

## Test Plan

Facility: Johnson Controls

Source: Lead Acid Battery Recycling

Permit #: 1040-0129

ID #: NA

Plan Submittal Date: October 23, 2012

Type of Testing: PM, Metals, HAPs, etc

Location: Florence, SC

December 12, 2012

Mr. Timothy Lafond  
Johnson Controls Battery Group, Inc.  
1800 Paper Mill Road  
Florence, SC 29501

**RE: Lead Acid Battery Recycling Facility Initial MACT and Permit Test Plan – Revision 1 Dated October 15, 2012 and NOx, CO, VFR Relative Accuracy Test Plan Submitted Electronically on November 21, 2012**

Dear Mr. Lafond:

The referenced site-specific test plans are approved by the Department contingent upon the following:

- 1) If upon inspection the Department does not agree that SO<sub>2</sub>, NO<sub>x</sub>, and CO would be the only pollutants emitted from stack 11A, additional testing for the pollutants listed in construction permit number 1040-0129-CA may be required.
- 2) The vent/stack for the tests conducted on Unit ID 12 – Refining Ventilation, must be approved prior to testing by Department test observers.
- 3) Per 40 CFR 63.546(a)(5), the EPA Reference Method 29 sampling volume per run for sources subject to MACT Subpart X must be at least 70 dscf.
- 4) The CEMS referenced in Section 3f of the plan must complete performance specification test certifications prior to or during the stack test. The final test report must include the results of the relative accuracy tests and the calibration drift checks along with monitor serial numbers.
- 5) Your request to submit the final test report 45 days after each series of tests is approved.

Any deviations from the plans, without prior approval from the Department, may be cause for rejecting the test results.

If I can be of further assistance in this matter, please call me at (803) 898-3897 or e-mail me at [frickl@dhc.sc.gov](mailto:frickl@dhc.sc.gov).

Sincerely,

L. Jake Frick  
Compliance Management Division  
Bureau of Air Quality

ec: Michael Shroup, BAQ  
Quentin Best, CEC  
Patrick Turner, Weston

cc: Compliance File: 1040-0129



Frick, Jake <fricklj@dhec.sc.gov>

---

## Re: Protocol for JCI Florence

1 message

---

**Frick, Jake** <fricklj@dhec.sc.gov>  
To: timothy.j.lafond@jci.com, qbest@cecinc.com

Wed, Nov 7, 2012 at 3:16 PM

Please address, or note where applicable, the following regarding the plan:

- 1) Are the smelters batch or continuous processes? If batch please indicate the times for each phase of the process (charging, refining, tapping, etc.).
- 2) In Table 2 of the plan, in addition to the proposed process rates please include the maximum design rates of each of the processes.
- 3) Per 40 CFR 63.544, are total enclosures in stalled on (1) Smelting furnaces, (2) Smelting furnace charging areas, (3) Lead taps, slag taps, and molds during tapping, (4) Battery breakers, (5) Refining kettles, casting areas, (6) Dryers, (7) Agglomerating furnaces and agglomerating furnace product taps, (8) Material handling areas for any lead bearing materials except those listed in paragraph (b) of 63.544, (9) Areas where dust from fabric filters, sweepings or used fabric filters are processed?
- 4) Per 40 CFR 63.548(k), do the enclosure monitoring systems meet the sensitivity and accuracy of (k)(3) and the calibrations per (k)(5) must be included in the final test report.
- 5) Include in the plan that the enclosure negative pressures from the enclosure monitoring system will be recorded at least every 15 minutes during the test and those readings included in the final test report.
- 6) Per 40 CFR 63.548(c)(1), clarify in Section 3g of the plan that the pressure drop of each cell of the baghouses and the pressure drop across each HEPA filter cleaning system will be monitored.
- 7) Include in the plan that the cleaning cycle times for each baghouse will be recorded during the test and those readings included in the final report.
- 8) Per Section 13.4.5 of Method TO-11A, will an ozone denuder be used during the sampling?
- 9) Regarding Methods TO-11A and TO-15, please explain how the recovery studies will be done.

10) Regarding Section 5.a.19 of the plan, how will the sampling location be chosen? Is it possible to conduct a Method 25A or Method 21 screening at representative points prior to each run and select the sampling location based on that screening (note that the sampling location may change from run to run based on the screening)?

11) Regarding Section 5.a.19 of the plan, how will the air flow from the poly plant room be measured and how often will the measurements be taken (provide detailed description)?

12) Please provide some additional documentation (drawings, etc) that shows why SO2, NOx, and CO would be the only pollutants emitted from stack 11A.

13) The CEMS referenced in Section 3f of the plan need to complete performance specification test certifications prior to or during the stack test. Please include in the plan that the certification testing will be done, when it will be done, the methods used for the tests, number of runs, run times, etc.

14) Per 60.11 the Methods 9 VE's shall be conducted concurrent with the PM tests. For the 2 hour PM runs 1 Method 9 observation per PM run is acceptable.

I'm still waiting for feedback from our Permitting and Air Toxics staff and may have some additional questions after I hear back from them.

Thanks

\*\*\*\*\*

----- Forwarded message -----

From: **Best, Quentin** <qbest@cecinc.com>  
Date: Tue, Oct 23, 2012 at 9:03 AM  
Subject: Protocol for JCI Florence  
To: "Michael D. Shroup (SHROUPMD@dhec.sc.gov)" <SHROUPMD@dhec.sc.gov>  
Cc: "timothy.j.lafond@jci.com" <timothy.j.lafond@jci.com>

Please find attached the protocol for the Johnson Controls Battery Group, Inc. – Florence Recycling Plant (Johnson Controls) located at 1800 Paper Mill Road, Florence, SC 29501. Please review and contact myself or Tim Lafond of JCI with any questions. CEC would like to start the test program on December 11, 2012.

**W. Quentin Best, QSTI / Senior Project Manager**

Civil & Environmental Consultants, Inc.

2030 S. Tryon Street, Suite 3E · Charlotte, NC 28203

Toll-Free: 855-859-9932 · Direct: 980-224-8104 · Fax: 980-224-8172

Mobile: 704-309-7421 · Email: [qbest@cecinc.com](mailto:qbest@cecinc.com) · <http://www.cecinc.com>

Senior Leadership · Integrated Services · Personal Business Relationships

*This electronic communication and any attachments are intended solely for the use of the person or entity to which it is addressed, and may contain information that is confidential, privileged and exempt from disclosure under applicable law, including copyright law. If you are not the intended recipient of this message, you are prohibited from disclosing, reproducing, distributing, disseminating or otherwise using this transmission. Please promptly notify the sender by reply electronic communication and immediately delete this message from your system.*

--

Michael D. Shroup, Program Manager  
Source Evaluation Section

DHEC - Bureau of Air Quality  
2600 Bull Street  
Columbia, SC 29201

[shroupmd@dhec.sc.gov](mailto:shroupmd@dhec.sc.gov)

phone (803)-898-4051  
fax (803)-898-4281

--

Jake Frick  
SC Dept. of Health & Environmental Control  
Bureau of Air Quality  
803.898.3897

1) Are the smelters batch or continuous processes? If batch please indicate the times for each phase of the process (charging, refining, tapping, etc.).

**Batch process - 4 cycles/day      6 hours/cycle**

- Each cycle has 3 distinct steps: charging, smelting and tapping
- Charging takes about 1 hour consisting of 3 charges (20 min/charge including time for the charge to spread out, moisture to evaporate, separators to burn off, etc.)
- Smelting takes about 4 hours - there is a lead tap in this process to take out what melts/smelts quickly to allow the remaining charge to climb the walls during rotation.
- Tapping takes about 1 hour - 30 min for lead and 30 min for slag

DHEC Follow-up: We will allow the run times, for some methods anyway, indicated in Table 1, provided minimum sample volumes are attained and each test run on the Furnaces begins at the beginning of the initial charge; otherwise the runs must last the duration of the batch cycle (charging through tapping). The basis for the requirement for each run to begin when the charging begins is that is when most of the emissions should occur, with the possible exception of the HCl and D/F emissions. Those may occur when salt flux is added but since the D/F runs are 4 hours each those runs may capture the fluxing anyway. Approximately when during the above batch cycle does the majority of the fluxing occur? Note that if that 4 hour run would capture the majority of the fluxing, then the HCl test run times should be increased to 4 hours also.

2) In Table 2 of the plan, in addition to the proposed process rates please include the maximum design rates of each of the processes.

The values in table 2 are the process weight rates as contained in the permit. The process weight rate is the mass of all materials entering the process. Please note that the process weight rate can be different than the production rate. If it is the production rate that you will be tracking for testing purposes, i.e., to determine if you are at 90% or more of production capacity or determine a factor for pounds of emissions per ton of production, then the following values from the permit application & Engitec material balances should be used as production rate maximums:

Proposed Production Rates		
Johnson Controls Battery Group		
Florence, South Carolina		
Process	Unit I.D No.	Proposed Process Rates
CX Plant Equipment	ID 01	24.8 tons/hr
PP Storage, Extrusion	ID 03	1.82 tons/hr
Melter	ID 06	4.83 tons/hr
Charge Preparation	ID 06	19.94 tons/hr
Natural Gas Fired Furnace 1, 2 or 3	IDs 07, 08 or 09	Lead 4.72 tons/hr each Slag 0.54 tons/hr each

Proposed Production Rates		
Johnson Controls Battery Group		
Florence, South Carolina		
Foundry Ventilation	ID 010	Normal Operation inside
Refining Kettles and Casting Emission Stack	ID 11A	Lead 17.34 tons/hr Dross 1.77 tons/hr
Refining Kettles and Casting Furnace Exhaust Stack	ID 11B	Lead 17.34 tons/hr Dross 1.77 tons/hr
Refining Ventilation	ID 12	Normal Operation inside
Slag Warehouse	ID 14	1.62 tons/hr

DHEC Follow-up: The 90% capacity rate is arbitrary and we expect facilities to operate at design capacity. If not operating at design capacity, operating restrictions may be imposed. FYI, to avoid potential restrictions the target operating rate should be 100%.

3) Per 40 CFR 63.544, are total enclosures installed on (1) Smelting furnaces, (2) Smelting furnace charging areas, (3) Lead taps, slag taps, and molds during tapping, (4) Battery breakers, (5) Refining kettles, casting areas, (6) Dryers, (7) Agglomerating furnaces and agglomerating furnace product taps, (8) Material handling areas for any lead bearing materials except those listed in paragraph (b) of 63.544, (9) Areas where dust from fabric filters, sweepings or used fabric filters are processed?

**Yes.**

DHEC Follow-up: Okay.

4) Per 40 CFR 63.548(k), do the enclosure monitoring systems meet the sensitivity and accuracy of (k)(3) and the calibrations per (k)(5) must be included in the final test report.

**Yes and calibrations will be included (Ed Gainey).**

DHEC Follow-up: Okay.

5) Include in the plan that the enclosure negative pressures from the enclosure monitoring system will be recorded at least every 15 minutes during the test and those readings included in the final test report.

**This will be done**

DHEC Follow-up: Okay, note that the differential readings from each of the 3 walls on each enclosure must be recorded and included and the pressure monitors must meet the range and accuracy requirements of 40 CFR 63.548(k)(3). The manufacturer range and accuracy specifications must be included in the final test report.

6) Per 40 CFR 63.548(c)(1), clarify in Section 3g of the plan that the pressure drop of each cell of the baghouses and the pressure drop across each HEPA filter cleaning system will be monitored.

**Yes, it will.**

DHEC Follow-up: Okay.

7) Include in the plan that the cleaning cycle times for each baghouse will be recorded during the test and those readings included in the final report.

**This will be monitored and included.**

DHEC Follow-up: Okay.

8) Per Section 13.4.5 of Method TO-11A, will an ozone denuder be used during the sampling? CEC

**CEC will be using SKC Formaldehyde Sampling Tube Cat. No. 226-120 and SKC Formaldehyde Tube Cat. No. 226-119 SKC in series. Formaldehyde Tube Cat. No. 226-119 is 6-mm OD x 110-mm long and contains a 300-mg front sorbent section and a 150-mg backup sorbent section. The sorbent is silica gel with ultra-low background coated with 2,4-dinitrophenylhydrazine (DNPH) as specified in EPA TO-11A and ASTM D 5197. SKC tube Cat. No. 226-120 is 8-mm OD x 115-mm long and contains the same coated sorbent and backup sections. However, it also contains a section of potassium iodide that acts as an ozone scrubber as suggested in ASTM D 5197.**

DHEC Follow-up: Okay.

