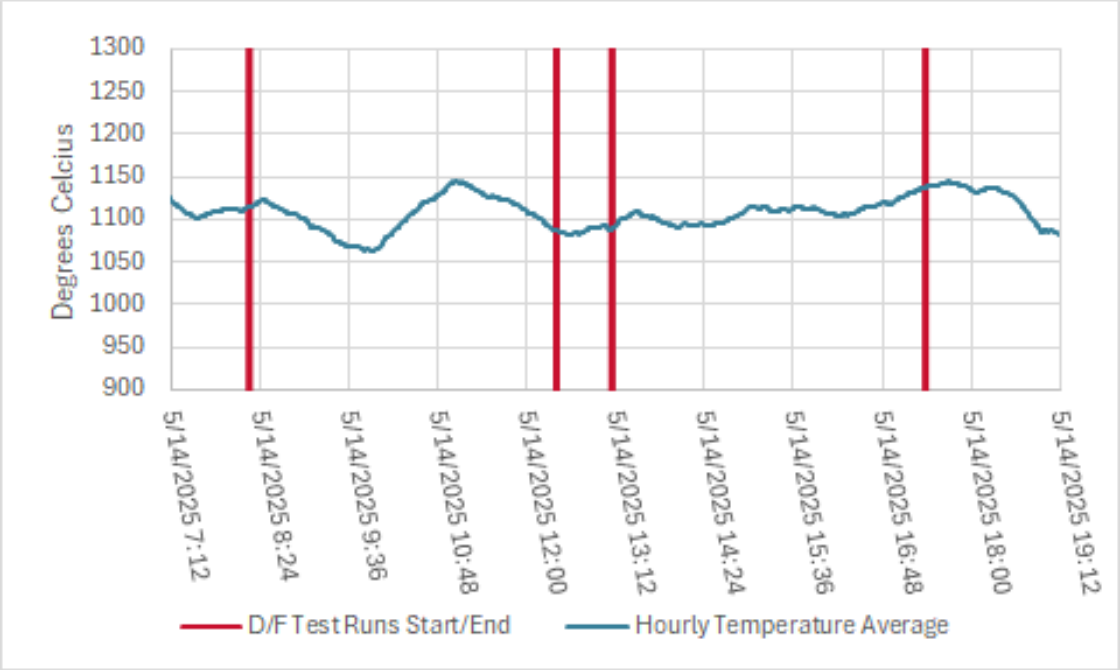


Figure 8 – Unit 1 D/F Run 3 Furnace Temperature 1-Hour Averages

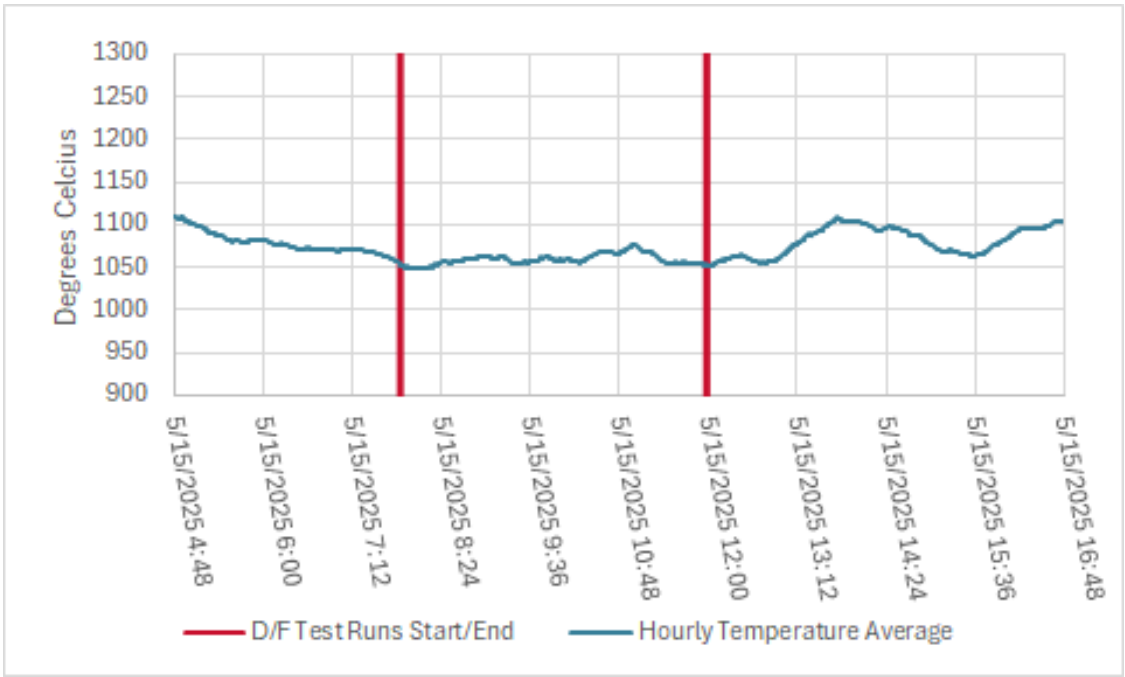


Figure 9 – Unit 2 D/F Runs 1 and 2 Furnace Temperature 1-Hour Averages

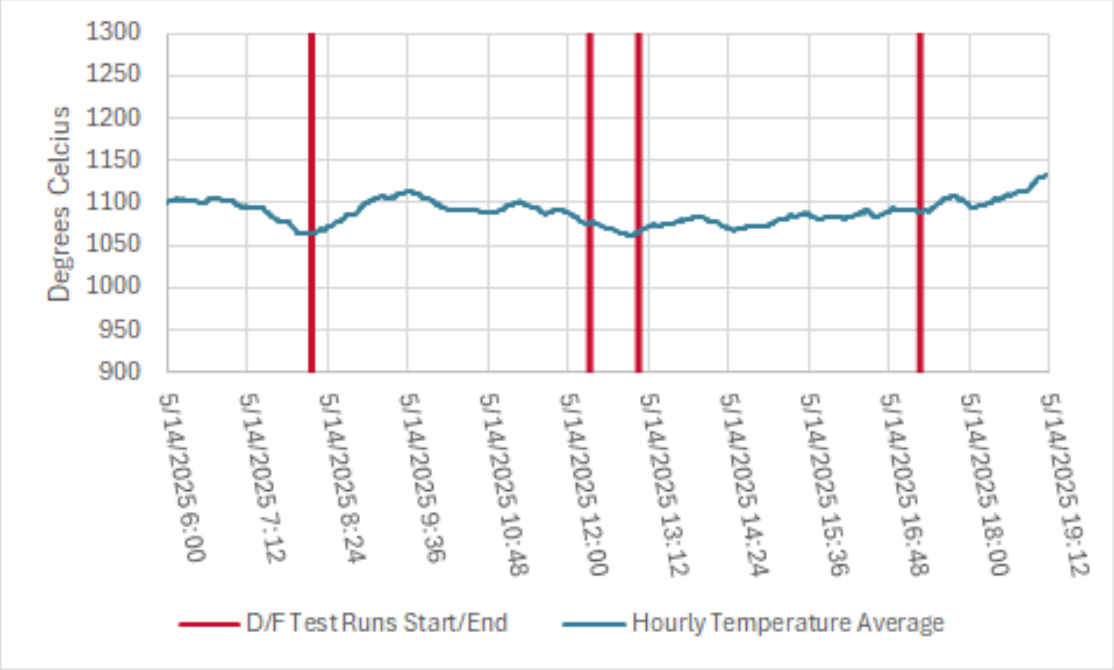


Figure 10 – Unit 2 D/F Run 3Furnace Temperature 1-Hour Averages

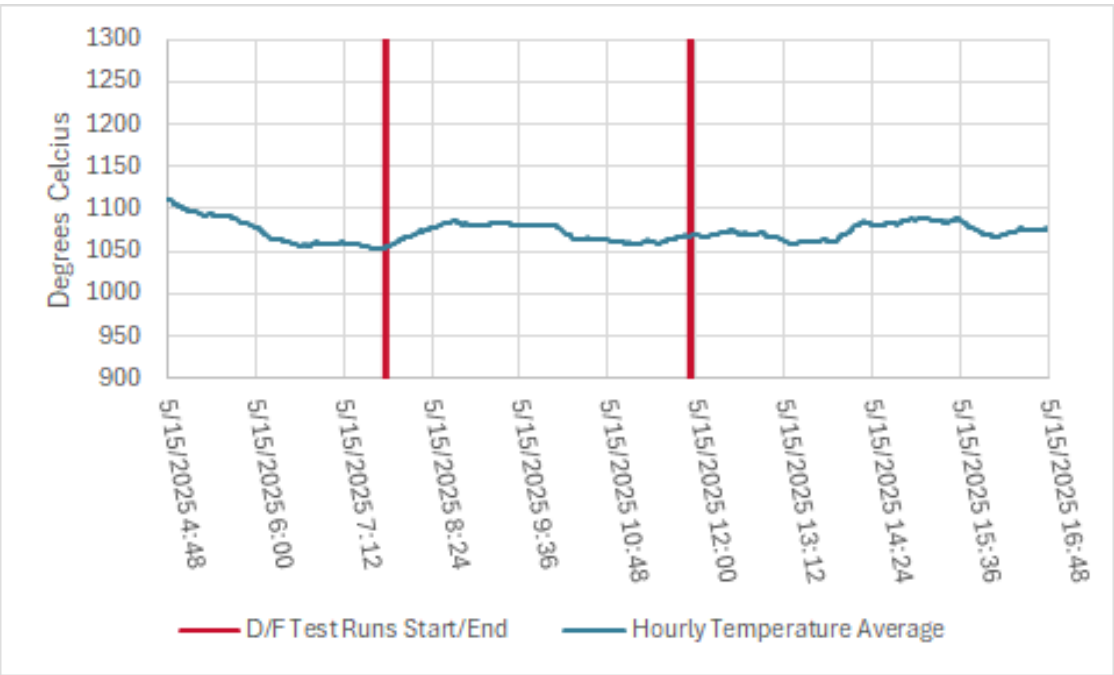


Table 1: DYEC Source Test Emission Results 2020-2025

Parameter	Emission limit	Spring 2020 Voluntary		Fall 2020 Compliance		Spring 2021 Voluntary		Fall 2021 Compliance		Spring 2022 Voluntary		Fall 2022 Compliance		Spring 2023 Voluntary		Fall 2023 Compliance		Spring 2024 Compliance		Fall 2024 Voluntary		Spring 2025 Compliance	
		Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2	Boiler 1	Boiler 2
Cadmium	7 µg/Rm^3	0.056	0.110	0.075	0.056	0.068	0.045	0.064	0.020	0.023	0.390	0.063	0.030	0.120	0.080	0.830	0.370	0.090	0.057	1.080	0.550	0.030	0.020
Carbon Monoxide	40 mg/Rm^3	15.2	11.4	11.4	14.1	12.6	12.7	9.7	11.7	10.7	15.3	9.1	9.4	9.0	16.1	8.1	9.9	6.1	8.0	13.3	15.8	10.6	13.6
