



Catherine B. Templeton, Director

*Promoting and protecting the health of the public and the environment*

November 14, 2013

Mr. Gary Minck  
 Johnson Controls Battery Group, Inc.  
 1800 Paper Mill Road  
 Florence, SC 29501

**Re: Furnaces 1 & 2 (ID 07 & 08), Foundry Ventilation (ID 10), Refining Kettles (ID 11A), Refining Kettles and Casting Baghouse (ID 11B), Refining Ventilation (ID 12), and Slag Warehouse (ID 14) Emissions Testing – Conducted February 4-12, 2013 – Revision 1**

Dear Mr. Minck:

The Department has reviewed the referenced tests and the results are summarized below:

<b>Furnace No. 1 (ID 07) Average Particulate Matter and Metals Emissions</b>				
<b>Pollutant</b>	<b>Emission Concentration (gr/dscf)</b>	<b>Emission Rate (lb/hr)</b>	<b>Emission Limit</b>	<b>Modeled Emission Rate (lb/hr)</b>
Particulate Matter	2.8E-04	0.13	0.022 gr/dscf 13.97 <sup>1</sup> lb/hr	----
Antimony	<1.07E-08	<4.88E-06	----	1.76E-02
Arsenic	<1.91E-08	<8.72E-06	----	8.81E-03
Beryllium	<2.68E-09	<1.22E-06	----	----
Cadmium	<1.60E-08	<7.29E-06	----	8.81E-03
Chromium	2.30E-07	1.05E-04	----	1.76E-03 <sup>2</sup>
Lead	1.54E-07	7.02E-05	8.70E-05 gr/dscf	0.18
Mercury	<1.08E-06	<4.93E-04	----	1.23E-03 <sup>3</sup>
Nickel	2.10E-07	9.61E-05	----	----
Selenium	<1.07E-08	<4.88E-06	----	----
Manganese	3.72E-07	1.69E-04	----	----

<sup>1</sup>Based on a production rate of 6.23 tph.

<sup>2</sup>Chromium results are reported as total chromium. Chromium limit is based on CR<sup>+6</sup> compounds.

<sup>3</sup>Emission rates may be used to demonstrate compliance with facility-wide emission limits in semiannual compliance reports.

<b>Furnace No. 1 (ID 07) Average Gaseous Pollutant Emissions</b>			
<b>Pollutant</b>	<b>Emission Concentration (ppm)</b>	<b>Emission Rate<sup>1</sup> (lb/hr)</b>	<b>Modeled Emission Rates (lb/hr)</b>
Sulfur Dioxide	1.72	0.97	2.33
Oxides of Nitrogen	18.2	7.30	4.19
Carbon Monoxide	100.1	24.2	4.79

<sup>1</sup>Emission rates may be used to demonstrate compliance with TPY emission limits submitted in semiannual compliance reports.

<b>Furnace No. 1 (ID 07) HAP Emissions Summary<sup>1</sup></b>			
<b>Pollutant</b>	<b>Average Emissions (lb/hr)</b>	<b>Pollutant</b>	<b>Average Emissions (lb/hr)</b>
Vinyl Chloride	<0.37	m-/p-Xylenes	<0.040
1,3-Butadiene	<0.31	o-Xylene	<0.018
Acrolein	<0.49	Styrene	<0.278
Chloroform	<1.50E-02	HCl <sup>2</sup>	0.0048
Benzene	0.655	Formaldehyde <sup>3</sup>	0.176
Toluene	<0.173	Acetaldehyde <sup>3</sup>	<0.63
Ethylbenzene	<0.047	Propionaldehyde <sup>3</sup>	0.018

<sup>1</sup>Results may be used to represent emissions from Furnaces 2 and 3.

<sup>2</sup>HCl modeled emission rate for Furnace No.1 is 0.337 lb/hr.

<sup>3</sup>Determined using method 0011.

<b>Visible Emissions Summary</b>	
	<b>Method 9</b>
Minutes of Observation	180
Highest 6 Minute Set	0%
Sets Greater Than Standard	0
Allowable Opacity Limit	20%

The EPA Method 9 opacity was at a static 0% during the test.

