TOXECON™ RETROFIT FOR MERCURY AND MULTI-POLLUTANT CONTROL ON THREE 90-MW COAL-FIRED BOILERS

Quarterly Technical Progress Report

Reporting Period: July 1, 2008–September 30, 2008

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ABSTRACT

With the Nation's coal-burning utilities facing tighter controls on mercury pollutants, the U.S. Department of Energy is supporting projects that could offer power plant operators better ways to reduce these emissions at much lower costs. Sorbent injection technology represents one of the simplest and most mature approaches to controlling mercury emissions from coal-fired boilers. It involves injecting a solid material such as powdered activated carbon into the flue gas. The gas-phase mercury in the flue gas contacts the sorbent and attaches to its surface. The sorbent with the mercury attached is then collected by a particulate control device along with the other solid material, primarily fly ash.

We Energies has over 3,200 MW of coal-fired generating capacity and supports an integrated multi-emission control strategy for SO_2, NO_x, and mercury emissions while maintaining a varied fuel mix for electric supply. The primary goal of this project is to reduce mercury emissions from three 90-MW units that burn Powder River Basin coal at the We Energies Presque Isle Power Plant. Additional goals are to reduce nitrogen oxide (NO_x), sulfur dioxide (SO_2), and particulate matter (PM) emissions, allow for reuse and sale of fly ash, demonstrate a reliable mercury continuous emission monitor (CEM) suitable for use in the power plant environment, and demonstrate a process to recover mercury captured in the sorbent. To achieve these goals, We Energies (the Participant) will design, install, and operate a TOXECON™ system designed to clean the combined flue gases of Units 7, 8, and 9 at the Presque Isle Power Plant.

TOXECON™ is a patented process in which a fabric filter system (baghouse) installed downstream of an existing particulate control device is used in conjunction with sorbent injection for removal of pollutants from combustion flue gas. For this project, the flue gas emissions will be controlled from the three units using a single baghouse. Mercury will be controlled by injection of activated carbon or other novel sorbents, while NO_x and SO_2 will be controlled by injection of sodium-based or other novel sorbents. Addition of the TOXECON™ baghouse will provide enhanced particulate control. Sorbents will be injected downstream of the existing particulate control device to allow for continued sale and reuse of captured fly ash from the existing particulate control device, uncontaminated by activated carbon or sodium sorbents.

Methods for sorbent regeneration, i.e., mercury recovery from the sorbent, will be explored and evaluated. For mercury concentration monitoring in the flue gas streams, components available for use will be evaluated and the best available will be integrated into a mercury CEM suitable for use in the power plant environment. This project will provide for the use of a control system to reduce emissions of mercury while minimizing waste from a coal-fired power generation system.

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EXECUTIVE SUMMARY

Wisconsin Electric Power Company (We Energies) signed a Cooperative Agreement with the U.S. Department of Energy (DOE) in March 2004 to fully demonstrate TOXECON™ for mercury control at the We Energies Presque Isle Power Plant. The primary goal of this project is to reduce mercury emissions from three 90-MW units (Units 7, 8, and 9) that burn Powder River Basin (PRB) coal. Additional goals are to reduce nitrogen oxide (NO_x), sulfur dioxide (SO_2), and particulate matter (PM) emissions, allow for reuse and sale of fly ash, demonstrate a reliable mercury continuous emission monitor (CEM) suitable for use in the power plant environment, and demonstrate a process to recover mercury captured in the sorbent.

We Energies teamed with ADA-ES, Inc., (ADA-ES) and Cummins & Barnard, Inc., (C&B) to execute this project. ADA-ES is providing engineering and management on the mercury measurement and control systems. Cummins & Barnard is the engineer of record and was responsible for construction, management, and startup of the TOXECON™ equipment.

This project was selected for negotiating an award in January 2003. Preliminary activities covered under the "Pre-Award" provision in the Cooperative Agreement began in March 2003. This Quarterly Technical Progress Report summarizes progress made on the project from July 1, 2008, through September 30, 2008. During this reporting period, work was conducted on the following tasks:

- Task 15. Operate, Test, Data Analysis, and Optimize TOXECON™ for Mercury Control
- Task 16. Operate, Test, Data Analysis, and Optimize TOXECON™ for SO_2/NO_x Control
- Task 17. Carbon-Ash Management System
- Task 18. Revise Design Specifications/O&M Manuals
- Task 19. Reporting, Management, Subcontracts, Technology Transfer

INTRODUCTION

DOE awarded Cooperative Agreement Number DE-FC26-04NT41766 to We Energies to demonstrate TOXECON™ for mercury and multi-pollutant control, a reliable mercury continuous emission monitor (CEM), and a process to recover mercury captured in the sorbent. Under this agreement, We Energies is working in partnership with the DOE.

Quarterly Technical Progress Reports will provide project progress, results from technology demonstrations, and technology transfer information.

Project Objectives

The specific objectives of this project are to demonstrate the operation of the TOXECON™ multi-pollutant control system and accessories, and

- Achieve 90% mercury removal from flue gas through activated carbon injection
- Evaluate the potential for 70% SO_2 control and trim control of NO_x from flue gas through sodium-based or other novel sorbent injection
- Reduce PM emission through collection by the TOXECON™ baghouse
- Recover 90% of the mercury captured in the sorbent
- Utilize 100% of fly ash collected in the existing electrostatic precipitator
- Demonstrate a reliable, accurate mercury CEM suitable for use in the power plant environment
- Successfully integrate and optimize TOXECON™ system operation for mercury and multi-pollutant control

Scope of Project

The "TOXECON™ Retrofit for Mercury and Multi-Pollutant Control on Three 90-MW Coal-Fired Boilers" project will be completed in two Budget Periods. These two Budget Periods are:

Budget Period 1: Project Definition, Design and Engineering, Prototype Testing, Major Equipment Procurement, and Foundation Installation. Budget Period 1 initiated the project with project definition activities including NEPA, followed by design, which included specification and procurement of long lead-time major equipment, and installation of foundations. In addition, testing of prototype mercury CEMs was conducted. Activities under Budget Period 1 were completed during 1Q05.

