

Alexandria Arlington Resource Recovery Facility

Fiscal Year 2018
First Quarter Operations Report

November 2017



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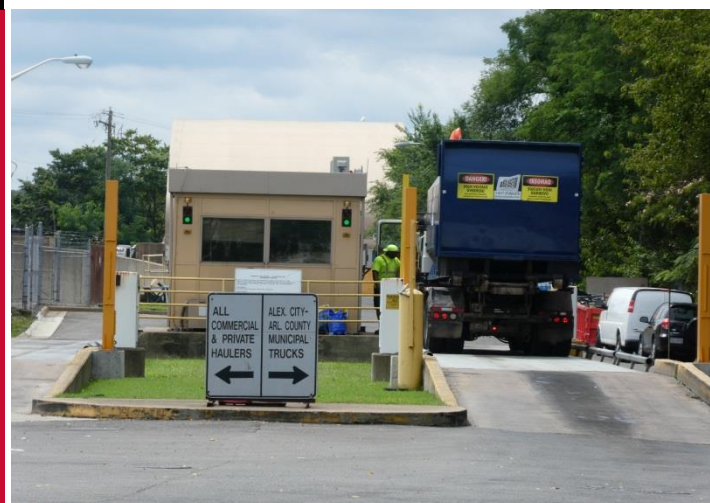


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Definition of Abbreviations & Acronyms

<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
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)
kW/hr	Kilowatt hours (1,000 watt-hours)
lbs	Pounds
LOA	Letter of Agreement
Mar	March
Max	Maximum
May	May
Min	Minimum
MSW	Municipal Solid Waste
MW/hr	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
Q3	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 First Quarter Operations Report – Fiscal Year 2018

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 2017 calendar year. This report is prepared for the first quarter of the 2018 fiscal year and summarizes Facility operations between July 1, 2017 and September 30, 2017. This report identifies the fiscal year beginning on July 1, 2017 as FY18 and the quarter beginning on July 1, 2017 as Q1FY18.

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 Q1FY18. The operation of the Facility, maintenance, safety, and overall cleanliness continue to be above average. Environmental performance was excellent with no reportable environmental excursions throughout the quarter. Note that as of September 30, 2017, the CAAI Facility has operated 1,388 days without an environmental excursion.

During Q1FY18, the boilers experienced one (1) instance of unscheduled downtime totaling 17.7 hours, and the turbine generators experienced one (1) instance of unscheduled downtime totaling 8.3 hours. All three (3) boilers experience scheduled mini outages totaling 66.8 hours of downtime. Beginning on September 16th, Boiler No. 1 experienced 116.0 hours of downtime for the Fall

2017 Scheduled Maintenance. During the quarter, Boiler No. 1 experienced one (1) instance of standby time totaling 8.0 hours, and Turbine Generator No. 2 experienced 14.5 hours of standby time while Boiler No. 1 was down. Note that standby time is not factored into overall availability. A detailed listing of downtime is provided in Section 5.2 of this report.

Average waste processed during the quarter was 967.6 tons per day, or 99.2% of nominal facility capacity. Waste deliveries averaged 978.9 tons per day, which is 1.2% higher than the burn rate. The capacity utilization of 99.2% is excellent when compared to that of mature, well run waste to energy facilities.

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 slightly increased (0.5%) from the corresponding quarter in FY17; steam production increased (1.5%), and electricity generated (gross) increased (1.7%) from the corresponding quarter in FY17. The increase in steam generation is attributable to the increase (0.8%) in waste heating value, paired with less boiler downtime (77.8 fewer hours). The increase in electricity generated (gross) in Q1FY18, is attributable to higher steam production, paired with less turbine generator downtime (78.5 fewer hours) experienced by the turbine generators.

3.0 Facility Inspection and Records Review

In August 2017, HDR met with the Facility management and other plant personnel to discuss Facility operations and maintenance, acquire data and reports, perform an independent visual inspection of the operating Facility, photograph areas of interest, and perform a review of recent Facility activity. This visit was coordinated with the scheduled FMG meeting. At the time of the inspection, HDR reviewed CAAI records, discussed performance issues with

CAAI staff, and provided a verbal report addressing Facility conditions and performance statistics at the August 2017 FMG meeting. 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 at the earliest convenience, 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	Corrosion on ceiling panels in Turbine Generator Enclosure	August 2014	C	Sand, Prime, Paint and Preserve, and replace deteriorated panels as necessary	HDR observed the corroded/deteriorated sections had been primed, but no panels were replaced. CAAI reports that it plans to replace panels in 1 to 2 years.	Open
2	Deteriorated purlin east wall in Tipping Floor Enclosure	November 2014	C	Replace deteriorated purlin	Complete	Closed
3	Induced Draft Fan No. 1 Lagging deteriorated, west side of CEMS Enclosure	May 2015	C	Replace deteriorated Induced Draft Fan Lagging	Complete	Closed
4	Pot hole, southeast corner of Ash Trailer Canopy	August 2015	C	Repair road surface	Status Unchanged	Open
5	Underside of grating deteriorated, upper elevations of all three economizers	August 2016	C	Replace economizer grating in upper elevations	Complete	Closed
6	Pavement spider-cracking at Tipping Floor Entrance	November 2016	C	Resurface section of pavement at Tipping Floor Entrance	Status Unchanged	Open
7	Concrete slab damaged that Citizen's Drop-off Roll-off is on	November 2016	C	Repair concrete slab	Status Unchanged	Open
8	Corrosion on Scale House	November 2016	C	Conduct proper painting preservation measures on corroded spots of Scale House	Complete	Closed
9	Tipping Floor Center Bay concrete apron eroded and rebar exposed	February 2017	C	Resurface eroded section of Tipping Floor near refuse pit	Status Unchanged	Open
10	Ceiling panels deteriorated above Boiler Nos. 2 and 3	May 2017	C	Replace deteriorated ceiling tiles and conduct painting preservation measures	Status Unchanged	Open
11	Pebble Lime Warning Sign deteriorated on SDA No. 3 Entrance Door	May 2017	A	Replace sign	Complete	Closed
12	Fence falling over near Citizen's Drop Roll-Off	May 2017	C	Re-align and secure fence	Complete	Closed
13	Siding on north and east side of Facility dirty	May 2017	C	Pressure Wash Siding	Status Unchanged	Open
14	Viewport glass cracked on Boiler No. 3 Barn Door	May 2017	A	Replace viewport glass	Status Unchanged	Open

Item No.	Inspection Report Deficiencies	Issue Reported	Priority*	HDR Recommendation	Status	Open / Closed
15	Windshield cracked on Roll-off Truck No. 103 – New Deficiency — See Figure 1 (Appendix B)	August 2017	A	Report to hauler contractor and monitor repair process	Status Unchanged	Open
16	Pressure wash of exterior siding needed at Charging Floor Elevation Above Service Elevator Bay – New Deficiency — See Figure 2 (Appendix B)	August 2017	C	Pressure wash exterior siding	Status Unchanged	Open
17	Viewport damaged on 4 th Floor Elevation at the northwest corner of Boiler No. 1 – New Deficiency — See Figure 3 (Appendix B)	August 2017	C	Repair viewport	Status Unchanged	Open

4.0 Facility Performance

Monthly operating data provided by CAAI indicates that 93,024 tons of MSW were processed during Q1FY18, and a total of 94,315 tons of MSW including 4,842 tons of Special Handling Waste were received. Total ash production during the quarter was 18,451 tons, which represents 19.8% of the waste processed by weight. The average uncorrected steam production rate for Q1FY18 was 3.04 tons_{steam}/ton_{waste}, which is higher (1.8%) than the corresponding quarter in FY17. The increase in this metric is attributable to the 1.4% increase in the average waste heating value (HHV) calculated by CAAI.

Chart 1: Tons of Waste Processed

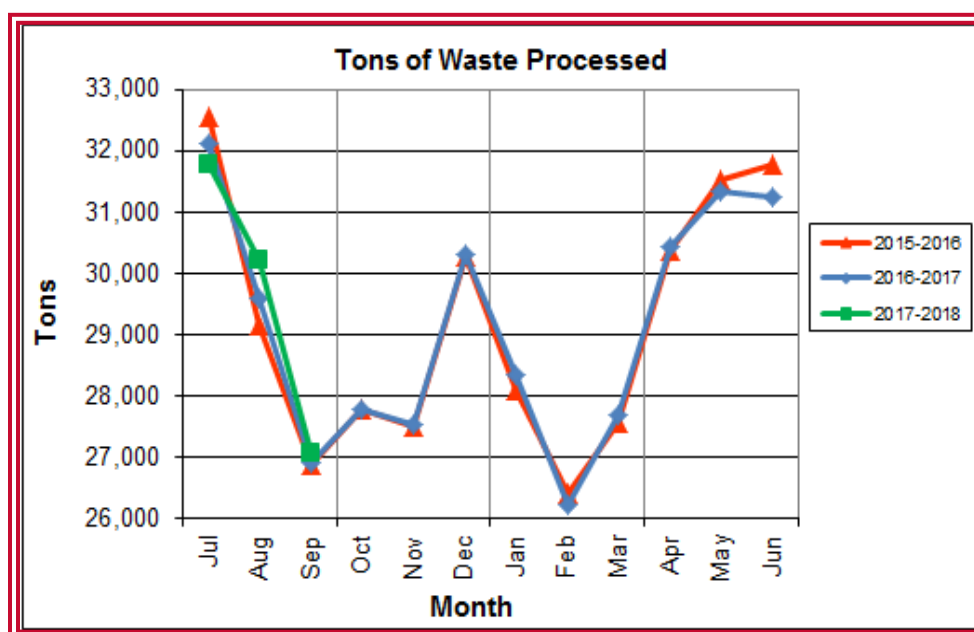


Chart 1 illustrates that Q1FY18 waste processed was slightly lower (0.7%) than the corresponding quarter, Q1FY17.