<b>Furnace No. 1 Baghouse Operating Parameters</b>					
<b>Compartment</b>		<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
<b>Module Differential Pressure (in. H<sub>2</sub>O)</b>	Range	2.60 – 4.60	2.00 – 3.50	2.20 – 4.10	2.20 – 4.40
	Average	3.68	2.67	3.10	3.36
<b>HEPA Differential Pressure (in. H<sub>2</sub>O)</b>	Range	0.70 – 1.00	0.60 – 1.50	0.70 – 1.00	0.60 – 0.80
	Average	0.88	1.04	0.81	0.72
<b>Overall Differential Pressure (in. H<sub>2</sub>O)</b>	Range	5.46 – 7.56			
	Average	6.702			

During the test of Furnace No. 1, the average production rate was 6.23 tons per hour, 94 percent of the rated capacity of 6.65 tons per hour. Furnace temperature ranged from 342.8°F to 1,193°F and averaged 697.4°F. The afterburner temperature ranged from 591.5°F to 1,159°F and averaged 699.7°F. Scrubber pH ranged from 7 to 10.5 and averaged 7.75. Scrubber recirculation flow ranged from 172.5 gpm to 310.8 gpm and averaged 177.1 gpm.

Building pressure ranged from -0.002 in w.c. to -0.061 in w.c. and averaged -0.036 in w.c. The building pressure monitors meet the sensitivity and accuracy requirements of 40 CFR §63.548. The building enclosure meets the requirements of 40 CFR §63.545.

<b>Furnace No. 2 (ID 08) Average Particulate Matter and Metals Emissions</b>				
<b>Pollutant</b>	<b>Emission Concentration (gr/dscf)</b>	<b>Emission Rate (lb/hr)</b>	<b>Emission Limit</b>	<b>Modeled Emission Rate (lb/hr)</b>
Particulate Matter	1.5E-04	0.062	0.022 gr/dscf 14.32 <sup>1</sup> lb/hr	----
Antimony	<1.63E-08	<6.97E-06	----	1.76E-02
Arsenic	<1.78E-08	<7.46E-06	----	8.81E-03
Beryllium	<2.53E-09	<1.07E-06	----	----
Cadmium	<1.17E-08	<4.98E-06	----	8.81E-03
Chromium	3.94E-07	1.67E-04	----	1.76E-03 <sup>2</sup>
Lead	1.92E-07	8.21E-05	8.70E-05	0.18
Mercury	<1.30E-06	<5.49E-04	----	1.23E-03 <sup>3</sup>
Nickel	2.76E-07	1.18E-04	----	----
Selenium	<1.01E-08	<4.30E-06	----	----
Manganese	3.55E-06	1.49E-03	----	----

<sup>1</sup>Based on a production rate of 6.47 tph.

<sup>2</sup>Chromium results are reported as total chromium. Chromium limit is based on CR<sup>+6</sup> compounds.

<sup>3</sup>Emission rates may be used to demonstrate compliance with facility-wide emission limits in semiannual compliance reports.

<b>Furnace No. 2 (ID 08) Average Gaseous Pollutant Emissions</b>			
<b>Pollutant</b>	<b>Emission Concentration (ppm)</b>	<b>Emission Rate<sup>1</sup> (lb/hr)</b>	<b>Modeled Emission Rates (lb/hr)</b>
Sulfur Dioxide	0.94	0.46	2.33
Oxides of Nitrogen	70.2	24.9	4.19
Carbon Monoxide	111.4	24.0	4.79

<sup>1</sup>Emission rates may be used to demonstrate compliance with TPY emission limits submitted in semiannual compliance reports.

Visible Emissions Summary	
	Method 9
Minutes of Observation	180
Highest 6 Minute Set	0%
Sets Greater Than Standard	0
Allowable Opacity Limit	20%

The EPA Method 9 opacity was at a static 0% during the test.

Furnace No. 2 Baghouse Operating Parameters					
Compartment		9	10	11	12
Module Differential Pressure (in. H <sub>2</sub> O)	Range	2.70 – 4.80	3.0 – 5.10	2.70 – 4.70	2.60 – 4.30
	Average	4.04	4.25	3.71	3.54
HEPA Differential Pressure (in. H <sub>2</sub> O)	Range	0.70 – 1.10	0.80 – 0.90	0.70 – 0.90	0.60 – 1.10
	Average	0.84	0.82	0.82	0.80
Overall Differential Pressure (in. H <sub>2</sub> O)	Range	5.24 – 6.94			
	Average	6.05			

During the test of Furnace No. 2, the average production rate was 6.47 tons per hour, 97 percent of the rated capacity of 6.65 tons per hour. Furnace temperature ranged from 421°F to 935°F and averaged 599°F. The afterburner temperature ranged from 438°F to 611°F and averaged 496°F. Scrubber pH ranged from 7.4 to 8.3 and averaged 7.8. Scrubber recirculation flow ranged from 301 gpm to 318 gpm and averaged 310 gpm.

