

# Alexandria/Arlington Resource Recovery Facility



## Third Quarter 2014 Summary Operating Report

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## Definition of Abbreviations & Acronyms

### Abbreviation/Acronym

APC  
Apr  
Aug  
Avg  
Btu  
CAAI  
CEMS  
CO  
Dec  
Feb  
FMG  
FY  
gal  
GAT  
HCl  
HDR  
ID  
Jan  
Jul  
Jun  
klbs  
kWhr  
lbs  
LOA  
Mar  
Max  
May  
Min  
MSW  
MWhr  
No  
NOV  
Nov  
NO<sub>x</sub>  
Oct  
OSHA  
PDS  
ppm  
ppmdv  
PSD  
Q1  
Q2  
Q3  
Q4  
RE  
RNE  
SDA  
Sep  
SO<sub>2</sub>  
TCLP  
VADEQ  
WL  
yr  
YTD

### Definition

Air Pollution Control  
April  
August  
Average  
British thermal unit  
Covanta Alexandria Arlington, Inc.  
Continuous Emissions Monitoring System  
Carbon Monoxide  
December  
February  
Facility Monitoring Group  
Fiscal Year  
Gallon  
Guaranteed Annual Tonnage  
Hydrochloric (Hydrogen Chlorides)  
HDR Engineering Inc  
Induced Draft  
January  
July  
June  
Kilo-pounds (1,000 lbs)  
Kilowatt hours (1,000 watt-hours)  
Pounds  
Letter of Agreement  
March  
Maximum  
May  
Minimum  
Municipal Solid Waste  
Megawatt hours  
Number  
Notice of Violation  
November  
Nitrogen Oxide  
October  
Occupational Safety and Health Administration  
Potomac Disposal Services  
Parts per million  
Parts per million dry volume  
Prevention of Significant Deterioration  
First Quarter  
Second Quarter  
Third Quarter  
Fourth Quarter  
Reportable Exempt  
Reportable Non-Exempt  
Spray Dryer Absorber  
September  
Sulfur Dioxide  
Toxicity Characteristic Leaching Procedure  
Virginia Department of Environmental Quality  
Warning Letter  
Year  
Year to date



# Alexandria/Arlington Waste-to-Energy Facility Third Quarter 2014 Summary Operating Report

## 1.0 Purpose of Report

HDR Engineering, Inc. (HDR) was given authorization by the Facility Monitoring Group (FMG) to conduct quarterly inspections and provide quarterly monitoring reports regarding the operation and maintenance of the Alexandria/Arlington Waste-to-Energy Facility (Facility) for the 2014 calendar year. This report is prepared for the third quarter of the 2014 fiscal year and summarizes Facility operations between January 1, 2014 and March 31, 2014. This report identifies the fiscal year beginning on July 1, 2013 as FY14 and the quarter beginning on January 1, 2014 as Q3FY14.

This report is based upon the experience HDR has 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 operator.

## 2.0 Executive Summary

CAAI operated the Facility in an acceptable manner and in accordance with established waste-to-energy industry practices during Q3FY14. 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.

During Q3FY14, the Facility experienced no unscheduled downtime for the boilers, and one (1) instance of unscheduled downtime for the turbine generators totaling 10.0 hours. On January 30, 2014, Turbine Generator No. 1 experienced 10.0 hours of downtime due to a condenser tube failure. Beginning January 25, 2014, Boiler No. 1 experienced 140.0 hours of downtime for scheduled maintenance. Beginning March 1, 2014, Boiler No. 2 experienced 138.6 hours of downtime for scheduled maintenance. Beginning March 8, 2014, Boiler No. 3 experienced 148.3 hours of downtime for scheduled maintenance. The boilers experienced three (3) instances of standby time totaling 138.5 hours, and the turbine generators experienced two (2) instances of standby time totaling 168.0 hours



during the quarter. A detailed listing of downtime is provided in Section 5.1 of this report.

Average waste processed during the quarter was 913.5 tons per day, or 93.7% of nominal facility capacity. Waste deliveries averaged 904.4 tons per day, which is 1.0% higher than the burn rate. The capacity utilization of 93.7% compares favorably to industry averages, which are generally in the 88% to 92% range.

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 increased 0.8% from the corresponding quarter in FY13; steam production decreased 4.1%, and electricity generated (gross) decreased 4.0% from the corresponding quarter in FY13. The decrease in steam generation was attributable to the decrease (6.3%) in the calculated average waste heating value, as well as more (42.2 additional hours) scheduled, unscheduled, and standby downtime. The decrease in gross electrical generation in Q3FY14 as compared to Q3FY13 is attributable to the decrease in steam production.



### 3.0 Facility Inspection and Records Review

In February 2014, HDR met with the Facility management and other plant personnel to discuss Facility operations and maintenance, acquire Facility 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 visit, HDR reviewed CAAI records, discussed performance issues with CAAI staff, and provided a verbal report and performance statistics. 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 audit 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.



**Table 1: Summary of Audit 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.	Audit Report Deficiencies	Issue Reported	Priority *	Resolution/Status	Date Resolved	Open / Closed
1	Spider cracking at scale entry area	July 2010	C	Repair		Open
2	Tipping Floor siding damaged	July 2012	C	Repair siding	February 2014	Closed
3	Pothole at truck entry roadway	May 2012	C	Repair		Open
4	Fire extinguisher certification throughout the Facility expired - Typical of All – See Figure 1 (Appendix B)	February 2014	A	Inspect and re-certify fire extinguishers throughout the Facility		Open
5	Danger sign on column at pit edge damaged – See Figure 2 (Appendix B)	February 2014	A	Replace danger signs at Tipping Floor Pit Edge		Open



## 4.0 Facility Operations

Monthly operating data provided by CAAI indicates that 82,214 tons of MSW were processed during Q3FY14, and a total of 81,400 tons of MSW including 699 tons of Special Handling Waste were received. Total ash production during the quarter was 17,036 tons, which represents 20.7% of the waste processed. The average uncorrected steam production rate for Q3FY14 was 3.0  $\text{ton}_{\text{steam}}/\text{ton}_{\text{waste}}$ , and 4.8% less than the corresponding quarter in FY13. The decrease in this metric is attributable to the decrease (6.3%) in the calculated average waste heating value that was experienced during the quarter, as compared to the corresponding quarter in FY13.

Chart 1: Tons of Waste Processed

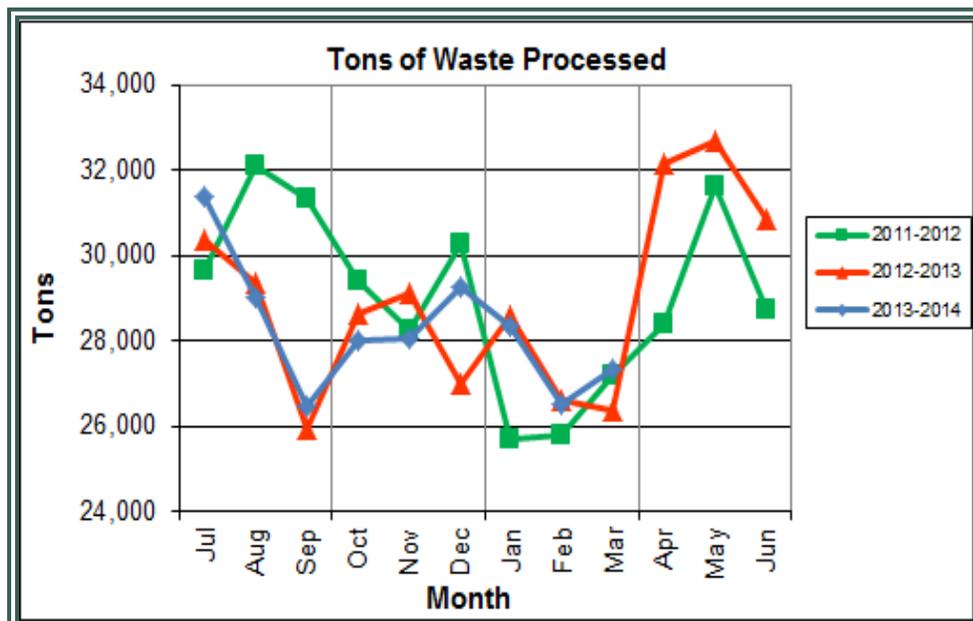


Chart 1 illustrates that Q3FY14 waste processed was slightly higher (0.8%) than the corresponding quarter Q3FY13. CAAI reported that 415 tipping floor/MSW internal inspections were conducted during the quarter and CAAI issued 12 notices of violation (NOV) to drivers for the following:

- January – Four (4) NOV were issued by CAAI:
  - Two (2) NOV were issued for excessive metal in the load
  - One (1) NOV was issued for baled waste in the load
  - One (1) NOV was issued for undoing turn buckles prior to entering the tipping floor



- February – Two (2) NOV were issued by CAAI:
  - One (1) NOV was issued for a driver leaving trash on the exit ramp
  - One (1) NOV was issued for a load of bricks
- March – Six (6) NOV were issued by CAAI:
  - One (1) NOV was issued for scavenging
  - One (1) NOV was issued for demolition debris in the load
  - One (1) NOV was issued for excessive metal in the load
  - One (1) NOV was issued for a driver dumping into the pit
  - One (1) NOV was issued for an unacceptable load
  - One (1) NOV was issued for bales in the load

