



# Alexandria Arlington Resource Recovery Facility

Fiscal Year 2020

Annual Operations Report



August 2020

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## Definition of Abbreviations & Acronyms

| <u>Abbreviation/Acronym</u> | <u>Definition</u>                             |
|-----------------------------|---|
| APC                         | Air Pollution Control                         |
| Apr                         | April   |
| Aug                         | August  |
| Avg                         | Average                                       |
| Btu                         | British thermal unit                          |
| CAAI                        | Covanta Alexandria Arlington, Inc.            |
| CEMS                        | Continuous Emissions Monitoring System        |
| CO                          | Carbon Monoxide                               |
| Dec                         | December                                      |
| ECOM                        | Emergency Communications                      |
| Feb                         | February                                      |
| FMG                         | Facility Monitoring Group                     |
| FY                          | Fiscal Year                                   |
| gal                         | Gallon  |
| GAT                         | Guaranteed Annual Tonnage                     |
| HCI                         | Hydrochloric (Hydrogen Chlorides)             |
| HDR                         | HDR Engineering Inc                           |
| HHV                         | Estimated Waste Heating Value (Btu/lb)        |
| ID                          | Induced Draft                                 |
| Jan                         | January                                       |
| Jul                         | July  |
| Jun                         | June  |
| klbs                        | Kilo-pounds (1,000 lbs)                       |
| kWhr                        | Kilowatt hours (1,000 watt-hours)             |
| lbs                         | Pounds  |
| LOA                         | Letter of Agreement                           |
| Mar                         | March   |
| Max                         | Maximum                                       |
| May                         | May   |
| Min                         | Minimum                                       |
| MSW                         | Municipal Solid Waste                         |
| MWhr                        | Megawatt hours                                |
| No                          | Number  |
| NOV                         | Notice of Violation                           |
| Nov                         | November                                      |
| NO <sub>x</sub>             | Nitrogen Oxide                                |
| Oct                         | October                                       |
| OSHA                        | Occupational Safety and Health Administration |
| PDS                         | Potomac Disposal Services                     |
| ppm                         | Parts per million                             |
| ppmdv                       | Parts per million dry volume                  |
| PSD                         | Prevention of Significant Deterioration       |
| Q1                          | First Quarter                                 |
| Q2                          | Second Quarter                                |
| Third                       | Third Quarter                                 |
| Q4                          | Fourth Quarter                                |
| RE                          | Reportable Exempt                             |
| RNE                         | Reportable Non-Exempt                         |
| SDA                         | Spray Dryer Absorber                          |
| Sep                         | September                                     |
| SO <sub>2</sub>             | Sulfur Dioxide                                |
| TCLP                        | Toxicity Characteristic Leaching Procedure    |
| VADEQ                       | Virginia Department of Environmental Quality  |
| WL                          | Warning Letter                                |
| yr                          | Year  |
| YTD                         | Year to date                                  |

# Alexandria/Arlington Waste-to-Energy Facility Annual Operations Report – Fiscal Year 2020

## 1.0 Purpose of Report

HDR Engineering, Inc. (HDR) was authorized by the Facility Monitoring Group (FMG) to conduct quarterly inspections and provide quarterly reports regarding the operation and maintenance of the Covanta Alexandria/Arlington Waste-to-Energy Facility (Facility) for the 2020 Fiscal Year. This report is prepared for the fourth quarter of the 2020 fiscal year and summarizes Facility operations between April 1, 2020 and June 30, 2020, as well as the entire fiscal year. This report identifies the fiscal year beginning on July 1, 2019 as FY20 and the quarter beginning on April 1, 2020 as Q4FY20.

This report is based upon HDR's experience in the waste-to-energy industry, upon site observation visits and previous reports provided by HDR, and upon data provided by Covanta Alexandria/Arlington, Inc. (CAAI), the Facility owner and operator.

## 2.0 Executive Summary

CAAI operated the Facility in an acceptable manner and in accordance with established waste-to-energy industry practices during Q4FY20. The operation of the Facility, maintenance, safety, and overall cleanliness continue to be above average. Environmental performance was excellent with no reportable environmental excursions experienced during the quarter.

During Q4FY20, the boilers experienced four (4) instances of unscheduled downtime totaling 29.3 hours, and the turbine generators experienced one (1) instance of unscheduled downtime totaling 6.8 hours. Boiler No. 1 experienced 22.4 hours of downtime for a scheduled cleaning outage. The entire Facility

experienced downtime for a scheduled “cold iron<sup>1</sup>” outage totaling 80.5 hours of boiler downtime and 52.6 hours of turbine generator downtime. The entire Facility experienced no standby time during Q4FY20. A detailed listing of downtime is provided in Section 5.2 of this report.

Average waste processed during the quarter was 1,025.9 tons per day, or 105.2% of nominal facility capacity. Waste deliveries averaged 1,046.8 tons per day, which is higher (2.0%) than the burn rate.

For FY20, average waste processed was 956.7 tons per day, or 98.1% of nominal facility capacity of 975 tons per day. Waste deliveries averaged 961.1 tons per day, which is 0.5% more than the annual burn rate. The annual capacity utilization of 98.1% compares very favorably to industry averages.

Performance trends for various measurements are presented in Section 4. In general, the Facility continues to demonstrate reasonable consistency in month to month performance throughout the most recent three-year period tracked for detailed comparisons.

During the quarter, MSW processed was slightly higher (0.2%) compared to the corresponding quarter in FY19; steam production increased (0.8%), and electricity generated (gross) increased (1.7%) from the corresponding quarter in FY19. The increase in steam generation is attributable to the increase (0.9%) in waste heating value, paired with less boiler downtime (18.8 fewer hours). The increase in electricity generated (gross) in Q4FY20, is partly due to higher steam production, offset by more turbine generator downtime (44.2 additional hours).

During FY20, MSW processed slightly increased (less than 0.1%) from FY19; steam production increased 1.1%, and electricity generated (gross) increased 0.5% compared to FY19. The increase in annual steam generation is attributable to the increase (1.0%) in annual calculated average waste heating value, paired

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<sup>1</sup> “Cold iron” is industry vernacular for shutting down and depressurizing all of the steam systems and connected equipment in order to safely make repairs or replacements that cannot otherwise be isolate.

with an additional day of operations in February 2020 due to a Leap Year, offset by more (253.9 additional hours) scheduled, unscheduled, and standby downtime experienced by the boilers. Annual electrical generation increased in FY20 compared to FY19 due to higher annual steam production, paired with an additional day of operations in February 2020 due to a Leap Year, offset by more (370.4 additional hours) scheduled, unscheduled, and standby downtime experienced by the turbine generators.

### **3.0 Facility Inspection and Records Review**

A site visit was not conducted in May 2020 as a result of the Coronavirus Pandemic being experienced in the United States and world-wide. Therefore, HDR was unable to meet with the Facility management and other plant personnel to discuss Facility operations and maintenance, perform an independent visual inspection of the operating Facility, and photograph areas of interest. HDR obtained operating data and monthly reports electronically from CAAI throughout the quarter. HDR maintains a running tabulation of the status of corrective actions and plant performance trends. CAAI provides the following documents for each month:

- Facility Monthly Operating Reports
- Monthly Continuous Emissions Monitoring System (CEMS) Reports

Table 1 summarizes maintenance, repair, and plant condition issues reported during this and prior reporting periods. An “A” indicates an issue of the highest priority and worthy of immediate attention. Such items are usually safety or operability issues. A “B” indicates that the issue needs to be dealt with as quickly as possible, but is not urgent. These items will usually result in a process improvement or will help avoid future “urgent” issues. A “C” indicates that the issue should be dealt with in due course, but is not a priority issue. This category might include issues related to aesthetics, non-urgent maintenance, or housekeeping improvements which are not safety related.

Note that HDR inspections are generally performed while equipment is operating, and are not intended to address the internal condition, performance or life expectancy of mechanical, electrical and electronic equipment and structures. HDR inspections are only performed quarterly, generally representing findings on the day of the inspection. CAAI is responsible, without limitation, for operations, maintenance, environmental performance and safety and should not rely on HDR observations or inspection reports which are overviews of Facility external conditions only.

**Table 1: Summary of Inspection Report Deficiencies**

\*A is highest priority & demands immediate attention; B needs attention, but is not urgent; C can be addressed at earliest opportunity & is not urgent.

| Item No. | Inspection Report Deficiencies   | Issue Reported | Priority* | HDR Recommendation   | Status   | Open / Closed |
|----------|--|----------------|-----------|--|--|---------------|
| 1        | Pot hole, southeast corner of Ash Trailer Canopy                         | August 2015    | C         | Repair road surface  | <b>Status Unchanged</b>  | Open          |
| 2        | Pavement spider-cracking at Tipping Floor Entrance                       | November 2016  | C         | Resurface section of pavement at Tipping Floor Entrance                        | <b>Status Unchanged</b>  | Open          |
| 3        | SDA Penthouse No. 3 Door deteriorated at base                            | November 2017  | C         | Patch and Paint Door – Replace if necessary                                    | <b>Status Unchanged</b>  | Open          |
| 4        | Roof Ventilation Fan Not Working above Deaerator                         | May 2019       | C         | Repair roof ventilation fan  | <b>CAAI reports that this item is complete pending verification.</b> | Open          |
| 5        | Diamond Plate Deck Corroded at Boiler No. 3 Opacity Monitor              | May 2019       | C         | Sand, Prime, Paint, and Preserve   | <b>CAAI reports that this item is complete pending verification.</b> | Open          |
| 6        | Deterioration behind lime slurry piping in SDA Penthouse No. 2           | August 2019    | C         | Replace kick-plate and conduct painting preservation measures                  | <b>Status Unchanged</b>  | Open          |
| 7        | Siding deteriorated beneath Baghouse No. 3 Hoppers                       | August 2019    | C         | Replace siding   | <b>CAAI reports that this item is complete pending verification.</b> | Open          |
| 8        | Siding on north side of Baghouse No. 2 Deteriorated                      | February 2020  | C         | Replace siding and conduct painting preservation measures                      | <b>Status Unchanged</b>  | Open          |
| 9        | Two-way Traffic Sign uprooted on Facility Entrance Road                  | February 2020  | A         | Re-install/secure uprooted traffic sign  | <b>CAAI reports that this item is complete pending verification.</b> | Open          |
| 10       | Light Fixtures (typical of 2) out at Penthouse Elevation of Boiler House | February 2020  | C         | Replace/Repair light fixtures  | <b>CAAI reports that this item is complete pending verification.</b> | Open          |
| 11       | Warning signs on Tipping Floor Columns missing/faded                     | February 2020  | A         | Replace missing signs and pressure wash existing signs for improved visibility | <b>CAAI reports that this item is complete pending verification.</b> | Open          |
| 12       | Light fixtures (typical of 2) out, north end of Tipping Floor Enclosure  | February 2020  | C         | Replace/Repair light fixtures  | <b>CAAI reports that this item is complete pending verification.</b> | Open          |
| 13       | Siding on east side of Tipping Floor Enclosure corroded                  | February 2020  | C         | Patch siding and conduct painting preservation measures                        | <b>Status Unchanged</b>  | Open          |

## 4.0 Facility Performance

Monthly operating data provided by CAAI indicates that 93,360 tons of MSW were processed during Q4FY20, and a total of 95,261 tons of MSW including 2,129 tons of Special Handling Waste (2.2% by weight) were received. Total ash production during the quarter was 19,859 tons, which represents 21.3% of the waste processed by weight. The average uncorrected steam production rate for Q4FY20 was 2.87 tons<sub>steam</sub>/ton<sub>waste</sub>, which is higher (0.6%) than the corresponding quarter in FY19. The increase in this metric is attributable to the 0.8% increase in the quarterly average waste heating value (HHV) calculated by CAAI.

On an annual basis, 350,147 tons of MSW were processed during FY20, and a total of 351,757 tons of MSW and 13,226 tons of Special Handling Waste (3.8% by weight) were received. Total ash production during FY20 was 70,964 tons, which represents 20.3% of the waste processed. The average uncorrected steam production rate for FY20 was 2.96 tons<sub>steam</sub>/ton<sub>waste</sub>, and higher (1.1%) than the prior fiscal year. The increase in this metric is attributable to the increase (1.0%) in the calculated average waste heating value when comparing FY20 to FY19.

**Chart 1: Tons of Waste Processed**

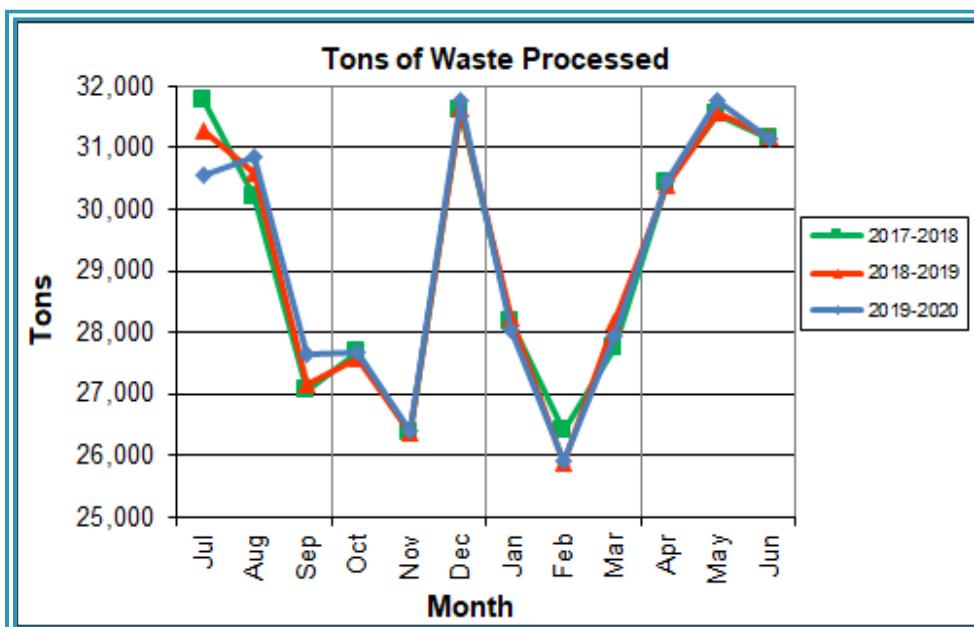


Chart 1 illustrates that Q4FY20 waste processed was slightly higher (0.2%) than the corresponding quarter, Q4FY19. The slight increase is attributable to less (18.8 fewer hours) downtime experienced by the boilers.