Building pressure ranged from -0.001 in w.c. to -0.060 in w.c. and averaged -0.028 in w.c. The building pressure monitors meet the sensitivity and accuracy requirements of 40 CFR §63.548. The building enclosure meets the requirements of 40 CFR §63.545.

Foundry Ventilation (ID 10) Average Particulate Matter Emissions			
Pollutant	Emission Concentration (gr/dscf)	Emission Rate (lb/hr)	Modeled Emission Rates (lb/hr)
PM	1.70E-04	0.079	0.26*

\*Modeled emission rate based on TSP and PM<sub>10</sub>.

Foundry Ventilation Baghouse Operating Parameters					
Compartment		1	2	3	4
Module DP (in. H <sub>2</sub> O)	Range	0.19 – 0.82	0.12 – 1.30	1.20 – 1.50	1.10 – 1.60
	Average	0.34	1.12	1.39	1.40
HEPA DP (in. H <sub>2</sub> O)	Range	0.10 – 1.40	0.16 – 1.40	0.10 – 1.30	0.41 – 1.00
	Average	0.51	0.87	0.73	0.80
Overall DP (in. H <sub>2</sub> O)	Range	3.60 – 4.60			
	Average	4.05			
Flow (cfm)	Range	57,429 – 62,040			
	Average	60,160			

Refining Kettles and Casting (ID 11) Total Emissions Summary			
Pollutant	Emission Rate (lb/hr)	Emission Limit	Modeled Emission Rate (lb/hr)
Particulate Matter	0.22	32.6 <sup>1</sup> lb/hr	-----
Antimony	<3.62E-05	-----	2.75E-03
Arsenic	<8.66E-06	-----	6.40E-04
Beryllium	<1.36E-06	-----	-----
Cadmium	<1.22E-05	-----	8.40E-04
Chromium	1.13E-04	-----	4.91E-04 <sup>2</sup>
Lead	1.66E-04 2.38E-07 gr/dscf	8.70E-05 gr/dscf	0.49
Mercury	<4.47E-05	-----	3.44E-04 <sup>3</sup>
Nickel	2.80E-04	-----	-----
Selenium	<9.68E-06	-----	-----
Manganese	9.80E-04	-----	-----
Sulfur Dioxide	4.51	-----	4.52 <sup>3</sup>
Oxides of Nitrogen	1.57	-----	3.30 <sup>3</sup>
Carbon Monoxide	0.94	-----	1.10 <sup>3</sup>

<sup>1</sup>Based on a production rate of 22.04 tph.

<sup>2</sup>Chromium results are reported as total chromium. Chromium limit is based on CR<sup>+6</sup> compounds.

<sup>3</sup>Emission rates may be used to demonstrate compliance with facility-wide emission limits in semiannual compliance reports.

During the Refining Kettles and Casting emissions testing, an average of 22.04 tons per hour was cast, 127 percent of the rated capacity of 17.34 tons per hour.

Visible Emissions Summary	
	Method 9
Minutes of Observation	180
Highest 6 Minute Set	0%
Sets Greater Than Standard	0
Allowable Opacity Limit	20%

The EPA Method 9 opacity was at a static 0% during the test.

Refining Kettles and Casting Baghouse Operating Parameters									
Compartment		1	2	3	4	5	6	7	8
Module Differential Pressure (in. H <sub>2</sub> O)	Range	1.10 – 1.60	1.20 – 1.70	1.00 – 2.90	1.40 – 2.00	1.80 – 2.60	1.70 – 2.50	1.90 – 2.90	1.80 – 2.70
	Average	1.37	1.51	1.26	1.78	2.27	2.12	2.50	2.36
HEPA Differential Pressure (in. H <sub>2</sub> O)	Range	0.36 – 0.54	0.30 – 0.46	0.41 – 0.58	0.36 – 0.52	0.38 – 0.51	0.38 – 0.55	0.28 – 0.46	0.32 – 0.59
	Average	0.46	0.40	0.51	0.46	0.46	0.48	0.38	0.44
Overall Differential Pressure (in. H <sub>2</sub> O)	Range	2.80 – 4.30							
	Average	3.70							
Flow (cfm)	Range	70,661 – 101,618							
	Average	90,121							

\*One vent was sampled. Results may be used for calculating emissions from all refining vents.

Refining Ventilation (ID 12) Average Particulate Matter and Metals Emissions*				
Pollutant	Emission Concentration (gr/dscf)	Emission Rate (lb/hr)	Emission Limit (gr/dscf)	Modeled Emission Rate (lb/hr)
Particulate Matter	2.00E-04	0.022	----	0.01 <sup>1</sup>
Antimony	<2.40E-08	<2.70E-06	----	1.12E-03
Arsenic	<1.03E-08	<1.16E-06	----	5.61E-04
Beryllium	<2.13E-09	<2.40E-07	----	----
Cadmium	<2.01E-08	<2.26E-06	----	5.61E-04
Chromium	1.56E-07	1.75E-05	----	1.12E-04 <sup>2</sup>
Lead	5.55E-07	6.25E-05	8.70E-05	0.01
Nickel	1.29E-07	1.46E-05	----	----
Selenium	<8.50E-09	<9.59E-07	----	----
Manganese	3.75E-07	4.21E-05	----	----

<sup>1</sup>PM modeled rates are based solely on PM<sub>10</sub>.

<sup>2</sup>Chromium results are reported as total chromium. Chromium limit is based on CR<sup>16</sup> compounds.

During the test of the Refining Ventilation, the pressure drop across the HEPA filter ranged from 1.50 in. w.c. to 1.60 in. w.c. and averaged 1.54 in. w.c. The room pressure ranged from -1.10 in. w.c. to -1.30 in. w.c. and averaged -1.22 in. w.c. The building pressure monitors meet the sensitivity and accuracy requirements of 40 CFR §63.548. The building enclosure meets the requirements of 40 CFR §63.545.

<b>Slag Warehouse (ID 14) Average Particulate Matter Emissions</b>			
<b>Pollutant</b>	<b>Emission Concentration (gr/dscf)</b>	<b>Emission Rate (lb/hr)</b>	<b>Emission Limit (lb/hr)</b>
PM	1.60E-04	0.059	5.66*

\*Based on a production rate of 1.62 tph.

During the test of the Slag Warehouse, the baghouse overall differential pressure ranged from 2.60 in. w.c. to 3.00 in. w.c. and averaged 2.74 in. w.c. The HEPA filter differential pressure remained constant at 1.1 in. w.c.

**Compliance Status:**

Furnaces 1 and 2, Foundry Ventilation, Refining Kettles and Casting, Refining Ventilation, and Slag Warehouse (Unit ID 07, 08, 10, 11, 12, 14)  
 (Permit No. 1040-0129-CA).....**Compliance**  
 (40 CFR 63, Subpart X).....**Compliance**  
 Furnace 1 and 2 (ID 07 and 08)  
 NOx and CO (Permit No. 1040-0129).....**Not Applicable\***  
 Refining Ventilation  
 PM (Permit No. 1040-0129).....**Not Applicable\***

**\*Note:** The NOx and CO emission rates from Furnaces 1 and 2 and the particulate matter emissions from the Refining Ventilation are higher than the Modeled Emission Rates in Attachment A of Permit 1040-0129-CA.

The next source test for particulate matter for Furnaces 1 and 2, the Foundry Ventilation, the Refining Kettles and Casting, the Refining Ventilation, and the Slag Warehouse shall be conducted no later than **February 28, 2015**. The next source test for lead, mercury, and sulfur dioxide for Furnaces 1 and 2 and Refining Kettles and Casting shall occur no later than **February 28, 2015**. Please note, a different vent for the Refining Ventilation (ID 12) must be tested during the next source test.

If I can be of further assistance, please do not hesitate to call me at (803) 898-0834 or e-mail me at williad@dhc.sc.gov.

Sincerely,



Derek T. Williams  
 Environmental Health Manager  
 Source Evaluation Section  
 SC DHEC Bureau of Air Quality

Cc: Compliance file: 1040-0129

Ec: Michael Shroup                      Carol Boney                      Dawn Jordan  
       Bryan Baxley                        James Myers                     Heinz Kaiser