9) Regarding Methods TO-11A and TO-15, please explain how the recovery studies will be done.

**Enthalpy analytical does participate in performance test program for TO11A and TO15 for their LELAP Certification Program. Enthalpy performs a performance test once every six months (twice a year). These methods are designed for ambient sampling. If required for TO11A a spike tube can be used for one run to perform a co-located sampling and be analyzed in the same manner as the sample.**

DHEC Follow-up: Thanks I received the proficiency testing results. Regarding the TO-11A sampling, yes we would like collated sampling with a spiked tube for at least one of the runs. Note that if the recovery is not between 80 and 120 percent additional testing may be required.

10) Regarding Section 5.a.19 of the plan, how will the sampling location be chosen? Is it possible to conduct a Method 25A or Method 21 screening at representative points prior to each run and select the sampling location based on that screening (note that the sampling location may change from run to run based on the screening)?

**A PID Mini RAE 2000 calibrated on isobutylene will be used to determine a sampling location. Prior to the sampling run, CEC will walk along the inside parameter of the room to determine if a high VOC concentration level can be determine within the Poly Room. If no noticeable VOC Loading difference is detected, the area of sampling will be ten feet back of the shipping load-out door which will be used to generate a flow from the room. If a high VOC loading is detected upon the parameter check of the room the sampling location will be moved to that parameter location. The sampling location will be setup as close as**

**possible to the area identified as the high VOC area. The sampling will not be place in high traffic areas or were areas of work is being performed. The parameter VOC will be check before each sampling run and the sampling location may be subject to change before each run.**

DHEC Follow-up: Okay.

11) Regarding Section 5.a.19 of the plan, how will the air flow from the poly plant room be measured and how often will the measurements be taken (provide detailed description)?

**The policy for the Poly Room is that all doors are to be closed except when going in and out of the room. One of the two shipping load-out doors will be raised by 3 inches to allow flow from the room to the outside. (Note the room is under positive pressure.) Flow measurements will be taken every ten minutes along the bottom of the door at four locations.**

DHEC Follow-up: That should be sufficient provided the measurement locations are at the centroid of each of the 4 equal area locations. What device will be used for the velocity/flow measurements (pitot tube, anemometer, etc.)?

12) Please provide some additional documentation (drawings, etc) that shows why SO<sub>2</sub>, NO<sub>x</sub>, and CO would be the only pollutants emitted from stack 11A.

**This is combustion stack for the process. The source was separated into two emission points (one for processes emissions and one for combustion emissions due to the CEMs monitoring requirement).**

DHEC Follow-up: This is not really the documentation I was looking for. We will inspect this source during our site visit and if we feel the additional pollutants may be emitted, testing for those will also be required.

13) The CEMS referenced in Section 3f of the plan need to complete performance specification test certifications prior to or during the stack test. Please include in the plan that the certification testing will be done, when it will be done, the methods used for the tests, number of runs, run times, etc.

**Larry Burkett and Thermo/Weston will complete this task prior to the stack test program.**

DHEC Follow-up: Okay.

14) Per 60.11 the Methods 9 VE's shall be conducted concurrent with the PM tests. For the 2 hour PM runs 1 Method 9 observation per PM run is acceptable.

**VE's will be performed concurrent with the PM tests.**

DHEC Follow-up: Okay.

15) Each of the furnaces must be tested for the MACT pollutants (lead, hydrocarbons, and dioxin/furans). Please update the plan accordingly. We may allow testing only one furnace for the other pollutants (PM, antimony, arsenic, beryllium, cadmium, chromium, mercury, nickel, selenium, manganese, SO<sub>2</sub>, NO<sub>x</sub>, CO, HAPS and HCL) depending upon your response to the following:

a) Does the furnace proposed for testing use the same feed materials and charge rates as the other 2 furnaces? **YES**

b) Is the same type of flux and same proportions of flux used in all 3 furnaces? **YES**

c) Does the furnace proposed for testing operate under the same work practices as the other 2 furnaces?  
**YES**

d) Are all 3 furnaces of the same design and capacity? **YES**

e) Will the furnace proposed for testing be operated at the highest load or capacity of any of the furnaces during the tests? **Yes, See No. 2.**

DHEC Follow-up: Okay.

16) Please update the plan to include that the furnaces will also be tested for hydrocarbons and dioxin/furans. Also include test methods, sampling times, etc. **CEC**

<b>Table 1            Sampling Matrix            Johnson Controls Battery Group            Florence, South Carolina</b>			
<b>Process</b>	<b>Stack No.</b>	<b>Pollutants</b>	<b>EPA Methods Proposed and sample run times*</b>
<b>CX Plant Equipment</b>	ID 01	Visible Emissions (VE)	No test requirements per permit
		Particulate Matter (PM)	Method 5 – 3 (2-hr)
		Sulfuric Acid	Method 8 - 3 (2-hr)
<b>CX Plant Ventilation</b>	ID 02	Lead	No testing required per permit
<b>PP Storage &amp; Extrusion (No Stack – room sampling)</b>	ID 03	VE & PM	No test requirement for VE & PM
		Acrolein, Benzene, Ethyl benzene, Chloroform, 1,3-Butdiene, Vinyl chloride, o-Xylene, m/p-Xylene, Styrene, and Toluene	TO-15 – 3 (1-hr)
		Acetaldehyde, Formaldehyde, and Propionaldehyde	TO11A – 3 (1-hr)

**Table 1  
Sampling Matrix  
Johnson Controls Battery Group  
Florence, South Carolina**

<b>Process</b>	<b>Stack No.</b>	<b>Pollutants</b>	<b>EPA Methods Proposed and sample run times*</b>
		HCl	NIOSH 7903- 3 (1-hr)
		(One sampling location within the 01 Poly Plant Room will be sampled for the pollutants listed above for ID 03 with determining airflow rates from the roll up door between the 01 Poly Plant Room and the 02 CX Room. The sampling location will identified with a PID. Velocity determinations will be made with an air velocity meter.)	
<b>Natural Gas Boiler</b>	ID 04	VE, PM, SO <sub>2</sub>	No test requirements per permit
<b>Flash Tube Dryer, Silos A &amp; B</b>	ID 05	VE, PM	No test requirements per permit

**Table 1  
Sampling Matrix  
Johnson Controls Battery Group  
Florence, South Carolina**

<b>Process</b>	<b>Stack No.</b>	<b>Pollutants</b>	<b>EPA Methods Proposed and sample run times*</b>
<b>Melter and Charge Preparations</b>	ID 06	VE	Method 9 – 3 (1-hr)
		PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Manganese)	Method 29 with PM – 3 (4-hrs)
		SO <sub>2</sub> , NO <sub>x</sub> , & CO.	Methods 6C, 7E, & 10 – 3 (1-hrs)
<b>Natural Gas Fired Furnace 1</b>	ID 07	VE	Method 9 – 3 (1-hr)
		PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Manganese)	Method 29 with PM – 3 (4-hrs)
		SO <sub>2</sub> , NO <sub>x</sub> , CO, & Hydrocarbons	Methods 6C, 7E, 10, 25A – 3 (1-hrs)
		HAPs	3 (1-hr)
		Acetaldehyde, Acrolein, 1,3-Butadiene, Vinyl Chloride	Method 18 – Bag 3 (1-hr)
		Benzene, Ethyl Benzene, Chloroform, o-Xylene, m/p-Xylene, Styrene, and Toluene	Method 18 – Tube 3 (1-hr)
		Formaldehyde, and Propionaldehyde	Method 0011 3 (1-hr)
		HCl	Method 26A – 3 (1-hr)
		Dioxins & Furans	Method 23 – 3 (4-hr)

**Table 1  
Sampling Matrix  
Johnson Controls Battery Group  
Florence, South Carolina**

<b>Process</b>	<b>Stack No.</b>	<b>Pollutants</b>	<b>EPA Methods Proposed and sample run times*</b>
<b>Natural Gas Fired Furnace 2</b>	ID 08	Lead	Method 12 – 3 (2-hr)
		Hydrocarbons	Method 25A – 3 (1-hr)
		Dioxins & Furans	Method 23 – 3 (4-hr)
<b>Natural Gas Fired Furnace 3</b>	ID 09	Lead	Method 12 – 3 (2-hr)
		Hydrocarbons	Method 25A – 3 (1-hr)
		Dioxins & Furans	Method 23 – 3 (4-hr)
<b>Foundry Ventilation</b>	ID 010	PM	Method 5 – 3 (2-hr)
<b>Refining Kettles and Casting Emission Baghouse Stack</b>	ID 11B	VE	Method 9 – 3 (1-hr)
		PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Manganese)	Method 29 with PM – 3 (4-hrs)
		SO <sub>2</sub> , NO <sub>x</sub> , CO	Methods 6C, 7E, & 10 – 3 (1-hrs)
<b>Refining Kettles Combustion Exhaust</b>	ID 11A	SO <sub>2</sub> , NO <sub>x</sub> , CO	Methods 6C, 7E, & 10 – 3 (1-hr)
<b>Refining Ventilation</b> <sup>*3</sup>	ID 12	PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Nickel, Selenium, Manganese)	Method 5/29 with PM – 3 (2-hrs)
		Proposing to test one of four sampling locations (“like for like”). The selected ID No. 12 emission source will need a stack extension to meet Method 1 criteria.	

**Table 1  
Sampling Matrix  
Johnson Controls Battery Group  
Florence, South Carolina**

<b>Process</b>	<b>Stack No.</b>	<b>Pollutants</b>	<b>EPA Methods Proposed and sample run times*</b>
<b>Natural Gas Emergency Generators EG1 &amp; EG2 units</b>	ID 13	NO <sub>x</sub> , CO	No test requirements per permit
<b>Slag Warehouse</b>	ID 14	VE	No test requirements per permit
		PM	Method 5&29 – 3 (2-hr)
		Metals (antimony, arsenic, beryllium, chromium, cadmium, manganese, selenium, nickel, Lead)	

DHEC Follow-up: The plan now includes the testing for hydrocarbons and D/F. Per 40 CFR 63.548(j)(2), prior to or in conjunction with the hydrocarbon and D/F tests, a performance evaluation of the temperature monitoring system must be done. I received a test plan from Weston for performance specification testing of the NO<sub>x</sub>, CO, and volumetric flow rate monitors but it did not include the temperature monitoring system. Please address how and when the temperature monitoring system performance evaluation testing will be done and note that (j)(2) references EPA Performance Specification 2.

Also, the hydrocarbon and D/F emissions are required to be corrected for O<sub>2</sub> and CO<sub>2</sub> respectively. Please update the plan to include methods for those.



Frick, Jake <fricklj@dhec.sc.gov>

---

## Re: JCI (1040-0129)

1 message

---

**Myers, James** <myersjm@dhec.sc.gov>

Wed, Nov 7, 2012 at 2:42 PM

To: "Frick, Jake" <fricklj@dhec.sc.gov>

Cc: "Welch, Pamela" <welchpd@dhec.sc.gov>, "Kaiser, Heinz" <kaiserh@dhec.sc.gov>

I will let Heinz and Pam answer 1 and the first part of 2.

For number 3, what they proposed is ok. There was going to be a single stack originally combining the process and combustion emissions but they changed it to two stacks after the permit was issued but we did not revise the permit.

On Wed, Nov 7, 2012 at 1:39 PM, Frick, Jake <fricklj@dhec.sc.gov> wrote:

I'm reviewing the test plan and have a few questions:

- 1) Do they have to meet the total hydrocarbon and dioxin/furan limits (Table 2 to MACT subpart X)?
- 2) They are proposing to test one of the furnaces (IDs 07, 08, & 09) and apply those rates to the other 2. I don't think that would be allowed for the MACT test but could be allowed for the non-MACT tests. What do you think?
- 3) They say that ID 11 has 2 stacks, 11A for combustion emissions and 11B for for process emissions from the closed loop baghouse system and they are proposing to not test 11A for PM and metals just SO<sub>2</sub>, NO<sub>x</sub>, and CO. Are you okay with that?

Thanks

--

Jake Frick  
SC Dept. of Health & Environmental Control  
Bureau of Air Quality  
803.898.3897

--

Thanks,

James Myers  
803-898-4621



Frick, Jake <fricklj@dhec.sc.gov>

## Re: FW: JCI Florence

1 message

**Welch, Pamela** <welchpd@dhec.sc.gov>  
To: "Frick, Jake" <fricklj@dhec.sc.gov>

Wed, Nov 28, 2012 at 9:33 AM

Jake,

That table is from the old rule (1995), the new rule has more D/F and THC testing requirements. If the facility has any processes that are listed in the table they must test.

