



Technical Memorandum

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From: Bruce Howie, PE

Date: November 28, 2018

**Re: Durham York Energy Centre: Fall 2018 Stack Test
HDR Observations During Testing and Summary of Results**

Introduction

During the period from September 10 through September 14, 2018, ORTECH Consulting, Inc. (ORTECH) conducted Compliance Testing at the Durham York Energy Center (DYEC). This testing is required annually as per Section 7(1) of the Amended Environmental Compliance Approval (ECA) No. 7306-8FDKNX, originally issued by the Ontario Ministry of Environment and Climate Change (MOECC) on June 29, 2011. HDR personnel were on-site to observe DYEC operations and procedures during the compliance testing on September 11, September 13, and September 14. The purpose of this technical memorandum is to summarize the observations of HDR personnel during the testing and to summarize our review of the results for the Compliance Testing based on the information provided in the ORTECH Test Report dated October 31, 2018.

HDR Observations during the Compliance Testing

HDR's role on-site was to observe operations of the DYEC and the conduct of Covanta (Facility Operator) and ORTECH (stack test firm hired by the Regions to conduct the tests and sampling) during the Compliance Testing. HDR personnel were on-site during the air emission testing on September 11, September 13, and September 14, 2018. Attachment A summarizes the schedule of tests completed. A complete day-by-day summary of HDR's observations of operations and testing during the entire 2018 Compliance Stack Test is included in Attachment B. Attachment C provides a summary of the DYEC operating data during the Dioxin/Furan testing. Based on HDR's observations and analysis, no deviations from the approved test protocol or applicable stack test procedures were observed and the boilers and APC equipment were operated under normal conditions.

Based on HDR's observations of plant operations, it is HDR's opinion that the boilers and air pollution control systems were operated under normal conditions during the sampling periods. There were a few process upsets during the course of the week that resulted in testing being delayed while issues were addressed. As part of our on-site observations, HDR noted the following items:

- There were some concerns regarding the moisture content within the waste as a result of the heavy rain events that occurred prior to and during the testing. Covanta operations staff followed standard operating practices during the test to ensure the waste being fed to the processing units was well mixed to provide opportunity for the material to dry before feeding. In addition, Covanta utilized auxiliary steam from the boilers to aid in heating the combustion air prior to entering the units to help dry the wet waste on the grate.
- The start of Day 3's Unit 1 testing was delayed due to blockage/plugging that occurred within one of Unit 1's fly ash recirculation hoppers prior to the commencement of testing. Covanta followed standard operating practice by removing the blockage to allow the hopper to operate/stabilize for approximately 20 minutes before testing commenced.
- The start of Day 4's testing was delayed to allow for investigation of operation upsets. Prior to testing, Covanta noted short duration spikes in the reported hydrogen chloride (HCl) emissions data. Ultimately an ash test was completed to ensure sufficient lime was present within the system and the HCl analyzer was recalibrated. Following recalibration, the readings stabilized and it was indicated that some non-linearity was likely being observed in the HCl analyzer readings, as opposed to a process issue.

Based on HDR's observations of the Compliance Testing, ORTECH followed the testing according to the applicable standards and procedures. ORTECH was careful during each port change 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. 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. Based on HDR's observation, most of the ORTECH personnel on-site during the Fall 2018 Compliance Stack Test were part of the same testing crews that conducted previous stack tests and sampling at the DYEC. 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 it took ORTECH to pull the probe out of the first port, leak check the sampling equipment, and insert the probe into the second port.

While rare, leak check failures and equipment issues can occur during typical stack testing programs. During run 3 of the Unit 1 metals testing, a leak was detected while performing the pre-run leak check. During ORTECH's investigation, the leak was determined to be at the nozzle of the probe. The leak was addressed before testing commenced. Similarly, a leak was detected during the pre-run leak checks for run 2 of the SVOC (dioxin) train on Unit 1. ORTECH

investigated the issue and the leak was found with a poor seal within the sampling train. The leak was addressed before testing commenced. Additionally, run 1 of Unit 2's aldehyde tests was aborted and restarted. During the test ORTECH personnel noted that one of the sampling fluids had been lost from the sampling train; ORTECH believed a pressure variation in the stack may have drawn the fluids into the system. In each of these cases, it is HDR's opinion that ORTECH acted in accordance with the testing procedures and generally accepted stack testing standards.

