

## Monthly Operating Reports

November 2021

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The following November 2021 operating report was sent to the Ministry of Environment and Climate Change Strategy on January 7, 2022.

# Metro Vancouver - Waste-to-Energy Facility CONTINUOUS EMISSION MONITORING SYSTEM

November 2021

## 1. Monthly Summary Report

Parameter	Compliance Limit (mg/dscm)	Compliance Period	Maximum Measurement (mg/dscm)		
			Unit 1	Unit 2	Unit 3
CO	50	24 hr	35.9	37.0	37.2
SO <sub>2</sub>	200	24 hr	151.2	74.4	119.5
NO <sub>x</sub>	190	24 hr	137.5	141.6	132.8
THC	10	24 hr	0.22	0.32	0.81
			Monthly Average (mg/dscm)		
			Unit 1	Unit 2	Unit 3
Opacity (%)			0.56	0.51	0.19
CO			26.9	23.6	29.2
THC			0.03	0.09	0.52
SO <sub>2</sub>			90.6	42.4	58.7
NO <sub>x</sub>			130.2	127.2	129.7

Interim Discharge Limits will apply until and including the following dates, at which point the Discharge Limits and Response Limits will apply

a. HCl – March 3, 2025

b. SO<sub>2</sub> – March 3, 2025

## 2. Monthly Exceedance Report

### 2.a. Discharge Limit Exceedances

Unit	Compliance Parameter	Discharge Limit (mg/dscm)	Date	Exceedance Level
	Reason/Action Taken			

### 2.b. Response Limit Exceedances

Compliance Parameter: Carbon Monoxide

Response Limit: 100 mg/dscm 1/2 hour average

Unit No. 1

Date / Time	Duration	Exceedance (mg/dscm)	Action Taken
1-Nov 05:30	30 min	103.9	Started gas burners, adjusted airflow, modified feed rate.
2-Nov 00:30	30 min	103.3	Started gas burners, adjusted airflow, modified feed rate, checked instrumentation.
4-Nov 16:00	30 min	127.6	Started gas burners, adjusted airflow.
5-Nov 09:30	30 min	119.2	Started gas burners, adjusted airflow, modified feed rate.
5-Nov 15:30	30 min	107.7	Started gas burners, adjusted airflow, modified feed rate.
7-Nov 04:30	30 min	103.2	Started gas burners, adjusted airflow, modified feed rate, checked instrumentation.
11-Nov 06:00	30 min	281.8	Started gas burners, adjusted airflow, modified feed rate, checked instrumentation.
11-Nov 10:30	30 min	144.0	Adjusted airflow, modified feed rate.
12-Nov 15:30	30 min	126.0	Adjusted airflow, modified feed rate.
14-Nov 01:00	30 min	122.7	Started gas burners, adjusted airflow, modified feed rate.
15-Nov 09:00	30 min	177.7	Started gas burners, adjusted airflow, modified feed rate, checked instrumentation.
17-Nov 18:00	30 min	151.9	Started gas burners, adjusted airflow, modified feed rate.
25-Nov 22:30	30 min	145.7	Started gas burners, adjusted airflow, modified feed rate.
29-Nov 08:30	30 min	173.4	Started gas burners, adjusted airflow, modified feed rate.

**Compliance Parameter: Carbon Monoxide**  
**Response Limit: 100 mg/dscm 1/2 hour average**  
**Unit No. 2**

Date / Time	Duration	Exceedance (mg/dscm)	Action Taken
4-Nov 11:00	30 min	145.4	Started gas burners, adjusted airflow, modified feed rate.
9-Nov 10:30	30 min	104.6	Started gas burners, adjusted airflow.
14-Nov 05:00	30 min	132.4	Started gas burners, adjusted airflow, modified feed rate.
17-Nov 21:00	30 min	111.0	Started gas burners, adjusted airflow, modified feed rate.
18-Nov 04:00	30 min	155.0	Started gas burners, adjusted airflow, modified feed rate.
24-Nov 14:30	30 min	141.1	Started gas burners, adjusted airflow, modified feed rate.
27-Nov 05:00	30 min	224.6	Started gas burners, adjusted airflow, modified feed rate.
29-Nov 10:00	30 min	107.9	Started gas burners, adjusted airflow, modified feed rate.