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

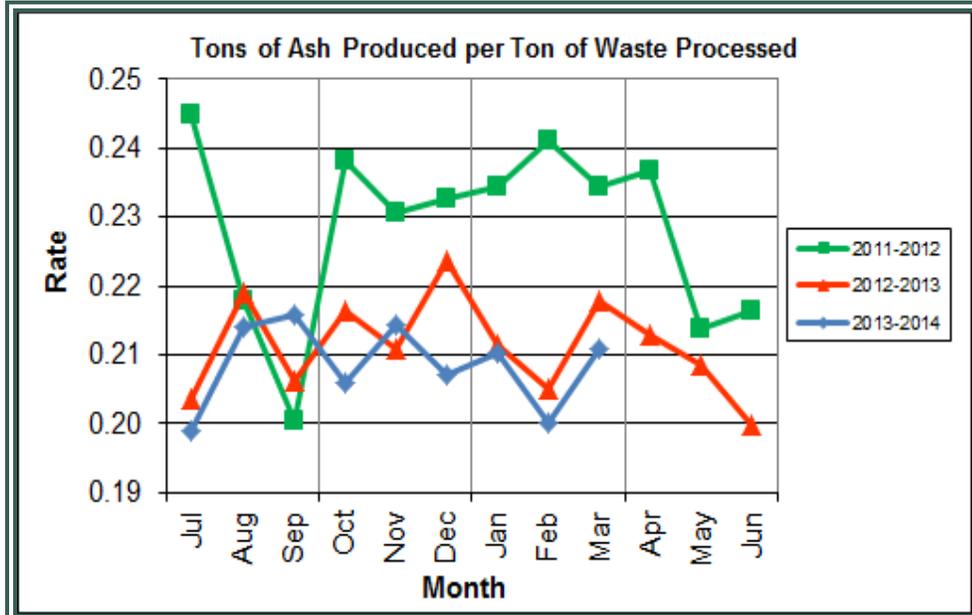


Chart 2 illustrates that ash production rates in Q3FY14 are lower (2.0%) at 20.7% of processed waste, compared to the corresponding quarter in FY13 when the ash production rate was 21.2% of processed waste. It appears that the ash production trend line has stabilized at approximately the 21.0% level, which is significantly lower than industry averages. This is attributed largely to the implementation of the semi-dry ash discharger modifications by CAAI, with the result that ash shipped to disposal has lower moisture content.



**Chart 3: Ferrous Recovery Rate**

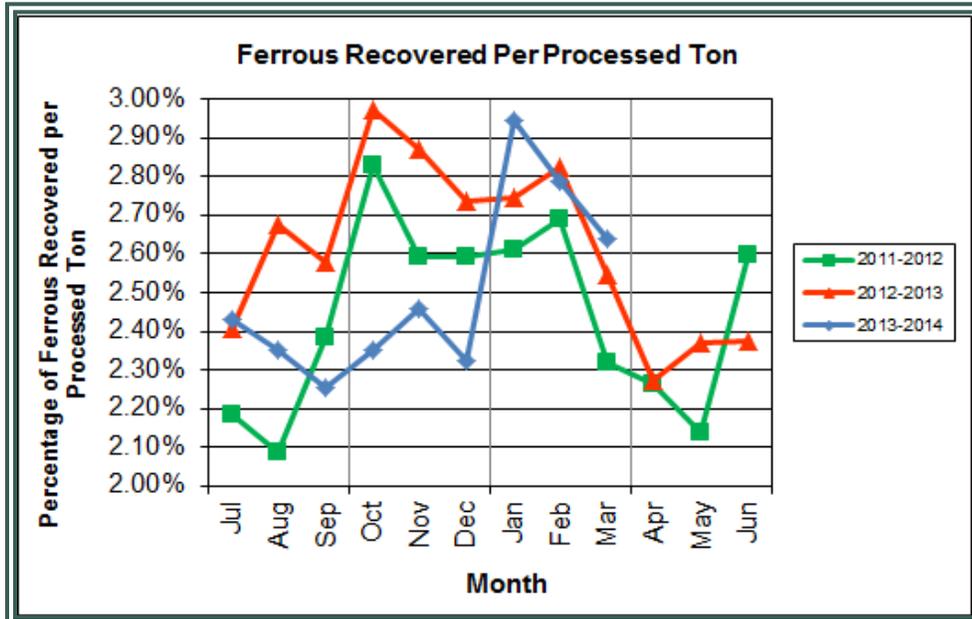
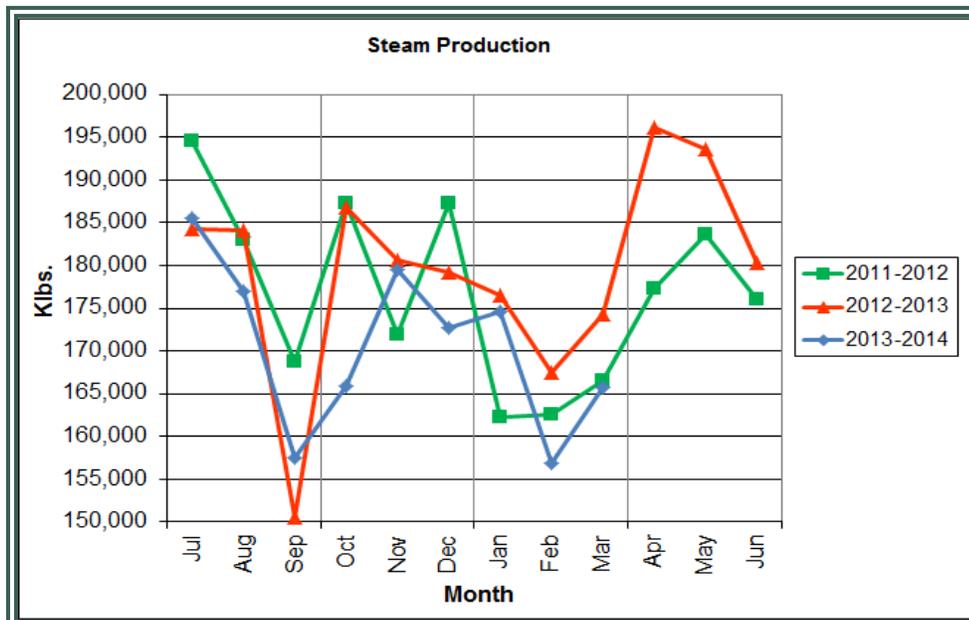


Chart 3 depicts the monthly ferrous metal recovery rate as a percentage of processed MSW tonnage. In Q3FY14, 2,296 tons of ferrous metals were recovered, which is 3.9% higher than the corresponding quarter in FY13 and equivalent to 2.8% of processed waste. The increase in ferrous metal recovery is attributable to the recently installed ferrous magnet shell, which was replaced during an outage in December 2013.

**Chart 4: Steam Production**



In Chart 4, the total steam production for Q3FY14 was 497,215 klbs., or 4.1% lower than the corresponding quarter in FY13. The decrease in steam production is attributable to the lower (6.3%) calculated average waste heating value during the quarter.

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

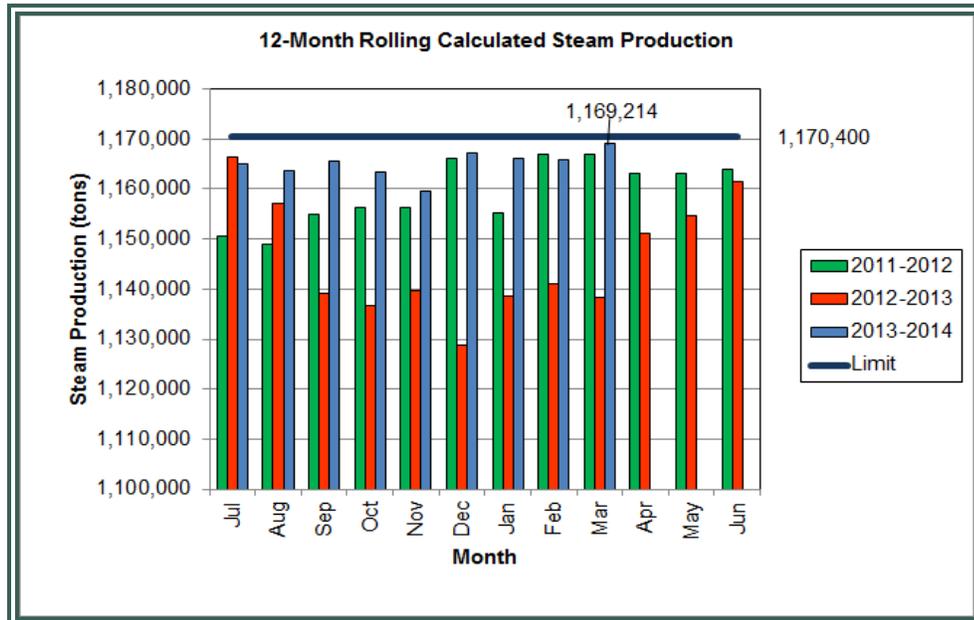
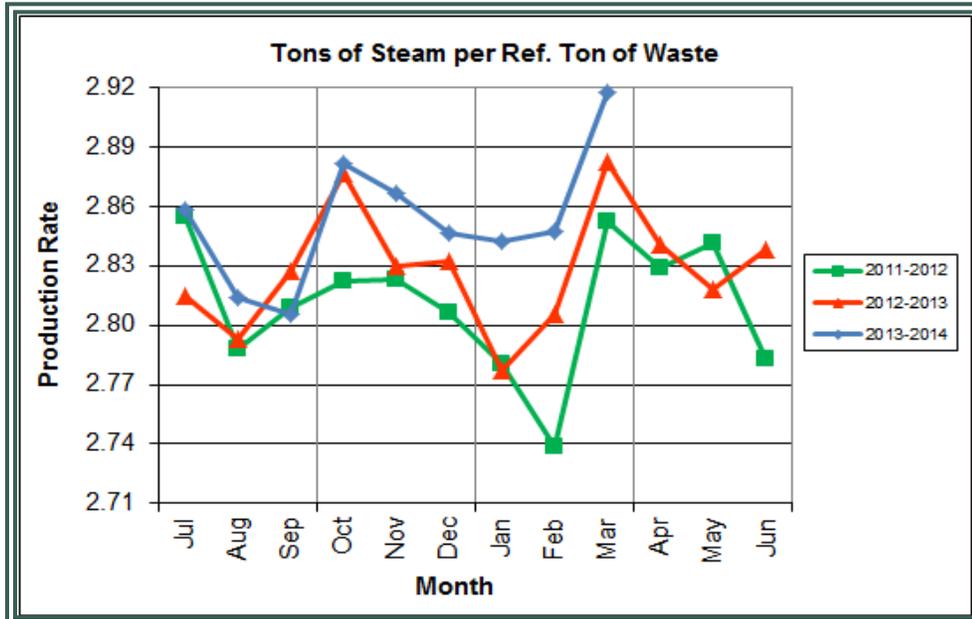