Summary of Results

The results of the testing program, based on ORTECH's July 18 2018 report, are summarized in Table 1 and Figures 1 and 2. As shown, emissions of all pollutants are corrected to 11% oxygen and were below the ECA's Schedule "C" limits. As a part of HDR's review of the ORTECH report, we completed a review of the data presented and calculations. There were no errors in calculations found during this review.

Table 1 – Summary of Test Results

Parameter	Units	ECA Limit	Unit 1		Unit 2	
			Result	% of Limit	Result	% of Limit
Particulate Matter (PM) ⁽¹⁾	mg/Rm ³	9	<0.34	3.8%	<0.32	3.6%
Mercury (Hg) ⁽¹⁾	µg/Rm ³	15	0.3	2.0%	0.13	0.9%
Cadmium (Cd) ⁽¹⁾	µg/Rm ³	7	0.14	2.0%	0.035	0.5%
Lead (Pb) ⁽¹⁾	µg/Rm ³	50	0.18	0.4%	0.22	0.4%
Hydrochloric Acid (HCl) ⁽²⁾⁽³⁾	mg/Rm ³	9	2.9	32.2%	4.1	45.6%
Sulphur Dioxide (SO ₂) ⁽²⁾⁽³⁾	mg/Rm ³	35	0	0.0%	0.1	0.3%
Nitrogen Oxides (NO _x) ⁽²⁾⁽³⁾	mg/Rm ³	121	109	90.1%	111	91.7%
Carbon Monoxide (CO) ⁽²⁾⁽⁴⁾	mg/Rm ³	40	13.0	32.5%	13.4	33.5%
Total Hydrocarbons (THC) ⁽⁵⁾	ppm	50	0.7	1.4%	1.0	2.0%
Dioxin and Furans ⁽⁶⁾	pg TEQ/Rm ³	60	<5.05	8.4%	<3.22	5.4%

(1) dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

(2) based on process data or CEM data provided by Covanta

(3) maximum calculated rolling arithmetic average of 24 hours of data measured by the DYEC CEMS, dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

(4) maximum calculated rolling arithmetic average of 4 hours of data measured by the DYEC CEMS, dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

(5) average of three one hour tests measured at an undiluted location, reported on a dry basis expressed as equivalent methane

