

DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION  
Field Observation Report: Stack Testing



Facility: Packaging Corporation of America - Filer City Mill		SRN / ID: B3692
Location: FILER CITY	County: MANISTEE	District: Cadillac

Permit(s):	MI-ROP-B3692-2009		
Save			
Contact (s):	Todd Wessel - Tester	Staff (s):	Jeremy Howe
	Sara Kaltunas - PCA		
		Date (s):	4-1-14

<b>ACTIVITY:</b>	
<input type="checkbox"/> Pre-Test Site Visit/Monitoring	<input type="checkbox"/> Source Test Observation
<input type="checkbox"/> Visible Emissions Observation	<input type="checkbox"/> Sample(s) Collected
<input type="checkbox"/> Photos Taken	<input type="checkbox"/> Other

This was an emissions test of EUBOILER4A at Packaging Corporation of America (PCA) in Filer City, Manistee County on April 1, 2014 for the following parameters:

Carbon Monoxide (CO)

The following individuals were involved with the test:

DEQ

Jeremy Howe – Cadillac

Stack Testers – BTEC

Todd Wessel – Trailer

Paul Draper – Stack

Facility

Sara Kaltunas – PCA Environmental Engineer

**Observations:**

**I arrived onsite at 1000**

I was going to arrive earlier, but Sara wrote me because the testers weren't going to be ready until 10 or 11 am. When I arrived, Sara told me that they still weren't ready. We went out to check on them and I learned that Todd did not come up the night before because he was on vacation and the trailer was not setup for testing prior to it leaving the shop so he had to do the setup onsite.

They weren't going to be ready for quite some time, so Sara and I went to her office building to discuss another upcoming test that she had questions on. I filled her in on any questions she had and then went to lunch and came back.

When I returned, Todd had the plumbing for the instruments set up and was starting to calibrate them. I noticed and confirmed with Todd that a gas diluter was onsite and they were using it. The protocol did not state BTEC would use a diluter nor that they would be using Method 205. Be that as it may, this is not an unusual method needing research and Todd said he was going to follow it so we proceeded. Gas diluters are much harder to follow (for the regulator) than just using several gas cylinders. BTEC's diluter has no readout on the front panel or gauges. Instead, it is controlled with a GUI on a computer with about size 6 font. Todd did talk with me on what he was doing and encouraged me to follow along, but again there are a lot of moving parts instead of just looking at tank values.

The crux of Method 205 is that the tester introduces an undiluted mid-range cylinder gas to the system and sees if it passes similar to the diluted levels. Todd was going to do this later in the evening (since it was such a late start), so I did not get to see it.

When Todd was deciding what the calibration span was going to be he asked Sara for the results of the last test. She told him that they were non-detect, so Todd calibrated the CO analyzer on a 0-90 ppm range. However, when Todd started sampling the instrument was reading slightly above the calibrated range (somewhere in the low 90s ppm), so Todd recalibrated up to 190 ppm. While going through the calibration a second time Todd went back and looked up the last time he

tested the boiler and found something more than non-detect (although I don't remember the number specifically). Sara questioned if Todd was set up correctly and he reassured her that he was. I believe now that Sara was merely delivering the thoughts of the powerhouse supervisor Jerry. Indeed, after the second calibration the instrument was reading over 100 ppm.

#### Run 1 started at 1336

The CO concentrations varied a lot for all three runs. The highest 1 minute average I observed was around 130 ppm during the first half of Run 1. It ended up around 30 ppm by the end of the run. Run 2 CO stayed down around 15 ppm. Finally, CO was back up to around 65 ppm for the start of Run 3. The load on the boiler was bumped up from 114 kpph steam to 125 kpph steam between Run 1 + 2, but evidently this did not smooth out emissions. Since the CO was varying, Todd decided use a diluent for the stratification test (I think it was CO<sub>2</sub>, but could have been O<sub>2</sub>). The diluent varied by more than 5%, but less than 10% so BTEC had to sample from 3 points. To be sure, it was varying not because the gas stream was stratified, but because the combustion was changing too much.