CAAI reported that 442 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:

- July 2017 – Three (3) NOVs were issued for:
 - Two (2) NOVs for jumping in line
 - One (1) NOV for dumping a load of drywall

- August 2017 – One (1) NOV was issued for dumping the dough box on the floor
- September 2017 – No NOVs were issued

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

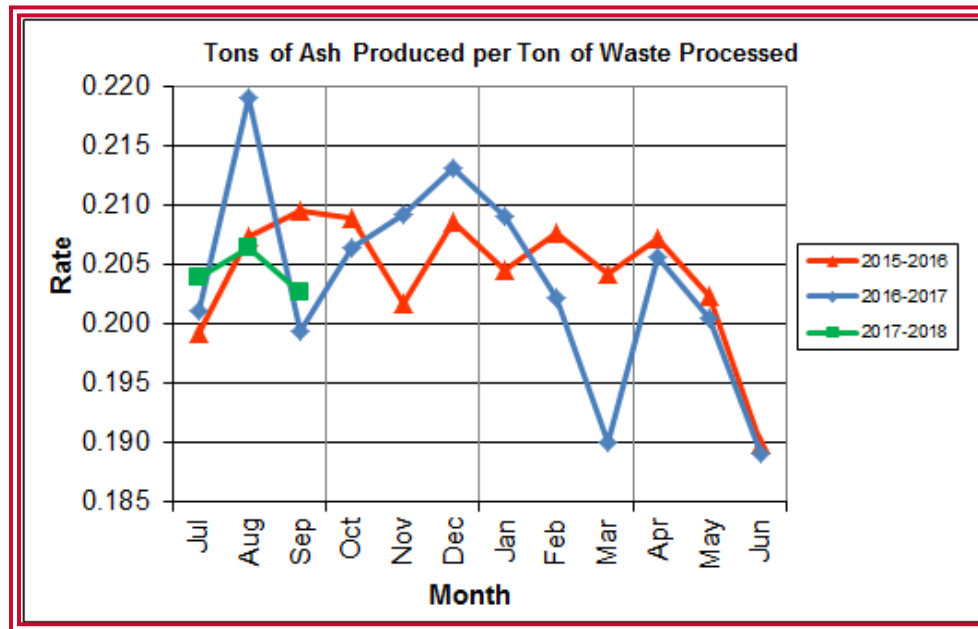


Chart 2 illustrates that the average ash production rate in Q1FY18 was slightly lower (0.3%) at 20.4% of processed waste, compared to the corresponding quarter in FY17 when the rate was 20.7%. Ash production rates remain significantly lower than comparable facilities, mainly due to less water in the ash stream, coupled with good metal removal.

Chart 3: Ferrous Recovery Rate

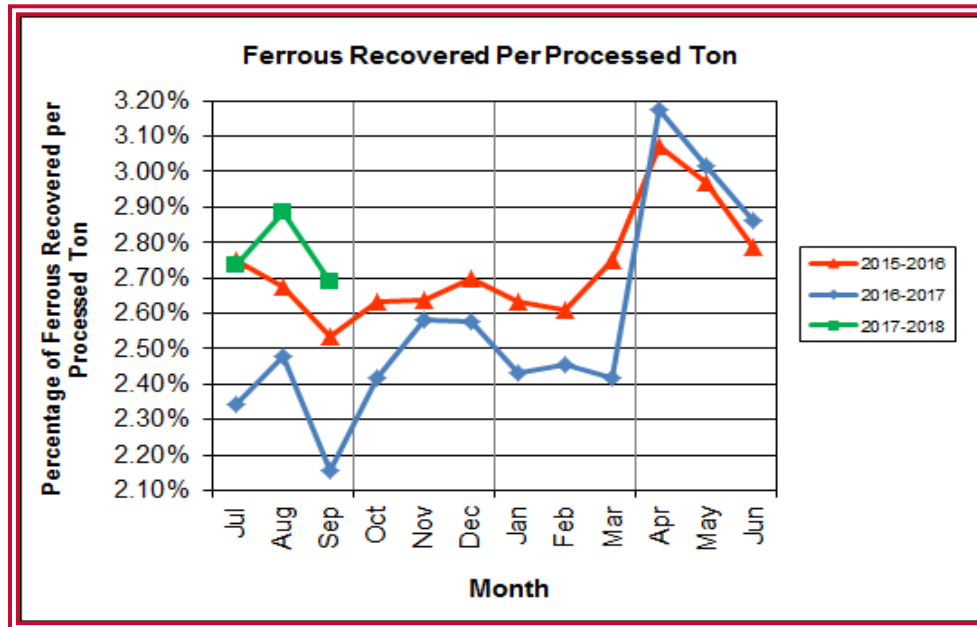
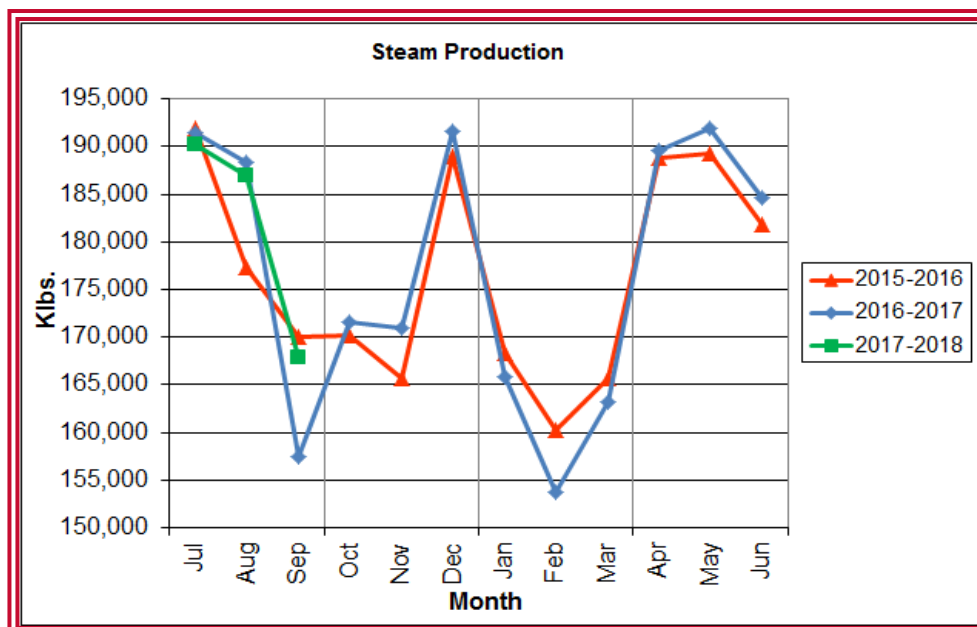


Chart 3 depicts the monthly ferrous metal recovery rate as a percentage of processed MSW tonnage. In Q1FY18, 2,468 tons of ferrous metals were recovered, which is 19.5% higher than the corresponding quarter in FY17 and equivalent to 2.8% of processed waste. CAA indicated that it replaced the last 8 inches of the main vibrating ash pan at the magnet during Q4FY17, which positively impacted the ferrous recovery.