(6) 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

Figure 1 DYEC Test Results as a Percent of ECA Limit

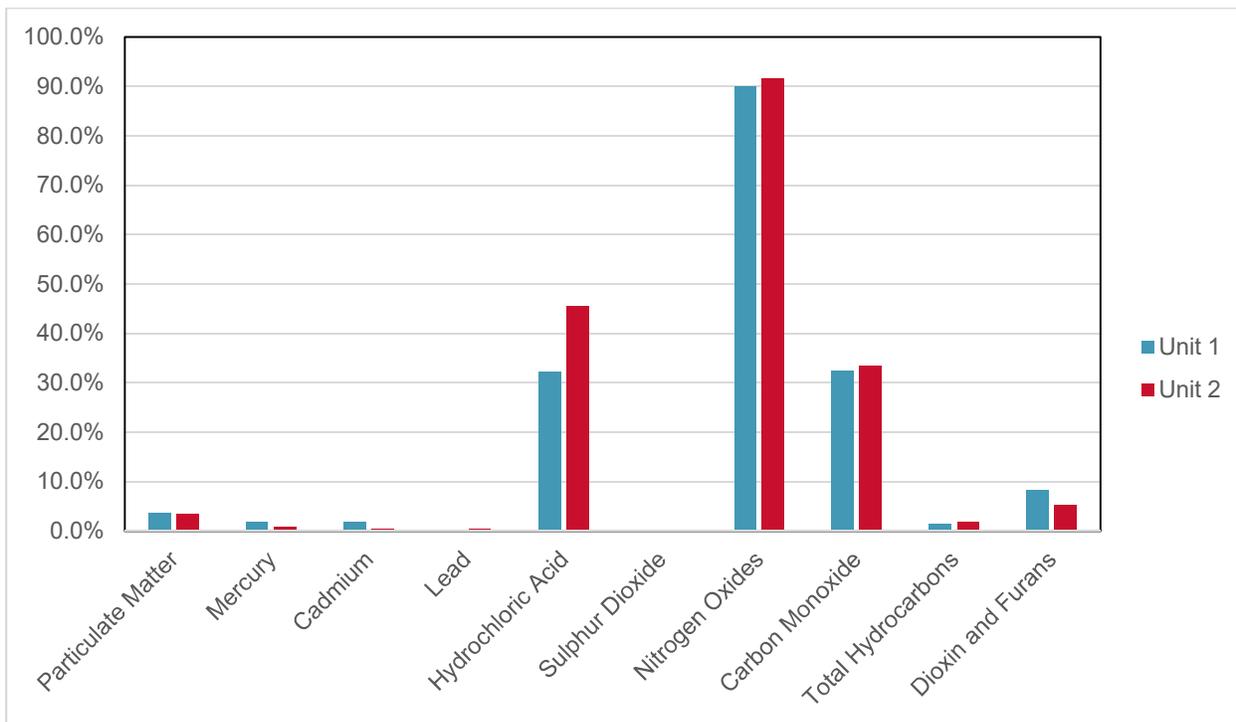
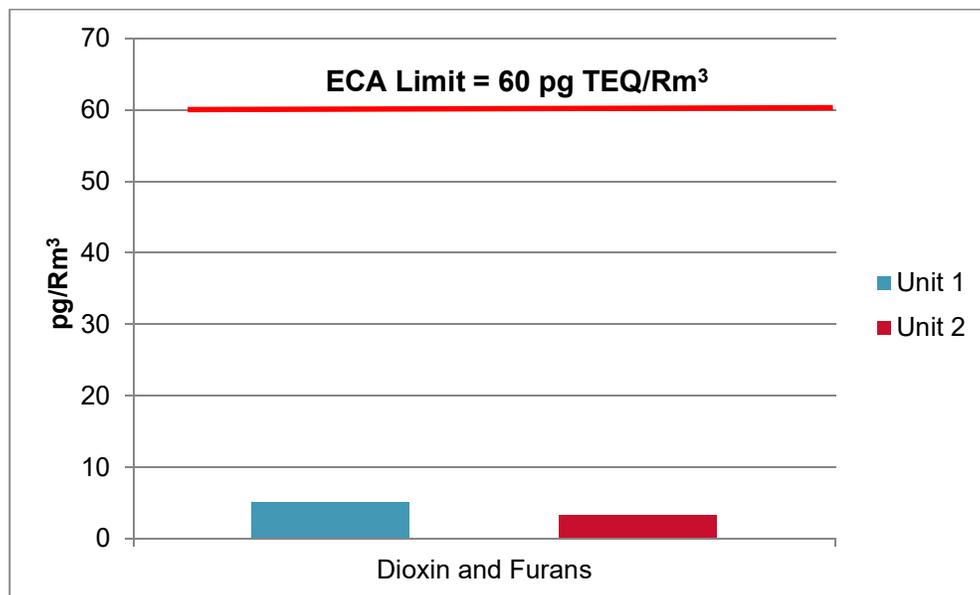


Figure 2 – Test Results for Dioxins and Furans



The analytical laboratory included the following notes that pertain to their analyses.

- Inorganics Analytical Report:

- (Metals), electronic page 488:

Antimony (Sb) observed in the reagent blank (RB) above the LOR. This target, as well as chromium (Cr), molybdenum (Mo), and nickel (Ni) were also observed in the method blank (MB). Data for these target analytes may be biased high as a result of this background, contributed by the reagents, and reagents + filter respectively.

Silver (Ag) recovery in the LCS/LCSD is outside ALS DQOs (found: 56%, 57%). This may be due to silver binding other elements in solution. MS recoveries are within range, however data may still be biased low for is target in this fraction.

Cr, Lead (Pb), Ni, observed in the reagent blank (RB) above the LOR. Data for these target analytes may be biased high.

- (Metals), electronic page 493:

Sb, Cr, Ni observed in the reagent blank (RB) above the LOR. These same target analytes, as well as Mo, were observed in the Method Blank (MB). The difference in these levels can be attributed to the presence of a filter in the method blank, whereas the reagent blank contains only the reagents used during digestion. Data is likely biased high as a result of these background levels.

Ag recovery in the LCSD is outside ALS DQOs (found: 41%, limits: 85-115%). This may be due to silver binding other elements in solution. MS and MSD recoveries for this target are within ranges, indicating that matrix-containing samples are unlikely to show any bias.

Lead (Pb) observed in the reagent blank (RB) above the LOR. Data is likely biased high as a result of this background level.

