Covanta Durham York Renewable Energy Limited Partnership

Acceptance Test Report

5-DAY
Throughput Capacity Test
Residue Quality Test
Residue Quantity Test

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1 OBJECTIVE

1.1 Throughput Performance Test

The objective of the Throughput Capacity Test was to demonstrate that the Facility could meet the Throughput Capacity Guarantee during a consecutive, five (5) day, (120-hour) test period. The Facility had to process 2,180 tonnes of Acceptable Waste at the Reference Waste HHV of 13 MJ/kg (5,589 BTU/lb) HHV or an equivalent, as shown in item 2 of Exhibit 2 to Appendix 19 of the Project Agreement, ("Agreement"). Over the course of the five (5) day test, each unit had to process at least 1,000 tonnes of Reference Waste or an equivalent. Furthermore, if the Residue Quality Guarantee was not met, the Facility would not pass the Throughput Capacity Test, even if the required tonnes of Waste were processed.

1.2 Residue Quality Test

The objective of the Residue Quality Test was to demonstrate that the Facility would produce Residue (consisting of bottom ash and grate siftings only) containing not more than three percent (3%) unburned combustible matter by dry weight and twenty-five percent (25%) moisture by weight after the combustion of Acceptable Waste. The average results during the five (5) day Throughput Capacity Test were compared to the guarantee.

1.3 Residue Quantity Test

The objective of the Residue Quantity Test was to demonstrate that the Facility could meet the Performance Guarantee for the generation of total Residue (including bottom ash, grate siftings, boiler and air pollution control flyash) as a percentage of waste combusted.

Residue was weighed with truck scales over the 5-Day Throughput Capacity Test for comparison to the guarantees. The percent guarantees vary with Waste HHV per item 4, Exhibit 2, Appendix 19 of the Agreement and exclude recovered ferrous and non-ferrous metals per the definition of Residue.

2 SUMMARY & CONCLUSIONS

Both the Throughput Capacity Test and Residue Quality & Quantity Tests were conducted in compliance with the requirements of the environmental permit. Facility CEM data are included in the Appendix for reference.

2.1 Throughput Capacity Test

The Throughput Capacity Test commenced at 0000 hours on September 27, 2015 and concluded five (5) days later at 2400 hours on October 1, 2015. The total actual throughput for the Project was **2,260** tonnes (**2,492** tons) as measured by the crane weigh scale system. The average refuse HHV for the 5-day test period was determined to be **13,336** kJ/kg (**5,733** BTU/lb). Per Exhibit 2 to Appendix 19 of the Agreement, for the as-tested HHV, the guaranteed throughput was **2,124** tonnes (**2,341** tons). Therefore, since the actual throughput was **136.7** tonnes (**150.6** tons) above the guarantee and as described in the following section, the Residue Quality Test was successfully demonstrated, the Throughput Capacity Guarantee was also successfully demonstrated. Each unit also processed over 1000 tonnes, with Units 1 & 2 processing **1,252** and **1,240** tonnes, respectively, thereby successfully surpassing that criteria.

2.2 Residue Quality Test

The 5-Day Residue Quality Test was run concurrently with the Throughput Capacity Test with the residue sampling commencing at 0100 hours on October 27, 2015 and concluding at 0100 hours on November 1, 2015. The daily composite samples, reduced from 2-hour samples were analyzed by SGS Mineral Services Division in South Holland IL, an independent laboratory.

2.2.1 Unburned Combustible

All 5 daily lab results showed the combustion residue contained less than the test method detectible limit of 232.6 kJ/kg (100 BTU/lb) or less than 0.83% unburned combustible matter by dry weight. Note the reference HHV for unburned combustible is 27,912 kJ/kg (12,000 BTU/lb) as recommended by ASME PTC-34. The Residue Quality Guarantee for unburned combustible was therefore successfully demonstrated.

2.2.2 Moisture

The 5 daily lab results of the combustion residue averaged 16.7% moisture which is less than the 25% moisture guarantee. The Residue Quality Guarantee for moisture was therefore successfully demonstrated.

2.3 Residue Quantity Test

The 5-Day Residue Quantity Test was run concurrently with the 5-Day Throughput Capacity Test and the 5-Day Residue Quality Test with the residue collection commencing at 0100 hours on September 27, 2015 and concluding at 0100 hours on October 1, 2015. Consistent with the test procedure modification described in Section 3 below, the total amount of Residue (bottom ash plus flyash) was **26.8%** of the refuse processed during the 5 days. The average refuse HHV for the 5 days was determined to be 13.3 MJ/kg so the guarantee from Exhibit 2 of Appendix 19 was **29.4**%. Since the actual Residue percentage was ***less than*** the guaranteed Residue percentage, the Residue Quantity Guarantee was therefore met for the 5-Day test.

3 TEST PROCEDURES & MODIFICATIONS

The Throughput Capacity and Residue Quality and Quantity tests were performed according to the test procedures agreed to by Covanta Durham York Renewable Energy Limited Partnership (Covanta) and the Durham York Regions' Consulting Engineer, HDR. The test procedures are included in the Appendix.

There was one modification to the test procedures concerning the Residue Quantity Guarantee Test. It was discovered that contrary to the Project Agreement definitions, the test procedures had incorrectly defined Residue to include the Fly Ash treatment materials of cement, pozzolan and water. Data was acquired and calculations of the usage of these materials were performed so they could be subtracted from the total treated Fly Ash leaving the facility. These calculations are described in section 4.3.

4 DATA ANALYSIS & CALCULATIONS

Major boiler operating data, e.g. water, steam and air flows and steam and flue gas temperatures were recorded by the facility DCS and were plotted in the individual data files forwarded to HDR during the testing. These trends demonstrate boiler operating conditions for the 5-day testing period.

Instrument calibrations were performed prior to the start of the Throughput Capacity and Residue Quality & Quantity Tests. Other than a small 0.3% correction to crane scales, no other corrections to test data were required or performed.

4.1 Throughput Capacity Test

4.1.1 Actual Waste Throughput

4.1.1.1 Determination of Total Actual Waste Throughput

Actual waste throughput was calculated as the sum of the grapple weights loaded into the feed hoppers for each day. Refer to the 30-Day test report and Appendix for more detailed data and summaries.

4.1.1.2 Crane Span Checks

Calibration weights of 3966 and 3926 kgs as weighed on the facility truck scales were lifted by the cranes and recorded twice a day; between 7 and 8 am and between 5 and 6 pm of the 5-Day Throughput Capacity Test. See the 30-Day test report for the complete crane scale span check log sheets. The tables below show the span checks performed, the average deviation between the test weight and the average scale indication for the 5-Day period.

Covanta Durham / York East Crane Scale Span Check Record Sheet

Date	Time	Crane	Test Weight (kg)	Zero Initial (kg)	Zero End (kg)	Lift (kg) 1	2	3	Reduntant (Parking)	Average (kg)	Deviation (kg)	Remarks / Initial
9/26/2015	18:58	East	3,966	0	20	4,035	4,045	4,035	4,030	4,038.3	72.3	DD
9/27/2015	07:09	East	3,966	15	35	4,045	4,045	4,045	4,030	4,045.0	79.0	RL
9/27/2015	17:16	East	3,966	0	25	4,055	4,055	4,070	4,040	4,060.0	94.0	
9/28/2015	07:09	East	3,966	0	30	4,050	4,045	4,045	4,035	4,046.7	80.7	
9/28/2015	17:06	East	3,966	0	25	4,045	4,035	4,030	4,030	4,036.7	70.7	
9/29/2015	07:08	East	3,966	0	20	4,060	4,050	4,050	4,025	4,053.3	87.3	
9/29/2015	17:11	East	3,966	-5	15	4,040	4,040	4,040	4,030	4,040.0	74.0	
9/30/2015	07:12	East	3,966	-5	5	4,035	4,025	4,015	4,005	4,025.0	59.0	
9/30/2015	17:02	East	3,966	0	5	4,025	4,010	4,025	4,015	4,020.0	54.0	
10/1/2015	07:16	East	3,966	-5	15	4,020	4,000	4,015	4,015	4,011.7	45.7	
10/1/2015	17:14	East	3,966	-5	10	4,010	4,020	4,020	4,015	4,016.7	50.7	
10/2/2015	07:19	East	3,966	-20	0	4,000	3,980	3,985	3,980	3,988.3	22.3	
1st 5-Day Avg		East	3,966	-2.1	17.1				4,020.8	**4,031.8**	**65.8**	**1.66%**