<http://www.epa.gov/ttn/atw/lead2nd/fr05ja12.pdf>

Thanks,

On Tue, Nov 27, 2012 at 7:41 PM, Frick, Jake <fricklj@dhec.sc.gov> wrote:

----- Forwarded message -----

From: **Best, Quentin** <qbest@cecinc.com>  
Date: Tue, Nov 27, 2012 at 4:18 PM  
Subject: FW: JCI Florence  
To: "SCDHEC (fricklj@dhec.sc.gov)" <fricklj@dhec.sc.gov>

JCI is disagreeing with the D/F and THC testing requirement. Table 2 of Subpart X, excerpted below, only has limits for lead from rotary furnaces. THC and D/F limits do not apply to rotary furnaces, thus there is not a testing requirement. What is the basis for the requirement for testing THC and D/F?

Table 2-Summary of Standards for Process Sources

Furnace configuration	Lead compounds (milligrams per dry standard cubic meter)	Total hydrocarbons	Citation
Collocated blast furnace and reverberatory furnace:			
When both furnaces	2.0	20 parts per million by	§63.543(a),

operating		volume <sup>1</sup>	(c).
When reverberatory furnace not operating	2.0	360 parts per million by volume <sup>1</sup> (existing)	§63.543(a), (c)(1).
		70 parts per million by volume <sup>1</sup> (new) <sup>2</sup>	§63.543(a), (c)(2).
Blast	2.0	360 parts per million by volume <sup>1</sup> (existing)	§63.543(a), (d).
		70 parts per million by volume <sup>1</sup> (new) <sup>2</sup>	§63.543(e).
		0.20 kilograms per hour <sup>3</sup>	§63.543 (g).
Reverberatory, rotary, and electric	2.0	Not applicable	§63.543(a).

<sup>1</sup>Total hydrocarbons emission limits are as propane at 4 percent carbon dioxide to correct for dilution, based on a 3-hour average.

<sup>2</sup>New sources include those furnaces that commence construction or reconstruction after June 9, 1994.

<sup>3</sup>Applicable to blast furnace charging process fugitive emissions that are not combined with the blast furnace process emissions prior to the point at which compliance with the total hydrocarbons concentration standard is determined.

Furthermore, page 564 of the final Residual Risk Rule for Secondary Lead states the following:

*The EPA is not adopting numerical limits for THC and D/F emissions from rotary furnaces pending further data gathering and analysis for this furnace type.*

Please contact me at your earliest convenience to discuss. Thanks

**W. Quentin Best, QSTI / Senior Project Manager**

Civil & Environmental Consultants, Inc.

2030 S. Tryon Street, Suite 3E · Charlotte, NC 28203

Toll-Free: 855-859-9932 · Direct: 980-224-8104 · Fax: 980-224-8172

Mobile: 704-309-7421 · Email: [qbest@cecinc.com](mailto:qbest@cecinc.com) · <http://www.cecinc.com>

Senior Leadership · Integrated Services · Personal Business Relationships

*This electronic communication and any attachments are intended solely for the use of the person or entity to which it is addressed, and may contain information that is confidential, privileged and exempt from disclosure under applicable law, including copyright law. If you are not the intended recipient of this message, you are prohibited from disclosing, reproducing, distributing, disseminating or otherwise using this transmission. Please promptly notify the sender by reply electronic communication and immediately delete this message from your system.*

--

Jake Frick  
SC Dept. of Health & Environmental Control  
Bureau of Air Quality  
803.898.3897

--

Pamela Welch  
Environmental Health Manager  
Air Toxic Section/Bureau of Air Quality  
SC Department of Health and Environmental Control  
Phone (803) 898-2483  
Fax (803) 898-4117  
Email: [welchpd@dhec.sc.gov](mailto:welchpd@dhec.sc.gov)



Frick, Jake <frickl@dhc.sc.gov>

Re: FW: JCI Florence

1 message

Frick, Jake <frickl@dhc.sc.gov>
To: "Best, Quentin" <qbest@cecinc.com>
Cc: timothy.j.lafond@jci.com

Fri, Nov 30, 2012 at 8:44 AM

Bad intel...sorry about that. They are correct, rotary furnaces are currently exempt. There is still one follow-up (see below) that needs to be cleared up before a revised plan is submitted. After that, the revised plan can be submitted (include revision number) and if you could redline the revised text in the new submittal it would help me a lot.

1) Are the smelters batch or continuous processes? If batch please indicate the times for each phase of the process (charging, refining, tapping, etc.).

Batch process - 4 cycles/day 6 hours/cycle

- Each cycle has 3 distinct steps: charging, smelting and tapping
Charging takes about 1 hour consisting of 3 charges (20 min/charge including time for the charge to spread out, moisture to evaporate, separators to burn off, etc.)
Smelting takes about 4 hours - there is a lead tap in this process to take out what melts/smelts quickly to allow the remaining charge to climb the walls during rotation.
Tapping takes about 1 hour - 30 min for lead and 30 min for slag

DHEC Follow-up: We will allow the run times, for some methods anyway, indicated in Table 1, provided minimum sample volumes are attained and each test run on the Furnaces begins at the beginning of the initial charge; otherwise the runs must last the duration of the batch cycle (charging through tapping). The basis for the requirement for each run to begin when the charging begins is that is when most of the emissions should occur, with the possible exception of the HCl and D/F emissions. Those may occur when salt flux is added but since the D/F runs are 4 hours each those runs may capture the fluxing anyway. Approximately when during the above batch cycle does the majority of the fluxing occur? Note that if that 4 hour run would capture the majority of the fluxing, then the HCl test run times should be increased to 4 hours also.

Thanks

\*\*\*\*\*

On Tue, Nov 27, 2012 at 4:18 PM, Best, Quentin <qbest@cecinc.com> wrote:

JCI is disagreeing with the D/F and THC testing requirement. Table 2 of Subpart X, excerpted below, only has limits for lead from rotary furnaces. THC and D/F limits do not apply to rotary furnaces, thus there is not a testing requirement. What is the basis for the requirement for testing THC and D/F?

Table 2-Summary of Standards for Process Sources

Furnace configuration	Lead compounds (milligrams per dry standard cubic meter)	Total hydrocarbons	Citation
Collocated blast furnace and reverberatory furnace:			
When both furnaces	2.0	20 parts per million by	§63.543(a),

operating		volume <sup>1</sup>	(c).
When reverberatory furnace not operating	2.0	360 parts per million by volume <sup>1</sup> (existing)	§63.543(a), (c)(1).
		70 parts per million by volume <sup>1</sup> (new) <sup>2</sup>	§63.543(a), (c)(2).
Blast	2.0	360 parts per million by volume <sup>1</sup> (existing)	§63.543(a), (d).
		70 parts per million by volume <sup>1</sup> (new) <sup>2</sup>	§63.543(e).
		0.20 kilograms per hour <sup>3</sup>	§63.543 (g).
Reverberatory, rotary, and electric	2.0	Not applicable	§63.543(a).

<sup>1</sup>Total hydrocarbons emission limits are as propane at 4 percent carbon dioxide to correct for dilution, based on a 3-hour average.

<sup>2</sup>New sources include those furnaces that commence construction or reconstruction after June 9, 1994.

<sup>3</sup>Applicable to blast furnace charging process fugitive emissions that are not combined with the blast furnace process emissions prior to the point at which compliance with the total hydrocarbons concentration standard is determined.

Furthermore, page 564 of the final Residual Risk Rule for Secondary Lead states the following:

*The EPA is not adopting numerical limits for THC and D/F emissions from rotary furnaces pending further data gathering*

*and analysis for this furnace type.*

Please contact me at your earliest convenience to discuss. Thanks

**W. Quentin Best, QSTI / Senior Project Manager**

Civil & Environmental Consultants, Inc.

2030 S. Tryon Street, Suite 3E · Charlotte, NC 28203

Toll-Free: 855-859-9932 · Direct: 980-224-8104 · Fax: 980-224-8172

Mobile: 704-309-7421 · Email: [qbest@cecinc.com](mailto:qbest@cecinc.com) · <http://www.cecinc.com>

Senior Leadership · Integrated Services · Personal Business Relationships

*This electronic communication and any attachments are intended solely for the use of the person or entity to which it is addressed, and may contain information that is confidential, privileged and exempt from disclosure under applicable law, including copyright law. If you are not the intended recipient of this message, you are prohibited from disclosing, reproducing, distributing, disseminating or otherwise using this transmission. Please promptly notify the sender by reply electronic communication and immediately delete this message from your system.*

—

Jake Frick  
SC Dept. of Health & Environmental Control  
Bureau of Air Quality  
803.898.3897

# **SITE-SPECIFIC TEST PLAN**

**FOR**

**JOHNSON CONTROLS BATTERY GROUP, INC.**

**FLORENCE, SOUTH CAROLINA**

**Initial Stack Testing  
For the Lead Acid Battery Recycling Facility**

**Revision 1**

Prepared by:

Civil & Environmental Consultants, Inc.  
Air Monitoring Group  
2030 South Tryon Street, Suite 3E  
Charlotte, North Carolina 28203  
704.224.8104

October 15, 2012

# TABLE OF CONTENTS

Page No

<b>Section 1.0</b>	<b>FACILITY INFORMATION.....</b>	<b>1</b>
	Section 1a Facility Address.....	1
	Section 1b Permit & Source Identification.....	1
	Section 1c Source Testing Contractor.....	1
	Section 1d Subcontract Laboratory.....	1
<b>Section 2.0</b>	<b>TEST OBJECTIVES.....</b>	<b>2</b>
	Section 2a Test Purpose.....	2
	Table 1 – Sampling Matrix.....	3
	Section 2b Regulatory Requirements & Limitations.....	5
<b>Section 3.0</b>	<b>PROCESS DESCRIPTION.....</b>	<b>6</b>
	Section 3a Detailed Process Description.....	6
	Section 3b Process Design/Normal Operating Rate.....	7
	Table 2 – Process Permitted Operating Limits.....	7
	Section 3c Proposed Operating Rate & Conditions.....	8
	Section 3d Demonstration of Operating Rate.....	8
	Section 3e Air Pollution Control Equipment.....	8
	Table 3 – Air Pollution Control Equipment.....	8
	Section 3f Continuous Emission Monitoring Equipment (CEM).....	9
	Section 3g Ancillary Monitoring Devices.....	10
<b>Section 4.0</b>	<b>SAFETY CONSIDERATIONS.....</b>	<b>11</b>
	Section 4a Identification of Safety Concerns.....	11
	Section 4b Personal Protective Equipment.....	12
<b>Section 5.0</b>	<b>SAMPLING METHODS.....</b>	<b>12</b>
	Section 5b Total Tests Conducted.....	31
	Section 5c Total Runs Per Test.....	31
	Section 5d Duration of Test Runs.....	31
	Section 5e Minimum Sample Volumes.....	31
	Section 5f Simultaneous Sampling.....	31
	Section 5g Sample Recovery Location.....	32
	Section 5h Blank Recovery Application.....	32
	Section 5i Sample Hold Time.....	32
<b>Section 6.0</b>	<b>SAMPLING LOCATIONS AND DOCUMENTATION.....</b>	<b>33</b>
	Section 6a Sampling Sites Schematics.....	33
	Section 6b Fugitive Emission Points.....	33
	Section 6c Cyclonic Flow Check.....	33
<b>Section 7.0</b>	<b>QUALITY ASSURANCE.....</b>	<b>34</b>
	Section 7a Reference Method QA/QC Procedures.....	34
	Section 7b Chain-of-Custody Procedures.....	34

## TABLE OF CONTENTS

Page No

Section 7c	Leak Check Procedures .....	35
Section 7d	Equipment Calibration.....	35
Section 7e	Analytical Detection Limit.....	37
Section 7f	Subcontract Laboratory Information.....	37
Section 7g	Audit Samples .....	37
<b>Section 8.0</b>	<b>FINAL TEST REPORT OUTLINE.....</b>	<b>38</b>
Section 8b	Example Calculations .....	39
Section 8c	Proposed Report Submission Date .....	39



## **Section 1.0 FACILITY INFORMATION**

### **Section 1a Facility Address**

Site-Specific Test Plan for:

Company Name: Johnson Controls Battery Group, Inc.  
Facility: Florence Battery Recycling Facility  
Address: 1800 Paper Mill Road  
City, State, Zip: Florence, South Carolina 29501  
Phone Number: 414.870.0754  
Facility Contact: Mr. Tim Lafond, P.E.

