To: Ogulei, David[Ogulei.David@epa.gov]
Cc: andreag@cooperenvironmental.com[andreag@cooperenvironmental.com]; 'John Cooper'[jacooper@cooperenvironmental.com]
From: Krag Petterson
Sent: Wed 7/17/2013 10:31:34 PM
Pall Comments on the Secondary Lead Smelter MACT Rule.pdf
Method 301 Report.pdf
Yanca-2006.pdf
EP-D-07-026 Final Report and Appendix A.pdf
Xact 625 ETV Report.pdf
xcem.pdf
Feasibility of using the Xact Multi-metals CEMS as a Mercury Monitor on Coal Fired Power Plants.pdf

Mr. Ogulei,

Andrea asked me to provide you with some responses to the questions you sent to her in your email dated June 21, 2013. My responses to each question are given in red. In addition I have attached several files in response to these questions as well.

I am particularly interested in receiving an update on the following areas:

1. Commercial availability of the Xact multi-metals CEMS.

The Xact CEMS is available commercially from Cooper Environmental Services, LLC. (CES) Pall Corporation discontinued its license in early February of this year and since that time CES has been marketing and manufacturing both the Xact 625 and Xact 640 and 645 (CEMS models).

Xact 640 (Multi-Metals CEMS) – All CEMS sales have been in the United States.

Eli Lilly – 1 unit

US Army – 3 units

CES – This demonstration unit has been used for testing sponsored by various organizations including U.S. EPA, Electric Power Research Institute (EPRI) and Eli Lilly.

Xact 620/625

Korea – 6 units purchased by National Institute of Environmental Research

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Xact 620/625

Korea – 6 units purchased by National Institute of Environmental Research

China – 9 units purchased by various Environmental Monitoring Centers

Canada – 8 units Ontario Ministry of Environment, Environment Canada, Quebec Ministry of Environment, University of Toronto, University of Dalhousie, and a smelting facility

New Zealand – 1 unit – secondary lead smelter

Austraila 1 unit – Queensland EPA

United States 3 units – U. Mass., Missouri DEQ, U.S. EPA

We have known competition for the ambient market in China from FPI and Skyray (both Chinese companies). We have also heard that FPI produces a multi-metals CEMS but cannot confirm this.

We have no known competition outside of China.

2. Applicability/feasibility/reliability of the Xact multi-metals CEMS for measuring emissions from heterogeneous waste streams.

The Xact and the filter chemistry utilized by the Xact have demonstrated the ability to make measurements in wide variety of stack conditions. Testing with the Xact and its filter chemistry has occurred on stacks burning many different fuel types including coal (sub-bit, lignite and bituminous), natural gas, and diesel fuel and testing has occurred at facilities with different pollution controls like ESP's, baghouses, and wet scrubbers. The Xact has been tested on facilities with stack temperatures ranging from 100 to 450 degrees Fahrenheit and ranging in moisture content up to at least 20%. In addition the Xact has demonstrated accuracy in the presence of a wide range chemical species likely to be present in stack effluent.

One of the strengths of the Xact is that the sample collection is separated from the X-ray analysis. This means that the more sensitive components of the analysis system are never exposed to stack effluent. In addition because the Xact collects a sample for a defined length of time (for example

15 minutes) this means that the filter trapping chemistry is refreshed with every sample eliminating the problems with the chemistry becoming spent over time. Also the Xact employs sample dilution prior to the filter trapping allowing many of the stack gas components and the dew point to be diluted to their optimal ranges. Finally, we would recommend dynamic spiking procedures in performing RATA's, similar to those used by Eli Lilly in their alternative

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monitoring petition. Dynamic spiking allows the Xact to be challenged by a known concentration of metals in the presence of potentially interfering components from the stack gas.

I've attached two files with details on the range of stack conditions over which the Xact has been tested.

1) Method 301 Report.pdf – please see section 7

2) Pall Comments on the Secondary Lead Smelter MACT Rule.pdf – these give additional details on places the Xact has been tested.

3. Case studies documenting application and/or deployment of the Xact multi-metals CEMS.

Please see the files above. In addition I would add the following documents listed below.

1) Yanca-2006 - Paper published in the Journal of the Air and Waste Management Association documenting the Method 301 validation of the Xact.

2) EP-D-07-026 Final report and Appendix A.pdf – paper documenting the Xact's performance during an EPA sponsored Small Business Innovative Research grant. The RATA procedures used at Eli Lilly were performed on a coal fired source.

3) Xact 625 ETV Report.pdf – this was study was done on an ambient unit but demonstrates the accuracy of the technology

4) Xcem.pdf – an Army Corps of Engineers study of the Xact's performance on Army's hazardous waste incinerators.

5) Feasibility of using the Xact Multi-metals CEMS as a Mercury Monitor on Coal Fired Power Plants.pdf – presentation given at the EUEC conference in 2011 and documents our comparison with Method 30B for mercury.

4. List of locations/facilities where the Xact multi-metals CEMS is currently deployed and operating for any reason.

I've listed the facilities were the Xact CEMS was deployed

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1. Eli Lilly's Tippecanoe Laboratories, Lafayette IN – Deployed and operated for 6 years. The facility is under new ownership and the Xact is no longer operated.

2. U.S. Army – Tooele UT munitions test furnace – It operated periodically at this facility as the U.S. Army tested procedures for burning different types of munitions.

3. U.S. Army – Tooele, UT production furnace. The Xact was installed at this facility but was never operated because regulations were never required for it.

4. U.S. Army – Crane, IN production furnace. The Xact was installed at this facility but was never operated because regulations were never required for it.

5. How beryllium emissions are typically handled given that the Xact multi-metals CEMS cannot quantify beryllium.

Eli Lilly was only client that utilized the Xact CEMS for compliance purposes it handled the beryllium issue as follows (quoted from Lilly's AMP)

"Because the XACT is incapable of measuring beryllium (Be), Lilly has developed a default value for beryllium emissions. Fortunately, beryllium is a scarce element that is not used in Lilly pharmaceutical manufacturing processes. Lilly has examined all its manufacturing processes and associated process construction materials (e.g. alloy steels) and found no indication that beryllium should be present. Therefore, Lilly believes that a conservatively calculated default value for beryllium is technically defensible.

Trace levels of beryllium are possible in raw materials and ground water. Lilly has sampled its liquid waste and found only sporadic "hits" of beryllium at levels close to the detection limits. Lilly has also done some limited sampling of plant trash, some of which might be processed in the solid-liquid incinerator, and some low-levels of beryllium were reported. For the purposes of calculating a conservative default emission concentration, Lilly has assumed that all liquid and solid wastes fed to the solid-liquid incinerator contain Be at the maximum levels detected: 1.0 ppm in the solid waste and 0.01ppm in the liquid wastes. The default emission concentration was then calculated using the maximum waste feed rates from the CPT plan, and an LVM system removal efficiency (SRE) of 98% (which is a factor of two less than the design SRE of 99% and a factor of 20 less than the SRE of 99.9% obtained during the CPT of another Lilly incinerator with a virtually identical scrubber system). The resulting value was just over 1 ug/dscm. To be more conservative, Lilly has chosen 2 ug/dscm as a default value. Therefore, a value of 2 ug/dscm will be added to the measured LVM emission before comparison to the emission standard limit. If the CPT data or any other evidence indicates the default value is not appropriate, it will be adjusted accordingly."

6. Estimated timeline for deployment of the Xact multi-metals CEMS at an existing facility, i.e., from order date to operation. What are the potential challenges?

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We believe that a 9 month time line is sufficient and includes manufacturing, shipping installation and RATA testing.

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