A boiler with a consistent fuel (such as natural gas) should not be varying in emissions as much as EUBOILER4A was during testing. If a solid fuel was being fired or fumes from some sort process waste, then I could see the varied emissions since the fuel would've been varied. However, natural gas is very consistent so the only plausible explanation was the boiler. Whether it was not operating properly or needed to be cleaned or some sort of other problem; I have no idea. It did not occur to me to look at the NO<sub>x</sub>/O<sub>2</sub> CEM data while onsite. I will probably request the CEM data once I get the report and see if they varied greatly too.

Readings @ 1404		
CO	68.8	ppm
O <sub>2</sub>	4.0	%
CO <sub>2</sub>	9.5	%

I read the meter box and calculated a flow of 25,112 dscfm for Run 1. While the average ppm for Run 1 was 75 ppm, I decided to use the maximum 1 minute average of 130 ppm for the worst case scenario. I don't usually do this, but felt I had to because of the wildly varying concentrations. I calculated the CO pph worst case scenario to be:

$$130 \text{ ppm} \times 28 \text{ CO mol wt} \times 25,112 \text{ dscfm} \times 60 \text{ min/hr} \times 2.6\text{e-}9 \text{ conv} = 14.2 \text{ pph} \quad \text{LIMIT} = 22.7 \text{ pph}$$

EUBOILER4A was about 2/3 of the limit at a worst case scenario, so even with erratic emissions it looked like it would not have any trouble passing. Using the run average (75.8 ppm) the result was 8.3 pph CO.

In between runs Sara and I had a follow-up conversation from an earlier one we had about what load the boiler should be running at for testing. In the letter I stated maximum achievable for testing, but told her onsite that this language is because companies will often choose to operate their equipment at less than design value (usually for economic reasons). If we state maximum normal, then I've seen too many tests in which maintenance or other "normal" activities are conducted during testing and the equipment does not operate at its potential. To avoid all this and the problem of oversized equipment I always insist on maximum achievable in the approval letter and go with something less onsite if appropriate.

While we discussed this earlier, I was under the impression the maximum normal that the boiler runs in 99% of all cases was 114 kpph steam. Sara corrected me at this time and said that was actually the average load for all of 2013. I told her that we didn't want to do that and I explained to her the boiler needed to run as described above. She called the powerhouse supervisor Jerry who came and talked to us. He insisted that I provide a load to run at, but I did not give him one. Instead I tried to help him through the decision by explaining what was appropriate, but also letting him know that the higher he runs for the test the more room he gets to operate with. He eventually came up with a load of 125 kpph steam which took about 20 minutes to ramp up to. After the boiler was at the new load Todd restarted Run 2 and began testing again.

#### Run 2 started at 1537

I had Sara take me up to the ports during Run 2. The ports were at the top of the powerhouse building just below the ceiling. They were at 90 degrees to each other and adequately plugged. After that we went down to the control room and I observed the steam flow to be 125 kpph and I believe the natural gas flow rate was 141.4 kscfh. Sara and I then went back down to the testing trailer.

CO concentrations were in the teens ppm from what I saw during Run 2 and the run average was 16. Todd calculated a flow of around 30,000 dscfm. Thus, the results for Run 2 were 2.1 pph CO.

Todd did his checks in between runs for bias and drift. When he put the probe back to measure stack gas he thought there was a leak and cal gas was being sampled because the CO was about 60-70 ppm and the diluents were at zero. Todd was just about ready to tear his stuff apart and check connections when the diluents went back to what they were during sampling (4%O<sub>2</sub>, 9%CO<sub>2</sub>), but the CO stayed 60-70 ppm. We waited for a couple of minutes, but no changes in the concentrations were observed.

**Run 3 started at 1705**

Readings @ 1712		
CO	65.8	ppm
O <sub>2</sub>	4.07	%
CO <sub>2</sub>	9.62	%

I stayed for roughly the first 15 minutes of Run 3, but observed no meaningful changes in the concentrations. As such, if the concentrations stayed the same and the flow was the same as Run 2, then the result for Run 3 would be about 8.5 pph CO.

I felt it was safe to leave at this time. Using the results of all three runs the average would be 6.3 pph CO. I did not feel it was necessary to have an extra run at the new load because it would require a result of 57.8 pph CO to fail the permitted limit (roughly 520 ppm).

**I left the site @ 1730**

Staff:

CC:

Date:

