Alexandria Arlington Resource Recovery Facility

Fiscal Year 2021

Second Quarter Operations Report

February 2021

Prepared by:

HDR Engineering, Inc.
4830 W. Kennedy Blvd., Suite 400
Tampa, Florida 33609-2548

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Definition of Abbreviations & Acronyms

Abbreviation/Acronym	Definition
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
HCl	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_x	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_2	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
Second Quarter Operations Report – Fiscal Year 2021

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 Second Quarter of the 2021 Fiscal Year. This report summarizes Facility operations between October 1, 2020 and December 31, 2020 and identifies the fiscal year beginning on July 1, 2020 as FY21 and the quarter beginning on October 1, 2020 as Q2FY21.

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 Q2FY21. The entire quarter was subject to additional protocols per Covanta corporate direction to address the Coronavirus Pandemic. 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 Q2FY21, the boilers experienced three (3) instances of unscheduled downtime totaling 34.6 hours, and the turbine generators experienced one (1) instance of unscheduled downtime totaling 10.1 hours. Boiler No. 2 experienced 23.0 hours of scheduled downtime to complete a repair to the feed table refractory drop-of wall and Boiler No. 1 experienced 301.0 hours of scheduled downtime for a major outage that included the installation of the Low NO_x (LN^{TM})

Technology. Turbine Generator No. 1 experienced 33.1 hours of scheduled downtime for warranty work due to oil leaks on the bearings. The boilers experienced one (1) instance of standby downtime totaling 24.0 hours and the turbine generators experienced one (1) instance of standby downtime totaling 15.8 hours. A detailed listing of downtime is provided in Section 5.2 of this report.

Average waste processed during the quarter was 932.9 tons per day, or 95.7% of nominal facility capacity. Waste deliveries averaged 909.1 tons per day, which is lower (2.6%) than the burn rate.

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 lower (less than 0.1%) compared to the corresponding quarter in FY20; steam production decreased (0.3%), and electricity generated (gross) increased (2.3%) from the corresponding quarter in FY20. The slight decrease in steam generation occurred despite less boiler downtime (62.1 fewer hours) and a slight increase in waste heating value (0.5%). The increase in electricity generated (gross) in Q2FY21 is attributable to significantly less turbine generator downtime (561.5 fewer hours) compared to the same quarter last fiscal year when a Turbine Generator No. 1 Major Overhaul was conducted.

3.0 Facility Inspection and Records Review

In November 2020, HDR met with the Facility management and other plant personnel to discuss Facility operations and maintenance, perform an independent visual inspection of the operating Facility, photograph areas of interest, and perform a review of recent Facility activity. HDR obtained operating data and monthly reports electronically from CAAI throughout the quarter and

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	Pothole, southeast corner of Ash Trailer Canopy	August 2015	C	Repair road surface	**Status Unchanged**	Open
2	Pavement spider-cracking at Tipping Floor Entrance	November 2016	C	Resurface section of pavement at Tipping Floor Entrance	**Status Unchanged**	Open
3	SDA Penthouse No. 3 Door deteriorated at base	November 2017	C	Patch and Paint Door – Replace if necessary	**Status Unchanged**	Open
4	Roof Ventilation Fan Not Working above Deaerator	May 2019	C	Repair roof ventilation fan	**Status Unchanged**	Open
5	Deterioration behind lime slurry piping in SDA Penthouse No. 2	August 2019	C	Replace kick-plate and conduct painting preservation measures	**Status Unchanged**	Open
6	Siding deteriorated beneath Baghouse No. 3 Hoppers	August 2019	C	Replace siding	**Status Unchanged**	Open
7	Siding on north side of Baghouse No. 2 Deteriorated	February 2020	C	Replace siding and conduct painting preservation measures	**Status Unchanged**	Open
8	Siding on east side of Tipping Floor Enclosure corroded	February 2020	C	Patch siding and conduct painting preservation measures	**Status Unchanged**	Open
9	Damaged/Missing insulation and lagging throughout Facility	August 2020	C	Replace damaged/missing insulation and lagging throughout the Facility	**Status Unchanged**	Open
10	Damaged/Missing insulation and lagging throughout Facility	August 2020	C	Replace damaged/missing insulation and lagging throughout the Facility	**Status Unchanged**	Open
11	Damaged overhead roll-up door at Main Condenser Enclosure	August 2020	C	Repair Roll-up Door	**Status Unchanged**	Open
12	Steam valve leaking, northwest corner of Boiler No. 3 at Penthouse Elevation	August 2020	C	Repair/Repack steam valve	**Status Unchanged**	Open
13	Emergency backup generator is out of service	August 2020	A	Repair or replace Emergency Backup Generator	**Status Unchanged**	Open
14	Steam Valve (typical of 2 locations) Packing Leaking above Boiler Nos. 1 and 3 – See Figure 1 in Appendix B	November 2020	C	Adjust/repair leaking packing	**Status Unchanged**	Open
15	Roof Ventilation Fan above Boiler No. 3 is not operating– See Figure 2 in Appendix B	November 2020	C	Repair roof ventilation fan	**Status Unchanged**	Open

4.0 Facility Performance

Monthly operating data provided by CAAI indicates that 85,827 tons of MSW were processed during Q2FY21, and a total of 83,637 tons of MSW including 2,834 tons of Special Handling Waste (3.4% by weight) were received. Total ash production during the quarter was 18,052 tons, which represents 21.0% of the waste processed by weight. The average uncorrected steam production rate for Q2FY21 was 2.95 $tons_{steam}/ton_{waste}$, which is slightly lower (0.3%) than the corresponding quarter in FY20. The decrease in this metric occurred despite the slight increase (0.5%) in the quarterly average waste heating value (HHV) calculated by CAAI.

Chart 1: Tons of Waste Processed

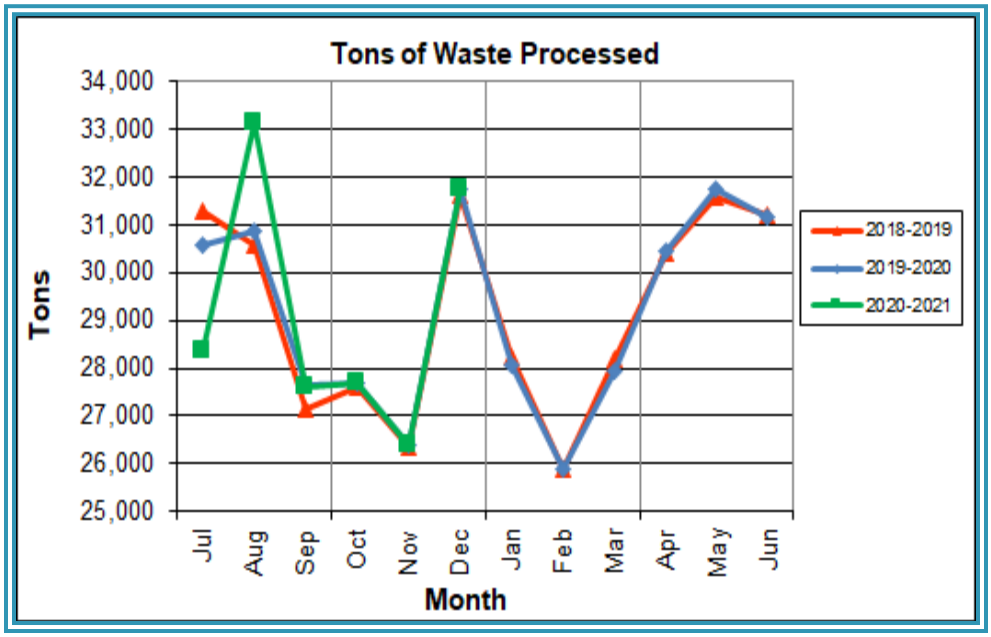


Chart 1 illustrates that Q2FY21 waste processed was slightly lower (less than 0.1%) than the corresponding quarter, Q2FY20. The slight decrease occurred despite less (62.1 fewer hours) downtime experienced by the boilers, and is primarily attributed to throttled operation due to steam permit rolling average restrictions during each month in Q2. CAAI reported that 422 tipping floor/MSW internal inspections were conducted during the quarter and four (4) notices of violation (NOVs) were issued to haulers for the following issues:

- October 2020 – two (2) NOVs were issued for:

- Excessive tires in the load
- Excessive metal in the load

- November 2020 – one (1) NOV was issued for concrete in the load
- December 2020 – one (1) NOV was issued for excessive metal in the load

