

Monthly Operating Reports

April 2020

The following April 2020 operating report was sent to the Ministry of Environment and Climate Change Strategy on June 11, 2020.



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

April 2020

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 | 41.9 | 31.9 | 38.4 |
| SO ₂ | 200 | 24 hr | 146.6 | 144.8 | 153.8 |
| NOx | 190 | 24 hr | 132.3 | 131.9 | 138.0 |
| THC | 10 | 24 hr | 0.32 | 0.19 | 0.50 |
| | | | Monthly Average (mg/dscm) | | |
| | | | Unit 1 | Unit 2 | Unit 3 |
| Opacity (%) | | | 1.09 | 0.99 | 0.52 |
| CO | | | 26.4 | 24.7 | 32.3 |
| THC | | | 0.18 | 0.06 | 0.30 |
| SO ₂ | | | 72.3 | 61.8 | 77.9 |
| NOx | | | 123.3 | 129.0 | 130.8 |

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

a. HCl – December 31, 2022

b. SO₂ – December 31, 2022

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 |
|--------------|----------|----------------------|--|
| 3-Apr 22:30 | 30 min | 151.5 | Feeder hang up, started gas burners, adjusted airflow, modified feed rate, cleared hang up. |
| 4-Apr 21:00 | 30 min | 114.4 | Poor refuse quality, started gas burners, adjusted airflow, modified feed rate. |
| 9-Apr 13:30 | 30 min | 104.1 | Started gas burners, adjusted airflow, modified feed rate. |
| 10-Apr 10:30 | 30 min | 115.7 | Poor refuse quality, started gas burners, adjusted airflow, modified feed rate, checked instrumentation. |
| 15-Apr 11:30 | 30 min | 109.4 | Short duration spike, no action needed. |
| 20-Apr 03:30 | 30 min | 160.9 | Started gas burners, adjusted airflow, modified feed rate. |
| 20-Apr 16:00 | 30 min | 111.7 | Started gas burners, adjusted airflow, modified feed rate. |
| 27-Apr 15:00 | 30 min | 101.1 | Feeder hang up, started gas burners, adjusted airflow, modified feed rate, cleared hang up, checked instrumentation. |
| 30-Apr 03:30 | 30 min | 148.8 | Poor refuse quality, gas burners on, 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 |
|----------------|----------|----------------------|--|
| 2-Apr 20:30 | 30 min | 135.4 | Started gas burners, adjusted airflow, modified feed rate. |
| 3-Apr 11:30 | 30 min | 332.1 | Started gas burners, adjusted airflow, modified feed rate. |
| 10-Apr 15:00 | 30 min | 122.8 | Started gas burners, adjusted airflow, modified feed rate. |
| 13-Apr 08:00 | 30 min | 102.3 | Started gas burners, adjusted airflow. |
| 19-Apr 03:30 | 30 min | 110.0 | Started gas burners, adjusted airflow, modified feed rate. |
| April 20, 2:00 | 30 min | 141.4 | 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 |
|----------------|----------|----------------------|--|
| April 3, 10:00 | 30 min | 146.9 | Started gas burners, adjusted airflow, modified feed rate. |
| April 3, 13:30 | 30 min | 102.0 | Started gas burners, adjusted airflow, modified feed rate. |
| 9-Apr 07:30 | 30 min | 151.0 | Started gas burners, adjusted airflow, modified feed rate. |
| 9-Apr 15:30 | 30 min | 113.9 | Started gas burners, adjusted airflow, modified feed rate. |
| 19-Apr 15:00 | 30 min | 116.6 | Adjusted airflow, modified feed rate. |
| 20-Apr 02:30 | 30 min | 130.6 | Forced draft fan trip, started gas burners, adjusted airflow, modified feed rate, checked instrumentation. |
| 20-Apr 10:30 | 30 min | 104.3 | Adjusted airflow, modified feed rate. |

2.c. Transient Conditions

Gas burners unavailable during shutdown

| Unit | Duration | Date | Time | |
|--|----------------|-----------|-------------|--|
| 1 | 2 hours 50 min | 18-Apr-20 | 00:30-03:20 | |
| Cause | | | | |
| Auxiliary burners on unit 1 were unavailable, due to a safety permissive, to maintain the secondary combustion zone temperature during a boiler shutdown period as required. | | | | |
| Unit 1 was placed in shutdown mode at 2020-04-18 00:30 due to a suspected tube leak in the boiler. The operator was unable to use the natural gas burners as the water flow to the boiler could not be maintained due to the leak. The combustion of waste was completed at 2020-04-18 03:20. The auxiliary burners were unavailable for a period of 2 hours and 50 minutes between 2020-04-18 00:30 and 2020-04-18 03:20. | | | | |
| Action Taken to Restore Steady State Conditions | | | | |
| Covanta repaired the tube leak and hydrostatically tested the boiler before restarting. | | | | |
| Remedial Action Planned and/or Taken | | | | |
| None identified | | | | |