**Compliance Parameter: Carbon Monoxide**  
**Response Limit: 100 mg/dscm 1/2 hour average**  
**Unit No. 3**

Date / Time	Duration	Exceedance (mg/dscm)	Action Taken
1-Nov 04:00	30 min	144.7	Started gas burners, adjusted airflow, modified feed rate.
2-Nov 23:00	30 min	266.0	Started gas burners, adjusted airflow, modified feed rate, checked instrumentation.
5-Nov 07:30	30 min	113.6	Started gas burners, adjusted airflow, modified feed rate.
8-Nov 05:00	30 min	137.7	Started gas burners, adjusted airflow, modified feed rate, checked instrumentation.
9-Nov 10:30	30 min	106.0	Started gas burners, adjusted airflow.
10-Nov 05:00	30 min	101.5	Started gas burners, adjusted airflow, modified feed rate.
13-Nov 09:00	30 min	153.2	Started gas burners, adjusted airflow, modified feed rate, checked instrumentation.
15-Nov 21:30	30 min	110.9	Started gas burners, adjusted airflow, modified feed rate.
18-Nov 18:30	30 min	153.9	Started gas burners, adjusted airflow, modified feed rate.
26-Nov 16:30	30 min	107.5	Started gas burners, adjusted airflow, modified feed rate.
29-Nov 12:30	30 min	248.3	Started gas burners, adjusted airflow, modified feed rate, checked instrumentation.
29-Nov 14:30	30 min	114.4	Started gas burners, adjusted airflow, modified feed rate.
30-Nov 00:00	30 min	103.8	Started gas burners, adjusted airflow, modified feed rate.

**Compliance Parameter: Opacity**  
**Response Limit: 5% 1/2 hour average**  
**Unit No. 3**

Date / Time	Duration	Exceedance (mg/dscm)	Action Taken
9-Nov 10:30	30 min	12.2	Instrumentation/electrical inspection.

## 2.c. Transient Conditions

### Gas burners unavailable during shutdown and furnace temperature average below 800C

Unit	Duration	Date	Time	
#1	24 minutes	16-Nov-21	17:49-18:13	
<b>Cause</b>				
Auxiliary burners on unit 1 were unavailable to maintain the secondary combustion zone temperature during boiler shutdown period.				
Unit 1 was placed in shutdown mode on 2021-11-16 at 17:49 due to high furnace pressure which tripped the forced draft fan. The Provincial Boiler Vessel Safety Act and the Provincial Gas Act require a boiler purge following the restart of the combustion fans. The auxiliary burners were unavailable for a period of 24 minutes between 2021-11-16 17:49 and 18:13.				
<b>Action Taken to Restore Steady State Conditions</b>				
The induced draft fan was restarted at 2021-11-16 17:15 and the forced draft fan was restarted at 2021-11-16 17:51. Natural gas burners were online at 2021-11-16 18:13. The shutdown was complete at 2021-11-16 18:40.				
<b>Remedial Action Planned and/or Taken</b>				
Reminder to refuse crane operators to mix the refuse well.				

### Gas burners unavailable during shutdown and furnace temperature average below 800C

Unit	Duration	Date	Time	
#3	68 minutes	26-Nov-21	14:17-15:25	
<b>Cause</b>				
Auxiliary burners on unit 3 were unavailable to maintain the secondary combustion zone temperature during boiler shutdown period.				
Unit 3 was placed in shutdown mode on 2021-11-26 at 14:17 due to high furnace pressure which tripped the forced draft fan. The Provincial Boiler Vessel Safety Act and the Provincial Gas Act require a boiler purge following the restart of the combustion fans. The auxiliary burners were unavailable for a period of 68 minutes between 2021-11-26 14:17 and 15:25.				
<b>Action Taken to Restore Steady State Conditions</b>				
The forced draft fan was restarted at 2021-11-26 15:10. Natural gas burners were online at 2021-11-26 15:25. The shutdown was complete at 2021-11-26 15:51.				
<b>Remedial Action Planned and/or Taken</b>				
Reminder to refuse crane operators to mix the refuse well.				