Chart 5 depicts the 12-month rolling steam production total for the period ending in March 2014. According to the Title V permit, the annual steam production for the Facility shall not exceed 1,170,400 tons on the basis of an average value of 3.34 lbs of steam per lb of MSW processed, calculated monthly 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 the quarter. The 12-month rolling total for steam production ending in March 2014 was 1,169,214 tons which is 99.9% of the limit.



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 Q3FY14 this metric tracked higher (1.7%), at 2.9 tons<sub>steam/ton<sub>ref</sub></sub>, than the corresponding quarter in FY13.



**Chart 7: Calculated Waste Heating Value**

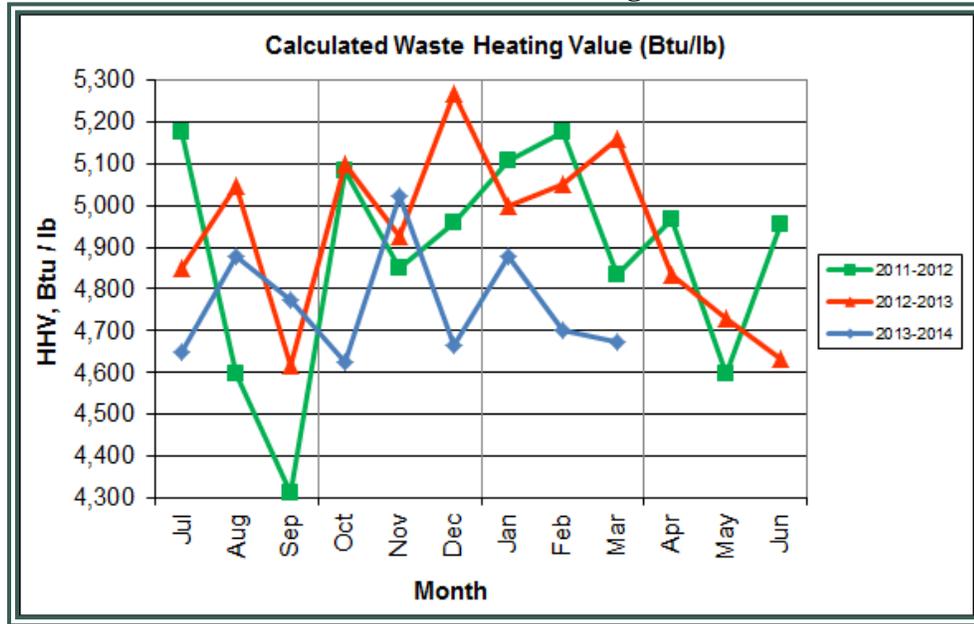


Chart 7 illustrates that Q3FY14 calculated average waste heating value was lower (6.3%) at 4,752Btu/lb than the corresponding quarter Q3FY13, which averaged 5,070 Btu/lb. According to historical precipitation charts, Washington DC Area experienced significantly more (59.1%) precipitation during Q3FY14 at 11.2 inches than the 7.0 inches experienced in Q3FY13. This increase explains the significant decrease in waste heating value experienced during the quarter.



**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 (kWhr)
Q3FY12	<b>Quarterly Totals</b>	<b>78,699</b>	<b>0</b>	<b>18,623</b>	<b>49</b>	<b>1,996</b>	<b>491,296</b>	<b>34,237</b>
	January-12	25,711	0	6,030	12	671	162,221	11,174
	February-12	25,813	0	6,220	22	695	162,605	11,766
	March-12	27,175	0	6,373	15	630	166,470	11,297
Q3FY13	<b>Quarterly Totals</b>	<b>81,592</b>	<b>0</b>	<b>17,259</b>	<b>804</b>	<b>2,209</b>	<b>518,448</b>	<b>36,791</b>
	January-13	28,610	0	6,050	363	786	176,575	12,943
	February-13	26,598	0	5,458	365	751	167,519	11,980
	March-13	26,384	0	5,751	76	672	174,354	11,868
Q3FY14	<b>Quarterly Totals</b>	<b>82,214</b>	<b>0</b>	<b>17,036</b>	<b>699</b>	<b>2,296</b>	<b>506,066</b>	<b>34,952</b>
	January-14	28,329	0	5,956	276	834	174,634	12,523
	February-14	26,537	0	5,314	192	740	165,716	11,037
	March-14	27,348	0	5,766	231	722	165,716	11,392
<b>FY14 YTD Totals</b>		<b>254,384</b>	<b>0</b>	<b>53,036</b>	<b>3,035</b>	<b>6,366</b>	<b>1,544,005</b>	<b>103,655</b>
<b>FY13 Totals</b>		<b>347,790</b>	<b>0</b>	<b>73,446</b>	<b>2,665</b>	<b>9,063</b>	<b>2,154,201</b>	<b>148,366</b>
<b>FY12 Totals</b>		<b>348,455</b>	<b>0</b>	<b>79,424</b>	<b>336</b>	<b>8,474</b>	<b>2,121,209</b>	<b>149,919</b>

Table 2 presents the production data provided to HDR by CAAI for Q3FY14 on both a monthly and quarterly basis. For purposes of comparison, data for Q3FY12 and Q3FY13 are also shown, as well as FY12, FY13 and FY14 year-to-date (YTD) totals.

In comparing quarterly totals, the data shows:

- More waste was processed in Q3FY14 than Q3FY13 and Q3FY12
- Less steam was generated in Q3FY14 than Q3FY13 and more than Q3FY12
- Less electricity was generated in Q3FY14 than Q3FY13 and more than Q3FY12
- Less supplemental waste was received in Q3FY14 than Q3FY13 and significantly more than Q3FY12.

Please note 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 12-month rolling average monthly basis, and not a fiscal year basis. It is also worth noting that the quantity of waste processed during Q3FY14 was limited by the steam production permit restrictions (refer to Chart 5).