Gas burners unavailable during shutdown

| Unit | Duration | Date | Time | |
|---|--------------|-----------|-------------|--|
| 1 | 1 hour 7 min | 24-Apr-20 | 14:23-15:30 | |
| Cause | | | | |
| Auxiliary burners on unit 1 were unavailable, due to a safety permissive, to maintain the secondary combustion zone temperature during a boiler shutdown period as required. | | | | |
| Unit 1 was placed in shutdown mode at 2020-04-24 14:23 to stop a steam leak on a section of instrumentation tubing. The instrumentation tubing was isolated which indirectly resulted in the induced draft fan tripping at 2020-04-24 14:23. The boiler safety logic shut down the forced draft fan following the loss of the induced draft fan to prevent pressure build up in the boiler. The Provincial Boiler Pressure Vessel Safety Act and the Provincial Gas Act required a boiler purge following the restart of the fans as the boiler temperature was below the safety permissive. The auxiliary burners were unavailable for a period of one hour and 7 minutes between 2020-04-24 14:23 and 2020-04-24 15:30. | | | | |
| Action Taken to Restore Steady State Conditions | | | | |
| Covanta restarted the induced draft fan at 2020-04-24 15:09 and the forced draft fan at 2020-04-24 15:12. The natural gas burners were back online at 2020-04-24 15:30. The shutdown was completed at 2020-04-24 15:41. | | | | |
| Remedial Action Planned and/or Taken | | | | |
| None identified. | | | | |

Gas burners unavailable and unable to close feed chute damper during shutdown

| Unit | Duration | Date | Time | |
|---|------------|-----------|------------|--|
| 2 | 20 minutes | 27-Apr-20 | 04:27-4:47 | |
| Cause | | | | |
| Auxiliary burners on unit 2 were unavailable, due to a safety permissive, to maintain the secondary combustion zone temperature during a boiler shutdown period as required. The operator was unable to close the feed chute damper during the shutdown as required. | | | | |
| Unit 2 was placed in shutdown mode at 2020-04-27 04:27 following a high furnace pressure which tripped the induced draft fan and forced draft fan. The operator was unable to close the feed chute damper as the refuse was above the damper in the feed chute. The Provincial Boiler Pressure Vessel Safety Act and the Provincial Gas Act required a boiler purge following the restart of the fans as the boiler temperature was below the safety permissive. The auxiliary burners were unavailable for a period of 20 minutes between 2020-04-27 04:27 and 2020-04-27 04:47. | | | | |
| Action Taken to Restore Steady State Conditions | | | | |
| Covanta started the induced draft fan at 2020-04-27 04:31 and the forced draft fan at 2020-04-27 04:32. The shutdown was completed at 2020-04-27 05:03. | | | | |
| Remedial Action Planned and/or Taken | | | | |
| None identified. | | | | |

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 | 98 | 99 | 99 |
| CO | 90 | Hour | 98 | 99 | 99 |
| SO ₂ | 90 | Hour | 98 | 99 | 99 |
| NOx | 90 | Hour | 98 | 99 | 99 |
| THC | 90 | Hour | 98 | 99 | 99 |
| Stack Flow | 90 | Hour | 98 | 99 | 99 |

4. Shutdown Report

Unit 1

| Duration in Hours | Reason | Date |
|-------------------|-----------------------------------|-------------|
| 59.88 | Minor shutdown | April 6 - 8 |
| 0.55 | Underfire air compartment plugged | April 12 |
| 2.22 | Water jet sootblower blocked | April 15 |
| 0.52 | High furnace pressure trip | April 16 |
| 32.48 | Primary economizer tube leak | April 18-19 |
| 0.43 | Induced draft fan trip | April 20 |
| 30.28 | Grate bar replacement | April 22-24 |
| 1.30 | Steam drum level sensor failure | April 24 |
| 0.15 | BC Hydro power interruption | April 25 |
| 2.38 | Oxygen sensor probe failure | April 25-26 |