- (Mercury), electronic page 502:

LCSD for fraction 1B is outside ALS DQOs (observed 81%). Sample was reanalyzed and found to be consistent. LCS is within range, as well as MS and MSD for this fraction. Likely the LCSD is compromised, however these other QC samples provide sufficient evidence of control that there is no anticipated impact on data quality.

- SVOC Analytical Report:

- (PCDD/F), electronic page 525:

During the runs, the mass resolution dropped below 10,000 for selected targets. The mass resolution is of value as a mass filter to remove potential interferences where

the masses are close to those being monitored for target and labelled analytes. Since there was no evidence for significant chemical interferences, therefore there is no significant impact to the data quality due to the mass resolution exceedance .

- Toxic PCB Congeners by GC/HRMS, electronic page 539:
For the samples 18-21880-SVOC-(31 thru 35) #2 APC outlet test #3 and 18-21880-SVOC-(36 thru 40) #2 APC outlet blank there appear to have been losses of selected PCBs during laboratory preparation, particularly for the poly-ortho substituted congeners. Each toxic PCB target has been calculated against an exact ¹³C labelled extraction standard. These data are not expected to be biased. However, the reported recoveries of the ¹³C₁₂-PCB-111 cleanup standard and the ¹³C₁₂-PCB-153 field standard appear to be biased low.
- CB by LRGC/MS, electronic page 553:
For the XAD- containing method blank, the mono-and dichlorobenzenes were not recovered and have not been reported. The tri- and tetrachlorobenzenes were poorly recovered. As a result, the detection limit has been elevated. However the recoveries for the reagent method blank, which has been through the entire analytical procedure, but without the addition of XAD, are within limits. In addition, there are two field blanks that demonstrate that there is no undue laboratory background.
- Chlorophenols as acetate derivatives by SIM GC/MS, electronic page 567:
Data are not corrected for extraction standard recoveries. Poor LCS recoveries on 2,6-Dichlorophenol indicates a potential low bias to this target in the sample data.

The Unit #2 Test 1 and 2 samples showed poor and inconsistent extraction standard recoveries. They also showed an absence of field spike recoveries. Therefore the overall target chlorophenol values are suspect and maybe compromised. Poor recoveries of phenols from XAD2 is commonly observed.

- SVOC and VOST Proof Data:

- VOCS via SW846 Method 5041A/8260C, electronic page 603:
Ketone data by VOST analyses are estimated values only.

Samples L2165270-12 & L2165270-27 showed low internal standard recoveries due to instrument suppression from high levels of desorbed water. Reported values for targets on these samples are estimates.

- Toxic PCB Congeners by GC/HRMS, electronic page 652:
Low levels of selected PCBs were detected in the proof. Glassware is approved for collection of samples for toxic PCB congener analysis.

As indicated in the lab notes, the majority of these items are expected to either have no impact on results or to have biased the results to be higher. For the chlorophenols that are indicated as being potentially biased low, the results for all compounds are either below detection limit or close to the detection limit and the modeling results indicate that the largest has an impact of less than 1% of the corresponding MOECC limit (the remainder are orders of magnitude below their corresponding Jurisdictional Screening Levels). Therefore, none of these items are expected to adversely impact the DYEC's compliance status as reported in the ORTECH document.

Conclusions and Recommendations

HDR has completed our review of the preliminary results from the DYEC Fall 2018 Compliance Test that was performed during the period between September 11 and September 14, 2018. Representatives from HDR were present to observe the testing procedures and DYEC operations throughout the majority of the Compliance Test period. Overall, ORTECH appeared to follow good stack sampling procedures, and Covanta's plant personnel were observed to be operating the DYEC in accordance with acceptable industry operating standards and to normal operating conditions. Based on the preliminary results summarized in Table 1, the results of the Fall 2018 Compliance Stack Test demonstrated that the DYEC operated below the ECA's Schedule "C" limits.