### **Section 1b Permit & Source Identification**

The Johnson Controls Battery Group (Johnson Controls) Florence facility has been issued Construction Permit No. 1040-0129-CA from the South Carolina Department of Health and Environmental Control (SC DHEC) for the start-up and operation of the new lead acid battery recycling plant.

### **Section 1c Source Testing Contractor**

For purposes of performing source tests, Johnson Controls has contracted:

Civil & Environmental Consultants, Inc. (CEC)  
2030 South Tryon Street, Suite 3E  
Charlotte, North Carolina 28203  
Phone Number: 704.224.8104  
Bryan Starnes – Project Manager

### **Section 1d Subcontract Laboratory**

Enthalpy Analytical, Inc.  
800-1 Capitola Drive  
Durham, NC 27713  
Phone Number: 919.850.4392  
Brian Tyler

Element One, Inc.  
5022-C Wrightsville Avenue  
Wilmington, NC 28403  
Phone Number: 910.793.0128  
Ken Smith, President



## **Section 2.0 TEST OBJECTIVES**

### **Section 2a Test Purpose**

The purpose of this program is to determine compliance with the referenced construction permit issued on February 5, 2010. The following table (Table 1) lists the processes, stack identification numbers and the pollutants of interest for the upcoming emission testing. CEC is requesting to perform the testing on Unit No. 01 (Plate Scrubber FL-503) on December 18<sup>th</sup>, Charge Prep & Melter on December 19 and 20 and PP Storage and Extrusion Room for HAPs on December 18<sup>th</sup>, 2012. The other sources CEC will provide notification once these sources can be tested.



**Table 1  
Sampling Matrix  
Johnson Controls Battery Group  
Florence, South Carolina**

<b>Process</b>	<b>Stack ID. No.</b>	<b>Pollutants</b>	<b>EPA Methods Proposed and sample run times*</b>
<b>CX Plant Equipment</b>	ID 01	Visible Emissions (VE)	No test requirements per permit
		Particulate Matter (PM)	Method 5 – 3 (2-hr)
		Sulfuric Acid	Method 8 3 (2-hr)
<b>PP Storage &amp; Extrusion (No Stack – room sampling)</b>	ID 03	VE & PM	No test requirement for VE & PM Silos and Extruder do not vent outside of the room.
		Acrolein, Benzene, Ethyl benzene, Chloroform, 1,3-Butdiene, Vinyl chloride, o-Xylene, m/p-Xylene, Styrene, and Toluene	TO-15 – 3 (1-hr)
		Acetaldehyde, Formaldehyde, and Propionaldehyde	TO11A – 3 (1-hr) +1 spiked run & 1 collocated run
		HCl	NIOSH 7903– 3 (1-hr)

One sampling location within the 01 Poly Plant Room will be sampled for the HAP pollutants listed above for ID 03. This sampling location will be determined by a portable PID. A PID Mini RAE 2000 calibrated on isobutylene will be used to determine a sampling location. Prior to the sampling run, CEC will walk along the inside parameter of the room to determine if a high VOC concentration level can be determine within the Poly Room. If no noticeable VOC Loading difference is detected, the area of sampling will be ten feet back of the shipping load-out door which will be used to generate a flow from the room. If a high VOC loading is detected upon the parameter check of the room the sampling location will be moved to that parameter location. The sampling location will be setup as close as possible to the area identified as the high VOC area. The sampling will not be placed in high traffic areas or in areas where work is being performed. The parameter VOC will be check before each sampling run and the sampling location may be subject to change before each run.

For flow or velocity determinations: The policy for the Poly Room is that all doors are to be closed except when going in and out of the room. One of the two shipping load-out doors will be raised approximately 3 inches to allow flow from the room to the outside during the sampling runs. (Note the room is under positive pressure.) Flow measurements will be taken with a vane anemometer every fifteen minutes along the bottom of the door at four locations. The area of the opening will be measured and flow will be recorded in feet per minute. This data will be used to generate a pound per hour number for the pollutants tested in the room.



**Table 1  
Sampling Matrix  
Johnson Controls Battery Group  
Florence, South Carolina**

<b>Process</b>	<b>Stack ID. No.</b>	<b>Pollutants</b>	<b>EPA Methods Proposed and sample run times*</b>
<b>Melter and Charge Preparations</b>	ID 06	VE	Method 9 – 3 (1-hr) (Performed with the particulate matter sampling.)
		PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Manganese)	Method 29 with PM – 3 (4-hrs)
		SO <sub>2</sub> , NO <sub>x</sub> , & CO.	Methods 3A, 6C, 7E, & 10 – 3 (4-hrs)
<b>Natural Gas Fired Furnace 1*</b>	ID 07	VE	Method 9 – 3 (1-hr)
		PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Manganese)	Method 29 with PM – 3 (4-hrs)
		SO <sub>2</sub> , NO <sub>x</sub> , CO,	Methods 3A, 6C, 7E, & 10 – 3 (4-hrs)
		HAPs	<b>Method 18</b> (Acetaldehyde, Acrolein, Benzene, Ethyl benzene, Chloroform, 1,3-Butdiene, Vinyl chloride, o-Xylene, m/p-Xylene, Styrene, and Toluene) – 3 (1-hr) & <b>Method 0011</b> (Formaldehyde, and Propionaldehyde) – 3 (2-hr)
		HCl	Method 26A – 3 (2-hr)
<b>Natural Gas Fired Furnace 2 &amp; 3*</b>	ID 08, or ID 09	VE	Method 9 – 3 (1-hr)
		PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Manganese)	Method 29 with PM – 3 (4-hrs)



**Table 1  
Sampling Matrix  
Johnson Controls Battery Group  
Florence, South Carolina**

<b>Process</b>	<b>Stack ID No.</b>	<b>Pollutants</b>	<b>EPA Methods Proposed and sample run times*</b>
<b>Foundry Ventilation</b>	ID 010	PM	Method 5 – 3 (2-hr)
<b>Refining Kettles and Casting Emission Baghouse Stack</b>	ID 11B	VE	Method 9 – 3 (1-hr)
		PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Manganese)	Method 29 with PM – 3 (4-hrs)
		SO <sub>2</sub> , NO <sub>x</sub> , CO	Methods 3A, 6C, 7E, & 10 – 3 (4-hrs)
<b>Refining Kettles Combustion Exhaust</b>	ID 11A	SO <sub>2</sub> , NO <sub>x</sub> , CO	Methods 6C, 7E, & 10 – 3 (1-hr)
<b>Refining Ventilation</b> <sup>*3</sup>	ID 12	PM, Metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Nickel, Selenium, Manganese)	Method 29 with PM – 3 (4-hrs)
		Proposing to test one of four sampling locations (“like for like”). The selected ID No. 12 emission source will need a stack extension to meet Method 1 criteria.	
<b>Slag Warehouse</b>	ID 14	PM	Method 5 – 3 (4-hr)

\*The testing runs for the Furnace Nos. 1, 2 and 3 will start on the startup of the six hour cycle.

**Section 2b Regulatory Requirements & Limitations**

Measurements performed by the CEC Air Monitoring Group will be conducting using United States Environmental Protection Agency (US EPA) Reference Test Methods published in the *Code of Federal Regulations* Volume 40, Part 60. The location of sampling ports, the number of traverse points and presence or absence of cyclonic flow will be determined by Method 1. The determination of velocity and volumetric flow rates are to be determined by Method 2. Method 2 will be used for the assignment of a dry molecular weight of 29.0 for the gas stream for non-



combustion processes. Methods 3 and 3A will be used for the determination of a dry molecular weight at the combustion emission sources. The moisture content of each emission source will be determined by Method 4. Method 5 will be used to determine particulate matter concentrations and emission rates (or performed in conjunction with EPA Method 29 sampling procedures). Method 6C, 7E and 10 will be used for the determination of sulfur dioxide, oxide of nitrogen and carbon monoxide concentrations and emission rates. Method 8 will be used for determining sulfuric acid concentrations and emission rates. Visible opacity observations will be performed according to EPA Method 9 criteria. Method 26A will be used for determining hydrogen chloride concentrations and emission rates. Method 29 will be used for determining multiple metal including mercury emission rates. The individual hazardous air pollutants will be collected using USEPA Method 18 Tedlar bags and tubes (the compound of interest list is included in Sections 5.a.15 of the Speciated Volatile Organic HAP sampling and analysis write up). Method 0011 will be used to collect formaldehyde and propionaldehyde compounds for determining emission rates. Specific application of these methods is described in Section 5.0, Sampling Methods.

### **Section 3.0 PROCESS DESCRIPTION**

This section contains a brief description of the process, a typical process air flow schematic and the process conditions and controls to be in force during the emissions testing.

#### **Section 3a Detailed Process Description**

The newly constructed Johnson Controls Lead Recycling Facility will receive approximately 595 tons of automotive and marine batteries daily (on a dry basis). These batteries as well as other non-hazardous lead bearing materials from other Johnson Controls facilities are recycled in four key areas of the plant.

- CX Plant- this area is where the batteries are dismantled and broken.
- Charge Preparation- this is where the materials are separated and categorized into individual components.
- Smelting Furnaces Room- the lead components from the Charge Preparation room are melted down inside three separate smelt furnaces and tapped from the non-lead slag.



- Refining and Casting- the lead from the kettles are refined into different purities and cast into rectangular pigs for storage and transport.

**Section 3b Process Design/Normal Operating Rate**

Johnson Controls proposes to conduct emission testing for each process at the permitted normal or elevated worst case scenario. Table 2 shows the proposed operating rates for the initial compliance determination. Johnson Controls will record the relevant production data for each system and control device parameters. This production data will be included in the final test report as an Appendix.

<b>Table 2</b> <b>Proposed Production Rates</b> <b>Johnson Controls Battery Group</b> <b>Florence, South Carolina</b>		
<b>Process</b>	<b>Unit I.D No.</b>	<b>Proposed Process Rates</b>
<b>CX Plant Equipment</b>	ID 01	24.8 tons/hr
<b>PP Storage, Extrusion</b>	ID 03	1.82 tons/hr
<b>Melter and Charge Preparations</b>	ID 06	4.83 tons/hr and 19.94 tons/hr
<b>Natural Gas Fired Furnace 1, 2 or 3</b>	IDs 07, 08 or 09	Lead 4.72 tons/hr Slag 0.54 tons/hr
<b>Foundry Ventilation</b>	ID 010	Normal Operation inside
<b>Refining Kettles and Casting Emission Stack</b>	ID 11A	Lead 17.34 tons/hr Dross 1.77 tons/hr
<b>Refining Kettles and Casting Furnace Exhaust Stack</b>	ID 11B	Lead 17.34 tons/hr Dross 1.77 tons/hr
<b>Refining Ventilation</b>	ID 12	Normal Operation inside
<b>Slag Warehouse</b>	ID 14	1.62 tons/hr



The values in table 2 are the process weight rates as contained in the permit. The process weight rate is the mass of all materials entering the process. Please note that the process weight rate can be different than the production rate. The facility will be operating at design capacity and JCI understands operating restrictions may be imposed if the testing is not performed during design or capacity of the process.

The smelters are batch process (4 cycles/day approximately, 6 hours/cycles). Each cycle has 3 distinct steps: charging, smelting and tapping. Charging takes about 1 hour consisting of 3 charges (20 min/charge including time for the charge to spread out, moisture to evaporate, separators to burn off, etc.) Smelting takes about 4 hours. There is a lead tap in this process to take out what melts/smelts quickly to allow the remaining charge to climb the walls during rotation. Tapping takes about 1 hour (30 min for lead and 30 min for slag.) Fluxing takes place during the charging of the smelters and the first hour of the smelting for a total time of two hours of the six hour cycle.

### **Section 3c Proposed Operating Rate & Conditions**

As required in South Carolina Department of Health and Environmental Control, *Procedures and Minimum Requirements for Source Tests in South Carolina*, an effort will be made to maintain the operating conditions as close to the permitted operating rate as possible during testing.

### **Section 3d Demonstration of Operating Rate**

To demonstrate and verify operating rate during the testing, production data will be recorded by Johnson Control's personnel.