Dioxins and Furans	60 pgTEQ/Rm^3	1.82	2.53	28.70	7.26	4.10	7.35	14.7	2.56	7.28	4.10	3.68	3.91	6.61	9.18	10.90	4.43	2.30	1.88	2.25	2.63	2.56	2.61
Hydrogen Chloride	9 mg/Rm^3	4.5	5.1	3.8	3.2	3.1	2.9	2.2	1.8	1.0	3.6	0.4	3.8	0.8	3.1	1	3.1	0.3	2.2	0.6	2.1	2.1	3.3
Lead	50 µg/Rm^3	0.55	0.61	0.37	0.34	0.44	0.32	0.46	0.17	0.55	0.28	0.23	0.15	0.28	0.15	0.56	0.25	0.31	0.26	0.29	0.39	0.26	0.26
Mercury	15 µg/Rm^3	0.130	0.100	0.340	0.045	0.086	0.081	0.053	0.050	0.089	0.090	0.093	0.090	0.090	0.090	0.090	0.080	0.160	0.580	0.130	0.099	0.130	0.130
Nitrogen Oxides	121 mg/Rm^3	109	109	110	110	109	110	111	110	110	110	112	111	110	110	109	111	111	108	111	109	109	109
Organic Matter	50 ppmdv	0.20	1.70	0.50	1.10	1.00	0.40	0	0	0.70	1.50	0.10	0.30	0.03	0.40	0.50	0.40	0.10	0.20	1.60	0.40	0.67	0.16
Sulphur Dioxide	35 mg/Rm^3	0	0	0.10	0.10	0.30	0.70	0.30	0.20	0.02	0.90	0.50	0.60	0.02	0.13	0	0.03	0.20	0.39	7.20	1.80	2.60	5.20
Total Suspended Particulate Matter	9 mg/Rm^3	1.14	1.04	2.60	2.00	0.78	0.25	0.48	0.31	0.87	1.58	0.27	0.20	0.20	0.24	0.57	0.43	1.31	1.48	0.37	0.39	0.29	0.34