Covanta Durham / York West Crane Scale Span Check Record Sheet

Date	Time	Crane	Test Weight (kg)	Zero Initial (kg)	Zero End (kg)	Lift (kg) 1	2	3	Reduntant (Parking)	Average (kg)	Deviation (kg)	Remarks / Initial
9/26/2015	19:19	West	3,926	0	20	3,885	3,890	3,890	3,865	3,888.3	-37.7	DD
9/27/2015	07:30	West	3,926	0	20	3,890	3,895	3,895	3,870	3,893.3	-32.7	RL
9/27/2015	17:35	West	3,926	0	25	3,890	3,900	3,900	3,885	3,896.7	-29.3	RL
9/28/2015	07:32	West	3,926	0	15	3,900	3,900	3,900	3,880	3,900.0	-26.0	
9/28/2015	17:25	West	3,926	0	15	3,895	3,905	3,905	3,880	3,901.7	-24.3	
9/29/2015	07:27	West	3,926	0	5	3,880	3,890	3,890	3,875	3,886.7	-39.3	
9/29/2015	17:31	West	3,926	5	20	3,895	3,915	3,905	3,890	3,905.0	-21.0	
9/30/2015	07:30	West	3,926	15	25	3,885	3,875	3,885	3,865	3,881.7	-44.3	
9/30/2015	17:26	West	3,926	5	30	3,895	3,895	3,895	3,875	3,895.0	-31.0	
10/1/2015	07:31	West	3,926	5	20	3,875	3,875	3,895	3,850	3,881.7	-44.3	
10/1/2015	17:31	West	3,926	0	-15	3,870	3,890	3,870	3,860	3,876.7	-49.3	
10/2/2015	07:34	West	3,926	-5	20	3,860	3,860	3,855	3,840	3,858.3	-67.7	
1st 5-Day Avg		West	3,926	2.1	16.7				3,869.6	**3,888.8**	**-37.3**	**-0.95%**

4.1.1.3 Correction of Crane Scale Data

Corrections for calibration drift were made by applying the average percent deviation per crane during the 5-Day test period to all weights fed by the associated crane during that period as illustrated in the table below. The corrected throughput was 0.41% higher than the as-measured value.

5-Day Residue Quantity Test - Crane Feed Adjustment 9/27/2015 00:00 - 10/1/2015 24:00				
	Unit	Crane 1 (East)	Crane 2 (West)	Total / Average / Net
Crane Feed by Crane Weighing System	kg	26,032	2,225,196	2,251,228
Crane Feed Count	Count	14	1,266	1,280
Average Crane Load per Feed	kg/feed	1,859	1,758	1,759
Crane Span Check Reference Weight	kg	3,966	3,926	
Average Load Percent of Span Weight	%	46.9%	44.8%	
Crane Span Check Deviation	%	1.66%	-0.95%	
Crane Feed Adjustment Factor	%	-0.78%	0.42%	
Crane Feed Adjustment	kg	-203	9,452	9,250
Adjusted Crane Feed	**kg**	25,829	2,234,648	2,260,478
Percentage of Net Adjustment	%			0.41%

Daily throughput summaries are also included in the 30-Day test report. Crane scale data in included in the Appendix.

4.1.2 Determination of Guaranteed Throughput

In order to obtain the guaranteed throughput from the table in item 3 of Exhibit 2 to Appendix 19, the average HHV of waste for the 5 days must first be obtained. The following sections describe the process used to obtain the average daily refuse HHV for the 5 Days.

4.1.2.1 Boiler Calorimetry (Refuse HHV) Tests

As part of the Energy Recovery Tests, five (5), 8-hour boiler-as-a-calorimeter (B-A-C) tests were performed each day from September 27 through October 1, 2015 in accordance with ASME PTC-34 to obtain 5, 8-hour refuse HHV's. These 5 test results were utilized to calibrate the theoretical, site specific, specific steam output (SSO) correlation -- a linear correlation between refuse HHV (BTU/Lb Refuse) and specific steam output (BTU Steam/Lb Refuse) that was presented in the test procedures. The calibrated correlation was then used to obtain the average daily HHV for each of the 5 days of the Throughput Capacity Test.

Calculations and data for the HHV tests can be found in the Energy Recovery Test Report. An excerpt of the results summary of the 5 tests from that report is included as Table 1 below.

Durham York Energy Recovery: Overall Test Summary							
	Start Time	9/27/15 8:00	9/28/15 8:00	9/29/15 9:00	9/30/15 8:00	10/1/15 9:00	
	End Time	9/27/15 16:00	9/28/15 16:00	9/29/15 17:00	9/30/15 16:00	10/1/15 17:00	
	Test	ER 1	ER 2	ER 3	ER 4	ER 5	AvG
Actual Refuse Processed	tonnes	146	143	138	153	144	145
Steam Flow	kg/hr	70,881	69,894	70,206	69,621	69,919	70,104
Steam Temperature	C	501	503	500	505	501	502
Steam Pressure	bar-g	88.4	88.4	88.4	88.4	88.4	88.4
% of MCR Steam Output	%	104%	101%	104%	103%	103%	103%
Feedwater Temperature	C	138	138	136	136	136	137
Boiler Outlet Oxygen, Dry	%	8.23	8.36	8.20	8.13	7.42	8.07
Flue Gas Moisture @ Boiler Outlet	%	16.1	16.3	15.6	15.4	15.2	15.7
Excess Air	%	58.2	58.1	52.2	56.1	54.1	55.7
Flue Gas Flow	act m^3/h	184,793	191,918	188,357	195,575	174,272	186,983
Heated Comb Air Temperature	C	74	75	124	71	144	98
Economizer Outlet Temperature	C	166	167	166	167	166	167
Heat Input	KJ/kg	14,040	14,322	14,796	13,416	13,945	14,104
Heat Losses	KJ/kg	3,225	3,397	3,381	3,198	3,088	3,258
Heat Credits	KJ/kg	248	278	539	232	534	366
Heat Output	KJ/kg	10,815	10,926	11,414	10,218	10,857	10,846
Unburned Combustible	%	0.83	0.83	0.83	0.83	0.83	0.83
Residue Moisture Content	%	19.6	18.0	17.4	15.0	16.5	17.3
As-Tested Waste HHV	KJ/kg	13,792	14,044	14,257	13,184	13,411	13,738
As-Tested Boiler Efficiency	%	77.0	76.3	77.2	76.2	77.9	76.9

4.1.2.2 Un-Calibrated Refuse HHV's from Correlation

The ***un-calibrated*** site-specific theoretical linear correlation of normalized specific steam output ratio to refuse HHV was calculated and presented in the test procedures. The SSO ratio is the ratio of the heat output in the feedwater to steam conversion in BTU/lb including boiler blowdown, divided by the heat input in the refuse, i.e. the refuse higher heating value, also in BTU/lb.

$$SSO\ \left(\frac{BTU}{lb}\right) = \frac{\left[W_{stm} \times \left(H_{stm} - H_{fw}\right) + W_{CBD} \times \left(H_{f-drum} - H_{fw}\right)\right]}{W_{refuse}}$$

where:

W_{stm} = *steam production (lbs)*
H_{stm} = *Enthalpy of main steam (BTU/lb)*
H_{fw} = *Enthalpy of feedwater (BTU/lb)*
W_{refuse} = *refuse processed (lbs)*
W_{CBD} = *continuous boiler blowdown (lbs)*
$H_{f\text{-}drum}$ = *Fluid enthalpy of drum (BTU/lb)*

To develop this correlation, typical waste ultimate analyses along with design ultimate analyses from the Martin Stoker design summary sheets were used. Design operating parameters for the Durham York boilers were also used to customize the correlation to the Durham York boiler design. The resulting equation was HHV (BTU/lb) = 1.07 x SSO + 671.

4.1.2.3 Validation/Calibration of Specific Steam Output Correlation using the 5 HHV Tests

Data required by the correlation for the same time periods as the 5, 8-hour ASME PTC 34 HHV tests are shown in the table below. As described in the test procedures, the calculation results of each 8-hour SSO and corrections of the SSO to design parameters are also shown in the below table.