### **Section 3e Air Pollution Control Equipment**

<p style="text-align: center;"><b>Table 3</b> <b>Air Pollution Control Equipment</b> <b>Johnson Controls Battery Group</b> <b>Florence, South Carolina</b></p>
--



<b>Table 3 Air Pollution Control Equipment Johnson Controls Battery Group Florence, South Carolina</b>		
<b>Process</b>	<b>Unit I.D No.</b>	<b>Control Device*</b>
<b>CX Plant Equipment</b>	ID 01	Plate Scrubber
<b>PP Storage, Extrusion</b>	ID 03	No control
<b>Melter and Charge Preparations</b>	ID 06	Baghouse with HEPA filter
<b>Natural Gas Fired Furnace 1, 2 or 3</b>	IDs 07, 08 or 09	Afterburner, Baghouse with HEPA filter, Wet Scrubber
<b>Foundry Ventilation</b>	ID 010	Baghouse with HEPA filter
<b>Refining Kettles and Casting Emission Stack</b>	ID 11A	Baghouse with HEPA filter
<b>Refining Kettles and Casting Furnace Exhaust Stack</b>	ID 11B	Oven Exhaust- None
<b>Refining Ventilation</b>	ID 12	HEPA filter
<b>Slag Warehouse</b>	ID 14	Baghouse with HEPA filter

\*Each process unit vents through the attached control device(s) prior to release to the atmosphere in Table 3.

Per 40 CFR 63.544, total enclosures are installed on (1) Smelting furnaces, (2) Smelting furnace charging areas, (3) Lead taps, slag taps, and molds during tapping, (4) Battery breakers, (5) Refining kettles, casting areas, (6) Dryers, (7) Agglomerating furnaces and agglomerating furnace product taps, (8) Material handling areas for any lead bearing materials except those listed in paragraph (b) of 63.544, (9) Areas where dust from fabric filters, sweepings or used fabric filters are processed.

### **Section 3f Continuous Emission Monitoring Equipment (CEM)**

Johnson Controls has installed CEM monitors for Unit Nos. 06, 07, 08, 09 (NO<sub>x</sub>, CO), 11B and 11A (NO<sub>x</sub>) stacks.



### **Section 3g Ancillary Monitoring Devices**

Operational ranges for controls device will be recorded a minimum every 15 minutes. Pressure drop readings will be recorded for each baghouse and HEPA system. Pressure drop, liquid flow rates, liquid pressure, gas flow and pH will be recorded for the Unit ID No. 1 scrubber system. The scrubber control devices liquid flow rates, exit pH and liquid to gas ratio parameters for Unit ID Nos. 07, 08 and 09 smelt furnaces will be recorded. Temperature readings will be recorded for the afterburner control device for Smelt Furnaces Unit ID Nos. 07, 08 and 09.

Per 40 CFR 63.548(k), the enclosure monitoring systems meet the sensitivity and accuracy of 40 CFR 63.548(k)(3) and the calibrations per (k)(5) will be included in the final test report. The manufacturer range and accuracy specifications will be include in the final test report. The enclosure negative pressures from the enclosure monitoring system will be recorded at least every 15 minutes during the test and those readings included in the final test report. Note that the differential readings from each of the 3 walls on each enclosure will be recorded and included in the test report.

Per 40 CFR 63.548(c)(1), in Section 3g of the plan that the pressure drop of each cell of the baghouse being tested and the pressure drop across each HEPA filter cleaning system will be monitored and reported in the final report.

The cleaning cycle times for each baghouse will be recorded during the test and those readings included in the final report.



## **Section 4.0 SAFETY CONSIDERATIONS**

### **Section 4a Identification of Safety Concerns**

Johnson Controls and CEC are committed to conducting business activities in a responsible manner; free from recognized hazards, to respect the health and safety. Please be advised that Johnson Controls is a lead-acid battery recycling manufacturing facility which consists of work areas where lead concentrations in air levels exceed the action level of 30ug/m<sup>3</sup> and/or exceed the permissible exposure limit (50ug/m<sup>3</sup>). Lead may enter the body by breathing or injection of lead dust or fumes. All work inside the plant will require CEC to follow established personal protection equipment (PPE) requirements of Johnson Controls.

The following risks are identified as applicable to the testing and sampling personnel.

1. Tripping and falling hazards associated with an industrial environment with ladders, stairways, uneven platforms, scaffolding, and accumulated debris in walkways. Johnson Controls and CEC employees will make efforts to maintain a clean workspace and be aware of potential obstacles in their work areas. Fall protection equipment will be utilized on elevated sampling platforms.
2. Exposure to temperature extremes. Testing crew may be exposed to high heat conditions. Johnson Controls and CEC employees will wear appropriate protective clothing and maintain healthy hydration levels.
3. Weather hazards, including lightening, when working elevated sampling platforms. Johnson Controls and CEC employees will maintain awareness of weather conditions and suspend testing before conditions become unsafe at the testing locations.



4. Inadequate Illumination. Work will be restricted to daylight hours when working in elevated areas or roof tops without adequate lights. Johnson Controls and CEC will ensure that proper illumination is available if work is to be performed in low light.
5. Hazards from falling objects. Johnson Controls and CEC will barricade areas beneath test crews and make sure engineering controls are in place to prevent objects from falling below.
6. Overexertion. Test crews will be handling heavy equipment and may be working long hours, creating the potential for exhaustion and muscle strain. Johnson Controls and CEC will use available assistance for lifting and transporting heavy objects, including elevators, carts, ropes and pulleys. Proper lifting techniques will be observed.
7. Process Equipment Hazards. Johnson Controls will make sure the test crews are aware of hazards associated with process equipment, how to abate the hazards, and how to respond to process emergencies.

#### **Section 4b Personal Protective Equipment**

The minimum personal protective equipment required while working on site includes: nitrile gloves, safety glasses, hard hat, hearing protection, and steel-toed shoes. When under employees at elevated heights and when lowering equipment from elevated platforms, ground personnel must not be directly under the load and hard hats must be worn. These safety areas will be barricaded to prevent falling objects hurting personnel and damaging nearby property.

#### **Section 5.0 SAMPLING METHODS**

This section describes the sampling strategy and the sampling and analytical methods proposed for this test program. These procedures are to be adhered to throughout the course of this project.

##### **Section 5.a.1 Sampling Strategy**

The sampling and analytical procedures being proposed for this test program are those established by the US EPA and SC DHEC. The sampling runs will be conducted in triplicate to validate the sampling for each operating condition and emission unit. Tests are to be scheduled during normal



operating conditions. CEC would like to propose to sample only one of the three smelt furnaces (Furnace No.1 ID No. 7) for all of the hazardous air pollutants, since the three furnaces are identical (“Like for Like sampling approach). These three furnaces are newly installed with identical control devices and operating rates. CEC will test the other two furnaces (Furnace Nos. 2 and 3 ID Nos. 8 and 9) for visible opacity, particulate matter and metals (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Manganese). CEC would also like to propose sampling only one of the four exhausts of the Refining Ventilation system for particulate matter. The Refining Ventilation System consists of four exhaust units creating a negative pressure on the building for refining and casting fugitives.

### **Section 5.a.2 Sampling and Analytical Procedures Summary**

The location of sampling ports, the number of traverse points and presence or absence of cyclonic flow will be determined by Method 1. The determination of velocity and volumetric flow rates are to be determined by Method 2. Method 2 will be used for the assignment of a dry molecular weight of 29.0 for the gas stream for non-combustion processes. Method 3A will be used for the determination of a dry molecular weight at the combustion emission sources. The moisture content of each emission source will be determined by Method 4. Method 5 will be used to determine particulate matter concentrations and emission rates (or performed in conjunction with EPA Method 29 sampling procedures). Method 6C, 7E and 10 will be used for the determination of sulfur dioxide, oxide of nitrogen and carbon monoxide concentrations and emission rates. Visible opacity observations will be performed according to EPA Method 9 criteria. Method 8 will be used for determining sulfuric acid concentrations and emission rates. Method 29 will be used for determining multiple metal including lead and mercury emission rates. The individual hazardous air pollutants will be collected by EPA Method 18 Tedlar bags and tubes (the compound of interest list is included in Sections 5.a.15 of the Speciated Volatile Organic HAP sampling and analysis write up). Method 0011 with capture formaldehyde and propionaldehyde compounds for determining emission rates. Specific application of these methods is described in Section 5, Sampling Methods. These test methods are available in the Code of Federal Regulations Volume 40, Part 60 or by request from CEC.



### **Section 5.a.3 Sampling Ports, Traverse Points and Cyclonic Flow Determination**

The sampling locations will be prepared according to the criteria in Method 1. The duct diameters upstream and downstream from the sampling ports will be determined prior to sampling. The number of isokinetic traverse points is to be chosen with respect to sampling port location. Method 1 specifies that a minimum of 8 traverse points for sampling ports located  $>8/2$  downstream/upstream stack diameters from flow disturbances and 24 traverse points when located  $>2/0.5$ . The presence or absence of cyclonic flow will be determined prior to testing. CEM stratification points will be determined per EPA Method 7E Section 8.1.2.

### **Section 5.a.4 Velocity and Volumetric Flow Rate Determination**

Method 2 is used for determining the average gas velocity in a stack from measurements of gas density and the average velocity head with a Type S (Stausscheibe or reverse type) pitot tube. This method is applicable for quantifying gas flows, which meet the criteria of Method 1.

In principle measurements of velocity head and temperature are performed at the traverse points specified by Method 1. A properly scaled differential pressure gauge will be selected for the range of  $\Delta p$  values encountered during the traverse. A 0 to 0.25 or 0 to 10 inch water inclined manometer or digital manometer will be used as the differential pressure gauge.

The sampling locations will meet the criteria detailed in Method 1. Method 2 will be used for taking volumetric flow measurements and the assignment of 29.0 dry molecular weight at the non-combustion emission sources. Method 3A (analyzing oxygen and carbon dioxide with instrumental method analyzers) will be used to determine a dry molecular weight at the combustion emission stacks. Method 4 will be used to determine moisture percentages at each location by EPA Method 5, 26A or 29 sampling trains. The principal components of the Method 2 gas velocity measurement system are:

- A calibrated stainless steel Type S pitot tube and Type K thermocouple;
- Leak-free interface tubing between pitot tube and differential pressure gauge;
- A 0 to 0.25 or 0 to 10 inch inclined manometers and;
- An NIST traceable pyrometer.



The apparatus is to be set-up according to manufacturer and reference method recommendations. Pretest and posttest leak checks will be conducted using the procedures outlined in Method 2, Section 8.1. Velocity head and temperature measurements will be performed at the traverse points specified by Method 1 during each sampling run. The atmospheric and static pressure of the stack will also be determined at the beginning of each sampling run. The volumetric flow rate calculations used will be those specified in Method 2, Section 12. A more comprehensive explanation of the reference method can be found in the Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, September 30, 1994. (QA Handbook, Volume III)

#### **Section 5.a.5 Dry Molecular Weight Determination**

Method 3 is applicable for determining carbon dioxide and oxygen concentrations and dry molecular weight of a sample from a gas stream of a fossil-fuel combustion process. This method may also be applicable to other processes where it has been determined that compounds other than carbon dioxide, oxygen, carbon monoxide, and nitrogen are not present in concentrations sufficient to affect the results. However, USEPA Method 2, Section 8.6 states “For processes emitting essentially air, an analysis needs not be conducted; use a dry molecular weight of 29.0”.

The dry molecular weight for each combustion emission stack will be determined by EPA Method 3A (instrumental analyzer method) with respect to the analysis of oxygen and carbon dioxide emissions.

#### **Section 5.a.6 Moisture Determination**

Method 4 involves the determination of stack gas moisture. Stack gas moisture will be measured when the flue gas flow rate or a pollutant gas concentration is determined. The moisture content is used to correct the emission concentration or mass emission rate to a dry basis. EPA Method 4 and *Field Procedure 4* of the Quality Assurance Handbook Volume III will be used to measure stack gas moisture content. *Field Procedure 4* provides detailed Method 4 information.



The moisture content prior to each isokinetic sampling run will be determined using wet bulb/dry bulb thermometers and partial pressure, vapor and saturated vapor pressure equations. This technique is described in Method 4 and is summarized below:

- Moisten the wet bulb thermometer wick with deionized water;
- Insert both thermometers into the flue gas stream and monitor the wet bulb temperature;
- When the wet bulb temperature has stabilized, record both the wet bulb and dry bulb thermometer temperatures; and
- Calculate the flue gas moisture content (PMV) using saturated vapor and moisture equations.

The moisture content for each process exhaust stack will be determined in conjunction with EPA Method 5, 26A or 29 sampling procedures as described below in the following sections. Collected condensate measurements will be recorded on the Method 5, 26A or 29 moisture determination data analysis forms. Calculations will be performed according to Section 12 of Method 4.