Attachment #5 to Report #2025-INFO-79

Comparison Table: 2025 Compliance Source Test Results Compared to ECA limits and Ontario A-7 Guideline

Parameter	Units	Boiler #1	Boiler #2	DYEC Average	DYEC ECA limit	% below ECA limit	Ontario A-7 Guideline	% below A7	EU (2010/75/EU)	% below EU
Nitrogen Oxides	mg/ Rm^3	109.00	109.00	109.00	**121**	9.9%	**198**	44.9%	**183**	40.4%
Total Suspended Particulate Matter	mg/ Rm^3	0.29	0.34	0.32	**9**	96.5%	**14**	97.8%	**9**	96.5%
Sulphur Dioxide	mg/ Rm^3	2.60	5.20	3.90	**35**	88.9%	**56**	93.0%	**46**	91.5%
Hydrogen Chloride	mg/ Rm^3	2.10	3.30	2.70	**9**	70.0%	**27**	90.0%	**9**	70.0%
Carbon Monoxide	mg/ Rm^3	10.60	13.60	12.10	**40**	69.8%	**40**	69.8%	**46**	73.7%
Mercury	µg/Rm^3	0.13	0.13	0.13	**15**	99.1%	**20**	99.4%	**46**	99.7%
Cadmium	µg/Rm^3	0.03	0.02	0.02	**7**	99.7%	**7**	99.7%	**not applicable**	**not applicable**
Lead	µg/Rm^3	0.26	0.26	0.26	**50**	99.5%	**60**	99.6%	**not applicable**	**not applicable**
Dioxin/Furans	pg TEQ/Rm^3	2.56	2.61	2.60	**60**	95.7%	**80**	96.8%	**92**	97.2%