Budget Period 2: CEM Demonstration, TOXECON™ Erection, TOXECON™ Operation, and Carbon Ash Management Demonstration. In Budget Period 2, the TOXECON™ system was constructed and will be operated. Operation will include optimization for mercury control, parametric testing for SO_2 and NO_x control, and long-term testing for mercury control. The mercury CEM and sorbent regeneration processes will be demonstrated in conjunction with the TOXECON™ system operation.

The project continues to move through Budget Period 2 as of the current reporting period. Each task is described in the Statement of Project Objectives (SOPO) that is part of the Cooperative Agreement.

EXPERIMENTAL

None to report.

RESULTS AND DISCUSSION

Following are descriptions of the work performed on project tasks during this reporting period.

Task 1 – Design Review Meeting

Work associated with this task was previously completed.

Task 2 – Project Management Plan

Work associated with this task was previously completed.

Task 3 – Provide NEPA Documentation, Environmental Approvals Documentation, and Regulatory Approval Documentation

Work associated with this task was previously completed.

Task 4 – Balance-of-Plant (BOP) Engineering

Work associated with this task was completed during 1Q05 in Budget Period 1.

Task 5 – Process Equipment Design and Major Equipment Procurement

Work associated with this task was completed during 1Q05 in Budget Period 1.

Task 6 – Prepare Construction Plan

Work associated with this task was completed during 1Q05 in Budget Period 1. The Construction Plan was issued on January 26, 2005.

Task 7 – Procure Mercury Continuous Emission Monitor (CEM) Package and Perform Engineering and Performance Assessment

The overall goal of this task was to have a compliance-grade, reliable, certified mercury CEM installed and operational for use in the TOXECON™ evaluation. Installation and

checkout of two CEMs at the inlet and at the outlet of the baghouse was completed in 1Q06. The long-term evaluation of the mercury CEMs is described in Task 15 for the remainder of the project.

Task 8 – Mobilize Contractors

Primary work associated with this task was completed in 1Q06.

Task 9 – Foundation Erection

All major foundation work was completed during 1Q05.

Task 10 – Erect Structural Steel, Baghouse, and Ductwork

Primary work associated with this task was completed in 4Q05.

Task 11 – Balance-of-Plant Mechanical and Civil/Structural Installations

Primary work associated with this task was completed in 4Q05.

Task 12 – Balance-of-Plant Electrical Installations

Primary work associated with this task was completed in 4Q05.

Task 13 – Equipment Pre-Operational Testing

Pre-operational testing was completed in 4Q05.

Task 14 – Startup and Operator Training

Startup of all major equipment was completed in 4Q05. Final O&M manuals were received for most major equipment in 2005. Startup of the PAC system occurred in 1Q06.

The operator-training program was completed during 4Q05 to train the plant operations personnel.

The baghouse was initially brought into operation on December 17, 2005, with flue gas from Unit 7. Initial operation with Unit 8 occurred on January 5, 2006, and Unit 9 on January 27, 2006.

Task 15 – Operate, Test, Data Analysis, and Optimize TOXECON™ for Mercury Control

CEM Update

During 3Q08, the mercury Continuous Emissions Monitors (CEMs) located at the inlet and outlet of the baghouse were monitored for long-term operation. A summary of the operation of each system including any maintenance is presented below:

Inlet

The mercury system availability for July was 100% when the period between July 22 and July 29 is excluded as the system was being used by sorbent screening device. There were no failed calibrations from July 1-22 and July 29-31 and no maintenance activities unrelated to service performed for the sorbent screening device.

Availability for August was 92.1%. The system failed the calibration check three times with all failures coming immediately after switching from one probe to another probe. The system was also not properly sampling mercury between August 17 and August 20 due to a failure of the actuator valve. The daily calibration checks would pass but the probe was not functioning properly in sample mode. Including this into the performance of the system during the month would decrease the availability to 80.6%. Unit 9 was offline on August 23 and August 24 to reduce the number of operating hours to 696 for the month.

The system availability for September was 78.3%. Maintenance was performed on September 11 and did not pass calibration until September 13. There were also failed calibrations on September 22 and 23 due to errors with the mercury calibrator. The system was also not properly sampling mercury from September 23 through the end of the month due to an error with the actuator valve. Including this into the performance of the system during the month would decrease the availability to 61.7%.

Maintenance:

- July:
  - Sorbent Screening tests performed from July 22 to 28. CEM data was only available during the nighttime hours.
  - Switched sampling from probe #3 (Unit 7) to probe #1 (Unit 8) on July 28th. Sampled only total mercury from July 28 to 31.
- August:
  - Mercury lamp replaced on August 1.
  - Switched sampling from probe #1 (Unit 8) to probe #2 (Unit 9) on August 1. Sampled only total mercury until Aug. 12.
  - On August 4th a linearity check was performed on the system and passed.
  - Switched sampling from probe #2 (Unit 9) to probe #1 (Unit 8) on August 12.
  - On August 17th the actuator valve on probe #1 (Unit 8) was stuck in the closed position after the morning calibration check. The probe was unable to sample mercury during this period.
  - Switched sampling from probe #1 (Unit 8) to probe #2 (Unit 9) on August 20. Measured only total mercury while sampling from probe #2 (Unit 9).