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HHV Calculation Sheet

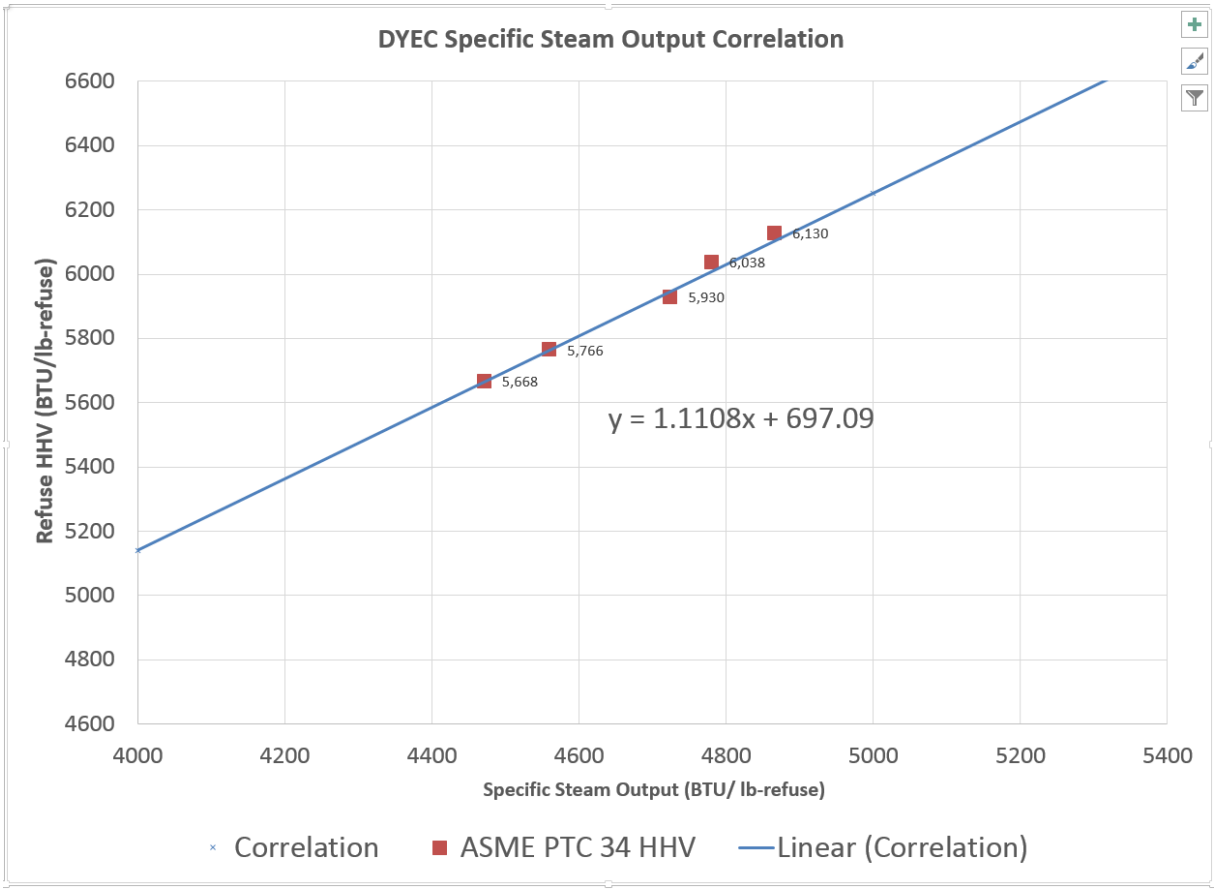
			ER1	ER2	ER3	ER4	ER5
		From:	9/27/15	9/28/15	9/29/15	9/30/15	10/1/15
			8:00:00	8:00:00	9:00:00	8:00:00	8:00:00
		To:	9/27/15	9/28/15	9/29/15	9/30/15	10/1/15
			16:00:00	16:00:00	17:00:00	16:00:00	16:00:00
		From:	9/27/15	9/28/15	9/29/15	9/30/15	10/1/15
			8:00:00	8:00:00	9:00:00	8:00:00	8:00:00
		To:	9/27/15	9/28/15	9/29/15	9/30/15	10/1/15
			16:00:00	16:00:00	17:00:00	16:00:00	16:00:00
REFERENCE VALUES	**DATA INPUTS**	**UNITS**	**VALUE**	**VALUE**	**VALUE**	**VALUE**	**VALUE**
	Refuse Processed Boiler 1	Tons	**80.1**	**80.3**	**77.2**	**83.8**	**81.0**
	Refuse Processed Boiler 2	Tons	**81.7**	**77.8**	**74.9**	**85.4**	**78.3**
	Total Operating Time - Unit 1	Hours	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**
	Total Operating Time - Unit 2	Hours	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**
	Boiler 1 Steam Production	klbs	**620.3**	**615.8**	**620.1**	**611.7**	**618.7**
	Boiler 2 Steam Production	klbs	**633.3**	**616.9**	**618.1**	**616.2**	**614.5**
	Boiler 1 Blowdown Flow	klbs	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
	Boiler 2 Blowdown Flow	klbs	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
930 deg F	Boiler 1 Stm Temp	deg F	**934.7**	**934.9**	**933.5**	**938.2**	**937.5**
	Boiler 2 Stm Temp	deg F	**934.1**	**938.8**	**932.2**	**942.4**	**929.4**
1300 psig	Boiler 1 Stm Press	psig	**1,282.7**	**1,282.2**	**1,282.2**	**1,282.2**	**1,282.7**
	Boiler 2 Stm Press	psig	**1,282.9**	**1,282.4**	**1,282.6**	**1,282.5**	**1,282.6**
275 deg F	Boiler 1 Feedwater Temperature	deg F	**280.8**	**280.8**	**277.2**	**277.0**	**277.2**
	Boiler 2 Feedwater Temperature	deg F	**280.0**	**279.9**	**276.2**	**276.3**	**276.6**
	Boiler 1 Feedwater Pressure	psig	**1,469.5**	**1,470.6**	**1,469.0**	**1,467.1**	**1,467.6**
	Boiler 2 Feedwater Pressure	psig	**1,486.2**	**1,476.0**	**1,473.7**	**1,473.5**	**1,464.4**
	Boiler 1 Drum Pressure	psig	**1,400.1**	**1,397.7**	**1,399.4**	**1,395.5**	**1,399.0**
	Boiler 2 Drum Pressure	psig	**1,403.9**	**1,396.6**	**1,397.2**	**1,395.0**	**1,395.9**
330 deg F	Blr 1 Econ Exit Gas Temp	deg F	**328.7**	**329.3**	**328.8**	**330.0**	**329.2**
	Blr 2 Econ Exit Gas Temp	deg F	**331.6**	**333.5**	**330.0**	**332.9**	**329.4**
200 deg F	Blr 1 Heated Comb Air Temp	deg F	**169.6**	**169.6**	**256.6**	**164.3**	**289.3**
	Blr 2 Heated Comb Air Temp	deg F	**162.7**	**163.5**	**252.6**	**157.1**	**291.9**
80 deg F	Boiler 1 Ambient Air Temp	deg F	**73.2**	**77.1**	**78.3**	**71.3**	**66.8**
	Boiler 2 Ambient Air Temp	deg F	**73.2**	**77.1**	**78.3**	**71.3**	**66.8**
	Blr 1 Econ Exit Dry O2	%	**7.98**	**7.97**	**7.44**	**7.78**	**7.61**
	Blr 2 Econ Exit Dry O2	%	**8.47**	**8.73**	**8.96**	**8.47**	**7.22**
1,000 Btu/cuft	Aux Fuel Usage - Boiler 1 Natural Gas	kcuft	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
1,000 Btu/cuft	Aux Fuel Usage - Boiler 2 Natural Gas	kcuft	**5.46**	**0.00**	**0.00**	**0.00**	**0.00**

1,455.71	Btu/lb		**ENTHALPIES**						
			Main Steam	Btu/lb	1,458.17	1,458.33	1,457.52	1,460.32	1,459.88
					1,457.82	1,460.67	1,456.69	1,462.86	1,455.00
247.14	Btu/lb		Feedwater	Btu/lb	252.87	252.81	249.14	248.99	249.13
					252.06	251.94	248.17	248.29	248.52
			Blowdown	Btu/lb	600.70	600.38	600.60	600.09	600.55
					601.18	600.24	600.32	600.03	600.14
			CALCULATIONS						
54.83	%		% Excess Air from %O2	%	60.74	60.64	54.74	58.41	56.53
			% Excess Air from %O2	%	66.84	70.30	73.61	66.80	52.50
			Blr 1 Steam Ht Output	MBTUH	93.46	92.79	93.67	92.62	93.64
85%	Eff. on Aux Fuel		Blr 2 Steam Ht Output	MBTUH	95.45	93.21	93.37	93.56	92.67
		0.85	Ht Output due to Aux Fuel	MBTUH	-	-	-	-	-
			Ht Output due to Aux Fuel	MBTUH	0.58	-	-	-	-
			Blr 1Ht Output from Refuse	MBTUH	93.46	92.79	93.67	92.62	93.64
			Blr 2Ht Output from Refuse	MBTUH	94.87	93.21	93.37	93.56	92.67
			Blr 1 Spec Stm Output (BTU/lb ref fired)		4,667.62	4,623.66	4,853.25	4,419.80	4,623.62
			Blr 2 Spec Stm Output (BTU/lb ref fired)		4,645.89	4,792.22	4,984.92	4,381.46	4,733.73
			Weighted Average SSO (BTU/lb)		**4,656.6**	**4,706.6**	**4,918.1**	**4,400.5**	**4,677.7**
			ADJUSTMENTS						
Factors			***Total/Average for both Boilers***						
			Wgt Avg Econ Gas Temp	deg F	330.2	331.4	329.4	331.4	329.3
0.40	% output/10 deg F		Econ Gas Temp Adjustment	BTU/lb	0.4	2.6	(1.2)	2.5	(1.3)
			Wgt Avg Htd Comb Air Temp	deg F	166.1	166.6	254.6	160.7	290.6
			Wgt Avg Ambient Air Temp	deg F	73.2	77.1	78.3	71.3	66.8
-0.28	% output/10 deg F		Htd Comb Air Temp Adjustment	BTU/lb	35.3	40.3	(77.6)	37.7	(135.8)
-0.32	% output/10 deg F		Ambient Air Temp Adjustment	BTU/lb	10.1	4.3	2.7	12.2	19.7
			Wgt Avg Excess Air	%	63.8	65.4	64.0	62.6	54.5
0.52	% output/10%		Excess Air Adjustment	BTU/lb	21.8	25.8	23.5	17.9	(0.7)
Slope	**y-intercept**		Adjusted SSO (BTU/lb ref fired)	Btu/lb	**4,724.2**	**4,779.7**	**4,865.5**	**4,470.8**	**4,559.6**
1.1108	697.09		**HHV from Correlation**	BTU/lb	**5,945**	**6,006**	**6,102**	**5,663**	**5,762**
			ASME PTC 34 HHV	BTU/lb	**5,920**	**6,029**	**6,137**	**5,664**	**5,767**
			Δ% & RMS Δ%		-0.41%	0.37%	0.58%	0.02%	0.08%	0.0036

As stated in the test procedures, to calibrate this theoretical curve to actual tested conditions, the fixed losses used in the original calculation of the theoretical correlation were increased until the root-mean-square difference between the 5, 8-hour ASME PTC 34 HHV's and those determined from the correlation was minimized. An increase in the fixed losses to 5.5% from 3.6% achieved the best agreement, i.e. the lowest root-mean-square difference. The 5, 8-hour HHV's obtained from the correlation and the 5, 8-hour HHV's obtained using PTC 34 boiler calorimetry tests for the same time periods, along with the differences are summarized below in Table 3

	Test Name:	**ER1**	**ER2**	**ER3**	**ER4**	**ER5**		
	Test Date/Time	9/27/2015 08:00 - 16:00	9/28/2015 08:00 - 16:00	9/29/2015 09:00 - 17:00	9/30/2015 08:00 - 16:00	10/01/2015 09:00 - 17:00	Root-Mean-square	**Notes:**
ASME PTC 34 HHV	**BTU/lb**	**5,920**	**6,029**	**6,137**	**5,664**	**5,767**		
HHV from Correlation	**BTU/lb**	**5,945**	**6,006**	**6,102**	**5,663**	**5,762**		After correlation calibration using 5.5% fixed losses.
	Δ%	**-0.41%**	**0.37%**	**0.58%**	**0.02%**	**0.08%**	**0.36%**	
	$(\Delta\%)^2$	0.001680	0.001381	0.003383	0.000004	0.000072		
Fixed Heat Loss (%)	2.05	3.30%	4.05%	4.25%	3.71%	3.77%	3.83%	
	3.59	1.68%	2.44%	2.65%	2.10%	2.16%	2.23%	
	4.00	1.24%	2.00%	2.21%	1.66%	1.72%	1.80%	
	5.00	0.14%	0.92%	1.13%	0.57%	0.63%	0.76%	
	5.50	**-0.41%**	**0.37%**	**0.58%**	**0.02%**	**0.08%**	**0.36%**	Best Fit (minimum Δ%)
	6.00	-0.97%	-0.18%	0.03%	-0.54%	-0.47%	0.55%	
	6.50	-1.54%	-0.75%	-0.54%	-1.10%	-1.04%	1.05%	
	7.00	-2.11%	-1.31%	-1.10%	-1.67%	-1.61%	1.60%	

The calibrated theoretical specific steam output correlation is shown below.



The X-axis of the correlation represents the specific steam output ratio or BTU of steam output divided by the pounds of refuse processed. The Y-axis represents the respective refuse HHV in BTU/lb. The individual points on the chart represent the HHV's from the ASME boiler calorimetry tests. The ***calibrated*** theoretical correlation line equation is:

$$HHV = 1.1108 * SSO + 697$$

This theoretical correlation is referenced to the design parameters of economizer exit gas temperature, ambient air temperature, heat credit and percent excess air.

4.1.2.4 Daily Specific Steam Ratios

The specific steam correlation is then utilized to determine the daily refuse HHV of the refuse processed for each of the 5 days and finally a weighted average is calculated for the overall 5-Day period as shown in Table 4. Daily DCS data and summaries utilized in this determination are included in the appendix. One-minute data is included in electronic format along with daily average summaries.

The daily reference steam output produced is obtained similarly to the 8-hour tests by multiplying daily as-tested steam production with feedwater to steam enthalpy difference. Since no auxiliary fuel was used during the 5-day test period, daily reference steam produced will then equal daily reference steam produced from refuse, i.e. reference steam from auxiliary fuel is zero (0). Note that boiler continuous blowdown was calculated as feedwater flow minus steam flow. All data are averages of 1 minute DCS readings over the entire 24 hours.