**Table 3: Waste Delivery Classification**

		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	% of Total
FY11	Jurisdiction Waste	18,201	19,320	18,100	18,244	17,812	17,394	16,316	15,212	18,279	18,596	20,355	19,382	217,213	62.20%
	Spot Waste tons	13,996	13,917	11,696	9,336	10,177	11,441	12,968	7,016	8,459	10,177	12,947	9,657	131,786	37.74%
	Supplemental Waste	8	17	12	13	6	13	14	34	25	29	26	6	203	0.06%
	<b>MSW Totals</b>	<b>32,205</b>	<b>33,254</b>	<b>29,808</b>	<b>27,593</b>	<b>27,995</b>	<b>28,848</b>	<b>29,298</b>	<b>22,262</b>	<b>26,763</b>	<b>28,803</b>	<b>33,328</b>	<b>29,044</b>	<b>349,202</b>	<b>100.00%</b>
FY12	Jurisdiction Waste	18,112	20,021	19,304	17,796	17,523	17,211	16,202	14,952	17,430	18,338	20,138	18,361	215,381	61.89%
	Spot Waste tons	8,901	13,623	13,303	9,788	11,976	11,900	10,276	10,697	10,283	10,029	11,333	10,177	132,295	38.01%
	Supplemental Waste	10	10	34	15	15	21	12	22	15	23	68	91	336	0.10%
	<b>MSW Totals</b>	<b>27,023</b>	<b>33,654</b>	<b>32,641</b>	<b>27,599</b>	<b>29,514</b>	<b>29,132</b>	<b>26,490</b>	<b>25,672</b>	<b>27,729</b>	<b>28,390</b>	<b>31,539</b>	<b>28,629</b>	<b>348,012</b>	<b>100.00%</b>
FY13	Jurisdiction Waste	19,413	18,357	16,632 <sup>(2)</sup>	17,625 <sup>(3)</sup>	18,838 <sup>(4)</sup>	16,195	-	-	-	-	-	-	107,058	30.76%
	Spot Waste tons	10,516	11,326	10,610	10,317	9,330	9,558	-	-	-	-	-	-	61,656	17.72%
	City Waste	-	-	-	-	-	-	1,683 <sup>(1)</sup>	1,287	1,444	2,382	2,286	1,919	11,000	3.16%
	County Waste	-	-	-	-	-	-	2,442 <sup>(1)</sup>	2,100	2,372	3,381	3,932	3,309	17,536	5.04%
	Municipal Solid Waste	-	-	-	-	-	-	25,019 <sup>(1)</sup>	23,637	21,661	27,066	25,794	24,930	148,107	42.56%
	Supplemental Waste	151	11	80	25	234	405	363	365	76	403	281	271	2,665	0.77%
	<b>MSW Totals</b>	<b>29,928</b>	<b>29,683</b>	<b>27,241</b>	<b>27,942</b>	<b>28,167</b>	<b>25,753</b>	<b>29,507</b>	<b>27,388</b>	<b>25,552</b>	<b>33,231</b>	<b>32,293</b>	<b>30,429</b>	<b>348,022</b>	<b>100.00%</b>
FY14	City Waste	2,065	1,693	1,702	1,924	1,566	1,780	1,529	1,231	1,556				15,047 <sup>(2)</sup>	5.90% <sup>(2)</sup>
	County Waste	3,459	3,079	2,784	3,091	2,707	2,802	2,568	1,957	2,272				24,720 <sup>(3)</sup>	9.70% <sup>(2)</sup>
	Municipal Solid Waste	26,167	23,604	22,034	23,354	21,879	25,531	23,869	22,523	23,198				212,157 <sup>(2)</sup>	83.21% <sup>(2)</sup>
	Supplemental Waste	546	676	248	410	188	268	275	192	231				3,034 <sup>(2)</sup>	1.19% <sup>(2)</sup>
	<b>MSW Totals</b>	<b>32,237</b>	<b>29,053</b>	<b>26,768</b>	<b>28,779</b>	<b>26,340</b>	<b>30,380</b>	<b>28,241</b>	<b>25,903</b>	<b>27,256</b>				<b>254,958<sup>(2)</sup></b>	<b>100.00%<sup>(2)</sup></b>

Note (1): Beginning January 2013, the method in which waste was classified was modified as compared to prior periods due to change in contractual obligations and plant ownership

Note (2): Values indicated are year to date (YTD) totals

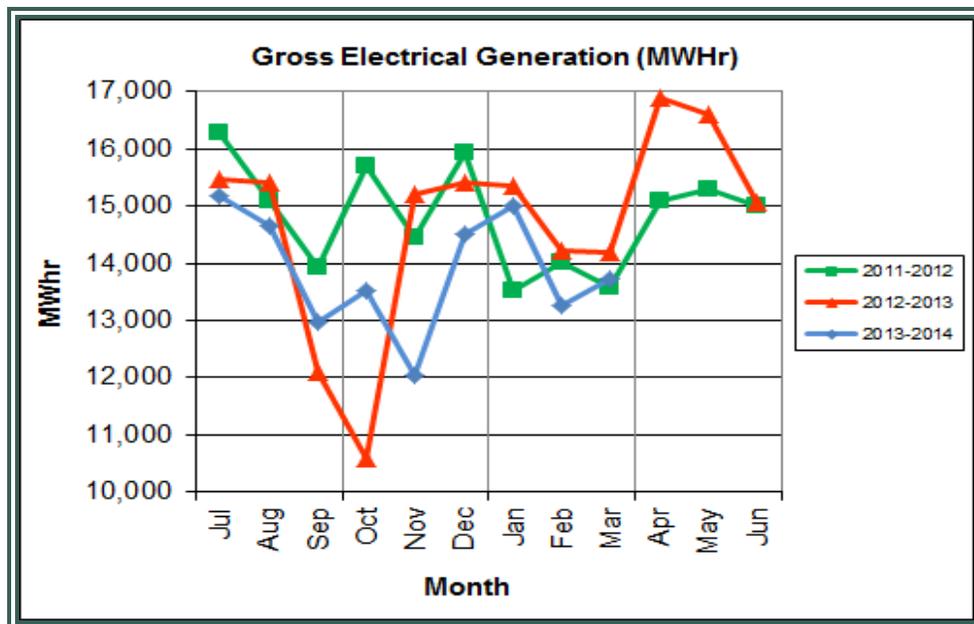


**Chart 8: Cumulative Total Waste Delivery**



Depicted in Table 3 and Chart 8, for the period ending in March 2013; cumulative total waste delivery was 1.1% more compared to the same period in FY13.

**Chart 9: Gross Electrical Generation**

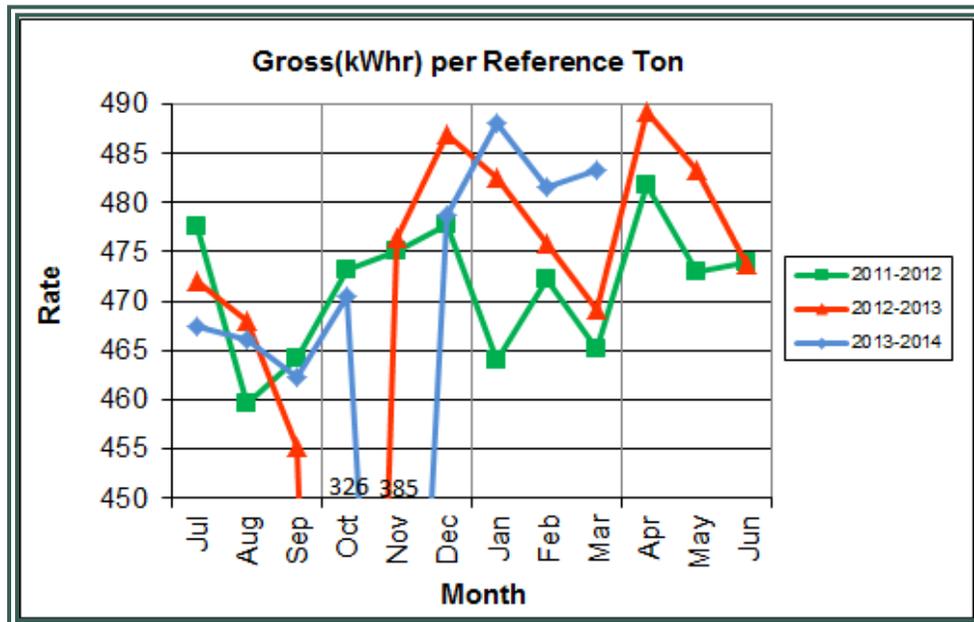


During Q3FY14, the Facility generated 41,990 MWhrs (gross) of electricity compared to Q3FY13 generation of 43,738 MWhrs (gross), a 4.0% decrease. The decrease in gross electrical production is attributable to the decrease (4.1%) in steam production.



Note that the 3-year low of gross electrical production experienced in October 2012 was due to Turbine Generator No. 1 experiencing 494.5 hours of downtime for scheduled maintenance. Evidence of the downtime experienced by the Turbine Generators is also apparent in Chart Nos. 10 through 14, including sharp spikes in the trends for the months of October 2012 and 2013 as well as November 2013 when the Overhauls were conducted on Turbine Generator Nos. 1 and 2.

**Chart 10: Gross Conversion Rate**



As shown in Chart 10, the average gross electrical generation per reference ton of refuse processed during Q3FY14 was 484 kWhr, which is 1.8% higher than the corresponding quarter in FY13. 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**

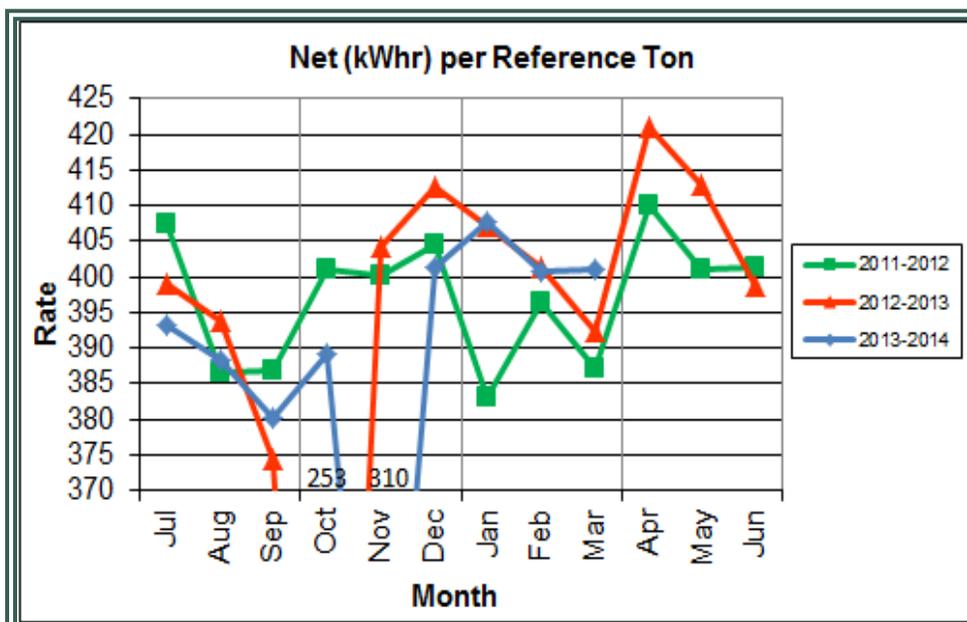


Chart 11 depicts the normalized net power (gross minus in-house usage) generation history. In Q3FY14, the average net electrical generation per reference ton was 403 kWhr, which is 0.7% higher than the corresponding quarter in FY13.

**Chart 12: Net Conversion Rate**

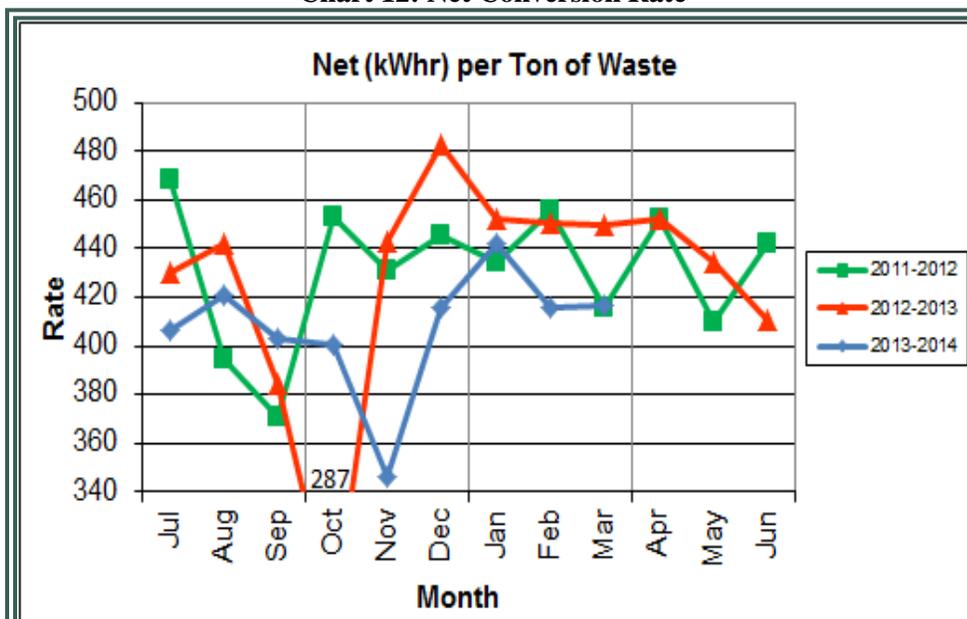
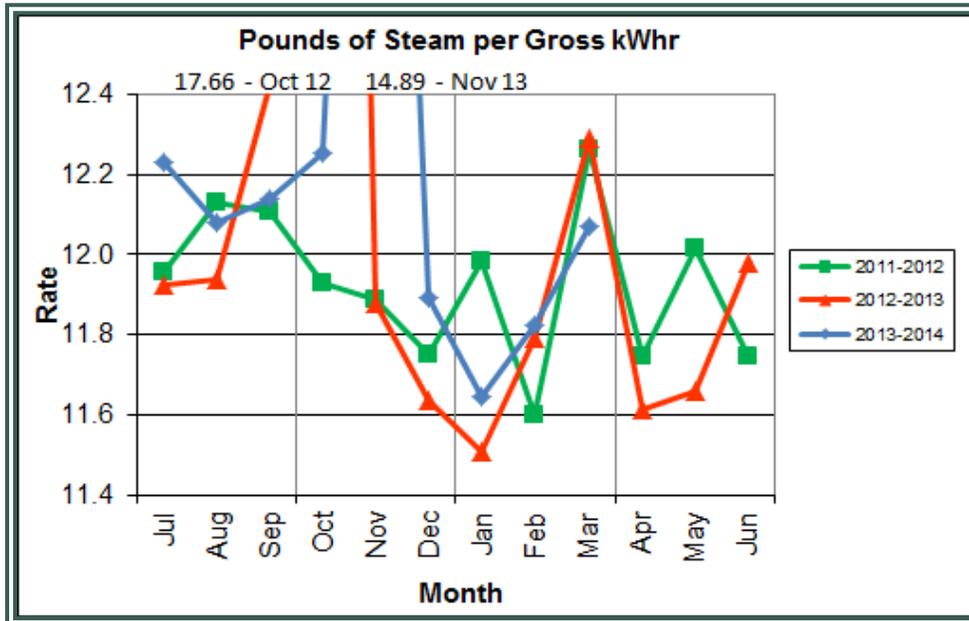


Chart 12 depicts the net power generation per processed ton. The net electrical generation per processed ton in Q3FY14 was 425 kWhr, which is 5.8% lower than the corresponding quarter in FY13.



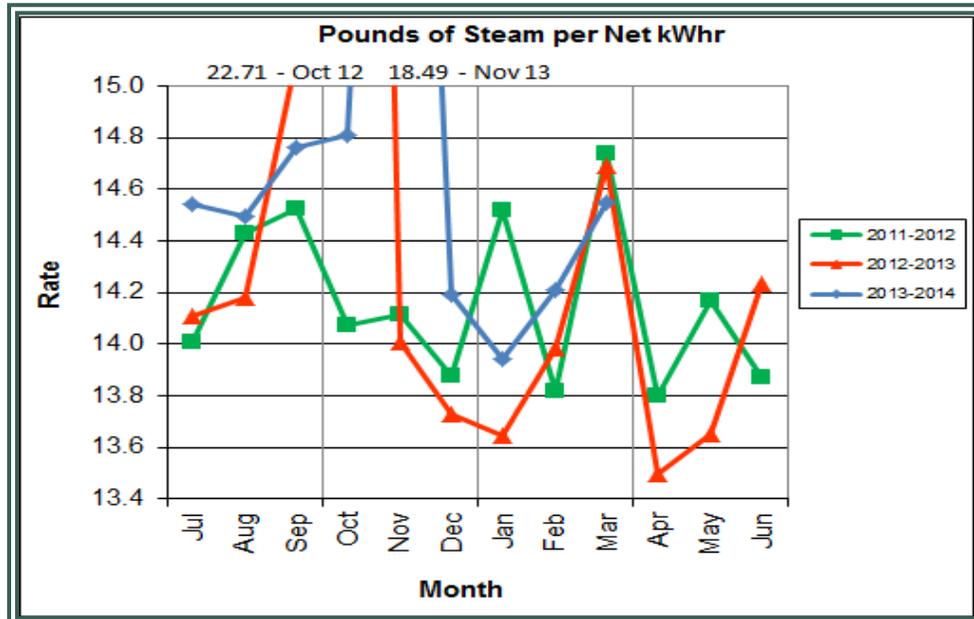
**Chart 13: Gross Turbine Generator Conversion Rate**



Charts 13 and 14 illustrate the quantities of steam required to generate one 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 Q3FY14 the average lbs of steam consumed per gross kWhr was 11.8, which is lower (0.1%) than the corresponding quarter Q3FY13. The average lbs of steam consumed per net kWhr was 14.2, which is higher (1.0%) than the corresponding quarter in FY13. The average steam temperature during the quarter was 676.4° F, which is 1.1% lower than the average steam temperature of the corresponding quarter last year, and 23.6° F lower than design temperature of 700° F.



**Chart 14: Net Turbine Generator Conversion Rate**



## 5.0 Facility Availability

Facility availabilities for Q3FY14 are shown in Table 4. According to CAAI reports, the average unit availabilities for Boiler Nos. 1, 2, and 3 for Q3FY14 were 93.7%, 93.8%, and 93.4%, respectively. The three-boiler average availability during the quarter was 93.6%, which is good.

During Q3FY14, the average availability for Turbine Generator Nos. 1 and 2 was 100.0% and 99.6%. The two-turbine generator average availability during the quarter was 99.8%, which is good. Note that the reported unit availability percentages exclude standby time.