- Unit 9 was offline from August 23 to 25.

- September:
  - Switched sampling from probe #2 (Unit 9) to probe #1 (Unit 8) on September 11. Switching to probe #1 enabled the ability to sample both elemental and total mercury.
  - On September 11, the actuator valve on probe #1 (Unit 8) was temporarily repaired. The valve was manually freed from its stuck position but it still has the tendency to get stuck.
  - On September 11, four fittings inside probe #3 (Unit 7) were found to be loose. These fittings were tightened.
  - On September 19, the calibrator's mercury core temperature was reading -99C which did not allow proper calibrations to occur.
  - On September 23, the mercury concentrations went to zero. The actuator valve on probe #1 (Unit 8) was stuck again.

Outlet

The availability of the system in July was 99.2%. The recalibration of the system on June 30 did not result in the proper dilution factor and caused a failed calibration check on July 1. Another complete recalibration of the system was performed and the system performed very well for the rest of July.

There were no failed calibrations for August and the availability for the month was 100.0%.

The availability for September was 100.0%. There were no failed calibrations during the month even though the eductor pressure failed on August 31 and was not repaired until on-site maintenance activities on September 11. Including the time when the eductor was not functioning, the availability of the instrument was 62.2%.

Maintenance:

- July:
  - None
- August:
  - On August 31, the eductor pressure gauge failed which caused some unstable readings
- September:
  - Mercury lamp replaced on September 2.
  - Eductor transducer and electronic regulator replaced.
  - The system integrity check passed with the converter core temperature set at 800C on Friday, September 12.
  - On September 16 the system integrity check produced no oxidized mercury due to the chlorine in nitrogen cylinder being out of gas.

Ash Silo

During 3Q08, significant progress was made correcting the problems with excessive dusting during unloading of the ash silo using the wet unloader, primarily during startup of the pin

mixer. United Conveyer Corporation (UCC) and We Energies continued to work on modifications to the mixer and optimizing its operation to reduce dusting.

The excessive dusting is due to the short material retention time in the mixer that occurs until the material bed height is established. In July, UCC was on site to view the ash being unloaded using the wet mixer. UCC checked the rotary valve speed, the ramp up speed, and re-arranged the atomizing shower nozzles in the mixer. There was still dusting for 15-20 seconds on startup.

During August, a high pressure water curtain was added at the discharge end of the mixer to operate for 20 seconds at startup. With this change in place dust-free operation was achieved. The operation of the high pressure water curtain needs to be automated and upgraded for permanent operation.

There continue to be problems with overloading the motor, breaking the chain tensioner and jamming the mixer shafts. Although repairs have been made, the mixer shafts are bent and the mixer needs a complete rebuild. UCC worked on plans for rebuilding the mixer shafts and drive mechanism and is investigating how to upgrade this equipment to increase reliability.

The plant plans to build a partial enclosure around the base of the ash silo to eliminate the wind tunnel effect and prevent airborne dusting. This work is scheduled for 4Q08.

Duct Repair Work

In 2Q08, plant workers noticed severe corrosion on some sections of the return duct insulation and lagging. After an inspection, corrosion was also found on the supply duct insulation and lagging. Plant personnel began removing the lagging from both supply and return ducts. Workers were unable to identify any leaks in the duct. The ducts were inspected from the inside on May 20th during the scheduled baghouse outage. No leaks were identified during the internal inspection. After the baghouse was returned to service additional removal of lagging and insulation uncovered a weld that was not completed. This was the likely source of flue gas corrosion of the exterior.

During 3Q08, additional corroded insulation and lagging was removed from the ducts. Repairs were made to the structural steel duct where the flue gas was leaking, then new insulation and lagging were installed.

Additional duct access platforms were also installed this quarter. These platforms are designed to allow safer access for future inspection and repair work. The addition of insulation around the duct expansion joints was started this quarter. The insulation should reduce internal corrosion which was noticed at the expansion joints during the duct inspection in 2Q08. This work should be complete in October.

Baghouse Operations

In July, 5 test bags from GE were installed in Compartment 8A near the existing test bags. These will be monitored for performance along with the PPS and other test bags.

DARCO® Hg-LH, a brominated carbon, has been used since the beginning of the year. Figure 1 shows TOXECON™ data for July 2008. Mercury removal was over 90% for the majority of the month using 1.5 lb/MMacf PAC. The baghouse cleaning frequency was steady at 0.18 p/b/hr. The tube sheet pressure drop was around 2.0 inches of water with two units at full load.