Unit 2

| Duration in Hours | Reason | Date |
|-------------------|-----------------------------|----------|
| 0.57 | Low steam drum level trip | April 8 |
| 0.60 | Ash discharger plug | April 10 |
| 0.92 | Poor refuse quality | April 12 |
| 0.23 | Forced draft fan trip | April 13 |
| 0.42 | BC Hydro power interruption | April 25 |
| 0.55 | High furnace pressure trip | April 27 |

Unit 3

| Duration in Hours | Reason | Date |
|-------------------|-----------------------------|-------------|
| 0.08 | Forced draft fan trip | April 2 |
| 46.25 | Boiler cleaning | April 14-15 |
| 2.12 | Sifting hopper inspection | April 17 |
| 1.45 | Sifting hopper inspection | April 18 |
| 0.43 | BC Hydro power interruption | April 25 |
| 0.27 | Induced draft fan trip | April 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 | 19,607 | | |
| Waste Processed | tonnes/day | 203 | 242 | 219 |
| Maximum Waste Processed | tonnes/day | 261 | 257 | 258 |
| | | Units 1, 2, and 3 | | |
| Natural Gas Consumed | m ³ /day | 5,479 | | |
| | m ³ /month | 164,357 | | |
| Fly ash disposed | tonnes | 478 | | |
| Bottom ash disposed | tonnes | 3,970 | | |

7. Complaints and Responses

| Date/Time | Complaint | Action Taken |
|-----------|-----------|--------------|
| | | |

April 2020 - Monthly CEMS Data

| Date | Boiler #1 | | | | | | | | Boiler #2 | | | | | | | | Boiler #3 | | | | | | | |
|---------|------------|--------------------|--------------------------------------|--------------------------------------|-------------------------|--------------------------|-------------|--------------|------------|--------------------|--------------------------------------|--------------------------------------|-------------------------|--------------------------|-------------|--------------|------------|--------------------|--------------------------------------|--------------------------------------|-------------------------|--------------------------|-------------|--------------|
| | Stack Temp | O ₂ (%) | SO ₂ (mg/m ³) | NO _x (mg/m ³) | CO (mg/m ³) | THC (mg/m ³) | Opacity (%) | Furnace Temp | Stack Temp | O ₂ (%) | SO ₂ (mg/m ³) | NO _x (mg/m ³) | CO (mg/m ³) | THC (mg/m ³) | Opacity (%) | Furnace Temp | Stack Temp | O ₂ (%) | SO ₂ (mg/m ³) | NO _x (mg/m ³) | CO (mg/m ³) | THC (mg/m ³) | Opacity (%) | Furnace Temp |
| 4/1/20 | 153 | 10.1 | 4.3 | 120.4 | 27 | 0.29 | 0.96 | 945 | 154 | 8.7 | 20.5 | 130.3 | 19.2 | 0.06 | 1.08 | 972 | 152 | 10 | 18 | 130.8 | 30.9 | 0.45 | 1.67 | 920 |
| 4/2/20 | 153 | 10.4 | 6 | 115.8 | 23.9 | 0.18 | 0.95 | 947 | 153 | 9 | 22.5 | 129.3 | 24.3 | 0.07 | 0.07 | 969 | 150 | 10.2 | 17.2 | 129.9 | 29.8 | 0.32 | 2.04 | 922 |
| 4/3/20 | 155 | 10.2 | 5.8 | 115.3 | 27.8 | 0.12 | 0.90 | 934 | 153 | 9.4 | 24.5 | 130.6 | 28.7 | 0.19 | 0.43 | 960 | 149 | 10.2 | 20.1 | 129.2 | 32.7 | 0.23 | 1.13 | 924 |
| 4/4/20 | 154 | 9.9 | 9.5 | 109.6 | 29.8 | 0.18 | 0.89 | 952 | 156 | 9.2 | 31.9 | 130.4 | 22.6 | 0.04 | 0.94 | 961 | 152 | 9.7 | 20.2 | 128 | 24 | 0.24 | 0.26 | 936 |
| 4/5/20 | 153 | 10.2 | 11.6 | 112.8 | 29.5 | 0.24 | 0.87 | 948 | 156 | 9.4 | 31.9 | 131.5 | 23.6 | 0.11 | 1.21 | 950 | 154 | 9.7 | 23.1 | 130.5 | 26.8 | 0.36 | 0.28 | 935 |
| 4/6/20 | | | | | | | | | 156 | 9.2 | 65.2 | 129.3 | 23.3 | 0.06 | 1.37 | 940 | 152 | 9.6 | 49 | 127.9 | 26 | 0.33 | 0.33 | 918 |
| 4/7/20 | | | | | | | | | 157 | 9.2 | 144.8 | 126.6 | 29.1 | 0.18 | 1.03 | 934 | 153 | 10.2 | 91.3 | 129.1 | 34.2 | 0.34 | 0.33 | 909 |
| 4/8/20 | | | | | | | | | 154 | 8.9 | 88.1 | 130.2 | 23 | 0.07 | 1.02 | 961 | 149 | 10.2 | 66.8 | 127.5 | 35.6 | 0.31 | 0.39 | 914 |
| 4/9/20 | 153 | 9.4 | 111.9 | 129.1 | 30.2 | 0.17 | 0.96 | 914 | 155 | 8.8 | 61.1 | 129.6 | 19.6 | 0.06 | 0.69 | 964 | 146 | 9.7 | 49.4 | 128.9 | 37.1 | 0.39 | 0.40 | 912 |
| 4/10/20 | 157 | 10.3 | 125.9 | 132.3 | 37 | 0.13 | 0.94 | 903 | 155 | 9.3 | 66 | 131.9 | 25.7 | 0.07 | 0.40 | 938 | 149 | 10.1 | 52.8 | 130.3 | 31.2 | 0.30 | 0.37 | 913 |
| 4/11/20 | 155 | 9.6 | 146.6 | 126 | 24.3 | 0.13 | 0.92 | 953 | 155 | 9.1 | 100.6 | 129.4 | 22.4 | 0.07 | 0.39 | 957 | 151 | 10.1 | 93.1 | 129.6 | 28.2 | 0.24 | 0.35 | 933 |
| 4/12/20 | 154 | 10.4 | 144 | 130 | 20.7 | 0.16 | 1.00 | 926 | 156 | 9.4 | 102.2 | 131.4 | 22.9 | 0.09 | 0.93 | 952 | 151 | 10.7 | 96 | 128.9 | 28.8 | 0.33 | 0.40 | 901 |
| 4/13/20 | 156 | 10.2 | 92.7 | 127.9 | 21.9 | 0.11 | 1.05 | 927 | 155 | 9.5 | 59.2 | 128.9 | 27 | 0.07 | 0.95 | 921 | 148 | 10.5 | 66.8 | 128.1 | 31.2 | 0.36 | 0.43 | 898 |
| 4/14/20 | 153 | 10.1 | 93.5 | 127.7 | 19.9 | 0.14 | 1.11 | 939 | 156 | 9.6 | 85 | 128.5 | 23.2 | 0.01 | 0.60 | 938 | | | | | | | | 0 |