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HHV Calculation Sheet

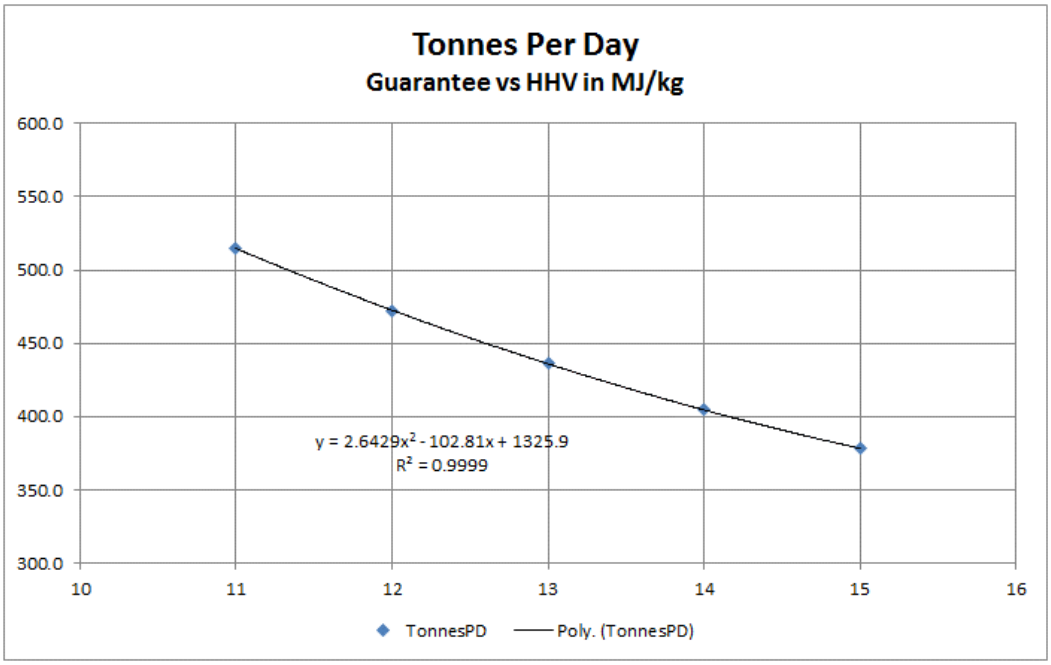
				1st5Day1	1st5Day2	1st5Day3	1st5Day4	1st5Day5
			From:	9/27/15	9/28/15	9/29/15	9/30/15	10/1/15
				0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
			To:	9/28/15	9/29/15	9/30/15	10/1/15	10/2/15
				0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
			From:	9/27/15	9/28/15	9/29/15	9/30/15	10/1/15
				0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
			To:	9/28/15	9/29/15	9/30/15	10/1/15	10/2/15
				0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
REFERENCE VALUES		**DATA INPUTS**	**UNITS**					
		Refuse Processed Boiler 1	Tons	**246.2**	**250.8**	**249.3**	**254.1**	**251.2**
		Refuse Processed Boiler 2	Tons	**250.4**	**245.6**	**236.2**	**259.2**	**248.7**
		Total Operating Time - Unit 1	Hours	**24.0**	**24.0**	**24.0**	**24.0**	**24.0**
		Total Operating Time - Unit 2	Hours	**24.0**	**24.0**	**24.0**	**24.0**	**24.0**
		Boiler 1 Steam Production	klbs	**1,858**	**1,853**	**1,854**	**1,849**	**1,856**
		Boiler 2 Steam Production	klbs	**1,846**	**1,857**	**1,854**	**1,855**	**1,851**
		Boiler 1 Blowdown Flow	klbs	**18.7**	**21.0**	**15.8**	**13.6**	**16.4**
		Boiler 2 Blowdown Flow	klbs	**7.4**	**6.1**	**5.3**	**2.7**	**4.8**
930	deg F	Boiler 1 Stm Temp	deg F	**932.4**	**937.2**	**935.1**	**939.1**	**937.5**
		Boiler 2 Stm Temp	deg F	**930.3**	**938.6**	**935.1**	**941.7**	**936.0**
1300	psig	Boiler 1 Stm Press	psig	**1,282.2**	**1,282.0**	**1,282.0**	**1,282.2**	**1,282.6**
		Boiler 2 Stm Press	psig	**1,282.1**	**1,282.3**	**1,282.3**	**1,282.4**	**1,282.6**
275	deg F	Boiler 1 Feedwater Temperature	deg F	**280.9**	**280.8**	**278.4**	**276.9**	**277.0**
		Boiler 2 Feedwater Temperature	deg F	**280.1**	**279.9**	**277.5**	**276.2**	**276.4**
		Boiler 1 Feedwater Pressure	psig	**1,470.4**	**1,473.1**	**1,469.6**	**1,468.5**	**1,471.1**
		Boiler 2 Feedwater Pressure	psig	**1,475.1**	**1,477.1**	**1,475.3**	**1,474.9**	**1,471.6**
		Boiler 1 Drum Pressure	psig	**1,399.0**	**1,398.1**	**1,398.4**	**1,397.5**	**1,398.6**
		Boiler 2 Drum Pressure	psig	**1,395.9**	**1,397.2**	**1,396.8**	**1,396.1**	**1,396.4**
330	deg F	Blr 1 Econ Exit Gas Temp	deg F	**328.8**	**329.7**	**328.9**	**329.0**	**329.0**
		Blr 2 Econ Exit Gas Temp	deg F	**332.5**	**335.7**	**331.4**	**333.4**	**330.7**
200	deg F	Blr 1 Heated Comb Air Temp	deg F	**166.8**	**166.9**	**216.7**	**161.9**	**245.2**
		Blr 2 Heated Comb Air Temp	deg F	**159.6**	**160.4**	**211.4**	**154.3**	**242.8**
80	deg F	Boiler 1 Ambient Air Temp	deg F	**78.0**	**81.7**	**81.4**	**73.6**	**69.4**
		Boiler 2 Ambient Air Temp	deg F	**79.5**	**82.4**	**81.2**	**72.5**	**67.5**
		Blr 1 Econ Exit Dry O2	%	**8.28**	**8.21**	**8.16**	**8.23**	**8.22**
		Blr 2 Econ Exit Dry O2	%	**8.87**	**7.77**	**7.40**	**7.55**	**7.50**
1,000	Btu/cuft	Aux Fuel Usage - Boiler 1 Natural Gas	kcuft	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
1,000	Btu/cuft	Aux Fuel Usage - Boiler 2 Natural Gas	kcuft	**5.51**	**0.00**	**0.00**	**0.00**	**0.00**
		ENTHALPIES						
1,455.71	Btu/lb	Main Steam	Btu/lb	1,456.80	1,459.75	1,458.45	1,460.88	1,459.87
				1,455.55	1,460.53	1,458.48	1,462.40	1,458.98
247.14	Btu/lb	Feedwater	Btu/lb	252.97	252.81	250.44	248.86	248.96
				252.16	251.93	249.51	248.12	248.32
		Blowdown	Btu/lb	600.54	600.43	600.47	600.36	600.49
				600.15	600.31	600.27	600.17	600.22
		CALCULATIONS						
54.83	%	% Excess Air from %O2	%	64.38	63.55	62.92	63.80	63.64
		% Excess Air from %O2	%	72.32	58.23	54.33	55.86	55.35
		Blr 1 Steam Ht Output	MBTUH	93.45	93.48	93.55	93.58	93.86
85%	Eff. on Aux Fuel	Blr 2 Steam Ht Output	MBTUH	92.66	93.61	93.45	93.87	93.45
0.85		Ht Output due to Aux Fuel	MBTUH	-	-	-	-	-
		Ht Output due to Aux Fuel	MBTUH	0.20	-	-	-	-
		Blr 1Ht Output from Refuse	MBTUH	93.45	93.48	93.55	93.58	93.86
		Blr 2Ht Output from Refuse	MBTUH	92.46	93.61	93.45	93.87	93.45
		Blr 1 Spec Stm Output (BTU/lb ref fired)		4,553.99	4,473.09	4,503.36	4,419.94	4,484.53
		Blr 2 Spec Stm Output (BTU/lb ref fired)		4,431.02	4,574.11	4,747.02	4,345.33	4,508.23
		Weighted Average SSO (BTU/lb)		**4,492.0**	**4,523.1**	**4,621.9**	**4,382.3**	**4,496.3**
		ADJUSTMENTS						
Factors		***Total/Average for both Boilers***						
		Wgt Avg Econ Gas Temp	deg F	330.6	332.7	330.1	331.2	329.8
0.40	% output/10 deg F	Econ Gas Temp Adjustment	BTU/lb	1.2	4.9	0.3	2.1	(0.3)
		Wgt Avg Htd Comb Air Temp	deg F	163.2	163.7	214.1	158.1	244.0
		Wgt Avg Ambient Air Temp	deg F	78.7	82.1	81.3	73.1	68.4
-0.28	% output/10 deg F	Htd Comb Air Temp Adjustment	BTU/lb	44.7	48.6	(16.6)	42.9	(70.0)
-0.32	% output/10 deg F	Ambient Air Temp Adjustment	BTU/lb	1.8	(3.0)	(1.9)	9.7	16.6
		Wgt Avg Excess Air	%	68.4	60.9	58.7	59.8	59.5
0.52	% output/10%	Excess Air Adjustment	BTU/lb	31.7	14.3	9.4	11.3	11.0
Slope	**y-intercept**	Adjusted SSO (BTU/lb ref fired)	Btu/lb	**4,571.3**	**4,587.8**	**4,613.1**	**4,448.3**	**4,453.7**
1.1108	697.09	**HHV from Correlation**	BTU/lb	**5,775**	**5,793**	**5,821**	**5,638**	**5,644**
		ASME PTC 34 HHV	BTU/lb					

4.1.3 Comparison of Guaranteed and Actual Waste Processed

The 5 day weighted average HHV was determined to be **13,336** kJ/kg (**5,733** BTU/lb), which linearly interpolating the table in item 3 of Exhibit 2 to Appendix 19, corresponds to a guaranteed tonneage of **425.0** Tonnes per day or **2,124** Tonnes for the 5 days. Since the actual tonnes of refuse processed averaged **453.0** tonnes per day or **2,260** Tonnes total, the Throughput Capacity Guarantee was surpassed by **28.0** Tonnes per day or **136.7** Tonnes.

Each unit also processed over **1,000** Tonnes, with Units 1 & 2 processing **1,252** and **1,240** Tonnes, respectively, thereby successfully demonstrating that requirement.

	Test 1						
	Sunday	Monday	Tuesday	Wednesday	Thursday		
Day of Week	1	2	3	4	5		
Test Day	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Total**	**Wtd. Avg.**
	9/27/15	9/28/15	9/29/15	9/30/15	10/1/15		
Refuse Daily HHV (BTU/lb)	**5,775**	**5,793**	**5,821**	**5,638**	**5,644**		**5,733**
Guaranteed Tons	464.8	463.3	461.0	476.2	475.7	2,341	**468.4**
Actual Tons Processed	496.6	496.4	485.5	513.3	499.9	2,492	**499.3**
Tons Above Guarantee	31.85	33.06	24.46	37.07	24.18	150.6	30.9
% Above Guarantee	6.9%	7.1%	5.3%	7.8%	5.1%	**6.4%**	
Refuse Daily HHV (kJ/kg)	13,433	13,476	13,541	13,115	13,129		**13,336**
Guararanteed Tonnes	421.7	420.3	418.3	432.0	431.6	2,124	**425.0**
Actual Tonnes Processed	450.6	450.3	440.5	465.7	453.5	2,260	**453.0**
Tonnes Above Guarantee	28.90	29.99	22.19	33.63	21.94	136.7	28.0
% Above Guarantee	6.9%	7.1%	5.3%	7.8%	5.1%	**6.4%**	
Unit 1 tonnes processed	246.24	250.79	249.28	254.06	251.16	1,252	
Unit 2 tonnes processed	250.40	245.57	236.23	259.24	248.74	1,240	



4.2 Residue Quality Test

Residue (bottom ash) was sampled every two hours over the 5-day test period per the test procedures to demonstrate acceptable combustion during the Throughput Capacity Test. Daily composite samples were sent for laboratory analysis of moisture per ASTM Method D-3302 and for carbon per ASTM Method D-5865 (adiabatic bomb calorimeter). The results from the lab for combustible content are in the form of dry ash HHV in BTU/lb. This HHV was divided by the HHV of combustible matter of 27,912 kJ/kg (12,000 BTU/lb) to obtain percent unburned combustible matter in the ash. Triplicate analyses were performed on each daily sample. See the table below for a summary of the lab results and the appendix for sampling data sheets and laboratory results sheets. The five (5) sample results were mathematically averaged. The average lab results were 16.7% moisture and less than 0.83% carbon in the dry ash. Since these results are well below the maximum limits of 25% moisture and 3% carbon by dry weight, correcting the percent combustible for previously removed inert materials and carbon injected for the mercury control purpose was deemed unnecessary and was not performed.

Bottom Ash Unburned Combustible Analysis
Reported in Gross Calorific Value (BTU/Lb)

Residue Quality Test					
Date	**Name**	**Run 1**	**Run 2**	**Run 3**	**Average**
9/27/2015	120HRD1	100	100	100	100
9/28/2015	120HRD2	100	100	100	100
9/29/2015	120HRD3	100	100	100	100
9/30/2015	120HRD4	100	100	100	100
10/1/2015	120HRD5	100	100	100	100
Average					**100.0**
HHV for Unburned Combustibles					**12,000**
Unburned Combustible %					**0.42***

* Result is average of zero and minimum detection limit of 0.83%

Bottom Ash Laboratory Moisture Content (%)
As-Received Basis

Residue Quality Test					
Date	**Name**	**Run 1**	**Run 2**	**Run 3**	**Average**
9/27/2015	120HRD1	17.68%	17.68%	17.65%	**17.7%**
9/28/2015	120HRD2	17.80%	17.77%	17.80%	**17.8%**
9/29/2015	120HRD3	16.71%	16.71%	16.67%	**16.7%**
9/30/2015	120HRD4	15.75%	15.72%	15.73%	**15.7%**
10/1/2015	120HRD5	15.90%	15.90%	15.05%	**15.6%**
Average					**16.7%**

Since the unburned carbon content by dry weight and moisture content were below the maximum limits of 25% moisture and 3% unburned combustible by dry weight, as illustrated in the above tables, the Throughput Capacity Guarantee was therefore successfully demonstrated.

4.3 Residue Quantity Test

4.3.1 Measurement of Total Bottom Ash & Treated Flyash

The 5-Day Residue Quantity Test was run concurrently with the Residue Quality Test with the segregation of residue commencing at 0100 hours on September 27, 2015 and concluding at 0100 hours on October 2, 2015. A one hour offset was used to estimate the time for the test refuse to combust and travel to the ash building.

At the commencement of the test period the bottom ash was physically segregated from previously produced bottom ash in the ash house bottom ash bunkers. The flyash train was shifted to an empty surge bin at 0100 hours. Flyash produced prior to 0100 was processed, then physically segregated from test period flyash in the ash house flyash bunkers. Test period flyash was then processed and tracked in the flyash bunkers to be shipped and weighed when properly cured as required by MOE approved procedures.

The shipping of the segregated test period ash was tracked and measured at the facility scales as it was shipped to the landfill. At the end of the 5 day Ash Quantity Test period the bottom ash and flyash were segregated as above from further ash being produced.

5-Day Residue Quantity Test
09/27/2015 00:00 - 10/01/2015 24:00

Total Waste Processed	**Tonne**	**2,260.5**
Total Bottom Ash	Tonne	470.3
Total Treated Fly Ash	Tonne	240.2
Total Residue	**Tonne**	**710.5**

Covanta Durham York		
5-Day Residue Quantity Test		
Bottom Ash Quantity		
Date	Net Weight (kg)	Remarks
9/28/2015	39,470	Shipped
9/28/2015	34,450	Shipped
9/29/2015	39,310	Shipped
9/29/2015	39,000	Shipped
9/29/2015	33,370	Shipped
9/30/2015	35,000	Shipped
9/30/2015	35,910	Shipped
10/1/2015	33,130	Shipped
10/1/2015	35,890	Shipped
10/2/2015	37,200	Shipped
10/2/2015	40,260	Shipped
10/2/2015	35,040	Shipped
10/2/2015	32,290	Shipped
Total	**470,320**	
Complete as of 10/2/2015 16:43		

5-Day Residue Quantity Test				
Treated Fly Ash Quantity				
Date	Tare Weight (kg)	Gross Weight (kg)	Net Weight (kg)	Remarks
10/3/2015	17,870	30,150	-12,280	Pre-test fly ash, partial load-out.
10/3/2015	17,870	51,560	33,690	Test & pre-test fly ash quantity shipped.
10/3/2015	17,400	51,110	33,710	Test fly ash shipped
10/5/2015			43,570	
10/5/2015			34,020	9/27, 9/28 & 9/29 generated fly ash is emptied. 9/30 & 10/1 generated fly ash remained on site.
10/8/2015			38,580	1 truck load from Bay 7.
10/10/2015	18,220	54,610	36,390	From Bay 7
10/10/2015	18,520	51,020	32,500	From Bay 7 Partial Shipment
			240,180	**Complete as of 10/10/2015**

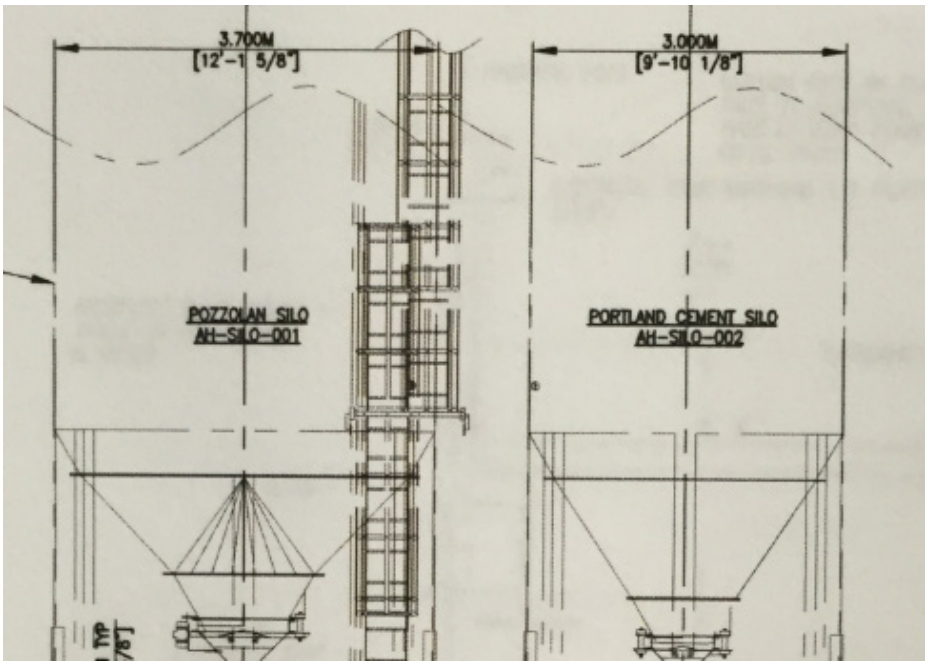
Daily bottom ash and fly ash quantities shipped are summarized in the 30-Day test report while truck scale reports are included in the Appendix.

4.3.2 Adjustment/Subtraction of Materials to Treat Flyash

4.3.2.1 Cement & Pozzolan

Cement and pozzolan quantities used during the 5 Days of the Residue Quantity Test were determined via silo level readings. Level readings were logged by the plant staff each morning at 07:00. Using the level readings and the area of the silos, the changes in volume were first calculated. The changes in volume were then multiplied by the appropriate density to obtain the changes in weight. Since the silo level readings did not coincide with the test start & stop times, the average rate determined over the period was applied to the test period.

The silo areas were calculated using a cement silo diameter of 3.000M and a pozzolan silo diameter of 3.700M obtained from the below drawing.



As shown in the table below, the density used for Portland cement was 1,506 kg/m^3 (94 lb/ft^3) while the density of the pozzolan material of 1,346 kg/m^3 (84 lb/ft^3) which was obtained from the supplier, is closer regular cement.

Material	Lbs/cu.ft	Kgs/cu.m
Cement	85	1362
Cement (Portland)	94	1506
Cement (Portland) Clinker	95	1522
Cement Dust	50	801

The cement and pozzolan silo levels and change in weight are summarized in the below table. Note that the cement data is from 9/29 – 10/2 and the pozzolan data is an average rate from 9/21 through 10/2 because of a cement delivery on 9/28 and pozzolan deliveries on delivery on 9/28 and 10/2.