Chart 4: Steam Production



In Chart 4, the total steam production for Q1FY18 was 545,082 klbs., and higher (1.5%) than the corresponding quarter in FY17. The increase in steam generation is attributable to the increase (0.8%) in waste heating value, paired with less boiler downtime (77.8 fewer hours)

Chart 5: 12-Month Rolling Steam Production

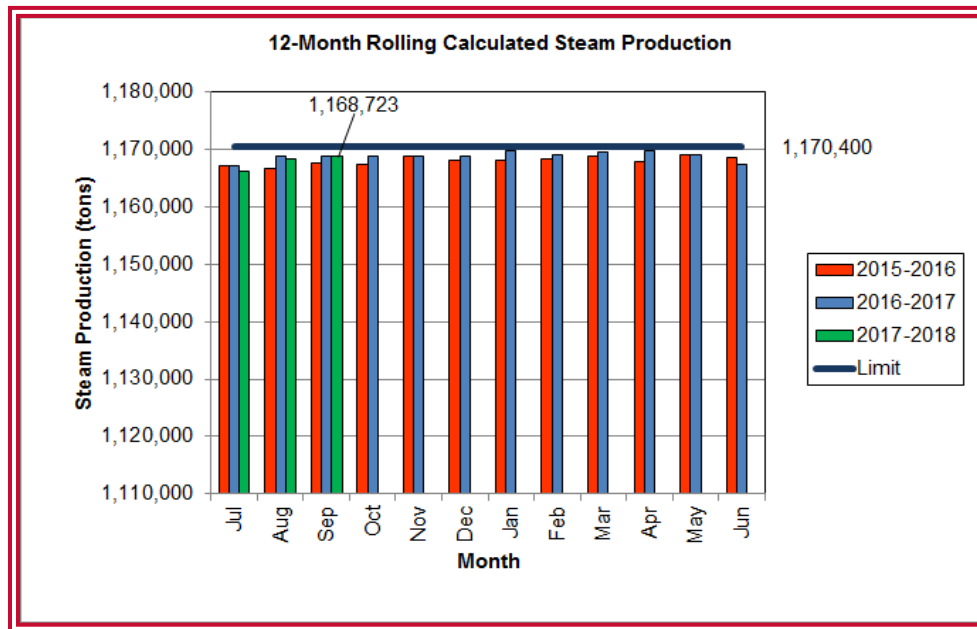
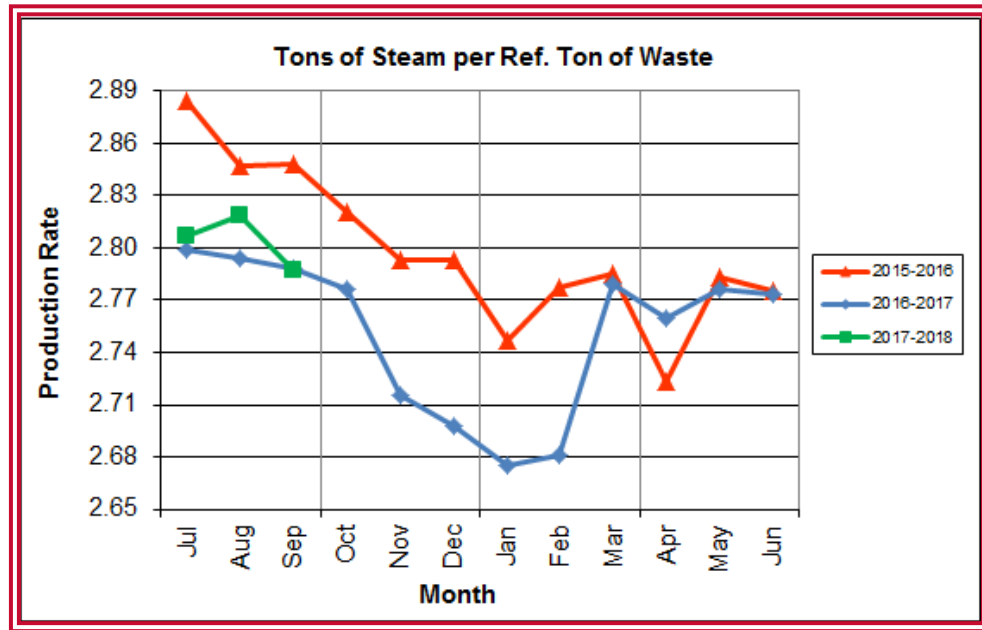


Chart 5 depicts the 12-month rolling steam production total for the period ending in September 2017. According to the Title V permit, the annual steam production for the Facility shall not exceed 1,170,400 tons on the basis of an average value of 3.34 lbs of steam per lb of MSW processed, calculated 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 Q1FY18. The 12-month rolling total for steam production ending in September 2017 was 1,168,723 tons which is 99.9% of the limit. Chart 5 clearly 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 Q1FY18, this metric tracked slightly higher (0.4%) at 2.80 tons_{steam/ton_{ref.}}, compared to the corresponding quarter in FY17. This trend shows a slight improvement of boiler performance compared to the corresponding quarter in FY17, but is lower (2.1%) than two (2) years ago.

Chart 7: Calculated Waste Heating Value

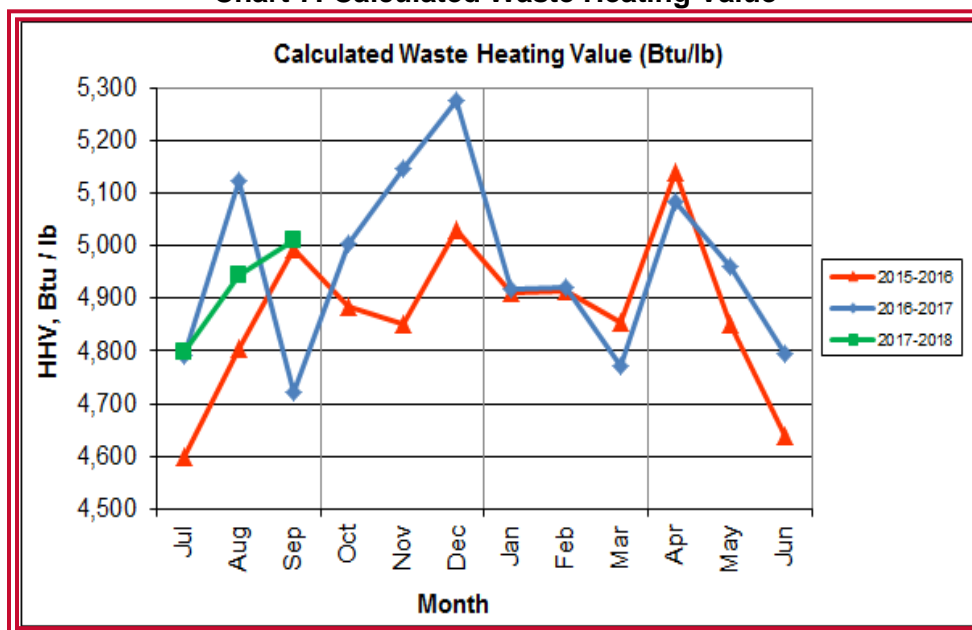


Chart 7 illustrates that Q1FY18 calculated average waste heating value was higher (0.8%) at 4,918 Btu/lb than the corresponding quarter Q1FY17, which averaged 4,878 Btu/lb.

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)
Q1FY16	Quarterly Totals	88,572	0	18,162	1,874	2,357	539,103	37,062
	July -15	32,537	0	6,482	676	895	191,850	13,358
	August -15	29,150	0	6,047	427	780	177,256	12,048
	September - 15	26,885	0	5,633	771	682	169,997	11,656
Q1FY17	Quarterly Totals	88,622	0	18,307	1,880	2,066	537,123	37,367
	July -16	32,121	0	6,459	504	752	191,425	13,363
	August -16	29,593	0	6,482	642	734	188,295	13,092
	September - 16	26,908	0	5,366	734	580	157,403	10,912
Q1FY18	Quarterly Totals	89,023	0	18,197	5,448	2,468	545,082	38,038
	July -17	31,763	0	6,476	1,807	869	190,170	13,182
	August -17	30,200	0	6,237	1,836	871	186,971	12,970
	September - 17	27,060	0	5,484	1,805	728	167,941	11,886
FY18 YTD Totals		89,023	0	18,197	5,448	2,468	545,082	38,038
FY17 Totals		349,516	0	71,208	13,411	9,036	2,120,115	150,935
FY16 Totals		349,881	0	71,019	5,413	9,864	2,109,442	145,085

Table 2 presents the production data provided to HDR by CAAI for Q1FY18 on both a monthly and quarterly basis. For purposes of comparison, data for

Q1FY16 and Q1FY17 are also shown, as well as FY16, FY17 and FY18 Year-to-Date (YTD) totals.

In comparing quarterly totals, the data shows:

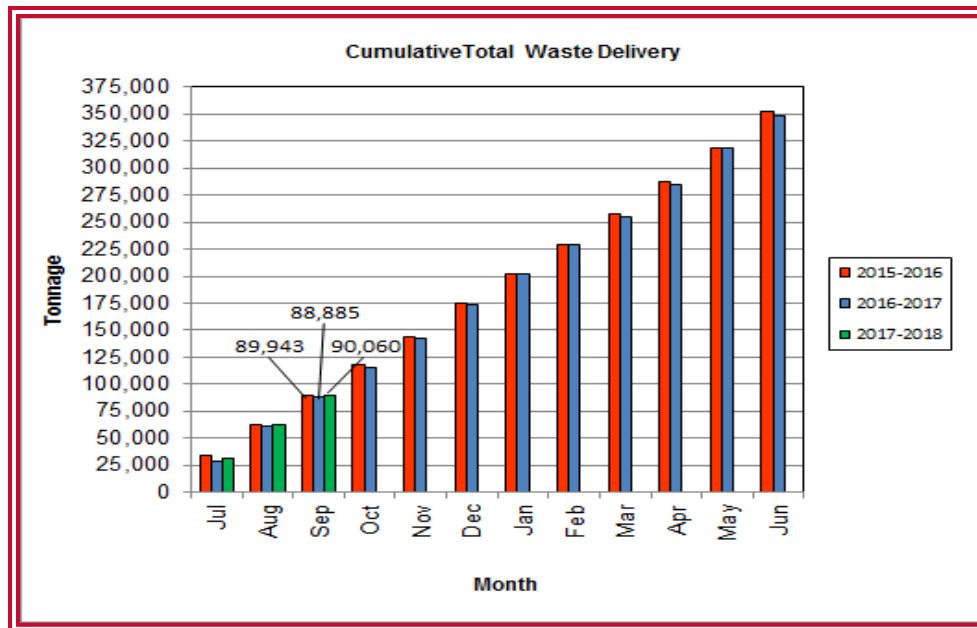
- More waste was processed in Q1FY18 than Q1FY17 and Q1FY16
- More steam was generated in Q1FY18 than Q1FY17 and Q1FY16
- More electricity was generated in Q1FY18 than Q1FY17 and Q1FY16
- Significantly more supplemental waste was received in Q1FY18 than Q1FY17 and Q1FY16.