CAAI reported that 416 tipping floor/MSW internal inspections were conducted during the quarter and three (3) notices of violation (NOVs) were issued to haulers for the following issues:

- April 2020 – one (1) NOV was issued for a load of metal dumped and left on the Tipping Floor
- June 2020 – two (2) NOVs were issued for drivers blocking the intersection to the Tipping Floor

**Chart 2: Tons of Ash Produced per Ton of Waste Processed**

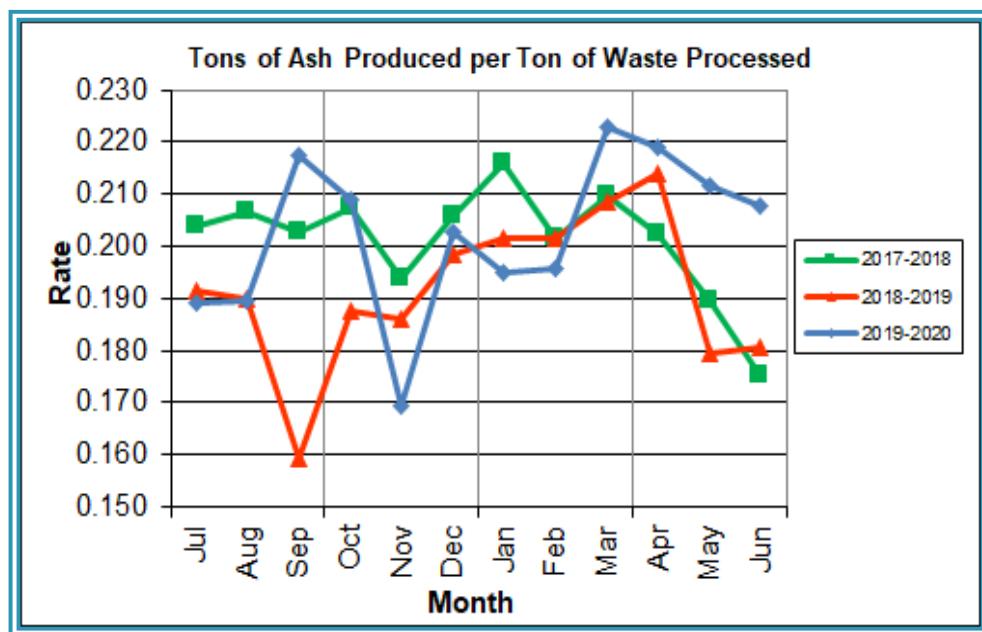


Chart 2 illustrates that the average ash production rate in Q4FY20 was higher (2.2%) at 21.3% of processed waste, compared to the corresponding quarter in FY19 when the rate was 19.1%. CAAI reported in Q4FY19 that it began processing the recovered metals through a trommel screen to remove some of the residual ash, which continued through the end of FY20. During Q3FY20, CAAI indicated that it began adding the quantified ash that was removed with the trommel back into the monthly ash totals, which correlates to the elevated ash production rates beginning in March 2020 through the end of the fiscal year.

The annual ash production rate for FY20 was higher (1.1%) at 20.3% of processed waste, compared to FY19 when the rate was 19.2%.

**Chart 3: Ferrous Recovery Rate**

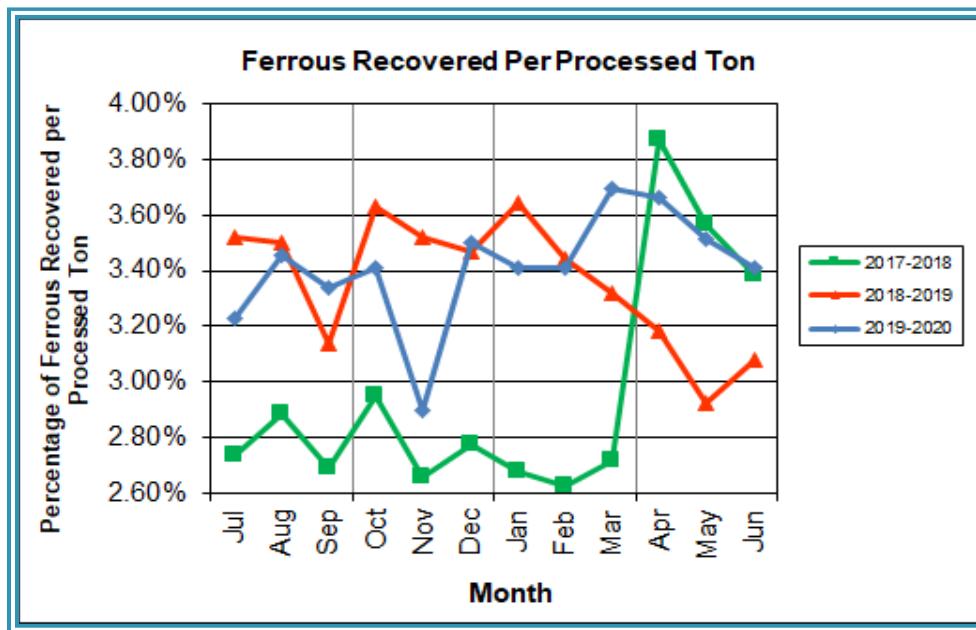
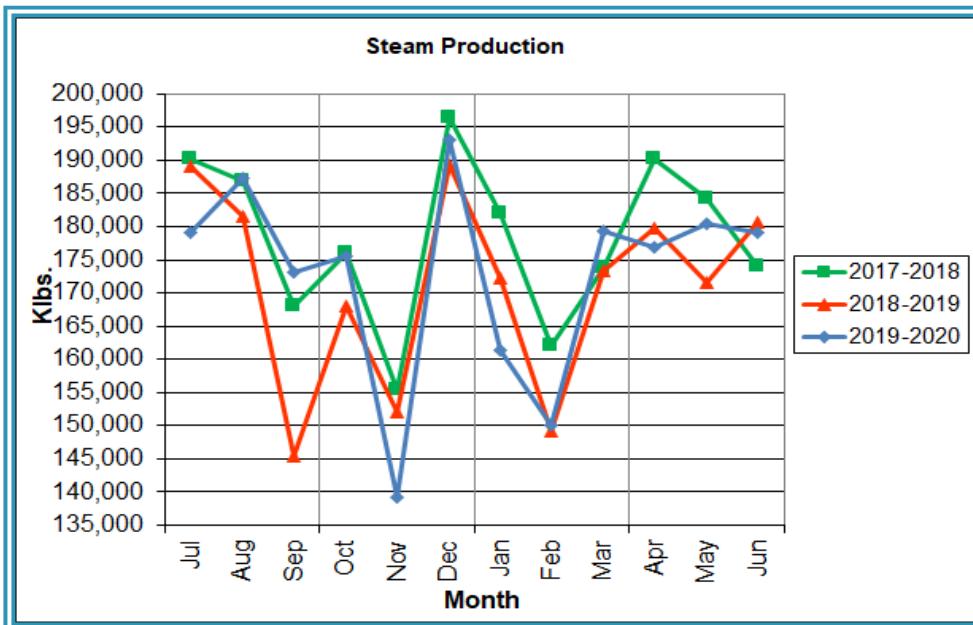


Chart 3 depicts the monthly ferrous metal recovery rate as a percentage of processed MSW tonnage. In Q4FY20, 3,295 tons of ferrous metals were recovered, which is 15.6% higher than the corresponding quarter in FY19 and equivalent to 3.5% of processed waste.

In FY20, 11,966 tons of ferrous metals were recovered, which is 1.8% higher than FY19 and equivalent to 3.4% of processed waste.

**Chart 4: Steam Production**



In Chart 4, the total steam production for Q4FY20 was 536,395 klbs, and higher (0.8%) than the corresponding quarter in FY19. The increase in steam generation is attributable to the increase (0.9%) in waste heating value, paired with less boiler downtime (18.8 fewer hours).

Annual steam production for FY20 was 2,074,819 klbs. which is 1.1% higher than FY19 when 2,052,153 klbs. were produced. The increase in annual steam generation is attributable to the increase (1.0%) in annual calculated average waste heating value, paired with an additional day of operations in February 2020 due to a Leap Year, offset by more (253.9 additional hours) scheduled, unscheduled, and standby downtime experienced by the boilers.

**Chart 5: 12-Month Rolling Steam Production**

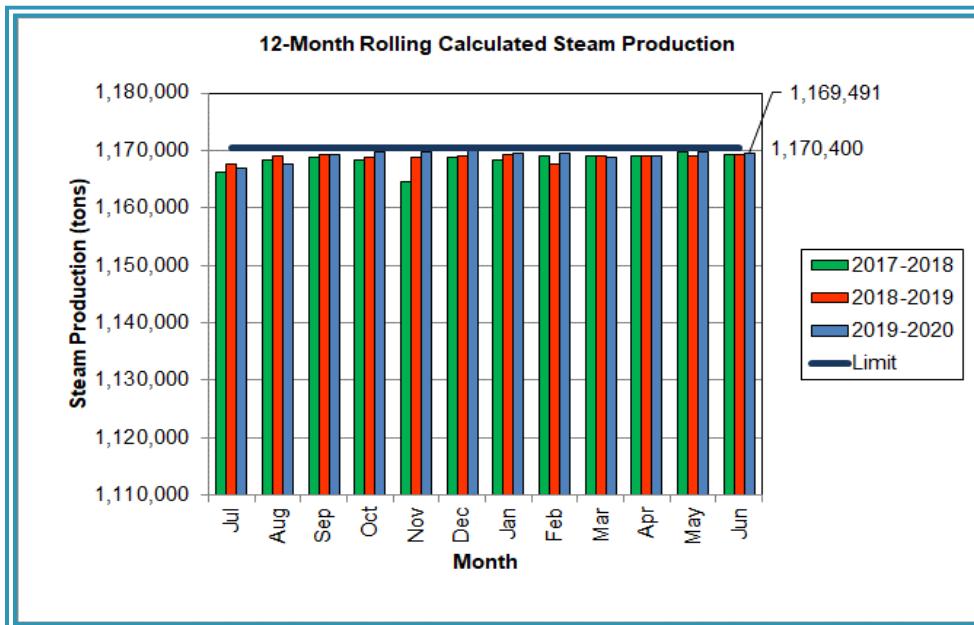
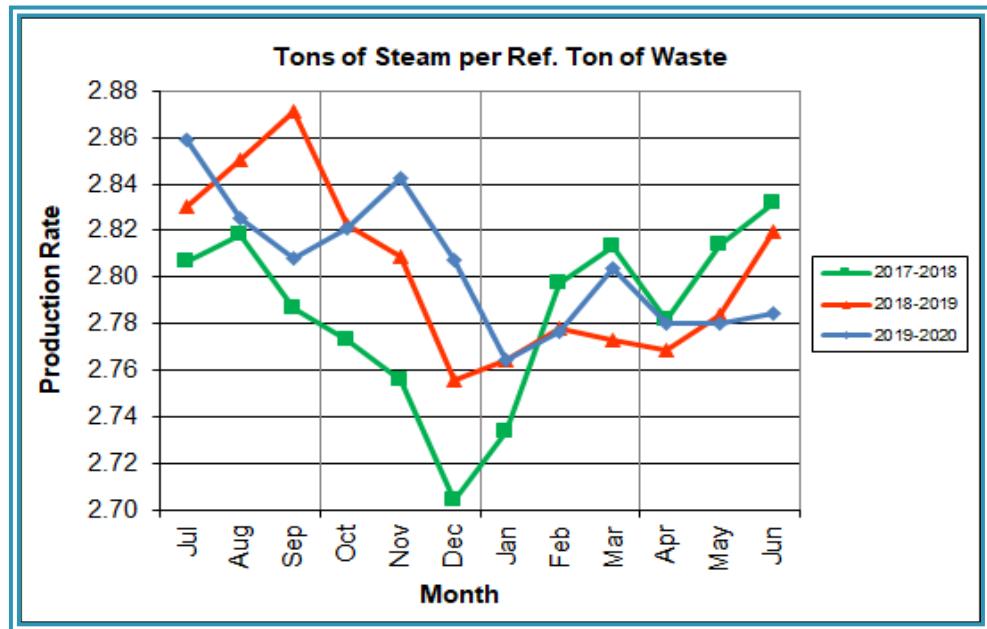


Chart 5 depicts the 12-month rolling steam production total for the quarter ending in June 2020, and for the prior two (2) fiscal years. According to the Title V permit, the annual steam production for the Facility shall not exceed 1,170,400 tons on the basis of an average value of 3.34 lbs. of steam per lb. of MSW processed, calculated monthly as the sum of each consecutive 12-month period. The Facility was in compliance with the 12-month rolling steam production total every month in Q4FY20. The 12-month rolling total for steam production ending in June 2020 was 1,169,491 tons which is 99.9% of the limit. Chart 5 shows that Facility throughput, and in turn, steam and electricity production are being throttled to stay ever so slightly below the steam production limit nearly every month.