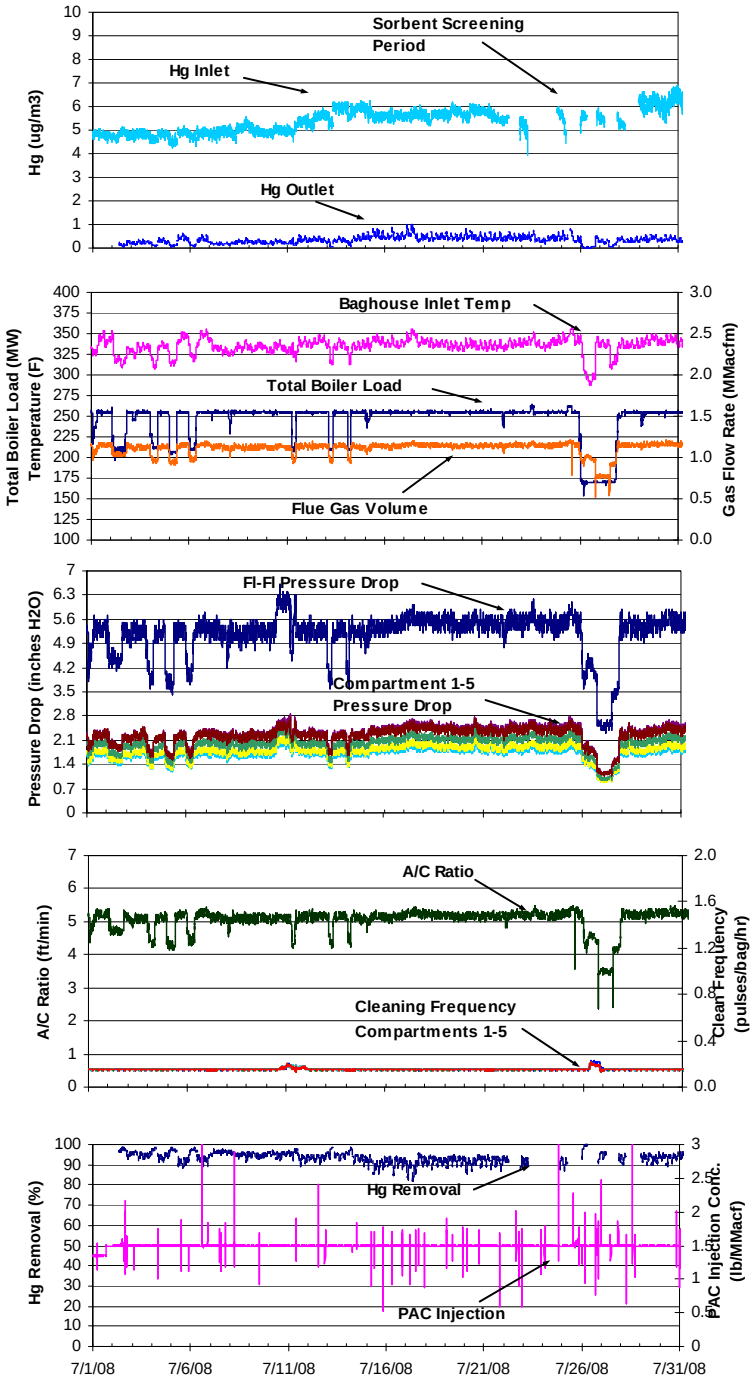

Figure 1. TOXECON™ Performance Data for July 2008.

Figure 2 shows TOXECON™ data for August 2008. Mercury removal was over 90% at a PAC injection rate of 1.5 lb/MMacf. The baghouse cleaning frequency was steady at 0.18 p/b/hr. The tube sheet pressure drop was around 2.0 inches of water when all units were at full load.