**Table 4: Quarterly Facility Unit Availabilities**

Availability	Q1FY14 Average	Q2FY14 Average	Q3FY14 Average	FY14 YTD Average
Boiler No. 1	100.0%	95.3%	93.7%	96.3%
Boiler No. 2	93.5%	100.0%	93.8%	95.8%
Boiler No. 3	95.9%	95.5%	93.4%	94.9%
<b>Avg.</b>	<b>96.5%</b>	<b>96.9%</b>	<b>93.6%</b>	<b>95.7%</b>
Turbine No. 1	99.9%	99.3%	100.0%	99.7%
Turbine No. 2	100.0%	71.3%	99.6%	90.3%
<b>Avg.</b>	<b>100.0%</b>	<b>85.3%</b>	<b>99.8%</b>	<b>95.0%</b>

## 5.1 Facility Operations

During Q3FY14, the Facility experienced no unscheduled downtime for the boilers, and one (1) instance of unscheduled downtime for the turbine generators totaling 10.0 hours. On January 30, 2014, Turbine Generator No. 1 experienced 10.0 hours of downtime for condenser tube failure. Beginning January 25, 2014, Boiler No. 1 experienced 140.0 hours of downtime for scheduled maintenance. Beginning March 1, 2014, Boiler No. 2 experienced 138.6 hours of downtime for scheduled maintenance. Beginning March 8, 2014, Boiler No. 3 experienced 148.3 hours of downtime for scheduled maintenance. The boilers experienced three (3) instances of standby time totaling 138.5 hours, and the turbine generators experienced two (2) instances of standby time totaling 168.0 hours during the quarter. Details of downtime events experienced during the quarter are portrayed in Tables 5 and 6 as follows:



**Table 5: Boiler Downtime – Q3FY14**

Boiler Number	Outage Begin Date	Outage End Date	Hours Unavailable	Downtime Classification	Reason Unavailable
3	1/1/14	1/1/14	1.5	Standby	Preventative measure taken to avoid exceeding 350,000 ton rolling 12-month process limit
1	1/25/14	1/31/14	140.0	Scheduled	Spring 2014 Scheduled Outage
2	2/12/14	2/17/14	117.0	Standby	Preventative measure taken to avoid exceeding 350,000 ton rolling 12-month process limit
3	2/17/14	2/18/14	20.0	Standby	Preventative measure taken to avoid exceeding 350,000 ton rolling 12-month process limit
2	3/1/14	3/7/14	138.6	Scheduled	Spring 2014 Scheduled Outage
3	3/8/14	3/14/14	148.3	Scheduled	Spring 2014 Scheduled Outage
<b>Total Unscheduled Downtime</b>			<b>0.0 Hours</b>		
<b>Total Scheduled Downtime</b>			<b>426.9 Hours</b>		
<b>Total Standby Downtime</b>			<b>138.5 Hours</b>		
<b>Total Downtime</b>			<b>565.4 Hours</b>		

**Table 6: Turbine Generator Downtime – Q3FY14**

Turbine Generator Number	Outage Begin Date	Outage End Date	Hours Unavailable	Downtime Classification	Reason Unavailable
2	1/27/14	1/29/14	61.5	Standby	Spring 2014 Outage – Boiler No. 1
2	1/30/14	1/30/14	10.0	Unscheduled	Condenser tube failure
2	3/8/14	3/12/14	106.5	Standby	Spring 2014 Outages- Boiler Nos. 2 and 3
<b>Total Unscheduled Downtime</b>			<b>10.0 Hours</b>		
<b>Total Scheduled Downtime</b>			<b>0.0 Hours</b>		
<b>Total Standby Downtime</b>			<b>168.0 Hours</b>		
<b>Total Downtime</b>			<b>178.0 Hours</b>		



## 5.2 Utility and Reagent Consumptions

**Table 7: Facility Utility and Reagent Consumptions**

Utility	Units	Q3FY14 Total	Q3FY13 Total	Q3FY14 "Per Processed Ton" Consumption	Q3FY13 "Per Processed Ton" Consumption	FY14 YTD Total
Purchased Power	MWhr	6,033	5,416	0.07	0.07	17,315
Fuel Oil	Gal.	11,870	9,990	0.14	0.12	41,010
Boiler Make-up	Gal.	2,048,000	1,777,000	24.91	21.78	6,277,000
Cooling Tower Make-up <sup>(1)</sup>	Gal.	23,898,220	37,400,000	290.68	458.38	93,139,367
Pebble Lime	Lbs.	1,288,000	1,238,000	15.67	15.17	3,754,000
Ammonia	Lbs.	152,000	136,000	1.85	1.67	467,000
Carbon	Lbs.	96,000	98,000	1.17	1.20	300,000
Dolomitic Lime	Lbs.	298,000	188,000	3.62	2.30	840,000

Note (1): CAAI reports issues with the meter continued during Q3FY14, resulting in low readings.

Fuel oil usage during the quarter represents approximately 0.22% of the total heat input to the boilers, which compares favorably with industry averages, and is slightly higher than the percentage of heat input in Q3FY13 at 0.19%. 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 3.4% of steam flow, and is acceptable. Pebble lime usage, at 1,288,000 lbs. is higher (4.0%) than the corresponding quarter last year, and the quarterly consumption rate of 15.7 lbs/ton is below historical levels (16-18 lbs/ton).

In comparing Q3FY14 to Q3FY13 on a per processed ton consumption basis:

- the purchased power consumption rate was 10.6% higher
- the total fuel oil consumption rate was 17.9% higher
- the boiler make-up water consumption rate was 14.4% higher
- the cooling tower make-up water consumption rate was 36.6% lower, but may be based on erroneous metering equipment
- the total pebble lime consumption rate was 3.3% higher
- the ammonia consumption rate was 10.9% higher
- the carbon consumption rate was 2.8% lower



- the total dolomitic lime consumption rate was 57.3% higher

CAAI reports that the significant increase in dolomitic lime consumption rate is attributable to a more powdery product provided by a new dolomitic lime supplier company. CAAI also noted that it has been experimenting with feeder speeds to correct the excess usage.

## **6.0 Environmental**

The retrofit 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 Q3FY14 are summarized in Appendix A. The Facility experienced no environmental exceedances during the quarter.

### **6.1 Nitrogen Oxide Emissions**

During Q3FY14, the monthly emission concentrations of nitrogen oxides (NO<sub>x</sub>) averaged 168.0 ppmdv, 163.3 ppmdv and 162.0 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 Q3FY14 the monthly emission concentration of stack sulfur dioxide (SO<sub>2</sub>) averaged 1.7 ppmdv, 1.3 ppmdv, and 0.7 ppmdv for Boiler Nos. 1, 2, and 3, respectively. All of these stack SO<sub>2</sub> concentrations are significantly below the 40 CFR Subpart Cb requirement of 29 ppmdv @ 7% O<sub>2</sub>.

### **6.3 Carbon Monoxide Emissions**

During Q3FY14, the average CO emission concentrations on Boiler Nos. 1, 2, and 3 were 36.3 ppmdv, 36.3 ppmdv, and 21.7 ppmdv, respectively, and all are well within permit limits (100 ppmdv, hourly average).

### **6.4 Opacity**

During Q3FY14, the average opacity for Boiler Nos. 1, 2, and 3 was 0.7%, 1.1%, and 0.1% 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 Q3FY14. 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.

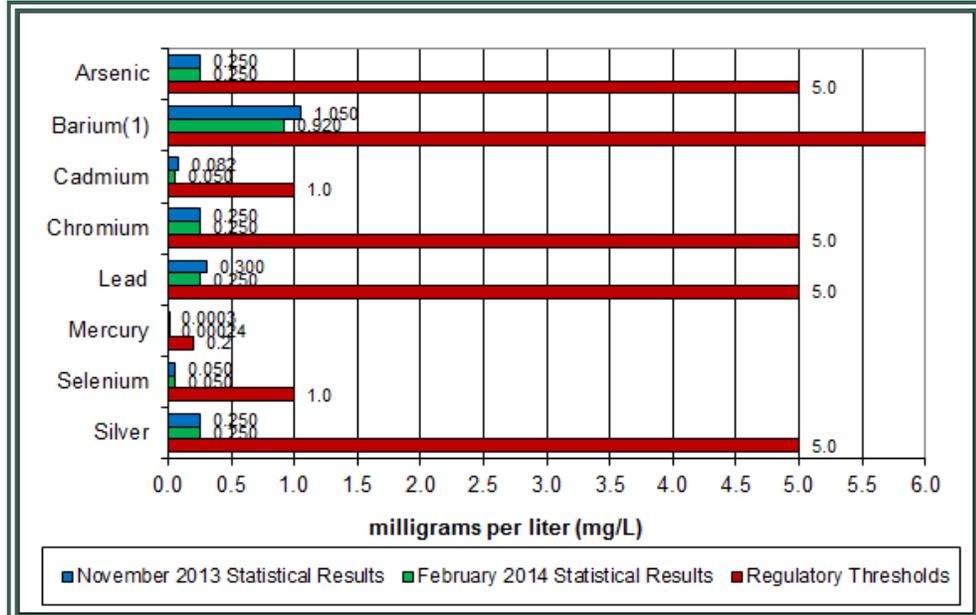
## 6.6 Ash System Compliance

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 4 to 9 lbs per ton. Ash Toxicity (TCLP) tests were performed for field samples collected over a seven (7) day period in February 2014, and results indicate that the average pH during testing was 10.3. Results from the TCLP testing conducted in February 2014 are depicted in Table 8 and Chart 15 below.