Attachments:

Attachment A – Summary of Stack Test Schedule

Attachment B – Summary of Field Notes for the Stack Test Period

Attachment C – Summary of Operating Data during Dioxin/Furan Tests

Attachment A:
Summary of Stack Test
Schedule

Table 2 –2018 Compliance Stack Test Schedule

Tuesday September 11, 2018

# 1 APC Outlet	Particulate/Metals	Ontario 5/EPA 29	1	180	9:19	12:46
			2	180	14:00	17:10
	Hydrogen Fluoride	EPA M26A	1	60	9:17	10:17
			2	60	11:12	12:12
			3	60	12:43	13:43
# 2 APC Outlet	PM10, PM2.5 Cond	EPA M201A/202	1	120	9:20	11:24
			2	120	13:10	15:15
			3	120	16:40	18:44

Wednesday September 12, 2018

# 1 APC Outlet	PM10, PM2.5 Cond	EPA M201A/202	1	120	8:35	10:39
			2	120	11:44	13:47
			3	120	15:17	17:22
# 2 APC Outlet	Particulate/Metals	Ontario 5/EPA 29	1	9:26	13:22	9:26
			2	15:17	17:22	15:17
	Hydrogen Fluoride	EPA M26A	1	9:24	10:24	9:24
			2	11:49	12:49	11:49
			3	13:38	14:38	13:38

Thursday September 13, 2018

# 1 APC Outlet	Dioxins and Furans	EPS 1/RM/2	1	240	10:23	14:44
			2	240	17:09	21:18
	VOST	SW846-0030	1	80	12:37	14:13
			2	80	17:09	18:45
	Aldehydes	CARB Method 430	1	60	11:14	12:14
			2	60	14:37	15:37
# 2 APC Outlet	Particulate/Metals	Ontario 5/EPA 29	3	180	10:23	14:37
	Particulate/Metals	Ontario 5/EPA 29	3	180	15:16	19:05
	Dioxins and Furans	EPS 1/RM/2	1	240	8:53	13:09
			2	240	15:17	19:33
	VOST	SW846-0030	1	80	10:23	12:15
			2	80	12:28	15:11
Aldehydes	CARB Method 430	1	60	15:31	16:31	
		2	60	17:11	18:11	

Friday September 14, 2018

# 1 APC Outlet	Dioxins and Furans	EPS 1/RM/2	3	240	9:36	13:46
	VOST	SW846-0030	3	80	9:38	11:21
	Aldehydes	CARB Method 430	3	60	11:47	12:47
# 2 APC Outlet	Dioxins and Furans	EPS 1/RM/2	2	240	8:29	12:41
	VOST	SW846-0030	3	80	9:52	11:32
	Aldehydes	CARB Method 430	3	60	8:32	9:32

Attachment B:
Summary of HDR Field Notes
For the Stack Test Period

Day #1, Sept 11 Recap:

Testing start time: 9:17, end time: 18:44.

- HDR (Andrew Evans) was on-site yesterday at the DYEC to observe the start of the Compliance Test on boilers 1 and 2.
- During our observations, both boilers were at full load at ~33,600 kg/hr. Carbon was at 5.2 kg/hr and lime was at 175 kg/hr
- Operations and testing activities all appeared to going smoothly, and all tests planned for were completed successfully (in addition to those noted below inlet and outlet THC runs were also completed by Ortech). From Covanta, Rick Kohler was in attendance to support and monitor the testing activities. It was noted that the waste received was somewhat wet given the recent rain. Covanta has been working to ensure that it is adequately 'fluffed' in order to dry out before feeding, and are avoiding use of any wetter pockets during the testing period. Of note Bill Marsden and Steve Deduck won't be on site this week. Covanta feels they have a good handle on the maintenance/testing requirements now and so don't need as much support. From speaking with Rick on site, our understanding is that Covanta did not undertake engineering runs for this set of tests.

HDR (Andrew Evans) will be back on-site Thursday and Friday to monitor the Dioxins/Furans testing on both units. We will obtain the results for today (Wednesday) at this time.

A summary of the tests and start/stop times is provided below.

Unit	Test Parameter	Test Method	Run No.	Test Start	Test Stop
Unit 1	Particulates/Metals	US EPA 29	1	9:19	12:46
	Particulates/Metals	US EPA 29	2	14:00	17:10
	Hydrogen Fluoride	US EPA 26A	1	9:17	10:17
	Hydrogen Fluoride	US EPA 26A	2	11:12	12:12
	Hydrogen Fluoride	US EPA 26A	3	12:43	13:43
Unit 2	PM10/PM2.5/Condensable	US EPA M201A/202	1	9:20	11:24
	PM10/PM2.5/Condensable	US EPA M201A/202	2	13:10	15:15
	PM10/PM2.5/Condensable	US EPA M201A/202	3	16:40	18:44

Day #2, September 12 Recap:

Testing start 8:12, end time 18:40. HDR was not on site during the testing, and has provided information based on records provided to us by Covanta

For Day 2 (Sept 12) run information was obtained from Covanta's testing logs as produced by the testing supervisor and the operators. All tests scheduled were completed (run times in table 1 below). The plant was generally operating well, although a short period of low steam (~28.8k kg/h) referred to as a 'steam dip' by Covanta of approximately 7 minutes was noted on each unit. Testing was not stopped during the variation in steam flow. Dips occurred in Unit 1 at 15:30 Unit 2 at 4:20.