Please 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. It is also worth noting that the quantity of waste processed during Q1FY18 continues to be limited by the steam production permit restrictions (refer to Chart 5).

Table 3: Waste Delivery Classification

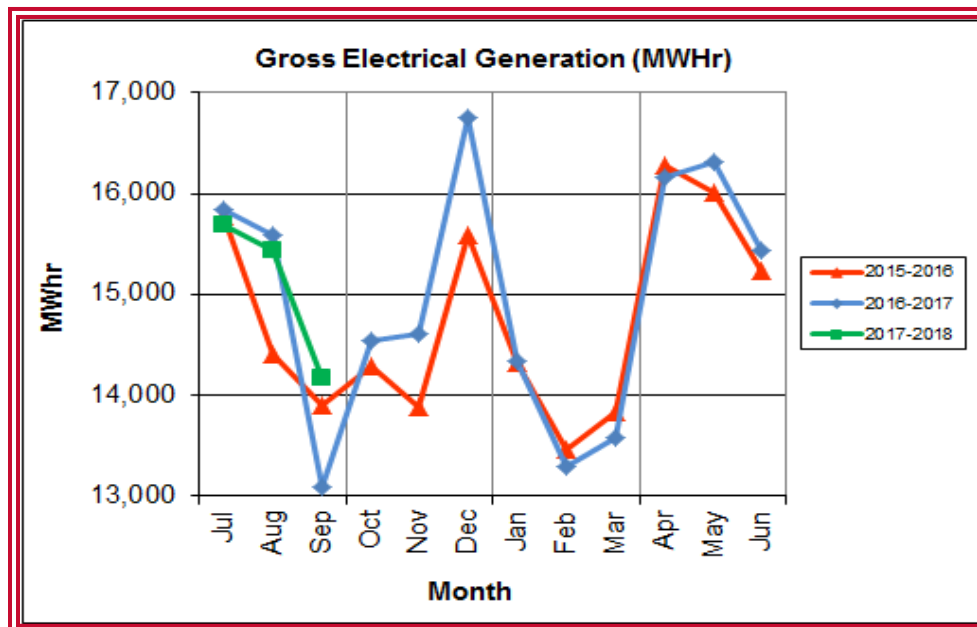
		<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Totals</u>	<u>% of Total</u>
FY14	City Waste	2,065	1,693	1,702	1,924	1,566	1,780	1,529	1,231	1,556	2,256	2,203	1,883	21,389	6.11%
	County Waste	3,459	3,079	2,784	3,091	2,707	2,802	2,568	1,957	2,272	3,326	3,987	3,387	35,419	10.12%
	Municipal Solid Waste	26,167	23,604	22,034	23,354	21,879	25,531	23,869	22,523	23,198	25,414	27,206	24,812	289,590	82.75%
	Supplemental Waste	546	676	248	410	188	268	275	192	231	253	151	110	3,548	1.01%
	MSW Totals	32,237	29,053	26,768	28,779	26,340	30,380	28,241	25,903	27,256	31,249	33,546	30,193	349,946	100.00%
		<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>
FY15	City Waste	1,814	1,497	1,699	1,737	1,518	1,770	1,411	1,209	1,648	2,155	2,059	2,045	20,562	5.91%
	County Waste	3,297	2,868	2,973	3,095	2,508	2,852	2,358	1,833	2,411	3,269	3,652	3,572	34,687	9.96%
	Municipal Solid Waste	26,661	24,466	21,887	21,241	21,678	27,906	24,611	20,915	24,094	25,189	23,126	25,667	287,442	82.57%
	Supplemental Waste	141	275	329	521	764	529	389	351	272	613	531	698	5,413	1.55%
	MSW Totals	31,913	29,106	26,888	26,595	26,468	33,057	28,769	24,308	28,424	31,225	29,369	31,982	348,105	100.00%
		<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	City Waste	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%
	County Waste	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%
	Municipal Solid Waste	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%
	Supplemental Waste	676	427	771	684	676	787	642	850	792	996	605	661	8,565	2.43%
	MSW Totals	34,196	27,869	27,878	28,047	25,722	31,687	26,446	27,639	28,232	29,814	31,623	32,896	352,049	100.00%
		<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	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%
		<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 (YTD)</u>	<u>% of Total (YTD)</u>
FY18	City Waste	1,699	1,876	1,642										5,217	5.79%
	County Waste	2,458	2,654	2,513										7,625	8.47%
	Municipal Solid Waste	24,950	25,303	21,518										71,771	79.69%
	Supplemental Waste	1,807	1,835	1,805										5,448	6.05%
	MSW Totals	30,914	31,668	27,478										90,060	100.00%

Chart 8: Cumulative Total Waste Delivery



As depicted in Table 3 and Chart 8, for the quarter ending in September 2017; cumulative total waste delivery was 1.3% higher compared to the same period in FY17.

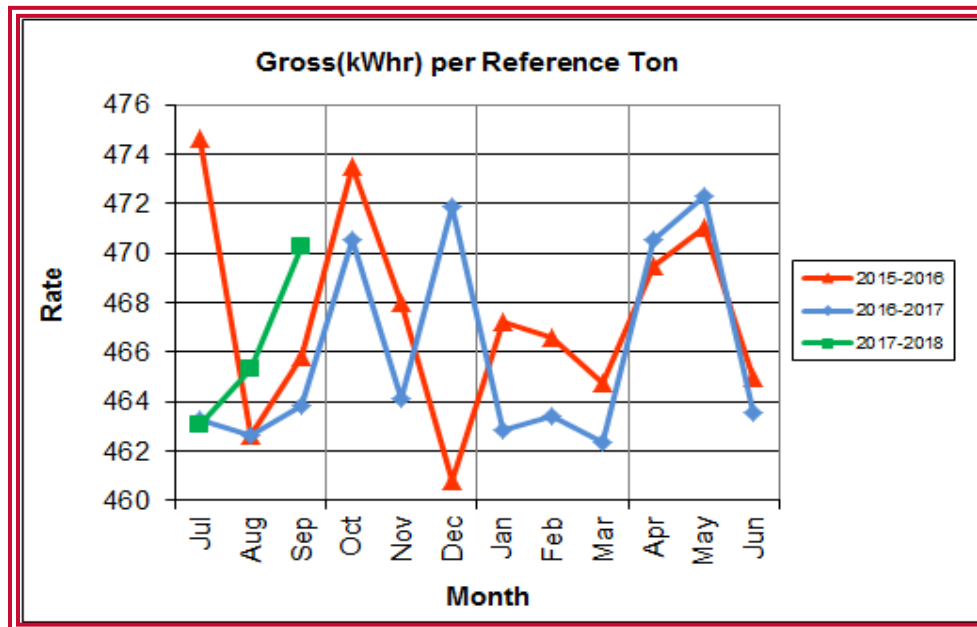
Chart 9: Gross Electrical Generation



During Q1FY18, the Facility generated 45,293 MWhrs (gross) of electricity compared to Q1FY17 generation of 44,524 MWhrs (gross), a 1.7% increase.

The increase in electricity generated (gross) in Q1FY18, is attributable to higher steam production, paired with less turbine generator downtime (78.5 fewer hours) 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 Q1FY18 was 466 kWhr, which is slightly higher (0.6%) than the corresponding quarter in FY17. 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

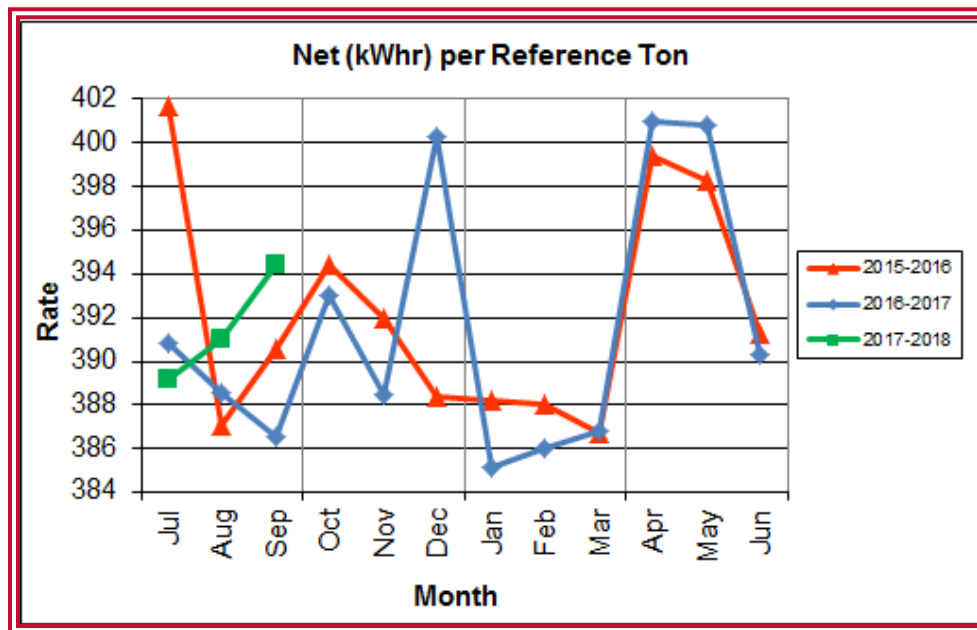


Chart 11 depicts the normalized net power (gross minus in-house usage) generation history. In Q1FY18, the average net electrical generation per reference ton was 392 kWhr, which is 0.7% higher than the corresponding quarter in FY17.