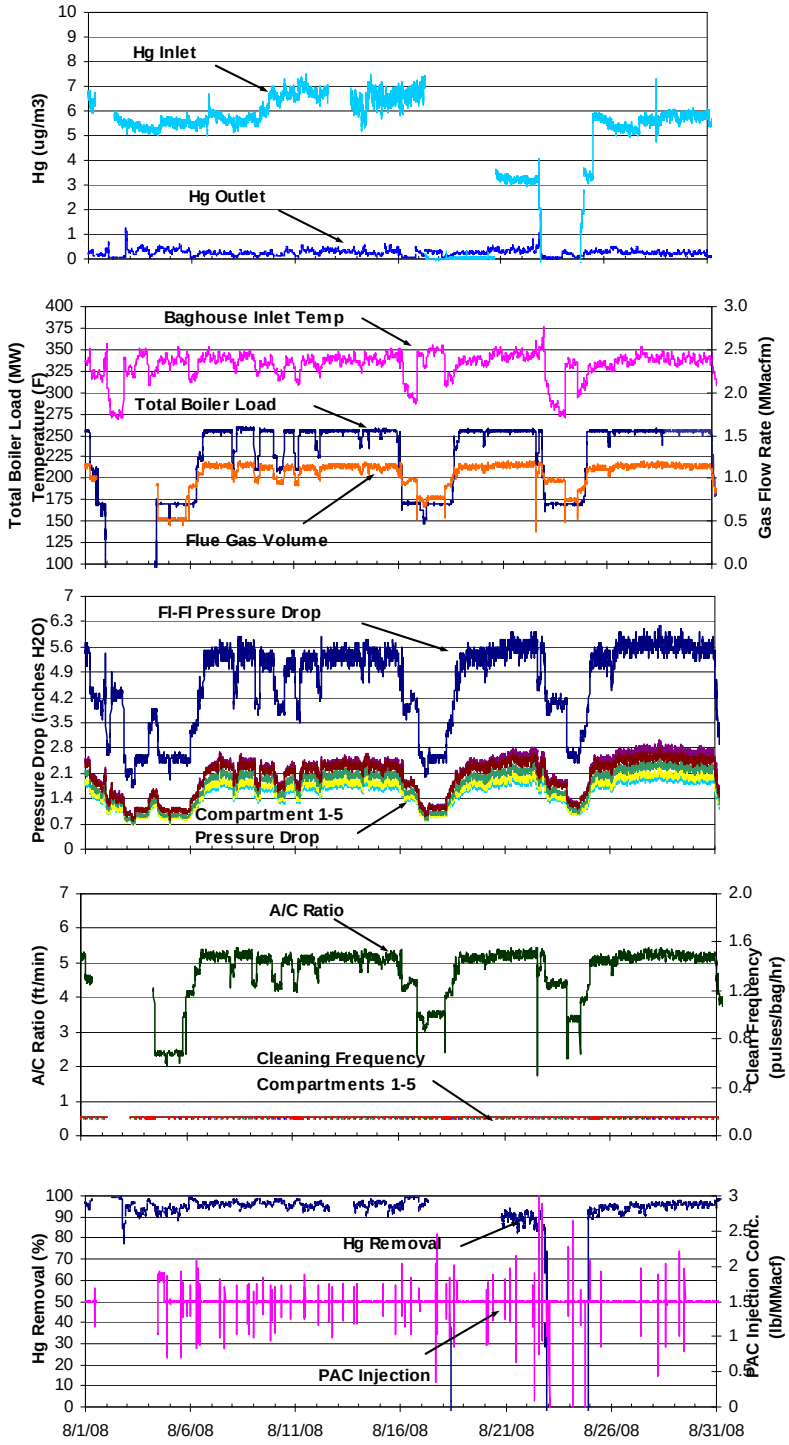

Figure 2. TOXECON™ Performance Data for August 2008.

Figure 3 shows TOXECON™ data for September 2008. Mercury removal was over 90% for most of the month with a PAC injection rate of 1.2-1.5 lb/MMacf. The baghouse cleaning frequency was steady at 0.18 p/b/hr. The tube sheet pressure drop was around 2.0 inches of water when all units were at full load.

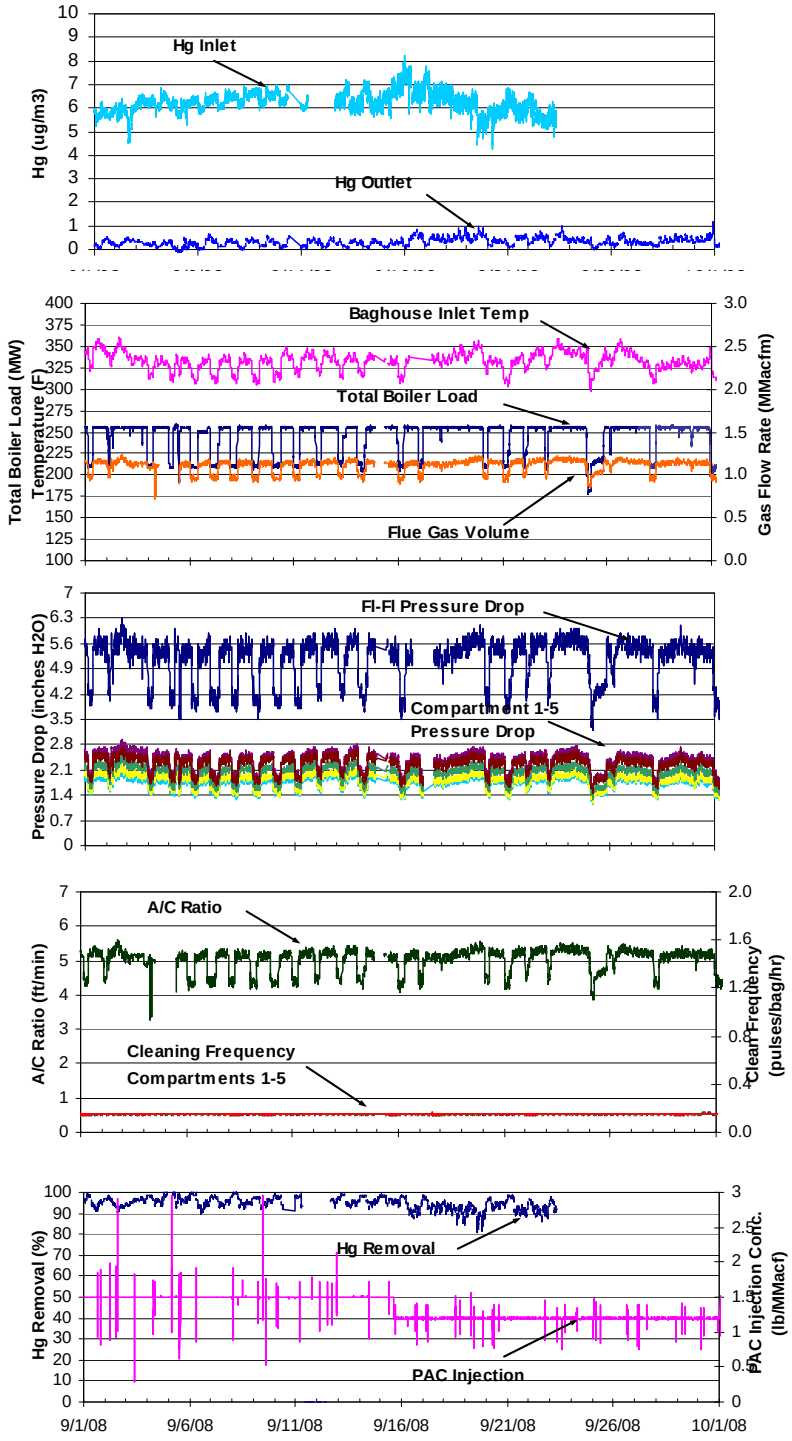

Figure 3. TOXECON™ Performance Data for September 2008.

Alternative Carbon Testing

In August, Norit delivered a truckload of experimental brominated PAC. Figure 4 shows the results from this test. The experimental PAC performed comparable to the DARCO Hg LH, showing an average of 96% removal at 1.5 lb/MMacf when corrected to 330°F.