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

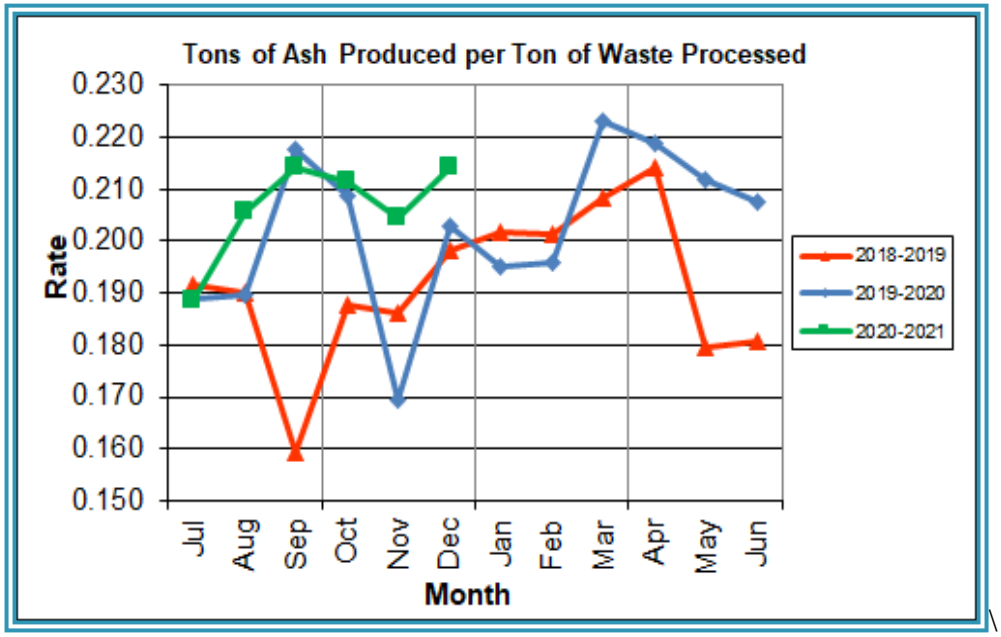


Chart 2 illustrates that the average ash production rate in Q2FY21 was higher (1.6%) at 21.0% of processed waste, compared to the corresponding quarter in FY20 when the rate was 19.4%. CAAI reports that it continues to process recovered metals through a trommel screen to remove some of the residual ash, which is quantified and added back into the monthly ash totals. Note that this screening was not performed in the prior 2 years during the same quarter.

Chart 3: Ferrous Recovery Rate

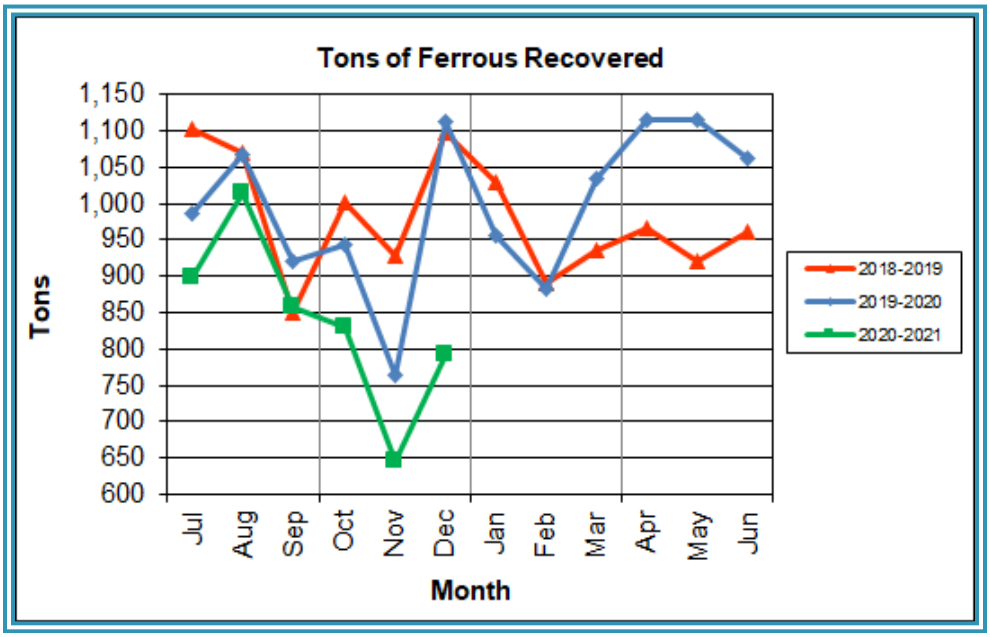
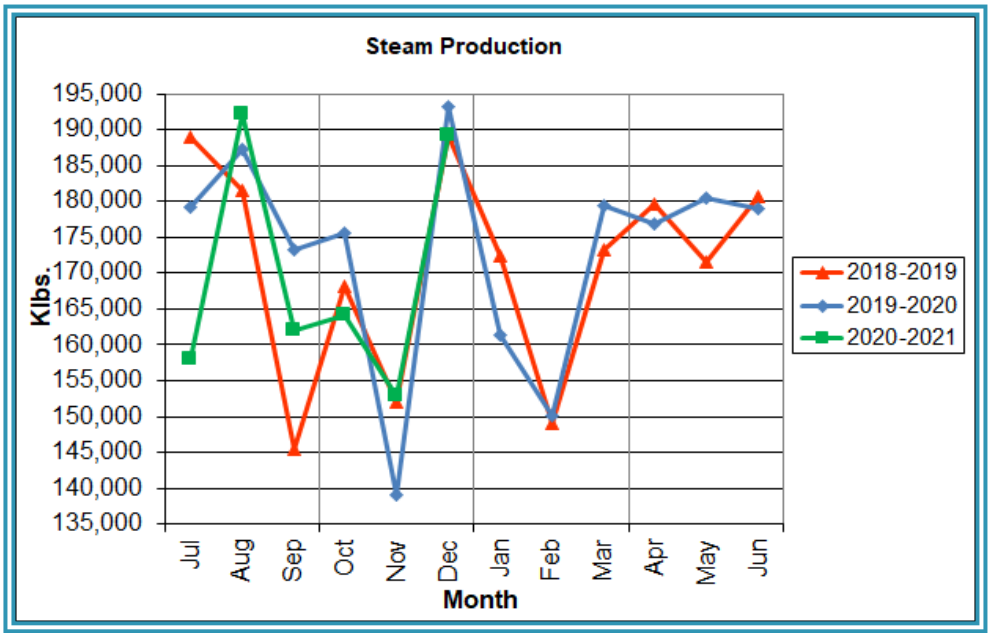


Chart 3 depicts the monthly ferrous metal recovery rate as a percentage of processed MSW tonnage. In Q2FY21, 2,265 tons of ferrous metals were recovered, which is 19.7% lower than the corresponding quarter in FY20 and equivalent to 2.6% of processed waste. As previously mentioned, the post-combustion recovered ferrous metals were processed through a trommel during the quarter to remove entrained ash, which results in a lower, but cleaner recovered metal tonnage.

Chart 4: Steam Production



In Chart 4, the total steam production for Q2FY21 was 506,239 klbs, and slightly lower (0.3%) than the corresponding quarter in FY20. The decrease in steam generation occurred despite less boiler downtime (62.1 fewer hours) and a slight increase in waste heating value (0.5%).