Unit	Test Parameter	Test Method	Run No.	Test Start	Test Stop
Unit 1	PM10/PM2.5/Condensable	US EPA M201A/202	1	8:35	10:39
	PM10/PM2.5/Condensable	US EPA M201A/202	2	11:44	13:47
	PM10/PM2.5/Condensable	US EPA M201A/202	3	15:17	17:22
Unit 2	Particulates/Metals	US EPA 29	1	9:26	13:22
	Particulates/Metals	US EPA 29	2	15:17	17:22
	Hydrogen Fluoride	US EPA 26A	1	9:24	10:24
	Hydrogen Fluoride	US EPA 26A	2	11:49	12:49
	Hydrogen Fluoride	US EPA 26A	3	13:38	14:38

Day #3, Sept 13 Recap:

Start time 8:53, end time 21:18.

- HDR (Andrew Evans) was on-site at the DYEC to observe the Compliance Test on boilers 1 and 2.
- HDR was on-site yesterday (Sept 13) at the DYEC to observe the continued Compliance Test on boilers 1 and 2. During our observations, both boilers were at full load at ~32,600 kg/hr and the hydrated lime and carbon rates on both units were set at 175 kg/hr and 5.2 kg/hr, respectively.
- Martin Adomait from Airzone was also on site conducting auditing of the testing.
- For Day 3 – All tests were completed successfully, additionally the planned particulate/metals test – scheduled for Unit 2 today (Friday) was moved forward and was completed yesterday (Thursday).
- Covanta is currently correlating the AMESA cartridges. Blank cartridges were inserted ahead of testing – Currently the unit is started when a test commences, and paused between tests. The unit is operating during port change over (~15 minutes).
- Several minor issues were encountered which resulted in testing delays,
 - Start of testing was delayed shortly due to blockage/plugging within unit 1's fly ash recirculation hopper. The system was examined by Covanta and the blockage removed and the hopper allowed to operate for ~20 minutes before testing was commenced.
 - During the pre-testing leak checks for Unit 1 – PM/Metals – a leak was found to be occurring, it was ultimately isolated at the nozzle which was adjusted and testing commenced.
 - During the pre-testing leak checks for Unit 1 – SVOC (dioxin) run 2 leakage was found to be occurring. Ortech investigated the problem – ultimately locating a poor seal on part of the sampling train. The unit was repaired, retested prior to the test commencing – the troubleshooting lasted approximately 1 hour.
 - Aldehyde Run 1 for Unit 2 was aborted and restarted. One of the sampling fluids was lost during the test (likely pulled into the stack during a pressure variation). The test was restarted and completed later, no delay occurred as a result.

A summary of the tests and start/stop times is provided below.

Unit	Test Parameter	Test Method	Run No.	Test Start	Test Stop
Unit 1	Outlet SVOC (Dioxin/Furan)	EPS 1/RM/2	1	10:23	14:44
	Outlet SVOC (Dioxin/Furan)	EPS 1/RM/2	2	17:09	21:18
	VOST	SW846-0030	1	12:37	14:13
	VOST	SW846-0030	2	17:09	18:45
	Aldehydes	CARB Method 430	1	11:14	12:14
	Aldehydes	CARB Method 430	2	14:37	15:37
	Particulate Metals	US EPA 29	3	10:23	14:37
Unit 2	Outlet SVOC (Dioxin/Furan)	EPS 1/RM/2	1	8:53	13:09
	Outlet SVOC (Dioxin/Furan)	EPS 1/RM/2	2	15:17	19:33
	VOST	SW846-0030	1	10:23	12:15
	VOST	SW846-0030	2	12:28	15:11
	Aldehydes	CARB Method 430	1	15:31	16:31
	Aldehydes	CARB Method 430	2	17:11	18:11
	Particulate Metals	US EPA 29	3	15:16	19:05

* stack tester left before end time could be confirmed. Will check the note sheets tomorrow (updated time in brackets).