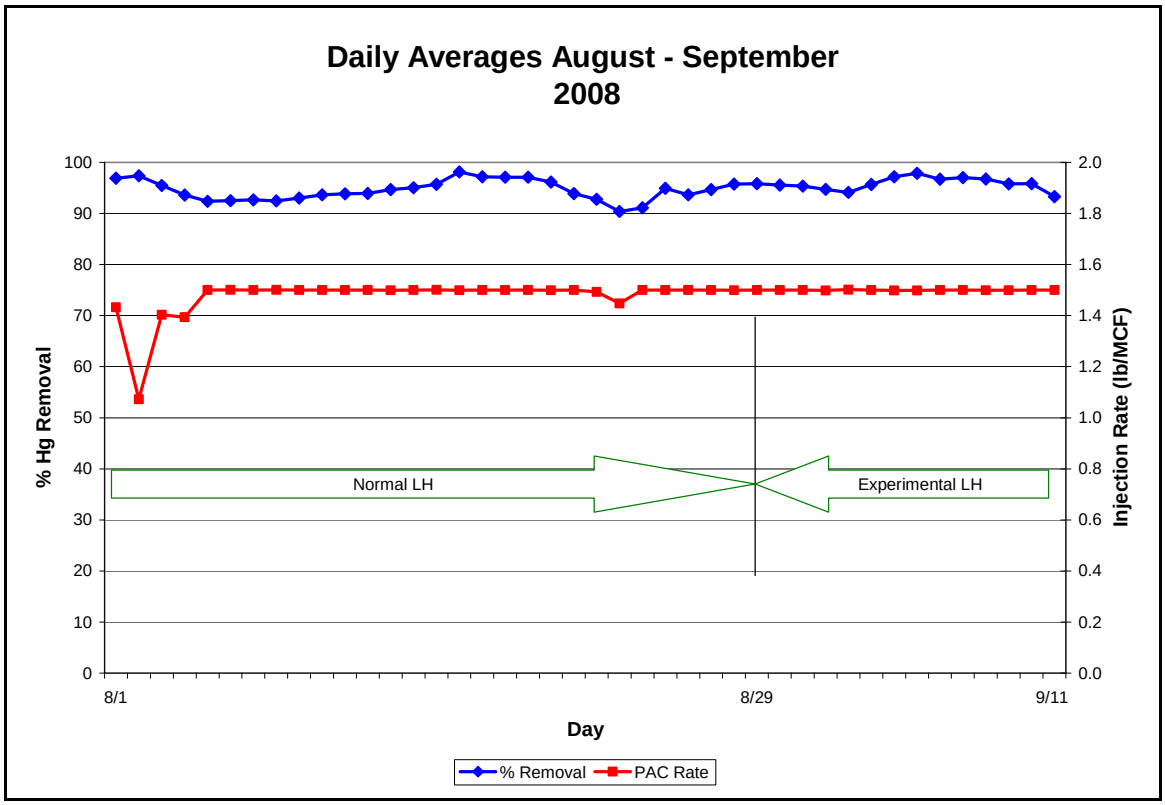

Figure 4. Comparison of Norit Experimental PAC and DARCO® Hg LH.

Task 16 – Operate, Test, Data Analysis, and Optimize TOXECON™ for NO_x and SO_2 Control

This test effort was designed to support the overall objectives of the TOXECON™ retrofit at Presque Isle as well as to further the technical understanding of the TOXECON™ technology for both We Energies and the greater industry. Parametric tests were performed in August, 2007 to assess the capability of trona (sodium sesquicarbonate) injection upstream of the TOXECON™ baghouse to control SO_2 and NO_x. Injection equipment and measurement instrumentation were installed specifically for these tests. The following were the objectives of the testing program:

- Quantify the trona injection rate versus SO_2/NO_x removal.
- Record baghouse performance over the test period, showing how pressure drop, cleaning frequency and mercury removal change.
- Determine if there is any negative effect of trona injection on emissions (NO_2).

- Evaluate the technical and economic performance of trona.

Data and results from the testing in August were presented in the 3Q07 quarterly report. A draft topical report including technical results and economic assessment was submitted in late 1Q08. The final topical report was sent out for review and was submitted in August.

Task 17 – Carbon/Ash Management System

During 4Q07 a review on current technologies concerning mercury removal from high carbon ash was completed. Several thermal treatment technologies were identified as having potential for a pilot scale test in 2008. During 1Q08 two thermal technologies were identified as having the potential to treat the TOXECON™ baghouse ash. One process uses microwave energy while the other uses natural gas as the heating source. Several 55-gallon drums of baghouse ash were shipped out to be tested using both technologies.

Results of the work performed by United Environment & Energy (UEE), Michigan Technological University, and ADA-ES are described.

UEE Update

PAC-Ash characterization results

UEE received three 55-gallon drums of PAC-Ash from We Energies. The fly ash sample was characterized in terms of composition, density, and surface area. SEM analysis of the particle size of the fly ash is under way. The BET surface area of PAC-Ash was measured at UEE using the Quantachrome BET Surface Area System. The surface area of PAC-Ash was 123 m^2/g and the density was 0.60 g/ml.