**Chart 6: Steam Production Rate**



In Chart 6, the conversion of raw waste tonnages into “reference tons” is another way of analyzing steam production and helps to determine whether changes are related to boiler performance or to fuel issues. “Reference tons” are adjusted to account for the calculated average fuel heating value, so that lower Btu fuel raw tonnages are adjusted upwards and vice versa. In Q4FY20, this metric tracked lower (0.3%) at 2.78 tons<sub>steam</sub>/ton<sub>ref</sub> compared to the corresponding quarter in FY19.

The Annual steam production rate for FY20 was 2.80 tons<sub>steam</sub>/ton<sub>ref</sub> which is slightly higher (0.1%) than FY19. The slight increase in this metric is indicative of a slight improvement in boiler performance when comparing FY20 to FY19.

**Chart 7: Calculated Waste Heating Value**

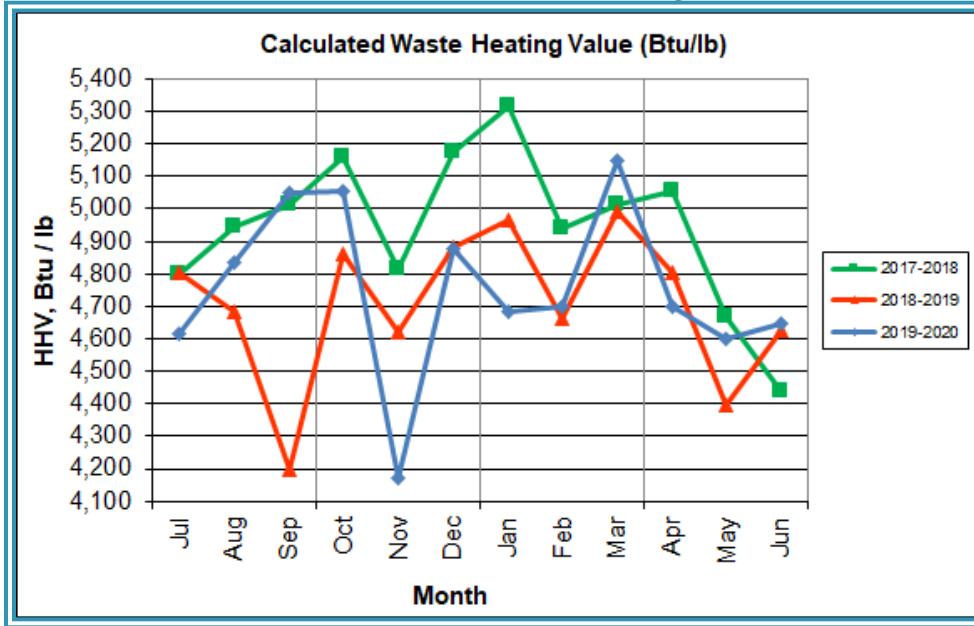


Chart 7 illustrates that Q4FY20 calculated average waste heating value was higher (0.9%) at 4,648 Btu/lb than the corresponding quarter Q4FY19, which averaged 4,608 Btu/lb. Note that the waste heating value in November 2019 of 4,172 Btu/lb was a historical low.

In FY20, the annual average waste heating value was higher (1.0%) at 4,757 Btu/lb than FY19, which averaged 4,708 Btu/lb. Note that 40.6 inches of precipitation were recorded at Ronald Reagan National Airport in FY20 compared to 69.9 inches of precipitation in FY19 which is 41.9% lower<sup>2</sup>. The decrease in precipitation in the Washington, D.C. Area positively impacted the annual average waste heating value.

The FY20 annual average heating value of 4,757 Btu/lb is 5.7% higher than the facility design value of 4,500 Btu/lb. This disparity in average heating value of the fuel compared to the original design value established in the 1980's is one of the reasons that the annual capacity utilization is close to 100% and considerably higher than similar facilities that generally operate in the 90% range (see Section 2.0). In other words, there was sufficient conservatism in the original design of the

<sup>2</sup> <https://www.wunderground.com/>

boiler(s) and their capacity to absorb more heat, and routinely process more MSW, than they were originally rated for.

**Table 2: Quarterly Performance Summaries**

| Month              |                         | Waste Processed (tons) | Waste Diverted (tons) | Ash Shipped (tons) | Special Handling (Supplemental) (tons) | Ferrous Recovered (tons) | Steam Produced (klbs) | Net Electrical Generation (MWhr) |
|--------------------|-------------------------|------------------------|-----------------------|--------------------|--|--------------------------|-----------------------|----------------------------------|
| <b>Q4FY18</b>      | <b>Quarterly Totals</b> | <b>93,094</b>          | <b>0</b>              | <b>17,592</b>      | <b>3,438</b>                           | <b>3,354</b>             | <b>548,286</b>        | <b>38,568</b>                    |
|                    | April -18               | 30,420                 | 0                     | 6,157              | 886                                    | 1,177                    | 190,177               | 13,812                           |
|                    | May -18                 | 31,531                 | 0                     | 5,979              | 1,391                                  | 1,124                    | 184,159               | 12,833                           |
|                    | June - 18               | 31,143                 | 0                     | 5,456              | 1,161                                  | 1,053                    | 173,950               | 11,923                           |
| <b>Q4FY19</b>      | <b>Quarterly Totals</b> | <b>93,144</b>          | <b>0</b>              | <b>17,806</b>      | <b>2,962</b>                           | <b>2,850</b>             | <b>532,040</b>        | <b>37,155</b>                    |
|                    | April -19               | 30,387                 | 0                     | 6,503              | 895                                    | 967                      | 179,676               | 12,894                           |
|                    | May -19                 | 31,567                 | 0                     | 5,670              | 1,038                                  | 922                      | 171,614               | 11,674                           |
|                    | June - 19               | 31,190                 | 0                     | 5,633              | 1,029                                  | 961                      | 180,750               | 12,587                           |
| <b>Q4FY20</b>      | <b>Quarterly Totals</b> | <b>93,360</b>          | <b>0</b>              | <b>19,859</b>      | <b>2,129</b>                           | <b>3,295</b>             | <b>536,395</b>        | <b>38,040</b>                    |
|                    | April - 20              | 30,451                 | 0                     | 6,666              | 582                                    | 1,116                    | 176,823               | 12,609                           |
|                    | May - 20                | 31,761                 | 0                     | 6,723              | 627                                    | 1,116                    | 180,503               | 12,721                           |
|                    | June - 20               | 31,148                 | 0                     | 6,470              | 920                                    | 1,063                    | 179,069               | 12,710                           |
| <b>FY20 Totals</b> |                         | <b>350,147</b>         | <b>0</b>              | <b>70,964</b>      | <b>13,226</b>                          | <b>11,966</b>            | <b>2,074,819</b>      | <b>143,282</b>                   |
| <b>FY19 Totals</b> |                         | <b>350,057</b>         | <b>0</b>              | <b>67,068</b>      | <b>11,778</b>                          | <b>11,756</b>            | <b>2,052,153</b>      | <b>142,430</b>                   |
| <b>FY18 Totals</b> |                         | <b>350,087</b>         | <b>0</b>              | <b>70,368</b>      | <b>16,431</b>                          | <b>10,418</b>            | <b>2,139,023</b>      | <b>150,506</b>                   |

Table 2 presents the production data provided to HDR by CAAI for Q4FY20 on both a monthly and quarterly basis. For purposes of comparison, data for Q4FY18 and Q4FY19 are also shown, as well as FY18, FY19 and FY20 totals.

In comparing quarterly totals, the data shows:

- More waste was processed in Q4FY20 than Q4FY19 and Q4FY18
- More steam was generated in Q4FY20 than Q4FY19 and less than Q4FY18
- More electricity (net) was generated in Q4FY20 than Q4FY19 and less than Q4FY18
- Less supplemental waste was received in Q4FY20 than Q4FY19 and Q4FY18.

Note that the total steam generation figures presented in Table 2 do not correlate with the annual steam production limit from the Facility Permit; such limits apply on a rolling average monthly basis, and not a fiscal year basis.

**Table 3: Waste Delivery Classification**

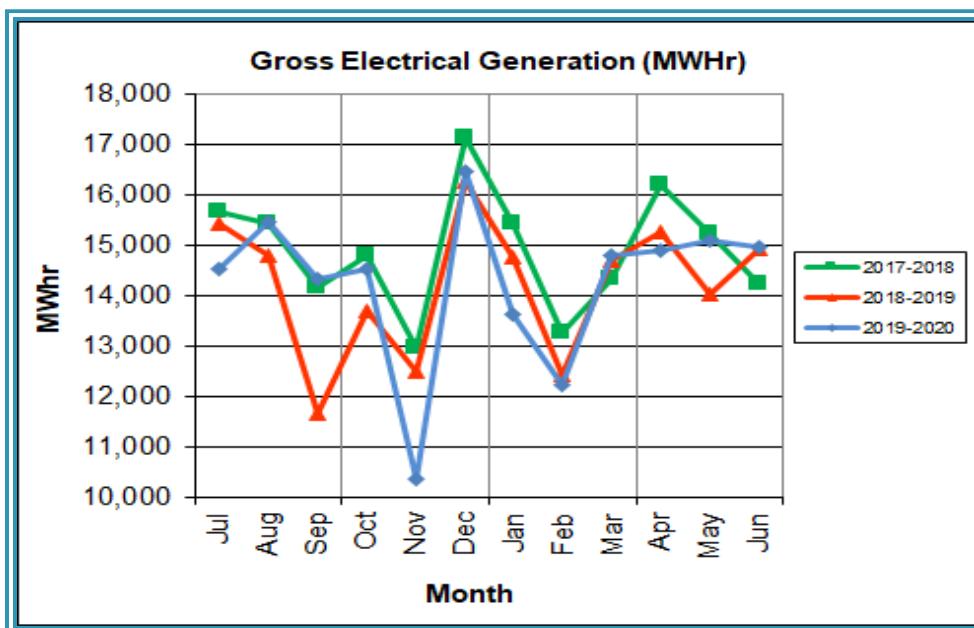
|      |                              | <u>Jul</u>    | <u>Aug</u>    | <u>Sep</u>    | <u>Oct</u>    | <u>Nov</u>    | <u>Dec</u>    | <u>Jan</u>    | <u>Feb</u>    | <u>Mar</u>    | <u>Apr</u>    | <u>May</u>    | <u>Jun</u>    | <u>Totals</u>  | <u>% of Total</u> |
|------|------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|-------------------|
| FY16 | <b>City Waste</b>            | 1,960         | 1,563         | 1,723         | 1,645         | 1,685         | 1,872         | 1,147         | 1,619         | 1,811         | 2,024         | 1,950         | 2,220         | 21,219         | 6.03%             |
|      | <b>County Waste</b>          | 3,627         | 2,880         | 2,832         | 2,869         | 2,682         | 2,891         | 2,025         | 2,389         | 2,694         | 2,406         | 2,508         | 2,661         | 32,465         | 9.22%             |
|      | <b>Municipal Solid Waste</b> | 27,933        | 22,999        | 22,552        | 22,850        | 20,679        | 26,138        | 22,632        | 22,781        | 22,935        | 24,388        | 26,561        | 27,355        | 289,801        | 82.32%            |
|      | <b>Supplemental Waste</b>    | 676           | 427           | 771           | 684           | 676           | 787           | 642           | 850           | 792           | 996           | 605           | 661           | 8,565          | 2.43%             |
|      | <b>MSW Totals</b>            | <b>34,196</b> | <b>27,869</b> | <b>27,878</b> | <b>28,047</b> | <b>25,722</b> | <b>31,687</b> | <b>26,446</b> | <b>27,639</b> | <b>28,232</b> | <b>29,814</b> | <b>31,623</b> | <b>32,896</b> | <b>352,049</b> | <b>100.00%</b>    |
|      |                              | <u>Jul</u>    | <u>Aug</u>    | <u>Sep</u>    | <u>Oct</u>    | <u>Nov</u>    | <u>Dec</u>    | <u>Jan</u>    | <u>Feb</u>    | <u>Mar</u>    | <u>Apr</u>    | <u>May</u>    | <u>Jun</u>    | <u>Totals</u>  | <u>% of Total</u> |
| FY17 | <b>City Waste</b>            | 1,678         | 1,836         | 1,668         | 1,722         | 1,817         | 1,708         | 1,597         | 1,452         | 1,604         | 1,882         | 2,170         | 2,002         | 21,136         | 6.06%             |
|      | <b>County Waste</b>          | 2,386         | 2,469         | 2,370         | 2,184         | 2,321         | 2,289         | 2,287         | 2,016         | 2,517         | 2,371         | 2,877         | 2,889         | 28,976         | 8.31%             |
|      | <b>Municipal Solid Waste</b> | 24,862        | 26,976        | 22,760        | 22,110        | 21,598        | 25,996        | 24,218        | 20,888        | 20,401        | 25,004        | 26,143        | 24,135        | 285,091        | 81.78%            |
|      | <b>Supplemental Waste</b>    | 504           | 642           | 734           | 926           | 941           | 1,036         | 1,083         | 1,413         | 1,291         | 1,420         | 1,705         | 1,717         | 13,412         | 3.85%             |
|      | <b>MSW Totals</b>            | <b>29,430</b> | <b>31,922</b> | <b>27,532</b> | <b>26,941</b> | <b>26,677</b> | <b>31,030</b> | <b>29,185</b> | <b>25,769</b> | <b>25,814</b> | <b>30,677</b> | <b>32,895</b> | <b>30,743</b> | <b>348,615</b> | <b>100.00%</b>    |
|      |                              | <u>Jul</u>    | <u>Aug</u>    | <u>Sep</u>    | <u>Oct</u>    | <u>Nov</u>    | <u>Dec</u>    | <u>Jan</u>    | <u>Feb</u>    | <u>Mar</u>    | <u>Apr</u>    | <u>May</u>    | <u>Jun</u>    | <u>Totals</u>  | <u>% of Total</u> |
| FY18 | <b>City Waste</b>            | 1,699         | 1,876         | 1,642         | 1,719         | 1,849         | 1,541         | 1,621         | 1,365         | 1,569         | 2,000         | 2,298         | 2,011         | 21,191         | 6.03%             |
|      | <b>County Waste</b>          | 2,458         | 2,654         | 2,513         | 2,529         | 2,635         | 2,321         | 2,502         | 2,110         | 2,391         | 2,509         | 2,959         | 2,776         | 30,356         | 8.63%             |
|      | <b>Municipal Solid Waste</b> | 24,950        | 25,303        | 21,518        | 20,885        | 19,108        | 24,668        | 25,302        | 20,826        | 22,980        | 26,645        | 27,438        | 24,091        | 283,714        | 80.67%            |
|      | <b>Supplemental Waste</b>    | 1,807         | 1,835         | 1,805         | 1,638         | 1,553         | 1,339         | 1,301         | 884           | 829           | 886           | 1,391         | 1,161         | 16,430         | 4.67%             |
|      | <b>MSW Totals</b>            | <b>30,914</b> | <b>31,668</b> | <b>27,478</b> | <b>26,772</b> | <b>25,146</b> | <b>29,869</b> | <b>30,726</b> | <b>25,185</b> | <b>27,770</b> | <b>32,040</b> | <b>34,086</b> | <b>30,039</b> | <b>351,693</b> | <b>100.00%</b>    |
|      |                              | <u>Jul</u>    | <u>Aug</u>    | <u>Sep</u>    | <u>Oct</u>    | <u>Nov</u>    | <u>Dec</u>    | <u>Jan</u>    | <u>Feb</u>    | <u>Mar</u>    | <u>Apr</u>    | <u>May</u>    | <u>Jun</u>    | <u>Totals</u>  | <u>% of Total</u> |
| FY19 | <b>City Waste</b>            | 1,848         | 1,836         | 1,823         | 1,996         | 1,892         | 1,732         | 1,823         | 1,458         | 1,614         | 2,063         | 2,442         | 1,882         | 22,409         | 6.43%             |
|      | <b>County Waste</b>          | 2,560         | 2,798         | 2,554         | 2,656         | 2,746         | 2,439         | 2,567         | 2,165         | 2,336         | 2,586         | 2,989         | 2,686         | 31,081         | 8.92%             |
|      | <b>Municipal Solid Waste</b> | 25,442        | 25,920        | 21,873        | 21,678        | 21,472        | 23,046        | 21,455        | 21,975        | 24,323        | 28,361        | 25,444        | 22,197        | 283,185        | 81.27%            |
|      | <b>Supplemental Waste</b>    | 1,012         | 1,040         | 1,138         | 1,108         | 992           | 933           | 964           | 743           | 885           | 895           | 1,038         | 1,029         | 11,777         | 3.38%             |
|      | <b>MSW Totals</b>            | <b>30,862</b> | <b>31,595</b> | <b>27,388</b> | <b>27,438</b> | <b>27,102</b> | <b>28,150</b> | <b>26,808</b> | <b>26,342</b> | <b>29,157</b> | <b>33,904</b> | <b>31,913</b> | <b>27,793</b> | <b>348,454</b> | <b>100.00%</b>    |
|      |                              | <u>Jul</u>    | <u>Aug</u>    | <u>Sep</u>    | <u>Oct</u>    | <u>Nov</u>    | <u>Dec</u>    | <u>Jan</u>    | <u>Feb</u>    | <u>Mar</u>    | <u>Apr</u>    | <u>May</u>    | <u>Jun</u>    | <u>Totals</u>  | <u>% of Total</u> |
| FY20 | <b>City Waste</b>            | 2,070         | 1,771         | 1,726         | 1,894         | 1,742         | 1,844         | 1,870         | 1,489         | 1,925         | 1,931         | 1,849         | 2,051         | 22,160         | 6.30%             |
|      | <b>County Waste</b>          | 3,069         | 2,600         | 2,544         | 2,664         | 2,507         | 2,575         | 2,694         | 2,195         | 2,509         | 2,518         | 2,663         | 2,861         | 31,399         | 8.93%             |
|      | <b>Brokered Waste</b>        | -             | -             | -             | -             | -             | -             | 120           | 114           | 67            | 58            | 0             | 0             | 359            | 0.10%             |
|      | <b>Municipal Solid Waste</b> | 26,033        | 23,287        | 22,129        | 23,644        | 20,837        | 23,822        | 24,859        | 20,472        | 20,333        | 24,220        | 27,605        | 27,375        | 284,614        | 80.91%            |
|      | <b>Supplemental Waste</b>    | 1,269         | 1,321         | 1,236         | 1,340         | 1,238         | 1,246         | 1,239         | 1,102         | 1,106         | 582           | 627           | 920           | 13,226         | 3.76%             |
|      | <b>MSW Totals</b>            | <b>32,440</b> | <b>28,979</b> | <b>27,634</b> | <b>29,541</b> | <b>26,324</b> | <b>29,487</b> | <b>30,781</b> | <b>25,371</b> | <b>25,939</b> | <b>29,309</b> | <b>32,745</b> | <b>33,207</b> | <b>351,757</b> | <b>100.00%</b>    |