### Gas burners unavailable during shutdown and furnace temperature average below 800C

Unit	Duration	Date	Time	
#1	31 minutes	28-Nov-21	08:14-08:45	
<b>Cause</b>				
Auxiliary burners on unit 1 were unavailable to maintain the secondary combustion zone temperature during boiler shutdown period.				
Unit 1 was placed in shutdown mode at 2021-11-28 at 08:14 due to an induced draft fan trip. The Provincial Boiler Vessel Safety Act and the Provincial Gas Act require a boiler purge following the restart of the combustion fans. The auxiliary burners were unavailable for a period of 31 minutes between 2021-11-28 08:14 and 08:45.				
<b>Action Taken to Restore Steady State Conditions</b>				
The induced draft fan was restarted at 2021-11-28 08:19 and the forced draft fan at 2021-11-28 08:20. Natural gas burners were online at 2021-11-28 08:45. The shutdown was complete at 2021-11-28 08:50.				
<b>Remedial Action Planned and/or Taken</b>				
The cause of the induced draft fan trip is being investigated.				

### Gas burners unavailable during shutdown and furnace temperature average below 800C

Unit	Duration	Date	Time	
#1	22 minutes	30-Nov-21	18:43-19:05	
<b>Cause</b>				
Auxiliary burners on unit 1 were unavailable to maintain the secondary combustion zone temperature during boiler shutdown period.				
Unit 1 was placed in shutdown mode at 2021-11-30 at 18:43 due to a failed furnace temperature probe and forced draft fan trip. The Provincial Boiler Vessel Safety Act and the Provincial Gas Act require a boiler purge following the restart of the combustion fans. The auxiliary burners were unavailable for a period of 22 minutes between 2021-11-30 18:43 and 19:05.				
<b>Action Taken to Restore Steady State Conditions</b>				
The forced draft fan was restarted at 2021-11-30 18:50. Natural gas burners were online at 2021-11-30 19:05. The shutdown was complete at 2021-11-30 19:20.				
<b>Remedial Action Planned and/or Taken</b>				
The furnace temperature probe was replaced.				

### 3. CEMS Availability

Analyzer	Required Availability (% hours per quarter)	Averaging Period	Monthly Availability		
			Unit 1	Unit 2	Unit 3
Opacity	90	Hour	100	100	100
Oxygen	90	Hour	97	98	99
CO	90	Hour	97	98	99
SO <sub>2</sub>	90	Hour	97	98	99
NOx	90	Hour	97	98	99
THC	90	Hour	96	97	99
Stack Flow	90	Hour	96	97	100

### 4. Shutdown Report

#### Unit 1

Duration in Hours	Reason	Date
2.28	Annual major maintenance outage	November 1
0.78	BC Hydro power interruption	November 2
0.40	Induced draft fan trip	November 4
0.52	Fabric filter bag inspection/change	November 12
3.65	Poor refuse quality	November 14-15
1.20	Ash discharger plug	November 15
1.10	Ash discharger plug	November 15
0.85	High furnace pressure trip	November 16
1.33	Ash discharger plug	November 16
1.83	Ash discharger plug	November 20
0.88	Poor refuse quality	November 24
2.32	Ash discharger plug	November 26
0.60	Induced draft fan trip	November 28
0.55	Induced draft fan trip	November 29
0.17	Induced draft fan trip	November 30
0.15	Induced draft fan trip	November 30
0.62	Furnace thermocouple failed	November 30
0.30	Induced draft fan trip	November 30

## Unit 2

Duration in Hours	Reason	Date
0.23	BC Hydro power interruption	November 2
0.27	Primary Economizer inspection	November 4
30.45	Primary Economizer tube leak	November 5-6
0.57	Fabrick filter bag inspection	November 13
1.67	Poor refuse quality	November 14
4.25	Poor refuse quality	November 15
3.47	Forced draft fan trip	November 25
1.57	High furnace pressure trip	November 26

## Unit 3

Duration in Hours	Reason	Date
0.58	BC Hydro power interruption	November 2
2.00	Ash discharger plug	November 8
0.17	Fabric filter bag inspection, two bags changed	November 14
1.98	Poor refuse quality	November 14
1.33	Poor refuse quality	November 15
0.30	Ash discharger plug	November 15
0.23	High furnace pressure trip	November 26

## 5. Facility Bypass and Emergency/spill Event Report

Date/Time	Cause	Duration
	Action Taken	

## 6. Other Data

		UNIT 1	UNIT 2	UNIT 3
Waste Received	tonnes/day	22,328		
Waste Processed	tonnes/day	262	234	254
Maximum Waste Processed	tonnes/day	302	281	294
		Units 1, 2, and 3		
Natural Gas Consumed	m <sup>3</sup> /day	10,374		
	m <sup>3</sup> /month	311,213		
Fly ash disposed	tonnes	930		
Bottom ash disposed	tonnes	3,173		