**Table 8: Comparison of Statistical Results and Regulatory Thresholds for Metal Analytes**

Metals	90% Upper Confidence (February 2014)	90% Upper Confidence (November 2013)	Regulatory Threshold (mg/L)	% of Threshold (February 2014)	% of Threshold (November 2013)
<b>Arsenic</b>	0.250	0.250	5.0	5.00%	5.00%
<b>Barium</b>	0.920	1.050	100.0	0.92%	1.05%
<b>Cadmium</b>	0.050	0.082	1.0	5.00%	8.20%
<b>Chromium</b>	0.250	0.250	5.0	5.00%	5.00%
<b>Lead</b>	0.250	0.300	5.0	5.00%	6.00%
<b>Mercury</b>	0.00024	0.0003	0.2	0.12%	0.15%
<b>Selenium</b>	0.050	0.050	1.0	5.00%	5.00%
<b>Silver</b>	0.250	0.250	5.0	5.00%	5.00%

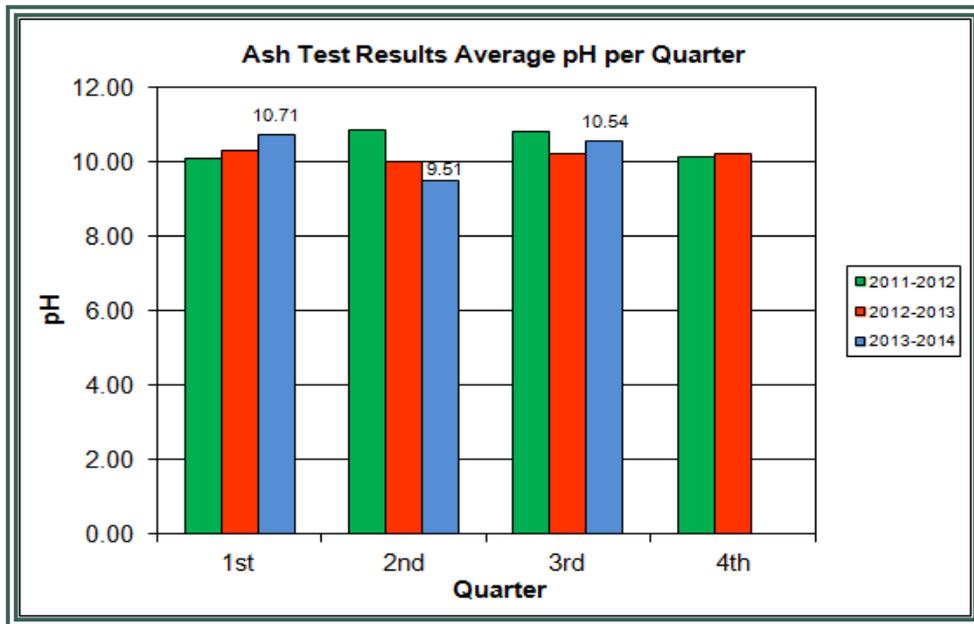
**Chart 15: Ash Toxicity Characteristic Leaching Procedure (TCLP) Results**



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 Q3FY14, the average ash pH for in-house tests was 10.5.

**Chart 16: Quarterly Ash Test Results**



## 6.7 Steam Production Issues

In October, 2007, VADEQ issued CAAI a “Warning Letter” (WL) regarding alleged violations of Condition 14 of the Facility’s Prevention of Significant Deterioration (PSD) permit issued in 2002. In response to the WL, CAAI recalculated annual steam production totals according to the VADEQ’s methodology which was to track the annual limit on a monthly basis, by adding the current month’s production to the previous 11 months’ total, and comparing it to the annual 1.12 million ton limit (Previously, CAAI tracked the annual limit on a calendar year basis, and not monthly). The recalculated data showed that the Facility exceeded the steam production limits on several occasions. Although there were not any exceedances of air emissions at the Facility, VADEQ issued a Notice of Violation (NOV) on February 29, 2008.

In March 2009, CAAI and VADEQ entered into a letter of agreement (LOA) to resolve the alleged violations. The tenets of the agreement stipulate that:

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, as compared to the measured totalized steam flow that was previously used.

Chart 5 on page 11 depicts the steam production total calculated monthly as the sum of each consecutive 12-month period.

While the agreement with DEQ settled a long-standing issue and clarifies the methodology to be used, HDR considers it to be a flawed approach, and not consistent with general industry practice. The DEQ approach relies on a more-subjective method of calculating steam flow based on the tonnage of waste processed. Determination of monthly tonnage of waste processed relies on estimates of the quantity of waste in the pit, based only on visual observation. In addition, it is well known that waste at the bottom of the pit has significantly higher density (weight per volume) than that at the top of the pit, and this is not factored into the monthly tonnage. Finally, the conversion of MSW tonnage to steam production ignores the variability in calculated waste heating value.



According to CAAI data, the waste processed each month during Q3FY14 was limited by the steam production limit and downtime (standby time) was used to stay below the limit. However, scheduled maintenance was conducted on boilers during the quarter, which resulted in less standby time being taken in comparison to recent prior quarters as a preventative measure to avoid process limitations.

## 7.0 Facility Maintenance

Throughout the quarter, significant routine and planned 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.

Scheduled maintenance was conducted during Q3FY14 on Boiler No. 1 beginning January 25, 2014, lasting 140.0 hours. Some significant maintenance items conducted during the outage included:

- Change-out of grate bars from Step Nos. 1 through 11 on both runs
- Replacement of the waterwall drain valve on the left of the furnace access door on the 1.5 level
- Repair of the superheater rod out-port
- Replacement of the hydraulic cylinder on the Run No. 2 Side Feeder
- Repair of a hole on the “D” Cell Fabric Filter Hopper
- Repair of the bottom plate on the feed chute hopper
- Replacement of the link belt coupling on the fly-ash transfer conveyor
- Replacement of the sootblower system lower isolation valve
- Replacement of both drum safety drain lines

Scheduled maintenance was conducted during Q3FY14 on Boiler No. 2 beginning March 1, 2014, lasting 138.6 hours. Some significant maintenance items conducted during the outage included:



- Replacement of Run No. 2 Side Feed Ram Hydraulic Cylinder
- Replacement of Run No. 1 Side Grate Drive Hydraulic Cylinder
- Replacement of all the feed ram wear plates
- Replacement of 12 triangular brake plates
- Replacement of G9B Sootblower Nos. 7 and 14
- Replacement of 10 wear plates in the ash discharger
- Replacement of seven (7) curved blocks

Scheduled maintenance was conducted during Q3FY14 on Boiler No. 3 beginning March 8, 2014, lasting 148.3 hours. Some significant maintenance items conducted during the outage included:

- Replacement of Run No. 1 Side Feed Ram Hydraulic Cylinder
- Replacement of G9B Sootblower Nos. 4 and 14
- Disconnect of the Electronic Relief Valve (ERV) and shipped out for repair
- Replacement of screw conveyor troughs, screws, and bearings for Baghouses E and F

In addition to the significant maintenance conducted during all three (3) boiler outages, CAAI reports that 2,838 preventative maintenance actions were completed during Q3FY14.

### **7.1 MobyDick Tank – Ash Discharger Treatment**

CAAI reports that it has begun experimenting with the use of a tank with an internal pump and a drag chain conveyor (MobyDick) for ash treatment in the dischargers. The process is to pump water to the discharger and drain the water back to the tank in an effort to help remove dry pockets in the ash. The purpose of the drag chain is to remove the solids from the bottom of the tank and convey them to the main vibratory pan. CAAI reports that the system has recently been tested with the use of flocculent chemicals in the water to assist with dropping out the solids after the liquid is drained back to the tank. CAAI reports that experiments with the system are ongoing and results have varied to date. Photos of the tank are shown in Figure 23 (Appendix B).



## **7.2 New Loading Dock Construction**

During the February 2014 site visit, HDR observed the ongoing construction of a new loading dock parallel to the Tipping Floor entrance. CAAI reports that the new loading dock will be used for supplemental waste deliveries, and potentially for other deliveries that currently slow traffic entering the Tipping Floor. Photos of the new loading dock construction are shown on the front cover of this report and on Figure 14 (Appendix B).

## **7.3 Safety**

The plant had no recordable accidents during the quarter. The plant has operated 1,229 days without an OSHA recordable incident through the end of March 2014. Safety training was conducted during the quarter with themes as follows:

January 2014 – Step-up Reinforcement/Leadership and Ash Management

February 2014 - Good Housekeeping, Slips, Trips, and Falls/Spill Prevention and Response

March 2014 – Conducting Job Observations/ Environmental Awareness

## **7.4 Facility Housekeeping**

CAAI is performing Facility housekeeping and maintaining plant cleanliness in accordance with acceptable industry practices. A site inspection was conducted in February 2014. 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 February 2014 inspection are presented in Table 9.



**Table 9: Facility Housekeeping Ratings – February 2014**

Facility Area	Highly Acceptable	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		√		