Chart 5: 12-Month Rolling Steam Production

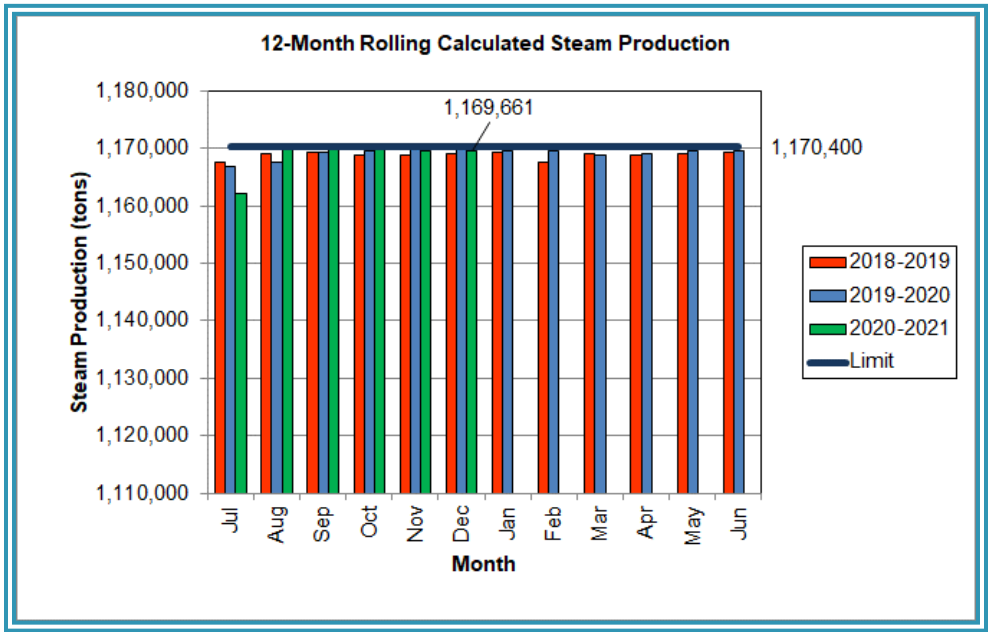
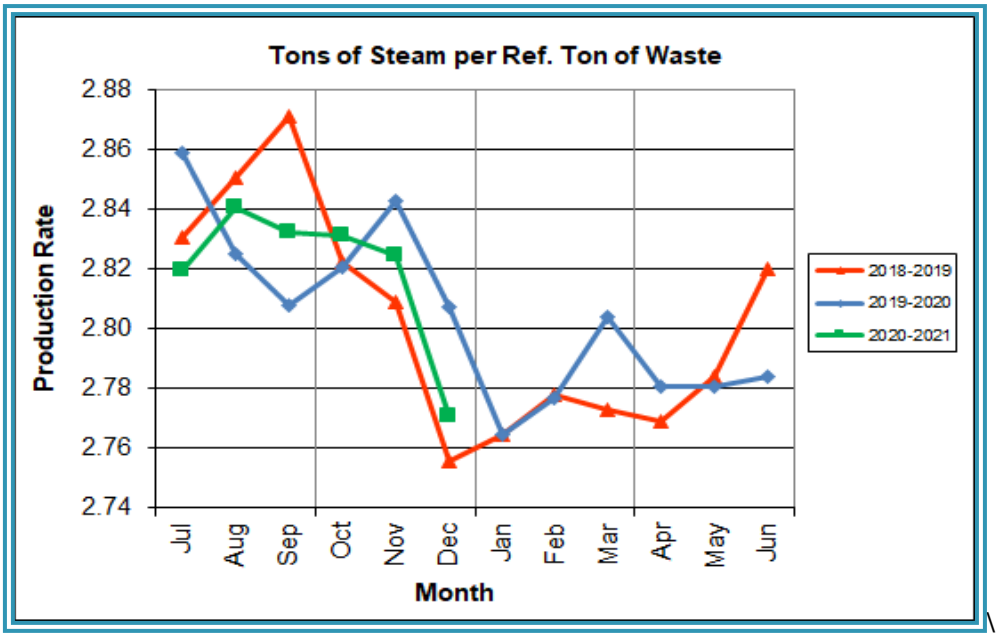


Chart 5 depicts the 12-month rolling steam production total for the quarter ending in December 2020, and for the prior two (2) fiscal years. According to the Title V

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 Q2FY21. The 12-month rolling total for steam production ending in December 2020 was 1,169,661 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.

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 Q2FY21, this metric tracked slightly lower (0.6%) at 2.81 $tons_{steam}/ton_{ref}$ compared to the corresponding quarter in FY20. The decrease in this metric shows indicates a slight decline in boiler performance.

Chart 7: Calculated Waste Heating Value

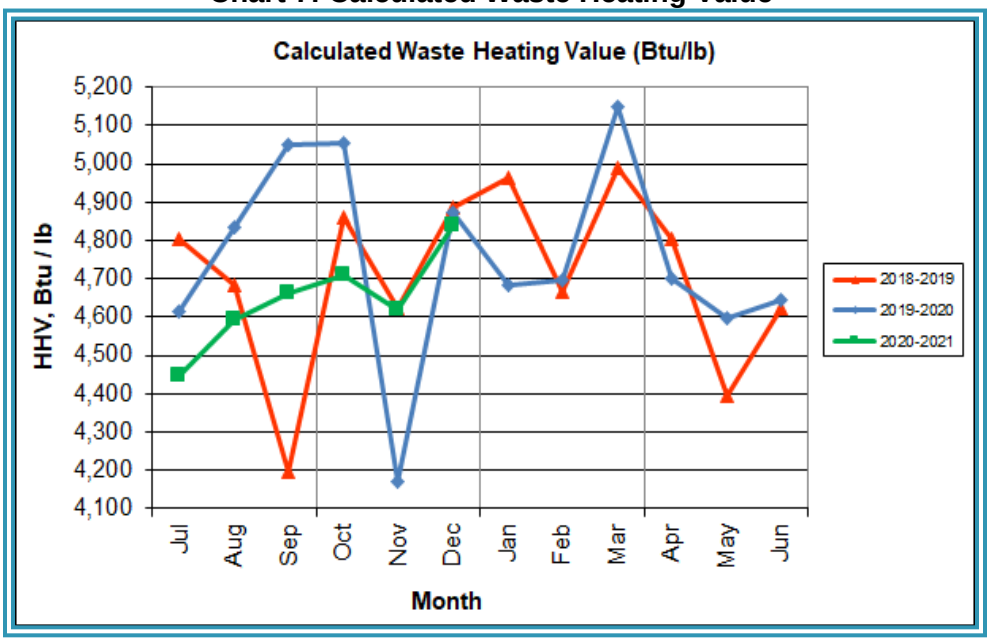


Chart 7 illustrates that Q2FY21 calculated average waste heating value was slightly higher (0.5%) at 4,722 Btu/lb than the corresponding quarter Q2FY20, which averaged 4,701 Btu/lb. Note that 16.0 inches of precipitation were recorded at Ronald Reagan National Airport in Q2FY21 compared to 11.5 inches of precipitation in Q2FY20 which is 39.4% higher[1]. Note that the high variability in November HHV compared to the prior and subsequent month continued during Q2FY21.

[1] https://www.wunderground.com/

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)
Q2FY19	**Quarterly Totals**	**85,584**	**0**	**16,355**	**3,033**	**3,026**	**509,442**	**35,419**
	October-18	27,584	0	5,173	1,108	1,001	168,116	11,381
	November-18	26,367	0	4,909	992	928	152,101	10,268
	December-18	31,633	0	6,273	933	1,097	189,225	13,770
Q2FY20	**Quarterly Totals**	**85,836**	**0**	**16,689**	**3,824**	**2,820**	**507,778**	**34,298**
	October-19	27,685	0	5,780	1,340	944	175,493	12,155
	November-19	26,393	0	4,468	1,238	764	139,112	8,187
	December-19	31,758	0	6,441	1,246	1,112	193,173	13,956
Q2FY21	**Quarterly Totals**	**85,827**	**0**	**18,052**	**2,834**	2,265	**506,239**	**35,289**
	October-19	27,695	0	5,858	1,045	829	164,131	11,300
	November-19	26,378	0	5,391	930	645	152,871	10,355
	December-19	31,754	0	6,803	859	791	189,237	13,634
FY21 YTD Totals		**174,933**	**0**	**36,120**	**5,591**	**5,033**	**1,018,523**	**70,135**
FY20 Totals		**350,147**	**0**	**70,964**	**13,226**	**11,966**	**2,074,819**	**143,282**
FY19 Totals		**350,057**	**0**	**67,068**	**11,778**	**11,756**	**2,052,153**	**142,430**

Table 2 presents the production data provided to HDR by CAAI for Q2FY21 on both a monthly and quarterly basis. For purposes of comparison, data for Q2FY19 and Q2FY20 are also shown, as well as FY19, FY20 and FY21 year-to-date (YTD) totals.

In comparing quarterly totals, the data shows:

- Slightly less waste was processed in Q2FY21 than Q2FY20 and more than Q2FY19
- Less steam was generated in Q2FY21 than Q2FY20 and Q2FY19
- More electricity (net) was generated in Q2FY21 than Q2FY20 and less Q2FY19
- Less supplemental waste was received in Q2FY21 than Q2FY20 and Q2FY19.

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 straight monthly basis.