## 7. Complaints and Responses

Date/Time	Complaint	Action Taken

## November 2021 - Monthly CEMS Data

Date	Boiler #1								Boiler #2								Boiler #3							
	Stack Temp	O <sub>2</sub> (%)	SO <sub>2</sub> (mg/m <sup>3</sup> )	NO <sub>x</sub> (mg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	THC (mg/m <sup>3</sup> )	Opacity (%)	Furnace Temp	Stack Temp	O <sub>2</sub> (%)	SO <sub>2</sub> (mg/m <sup>3</sup> )	NO <sub>x</sub> (mg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	THC (mg/m <sup>3</sup> )	Opacity (%)	Furnace Temp	Stack Temp	O <sub>2</sub> (%)	SO <sub>2</sub> (mg/m <sup>3</sup> )	NO <sub>x</sub> (mg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	THC (mg/m <sup>3</sup> )	Opacity (%)	Furnace Temp
11/1/21	151	8.5	86.3	127.2	25.5	0.15	0.58	892	152	8.8	43	127.2	17.3	0.05	2.20	928	157	10.8	67.9	130.2	29.2	0.81	0.27	923
11/2/21	155	8.7	98.3	127.9	30.6	0.06	0.50	884	152	9.2	45.6	126.5	21.1	0.07	1.31	925	156	10.7	78.9	128.7	31.8	0.60	0.25	933
11/3/21	154	8.8	107.3	129.4	30.3	0.05	0.46	889	155	9.7	32.8	127.6	19.7	0.04	0.75	892	159	11.1	62.6	129.3	26.5	0.77	0.22	904
11/4/21	156	9.3	103.5	131.8	33.6	0.06	0.50	888	157	10.1	42.3	128.3	22.5	0.06	0.58	879	159	11.7	71.2	132	28.5	0.79	0.15	883
11/5/21	153	8.4	98.8	131.9	28.6	0.01	1.09	904									157	11.1	73.4	131.8	34	0.79	0.21	907
11/6/21	150	8.9	115.4	129.7	26.8	0.02	0.86	908									156	10.9	119.5	131.7	31.4	0.51	0.24	917
11/7/21	151	9.4	117.3	137.5	22	0.00	0.42	893	154	9.1	67.5	141.6	17.8	0.32	0.00	917	158	10.9	117.6	132.3	26.2	0.54	0.28	915
11/8/21	154	8.9	108.7	130.4	23.7	0.01	0.42	902	154	8.9	63.8	127.9	21.2	0.27	0.07	908	158	11	109.4	130.7	31	0.54	0.28	901
11/9/21	154	9	112	130.4	27.8	0.00	0.28	916	154	9	66.4	128.3	26.1	0.07	0.34	922	156	10.3	59.1	129.4	33.2	0.50	0.44	926
11/10/21	151	9	92.9	131.7	29.6	0.00	0.27	906	152	9.2	40	129	22.8	0.04	0.51	917	156	10.9	56	132.2	37.2	0.50	0.19	912
11/11/21	153	8.9	93	132	35.9	0.03	0.27	911	152	9.1	38.2	127.8	23.2	0.06	0.38	914	157	10.6	57.2	129.5	27.2	0.33	0.20	914
11/12/21	151	7.4	78.1	125.8	30.4	0.01	0.22	918	155	9.1	33.2	126.2	23.8	0.05	0.50	915	156	10.4	42.1	128.4	29.6	0.39	0.14	914
11/13/21	153	8.4	83.7	125.8	23.6	0.00	0.21	916	156	9.7	49.7	127.9	24.1	0.05	0.38	893	158	10.8	55.7	131.8	32.8	0.52	0.18	910
11/14/21	153	9.2	151.2	130.1	29.4	0.22	0.22	906	155	10.2	74.4	127.5	21.6	0.18	0.02	872	158	10.4	111.4	129.5	29	0.47	0.13	904
11/15/21	150						0.20	887	156	10.2	30.3	128.8	20.2	0.05	0.05	866	156	10.2	49.1	132	31.8	0.47	0.12	892
11/16/21	151	9.7	66.2	129.6	20.9	0.00	0.27	876	155	10.3	51	125.4	17.4	0.06	0.44	873	155	10.7	33.3	130.3	24.5	0.53	0.17	879