				94 lb/ft^3								84 lb/ft^3			
	7.069 m^2		area	1505.8 kg/m^3				10.752 m^2		area	1345.6 kg/m^3				
	3.0 meter		diameter					3.7 meter		diameter					
	Cement							Slag/POZZOLAN							
		Meter	Volume	Received	Δm^3	Δkg	Δtonne /day		Meter	Volume	Received	Δm^3	Δkg	Δtonne /day	
9/21		3.4						9/21	4.7		41536				
9/22		3.3						9/22	3.8						
9/23		2.8						9/23	3.6						
9/24		2.2						9/24	3.5						
9/25		1.9						9/25	3						
9/26		1.9						9/26	2.8						
9/27		1.9						9/27	2.6						
9/28		0.8						9/28	1.8		?	31.181	41956.2	5.994	
9/29		4.27						9/29	3.9						
9/30		3.5						9/30	3.2						
10/1		2.6						10/1	2.5						
10/2		2.1		43930	15.339	23096.5	7.699	10/2	2.4		38310	16.128	21701.5	7.234	
10/3		5.1						10/3	4.6						

4.3.2.2 Water

Water used in the mixing of flyash, cement and pozzolan was estimated as being 45% by weight of the sum of the pozzolan and cement weight. See the 30-Day report for supporting information of this value.

4.3.3 Net Correction for Flyash Treatment Materials

									7.699	6.614	0.45		
				Waste Processed	Waste HHV	Guarantee	Bottom Ash	Treated Wet Fly Ash	CEMENT	POZZOLAN	Estimated Water	Net Dry Fly Ash (No CEM/POZ)	Net Total Residue-to-Waste Ratio
Date Start	Date End	Duration	Name	Tonne	MJ/kg	%	Tonne	Tonne	tonnes	tonnes	tonnes	tonnes	%
27-Sep	1-Oct	5	5-Day Test	2,260	13.34	**29.4**	470.3	240.2	38.5	33.1	32.2	136.4	**26.8%**

After adjusting/removing the cement, pozzolan and water, the ratio of total residue to refuse is 26.8% which is below/better than the guarantee of 29.4% at an average 5-Day HHV of 13.34 MJ/kg.

5 DISCUSSION

5.1 Throughput Performance Test

5.1.1 Daily Refuse HHV vs 8-Hour As-Tested HHV

The daily refuse HHV varied between 13.1 and 13.5 kJ/kg (5,638 and 5,821 BTU/lb) or roughly 3% over the 5-day period. The weighted average HHV for the 5-day test period was 13.3 kJ/kg (**5,733** BTU/lb). These HHV's are somewhat less than the HHV's of the five energy recovery tests. It was observed that fresh waste on top of the pit was fed during the daytime hours and older waste lower in the pit was fed during the other hours. The average 5-Day HHV was approximately 3.1% higher than the average of the 5, 8-hours tests and 2.6% higher than the design HHV of 13 kJ/kg (5589 BTU/lb).

5.2 Residue Quality Test

5.2.1 Unburned Carbon Detection Limit

All of the daily residue samples' calorific value (HHV) were less than the laboratory detection limit (LDL) of 232.6 kJ/kg (100 BTU/lb) or 0.83% of the HHV of combustible matter of 12,000 BTU/lb. The HHV of combustible matter is preferred by ASME PTC 34 and is lower than the typical value used for carbon of 33,727 kJ/kg (14,500 BTU/lb). Furthermore, all triplicate analyses were reported less than the LDL both on dry and as-received bases. When reporting average values, the average between the LDL of 0.83 % and zero or 0.42% is used.

Prior to chemical analysis, the laboratory removed visible non-combustible material and recorded the weights of such non-combustibles. Values on the lab reports are final calculated results including such corrections.

5.2.2 Moisture Content

The moisture content of the triplicate analyses of the 5 daily residue samples varied from 15.1% to 17.8% with an overall average of 16.7%. Therefore, all daily sample averages as well as all triplicate results were below the 25% guarantee.

6 ACKNOWLEDGEMENTS

The Throughput Capacity and Residue Quality & Quantity Tests were conducted by Covanta and witnessed by the Consultant Engineers for the Durham York Regions, HDR. The participants and representatives and especially the plant staff are gratefully acknowledged for their assistance and cooperation throughout the testing program.

HDR, Inc.

John Clark
Shawn Worster
Gregory Gesell
Donald "Mike" Singler
Jeff Martirano
Ryan Lichtman
Kirk Dunbar

Covanta

Matt Neild
Ken Coatham
Jigar Vyas
Jennifer Baron
Amanda Huxter
Stephen DeDuck
Lambert Xiao
Greg Rodia
Andy Lang (Great Lakes)
Bill Marsden (Hempstead)

Lakeland Multi-Trade

Mike Holmes
Korey Glover
Justin Whalen
James Forestall
Derek Anderson
Nick Quinten

7 Tables

7.1 Residue Quality Test

7.1.1 Sample Weight Data Sheets (3 sheets).

7.1.1.1 Days 1 & 2 Ash Sampling Raw Data Sheet

Covanta Durham-York
5-Day Bottom Ash Quality Sampling

Date	Time (2 hr. intervals)	Sample Number	Sample Weight (45.4 kg)		Screened Weight +50 mm	Screened Weight - 50 mm
Sun Sept 27	2:00	1	100 Lbs		2 Lbs	98 Lbs
	4:00	2	96 Lbs		6 Lbs	90 Lbs.
	6:00	3	95 Lbs		8 Lbs	87 Lbs.
	8:00	4	94 Lbs		2 lbs	92 lbs.
	10:00	5	88 lbs.		7 lbs.	81 lbs
	12:00 pm	6	95 lbs.		4 Lbs	91 lbs.
	2:00 pm	7	94 lbs		4 Lbs	90 Lbs
	4:00 pm	8	96 lbs.		9 lbs	87 Lbs
	6:00 pm	9	99 lbs		4 lbs	95 Lbs
	8:00 pm	10	98 lbs.		2 lbs.	96 lbs
	10:00 pm	11	94 lbs.		11 lbs.	83 lbs
	12:00 Am	12	96 lbs.		12 lbs.	84 lbs.
			1,145 Lbs.	Sub-totals	71 lbs.	1,074 lbs
Sept 28/15	2:00 am	1	97 Lbs.		7 Lbs.	90 Lbs.
	4:00 am	2	93 Lbs.		9 Lbs.	84 Lbs.
	6:00 am	3	94 Lbs		8 Lbs	86 lbs.
	8:00 am	4	96 lbs		2 lbs	94 lbs
	10:00 am	5	96 lbs		4 lbs	92 lbs
	12:00 pm	6	95 lbs.		2 lbs	93 lbs
	2:00 pm	7	96 lbs.		3 lbs	93 lbs.
	4:00 pm	8	102 lbs		1 lbs.	101 Lbs
	6:00 pm	9	100 lbs		2 lbs	98 Lbs.
	8:00 pm	10	98 lbs.		9 lbs.	89 lbs.
	10:00 pm	11	97 lbs.		5 lbs.	92 lbs.
	12:00 am	12	99 lbs.		2 lbs.	97 lbs.
			1,163 lbs.	Sub-totals	54 lbs.	1,109 lbs.

* UNUSED SAMPLE PUT INTO BAG 3 WITH TEST BOT ASH. SJO

D-Y Residue Sampling Data Sheets both units.xlsx 5 Day Res Samp kg **Table 4C** 6/4/2014 1:22 PM

7.1.1.2 Days 3 &4 Ash Sampling Raw Data Sheet

Covanta Durham-York
5-Day Bottom Ash Quality Sampling

Date	Time (2 hr. intervals)	Sample Number	Sample Weight (45.4 kg)	Screened Weight +50 mm	Screened Weight - 50 mm
sept 29/14	2:00 am	1	90 lbs	0	90 lbs.
	4:00 am	2	91 lbs.	3 lbs	88 lbs.
	6:00 am	3	93 lbs	3 lbs.	90 lbs.
	8:00 am	4	99 lbs.	2 lbs.	97 lbs
	10:00 am	5	95 lbs	2 lbs.	93 lbs.
	12:00 pm	6	93 lbs.	5 lbs.	88 lbs.
	2:00 pm	7	97 lbs.	3 lbs	94 lbs
	4:00 pm	8	95 lbs.	3 lbs.	92 lbs
	6:00 pm	9	100 lbs.	2 lbs	98 lbs
	8:00 pm	10	92 lbs.	13 lbs	79 lbs
	10:00 pm	11	95 lbs.	1 lbs.	94 lbs.
	12:00 am.	12	105 lbs.	15 lbs.	90 lbs.
			1,145 lbs.	Sub-totals 52 lbs.	1,093 lbs
Sept 30	2:00 am	1	95 lbs.	3 lbs.	92 lbs
	4:00 am	2	94 lbs	8 lbs	86 lbs
	6:00 am	3	95 lbs.	11 lbs.	84 lbs
	8:00 am	4	107 lbs	6 lbs	101 lbs
	10:00 am	5	96 lbs	1 lbs	95 lbs
	12:00 pm	6	96 lbs	7 lbs	94 lbs
	2 pm	7	92 lbs	0 lbs.	92 lbs.
	4:00 pm	8	90 lbs.	2 lbs.	88 lbs.
	6:00 pm	9	89 lbs	3 lbs	86 lbs
	8 pm	10	98	5 lbs.	93 lbs.
	10 pm	11	100	4 lbs	96 lbs.
	12 am	12	92	4 lbs	88 lbs.
			1,144	Sub-totals 49 lbs	1,095 lbs.