| 4/15/20 | 153 | 10.3 | 120.3 | 128.3 | 26.6 | 0.18 | 1.16 | 935 | 156 | 9.4 | 86.3 | 128.1 | 23.5 | 0.03 | 0.55 | 963 | | | | | | | | 0 |
| 4/16/20 | 152 | 10 | 130.3 | 126.1 | 21 | 0.14 | 1.24 | 936 | 156 | 9.2 | 105.5 | 128.5 | 24.3 | 0.04 | 0.91 | 960 | 149 | 9.5 | 153.8 | 132.6 | 35 | 0.30 | 0.43 | 895 |
| 4/17/20 | 157 | 10.1 | 80.8 | 127.6 | 26.6 | 0.32 | 1.41 | 932 | 156 | 9.5 | 61.9 | 129.3 | 21.8 | 0.05 | 1.30 | 949 | 150 | 9.5 | 129.5 | 138 | 38.2 | 0.50 | 0.47 | 912 |
| 4/18/20 | | | | | | | | | 156 | 9.2 | 67.6 | 128.1 | 25.1 | 0.03 | 1.07 | 959 | 148 | 9.6 | 123.8 | 132.8 | 30.5 | 0.41 | 0.44 | 898 |
| 4/19/20 | | | | | | | | | 156 | 9.2 | 83.9 | 129.5 | 31.9 | 0.09 | 1.23 | 949 | 148 | 9 | 133.5 | 130.7 | 34.2 | 0.25 | 0.42 | 913 |
| 4/20/20 | 153 | 9.7 | 127.5 | 122 | 41.9 | 0.30 | 1.32 | 927 | 155 | 9.5 | 92.7 | 128.5 | 27.2 | 0.11 | 1.45 | 948 | 150 | 9.2 | 130.8 | 129.5 | 38.4 | 0.43 | 0.40 | 911 |
| 4/21/20 | 154 | 10 | 77.1 | 126.8 | 28.6 | 0.23 | 1.14 | 941 | 154 | 9.5 | 42.2 | 126.7 | 22.7 | 0.03 | 1.23 | 953 | 150 | 9.5 | 108.2 | 132 | 35.3 | 0.24 | 0.41 | 927 |
| 4/22/20 | 155 | | | | | | 1.16 | 945 | 155 | 9.8 | 25.8 | 125.8 | 25 | 0.05 | 1.54 | 935 | 152 | 9.2 | 82.4 | 131.9 | 33.5 | 0.24 | 0.42 | 912 |
| 4/23/20 | | | | | | | | | 151 | 9.1 | 40.1 | 127.4 | 29.9 | 0.03 | 0.97 | 965 | 154 | 9.7 | 96.1 | 129.3 | 35.4 | 0.25 | 0.37 | 908 |
| 4/24/20 | 152 | 9.4 | 67.2 | 123.1 | 26.6 | 0.19 | 1.13 | 934 | 151 | 9 | 44.7 | 127.9 | 23.8 | 0.04 | 0.77 | 942 | 152 | 9 | 96.3 | 130.7 | 32.5 | 0.30 | 0.39 | 911 |
| 4/25/20 | 151 | 9.3 | 57.6 | 115.5 | 22.2 | 0.17 | 1.15 | 944 | 151 | 9.1 | 46 | 128.7 | 24.7 | 0.01 | 0.78 | 957 | 152 | 9.8 | 98.9 | 131 | 33.5 | 0.23 | 0.39 | 905 |
| 4/26/20 | 154 | 9.8 | 60.6 | 119 | 22.1 | 0.12 | 1.18 | 947 | 157 | 8.8 | 58.3 | 128.1 | 22.8 | 0.01 | 1.40 | 960 | 154 | 9.4 | 91.9 | 131.5 | 34.9 | 0.24 | 0.38 | 899 |
| 4/27/20 | 157 | 10.1 | 42.7 | 123.9 | 26.1 | 0.13 | 1.18 | 927 | 158 | 9.1 | 47 | 129.9 | 30.3 | 0.04 | 1.39 | 945 | 155 | 10 | 60.7 | 132.8 | 36.5 | 0.22 | 0.37 | 901 |
| 4/28/20 | 154 | 10 | 55.8 | 126 | 19.1 | 0.11 | 1.19 | 939 | 155 | 9.6 | 47.9 | 128 | 24.8 | 0.02 | 1.25 | 946 | 152 | 9.7 | 73.9 | 135.3 | 28.5 | 0.19 | 0.38 | 907 |
| 4/29/20 | 155 | 9.7 | 46.8 | 122.8 | 24.8 | 0.14 | 1.20 | 943 | 156 | 9.4 | 50.9 | 129 | 26.3 | 0.05 | 1.46 | 972 | 152 | 9.9 | 69.4 | 132.3 | 28.8 | 0.15 | 0.41 | 900 |
| 4/30/20 | 154 | 9.7 | 44.8 | 128 | 30.7 | 0.19 | 1.17 | 942 | 155 | 9.6 | 48.4 | 128.7 | 21.1 | 0.03 | 1.16 | 961 | 152 | 9.8 | 66.8 | 132 | 31.8 | 0.20 | 0.42 | 906 |
| Average | 154.0 | 10.0 | 72.3 | 123.3 | 26.4 | 0.18 | 1.09 | 936.7 | 155.0 | 9.3 | 61.8 | 129.0 | 24.7 | 0.06 | 0.99 | 952.7 | 150.9 | 9.8 | 77.9 | 130.8 | 32.3 | 0.30 | 0.52 | 851.3 |
| Min | 151.0 | 9.3 | 4.3 | 109.6 | 19.1 | 0.11 | 0.87 | 903.0 | 151.0 | 8.7 | 20.5 | 125.8 | 19.2 | 0.01 | 0.07 | 921.0 | 146.0 | 9.0 | 17.2 | 127.5 | 24.0 | 0.15 | 0.26 | 0.0 |
| Max | 157.0 | 10.4 | 146.6 | 132.3 | 41.9 | 0.32 | 1.41 | 953.0 | 158.0 | 9.8 | 144.8 | 131.9 | 31.9 | 0.19 | 1.54 | 972.0 | 155.0 | 10.7 | 153.8 | 138.0 | 38.4 | 0.50 | 2.04 | 936.0 |
| St Dev | 1.60 | 0.32 | 47.09 | 6.06 | 5.40 | 0.06 | 0.14 | 11.82 | 1.73 | 0.27 | 29.43 | 1.43 | 3.05 | 0.04 | 0.37 | 12.28 | 2.18 | 0.42 | 38.19 | 2.31 | 3.73 | 0.08 | 0.41 | 231.68 |

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

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.