Day #4, Sept 14 Recap:

Start time 8:29, end time 13:46

Observations from Andrew Evans for Sept 14:

- The remainder of the testing program was completed. Generally based on conversations with Covanta, it was felt that the plant was running satisfactorily.
- Prior to testing being commenced on Unit 1, Covanta noted short duration spikes in the reported HCl emissions data. Testing was delayed to allow for investigation, ultimately an ash test was completed to ensure sufficient lime was present within the system, and the HCl analyzer was recalibrated. Following recalibration the readings stabilized and it was indicated that some non-linearity was being observed in the readings, as opposed to a process issue. Testing commenced after ~1hr.
- There were two short duration steam dips during testing (one per unit). Unit 1 – 13:20, Unit 2 9:20. Testing continued during the instability.
- Covanta support on site, and the Regions' third party consultant, Airzone, is on site.

A summary of the tests and start/stop times is provided below.

Unit	Test Parameter	Test Method	Run No.	Test Start	Test Stop
Unit 1	Outlet SVOC (Dioxin/Furan)	EPS 1/RM/2	3	9:36	13:46
	VOST	SW846-0030	3	9:38	11:21
	Aldehydes	CARB Method 430	3	11:47	12:47
Unit 2	Outlet SVOC (Dioxin/Furan)	EPS 1/RM/2	3	8:29	12:41
	VOST	SW846-0030	3	9:52	11:32
	Aldehydes	CARB Method 430	3	8:32	9:32

Attachment C:
Summary of Operating Data
during the Dioxin/Furan Tests

Fall 2018 Compliance Dioxin Testing
Operations Data and Results

Operating Parameter ¹	Boiler 1			Boiler 2		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
	13-Sep	13-Sep	14-Sep	13-Sep	13-Sep	14-Sep
MSW Combusted (tonnes/day)	212	212	183	211	211	199
Steam (kg/hr)	32,986	33,427	33,297	32,966	33,130	33,339
Steam temp °C	500	502	499	499	503	501
-						
Primary Air Flow (Nm ³ / min)	34,113	34,111	34,170	36,418	37,653	36,896
Overfire Air Flow (Nm ³ / min)	6,250	6,167	6,245	6,767	6,490	6,734
Tertiary Air (Fresh LN Air) (Nm ³ / min)	10,014	10,067	10,081	9,785	9,734	9,817
Tertiary air temperature °C	38.5	40.5	39.2	35.9	40.9	37.0
Lime Injection (kg/day)	173.7	174.1	219.0	194.9	176.3	176.4
Ammonia Injection Rate (liters/m)	0.4	0.4	0.4	0.5	0.6	0.5
Carbon Injection (kg/hr)	5.3	5.3	5.3	5.2	5.3	5.2
Combustion air preheat temp °C	115.0	114.9	115.0	109.9	110.0	99.6
Average Combustion Zone Temp °C	1,062	1,077	1,076	1,073	1,109	1,115
Superheater #3 Flue gas inlet Temp °C	620	630	618	602	615	606
Economizer Inlet Temp °C	345	348	345	342	345	342
Economize Outlet Temp °C	172	175	171	169	174	168
Quench Outlet Temp °C	155	155	154	153	152	152
Reactor Outlet (BH Inlet) Temp °C	143	142	142	145	144	144
Baghouse Outlet Temp °C	140	139	139	142	141	140
Tertiary Air Header Pressure mbar	60	60	60	60	60	60
Tertiary Air Left mbar	39	40	40	38	38	39
Tertiary air Right mbar	39	40	39	38	38	39
Baghouse Differential Pressure mbar	13	13	14	11	11	11
Oxygen (%) – Boiler Outlet	8.4	8.2	8.6	8.0	7.9	7.6
Oxygen (%) - Baghouse Outlet	8.9	8.6	8.2	8.6	8.0	8.2
CO -Boiler Outlet	14.6	11.7	14.9	19.5	11.8	11.4
CO - Baghouse Outlet	8.9	7.2	6.3	14.5	8.1	7.6
NOx - mg/Rm3	109.8	109.0	109.9	108.9	110.8	109.2
NH ₃ mg/Rm3	7.2	7.3	7.7	10.7	10.6	10.6
Flue gas moisture	18%	19%	18%	16%	18%	18%
Outlet/Stack Dioxin - NATO - (pg TEQ/Rm ³)	5.7	4.7	4.8	3.3	3.4	2.9

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