

PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY



CONTACTS

Brad Tomer

Director
Office of Major Demonstrations
National Energy Technology
Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880
304-285-4692
brad.tomer@netl.doe.gov

Michael McMillian

Project Manager
National Energy Technology
Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880
304-285-4669
michael.mcmillian@netl.doe.gov

PARTICIPANT

Wisconsin Electric Power Co.
Milwaukee, WI

ADDITIONAL TEAM MEMBERS

ADA-ES (collaborator)
Cummins & Barnard (a/e services,
construction management)



Clean Coal Power Initiative (CCPI)

10/2008

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

Project Description

Wisconsin Electric Power Company will design, install, operate, and evaluate the TOXECON process as an integrated mercury, particulate matter, SO₂, and NO_x emissions control system for application on coal-fired power generation systems. TOXECON is a process in which sorbents, including powdered activated carbon for mercury control

and others for NO_x and SO_x control, are injected into a pulse-jet baghouse installed downstream of the existing particulate control device. The TOXECON configuration allows for separate treatment or disposal of the ash collected in the primary particulate control device. Wisconsin Electric Power Company, also known as We Energies, will be assisted by the following team members: ADA-ES will provide program management support and design and specifications for mercury control and monitoring; Cummins & Barnard will provide architect and engineering services and construction management; Wheelabrator Air Pollution Control, Inc., will provide baghouse design and installation support; and EPRI, the developer of TOXECON, will be a technical advisor to the project.



Presque Isle Power Plant

This demonstration project will be implemented at the Wisconsin Electric Power Company's Presque Isle Power Plant located in Marquette, MI. The Presque Isle plant burns low-sulfur, Powder River Basin sub-bituminous coal, and the TOXECON unit will be installed on the combined flue gas stream of Units 7, 8, and 9, which total 270 MWe. The key objectives of the project are to 1) achieve very high levels of mercury removal, 2) increase the collection efficiency of particulate matter, and 3) determine viability of sorbent injection for SO₂ and NO_x control, while maximizing the use of coal combustion by-products. The project concept is depicted in the figure on the following page.

ADDITIONAL TEAM MEMBERS (cont.)

Wheelabrator Air Pollution Control, Inc. (baghouse design, installation support)

Electric Power Research Institute (technology supplier)

LOCATION

Wisconsin Electric's Presque Isle Power Plant
Marquette, Marquette County, MI

ESTIMATED PROJECT DURATION

60 months

COST

Total Project Value
\$52,978,115

DOE/Non-DOE Share
\$24,859,578 / \$28,118,537

ADDRESS

National Energy Technology Laboratory

1450 Queen Avenue SW
Albany, OR 97321-2198
541-967-5892

2175 University Avenue South
Suite 201
Fairbanks, AK 99709
907-452-2559

3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880
304-285-4764

626 Cochran's Mill Road
P.O. Box 10940
Pittsburgh, PA 15236-0940
412-386-4687

One West Third Street,
Suite 1400
Tulsa, OK 74103-3519
918-699-2000

CUSTOMER SERVICE

1-800-553-7681

WEBSITE

www.netl.doe.gov

Benefits

A primary benefit of this project is its potential for a low-cost option for dramatic, deep cleaning of plant air emissions, especially mercury. The project addresses the need for mercury emission reduction from coal-fired power plants, which stems from the December 2000 U.S. EPA announcement of intent to regulate mercury emissions from the nation's coal-fired power plants. Its successful implementation will help provide an approach for segments of the power generating industry to achieve timely compliance with future mercury regulations.

When completed in 2009, this Wisconsin Electric Power Company technology demonstration project is expected to reduce mercury emissions by 90 percent and result in capture of about 80 pounds per year of mercury that would otherwise have been emitted to the environment from the three units combined. The multi-pollutant control strategy trials could be expected to reduce the already low sulfur dioxide and nitrogen oxide emissions at the plant by an additional 70 percent and 30 percent, respectively, resulting in capture of 1,145 tons per year of sulfur dioxide and 428 tons per year of nitrogen oxides. In addition, the release of particulate matter would be reduced to 0.01 pounds per million BTU.

This technology may prove to be the primary mercury control choice for western coals, and the only choice for units burning any coal-type with hot-side electrostatic precipitators. Thus, TOXECON has application at power plants burning any coals with hot side ESP's (18GW), bituminous coals with cold side ESPs (81GS), and plants burning western sub-bituminous coals with cold side ESP's (68GW). Using TOXECON to control SO₂ and NO_x further enhances its attractiveness for improved environmental control.

A successful project would demonstrate a significant reduction in the rate of air emissions from Presque Isle Units 7, 8, and 9 and substantial progress towards establishing the design criteria for one of the most promising mercury control retrofit technologies available today.

Project Status

We Energies has completed the design and construction of the TOXECON system and is currently in the operations phase of the project. We Energies has completed baseline testing, where the flue gas stream was characterized, and parametric testing, where the mercury removal characteristics of two activated carbons were evaluated.