#### **Section 5.a.7 Particulate Matter Determination**

Testing for particulate matter will be performed according to US EPA Method 5 or within Method 29 if metals analysis is needed at an emission source. Gaseous and particulate pollutants will be withdrawn isokinetically from the emission source and collected in a multi-component sampling train. In principle, particulate matter includes any material that will condense at or above the filtration temperature of approximately 250 degrees Fahrenheit and will be collected on a tared glass fiber filter. The gaseous components will then be bubbled through a measured volume of deionized water to determine the moisture content of the emission source. The principal components of the sampling system are sequentially:

- A stainless steel sample nozzle and borosilicate probe liner;
- A heated (248°F ±25°F) probe and filter assembly with tared glass fiber filter;
- An impinger train consisting of four sequential impingers. The first two impingers containing 100 ml each of deionized water followed by an empty impinger and a final impinger containing 200 grams of silica gel; and



- A metering system capable of maintaining an isokinetic sampling rate and accurately determining the sample volume according to specifications in APTD-0581.

After the test runs, the filter which collected the sample will be carefully removed from the glass filter support and sealed in a Petri dish. The liquid in the first three impingers will be measured to the nearest milliliter. The moisture collected by the silica gel in the fourth impinger will be determined to the nearest 0.1 gram. Collected condensate measurements will be recorded on the Method 4 moisture determination data analysis form. The nozzle, probe liner, and front filter-half of the filter assembly will be rinsed with acetone into a glass storage container which will be sealed and the liquid level marked.

An aliquot of the reagent grade acetone will be analyzed to determine the blank correction factor. The acetone rinse (corrected for the blank) is added to the filter catch to obtain the particulate matter weight. The particulate samples and method blanks will be analyzed by either Enthalpy Analytical (Method 5 only) or Element One Laboratory personnel (Method 29 with PM). The laboratory analyses and chain of custody documentation can be found in the laboratory appendix of the test report.

#### **Section 5.a.8 Gaseous Pollutant Instrumental Procedures**

Gaseous pollutant concentrations and emission rates will be determined according to EPA instrumental analyzer procedures. Sampling procedures to be used by CEC conform to the requirements of EPA Test Methods 3A, 6C, 7E, and 10. These methodologies utilize analyzers that sense the gas to be measured and generate an output proportional to its concentration. A portion of the sample gas stream will be continuously withdrawn from the emission source at a constant rate to be analyzed by the measurement system. The principal components of the measurement system will be sequentially:

- A 20-micron in-stack stainless steel sintered filter and a heated (248°F ±25°F) stainless steel sample probe;



- A heated (248°F ±25°F) stainless steel calibration valve assembly, 0.5 micron particulate filter, and heated Teflon sample transfer line;
- A refrigerator-type moisture removal system;
- Teflon sample transport line and pump with pressure and flow control;
- Stainless steel sample gas manifold;
- Instrumental analyzers with EPA Protocol calibration gases; and
- A data acquisition system (DAS) that continually logged one second intervals.

Prior to testing, all heated elements of the system will be heated to 250°F to prevent condensation of moisture. The gas conditioning system will be allowed to reach 40°F or lower before operating. Calibration procedures will commence with the introduction of zero and high-level calibration gas into the sampling system for each analyzer. The necessary adjustments will be made and the response to the mid-level gas will be recorded. A three-point analyzer calibration error test will be performed before the first run and again after any failed system bias test or failed drift test. The analyzer response will be recorded for each gas and the analyzer error will be calculated according to Method 7E Section 12. The analyzer calibration test is deemed acceptable if each calibration gas level (low, mid and high) is either within ± 2 percent of the calibration span  $\pm 0.5$  parts per million by volume (ppmv) of the manufacturer certified concentration of the calibration gas.

A converter efficiency test for the NO<sub>x</sub> analyzer will be performed per Method 7E Section 8.2.4.1 or 16.2 prior to the field test to verify the NO<sub>2</sub> to NO conversion efficiency of the analyzer. The converter efficiency must be  $\geq 90$  percent to comply with EPA Method 7E Section 8.2.4.

The initial system bias or two point system test for each analyzer will be performed by introducing the high-level or mid-level calibration gas (whichever best approximates the emissions) and zero gas concentrations into the measurement system at the probe upstream of all of the conditioning components in the measurement system. The system bias will be performed prior to the start of the test and after each sampling run. During the initial system bias, the response time for the system will be determined by measuring the time it takes for the upscale and low-level gases to achieve 95% of the stable response (or  $\pm 0.5$  ppm of the certified gas concentration, whichever is less



stringent). The response time is to be the longer interval of two response times. The pre- and post-run system bias must be within  $\pm 5.0$  percent of the calibration span for the low level and upscale calibration gases or  $\leq 0.5$  ppmv of the manufacturer certified concentration of the calibration gas.

Prior to sampling, a stratification test at each test site will be performed to determine the appropriate number of sample traverse points. If a stratification test is not performed, 12 points will be sampled (six point a traverse). The stratification test will be performed with a probe of appropriate length to measure the O<sub>2</sub>, CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub> and CO concentrations at twelve traverse points located according to Method 1. Alternatively, three points on a line passing through the centroidal area of the duct at points spaced at 16.7, 50.0, and 83.3 percent of the measurement line. The stratification test will consist of sampling for a minimum of twice the system response time at each of the predetermined sampling points. If the concentration (any one pollutant or diluent of interest) at each traverse point differs from the mean concentration for all the traverse points by no more than: a)  $\pm 5$  percent of the mean concentration; or b)  $\pm 0.5$  ppm (whichever is less restrictive), the gas stream is considered unstratified and sample collection from a single point which represents or closely matches the mean concentration can be used. If the concentration at each traverse point differs from the mean concentration for all the traverse points by no more than: a)  $\pm 10.0$  percent of the mean concentration; or b)  $\pm 1.0$  ppm (whichever is less restrictive), the gas stream is considered to be minimally stratified and sample collection from three points spaced at 16.7, 50.0, and 83.3 percent of the measurement line can be used. For stack diameters greater than 2.4 meters (7.8 ft.), the Method allows three point sampling located in the line exhibiting the highest average concentration during the stratification test at 0.4, 1.0, and 2.0 meters from the duct wall. If the gas stream is found to be stratified (exceeds the 10.0 percent or 1.0 ppm criterion), twelve traverse points as determined by Table 1-1 or 1-2 of Method 1 will be used for the testing.

Sampling will be initiated immediately following instrument calibration and after waiting at least two times the system response time. The minimum sampling time at each point is two times the response time. Subsequent traverse points will be recorded by omitting the two times the response time before recording except when the probe is removed from the source. The sampling points will be traversed with an equal length time at each traverse point for the



sampling run. CEC logs data every second and at least one valid data point per minute will be recorded and reported. Sulfur dioxide, oxides of nitrogen, and carbon monoxide (dry-basis) concentration will be recorded in parts per million (ppm) while the oxygen and carbon dioxide concentrations will be recorded on a percent basis. The concentrations will be subsequently corrected for any system bias before using these values in determining the pollutant emission rates. Data obtained during the test program from CEC's data acquisition system will be archived on a compact disc and will be presented with the sampling report.

At the conclusion of the each run, the zero and upscale-level calibration gases will be reintroduced and their respective responses recorded by the data acquisition system to determine drift. The drift for a sampling run is acceptable if the drift is  $\leq 3.0$  percent of the calibration span. The data is deemed acceptable if the criteria for the system bias and drift checks meet the required QC of EPA Method 7E and the run average of the sampling run is within the calibration span.

#### **Section 5.a.9 Verification of Gas Dilution Systems for Field Instrument Calibrations**

A gas dilution system may be used to provide known values of calibration gases through controlled dilution of high-level EPA Protocol 1 calibration gases with an appropriate dilution gas. USEPA Method 205 allows the use of a dilution system that produces known low-level calibration gases from high-level calibration gases, may be used for compliance tests in lieu of multiple calibration gases when the gas dilution system has demonstrated to meet the requirements of this method. The gas dilution system (EnviroNics Model 4000) will be evaluated at the test site on one analyzer once during each field test. A precalibrated analyzer is chosen to demonstrate that the gas dilution system produces predictable gas concentrations within  $\pm 2$  percent of the predicted values spanning a range of concentrations. At a minimum, two dilutions with three injections at each level within the range of each dilution device (mass flow controller) utilized in the dilution system. The predicted values are calculated based on the certified concentration of the protocol gas and the gas flow rates through the gas dilution system. No single injection will differ by more than  $\pm 2$  percent from the average instrument response for that dilution. The average instrument response will be  $\pm 2$  percent from predicted value. The



mid-level supply gas will be introduced directly to the precalibrated analyzer three times, by passing the dilution system. The average difference between the analyzer and the certified concentration of the mid-level supply gas will be within  $\pm 2$  percent. The gas dilution system is recalibrated annually using NIST-traceable primary flow standards with an uncertainty  $\leq 0.25$  percent. After meeting the requirements of this method, the remaining analyzers may be calibrated with the dilution system in accordance to the requirements of the applicable method for the duration of the field test.

#### **Section 5.a.10 Oxygen and Carbon Dioxide Instrumental Analyzer Description**

The oxygen concentration in the effluent will be determined by a California Analytical Instruments, Inc. Model 200 analyzer. Due to the magnetic properties of oxygen, the analyzer utilizes the phenomenon of paramagnetism to measure oxygen in the sample stream and generates a proportional electrical current.

The carbon dioxide concentration in the effluent will be determined by California Analytical Instruments, Inc. Model 200 Infrared Gas Analyzer. The analyzer utilizes a nondispersive infrared (NDIR) microflow detector to measure carbon dioxide in the sample stream and generates a proportional electrical current. The amplified and rectified voltage signal is recorded by the data acquisition system as percent carbon dioxide in the range of 0 to 20 percent. The electrical output signal is directly proportional to the concentration of the sample gas.

#### **Section 5.a.11 Sulfur Dioxide Instrumental Analyzer Description**

Sulfur dioxide concentrations will be determined according to EPA Method 6C. A Bovar Model 721 or Ametek 921 non-dispersive ultraviolet analyzer measures the absorbency of light at a discrete wavelength and then calculates the concentration of sulfur dioxide in the sample cell using the Beer-Lambert Law extended by using a system of linear equations. The resultant photomultiplier signals are amplified and the logarithm of the reciprocal of the transmittance gives an output that is directly proportional to the sulfur dioxide concentration which is sent to the DAS.



### **Section 5.a.12 Oxides of Nitrogen Instrumental Analyzer Description**

Oxides of nitrogen concentrations will be determined according to EPA Method 7E. This methodology utilizes an analyzer based on the principles of chemiluminescent absorption analytical techniques. The oxides of nitrogen concentrations will be determined using an Air Pollution Corporation (API) Model 200AH or 200E analyzer which utilizes full scale ranges from 5 to 5,000 ppm. The unit output signal is linearly proportional to the nitric oxide concentration. The signal is directed to a front panel meter and to the DAS.

The unit only measures nitric oxide and therefore nitrogen dioxide must first be converted to nitric oxide for the determination of total oxides of nitrogen (nitric oxide + nitrogen dioxide). The API Model 200AH or 200E houses a self-contained nitrogen dioxide to nitric oxide converter for the dissociation of nitrogen dioxide to nitric oxide via a heated stainless steel converter chamber.

### **Section 5.a.13 Carbon Monoxide Instrumental Analyzers**

Carbon monoxide concentrations and emission rates will be determined according to EPA Method 10. The carbon monoxide concentrations will be determined using an API Model 300 analyzer. This instrument utilizes the techniques of non-dispersive infrared (NDIR) for measurement of carbon monoxide. The system responds specifically to carbon monoxide and the detector signal is sent to the data acquisition system (DAS).

### **Section 5.a.14 Sulfuric Acid Mist (SO<sub>2</sub> and SO<sub>3</sub>) Sampling and Analysis**

Testing for sulfuric acid mist and sulfur dioxide will be performed using an EPA Method 8 sampling system. In principle, sulfuric acid mist which includes sulfur trioxide will be separated from sulfur dioxide. Gaseous pollutants will be withdrawn isokinetically from the stack exhaust and collected in a multicomponent sampling train. The principle components of the train will be sequentially:

- A stainless steel sample nozzle;
- A heated (248°F±25°F) probe liner and filter bypass; and



- An impinger train consisting of five sequential impingers. The first two impingers will contain 100 ml of an absorbing solution consisting of 80% isopropanol (100 ml plus additional 100 ml to minimize evaporation of IPA) followed by a glass fiber filter on a glass frit filter support and two impingers containing a 3% hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) absorbing solution. The final impinger was filled with 200 grams of indicating silica gel.