Chart 12: Net Conversion Rate

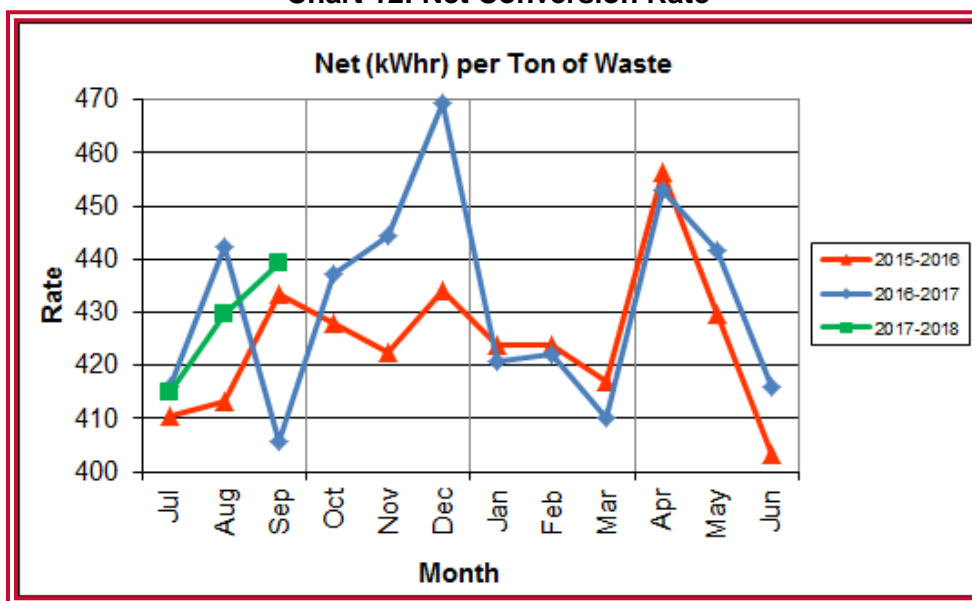
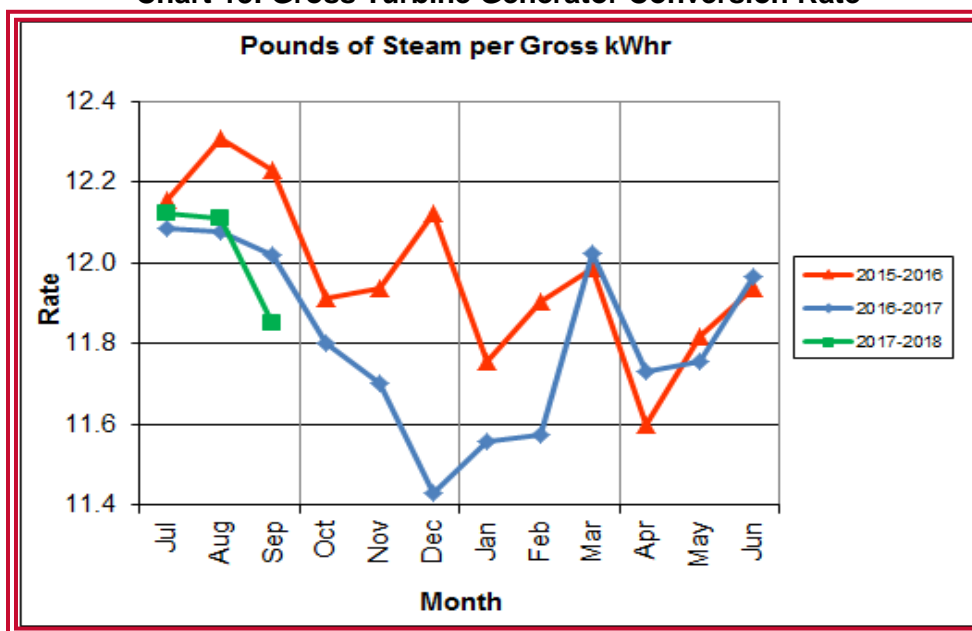


Chart 12 depicts the net power generation per processed ton. The net electrical generation per processed ton in Q1FY18 was 428 kWhr, which is 1.6% higher than the corresponding quarter in FY17, and is attributable to higher steam production, paired with less downtime (78.5 fewer hours) experienced by the turbine generators.

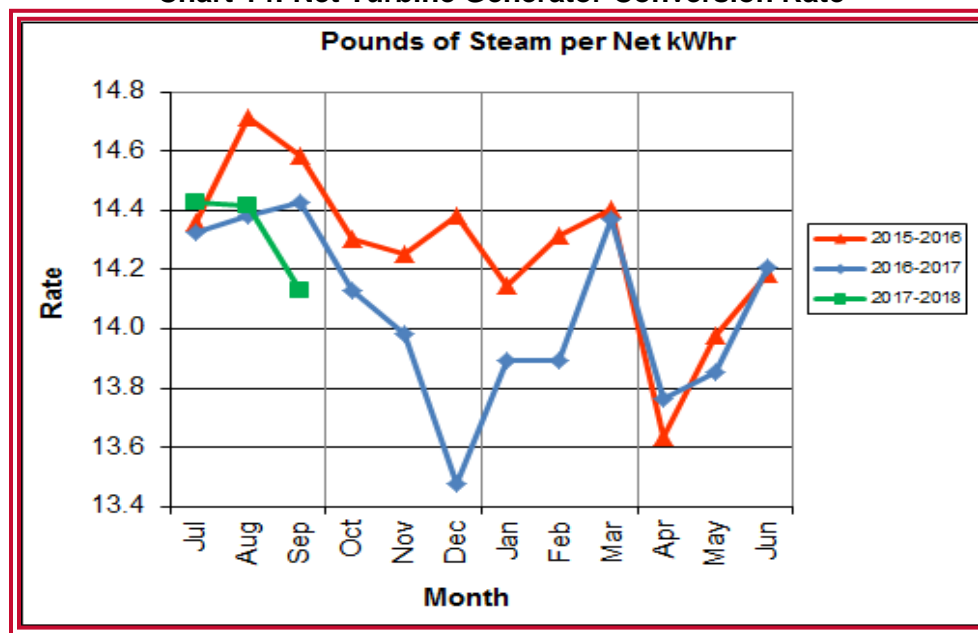
Chart 13: Gross Turbine Generator Conversion Rate



Charts 13 and 14 illustrate the quantities of steam required to generate one (1) kWhr of electricity, gross and net respectively. 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 Q1FY18 the average lbs of steam consumed per gross kWhr generated was 12.0, which is 0.2% lower (more efficient) than the corresponding quarter Q1FY17. A factor that negatively impacts this metric is Turbine Generator No. 2, which continues to operate with its Stage 9 blades removed from the rotor. CAAL 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. CAAL 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 lbs of steam consumed per net kWhr was 14.3, which is 0.3% lower (more efficient) than the corresponding quarter in FY17. The average main steam temperature during the quarter was 683.4° F, which is 0.2% lower than the average main steam temperature of the corresponding quarter last fiscal year and 16.6° F lower than design temperature of 700° F.

Chart 14: Net Turbine Generator Conversion Rate



4.1 Utility and Reagent Consumptions

Table 4: Facility Utility and Reagent Consumptions

Utility	Units	Q1FY18 Total	Q1FY17 Total	Q1FY18"Per Processed Ton" Consumption	Q1FY17"Per Processed Ton" Consumption
Purchased Power	MW/hr	5,670	5,598	0.06	0.06
Fuel Oil	Gal.	14,240	21,430	0.16	0.24
Boiler Make-up	Gal.	1,362,000	1,641,000	15.30	18.52
Cooling Tower Make-up	Gal.	40,368,876	45,019,026	453.47	507.99
Pebble Lime	Lbs.	1,404,000	1,254,000	15.77	14.15
Ammonia	Lbs.	179,000	170,000	2.01	1.92
Carbon	Lbs.	90,000	92,000	1.01	1.04
Dolomitic Lime	Lbs.	252,000	170,000	2.83	1.92

Fuel oil usage during the quarter represents approximately 0.25% of the total heat input to the boilers, which compares favorably with industry averages, and slightly lower than the percentage of heat input in Q1FY17 which was 0.37%. 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 2.1% of steam flow, which is slightly lower than the boiler makeup in Q1FY17 which was 2.5%, and is acceptable. Pebble lime usage, at 1,404,000 lbs. is higher (12.0%) than the corresponding quarter last year, and the quarterly consumption rate of 15.8 lbs/ton is below historical levels (16-18 lbs/ton).