D-Y Residue Sampling Data Sheets both units.xlsx 5 Day Res Samp kg **Table 4C** 6/4/2014 1:22 PM

7.1.1.3 Day 5 Ash Sampling Raw Data Sheet

Covanta Durham-York
5-Day Bottom Ash Quality Sampling

Date	Time (2 hr. intervals)	Sample Number	Sample Weight (45.4 kg)	Screened Weight +50 mm	Screened Weight - 50 mm
oct 1/15	2:00 am	1	94 lbs	5 lbs	89 lbs
	4:00 am	2	93 lbs	2 lbs	91 lbs
	6:00 am	3	92 lbs	7 lbs	85 lbs
	8:00 am	4	92 lbs	3 lbs	89 lbs
	10:00 am	5	93 lbs	2 lbs	91 lbs
	12:00 pm	6	93 lbs	2 lbs	91 lbs
	2:00 pm	7	94 lbs	2 lbs	92 lbs
	4:00 pm	8	96 lbs	5 lbs	96 lbs
	6:00 pm	9	104 lbs	5 lbs	99 lbs
	8:00 pm	10	101 lbs	6	95 lbs
	10:00 pm	11	99 lbs	6	93 lbs
	12:00 pm	12	103 lbs	4	99 lbs
			1,154 lbs	Sub-totals	44 1,000 lbs
		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
				Sub-totals	

D-Y Residue Sampling Data Sheets both units.xlsx 5 Day Res Samp kg **Table 4C** 6/4/2014 1:22 PM

7.1.2 SGS Unburned Combustible & Moisture Lab Results

Three (3) sheets per day. (15 sheets total).

7.1.2.1 Day 1 Ash Lab Result Run 1

SGS

Analysis Report

October 13, 2015

COVANTA ENERGY WBH LLC
445 SOUTH STREET
MORRISTOWN NJ 07960

ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.1 Run 1	Sample ID By:	Covanta
Date Sampled:	Sep 27, 2015	Sample Taken At:	Submitted
Date Received:	Sep 29, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.1

SGS Minerals Sample ID: 491-1588227-004

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	17.68	
Sulfur %	ASTM D4239 (A)	0.72	0.87
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.2 Day 1 Ash Lab Result Run 2

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October 13, 2015

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Page 1 of 1

ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.1 Run 2	Sample ID By:	Covanta
Date Sampled:	Sep 27, 2015	Sample Taken At:	Submitted
Date Received:	Sep 29, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.1

SGS Minerals Sample ID: 491-1588227-005

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	17.68	
Sulfur %	ASTM D4239 (A)	0.69	0.84
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.3 Day 1 Ash Lab Result Run 3

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Page 1 of 1

ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.1 Run 3	Sample ID By:	Covanta
Date Sampled:	Sep 27, 2015	Sample Taken At:	Submitted
Date Received:	Sep 29, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.1

SGS Minerals Sample ID: 491-1588227-006

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	17.65	
Sulfur %	ASTM D4239 (A)	0.70	0.85
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.4 Day 2 Ash Lab Result Run 1

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ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.2 Run 1	Sample ID By:	Covanta
Date Sampled:	Sep 28, 2015	Sample Taken At:	Submitted
Date Received:	Sep 30, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.2

SGS Minerals Sample ID: 491-1588248-004

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	17.80	
Sulfur %	ASTM D4239 (A)	0.68	0.83
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.5 Day 2 Ash Lab Result Run 2

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ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.2 Run 2	Sample ID By:	Covanta
Date Sampled:	Sep 28, 2015	Sample Taken At:	Submitted
Date Received:	Sep 30, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.2

SGS Minerals Sample ID: 491-1588248-005

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	17.77	
Sulfur %	ASTM D4239 (A)	0.64	0.78
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.6 Day 2 Ash Lab Result Run 3

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ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.2 Run 3	Sample ID By:	Covanta
Date Sampled:	Sep 28, 2015	Sample Taken At:	Submitted
Date Received:	Sep 30, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.2

SGS Minerals Sample ID: 491-1588248-006

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	17.80	
Sulfur %	ASTM D4239 (A)	0.64	0.77
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.7 Day 3 Ash Lab Result Run 1

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ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.3 Run 1	Sample ID By:	Covanta
Date Sampled:	Sep 29, 2015	Sample Taken At:	Submitted
Date Received:	Oct 1, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.3

SGS Minerals Sample ID: 491-1588274-004

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	16.71	
Sulfur %	ASTM D4239 (A)	0.85	1.02
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.8 Day 3 Ash Lab Result Run 2

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ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.3 Run 2	Sample ID By:	Covanta
Date Sampled:	Sep 29, 2015	Sample Taken At:	Submitted
Date Received:	Oct 1, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.3

SGS Minerals Sample ID: 491-1588274-005

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	16.71	
Sulfur %	ASTM D4239 (A)	0.87	1.05
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.9 Day 3 Ash Lab Result Run 3

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October 14, 2015

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MORRISTOWN NJ 07960

ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.3 Run 3	Sample ID By:	Covanta
Date Sampled:	Sep 29, 2015	Sample Taken At:	Submitted
Date Received:	Oct 1, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.3

SGS Minerals Sample ID: 491-1588274-006

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	16.67	
Sulfur %	ASTM D4239 (A)	0.86	1.03
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.10 Day 4 Ash Lab Result Run 1

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October 14, 2015

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MORRISTOWN NJ 07960

ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.4 Run 1	Sample ID By:	Covanta
Date Sampled:	Sep 30, 2015	Sample Taken At:	Submitted
Date Received:	Oct 2, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.4

SGS Minerals Sample ID: 491-1588306-004

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	15.75	
Sulfur %	ASTM D4239 (A)	1.12	1.33
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.11 Day 4 Ash Lab Result Run 2

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October 14, 2015

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MORRISTOWN NJ 07960

ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.4 Run 2	Sample ID By:	Covanta
Date Sampled:	Sep 30, 2015	Sample Taken At:	Submitted
Date Received:	Oct 2, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.4

SGS Minerals Sample ID: 491-1588306-005

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	15.72	
Sulfur %	ASTM D4239 (A)	1.10	1.31
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.12 Day 4 Ash Lab Result Run 3

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ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.4 Run 3	Sample ID By:	Covanta
Date Sampled:	Sep 30, 2015	Sample Taken At:	Submitted
Date Received:	Oct 2, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.4

SGS Minerals Sample ID: 491-1588306-006

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	15.73	
Sulfur %	ASTM D4239 (A)	1.10	1.31
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.13 Day 5 Ash Lab Result Run 1

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ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.5 Run 1	Sample ID By:	Covanta
Date Sampled:	Oct 1, 2015	Sample Taken At:	Submitted
Date Received:	Oct 5, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.5

SGS Minerals Sample ID: 491-1588334-004

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	15.90	
Sulfur %	ASTM D4239 (A)	1.43	1.70
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.14 Day 5 Ash Lab Result Run 2

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MORRISTOWN NJ 07960

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ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.5 Run 2	Sample ID By:	Covanta
Date Sampled:	Oct 1, 2015	Sample Taken At:	Submitted
Date Received:	Oct 5, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.5

SGS Minerals Sample ID: 491-1588334-005

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	15.90	
Sulfur %	ASTM D4239 (A)	1.41	1.68
Gross Calorific Value Btu/lb	ASTM D5865		<100

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7.1.2.15 Day 5 Ash Lab Result Run 3

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Analysis Report

October 13, 2015

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445 SOUTH STREET
MORRISTOWN NJ 07960

Page 1 of 1

ATTN: STEVE DEDUCK

Client Sample ID:	120 H.R. D.5 Run 3	Sample ID By:	Covanta
Date Sampled:	Oct 1, 2015	Sample Taken At:	Submitted
Date Received:	Oct 5, 2015	Sample Taken By:	Submitted
Product Description:	ASH	Sample ID:	Covanta DYEC 120 H.R. D.5

SGS Minerals Sample ID: 491-1588334-006

	Method	As Received	Dry
Moisture, Total %	ASTM D3302	15.05	
Sulfur %	ASTM D4239 (A)	1.40	1.65
Gross Calorific Value Btu/lb	ASTM D5865		<100

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