# 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 <sub>2</sub> ec	SO <sub>2</sub> sc	COsc	NO <sub>x</sub> sc	Opacity	FF InTemp	CarbInj	LimeFlow	
Units	K#/Hr	ppmc	ppm	ppmc	ppmc	%	deg F	#/hr	gpm	
Range	0-100	0-2000	0-500	0-4000	0-1000	0-100	100-500	0-50	0-20	
Jan-14	AVG	83.1	32.0	1.0	39.0	163.0	0.8	302.0	16.5	2.8
	Max	89.4	71.0	14.0	51.0	182.0	2.3	304.0	17.2	4.1
	Min	77.6	13.0	0.0	28.0	158.0	0.1	301.0	16.2	2.3
Feb-14	AVG	82.9	51.0	1.0	34.0	176.0	0.6	302.0	16.4	3.1
	Max	89.0	75.0	4.0	44.0	193.0	0.9	307.0	17.0	3.4
	Min	75.1	31.0	0.0	28.0	164.0	0.4	302.0	16.1	2.8
Mar-14	AVG	83.6	43.0	3.0	36.0	165.0	0.8	302.0	16.4	3.2
	Max	88.7	76.0	9.0	51.0	167.0	1.7	303.0	17.2	3.8
	Min	77.5	26.0	0.0	25.0	159.0	0.3	302.0	15.9	2.7
<b>Quarter Average</b>		83.2	42.0	1.7	36.3	168.0	0.7	302.0	16.4	3.0
<b>Quarter Max Value</b>		89.4	76.0	14.0	51.0	193.0	2.3	307.0	17.2	4.1
<b>Quarter Min Value</b>		75.1	13.0	0.0	25.0	158.0	0.1	301.0	15.9	2.3
<b>Limits:</b>		NA	NA	29	100	205	10	320	16(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 (ie., 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 <sub>2</sub> ec	SO <sub>2</sub> sc	COsc	NO <sub>x</sub> sc	Opacity	FF InTemp	CarbInj	LimeFlow	
Units	K#/Hr	ppmc	ppm	ppmc	ppmc	%	deg F	#/hr	gpm	
Range	0-100	0-2000	0-500	0-4000	0-1000	0-100	100-500	0-50	0-20	
Jan-14	AVG	82.6	27.0	1.0	37.0	158.0	1.5	297.0	16.4	2.6
	Max	90.2	39.0	3.0	50.0	169.0	2.9	299.0	16.9	2.9
	Min	75.7	18.0	0.0	27.0	157.0	0.1	297.0	16.2	2.3
Feb-14	AVG	84.3	20.0	1.0	39.0	160.0	1.0	297.0	16.3	2.9
	Max	89.5	34.0	3.0	51.0	188.0	3.4	303.0	16.6	3.1
	Min	74.8	11.0	0.0	25.0	153.0	0.1	296.0	16.1	2.7
Mar-14	AVG	86.8	73.0	2.0	33.0	172.0	0.8	297.0	16.3	3.1
	Max	91.2	119.0	6.0	44.0	183.0	2.4	301.0	16.9	3.6
	Min	78.6	17.0	0.0	22.0	151.0	0.0	297.0	16.0	2.7
<b>Quarter Average</b>	84.6	40.0	1.3	36.3	163.3	1.1	297.0	16.3	2.9	
<b>Quarter Max Value</b>	91.2	119.0	6.0	51.0	188.0	3.4	303.0	16.9	3.6	
<b>Quarter Min Value</b>	74.8	11.0	0.0	22.0	151.0	0.0	296.0	16.0	2.3	
<b>Limits:</b>	NA	NA	29	100	205	10	320	17(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 (ie., 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 <sub>2</sub> ec	SO <sub>2</sub> sc	COsc	NO <sub>x</sub> sc	Opacity	FF InTemp	CarbInj	LimeFlow	
Units	K#/Hr	ppmc	ppm	ppmc	ppmc	%	deg F	#/hr	gpm	
Range	0-100	0-2000	0-500	0-4000	0-1000	0-100	100-500	0-50	0-20	
Jan-14	AVG	85.6	31.0	0.0	23.0	159.0	0.2	303.0	16.4	2.8
	Max	91.8	42.0	1.0	37.0	171.0	0.5	304.0	17.2	3.1
	Min	79.6	16.0	0.0	13.0	156.0	0.0	301.0	16.2	2.5
Feb-14	AVG	83.9	19.0	0.0	22.0	161.0	0.1	303.0	16.3	3.1
	Max	89.9	33.0	3.0	31.0	187.0	0.9	305.0	16.5	3.3
	Min	75.4	7.0	0.0	15.0	157.0	0.0	299.0	16.0	2.9
Mar-14	AVG	86.6	64.0	2.0	20.0	166.0	0.0	303.0	16.4	3.3
	Max	92.1	122.0	10.0	29.0	183.0	0.5	304.0	18.5	4.2
	Min	80.0	19.0	0.0	9.0	144.0	0.0	302.0	16.0	2.7
<b>Quarter Average</b>		85.4	38.0	0.7	21.7	162.0	0.1	303.0	16.4	3.1
<b>Quarter Max Value</b>		92.1	122.0	10.0	37.0	187.0	0.9	305.0	18.5	4.2
<b>Quarter Min Value</b>		75.4	7.0	0.0	9.0	144.0	0.0	299.0	16.0	2.5
<b>Limits:</b>		NA	NA	29	100	205	10	320	16(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 (ie., 4-hour block averages for CO) do not correlate with the 24 hour average data reported above.



APPENDIX B  
SITE PHOTOS – FEBRUARY 2014





**Figure 1: Fire extinguisher certification throughout the Facility expired - Typical of All - New Deficiency**



**Figure 2: Danger sign on column at pit edge damaged - New Deficiency**



**Figure 3: Firing Aisle**



**Figure 4: Cooling Towers from SDA Penthouse**



**Figure 5: Scaffolding and outage materials**



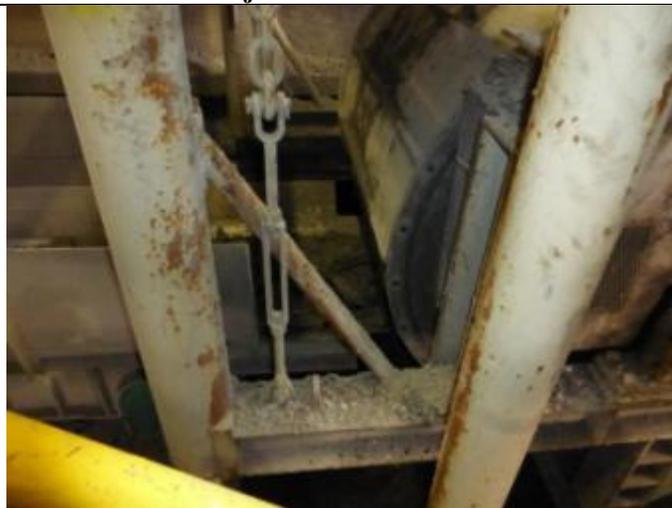
**Figure 6: Turbine Generator No. 2 Local Gauges**



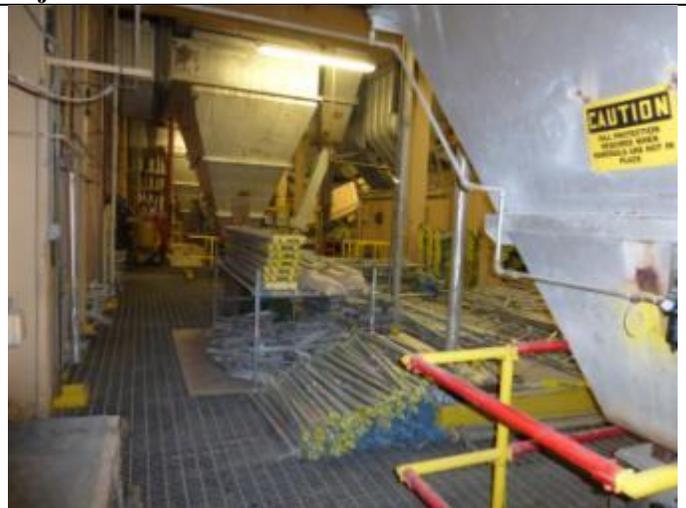
**Figure 7: Turbine Generator No. 2 upgraded controls reassembled after major overhaul**



**Figure 8: Turbine Generator No. 2 reassembled after major overhaul**



**Figure 9: Ferrous Magnet (new shell - December 2013) and Pan**



**Figure 10: Scaffolding and outage materials at Barn Door Elevation**



**Figure 11: New superheater bundle tubes to be installed during Fall 2014 Outages**



**Figure 12: Cooling Tower and Spray Dryer Absorbers**





**Figure 13: White Goods roll-off**



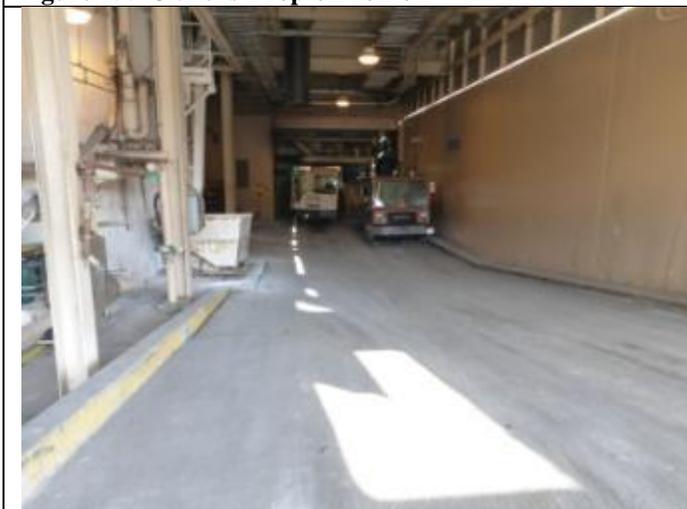
**Figure 14: New loading dock being erected near Tipping Floor Entrance**



**Figure 15: Citizens Drop-off roll-off**



**Figure 16: Inbound truck scales – no issues observed**



**Figure 17: Ash and Metal load-out ramp**



**Figure 18: Condensate Pumps**



**Figure 19: Main Vibrating Conveyor Area No issues to observe**



**Figure 20: General Photo from parking lot**



**Figure 21: General Facility Photo from across Eisenhower Ave.**



**Figure 22: Ash Trailers from Cooling Tower Deck**



**Figure 23: Moby Dick Tank – Experimental system for ash discharger conditioning**



**Figure 24: Dolomitic Lime Silo and General APC Area**