Following the run, a fifteen-minute purge with clean dry ambient air will be conducted at the average sampling rate observed during the sampling run. The first and second impingers, containing 80% isopropanol, are used to absorb the sulfuric acid mist including sulfur trioxide ( $\text{SO}_3$ ). After passing through the glass fiber filter, the sample gas is then bubbled through the 3%  $\text{H}_2\text{O}_2$  absorbing solution of the third and fourth impingers to capture the sulfur dioxide ( $\text{SO}_2$ ). The silica gel impinger will be used to collect any remaining moisture in the sample stream before entering into the dry gas meter.

The samples will be measured to the nearest milliliter for moisture determination and recovered by transferring the impinger solutions to polyethylene sample bottles. The probe, first and second impingers, the connecting glassware before the filter, and front half of filter holder are to be rinsed with 80% isopropanol. The rinse solution plus the filter will be added to the first impinger solution and diluted to 250 ml with 80% isopropanol- labeled the “sulfuric acid mist” fraction sample bottle. The third and fourth impingers plus connecting glassware will be rinsed with distilled, deionized water. The rinse will be added to the impinger solution and diluted to 1000 ml with deionized water- labeled the “sulfur dioxide fraction” sample bottle. The sample containers were sealed and marked. The sulfur dioxide fraction and the sulfuric acid mist fraction will be measured by ion chromatography. Blanks of the absorbing solution and rinsing reagents will be submitted and analyzed. Solution blanks which yield a positive concentration will be subtracted from the actual sample concentrations. The samples and appropriate blanks will be transported to Enthalpy Analytical, Inc. in Durham, North Carolina with proper chain-of-custody documentation, where they were analyzed.



### **Section 5.a.15 Hydrogen Chloride Sampling and Analysis**

Testing for hydrogen chloride will be performed according to EPA Method 26A. Gaseous and particulate pollutants will be withdrawn isokinetically from the emission source and collected in a multi-component sampling train. Particulate matter that is condensed at or above the filtration temperature of approximately 250 degrees Fahrenheit will be collected on a tared quartz filter. The gaseous components will be bubbled through a measured volume of 0.1N sulfuric acid and 0.1N sodium hydroxide to determine the moisture, HCl content of the emission source. The principal components of the sampling system are sequentially:

- A borosilicate glass sample nozzle and probe liner;
- A heated (248°F ±25°F) probe and filter assembly with a tared quartz filter and Teflon filter support;
- An impinger train consisting of five sequential impingers. Impingers one and two containing 100 ml each of an absorbing solution consisting of dilute sulfuric acid (0.1N H<sub>2</sub>SO<sub>4</sub>). Impingers three and four contained 100 ml of dilute sodium hydroxide (0.1N NaOH) followed by a final impinger containing 200 grams of silica gel; and
- A metering system capable of maintaining an isokinetic sampling rate and accurately determining the sample volume according to those specifications in APTD-0581.

Sample cleanup will begin immediately after each test run. If particulate matter will be quantified by either Method 5 or 29, the filter and rinsate from the nozzle, probe liner, and front filter-half of the filter assembly will not be analyzed and disposed of properly. If CEC decides to quantify particulate matter concentrations and emission rates during the sampling for HCl, CEC will perform the necessary cleanup according to procedures described in Section 8.a.7 for EPA Method 5.

HCl will be collected in the 0.1N sulfuric acid solution in impingers one and two. The liquid in these impingers will be measured to the nearest milliliter (or weighed to the nearest 0.1 g) and recorded in order to determine the moisture content. The collected sample will be placed in a high-density polyethylene (HDPE) storage container along with the deionized water rinse of



impingers one and two and connecting glassware. The container will be sealed and the liquid level will be marked.

The 0.1N sodium hydroxide solution in impingers three and four will be used as a scrubber to protect the sampling console. The liquid in these two impingers as well as impinger five will be measured to further determine the moisture content and later discarded. The moisture collected by the silica gel in the fifth impinger will be determined to the nearest 0.1 gram. Collected condensate measurements will be recorded on the “moisture determination and sample recovery data analysis” form. The acid halide samples will be shipped to Enthalpy Analytical, Inc., of Durham, North Carolina with chain-of-custody documentation where the samples will be analyzed by ion chromatography. The particulate samples (if collected) with the chain-of-custody will be shipped to Enthalpy Analytical Laboratories of Durham, North Carolina for filterable particulate matter analysis.

#### **Section 5.a.16 Particulate Matter and Multiple Metal Sampling and Analysis**

Testing for total filterable particulate matter and metals (antimony (Sb), arsenic (As), beryllium (Be), cadmium (Cd), chromium (Cr), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), and selenium (Se)) will be performed according to USEPA Method 29. Gaseous and particulate pollutants will be withdrawn isokinetically from the emission source and collected in a multi-component sampling train. In principle, particulate matter includes any material that is condensed at or above the filtration temperature of approximately 250 degrees Fahrenheit and will be collected on a tared quartz fiber filter. The gaseous components will be bubbled through a measured volume of 5% nitric acid / 10% hydrogen peroxide to determine the moisture and multiple metal content of the emission source. The acidified potassium permanganate portion of the sampling train will collect mercury. The principal components of the sampling system are sequentially:

- A borosilicate sample nozzle and probe liner;
- A heated (248°F ±25°F) probe and filter assembly with tared quartz fiber filter;
- An impinger train consisting of six sequential impingers. The first two impingers containing 100 ml each of 5% nitric acid/10% hydrogen peroxide followed by an empty



impinger, two impingers containing acidified potassium permanganate, the sixth impinger containing 200 grams of silica gel; and

- A metering system capable of maintaining an isokinetic sampling rate and accurately determining the sample volume according to those specifications in APTD-0581.

After the test run is finished and the post leak checks will be completed, the filter which collected the sample will be carefully removed from the Teflon filter support and sealed in a Petri-dish. The nozzle, probe liner, and front filter-half of the filter assembly will be rinsed with acetone into a glass storage container (Fraction No. 2) which will be sealed and the liquid level will be marked. Following the acetone rinse for particulate matter, the nozzle, probe liner, and front filter-half of the filter assembly will be rinsed with 0.1N nitric acid into a 250 milliliter high density polyethylene (HDPE) storage container (Fraction No. 3). The liquid in the first three impingers (if knock-out impinger is used) will be measured to the nearest milliliter. The collected sample will be stored in a one liter glass storage container (Fraction No. 4) along with the 0.1N nitric acid rinse of the first three impingers and connecting glassware. This back metals fraction container will be sealed and the liquid level marked. The liquid in the empty impinger or third impinger will be measured to the nearest milliliter and transferred to container 5A. This impinger and connecting u-tube will be rinsed with 0.1 nitric acid and added to container number 5A. The liquid in the two  $\text{KMnO}_4$  impingers will be measured to the nearest milliliter. The collected mercury (Hg) sample will be stored in a one liter glass storage container (Fraction No. 5B) along with the  $\text{KMnO}_4$  acid and water rinses of the Hg impingers and connecting glassware. An additional rinse of the Hg impinger and connecting glassware will be performed with concentrated HCL (8 Normal) to remove any brown spots on the glassware. This rinse will be added to 200 milliliters of water in container 5C. The moisture collected by the silica gel in the sixth or seventh impinger will be determined to the nearest 0.1 gram. The collected condensate measurements will be recorded on the Method 4/29 moisture determination data analysis form. These samples along with the filters and the chain-of – custody will be shipped to Element One Laboratories in Wilmington, North Carolina for filterable particulate matter, and metal analysis. Samples method blanks and spiked samples will be analyzed by inductively coupled plasma-mass spectrometer (ICP-MS).



### **Section 5.a.17 Speciated Volatile Organic HAP Sampling and Analysis**

Method 18 will be used to determine volatile organic compounds that have a boiling point between -15°C and 121°C in gaseous emissions. Concentrations will be expressed in parts per million (ppm) or parts per billion (ppb) units for the compound of interest. This method is not applicable for particulates or aerosols since isokinetic sampling will not be performed. Sample collection will be recorded and locked under chain of custody procedures.

The following compounds of interest for the Method 18 sample trains will be acetaldehyde, acrolein, benzene, ethyl benzene, chloroform, 1,3-butadiene, vinyl chloride, xylene (o and m/p), styrene and toluene. For this project, CEC will perform three one hour sample runs for the hazardous pollutants (HAPS) utilizing two separate sampling configurations- EPA Method 18 Tedlar bag collection and Method 18 adsorbent tube train collection.

A passive canister with Tedlar bag inside collection system drawing in stack gas will be used to quantify acetaldehyde, acrolein, 1,3-butadiene and vinyl chloride organic compounds. The minimum detection limit will be approximately 1.0 ppm. The Tedlar bag extraction system will include the following components:

- A stainless sampling probe with chilled DI H<sub>2</sub>O charged impinger to knock out moisture;
- Teflon tubing to a 25.0 liter capacity Tedlar bag inside a passive lung canister;
- A constant rate pump capable of flowing 0.35 liters per minute or 21 liters per sample run for 60 minutes;
- A calibrated dry gas meter and sampling pump with inert flexible tubing capable of maintaining a constant calibrated flow rate.

A leak check of each bag and canister will be performed prior to the test program. After a pre-leak check of the probe, midjet impinger and connecting tubing (excluding the canister holding the bag) at less than 1 mm (15 inches or higher vacuum on the sampling system) of Hg for 2 minutes liters per minute leak rate, the inlet of the probe will be placed at the centroid of the stack or at least one meter from the stack wall. A one hour sample will be performed at 350 cc per minute with



documented sample train parameters every 5 minutes to maintain sample flow rate into the Tedlar bag sample. The collected sample will consist of two fractions a condensate and a Tedlar Bag. The DI H<sub>2</sub>O charge impinger will be collected into a 40 milliliter vial along with rinses of the impinger and connective tubing. The condensate and Tedlar bag will be transported to Enthalpy Analytical Laboratories in Durham, North Carolina for analysis by gas chromatography/flame ionization detection (GC/FID).

A Method 18 adsorbent tube sampling train collection system will be used to quantify benzene, toluene, ethyl benzene, o-xylene, m/p-xylene, chloroform and styrene organic compounds. The minimum detection limit will be approximately 250 ppb for benzene, toluene, ethyl benzene, o-xylene. Minimum detection limit for m/p-xylene, chloroform and styrene will be approximately 1.00 ug/mL. Collocated sampling trains will be used for this test program. One train will be spike and the other will be unspiked. The dual adsorbent tube sampling system (independent unspiked system and spiked system) will include the following components:

- A stainless sampling probe with chilled DI H<sub>2</sub>O charged impinger to knock out moisture;
- Teflon tubing to a XAD-2 tube followed by a Charcoal tube;
- A constant rate pump capable of flowing 400 cc per minute for 60 minutes;
- A calibrated dry gas meter and sampling pump with inert flexible tubing capable of maintaining a constant calibrated flow rate with a minimum resolution of 0.01 liters.

After a pre-leak check at less than 0.02 liters per minute for 1 minute for sample train, the inlet of the probe will be placed near the centroid of the stack or at least one meter from the stack wall. A one hour sample will be performed at 400 cc (0.40 LPM) per minute with documented sample train parameters every 5 minutes to maintain sample flow rate through the adsorbent tubes of the sample train. No post-test leak check will be performed to prevent problems with sample loss and breakthrough contamination per Method 18 Section 8.2.4. The unspiked tubes, spiked tubes and condensates for each sample run will be transported to Enthalpy Analytical Laboratories in Durham, North Carolina for analysis by gas chromatography/flame ionization detection (GC/FID).



### **Section 5.a.18 Determination of Formaldehyde and Propionaldehyde Compounds**

Testing for formaldehyde and propionaldehyde will be performed according to US EPA Method 0011. A sample of the gas stream will be withdrawn isokinetically from the emission source and collected in a multi-component sampling train. The sample gas will be bubbled through a measured volume of acidic 2,4-Dinitrophenol Hydrazine (DNPH) reagent which reacts readily with formaldehyde to form a derivative. The principal components of the train will be sequentially:

- A borosilicate glass sample nozzle and probe liner;
- A heated ( $248^{\circ}\text{F} \pm 25^{\circ}\text{F}$ ) probe and filter bypass;
- An impinger train consisting of four sequential impingers. The first two impingers containing 100 ml each of acidic DNPH followed by an empty impinger and a final impinger containing 200 grams of silica gel; and
- A metering system capable of maintaining an isokinetic sampling rate and accurately determining the sample volume according to specifications in APTD-0581.