**Chart 8: Cumulative Total Waste Delivery**



As depicted in Table 3 and Chart 8, through FY20, cumulative total waste delivery was 0.9% higher compared to FY19.

**Chart 9: Gross Electrical Generation**

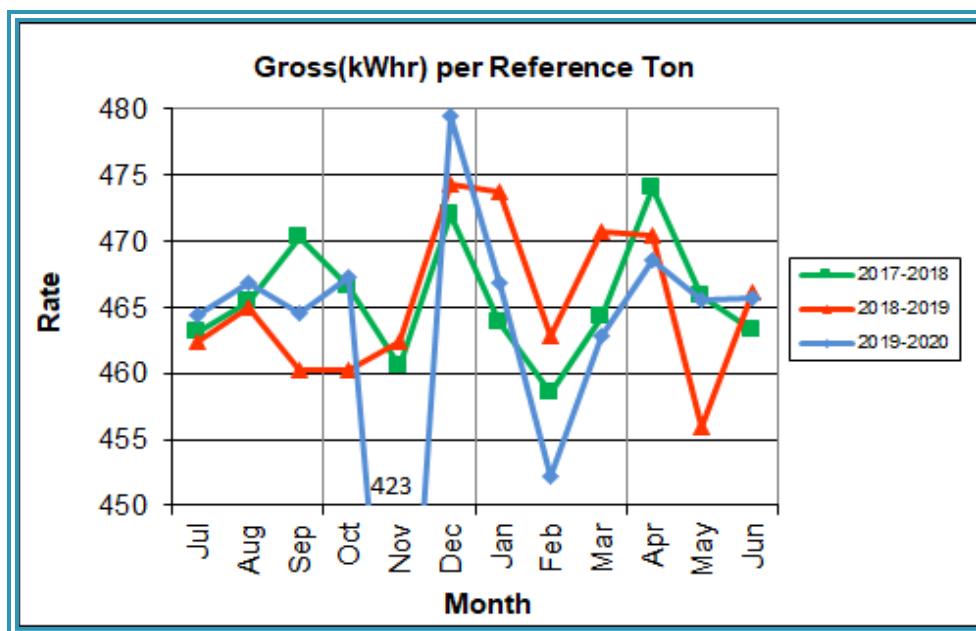


During Q4FY20, the Facility generated 44,985 MWhrs (gross) of electricity compared to Q4FY19 generation of 44,256 MWhrs (gross), a 1.7% increase. The increase in electricity generated (gross) in Q4FY20, is partly due to higher steam production, offset by more turbine generator downtime (44.2 additional hours).

Note that the sharp spikes depicted in Chart Nos. 10 through 13 for November 2019 are a result of significant downtime (635.0 hours) experienced by Turbine Generator No. 1 for a Scheduled Major Overhaul.

During FY20, the Facility generated 171,378 MWhrs (gross) of electricity compared to the FY19 generation of 170,553, a 0.5% increase. Annual electrical generation increased in FY20 compared to FY19 due to higher annual steam production, paired with an additional day of operations in February 2020 due to a Leap Year, offset by more (370.4 additional hours) scheduled, unscheduled, and standby downtime experienced by the turbine generators.

**Chart 10: Gross Conversion Rate**



As shown in Chart 10, the average gross electrical generation per reference ton of refuse processed during Q4FY20 was 467 kWhr, which is higher (0.5%) than the corresponding quarter in FY19. Since this calculated value uses reference or normalized tonnages of waste, it should cancel the effect of MSW heating value (Btu content) variability.

During FY20, the average gross electrical generation per reference ton of refuse processed was 462 kWhr, which is lower (0.7%) than FY19.

**Chart 11: Net Conversion Rate**

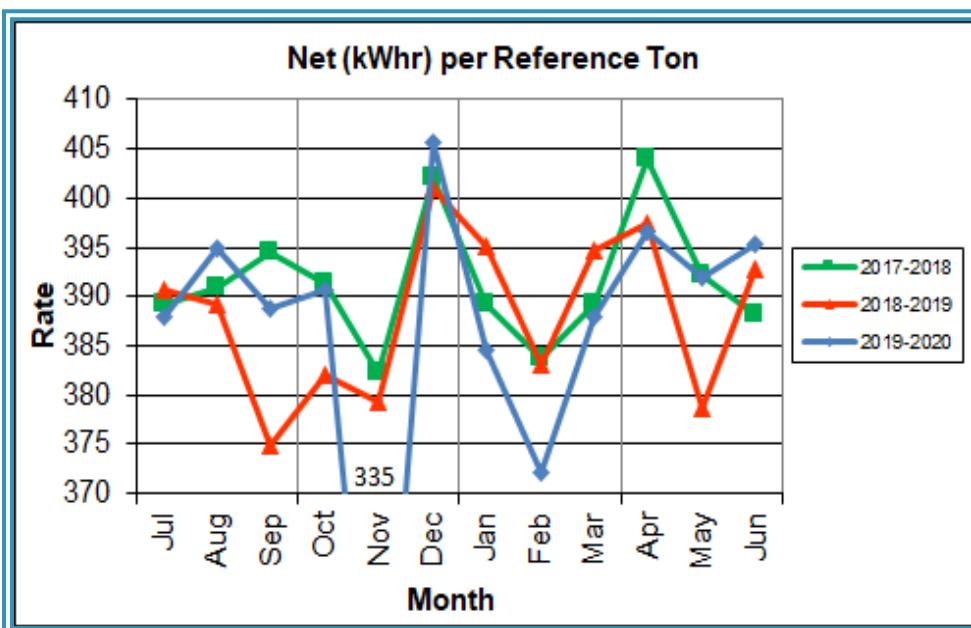


Chart 11 depicts the normalized net power (gross minus in-house usage) generation history. In Q4FY20, the average net electrical generation per reference ton was 395 kWhr, which is 1.3% higher than the corresponding quarter in FY19.

In FY20, the average net electrical generation per reference ton was 386 kWhr, which is lower (0.6%) than FY19.

**Chart 12: Net Conversion Rate**

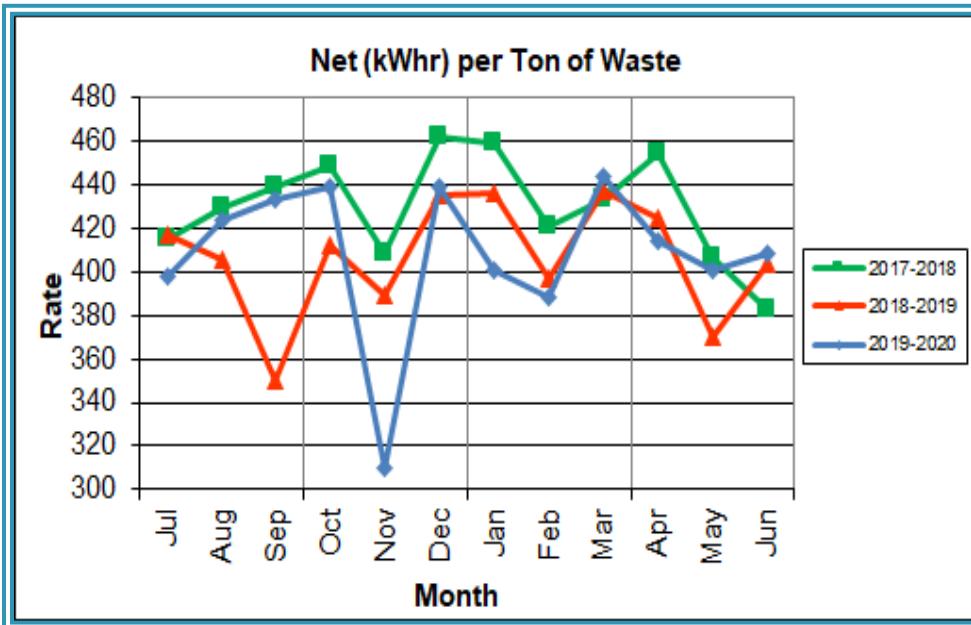


Chart 12 depicts the net power generation per processed ton. The net electrical generation per processed ton in Q4FY20 was 408 kWhr, which is 2.1% higher than the corresponding quarter in FY19 and is attributable to higher steam production, offset by more turbine generator downtime (44.2 additional hours).

In FY20, the net electrical generation per processed ton was 408 kWhr which is 0.5% higher than FY19. The increase is attributable to higher annual steam production, paired with an additional day of operations in February 2020 due to a Leap Year, offset by more (370.4 additional hours) scheduled, unscheduled, and standby downtime experienced by the turbine generators.

**Chart 13: Gross Turbine Generator Conversion Rate**

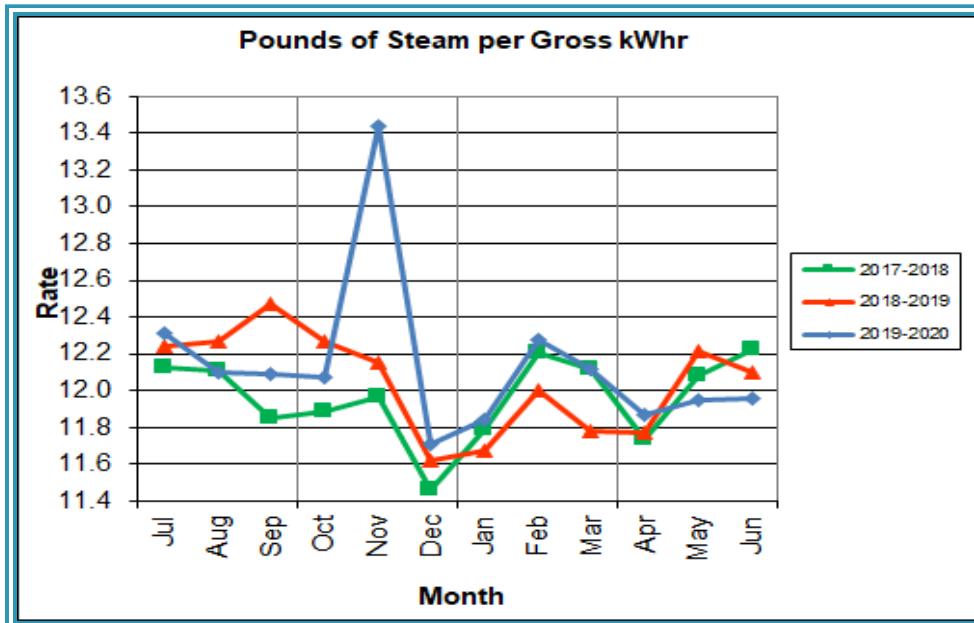


Chart 13 illustrates the quantities of steam required to generate one (1) kWhr of electricity. This measure is a turbine generator performance indicator, where lower steam rates indicate superior performance. For simplification, this calculated rate is based on the average for the two turbine generators. In Q4FY20 the average pounds of steam consumed per gross kWhr generated was 11.9, which is 0.8% lower (more efficient) than the corresponding quarter Q4FY19. A factor that negatively impacts this metric is Turbine Generator No. 2 continues to operate with its Stage 9 blades removed from the rotor. CAAI reported that during the Turbine Generator No. 2 overhaul in November 2013, some cracking was observed on the Stage 9 blades of the rotor, and the blading in that row was removed as a

precautionary measure. CAAI originally indicated that a new set of blades would be manufactured and installed during a Turbine Generator No. 2 Outage in 2016, but advised in May 2015, that the implementation of the replacement blades installation would be delayed and did not provide a date for repair. The average main steam temperature during the quarter was 679.1°F, which is 8.3°F lower than the average main steam temperature of the corresponding quarter last fiscal year and 20.9°F lower than design temperature of 700°F.

In FY20, the average pounds of steam consumed per gross kWhr was 12.1, which is 0.6% higher (less efficient) than the rate in FY19, noting that for this metric, lower steam consumption represents improved performance. The average steam temperature for FY20 was 677.9°F, which is 1.7°F lower than the average main steam temperature last fiscal year and 22.1°F lower than design temperature of 700°F.

#### 4.1 Utility and Reagent Consumptions

**Table 4: Facility Utility and Reagent Consumptions**

| Utility               | Units | Q4FY20 Total | Q4FY19 Total | Q4FY20 "Per Processed Ton" Consumption | Q4FY19 "Per Processed Ton" Consumption | FY20 Total  |
|-----------------------|-------|--------------|--------------|--|--|-------------|
| Purchased Power       | MWhr  | 5,370        | 5,553        | 0.0575                                 | 0.0596                                 | 22,098      |
| Fuel Oil              | Gal.  | 9,540        | 9,650        | 0.10                                   | 0.10                                   | 43,740      |
| Boiler Make-up        | Gal.  | 3,041,000    | 1,421,000    | 32.57                                  | 15.26                                  | 9,053,000   |
| Cooling Tower Make-up | Gal.  | 39,555,929   | 40,434,486   | 423.69                                 | 434.11                                 | 147,012,242 |
| Pebble Lime           | Lbs.  | 1,564,000    | 1,654,000    | 16.75                                  | 17.76                                  | 5,620,000   |
| Ammonia               | Lbs.  | 198,000      | 176,000      | 2.12                                   | 1.89                                   | 710,000     |
| Carbon                | Lbs.  | 76,000       | 76,000       | 0.81                                   | 0.82                                   | 292,000     |
| Dolomitic Lime        | Lbs.  | 0            | 0            | 0.00                                   | 0.00                                   | 0           |

Fuel oil usage during the quarter represents approximately 0.16% of the total heat input to the boilers, which compares favorably with industry averages, and is nearly identical to the percentage of heat input in Q4FY19. Fuel oil is used to stabilize combustion of wet fuel, as well as during start-up and shut-down of the boilers for maintenance. Boiler makeup water usage during the quarter represents 4.7% of steam flow, which is significantly higher than the boiler makeup in Q4FY19 which was 2.2% of steam flow. Higher boiler makeup quantities is indicative of increased steam leakage. Pebble lime usage, at 1,564,000 lbs. is lower (5.4%) than the

corresponding quarter last year. During Q3FY19, CAAI reported that it was discontinuing dolomitic lime feed, while increasing lime slurry feed to stabilize ash pH levels. Ash pH levels in the range of 8 to 11 are desirable to minimize leaching potential of heavy metals.

In comparing Q4FY20 to Q4FY19 on a per processed ton consumption basis:

- the purchased power consumption rate was 3.5% lower
- the total fuel oil consumption rate was 1.4% lower
- the boiler make-up water consumption rate was 113.5% higher
- the cooling tower make-up water consumption rate was 2.4% lower
- the total pebble lime consumption rate was 5.7% lower
- the ammonia consumption rate was 12.2% higher
- the carbon consumption rate was 0.2% lower
- No dolomitic lime was fed during the fourth quarters of FY19 and FY20

## 4.2 Safety & Environmental Training

The Facility experienced no OSHA recordable accidents or First Aid accidents during the quarter. CAAI has operated 827 days without an OSHA recordable accident as of June 30, 2020. Safety and Environmental training was conducted with themes as follows:

### April 2020

- Safety:
  - Dropped Objects and Elevated Surfaces
  - Bloodborne Pathogens
  - Hearing Conservation
- Environmental:
  - Profiled Waste
  - How to handle an excess emissions event caused by the processing of Profiled Waste

### May 2020

- Safety:

- Weather Emergencies and Preparedness
- Medical Emergencies - Burns
- Emergency Action Plans
- Fire Response Roles and Responsibilities
- Hand Washing and Protective Glove Removal
- Environmental:
  - Spill Prevention Control and Countermeasure Plan Inspections
  - Leaks and Discharges

### **June 2020**

- Safety:
  - Rigging Safety
  - In the Line of Fire
  - Community Outreach
  - Conveyors
  - Hopper Safety
- Environmental: No environmental training was reported by CAAI in June 2020

## **5.0 Facility Maintenance**

Throughout the quarter, significant routine and preventative maintenance was performed. HDR considers that the Facility is implementing an effective maintenance regimen, and is performing routine and preventative maintenance, along with selected equipment replacements in a timely manner. CAAI monthly maintenance reports provide a detailed account of maintenance performed.

Beginning June 23, 2020, the Facility was offline for a scheduled Cold Iron Outage with all three (3) boilers experiencing a combined 80.5 hours of downtime and both turbine generators experiencing a combined 52.6 hours of downtime. Some significant maintenance activities that were completed during the Cold Iron Outage are:

- Replacement of the Deaerator Multi-port Relief Valve

- Replacement and Repacking of the Flow Control Bypass Valve (FCV 801) to the dump condenser
- Weld-Repaired the 705 Bypass Line Leak
- Replacement of the Leaking Flex on the No. 2 Low Pressure Extraction Valve
- Weld-Repaired a leaking nipple on the Deaerator Vent Line
- Repair of the Deaerator Level Transmitter
- Replacement of the Deaerator Makeup Level Control Valve (LCV-831)
- Replacement of the Turbine Steam Chest Drain Valve

In addition to the scheduled outages, CAAI reports that 1,165 preventative maintenance actions were completed during the quarter.

## 5.1 Availability

Facility availabilities for Q4FY20 are shown in Table 5. According to CAAI reports, the average unit availabilities for Boiler Nos. 1, 2, and 3 for Q4FY20 were 97.7%, 98.5%, and 98.7%, respectively. The three-boiler average availability during the quarter was 98.3%, which is excellent and comparable to that of mature, well run waste to energy facilities.

According to CAAI reports, the average unit availabilities for Turbine Generator Nos. 1 and 2 for Q4FY20 were 98.9%, and 98.4%, respectively. The two-turbine average generator availability during the quarter was 98.6%, and was negatively impacted by the cold iron outage when the turbine generators experienced a combined total of 52.6 hours of downtime.

Overall boiler availability for FY20 was 94.8%, and overall turbine generator availability was 96.0%. Overall availabilities for the boilers are highly acceptable and above industry averages, noting that these reported availability metrics exclude standby time experienced during the fiscal year which amounted to 39.8 hours for the boilers and 11.2 hours for the turbine generators. Turbine generator availability was negatively impacted by the November 2019 major outage and inspection of Turbine Generator No. 1

**Table 5: Quarterly Facility Unit Availabilities**

| Availability  | Q1FY20 Average | Q2FY20 Average | Q3FY20 Average | Q4FY20 Average | FY20 Average |
|---------------|----------------|----------------|----------------|----------------|--------------|
| Boiler No. 1  | 95.9%          | 99.0%          | 93.3%          | 97.7%          | 96.5%        |
| Boiler No. 2  | 96.3%          | 82.8%          | 93.7%          | 98.5%          | 92.8%        |
| Boiler No. 3  | 97.4%          | 99.4%          | 85.3%          | 98.7%          | 95.2%        |
| <b>Avg.</b>   | <b>96.6%</b>   | <b>93.7%</b>   | <b>90.7%</b>   | <b>98.3%</b>   | <b>94.8%</b> |
| Turbine No. 1 | 100.0%         | 70.5%          | 100.0%         | 98.9%          | 92.3%        |
| Turbine No. 2 | 100.0%         | 100.0%         | 100.0%         | 98.4%          | 99.6%        |
| <b>Avg.</b>   | <b>100.0%</b>  | <b>85.3%</b>   | <b>100.0%</b>  | <b>98.6%</b>   | <b>96.0%</b> |

**Table 6: Boiler Downtime – Q4FY20**

| Boiler Number                     | Outage Begin Date | Outage End Date | Hours Unavailable | Downtime Classification | Reason Unavailable   |
|-----------------------------------|-------------------|-----------------|-------------------|-------------------------|--|
| 1                                 | 4/24/20           | 4/24/20         | 1.7               | Unscheduled             | Ash Discharger Plug  |
| 1                                 | 6/23/20           | 6/24/20         | 28.5              | Scheduled               | Scheduled Cold Iron Outage   |
| 2                                 | 6/23/20           | 6/24/20         | 28.0              | Scheduled               | Scheduled Cold Iron Outage   |
| 3                                 | 6/24/20           | 6/24/20         | 24.0              | Scheduled               | Scheduled Cold Iron Outage   |
| 1                                 | 6/25/20           | 6/25/20         | 18.8              | Unscheduled             | Waterwall Failure – Stress Crack on Left Wall 3 <sup>rd</sup> Pass |
| 2                                 | 6/25/20           | 6/25/20         | 3.8               | Unscheduled             | Medium Pressure Steam Header RV Repair                             |
| 3                                 | 6/25/20           | 6/25/20         | 5.0               | Unscheduled             | Medium Pressure Steam Header RV Repair                             |
| <b>Total Unscheduled Downtime</b> |                   |                 |                   |                         | <b>29.3 Hours</b>  |
| <b>Total Scheduled Downtime</b>   |                   |                 |                   |                         | <b>80.5 Hours</b>  |
| <b>Total Standby Downtime</b>     |                   |                 |                   |                         | <b>0.0 Hours</b>   |
| <b>Total Downtime</b>             |                   |                 |                   |                         | <b>109.8 Hours</b>   |

**Table 7: Turbine Generator Downtime – Q4FY20**

| Turbine Generator Number          | Outage Begin Date | Outage End Date | Hours Unavailable | Downtime Classification | Reason Unavailable                     |
|-----------------------------------|-------------------|-----------------|-------------------|-------------------------|--|
| 1                                 | 6/23/20           | 6/24/20         | 24.6              | Scheduled               | Scheduled Cold Iron Outage             |
| 2                                 | 6/23/20           | 6/24/20         | 28.0              | Scheduled               | Scheduled Cold Iron Outage             |
| 2                                 | 6/25/20           | 6/25/20         | 6.8               | Unscheduled             | Medium Pressure Steam Header RV Repair |
| <b>Total Unscheduled Downtime</b> |                   |                 |                   |                         | <b>6.8 Hours</b>                       |
| <b>Total Scheduled Downtime</b>   |                   |                 |                   |                         | <b>52.6 Hours</b>                      |
| <b>Total Standby Downtime</b>     |                   |                 |                   |                         | <b>0.0 Hours</b>                       |
| <b>Total Downtime</b>             |                   |                 |                   |                         | <b>59.4 Hours</b>                      |

## 5.2 Facility Housekeeping

CAAI is performing Facility housekeeping and maintaining plant cleanliness in accordance with acceptable industry practices. A site inspection was not conducted in May 2020 due to the Coronavirus Pandemic. Photos of interest from the HDR site visits for the first three (3) quarters of FY20 are depicted in Appendix B. The Facility housekeeping ratings from the last (February 2020) site inspection are presented in Table 8.