11/17/21	154	9.1	81.4	130.8	28.4	0.01	0.34	898	153	9.2	50	125.8	29.6	0.09	0.76	901	154	10.5	48	132.8	30.6	0.47	0.19	913
11/18/21	154	9	72.4	131.3	25.2	0.00	0.33	906	151	9.2	25.1	124.5	34.3	0.10	0.62	888	153	10.3	71.3	128.6	30.3	0.56	0.19	916
11/19/21	153	9.2	70.1	130.8	25.8	0.00	0.33	891	154	9.9	29.8	127.3	24.4	0.05	0.49	880	157	10.8	57.9	131.8	28.9	0.62	0.14	892
11/20/21	157	9.5	76.3	133.4	23	0.00	0.31	880	155	9.5	40.2	126.8	25.4	0.07	0.52	894	157	10.8	39.6	132.6	32.2	0.43	0.14	896
11/21/21	156	9.1	81.5	130.8	23.9	0.00	0.34	905	155	9.8	33.8	126.9	26.4	0.07	0.40	878	156	10.3	45.9	130.1	28.1	0.39	0.14	913
11/22/21	155	9	69.1	129.1	21.7	0.00	0.33	917	154	9.1	36.8	128.2	21.9	0.06	0.28	917	154	10	36	129.6	27.1	0.42	0.13	919
11/23/21	154	9	73.1	129.5	22.8	0.00	0.30	927	152	9.1	45.7	126.8	23.2	0.03	0.13	923	153	9.6	39.5	128.8	22.7	0.23	0.15	935
11/24/21	156	9.2	79.5	132.3	23.1	0.00	0.39	915	154	9.6	45.7	125.2	37	0.07	0.57	908	153	10.2	38.8	129.5	32.4	0.41	0.17	905
11/25/21	155	9.4	81.7	131.1	26.3	0.01	0.60	890	149	10	27	128.9	25.4	0.09	0.14	889	154	10	33.5	127.9	31.8	0.47	0.24	895
11/26/21	158	9.3	90.7	130.8	25.4	0.02	0.91	888	148	10	45.1	126.3	28.3	0.04	0.58	866	153	10	62.8	130.3	28.4	0.49	0.19	884
11/27/21	158	8.8	98.9	130.1	25.4	0.00	1.15	903	150	9.5	38.7	125.5	30.6	0.16	0.23	884	151	9.6	57.1	128.1	28.4	0.31	0.18	903
11/28/21	156	9.1	79.8	127.1	27.6	0.03	1.39	889	149	9.6	33.7	123.3	22.7	0.04	0.19	885	150	10	33.7	126.1	25.5	0.38	0.14	895
11/29/21	153	9.4	80.3	129.6	33.2	0.03	1.58	896	145	10.2	20.4	121.6	23.5	0.09	0.25	886	147	9.9	13.3	122.3	37.2	0.45	0.08	914
11/30/21	156	9.8	78.8	127.3	28.7	0.08	1.73	895	148	10.6	20.3	121.8	15.6	0.08	0.14	869	150	11.1	14.4	124.2	15.9	0.54	0.11	897
Average	154	9.0	90.6	130.2	26.9	0.03	0.56	900	152.7	9.5	42.4	127.2	23.6	0.09	0.51	897.1	155.1	10.5	58.7	129.7	29.2	0.52	0.19	907.5
Min	150	7.4	66.2	125.8	20.9	0.00	0.20	876	145.0	8.8	20.3	121.6	15.6	0.03	0.00	866.0	147.0	9.6	13.3	122.3	15.9	0.23	0.08	879.0
Max	158	9.8	151.2	137.5	35.9	0.22	1.73	927	157.0	10.6	74.4	141.6	37.0	0.32	2.20	928.0	159.0	11.7	119.5	132.8	37.2	0.81	0.44	935.0
St Dev	2.2	0.46	18.62	2.37	3.78	0.05	0.42	12.7	2.84	0.51	13.87	3.45	4.92	0.07	0.52	20.29	2.85	0.48	26.99	2.40	4.28	0.15	0.07	13.97

Blank days have less than 18 hours of valid data due to unit shut downs or analyzer outage/maintenance.

According to standard guidelines used by Metro Vancouver Air Quality Policy and Environment Division, a minimum of 18 hours of valid data is required to generate a valid 24hr average.