After the test run, the sample collected in the nozzle, probe liner and connecting glassware will be rinsed into a pre-cleaned 1000 ml amber glass bottle using a Teflon brush and dichloromethane. The dichloromethane rinses will be followed by rinses with organic free deionized water. The liquid in the first three impingers will be measured to the nearest milliliter and recorded on the Method 4 moisture determination and sample recovery data analysis form. The moisture collected by the silica gel in the fourth impinger will be determined to the nearest 0.1 gram. Impinger rinses as well as impinger liquids will be added to the sample storage container which will be sealed and the liquid level marked.

Samples will be kept on ice during collection and transportation. The sample containers will be prepared for transport prior to leaving the sampling site. The sample containers will be transported via courier to Enthalpy Analytical, Inc., Durham, North Carolina. Samples, reagent blanks and spikes will be analyzed according to the criteria in Method 0011A "Analysis for Aldehydes and Ketones by High Performance Liquid Chromatography". Minimum detection limits for Formaldehyde and Propionaldehyde will be approximately 100 ppb.



### **Section 5.a.19 Sampling of ID No. 3 PP Storage and Extrusion**

The PP Storage and Extrusion system is enclosed in a room without an emission point. The Poly Plant room that encloses this process has no natural draft openings. The Poly Plant room is under positive pressure and air concentrations are diffused from the room when the doors open and close. CEC proposes to sample the room for HAPs using ambient sampling methods. A PID Mini RAE 2000 calibrated on isobutylene will be used to determine a sampling location. Prior to the sampling run, CEC will walk along the inside parameter of the room to determine if a high VOC concentration level can be determine within the Poly Room. If no noticeable VOC loading difference is detected, the area of sampling will be ten feet back of the shipping load-out door which will be used to generate a flow from the room. If a high VOC loading is detected upon the parameter check of the room the sampling location will be moved to that parameter location. The sampling location will be setup as close as possible to the area identified as the high VOC area. The sampling will not be place in high traffic areas or were areas of work is being performed. The parameter VOC will be check before each sampling run and the sampling location may be subject to change before each run.

The policy for the Poly Room is that all doors are to be closed except when going in and out of the room. To generate a worst case flow rate, one of the two shipping load-out doors will be raised by 3 inches to allow flow from the room to the outside. (Note the room is under positive pressure.) The door will be left ajar for the sampling event and the flow from the Poly Plant room will be measured during the sampling event. Flow measurements will be taken with a vane anemometer every fifteen minutes along the bottom of the door at four locations.

CEC will use Method TO15 for acrolein, benzene, ethyl benzene, chloroform, 1,3-butadiene, vinyl chloride, xylene, styrene and toluene. CEC proposes to use Method TO11A for acetaldehyde, formaldehyde and Propionaldehyde. For HCl, CEC proposes to use National Institute for Occupational Safety and health (NIOSH) Method 7903. Three one hour sampling runs for each method will be performed downstream of the door. CEC will perform one spike collocated sample for Method TO11A and one collocated sample for TO11A.



### **Section 5b Total Tests Conducted**

One test series will be conducted for each process emission stack. CEC is requesting to test one of three smelt furnaces for all of the HAPs for the furnaces since they are identical. CEC is also proposing to sample the two stacks for 11A & B differently than listed. Stack 11A is for the combustion emissions from the nine (9) natural gas fired refining kettles rated at 8.55 million BTU/hr each. Stack No. 11B is the process emissions from the closed loop baghouse system. CEC is proposing to sample 11A just for NO<sub>x</sub> and CO only. CEC is proposing to sample 11B for PM, metals including lead & mercury, SO<sub>2</sub>, NO<sub>x</sub>, CO and VEs.

### **Section 5c Total Runs Per Test**

A minimum of three runs per test will be performed for each ID emission source. Additional tests may be done to insure that data is available, uninterrupted by production or instrument problems.

### **Section 5d Duration of Test Runs**

See Table 1.

### **Section 5e Minimum Sample Volumes**

The minimum sampling volume for the isokinetic methods will be 30 dry standard cubic feet for each run for particulate matter. The minimum sampling volume for the metal methods will be 70 dry standard cubic feet for each run.

### **Section 5f Simultaneous Sampling**

The outlet locations of each process will be tested during this project. Some methods (example CEMs and isokinetic methods) will be sampled during the same time intervals in order to calculate flow rates and moisture with gaseous compounds analysis.



**Section 5g Sample Recovery Location**

The wet chemistry post sample run cleanups will be performed onsite inside a sample recovery trailer.

**Section 5h Blank Recovery Application**

Sample blanks will be performed according to EPA Method 5, 18, 26A, 29, and 0011 procedures (see the previous sampling and analysis section for each method description).

**Section 5i Sample Hold Time**

Sample hold times are method specific but the samples after recovery will be analyzed within 14 days of receipt from the referenced two contract laboratories. Tedlar bag samples will be analyzed within 48 hours after stack emission collection.



## **Section 6.0 SAMPLING LOCATIONS AND DOCUMENTATION**

### **Section 6a Sampling Sites Schematics**

Sample ports are installed to meet Method 1 testing requirements. Method 1 information will be verified on setup day prior to testing for compliance demonstrations.

### **Section 6b Fugitive Emission Points**

There are no other emission points or fugitive emissions, associated with these sources.

### **Section 6c Cyclonic Flow Check**

Verification of the absence of cyclonic or non-parallel stack gas flow will be performed prior to starting the test program for each source according to Reference Method 1, Section 11.4 and Quality Assurance Handbook, Volume III, Field Procedure 1a, *Flow Verification*.



## **Section 7.0 QUALITY ASSURANCE**

Pretest and posttest calibrations will be conducted in accordance with United States Environmental Protection Agency (US EPA) specifications. CEC follows the calibration procedures outlined in EPA Reference Methods found in the Code of Federal Regulations (Volume 40, Part 60) and those recommended in the Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, September 30, 1994. When the Reference Methods do not detail procedures, CEC uses methods such as those prescribed by the American Society for Testing and Materials (ASTM).

### **Section 7a Reference Method QA/QC Procedures**

The following is a citation of the Quality Assurance Quality Control Procedures specified in Reference Methods 1, 2, 3, 4, 5, 7E (for 3A, 6C & 10), 26A, 29, 18, 0011 and the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, September 30, 1994. (QA Handbook, Volume III)

#### **Section 7.a.1**

Data sheets will be checked for completeness, legibility, accuracy, specifications, and reasonableness as suggested and defined in Part I 1.0 introduction and 2.0 Quality Assurance Plan of QA Handbook, Volume III.

#### **Section 7.a.2**

CEC's quality assurance procedures for Reference Method 2 include calibrations according to Calibration Procedure *2-Type S Pitot tube Inspection*, Calibration Procedure *2d-Barometer*, and Quality Control procedure *5-Metering System/Orifice Check*, of Reference Method 5. In addition, Reference Method 2 equipment is calibrated in accordance with Section 10.0 Calibration.

### **Section 7b Chain-of-Custody Procedures**

CEC has developed chain-of-custody procedures based on Section 1.3.2 and 2.8.4 of QA Handbook Volume III procedures, including the attached form. In addition, CEC sampling



personnel are trained on Chain-of-Custody procedures using US EPA APT II Course 443-Chain-of-Custody Guidebook.

### **Section 7c Leak Check Procedures**

CEC performs leak checks on vacuum lines, pitot tubes, tanks and other applicable equipment as normal pretest operations. The Method 4 sampling trains will be leak checked before and after the test runs according to Section 8.4 of Reference Method 5 and QA, Handbook Volume III, Field Procedure *5a-Leak Check of Isokinetic Sampling Train*. Pitot tubes are leak-checked according to Reference Method 2, Section 8.1 and QA Handbook, Volume III, Field Procedure *2a-Leak Check of Pitot tube System*. Leak check results will be recorded on applicable field data sheets.

### **Section 7d Equipment Calibration**

Calibrations are conducted in accordance with United States Environmental Protection Agency (US EPA) specifications. CEC follows the calibration procedures outlined in EPA Reference Methods found in the Code of Federal Regulations (Volume 40, Part 60) and those recommended in the Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III (EPA/600/R-94/038c). When the Reference Methods do not detail procedures, CEC, Inc. uses methods such as those prescribed by the American Society for Testing and Materials (ASTM).

#### **Section 7.d.1 Pitot Tubes**

CEC's Type S Pitot tubes are constructed and calibrated in accordance with the procedures contained in EPA Reference Method 2. A Type S pitot tube will have a coefficient of  $0.84 \pm 0.02$ . A standard pitot tube will have a coefficient of 0.99. The pitot tubes will be visually inspected prior to field use.

#### **Section 7.d.2 Dry Gas Meter and Orifice**

Metering systems receive a full calibration at the time of purchase and annually, thereafter. Post-test calibrations (comparison with a wet test meter or using ALT-009 procedures) are performed after the source test. If the calibration factor,  $\gamma$  (gamma), deviates by less than five percent from the



initial value, the test data are acceptable. If  $\gamma$  deviates by more than five percent, the meter is recalibrated and the meter coefficient (initial or recalibrated) that yields the lowest sample volume for the test runs is used. Standard practice at CEC is to recalibrate the dry gas meter anytime  $\gamma$  is found to be outside the range of  $0.97 \leq \gamma \leq 1.03$ .

### **Section 7.d.3 Barometer**

Field barometers are calibrated to agree within  $\pm 0.1$  inches Hg of a reference mercury barometer. The barometric pressure is corrected for pressure and temperature. Prior to and following the field test the field barometer is verified. The field test barometer will be calibrated prior to and after the test program.

### **Section 7.d.4 Thermometers**

New thermometers, pyrometers and thermocouples purchased or fabricated by CEC are calibrated in accordance with US EPA Protocol. Calibration tolerance limits are as follow:

Impinger Temperature Gauge	$\pm 1^{\circ}\text{C}$ or $2^{\circ}\text{F}$
Dry Gas Meter Temperature Gauge	$\pm 3^{\circ}\text{C}$ or $5.4^{\circ}\text{F}$
Stack Thermocouples	$\pm 1.5\%$ of absolute temperature

Thermometers and thermocouples are inspected and calibrated prior to and following the field test. Regardless of usage, thermometers and thermocouples are inspected and recalibrated on a yearly basis.

### **Section 7.d.5 Laboratory Equipment**

CEC has a written quality assurance document that covers calibration and maintenance of laboratory equipment. This includes calibration of the analytical balance against Class S weights. Calibration of thermometers, barometers, and wet test meters are traceable to NIST. A copy of our quality assurance document may be obtained by written request.



**Section 7e Analytical Detection Limit**

See Sections 5.a.15 and 5.a.16 for analytical detection limits for Organic HAPs. Instrumental methods will have sensitivity values of < 2% of calibration span for O<sub>2</sub>, CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub> and CO. Particulate matter detection limits will be 0.1 mg, HCl will be 0.2 ug/ml, and multi-metals detection limits are listed in Table 29-1 of Method 29 and referenced in Section 13.3.

**Section 7f Subcontract Laboratory Information**

See Section 1d on page 1 and 2 of this document.

**Section 7g Audit Samples**

Not Applicable



## **Section 8.0 FINAL TEST REPORT OUTLINE**

### **Section 8.a.1 Introduction**

This section describes the purpose, a brief outline including the sampling and analytical strategy, and the personnel involved in the test program.

### **Section 8.a.2 Process Description**

This section contains a brief description of the process, the type and amount of materials handled, and a typical process air flow schematic.

### **Section 8.a.3 Sampling Methods**

This section describes the sampling strategy, sampling and analytical methods, and quality assurance/quality control procedures implemented during the project.

### **Section 8.a.4 Results**

This section presents the mean pollutant sampling results. Tabular results will also be provided to present data from individual sampling runs collected during the project.

### **Section 8.a.5 Appendices**

This section will contain detailed supportive documentation that encompasses relevant aspects of the emission test program. Its contents will serve as the foundation for the test report. The emission test report presents a summary of the information gathered during the sampling activities. The information to be contained in the appendices is necessary to facilitate the review of the emission test report and determine whether proper procedures were used to accomplish the test plan objectives.

Defensible data and the subsequent pollutant concentrations and emission rates is one of the primary objectives of emission test program. To this end, results, example calculations, field data



sheets, sample recovery, laboratory results, Chain-of-Custody documentation, and equipment calibrations will be provided to support these objectives.

**Section 8b Example Calculations**

Example calculation to be used for reporting test results will be found in Appendix A, *Summary of Results and Example Calculations* of the sampling report.

**Section 8c Proposed Report Submission Date**

CEC's normal report submission date is twenty five business days after completion of field testing. CEC will submit its final report to Johnson Controls no later than 30 business days after completion of field activities. As such with the Holiday Season, CEC requests pre-approval from SC DHEC for a 45 day submission period instead of 30 days.