**Table 8: Facility Housekeeping Ratings – February 2020**

| Facility Area            | Acceptable | Needs Improvement | Unacceptable |
|--------------------------|------------|-------------------|--------------|
| Tipping Floor            | ✓          |                   |              |
| Citizen's Drop-off Area  | ✓          |                   |              |
| Tipping Floor Truck Exit | ✓          |                   |              |
| Front Parking Lot        | ✓          |                   |              |
| Rear Parking Lot         | ✓          |                   |              |
| Boiler House Pump Room   | ✓          |                   |              |
| Lime Slurry Pump Room    | ✓          |                   |              |
| Switchgear Area          | ✓          |                   |              |
| Ash Load-out Area        | ✓          |                   |              |
| Vibrating Conveyor Area  | ✓          |                   |              |
| Ash Discharger Area      | ✓          |                   |              |
| Cooling Tower Area       | ✓          |                   |              |
| Truck Scale Area         | ✓          |                   |              |
| SDA/FF Conveyor Area     | ✓          |                   |              |
| SDA Penthouses           | ✓          |                   |              |
| Lime Preparation Area    | ✓          |                   |              |
| Boiler Drum Levels       | ✓          |                   |              |
| Turbine Room             | ✓          |                   |              |
| Electrical Room          | ✓          |                   |              |

## 6.0 Environmental

The air pollution control equipment maintained emission concentrations well within the established regulations. Average Continuous Emission Monitoring System (CEMS) data collected for each monthly period during Q4FY20 are summarized in Appendix A. No permit deviations were experienced by the Facility during the Q4FY20 and as of June 30, 2020 the Facility operated 206 days without an environmental excursion.

## **6.1 Low NO<sub>x</sub> Technology Implementation**

The Virginia Department of Environmental Quality (VADEQ) has issued the final RACT permits for the installation and operation of LN™ Technology. During November 2019, Boiler No. 2 was retrofitted with LN™ Technology, including the installation of all associated ductwork, nozzles, and controls and CAAI reports that final calibration of instrumentation was scheduled for Q3FY20 and Q4FY20. On June 30, 2020 CAAI notified the VADEQ that Boiler No. 2 Low NOx System testing and optimization period concluded on June 28<sup>th</sup> and that Boiler No. 2 is now operating under the lower NOx limits of 110 ppm (24 hr) and 90 ppm (annual rolling average). CAAI indicated that it plans to install the LN™ Technology on subsequent units in the second quarter of Fiscal Years 2021 and 2022.

## **6.2 Nitrogen Oxide Emissions**

During Q4FY20, the monthly emission concentrations of nitrogen oxides (NO<sub>x</sub>) averaged 160.7 ppmdv, 104.0 ppmdv, and 159.0 ppmdv for Boiler Nos. 1, 2, and 3, respectively. As previously mentioned, the LN™ Technology was installed on Boiler No. 2 in November 2019, and CAAI has indicated that the system concluded its period of calibration and optimization on June 28, 2020. CAAI continued to operate the Boiler Nos. 1 and 3 at the lower (160 ppmdv) set-points through Q4FY20, and beginning April 28<sup>th</sup> operated Boiler No. 2 at the lower NOx limit of 110 ppm.

## **6.3 Sulfur Dioxide Emissions**

During Q4FY20 the monthly emission concentration of stack sulfur dioxide (SO<sub>2</sub>) averaged 0.3 ppmdv, 1.3 ppmdv, and 1.7 ppmdv for Boiler Nos. 1, 2, and 3, respectively. All of these stack SO<sub>2</sub> concentrations are significantly below the permit limit of 29 ppmdv @ 7% O<sub>2</sub>.

## **6.4 Carbon Monoxide Emissions**

During Q4FY20, the monthly average CO emission concentrations on Boiler Nos. 1, 2, and 3 were 30.3 ppmdv, 36.3 ppmdv, and 22.3 ppmdv, respectively, and all are well within permit limits (100 ppmdv, 4-hour average).

## **6.5 Opacity**

During Q4FY20, the average opacity on Boiler Nos. 1, 2, and 3 were 0.2%, 1.2%, and 0.9%, respectively, which are all significantly below the 10% (6-minute) average permit limit.

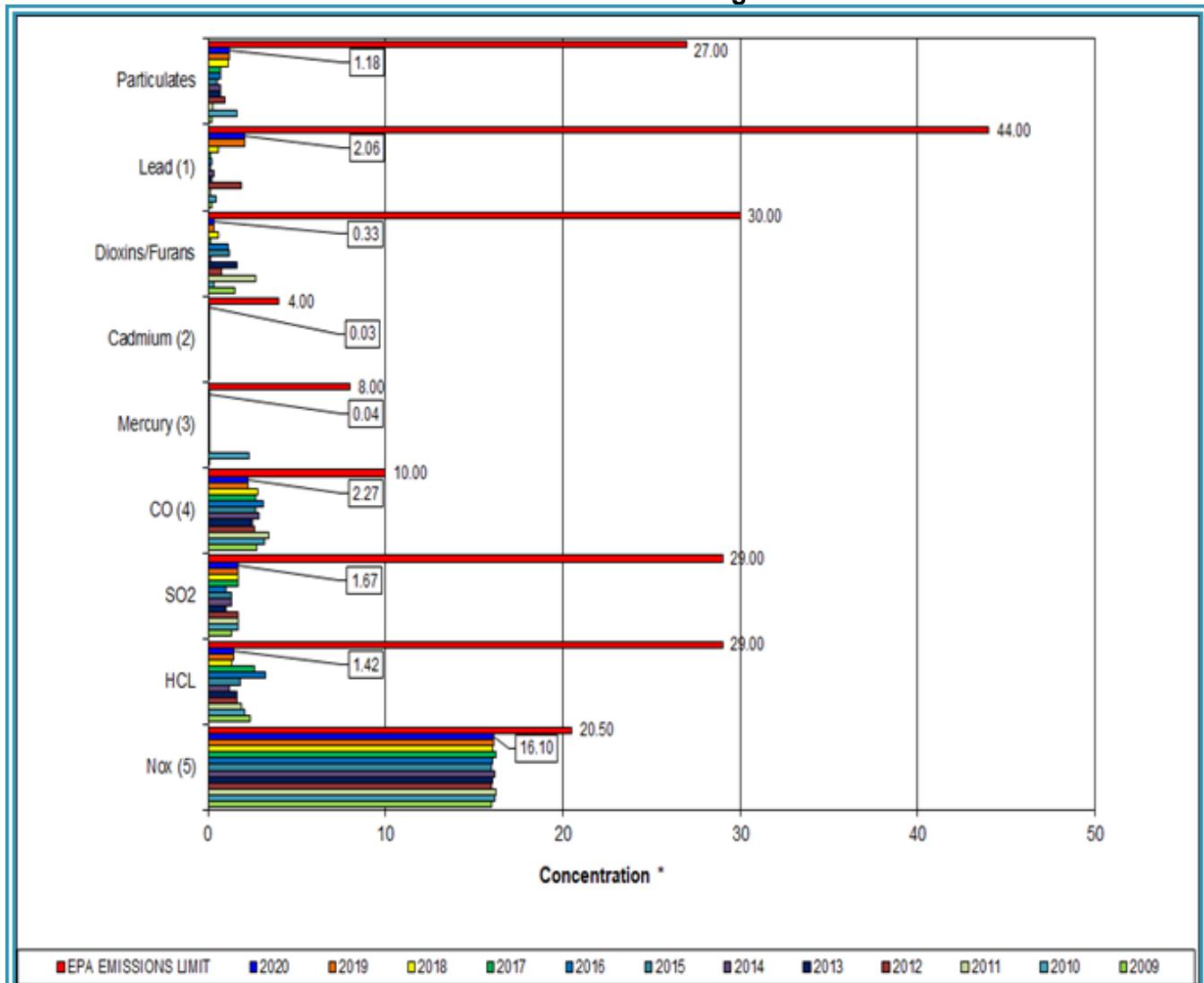
## **6.6 Daily Emissions Data**

Appendix A, Tables 11, 12, and 13 tabulate the monthly average, maximum, and minimum emissions data for each unit during Q4FY20. Excursions, if any, would appear in bold print. It should be noted that these tabulations of monthly averages, reported here for informational purposes, are based on tabulations of daily averages. These averages do not correlate with official reports to the regulatory agencies because of differences in averaging times and other technical differences required by agency report formats.

## **6.7 2020 Annual Stack Testing**

Annual stack testing was conducted March 23 through March 25, 2020 by Testar Inc. Historical stack test data including 2020 results are summarized in Chart 14 and Table 9. The 2020 test results demonstrate compliance well within the permit limits for all parameters. In addition to the tests required by the Facility permit, additional tests for small particulate matter ( $PM_{2.5}$ ) were conducted. While there are no current Facility regulatory limits established for  $PM_{2.5}$ , average results for 2020 were 0.002 Gr/DSCF (grains per dry standard cubic foot) corrected to 7%  $O_2$ , which is identical to average in 2019 for  $PM_{2.5}$ .

**Chart 14: Stack Test Results through 2020**



Note (1): Lead emissions have been increased by a factor of 100 for trending purposes

Note (2): Cadmium emissions have been increased by a factor of 100 for trending purposes

Note (3): Mercury emissions have been increased by a factor of 100 for trending purposes

Note (4): CO emissions have been decreased by a factor of 10 for trending purposes

Note (5): NO<sub>x</sub> emissions have been decreased by a factor of 10 for trending purposes