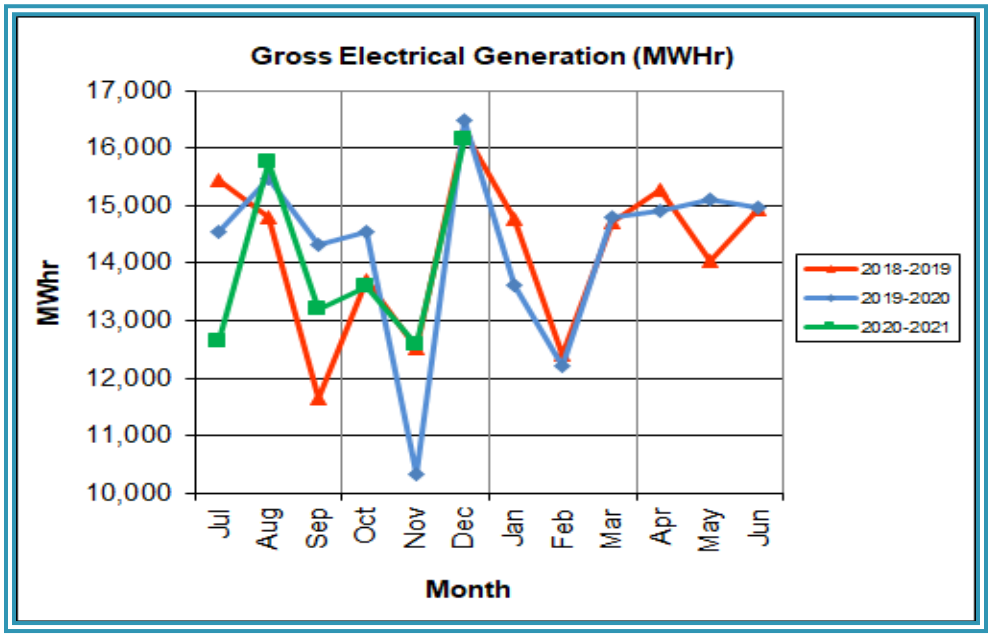
Table 3: Waste Delivery Classification

		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	% of Total
FY17	City Waste	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%
	County Waste	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%
	Municipal Solid Waste	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%
	Supplemental Waste	504	642	734	926	941	1,036	1,083	1,413	1,291	1,420	1,705	1,717	13,412	3.85%
	MSW Totals	**29,430**	**31,922**	**27,532**	**26,941**	**26,677**	**31,030**	**29,185**	**25,769**	**25,814**	**30,677**	**32,895**	**30,743**	**348,615**	**100.00%**
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	% of Total
FY18	City Waste	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%
	County Waste	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%
	Municipal Solid Waste	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%
	Supplemental Waste	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%
	MSW Totals	**30,914**	**31,668**	**27,478**	**26,772**	**25,146**	**29,869**	**30,726**	**25,185**	**27,770**	**32,040**	**34,086**	**30,039**	**351,693**	**100.00%**
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	% of Total
FY19	City Waste	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%
	County Waste	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%
	Municipal Solid Waste	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%
	Supplemental Waste	1,012	1,040	1,138	1,108	992	933	964	743	885	895	1,038	1,029	11,777	3.38%
	MSW Totals	**30,862**	**31,595**	**27,388**	**27,438**	**27,102**	**28,150**	**26,808**	**26,342**	**29,157**	**33,904**	**31,913**	**27,793**	**348,454**	**100.00%**
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	% of Total
FY20	City Waste	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%
	County Waste	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%
	Brokered Waste	-	-	-	-	-	-	120	114	67	58	-	-	359	0.10%
	Municipal Solid Waste	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%
	Supplemental Waste	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%
	MSW Totals	**32,440**	**28,979**	**27,634**	**29,541**	**26,324**	**29,487**	**30,781**	**25,371**	**25,939**	**29,309**	**32,745**	**33,207**	**351,757**	**100.00%**
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	% of Total
FY21	City Waste	1,583	1,905	2,121	1,906	1,970	1,999							11,484	6.61%
	County Waste	2,377	2,713	2,711	2,589	2,550	2,646							15,586	8.97%
	Brokered Waste	-	-	-	-	-	-	-	-	-	-	-	-	0	0.00%
	Municipal Solid Waste	22,517	26,941	24,523	22,102	19,209	25,831							141,124	81.21%
	Supplemental Waste	691	1,139	927	1,045	930	859							5,592	3.22%
	MSW Totals	**27,169**	**32,698**	**30,282**	**27,642**	**24,659**	**31,336**							**173,787**	100.00%

Chart 8: Cumulative Total Waste Delivery

As depicted in Table 3 and Chart 8, for the quarter ending December 2020, cumulative total waste delivery was 0.4% lower compared to the same period in FY20.

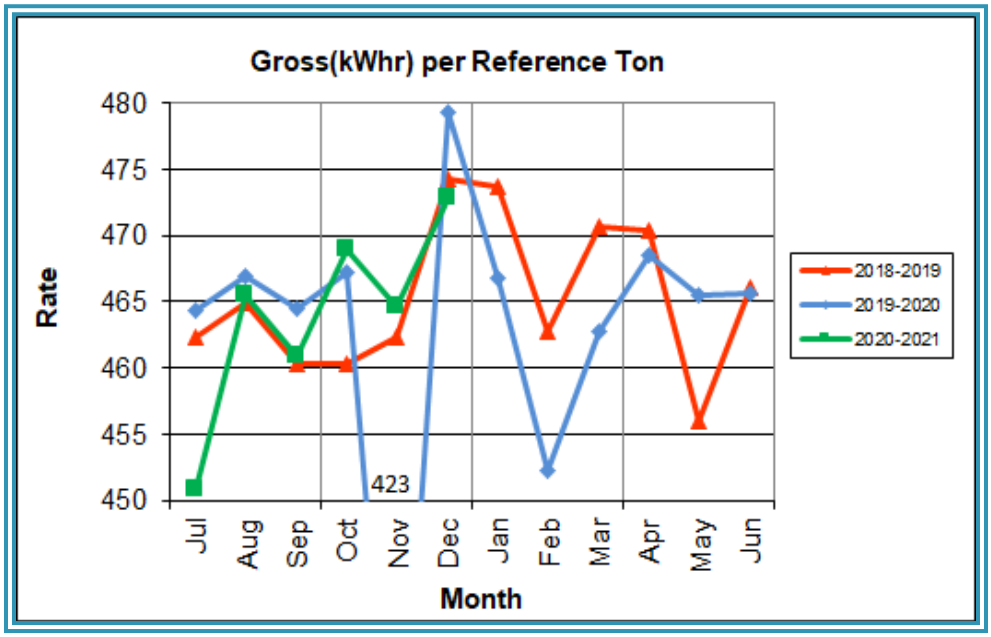
Chart 9: Gross Electrical Generation



During Q2FY21, the Facility generated 42,317 MWhrs (gross) of electricity compared to Q2FY20 generation of 41,376 MWhrs (gross), a 2.3% increase. The increase in electricity generated (gross) in Q2FY21 is attributable to

significantly less turbine generator downtime (561.5 fewer hours) compared to the same quarter last fiscal year when a Turbine Generator No. 1 Overhaul was conducted. Note that the sharp spikes depicted in Chart Nos. 9 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.

Chart 10: Gross Conversion Rate



As shown in Chart 10, the average gross electrical generation per reference ton of refuse processed during Q2FY21 was 469 kWhr, which is higher (2.7%) than the corresponding quarter in FY20. Since this calculated value uses reference or normalized tonnages of waste, it should cancel the effect of MSW heating value (Btu content) variability.

Chart 11: Net Conversion Rate

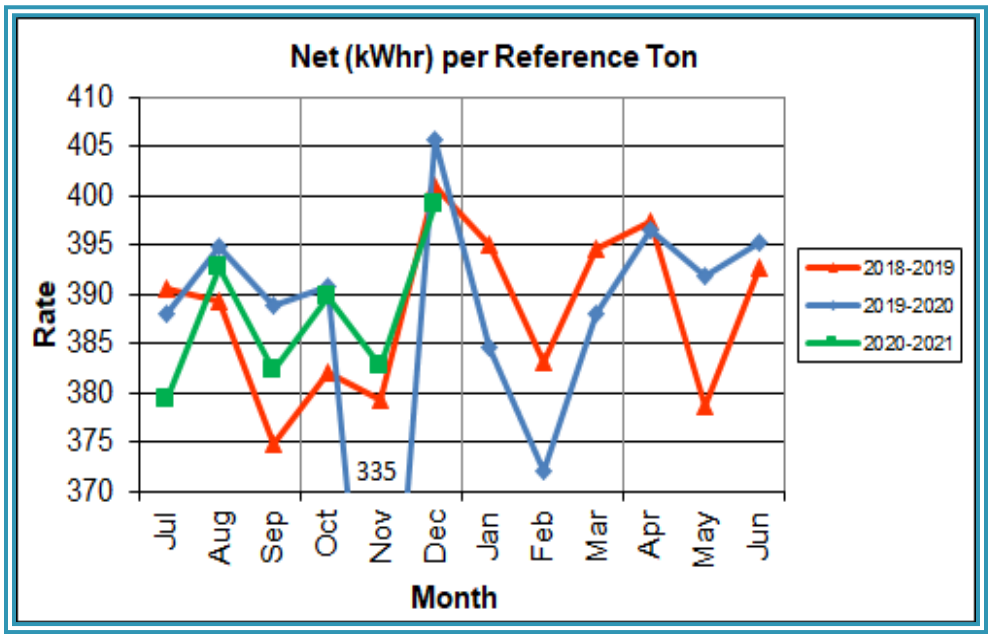


Chart 11 depicts the normalized net power (gross minus in-house usage) generation history. In Q2FY21, the average net electrical generation per reference ton was 391 kWhr, which is 3.6% higher than the corresponding quarter in FY20.

Chart 12: Net Conversion Rate

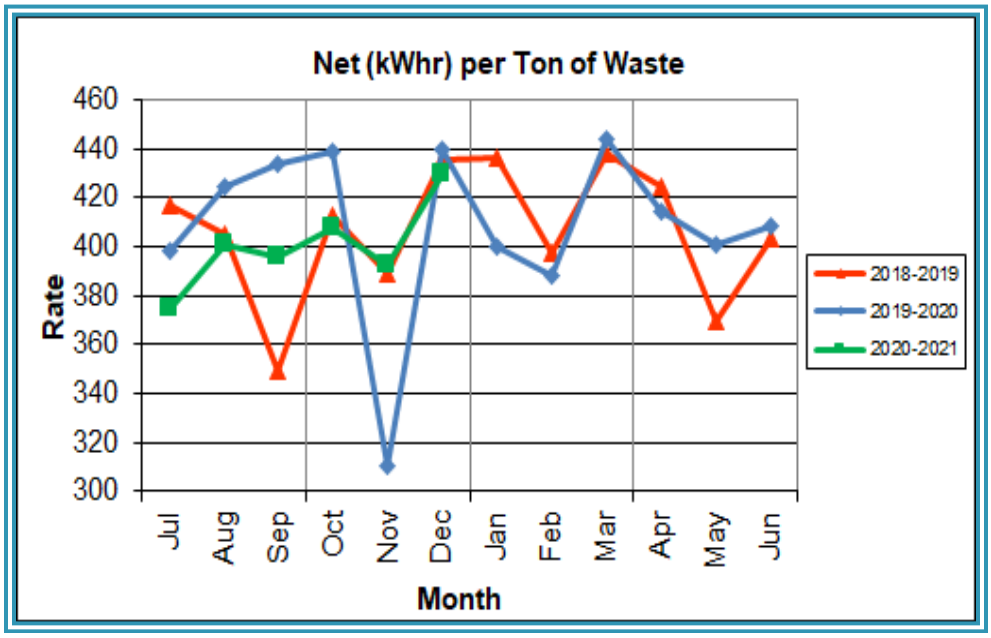


Chart 12 depicts the net power generation per processed ton. The net electrical generation per processed ton in Q2FY21 was 410 kWhr, which is 3.5% higher

than the corresponding quarter in FY20 and attributable to significantly less turbine generator downtime (561.5 fewer hours) compared to the same quarter last fiscal year when a Turbine Generator No. 1 Overhaul was conducted.

Chart 13: Gross Turbine Generator Conversion Rate

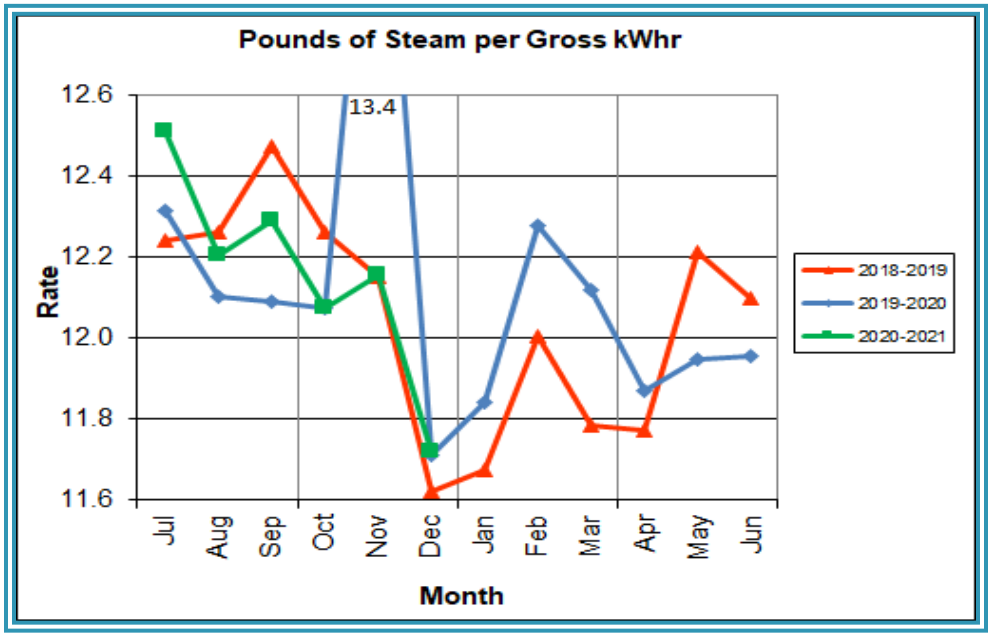


Chart 13 illustrates the quantities of steam required to generate one (1) kWhr of electricity. This measure is a turbine generator performance indicator, where lower steam rates indicate superior performance. For simplification, this calculated rate is based on the average for the two turbine generators. In Q2FY21 the average pounds of steam consumed per gross kWhr generated was 12.0, which is 2.5% lower (more efficient) than the corresponding quarter Q2FY20. A factor that negatively impacts this metric is Turbine Generator No. 2 continues to operate with its Stage 9 blades removed from the rotor[2]. Another factor is the diversion of steam to heat under-grate air to improve the combustion of low Btu (wet) fuel. This steam diversion decreases power generation. The average main steam temperature during the quarter was 680.7°F, which is 2.3°F higher than the average main steam temperature of the corresponding quarter

[2] 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.

last fiscal year and 19.3°F lower than design temperature of 700°F. Lower main steam temperature decreases power generation, all other factors being equal.

4.1 Utility and Reagent Consumptions

Table 4: Facility Utility and Reagent Consumptions

Utility	Units	Q2FY21 Total	Q2FY20 Total	Q2FY21"Per Processed Ton" Consumption	Q2FY20"Per Processed Ton" Consumption	FY21 YTD Total
Purchased Power	MWhr	5,493	5,629	0.0640	0.0656	10,761
Fuel Oil	Gal.	9,660	9,640	0.11	0.11	31,530
Boiler Make-up	Gal.	1,099,000	2,567,000	12.80	29.91	2,447,000
Cooling Tower Make-up	Gal.	32,937,463	32,883,491	383.77	383.10	76,200,607
Pebble Lime	Lbs.	1,596,000	1,304,000	18.60	15.19	3,158,000
Ammonia	Lbs.	164,000	171,000	1.91	1.99	347,000
Carbon	Lbs.	78,000	72,000	0.91	0.84	152,000

Fuel oil usage during the quarter represents approximately 0.17% of the total heat input to the boilers, which compares favorably with industry averages, and is identical to the percentage of heat input in Q2FY20. 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 1.8% of steam flow, which is significantly lower than the boiler makeup in Q2FY20 which was 4.2% of steam flow. Higher boiler makeup quantities are indicative of increased steam leakage, and the improvement in this metric indicates that the leakages have been substantially corrected. Pebble lime usage, at 1,596,000 lbs. is significantly higher (22.4%) than the corresponding quarter last year. CAAI reports that the significant increase in pebble lime usage is attributable to results from ash testing requiring an increase in lime slurry flow to maintain the required pH range. During Q2FY19, CAAI reported that it was discontinuing dolomitic lime feed, while increasing lime slurry feed (pebble lime) 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 Q2FY21 to Q2FY20 on a per processed ton consumption basis:

- the purchased power consumption rate was 2.4% lower
- the total fuel oil consumption rate was 0.2% higher
- the boiler make-up water consumption rate was 57.2% lower

- the cooling tower make-up water consumption rate was 0.2% higher
- the total pebble lime consumption rate was 22.4% higher
- the ammonia consumption rate was 4.1% lower
- the carbon consumption rate was 8.3% higher

4.2 Safety & Environmental Training

The Facility experienced no OSHA recordable accidents and two (2) First Aid Accidents; one (1) for ammonia exposure and one (1) for a contractor experiencing a burn to their wrist. CAAI has operated 1,011 days without an OSHA recordable accident as of December 31, 2020. Safety and Environmental training were conducted with themes as follows:

October 2020

- Safety:
  - Hazardous Materials and Labeling
  - Disposal of Potentially Contaminated Debris
  - Unknown Chemicals
  - Pressure Washing
  - Receiving Feedback
- Environmental:
  - Animal and Plant Health Inspection Service (APHIS) Waste Training

November 2020

- Safety:
  - The 3 R's
  - What if?
  - Chemical Unknown
  - Disposal of Contaminated Debris/Disinfecting
  - Pressure Washer Injury
- Environmental:
  - ECOM Self-Paced Training

December 2020

- Safety:
    - Fit-for-Duty Stretching and Ergonomics
    - Unresponsive Person
    - Angle Grinder Safety
    - Heat Stress
    - Ash Testing
- Environmental:
    - Spill Prevention Control Countermeasure (SPCC)/Storm Water Pollution Prevention Plan (SWPPP) Training
    - Profiled Waste

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 November 1, 2020 Boiler No. 1 experienced 301.0 hours of downtime for a scheduled major boiler outage. Some significant activities that were completed during the outage are:

- Installation of the Low NO_x (LN^{TM}) Technology including:
    - New automated control damper, positioner, associated power and control wiring, and DCS I/O modules on the front and rear OFA header supplies
    - Tertiary nozzles on the left and right side wall in the upper furnace
    - Ductwork from existing combustion air system to new tertiary nozzles
    - Flow measurement device and transmitter
    - Tertiary Control Damper and positioner
    - Pressure Sensing Elements and transmitter

    - Various local instrumentation, valves, dampers, and associated tubing and wiring
    - Control system design and programming to integrate the system into existing combustion and SNCR controls
    - Replacement of the rear 43 bullnose tubes, 18’ long to the header
    - Installation of 24 bent tubes for the nozzle penetrations
- Change-out of the Under Fire Air Fan Motor
- Completion of a 12-step grate bar overhaul
- Completion of a stoker hydraulic upgrade
- Completion of a stoker Programmable Logic Control (PLC) upgrade
- Repair of a cracked boiler casing on the 2.5 and 3.5 level

Beginning November 4, 2020 Turbine Generator No. 1 experienced 33.1 hours of scheduled downtime to complete warranty work to repair oil leaks on the bearings.

Beginning December 1, 2020, Boiler No. 2 experienced 23.0 hours of downtime for a scheduled boiler outage to repair drop-off wall refractory.

In addition to the scheduled outages, CAAI reports that 1,094 preventative maintenance actions were completed during the quarter.

5.1 Availability

Facility availabilities for Q2FY21 are shown in Table 5. According to CAAI reports, the average unit availabilities for Boiler Nos. 1, 2, and 3 for Q2FY21 were 86.1%, 99.0%, and 98.4%, respectively. The three-boiler average availability during the quarter was 94.5%, 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 Q2FY21 were 98.5%, and 98.9%, respectively. The two-turbine generator average availability during the quarter was 98.7%.

Table 5: Quarterly Facility Unit Availabilities

Availability	Q1FY21 Average	Q2FY21 Average	FY21 YTD Average
Boiler No. 1	97.4%	86.1%	91.7%
Boiler No. 2	96.4%	99.0%	97.7%
Boiler No. 3	94.6%	98.4%	96.5%
Avg.	***96.1%***	***94.5%***	***95.3%***
Turbine No. 1	98.6%	98.5%	96.5%
Turbine No. 2	98.6%	98.9%	98.8%
Avg.	***98.6%***	***98.7%***	***97.6%***

Table 6: Boiler Downtime – Q2FY21

Boiler Number	Outage Begin Date	Outage End Date	Hours Unavailable	Downtime Classification	Reason Unavailable
3	10/8/20	10/8/20	8.0	Unscheduled	Replacement of Failed Superheater Safety Valve
3	10/9/20	10/9/20	10.9	Unscheduled	Repair of Waterwall Leak in the Furnace
3	10/30/20	10/31/20	17.5	Unscheduled	Grate Bar Failure Repair
1	10/31/20	10/31/20	24.0	Standby	Process Limitations – 12-Month Rolling Average
1	11/1/20	11/13/20	301.0	Scheduled	Fall 2020 - Scheduled Boiler Outage
2	12/1/20	12/2/20	23.0	Scheduled	Completion of Feed Table Drop-off Wall
Total Unscheduled Downtime				**36.4 Hours**	
Total Scheduled Downtime				**324.0 Hours**	
Total Standby Downtime				**24.0 Hours**	
Total Downtime				**384.4 Hours**	

Table 7: Turbine Generator Downtime – Q2FY21

Turbine Generator Number	Outage Begin Date	Outage End Date	Hours Unavailable	Downtime Classification	Reason Unavailable
1	10/30/20	10/31/20	15.8	Standby	Process Limitations – 12-Month Rolling Average
1	11/4/20	11/5/20	33.1	Scheduled	Scheduled Outage – Warranty Work on Bearings
2	11/12/20	11/13/20	10.1	Unscheduled	Repair of a Solenoid Valve
2	12/2/20	12/2/20	14.5	Scheduled	Dominion Forced Outage – Preventative Maintenance
Total Unscheduled Downtime				**10.1 Hours**	
Total Scheduled Downtime				**47.6 Hours**	
Total Standby Downtime				**15.8 Hours**	
Total Downtime				**73.5 Hours**	

5.2 Facility Housekeeping

CAAI is performing Facility housekeeping and maintaining plant cleanliness in accordance with acceptable industry practices. A site inspection was conducted in November 2020. At the time of the inspection, new deficiencies were recorded, and prior deficiencies were given a status update. Photos of interest from the inspection are depicted in Appendix B. The Facility housekeeping ratings from the November 2020 inspection are presented in Table 8.

Table 8: Facility Housekeeping Ratings – November 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 Q2FY21 are summarized in Appendix A. No permit deviations were reported by the CAAI during Q2FY20 and as of December 31, 2020, the Facility operated 149 days without an environmental excursion.

6.1 Low NO_x 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 2020, Boiler No. 1 was retrofitted with LN™ Technology, including the installation of all associated ductwork, nozzles, and controls. Boiler No. 1 will undergo a period calibration and optimization which is expected to be finalized in the Spring of 2021.

Boiler No. 2 has been operating under the lower NOx limits of 110 ppm (24 hr) and 90 ppm (annual rolling average), since the end of June 2020. CAAI indicated that it plans to install the LN™ Technology on Boiler No. 3 in Fall of 2021.

6.2 Nitrogen Oxide Emissions

During Q2FY21, the monthly emission concentrations of nitrogen oxides (NO_x) averaged 160.7 ppmdv, 82.7 ppmdv, and 159.3 ppmdv for Boiler Nos. 1, 2, and 3, respectively. As previously mentioned, the LN™ Technology was installed on Boiler No. 1 in November 2020 and will undergo a period of calibration and optimization before operating under the lower NOx limits of 110 ppm (24 hr) and 90 ppm (annual rolling average). CAAI continued to operate the Boiler Nos. 1 and 3 at the lower (160 ppmdv) set-points. In comparing Q2FY21 to the corresponding quarter last year, ammonia usage decreased 4.1% while Boiler No. 2 operated at 50% NOx reduction.

6.3 Sulfur Dioxide Emissions

During Q2FY21 the monthly emission concentration of stack sulfur dioxide (SO_2) averaged 2.0 ppmdv, 1.0 ppmdv, and 1.3 ppmdv for Boiler Nos. 1, 2, and 3, respectively. All these stack SO_2 concentrations are significantly below the permit limit of 29 ppmdv @ 7% O_2.

6.4 Carbon Monoxide Emissions

During Q2FY21, the monthly average CO emission concentrations on Boiler Nos. 1, 2, and 3 were 28.7 ppmdv, 37.7 ppmdv, and 20.0 ppmdv, respectively, and all are well within permit limits (100 ppmdv, 4-hour average).

6.5 Opacity

During Q2FY21, the average opacity on Boiler Nos. 1, 2, and 3 were 0.5%, 0.9%, and 1.4%, respectively, which are all significantly below the 10% (6-minute) average permit limit.

6.6 Daily Emissions Data

Appendix A, Tables 10, 11, and 12 tabulate the monthly average, maximum, and minimum emissions data for each unit during Q2FY21. 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.

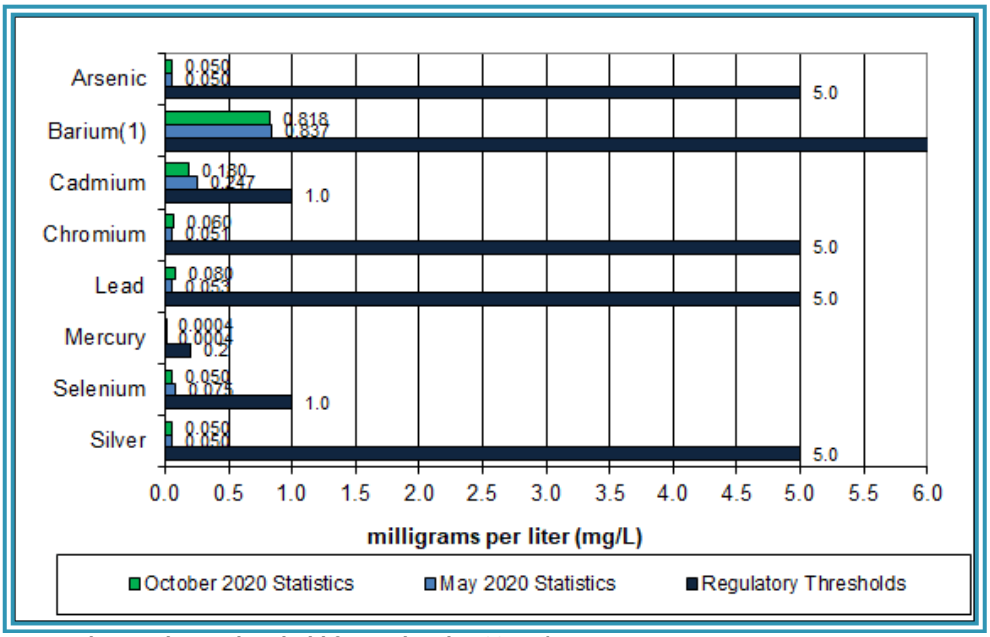
6.7 Ash System Compliance

During Q2FY19, CAAI reported that it was discontinuing dolomitic lime feed, while increasing lime slurry feed 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 during October 2020, and results indicated that the average pH during testing was 8.6. Results from the TCLP testing conducted in October 2020 and May 2020 are depicted in Table 9 and Chart 14 below.

Table 9: Comparison of Statistical Results and Regulatory Thresholds for Metal Analytes

Metals	90% Upper Confidence (October 2020)	90% Upper Confidence (May 2020)	Regulatory Threshold (mg/L)	% of Threshold (October 2020)	% of Threshold (May 2020)
Arsenic	0.050	0.050	5.0	1.00%	1.00%
Barium	0.818	0.837	100.0	0.82%	0.84%
Cadmium	0.180	0.247	1.0	18.00%	24.70%
Chromium	0.060	0.051	5.0	1.20%	1.02%
Lead	0.080	0.053	5.0	1.60%	1.06%
Mercury	0.0004	0.0004	0.2	0.20%	0.20%
Selenium	0.050	0.075	1.0	5.00%	7.50%
Silver	0.050	0.050	5.0	1.00%	1.00%

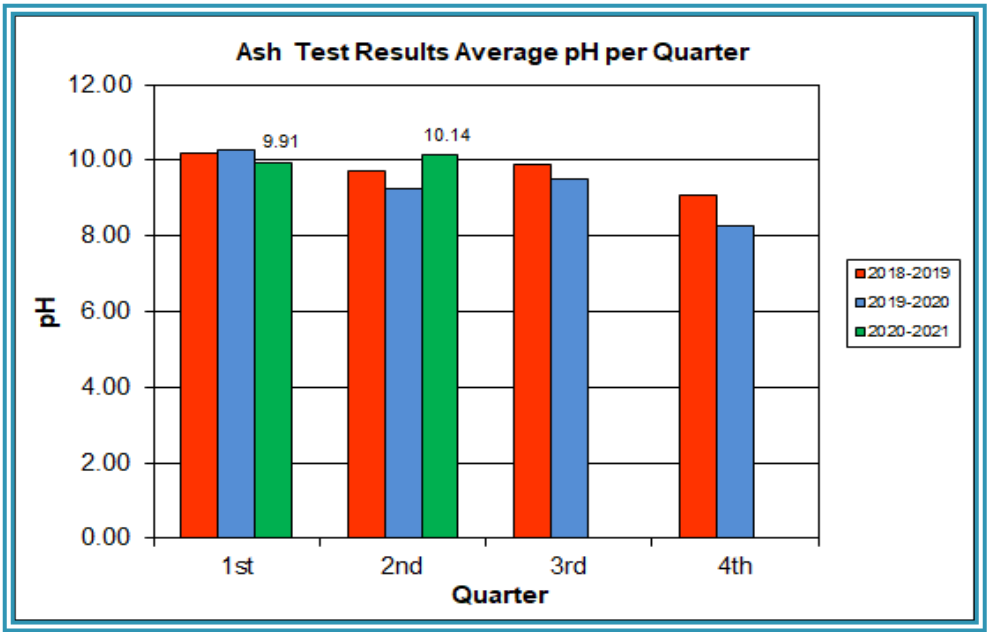
Chart 14: Ash Toxicity Characteristic Leaching Procedure (TCLP) Results



Note: The regulatory threshold for Barium is 100 mg/L

CAAI also samples ash monthly in-house, and documents pH reading to adjust lime feed rate. The results for the ash pH tests are found below in Chart 15 where each quarter is represented by the average of the respective monthly readings. During Q2FY21, the average ash pH for in-house tests was 10.1.