Mercury Chemical Absorbent Development

A new mercury chemical absorbent was developed at UEE to chemically capture mercury from the gas phase during fertilizer production. The absorbent is cylindrical pellets of 1 mm in diameter and 3-5 mm in length which were made from the mixture of Durite liquid resin, hardwood flour, and sulfur powder. The mixture was extruded into pellets using UEE high throughput extruder. The pellets were carbonized at 900 ^{o}C for 3 hours in nitrogen gas and activated in carbon dioxide for 2 hours. After cooling to room temperature, the pellets were treated using an aqueous solution containing $Fe(SO_4)_3$, $SnCl_2$, and KI.

This chemical absorbent exhibited excellent mercury capture performance. However, the economic analysis on the production cost of this absorbent showed that it is too expensive for any commercial applications. To commercialize the “fly ash to fertilizer” technology, an inexpensive mercury chemical absorbent should be obtained. After extensive literature search, a commercially available inexpensive mercury chemical absorbent was identified. The absorbent was produced by Calgon Carbon Corporation (Figure 5). It is a sulfur containing activated carbon in granular shape as shown in the picture. According to the data sheet from Calgon, this mercury chemical absorbent meets the need for our application. Further business discussion with Calgon is ongoing for a large quantity purchase of this absorbent.

Figure 5. Calgon Granular Carbon.

Continuous Production Rotary Reactor System

To produce fly ash fertilizer in a continuous mode, a rotary tube reactor system has been purchased and installed at UEE's facility (Figure 6). The system is comprised of four main components: a sample hopper, rotary tube reactor, nitrogen gas control system, and mercury chemical absorbent. The fly ash powder is fed into the rotary reactor tube from the hopper. The maximum feeding rate of the rotary feeder is 3 kg/hour. The rotation and the slope of the reactor tube cause the powder to gradually move downhill to the other end of the reactor tube. The residence time of the powder is controlled by the rotational speed and the degree of slope of the tube. The nitrogen gas is introduced into the reactor tube from the outlet side of the reactor tube, gets cooled, exits from the powder inlet side of the tube, and flows into the mercury chemical absorbent column.

Figure 6. UEE Rotary Reactor.

Trial-runs will be conducted in the first three weeks of October to put it into operation. The production of 50 lbs of fly ash fertilizer will start after that and is expected to complete in the mid of November. The economic analysis, plant design, and final report will be completed by early December.

Michigan Technological University Update

The purpose of this study is to conduct a small scale demonstration that would process a small quantity of PAC/ash, one batch at a time. The process would use microwave radiation to drive off the mercury. The mercury would be captured in a separate process. The PAC/ash mixture after the mercury was removed would then be available to test its mercury

absorbent ability. The demonstration testing was successfully completed during 3Q08. The final report is being written and should be available during 4Q08.

ADA-ES Update

An alternative use for the PAC/ash mixture from the TOXECON™ baghouse was identified in 4Q07. High carbon fly ash has been used successfully as an additive to create electrically conductive concrete. This could potentially create a demand for the untreated PAC/ash mixture from the TOXECON™ baghouse. During 1Q08 a patent search identified We Energies as holding two patents regarding this technology. In July, ADA-ES met with We Energies and UWM to discuss conductive concrete work that both We Energies and UWM have performed, and the anticipated tests at ADA-ES. There was no plan to implement or test this application full-scale during 2008, so the concrete development effort expanded to include structural concrete for non-electrical applications.

Electrical tests were performed on select batches of high carbon concrete to determine their electrical characteristics. Batches of concrete were created with and without carbon fibers. Carbon fibers have been shown to increase conductivity. These were compared with low-carbon concrete. Figure 7 shows the effect of the water to cement ratio in the initial concrete formulation even after 56 days of curing. A duplicate of the cylinder showing the lowest AC resistance was then heated at 150°F for 48 hours to remove any residual water. The final resistance of this cylinder went from 2600 Ohms to 5,000,000 Ohms, indicating that water is essential for conductivity even with carbon fibers in the mixture.

In order to create structural concrete suitable for exterior applications, the concrete must be able to withstand multiple freeze-thaw cycles. This freeze-thaw durability is obtained by the introduction of numerous small air bubbles in the concrete. The carbon content of fly ash has a negative effect on most air entrainment chemicals, resulting in increased cost for additional chemical and unreliable batching operations. During this quarter, a foam air entrainment system was identified that has good resistance to natural LOI carbon, and may be suitable for PAC-containing ash.

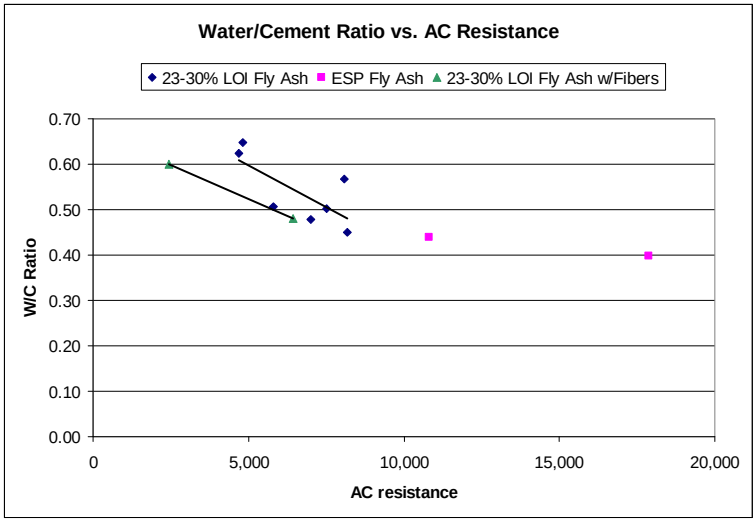

Figure 7. Water to Cement Ratio and Electrical Resistance.