In comparing Q1FY18 to Q1FY17 on a per processed ton consumption basis:

- the purchased power consumption rate was 0.8% higher
- the total fuel oil consumption rate was 33.9% lower
- the boiler make-up water consumption rate was 17.4% lower
- the cooling tower make-up water consumption rate was 10.7% lower
- the total pebble lime consumption rate was 11.5% higher
- the ammonia consumption rate was 4.8% higher
- the carbon consumption rate was 2.6% lower
- the total dolomitic lime consumption rate was 47.6% higher

CAAI reports that the significant increase in dolomitic lime usage during the quarter, when compared to the corresponding quarter last year, is attributable to delivery totals being utilized for usage since it is a more accurate than using the dolomitic lime silo level detector which was used during the prior fiscal year. CAAI reports that the significant increase in pebble lime usage and consumption during the quarter is attributable to controlling SO₂ spikes that occurred during the combustion of waste.

4.2 Safety & Environmental Training

The Facility experienced no OSHA recordable accidents during the quarter and has operated 376 days without an OSHA recordable accident. During the quarter, Safety and Environmental training was conducted with themes as follows:

July 2017

- Safety:
 - Confined Space
 - Confined Space Air Sampling
 - Confined Space Rescue
- Environmental:
 - Tipping Floor Inspections & Unauthorized Waste

August 2017

- Safety:
 - Lock-Out-Tag-Out (LOTO) Control of Hazardous Energy
 - LOTO Energy Isolation Devices
 - Seatbelt Usage in Mobile Equipment
 - Covanta LOTO
 - Crane Boarding – Safety Procedure 15B
- Environmental:
 - Regulatory Inspections
 - CPR/AED/First Aid
 - Blood Borne Pathogens

September 2017

- Safety:
 - Mobile Equipment
 - Machine/Equipment Guarding
 - Disposal of Potentially Contaminated Debris
 - Medical Surveillance and Access to Records
- Environmental:
 - Ash Generation, Treatment, and Testing
 - How to handle an ash spill offsite

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.

All three (3) boilers experienced mini outages during the quarter in which routine cleaning and inspections were conducted. The following are the dates of the mini outages:

- Boiler No. 3: July 11, 2017 – 22.8 hours of scheduled downtime
- Boiler No. 2: July 26, 2017 – 17.8 hours of scheduled downtime
- Boiler No. 1: August 1, 2017 – 26.2 hours of scheduled downtime

Along with minor outages being conducted on all three boilers, beginning September 16, 2017 Boiler No. 1 experienced 116.0 hours of downtime for scheduled maintenance. Some significant maintenance items completed during the outage are as follows:

- Change-out of the Under Fire Air Fan Coupling
- Change-out of the Induced Draft Fan Coupling and both the inner and outer bearings, housings, and adapters
- Replacement of five (5) curved blocks in the furnace rate system

- Replacement of 18 grate bars; 17 grate bars on Run No. 1, and one (1) on Run No. 2
- Replacement of the front Over Fire Air Fan Nozzle Joint
- Change-out of five (5) soot blower elements on G9B Sootblower Nos. 3, 4, 5, 9, and 18.
- Replacement of 17 tube shields
- Replacement of the expansion joint on the Under Fire Air Fan by the Ash Discharger
- Replacement of two (2) Transverse Wall Liner Plates on the Ash Discharger

Beginning September 17, 2017 Turbine Generator No. 2 experience downtime for a Minor Outage. Some significant maintenance items completed during the outage are as follows:

- Electrical testing on the generator
- Testing and changing seals on the Non Return Valves
- Inspecting the swing check valves.
- Replacement of the gasket on the gland seal regulator.
- Inspection of the Trip and Throttle valve and Control Valves
- Borescoped the turbine blades

In addition to the scheduled maintenance, CAAI reports that 909 preventative maintenance actions were completed during the quarter.

5.1 Availability

Facility availabilities for Q1FY18 are shown in Table 5. According to CAAI reports, the average unit availabilities for Boiler Nos. 1, 2, and 3 for Q1FY18 were 93.5%, 99.2%, and 98.2%, respectively. The three-boiler average availability during the quarter was 96.9%, 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 Q1FY18 were 100.0%, and 96.1%, respectively. During Q1FY18, the average availability for Turbine Generator Nos. 1 and 2 was 98.1%, which is acceptable.

Table 5: Quarterly Facility Unit Availabilities

Availability	Q1FY18 Average
Boiler No. 1	93.5%
Boiler No. 2	99.2%
Boiler No. 3	98.2%
Avg.	96.9%
Turbine No. 1	100.0%
Turbine No. 2	96.1%
Avg.	98.1%

5.2 Downtime Summary

Table 6: Boiler Downtime – Q1FY18

Boiler Number	Outage Begin Date	Outage End Date	Hours Unavailable	Downtime Classification	Reason Unavailable
3	7/11/17	7/11/17	22.8	Scheduled	Mini Scheduled Boiler Outage
2	7/26/17	7/26/17	17.8	Scheduled	Mini Scheduled Boiler Outage
1	8/1/17	8/2/17	26.2	Scheduled	Mini Scheduled Boiler Outage
3	8/29/17	8/29/17	17.7	Unscheduled	Waterwall Failure – External Leak
1	9/16/17	9/21/17	116.0	Scheduled	Fall 2017 Scheduled Boiler Outage
1	9/21/17	9/21/17	8.0	Standby	Preventative measure taken to avoid exceeding 350,000 ton rolling 12-month process limit
Total Unscheduled Downtime			17.7 Hours		
Total Scheduled Downtime			182.8 Hours		
Total Standby Downtime			8.0 Hours		
Total Downtime			208.5 Hours		

Table 7: Turbine Generator Downtime – Q1FY18

Turbine Generator Number	Outage Begin Date	Outage End Date	Hours Unavailable	Downtime Classification	Reason Unavailable
2	8/4/17	8/4/17	8.3	Unscheduled	Condenser Tube Repair
2	9/17/17	9/20/17	76.0	Scheduled	Scheduled Turbine Generator Minor Outage
2	9/21/17	9/21/17	14.5	Standby	Boiler No. 1 Outage and Process Limitations Preventative Measure
Total Unscheduled Downtime			8.3 Hours		
Total Scheduled Downtime			76.0 Hours		
Total Standby Downtime			14.5 Hours		
Total Downtime			98.8 Hours		

5.3 Facility Housekeeping

CAAI is performing Facility housekeeping and maintaining plant cleanliness in accordance with acceptable industry practices. A site inspection was conducted in August 2017. 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 August 2017 inspection are presented in Table 8.

Table 8: Facility Housekeeping Ratings – August 2017

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 Q1FY18 are summarized in Appendix A. No permit deviations were reported by the Facility during Q1FY18. Note that as of September 30, 2017, the CAAI Facility has operated 1,388 days without an environmental excursion.

On August 8, 2014, CAAI sent a letter to the Virginia Department of Environmental Quality (VADEQ) requesting relief from the steam permit limit requirements in the Facility's Title V and PSD permits. These requested changes relate to the permit values established for the calculated steam-to-waste ratio, which has resulted in a reduction of MSW throughput. In recent discussions, CAAI indicated that it is re-evaluating options to the proposed permit changes, and will provide further updates on this issue.

6.1 Nitrogen Oxide Emissions

During Q1FY18, the monthly emission concentrations of nitrogen oxides (NO_x) averaged 160.0 ppmdv, 160.0 ppmdv and 159.0 ppmdv for Boiler Nos. 1, 2, and 3, respectively. CAAI continues to operate the units at the lower (160 ppmdv) set-points, except immediately following a scheduled outage and associated boiler cleaning.

6.2 Sulfur Dioxide Emissions

During Q1FY18 the monthly emission concentration of stack sulfur dioxide (SO₂) averaged 1.3 ppmdv, 0.0 ppmdv, and 0.7 ppmdv for Boiler Nos. 1, 2, and 3, respectively. All of these stack SO₂ concentrations are significantly below the permit limit of 29 ppmdv @ 7% O₂.

6.3 Carbon Monoxide Emissions

During Q1FY18, the average CO emission concentrations on Boiler Nos. 1, 2, and 3 were 36.0 ppm_{dv}, 34.3 ppm_{dv}, and 33.0 ppm_{dv}, respectively, and all are well within permit limits (100 ppm_{dv}, hourly average). However, as reported by HDR during the May 2016 FMG Meeting, and continuing through Q1FY18, CO averages have been trending higher over the past year of operations on all three boilers, and CAAI has been requested to investigate and mitigate this uptrend. While not a permit issue, it is indicative of poorer boiler performance and combustion efficiency.

6.4 Opacity

During Q1FY18, the average opacity for Boiler Nos. 1, 2, and 3 was 0.2%, 1.0%, and 0.2% respectively. All of these averages are significantly below the 10% (6-minute) average permit limit.

6.5 Daily Emissions Data

Appendix A, Tables 10, 11, and 12 tabulate the monthly average, maximum, and minimum emissions data for each unit during Q1FY18. 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.

6.6 Ash System Compliance

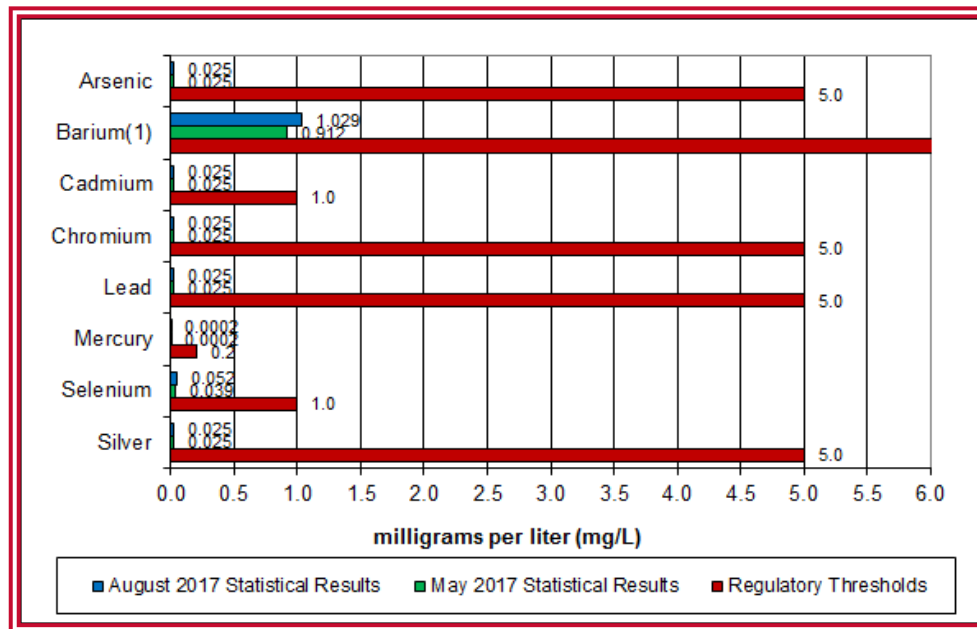
The dolomitic lime feed rate is adjusted periodically in order to maintain a desired ash pH level in the range of 8.0 to 11.0. Since initial startup, the feed rate has varied from between 1 to 9 lbs per ton each month. Ash Toxicity (TCLP) tests were performed for field samples collected over a seven (7) day period in August 2017, and results indicated that the average pH during testing was 10.2. Results

from the TCLP testing conducted in August 2017 and May 2017 are depicted in Table 9 and Chart 15 below.

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

Metals	90% Upper Confidence (August 2017)	90% Upper Confidence (May 2017)	Regulatory Threshold (mg/L)	% of Threshold (August 2017)	% of Threshold (May 2017)
Arsenic	0.025	0.025	5.0	0.50%	0.50%
Barium	1.029	0.912	100.0	1.03%	0.91%
Cadmium	0.025	0.025	1.0	2.50%	2.50%
Chromium	0.025	0.025	5.0	0.50%	0.50%
Lead	0.025	0.025	5.0	0.50%	0.50%
Mercury	0.0002	0.0002	0.2	0.10%	0.10%
Selenium	0.052	0.039	1.0	5.20%	3.90%
Silver	0.025	0.025	5.0	0.50%	0.50%

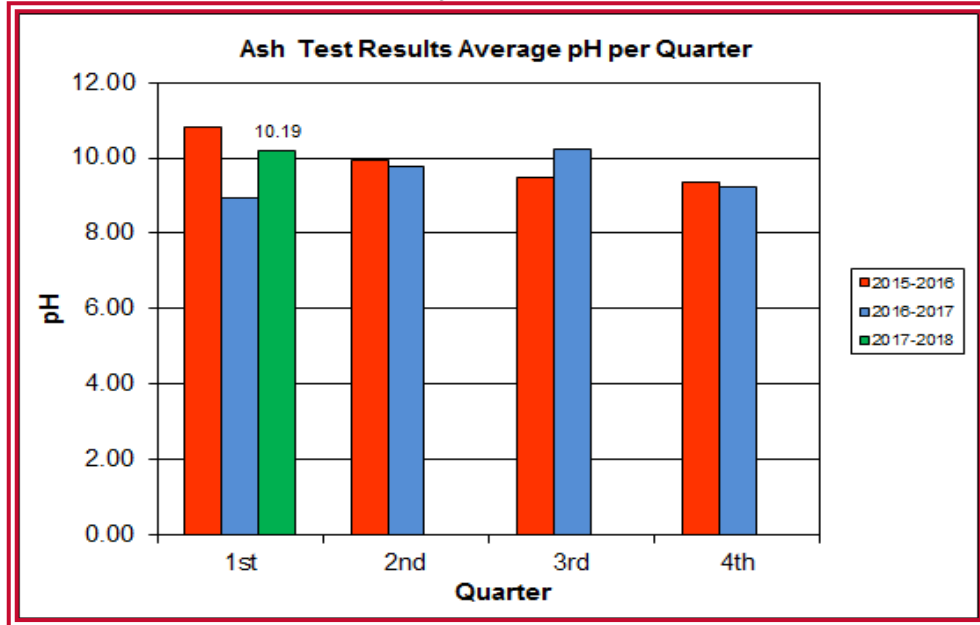
Chart 15: Ash Toxicity Characteristic Leaching Procedure (TCLP) Results



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

CAAI also samples ash monthly in-house, and documents pH reading to adjust 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 Q1FY18, the average ash pH for in-house tests was 10.2.

Chart 16: 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.		SteamFI	SO ₂ ec	SO ₂ sc	COsc	NO _x 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
Jul - 17	AVG	84.0	21.0	1.0	38.0	160.0	0.1	300.0	15.0	3.1
	Max	88.6	34.0	3.0	55.0	162.0	0.4	302.0	15.7	3.4
	Min	78.8	11.0	0.0	27.0	155.0	0.0	298.0	15.0	2.9
Aug - 17	AVG	84.8	55.0	2.0	38.0	160.0	0.1	300.0	15.0	3.2
	Max	88.1	95.0	5.0	48.0	162.0	0.3	301.0	15.5	3.6
	Min	78.5	24.0	0.0	29.0	157.0	0.0	296.0	15.0	2.9
Sep - 17	AVG	81.9	42.0	1.0	32.0	160.0	0.3	300.0	15.1	3.1
	Max	86.3	58.0	2.0	45.0	161.0	0.4	301.0	15.5	3.3
	Min	73.9	24.0	0.0	17.0	158.0	0.1	298.0	15.0	2.9
Quarter Average		83.6	39.3	1.3	36.0	160.0	0.2	300.0	15.0	3.1
Quarter Max Value		88.6	95.0	5.0	55.0	162.0	0.4	302.0	15.7	3.6
Quarter Min Value		73.9	11.0	0.0	17.0	155.0	0.0	296.0	15.0	2.9
Limits:		98	NA	29	100	205	10	331	14(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.		SteamFI	SO ₂ ec	SO ₂ sc	COsc	NO _x 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
Jul - 17	AVG	89.2	40.0	0.0	33.0	160.0	0.8	298.0	15.0	3.2
	Max	91.4	76.0	2.0	55.0	163.0	1.5	300.0	15.6	3.7
	Min	84.7	18.0	0.0	21.0	156.0	0.3	297.0	14.9	2.9
Aug - 17	AVG	88.2	31.0	0.0	38.0	160.0	1.0	299.0	15.0	3.1
	Max	91.0	47.0	2.0	48.0	162.0	1.5	301.0	15.1	3.5
	Min	82.0	13.0	0.0	30.0	158.0	0.3	298.0	14.9	2.5
Sep - 17	AVG	83.0	19.0	0.0	32.0	160.0	1.3	298.0	15.1	3.1
	Max	89.0	34.0	1.0	46.0	168.0	1.6	299.0	15.1	3.3
	Min	73.0	11.0	0.0	16.0	158.0	1.1	298.0	14.8	2.8
Quarter Average		86.8	30.0	0.0	34.3	160.0	1.0	298.3	15.0	3.1
Quarter Max Value		91.4	76.0	2.0	55.0	168.0	1.6	301.0	15.6	3.7
Quarter Min Value		73.0	11.0	0.0	16.0	156.0	0.3	297.0	14.8	2.5
Limits:		97	NA	29	100	205	10	331	14(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.		SteamFI	SO ₂ ec	SO ₂ sc	COsc	NO _x 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
Jul - 17	AVG	86.4	50.0	1.0	34.0	159.0	0.1	298.0	15.0	3.2
	Max	91.6	103.0	8.0	54.0	161.0	0.4	301.0	15.7	3.8
	Min	77.8	12.0	0.0	19.0	157.0	0.0	297.0	14.9	2.9
Aug - 17	AVG	81.9	43.0	1.0	35.0	159.0	0.2	298.0	15.0	3.2
	Max	90.5	73.0	5.0	61.0	160.0	0.5	298.0	15.1	3.5
	Min	69.2	24.0	0.0	20.0	152.0	0.0	292.0	14.9	3.1
Sep - 17	AVG	81.6	38.0	0.0	30.0	159.0	0.3	298.0	15.1	3.1
	Max	87.0	60.0	1.0	54.0	160.0	0.6	298.0	15.6	3.2
	Min	72.5	19.0	0.0	20.0	156.0	0.0	292.0	15.0	2.8
Quarter Average		83.3	43.7	0.7	33.0	159.0	0.2	298.0	15.0	3.2
Quarter Max Value		91.6	103.0	8.0	61.0	161.0	0.6	301.0	15.7	3.8
Quarter Min Value		69.2	12.0	0.0	19.0	152.0	0.0	292.0	14.9	2.8
Limits:		99	NA	29	100	205	10	339	14(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 – AUGUST 2017



Figure 1: Windshield cracked on Roll-off Truck No. 103 – New Deficiency



Figure 2: Pressure wash of exterior siding needed at Charging Floor Elevation Above Service Elevator Bay – New Deficiency



Figure 3: Viewport damaged on 4th Floor Elevation at the northwest corner of Boiler No. 1 – New Deficiency

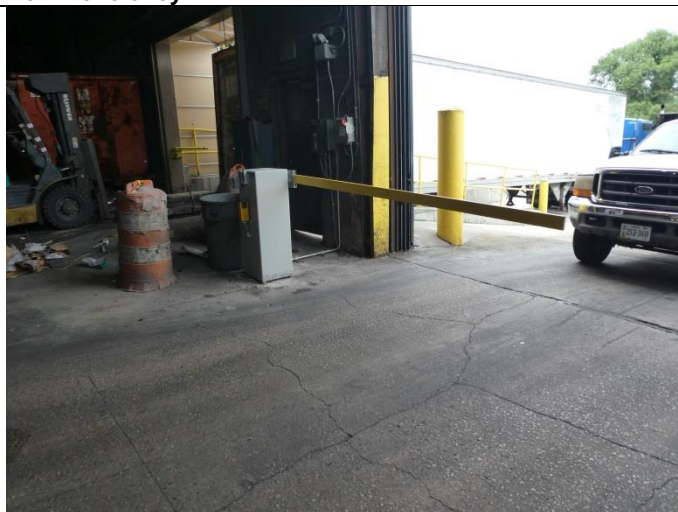


Figure 4: New Swing-Arm Gate at Tipping Floor Entrance

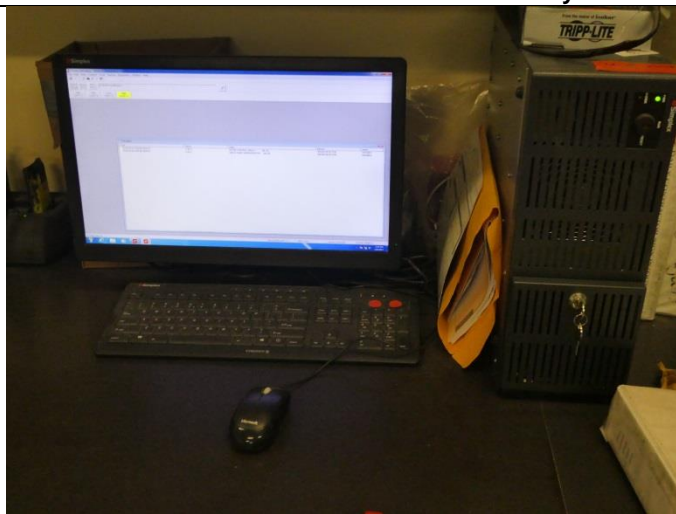


Figure 5: Fire Alarm System Control Panel & Programming were updated and new monitor installed



Figure 6: New Access Platform installed near top of Lime Silo between SDA Nos. 1 and 2 for Safety Improvement



Figure 7: New stairs and tread installed on the Cooling Tower Access Stairs



Figure 8: Waiting Area in Administration Reception Area – Construction & Upgrades Complete



Figure 9: Administration Reception area – Construction & Upgrades Complete



Figure 10: Ferrous Recovery Magnet and Main Vibratory Pan



Figure 11: SDA Penthouse



Figure 12: Baghouse Compartment Aisle

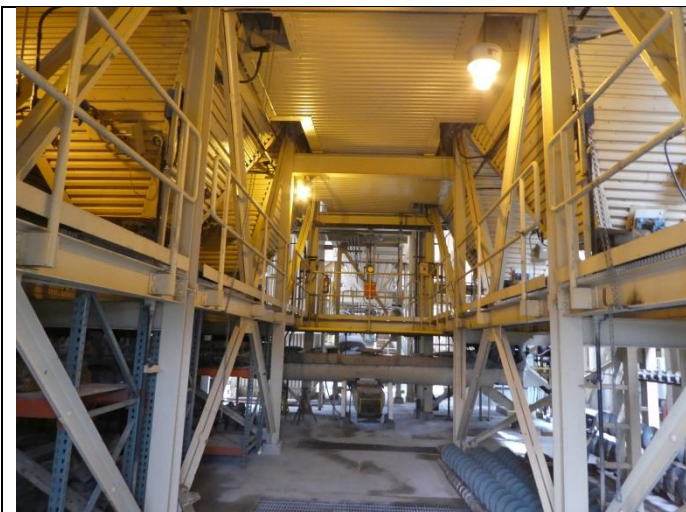


Figure 13: Baghouse Hopper Aisle



Figure 14: Cooling Tower & APC Side of Facility



Figure 15: Turbine Generator No. 2 Lube Oil Skid

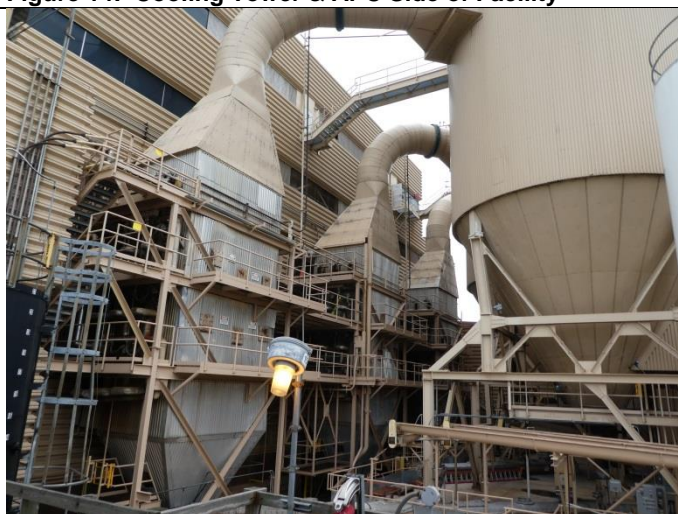


Figure 16: Economizers and SDA Vessels



Figure 17: Metal Roll-Off



Figure 18: Citizen's Drop-Off Roll-off



Figure 19: Scalehouse & Scales – Weigh-In in progress



Figure 20: Tipping Floor



Figure 21: Cooling Tower



Figure 22: Ash Trailer Canopy and Ammonia Delivery Area



Figure 23: Switchyard, Scalehouse & Entrance Roadway

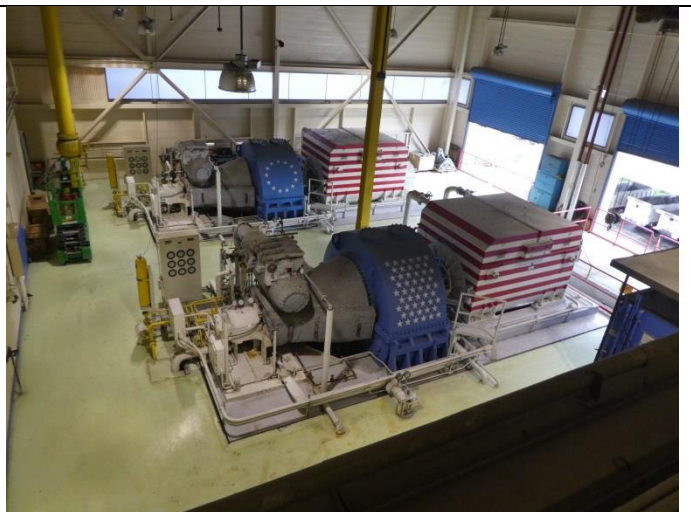


Figure 24: Turbine Generators



Figure 25: Induced Draft Fan, Dolomitic Lime Silo, SDA, and Economizer



Figure 26: General Facility Photo from Entrance



Figure 27: General Facility Photo from southeast up Eisenhower



Figure 28: General Facility Photo from Tipping Floor Entrance Road



Figure 29: Recovered Ferrous Metal Roll-Offs



Figure 30: Supplemental Waste Freight Elevator at Charging Floor Elevation