Chart 15: Quarterly Ash Test Results



APPENDIX A
FACILITY CEMS DATA

Table 10: 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_2ec	SO_2sc	COsc	NO_xsc	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
Oct - 20	AVG	75.5	22.0	1.0	24.0	160.0	0.8	300.0	12.3	3.7
	Max	87.0	30.0	4.0	32.0	163.0	1.1	301.0	12.4	4.2
	Min	70.3	14.0	0.0	19.0	157.0	0.6	299.0	12.3	3.2
Nov - 20	AVG	78.5	55.0	3.0	31.0	161.0	0.6	300.0	12.3	3.7
	Max	84.4	85.0	5.0	49.0	164.0	0.8	300.0	12.4	4.5
	Min	71.1	42.0	1.0	19.0	157.0	0.2	297.0	12.2	2.8
Dec - 20	AVG	84.4	29.0	2.0	31.0	161.0	0.1	300.0	12.3	3.9
	Max	87.9	53.0	4.0	50.0	162.0	0.3	300.0	12.4	4.2
	Min	74.5	14.0	0.0	18.0	160.0	0.0	300.0	12.1	3.3
Quarter Average		79.5	0.0	2.0	28.7	160.7	0.5	300.0	12.3	3.8
Quarter Max Value		87.9	85.0	5.0	50.0	164.0	1.1	301.0	12.4	4.5
Quarter Min Value		70.3	14.0	0.0	18.0	157.0	0.0	297.0	12.1	2.8
Limits:		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 11: 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_2ec	SO_2sc	COsc	NO_xsc	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
Oct - 20	AVG	74.6	48.0	1.0	30.0	82.0	0.9	304.0	12.3	3.8
	Max	88.2	61.0	4.0	37.0	88.0	1.1	304.0	12.4	4.4
	Min	68.3	37.0	0.0	22.0	81.0	0.6	303.0	12.1	3.2
Nov - 20	AVG	82.2	38.0	1.0	42.0	83.0	0.9	304.0	12.3	4.0
	Max	88.0	63.0	6.0	51.0	88.0	1.2	305.0	12.3	4.6
	Min	74.9	28.0	0.0	31.0	82.0	0.6	303.0	12.2	2.8
Dec - 20	AVG	85.5	28.0	1.0	41.0	83.0	1.0	304.0	12.2	4.0
	Max	91.3	48.0	8.0	53.0	87.0	1.2	306.0	12.5	4.4
	Min	75.2	10.0	0.0	32.0	80.0	0.8	300.0	12.1	3.3
Quarter Average		80.8	38.0	1.0	37.7	82.7	0.9	304.0	12.3	3.9
Quarter Max Value		91.3	63.0	8.0	53.0	88.0	1.2	306.0	12.5	4.6
Quarter Min Value		68.3	10.0	0.0	22.0	80.0	0.6	300.0	12.1	2.8
Limits:		98	NA	29	100	110	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 12: 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_2ec	SO_2sc	COsc	NO_xsc	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
Oct - 20	AVG	75.9	49.0	1.0	15.0	160.0	1.2	298.0	12.3	3.7
	Max	87.8	75.0	7.0	28.0	161.0	1.4	299.0	12.3	4.2
	Min	69.3	28.0	0.0	9.0	158.0	0.9	295.0	12.2	3.2
Nov - 20	AVG	83.0	33.0	1.0	21.0	158.0	1.3	298.0	12.3	3.9
	Max	89.2	51.0	3.0	32.0	168.0	1.8	299.0	12.6	4.5
	Min	75.3	19.0	1.0	12.0	151.0	0.9	297.0	12.2	2.9
Dec - 20	AVG	86.0	24.0	2.0	24.0	160.0	1.6	298.0	12.3	4.0
	Max	91.6	40.0	5.0	41.0	169.0	2.0	299.0	12.4	4.3
	Min	78.4	14.0	0.0	16.0	153.0	1.2	298.0	12.1	3.4
Quarter Average		81.6	35.3	1.3	20.0	159.3	1.4	298.0	12.3	3.9
Quarter Max Value		91.6	75.0	7.0	41.0	169.0	2.0	299.0	12.6	4.5
Quarter Min Value		69.3	14.0	0.0	9.0	151.0	0.9	295.0	12.1	2.9
Limits:		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 – NOVEMBER 2020

Figure 1: Steam Valve (typical of 2 locations) Packing Leaking above Boiler Nos. 1 and 3 – New Deficiency

Figure 2: Roof Ventilation Fan above Boiler No. 3 is not operating – New Deficiency

Figure 3: Firing Aisle

Figure 4: Turbine Generators

Figure 5: New Over Fire Air Fan – Boiler No. 1 LN™ Technology Installation

Figure 6: Refuse Pit – Photo from Charging Floor from north looking south

Figure 7: New Duct Work – Boiler No. 1 LN^{IM} Technology Installation

Figure 8: Additional New Duct Work – Boiler No. 1 LN^{IM} Technology Installation

Figure 9: New Nozzles – Boiler No. 1 LN^{IM} Technology Installation

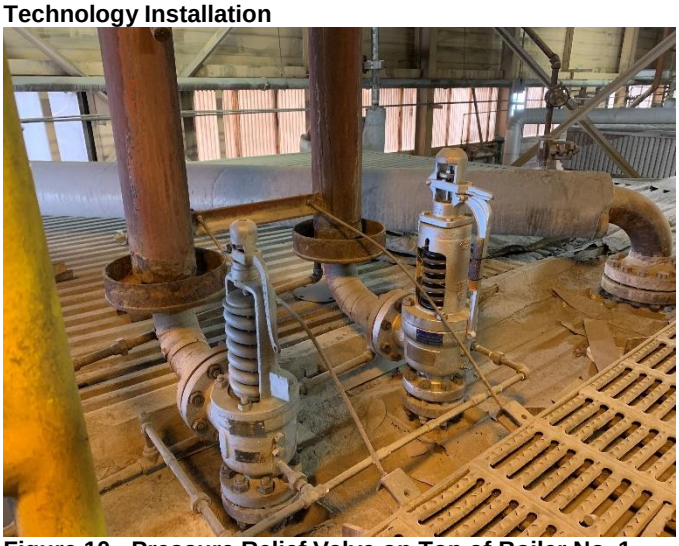


Figure 10: Pressure Relief Valve on Top of Boiler No. 1

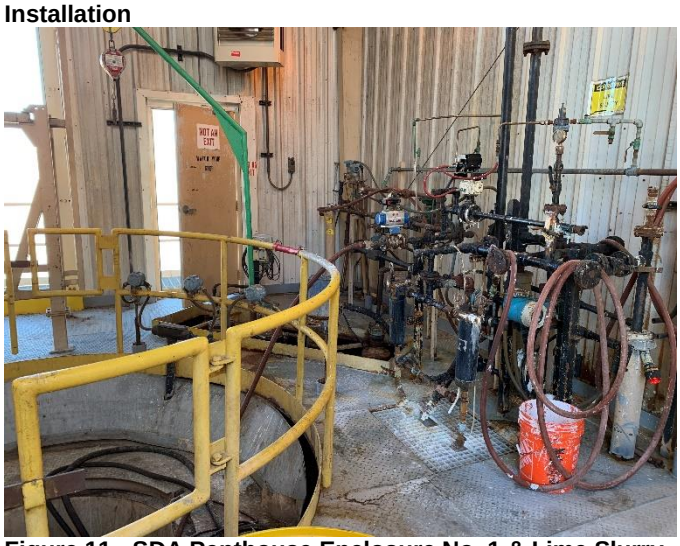


Figure 11: SDA Penthouse Enclosure No. 1 & Lime Slurry Piping

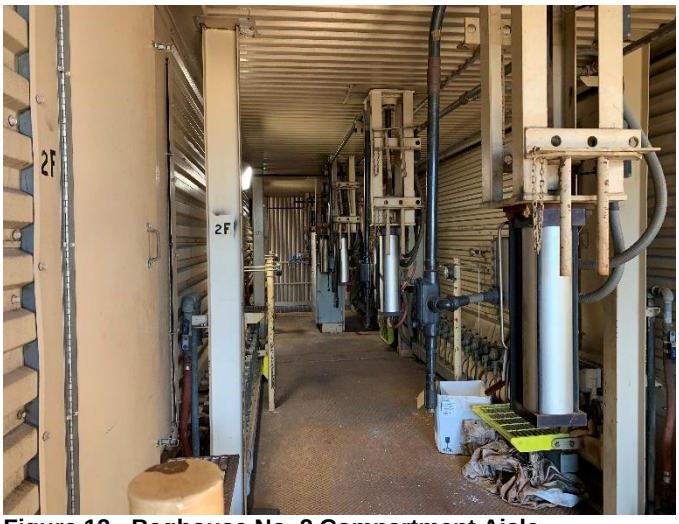


Figure 12: Baghouse No. 2 Compartment Aisle

Figure 13: Lime Slaker Enclosure

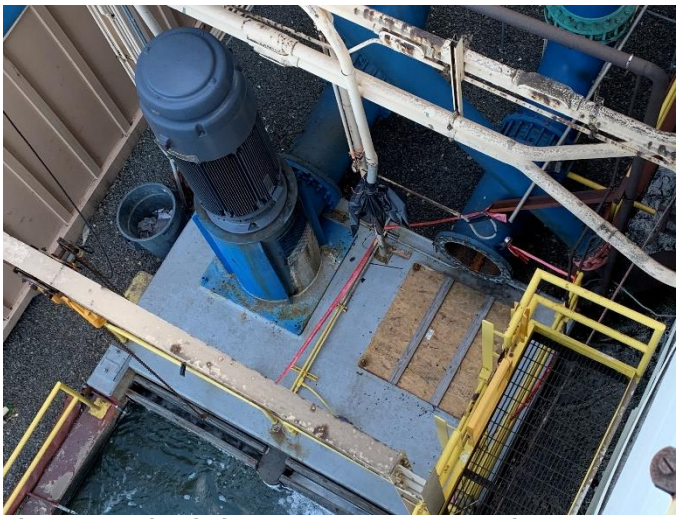


Figure 14: Circulating Water Pump Removed

Figure 15: Decommissioned Boiler No. 1 Over Fire Air Fan

Figure 16: Rented Backup Generator – Emergency Backup Generator remains out of service

Figure 17: Tipping Floor Operations – Photo from Northeast Corner looking west

Figure 18: Supplemental Waste Offloading in progress