During 3Q08 ADA-ES prepared concrete formulations varying the amount of fly ash, LOI, and using different air entrainment chemicals. Cylinders from successful batches were tested at an independent laboratory for compressive strength. CTL Thompson, Inc. is a Denver-based laboratory that has worked with ADA-ES in the past and is known for their expertise in analyzing concrete.

Figure 8 shows a comparison of compressive strength results using different air entrainment methods and varying carbon content. Because of the carbon content, significantly higher dosages of chemical air entrainment additives (AEAs) were used. These tests were performed to obtain comparisons on performance and cost using these different methods. Darex II and MicroAir are chemical AEAs that create air in the concrete during mixing. Miracon is a pre-formed foam that is added near the end of the mixing phase. Proportionally, less of the Miracon foam was needed when compared with the chemical AEAs, but it was still affected by the PAC. Modifications to the chemical used to make the foam are underway and will be tested in 4Q08.

Figure 8 shows that concrete made with as much as 30% LOI from PAC exhibits high strength both early and in the later stages. Most of the strength was achieved within 28 days.

Additional tests will be performed in 4Q08 using the modified foam and formulations that target a specific final strength. Cost comparisons of the different formulations will also be prepared.

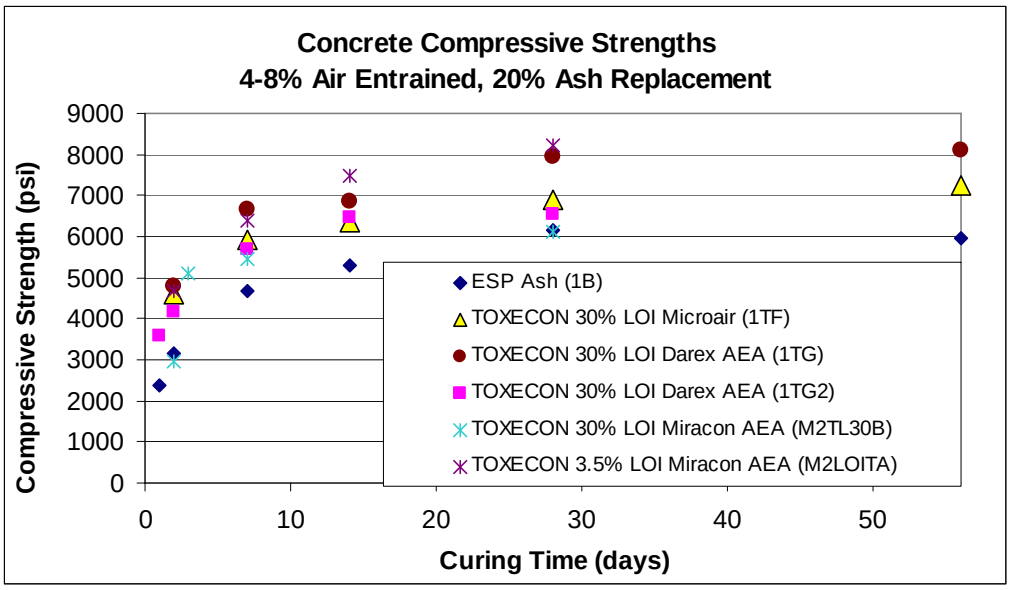

Figure 8. Concrete Compressive Strength Results.

Task 18 – Revise Design Specifications, Prepare O&M Manuals

Work continued this quarter regarding ongoing training of plant personnel on CEM maintenance, operation, and troubleshooting. In May 2008 ADA-ES presented a two-day training overview at the plant for technicians and engineers. The supporting presentation was sent to the plant as a supplement to the on-site training.

Task 19 – Reporting, Management, Subcontracts, Technology Transfer

Reports as required in the Financial Assistance Reporting Requirements Checklist and the Statement of Project Objectives are prepared and submitted under this task. Subcontract management, communications, outreach, and technology transfer functions are also performed under this task.

Activity during this Reporting Quarter:

- Quarterly Technical Progress Report delivered
- Quarterly Financial Status Report delivered
- Quarterly Federal Assistance Program/Project Status Report delivered
- A technical paper and presentation were prepared for the MEGA Symposium
- Presented at the MEGA Symposium in August 2008
- Attended an American Coal Ash Association meeting in September 2008
- Technical papers and presentations for future meetings include:
    - EUEC (January 2009)
    - EPRI Workshop (November 2008)

CONCLUSION

This is the eighteenth Quarterly Technical Progress Report under Cooperative Agreement Number DE-FC26-04NT41766. All major construction efforts were completed during 4Q05, and only punch list items remained during the current quarter. Operational issues that were addressed included modifying the ash silo wet unloading system to prevent dusting, duct insulation and lagging corrosion repair, duct access platform installation, and duct expansion joint insulation.

The baghouse, PAC injection system, and associated functions performed as planned this quarter. Mercury removal averaged 94% for this quarter. A truckload of experimental brominated PAC provided by Norit showed similar removal to their DARCO® Hg LH.

Work continued on the ash management task this quarter. Two groups tested their thermal treatment on ash samples from the baghouse in 3Q08. United Environment & Energy tested TOXECON ash in a continuous rotary reactor system. The eventual goal is to produce fertilizer using the mercury-free, high carbon ash.

ADA-ES continued developing formulations for using PAC-containing fly ash in the preparation of structural and conductive concrete. Test results from several batches showed excellent strength.

Several CEM operational maintenance efforts were performed this quarter. A two-day CEM training session at the plant was performed by ADA-ES.

The project team is actively involved in a number of reporting and technology transfer activities.