**Table 9: Stack Test Results through 2020**

|      |                | NOx<br>(ppmdv)            | HCL<br>(ppmdv) | SO <sub>2</sub><br>(ppmdv) | CO<br>(ppmdv) | Mercury<br>(mg/dscm) | Cadmium<br>(mg/dscm) | Dioxins/Furans<br>(ng/dscm) | Lead<br>(mg/dscm) | Particulates<br>(mg/dscm) | PM <sub>2.5</sub><br>(gr/dscf) |
|------|----------------|---------------------------|----------------|----------------------------|---------------|----------------------|----------------------|-----------------------------|-------------------|---------------------------|--------------------------------|
| 2012 | Boiler 1       | 163                       | 1.14           | 2.0                        | 23            | 0.000300             | 0.000310             |                             | 0.001340          | 0.640                     | 0.00932                        |
|      | Boiler 2       | 156                       | 2.02           | 2.0                        | 29            | 0.000340             | 0.000250             |                             | 0.006520          | 1.280                     | 0.00782                        |
|      | Boiler 3       | 161                       | 1.66           | 1.0                        | 27            | 0.000370             | 0.000590             | 0.75                        | 0.047800          | 1.020                     | 0.00679                        |
|      | <b>AVERAGE</b> | <b>160.0</b>              | <b>1.61</b>    | <b>1.67</b>                | <b>26.33</b>  | <b>0.000337</b>      | <b>0.000383</b>      | <b>0.75</b>                 | <b>0.018553</b>   | <b>0.980</b>              | <b>0.00798</b>                 |
| 2013 | Boiler 1       | 164                       | 1.48           | 1.0                        | 28            | 0.000364             | 0.000134             |                             | 0.001450          | 0.637                     | 0.00637                        |
|      | Boiler 2       | 158                       | 1.98           | 1.0                        | 25            | 0.000372             | 0.000112             | 1.66                        | 0.001050          | 0.737                     | 0.00475                        |
|      | Boiler 3       | 159                       | 1.52           | 1.0                        | 22            | 0.000422             | 0.000137             |                             | 0.003030          | 0.733                     | 0.00471                        |
|      | <b>AVERAGE</b> | <b>160.3</b>              | <b>1.66</b>    | <b>1.00</b>                | <b>25.00</b>  | <b>0.000386</b>      | <b>0.000128</b>      | <b>1.66</b>                 | <b>0.001843</b>   | <b>0.702</b>              | <b>0.00528</b>                 |
| 2014 | Boiler 1       | 167                       | 1.13           | 2.0                        | 35            | 0.000327             | 0.000270             | 0.16                        | 0.003820          | 0.282                     | 0.00337                        |
|      | Boiler 2       | 157                       | 1.02           | 1.0                        | 35            | 0.000348             | 0.000183             |                             | 0.002520          | 1.240                     | 0.00415                        |
|      | Boiler 3       | 161                       | 1.50           | 1.0                        | 17            | 0.000492             | 0.000228             |                             | 0.002850          | 0.520                     | 0.00425                        |
|      | <b>AVERAGE</b> | <b>161.7</b>              | <b>1.22</b>    | <b>1.33</b>                | <b>29.00</b>  | <b>0.000389</b>      | <b>0.000227</b>      | <b>0.16</b>                 | <b>0.003063</b>   | <b>0.681</b>              | <b>0.00392</b>                 |
| 2015 | Boiler 1       | 164                       | 1.80           | 2.0                        | 25            | 0.000316             | 0.000102             |                             | 0.000995          | 0.513                     | 0.00540                        |
|      | Boiler 2       | 157                       | 1.99           | 1.0                        | 29            | 0.000375             | 0.000109             |                             | 0.001300          | 0.532                     | 0.00410                        |
|      | Boiler 3       | 159                       | 1.71           | 1.0                        | 27            | 0.000385             | 0.000409             | 1.21                        | 0.003040          | 0.499                     | 0.00074                        |
|      | <b>AVERAGE</b> | <b>160.0</b>              | <b>1.83</b>    | <b>1.33</b>                | <b>27.00</b>  | <b>0.000359</b>      | <b>0.000207</b>      | <b>1.21</b>                 | <b>0.001778</b>   | <b>0.515</b>              | <b>0.00341</b>                 |
| 2016 | Boiler 1       | 166                       | 4.33           | 1.0                        | 29            | 0.000456             | 0.000231             |                             | 0.002810          | 1.170                     | 0.00680                        |
|      | Boiler 2       | 156                       | 3.46           | 1.0                        | 37            | 0.000428             | 0.000154             | 1.16                        | 0.001130          | 0.657                     | 0.00241                        |
|      | Boiler 3       | 159                       | 1.86           | 1.0                        | 28            | 0.000375             | 0.000107             |                             | 0.001590          | 0.371                     | 0.00456                        |
|      | <b>AVERAGE</b> | <b>160.3</b>              | <b>3.22</b>    | <b>1.00</b>                | <b>31.33</b>  | <b>0.000420</b>      | <b>0.000164</b>      | <b>1.16</b>                 | <b>0.001843</b>   | <b>0.733</b>              | <b>0.00459</b>                 |
| 2017 | Boiler 1       | 171                       | 1.41           | 2.0                        | 33            | 0.000493             | 0.000169             | 0.17                        | 0.001770          | 0.860                     | 0.00393                        |
|      | Boiler 2       | 160                       | 1.81           | 0.0                        | 25            | 0.000411             | 0.000139             |                             | 0.001040          | 0.742                     | 0.00160                        |
|      | Boiler 3       | 156                       | 4.71           | 3.0                        | 23            | 0.000368             | 0.000115             |                             | 0.001170          | 0.561                     | 0.00385                        |
|      | <b>AVERAGE</b> | <b>162.3</b>              | <b>2.64</b>    | <b>1.67</b>                | <b>27.00</b>  | <b>0.000424</b>      | <b>0.000141</b>      | <b>0.17</b>                 | <b>0.001327</b>   | <b>0.721</b>              | <b>0.00313</b>                 |
| 2018 | Boiler 1       | 165                       | 1.17           | 3.0                        | 36            | 0.000401             | 0.000223             |                             | 0.002670          | 0.649                     | 0.00839                        |
|      | Boiler 2       | 158                       | 0.99           | 1.0                        | 25            | 0.000415             | 0.000909             |                             | 0.011200          | 2.040                     | 0.00107                        |
|      | Boiler 3       | 158                       | 1.76           | 1.0                        | 24            | 0.000481             | 0.000243             | 0.59                        | 0.003190          | 0.655                     | 0.00200                        |
|      | <b>AVERAGE</b> | <b>160.3</b>              | <b>1.31</b>    | <b>1.67</b>                | <b>28.33</b>  | <b>0.000432</b>      | <b>0.000458</b>      | <b>0.59</b>                 | <b>0.005687</b>   | <b>1.115</b>              | <b>0.00382</b>                 |
| 2019 | Boiler 1       | 163                       | 1.40           | 1.0                        | 37            | 0.000423             | 0.000240             |                             | 0.002080          | 0.750                     | 0.00113                        |
|      | Boiler 2       | 157                       | 1.35           | 1.0                        | 30            | 0.000389             | 0.000136             | 0.23                        | 0.001120          | 0.973                     | 0.00191                        |
|      | Boiler 3       | 161                       | 1.18           | 1.0                        | 25            | 0.000409             | 0.000313             |                             | 0.008080          | 1.640                     | 0.00290                        |
|      | <b>AVERAGE</b> | <b>160.3</b>              | <b>1.31</b>    | <b>1.00</b>                | <b>30.67</b>  | <b>0.000407</b>      | <b>0.000230</b>      | <b>0.23</b>                 | <b>0.003760</b>   | <b>1.121</b>              | <b>0.00198</b>                 |
| 2020 | Boiler 1       | 165                       | 1.69           | 2.0                        | 27            | 0.000391             | 0.000507             | 0.33                        | 0.050800          | 1.790                     | 0.00325                        |
|      | Boiler 2       | 158                       | 1.60           | 2.0                        | 20            | 0.000375             | 0.000188             |                             | 0.002320          | 1.070                     | 0.00131                        |
|      | Boiler 3       | 160                       | 0.97           | 1.0                        | 21            | 0.000441             | 0.000199             |                             | 0.008700          | 0.685                     | 0.00205                        |
|      | <b>AVERAGE</b> | <b>161.0</b>              | <b>1.42</b>    | <b>1.67</b>                | <b>22.67</b>  | <b>0.000402</b>      | <b>0.000298</b>      | <b>0.33</b>                 | <b>0.020607</b>   | <b>1.182</b>              | <b>0.00220</b>                 |
|      |                | EPA EMISSIONS LIMIT       | 205            | 29                         | 29            | 100                  | 0.08                 | 0.04                        | 30                | 0.44                      | 27                             |
|      |                | Percent of Limit for 2020 | 78.5%          | 4.9%                       | 5.7%          | 22.7%                | 0.5%                 | 0.7%                        | 1.1%              | 4.7%                      | 4.4%                           |
|      |                |                           |                |                            |               |                      |                      |                             |                   | --                        |                                |

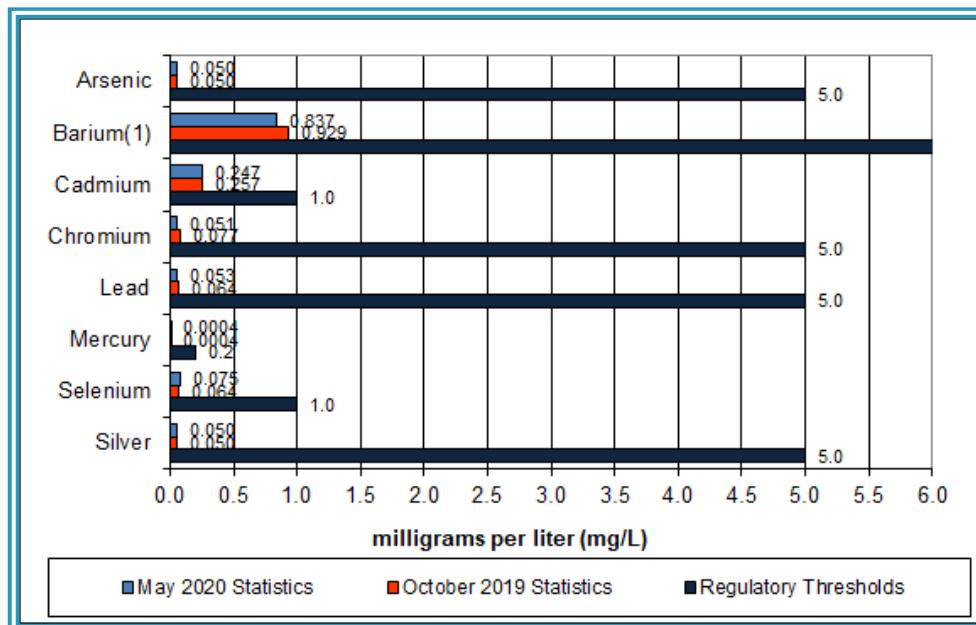
## 6.8 Ash System Compliance

During Q4FY19, CAAI reported that it was discontinuing dolomitic lime feed, while increasing lime slurry feed in an effort to stabilize the ash pH to levels that will allow eliminating dolomitic lime to condition the ash going forward. The desired ash pH level ranges from 8.0 to 11.0. Ash Toxicity (TCLP) tests were performed for field samples collected over an eight (8) day period in May 2020, and results indicated that the average pH during testing was 9.3. Results from the TCLP testing conducted in May 2020 and October 2019 are depicted in Table 10 and Chart 15 below.

**Table 10: Comparison of Statistical Results and Regulatory Thresholds for Metal Analytes**

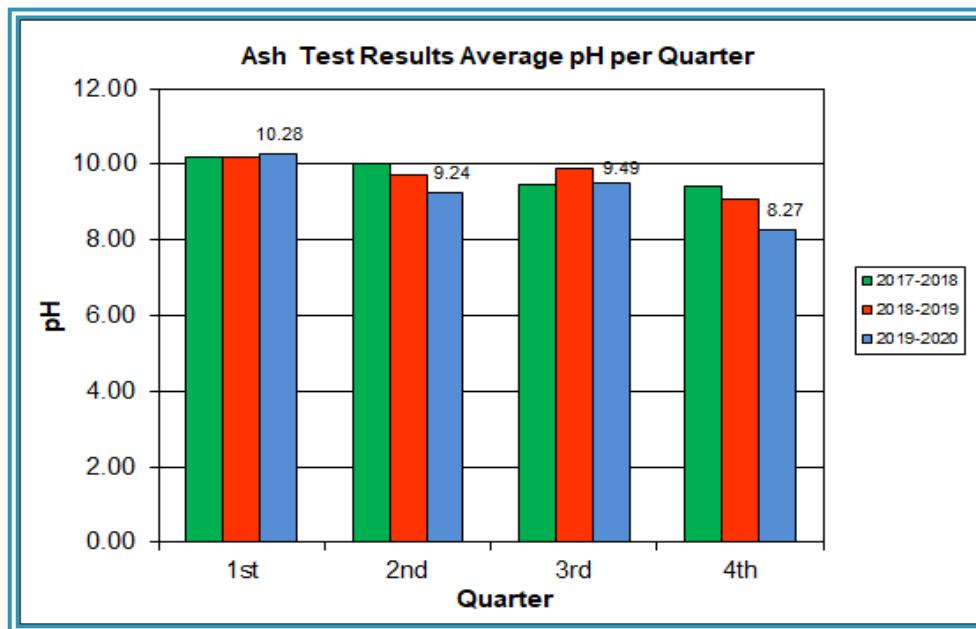
| Metals          | 90% Upper Confidence (May 2020) | 90% Upper Confidence (October 2019) | Regulatory Threshold (mg/L) | % of Threshold (May 2020) | % of Threshold (October 2019) |
|-----------------|---------------------------------|-------------------------------------|-----------------------------|---------------------------|-------------------------------|
| <b>Arsenic</b>  | 0.050                           | 0.050                               | 5.0                         | 1.00%                     | 1.00%                         |
| <b>Barium</b>   | 0.837                           | 0.929                               | 100.0                       | 0.84%                     | 0.93%                         |
| <b>Cadmium</b>  | 0.247                           | 0.257                               | 1.0                         | 24.70%                    | 25.70%                        |
| <b>Chromium</b> | 0.051                           | 0.077                               | 5.0                         | 1.02%                     | 1.54%                         |
| <b>Lead</b>     | 0.053                           | 0.064                               | 5.0                         | 1.06%                     | 1.28%                         |
| <b>Mercury</b>  | 0.0004                          | 0.0004                              | 0.2                         | 0.20%                     | 0.20%                         |
| <b>Selenium</b> | 0.075                           | 0.064                               | 1.0                         | 7.50%                     | 6.40%                         |
| <b>Silver</b>   | 0.050                           | 0.050                               | 5.0                         | 1.00%                     | 1.00%                         |

**Chart 15: Ash Toxicity Characteristic Leaching Procedure (TCLP) Results**



CAAI also samples ash monthly in-house, and documents pH reading to adjust dolomitic lime feed rate. The results for the ash pH tests are found below in Chart 16 where each quarter is represented by the average of the respective monthly readings. During Q4FY20, the average ash pH for in-house tests was 8.3.

**Chart 16: Quarterly Ash Test Results**



## APPENDIX A FACILITY CEMS DATA

**Table 11: Unit #1 Monthly Summary for Reportable Emissions Data**

| Group#-Channel#          | G8-C35    | G8-C28             | G8-C8              | G8-C4     | G8-C12             | G8-C34    | G8-C37    | G8-C40    | G8-C39   |
|--------------------------|-----------|--------------------|--------------------|-----------|--------------------|-----------|-----------|-----------|----------|
| Long Descrip.            | U-1 Steam | U-1 Econ           | U-1 Stack          | U-1 Stack | U-1 Stack          | U-1 Opaci | U-1 FF In | U-1 Carbo | U-1 Lime |
| Short Descrip.           | SteamFl   | SO <sub>2</sub> ec | SO <sub>2</sub> sc | COsc      | NO <sub>x</sub> sc | Opacity   | FF InTemp | Carblnj   | LimeFlow |
| Units                    | K#/Hr     | ppmc               | ppm                | ppmc      | ppmc               | %         | deg F     | #/hr      | gpm      |
| Range                    | 0-100     | 0-2000             | 0-500              | 0-4000    | 0-1000             | 0-100     | 100-500   | 0-50      | 0-20     |
| Apr - 20                 | AVG       | 80.4               | 32.0               | 1.0       | 32.0               | 160.0     | 0.2       | 299.0     | 12.3     |
|                          | Max       | 86.4               | 49.0               | 10.0      | 43.0               | 162.0     | 0.4       | 304.0     | 12.4     |
|                          | Min       | 74.0               | 19.0               | 0.0       | 19.0               | 154.0     | 0.0       | 294.0     | 12.2     |
| May - 20                 | AVG       | 80.2               | 32.0               | 0.0       | 30.0               | 161.0     | 0.2       | 299.0     | 12.2     |
|                          | Max       | 86.5               | 57.0               | 2.0       | 39.0               | 167.0     | 0.6       | 304.0     | 12.3     |
|                          | Min       | 72.8               | 20.0               | 0.0       | 21.0               | 157.0     | 0.0       | 296.0     | 12.2     |
| Jun - 20                 | AVG       | 85.5               | 27.0               | 0.0       | 29.0               | 161.0     | 0.2       | 296.0     | 12.3     |
|                          | Max       | 89.4               | 89.0               | 2.0       | 41.0               | 171.0     | 0.3       | 301.0     | 13.8     |
|                          | Min       | 78.1               | 12.0               | 0.0       | 20.0               | 155.0     | 0.1       | 287.0     | 12.2     |
| <b>Quarter Average</b>   |           | 82.0               | 30.3               | 0.3       | 30.3               | 160.7     | 0.2       | 298.0     | 12.3     |
| <b>Quarter Max Value</b> |           | 89.4               | 89.0               | 10.0      | 43.0               | 171.0     | 0.6       | 304.0     | 13.8     |
| <b>Quarter Min Value</b> |           | 72.8               | 12.0               | 0.0       | 19.0               | 154.0     | 0.0       | 287.0     | 12.2     |
| <b>Limits:</b>           |           | 99                 | NA                 | 29        | 100                | 205       | 10        | 331       | 12(a)    |

(a) Carbon flow limit is a minimum value

\* Note: The data reported herein represent 24-hour average data for all parameters. Emissions excursions that are measured on shorter time intervals (i.e., 4-hour block averages for CO) do not correlate with the 24-hour average data reported above.

**Table 12: Unit #2 Monthly Summary for Reportable Emissions Data**

| Group#-Channel#          | G8-C35    | G8-C28             | G8-C8              | G8-C4     | G8-C12             | G8-C34    | G8-C37    | G8-C40    | G8-C39   |     |
|--------------------------|-----------|--------------------|--------------------|-----------|--------------------|-----------|-----------|-----------|----------|-----|
| Long Descrip.            | U-2 Steam | U-2 Econ           | U-2 Stack          | U-2 Stack | U-2 Stack          | U-2 Opaci | U-2 FF In | U-2 Carbo | U-2 Lime |     |
| Short Descrip.           | SteamFl   | SO <sub>2</sub> ec | SO <sub>2</sub> sc | COsc      | NO <sub>x</sub> sc | Opacity   | FF InTemp | Carblnj   | LimeFlow |     |
| Units                    | K#/Hr     | ppmc               | ppm                | ppmc      | ppmc               | %         | deg F     | #/hr      | gpm      |     |
| Range                    | 0-100     | 0-2000             | 0-500              | 0-4000    | 0-1000             | 0-100     | 100-500   | 0-50      | 0-20     |     |
| Apr - 20                 | AVG       | 81.3               | 46.0               | 2.0       | 34.0               | 147.0     | 1.0       | 302.0     | 12.2     | 4.6 |
|                          | Max       | 89.0               | 61.0               | 8.0       | 42.0               | 162.0     | 1.4       | 302.0     | 12.4     | 4.0 |
|                          | Min       | 73.2               | 28.0               | 0.0       | 29.0               | 82.0      | 0.7       | 302.0     | 12.2     | 3.0 |
| May - 20                 | AVG       | 80.0               | 47.0               | 1.0       | 35.0               | 82.0      | 1.2       | 303.0     | 12.3     | 3.7 |
|                          | Max       | 88.5               | 70.0               | 5.0       | 50.0               | 83.0      | 1.7       | 305.0     | 12.4     | 4.1 |
|                          | Min       | 71.6               | 37.0               | 0.0       | 18.0               | 81.0      | 1.0       | 302.0     | 12.3     | 3.3 |
| Jun - 20                 | AVG       | 87.2               | 35.0               | 1.0       | 40.0               | 83.0      | 1.5       | 303.0     | 12.3     | 4.0 |
|                          | Max       | 91.3               | 49.0               | 4.0       | 55.0               | 87.0      | 1.8       | 306.0     | 12.4     | 4.3 |
|                          | Min       | 77.7               | 24.0               | 0.0       | 29.0               | 81.0      | 1.2       | 302.0     | 12.3     | 3.5 |
| <b>Quarter Average</b>   |           | 82.8               | 42.7               | 1.3       | 36.3               | 104.0     | 1.2       | 302.7     | 12.3     | 4.1 |
| <b>Quarter Max Value</b> |           | 91.3               | 70.0               | 8.0       | 55.0               | 162.0     | 1.8       | 306.0     | 12.4     | 4.3 |
| <b>Quarter Min Value</b> |           | 71.6               | 24.0               | 0.0       | 18.0               | 81.0      | 0.7       | 302.0     | 12.2     | 3.0 |
| <b>Limits:</b>           |           | 98                 | NA                 | 29        | 100                | 205       | 10        | 330       | 12(a)    |     |

(a) Carbon flow limit is a minimum value

\* Note: The data reported herein represent 24-hour average data for all parameters. Emissions excursions that are measured on shorter time intervals (i.e., 4-hour block averages for CO) do not correlate with the 24-hour average data reported above.

**Table 13: Unit #3 Monthly Summary for Reportable Emissions Data**

| Group#-Channel#          | G8-C35    | G8-C28             | G8-C8              | G8-C4     | G8-C12             | G8-C34    | G8-C37    | G8-C40    | G8-C39   |     |
|--------------------------|-----------|--------------------|--------------------|-----------|--------------------|-----------|-----------|-----------|----------|-----|
| Long Descrip.            | U-3 Steam | U-3 Econ           | U-3 Stack          | U-3 Stack | U-3 Stack          | U-3 Opaci | U-3 FF In | U-3 Carbo | U-3 Lime |     |
| Short Descrip.           | SteamFl   | SO <sub>2</sub> ec | SO <sub>2</sub> sc | COsc      | NO <sub>x</sub> sc | Opacity   | FF InTemp | CarbInj   | LimeFlow |     |
| Units                    | K#/Hr     | ppmc               | ppm                | ppmc      | ppmc               | %         | deg F     | #/hr      | gpm      |     |
| Range                    | 0-100     | 0-2000             | 0-500              | 0-4000    | 0-1000             | 0-100     | 100-500   | 0-50      | 0-20     |     |
| Apr - 20                 | AVG       | 83.1               | 46.0               | 2.0       | 23.0               | 159.0     | 1.2       | 298.0     | 12.3     | 3.6 |
|                          | Max       | 90.7               | 68.0               | 6.0       | 35.0               | 161.0     | 1.8       | 299.0     | 12.4     | 4.4 |
|                          | Min       | 76.9               | 35.0               | 0.0       | 18.0               | 158.0     | 0.6       | 298.0     | 12.1     | 3.1 |
| May - 20                 | AVG       | 81.5               | 45.0               | 2.0       | 20.0               | 159.0     | 1.0       | 298.0     | 12.3     | 3.6 |
|                          | Max       | 89.1               | 63.0               | 3.0       | 32.0               | 161.0     | 2.0       | 298.0     | 13.0     | 3.9 |
|                          | Min       | 73.1               | 34.0               | 0.0       | 12.0               | 155.0     | 0.2       | 296.0     | 12.1     | 3.2 |
| Jun - 20                 | AVG       | 88.6               | 38.0               | 1.0       | 24.0               | 159.0     | 0.6       | 298.0     | 12.3     | 3.9 |
|                          | Max       | 92.8               | 47.0               | 4.0       | 36.0               | 162.0     | 0.8       | 299.0     | 12.3     | 4.2 |
|                          | Min       | 79.3               | 28.0               | 1.0       | 17.0               | 156.0     | 0.4       | 297.0     | 12.2     | 3.4 |
| <b>Quarter Average</b>   |           | 84.4               | 43.0               | 1.7       | 22.3               | 159.0     | 0.9       | 298.0     | 12.3     | 3.7 |
| <b>Quarter Max Value</b> |           | 92.8               | 68.0               | 6.0       | 36.0               | 162.0     | 2.0       | 299.0     | 13.0     | 4.4 |
| <b>Quarter Min Value</b> |           | 73.1               | 28.0               | 0.0       | 12.0               | 155.0     | 0.2       | 296.0     | 12.1     | 3.1 |
| <b>Limits:</b>           |           | 98                 | NA                 | 29        | 100                | 205       | 10        | 332       | 12(a)    |     |

(a) Carbon flow limit is a minimum value

\* Note: The data reported herein represent 24-hour average data for all parameters. Emissions excursions that are measured on shorter time intervals (i.e., 4-hour block averages for CO) do not correlate with the 24-hour average data reported above.

## APPENDIX B SITE PHOTOS – FISCAL YEAR 2020



Figure 1: Boiler No. 3 Grates – Boiler No. 3 Cleaning Outage in progress – August 2019



Figure 2: SDA Penthouse No. 2 – Recently Painted Deck – August 2019



Figure 3: Baghouse Hopper Aisle – August 2019



Figure 4: Concrete Speed Bump at Tipping Floor Exit – August 2019

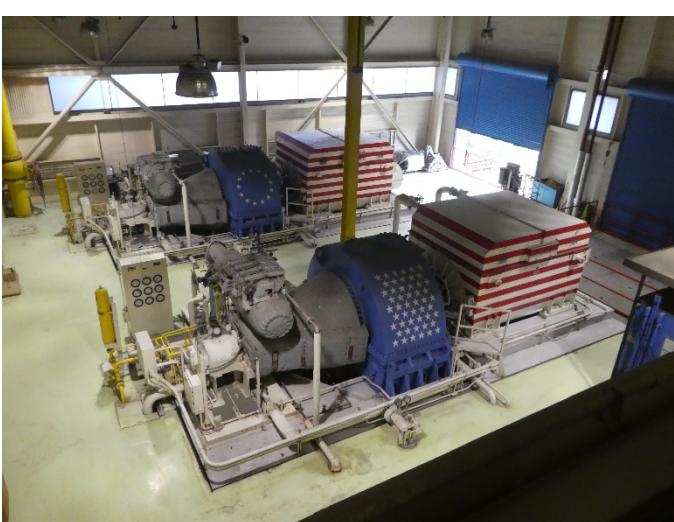


Figure 5: Turbine Generators – August 2019

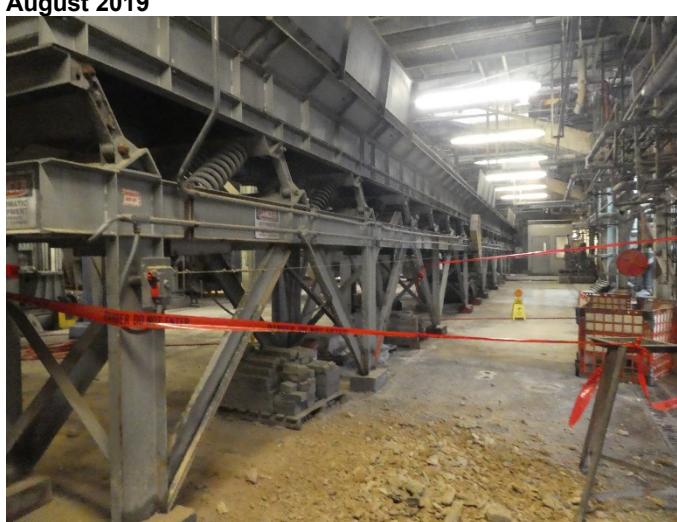


Figure 6: Main Vibrating Conveyor – Boiler No. 3 Cleaning Outage in progress – August 2019



Figure 7: New nozzle installation in upper elevation of Boiler – Boiler No. 2 LN<sup>TM</sup> Technology Installation – November 2019



Figure 8: New larger Over Fire Air Fan – Boiler No. 2 LN<sup>TM</sup> Technology Installation – November 2019



Figure 9: Boiler No. 2 bullnose and ignition roof replaced – Boiler No. 2 Outage – November 2019



Figure 10: Grates and Scaffolding Installed – Boiler No. 2 Outage – November 2019



Figure 11: Turbine Deck Overview Photo – TG No. 1 Overhaul In-Progress – November 2019



Figure 12: Upper Shell Removed – TG No. 1 Overhaul – November 2019



Figure 13: Generator Stator – TG No.1 Overhaul – November 2019



Figure 14: Generator Rotor Removed for Inspection and Testing – TG No. 1 Overhaul – November 2019



Figure 15: Turbine Rotor Removed for Sandblasting and Inspection – TG No. 1 Overhaul – November 2019



Figure 16: New Stoker Programmable Logic Controls Installation In-Progress – Boiler No. 2 Outage



Figure 17: New Automatic Voltage Regulator Cabinet Installation in Control Room – TG No. 1 Overhaul – November 2019



Figure 18: New Feeder Controls Installed – Boiler No. 2 Outage – November 2019



Figure 19: New Concrete – Southeast Corner of Ash Trailer Canopy – November 2019



Figure 20: New Concrete – Scale Entrance – November 2019



Figure 21: New Concrete – Scale Exit – November 2019



Figure 22: Tipping Floor Center Bay Surface Replaced – Approximately 800 ft<sup>2</sup> – November 2019



Figure 23: New Larger Boiler No. 2 Over Fire Air Fan Fully In Service – Boiler No. 2 LN Technology Upgrade – February 2020



Figure 24: New Automatic Voltage Regulator Cabinet Fully In Service – Turbine Generator No. 1 Overhaul Installation – February 2020



Figure 25: New Grate Bars Staged for Installation – Boiler No. 1 Outage in Progress – February 2020



Figure 26: Grates Cleaned off and Scaffolding Installed – Boiler No. 1 Outage in Progress – February 2020



Figure 27: General Facility Photo from northeast corner of Property – August 2019



Figure 28: General Facility Photo - Southwest Corner of Facility – November 2019



Figure 29: General Facility Photo – East Side from Fire Station Entrance – February 2020



Figure 30: Induced Draft Fan, SDA, Dolomitic Lime Silo, and Economizer – February 2020