

# Mercury Control Technology

## Commercial Application

The Energy & Environmental Research Center (EERC) has developed state-of-the-art, cost-effective mercury control technologies with its partners and is leading the drive to commercialize these mercury control solutions. Effective technologies now exist to remove all forms of mercury from flue gas, and the technologies can be scaled for use in virtually any site facility.

## Commercial Needs

Mercury, a bioaccumulative neurotoxin, is being regulated in many industries. Coal-fired power plants are currently faced with this challenge, but many commercial sectors that combust coal for production of hot water, steam, or other uses will also be candidates for future regulations. Consequently, mercury removal processes that are effective for both oxidized and elemental mercury are needed. Installation of a mercury control technology often requires lengthy lead times, making it prudent to develop strategies that can reduce mercury emissions at reasonable cost and with the least impact on the operation of the facility.

## Current Approaches

The challenge is to capture low concentrations of various forms of mercury within seconds. Currently, mercury is captured from flue gas in scrubbers or with various sorbents upstream of particulate control devices. The levels of performance are mixed, depending on coal type, flue gas constituents, and plant configuration.

Activated carbon has proven effective at removal of the oxidized form of mercury from flue gas streams. However, the removal of elemental mercury has been much more challenging, as has the removal of mercury in various flue gas scenarios where the activated carbon sites are poisoned before they can bind with the mercury.

## Technological Advantage

EERC technology addresses these shortcomings by providing a solution that is environmentally friendly, effective at removing both elemental and oxidized forms of mercury, and usable in many flue gas streams that would normally poison activated carbon sorbents.

## Benefits

- Effectiveness – sorbent enhancement additives significantly improve capture over plain activated carbon.
- Efficiency – using sorbent enhancement additives reduces the amount of material needed.
- Small footprint – no significant retrofits are needed to the existing facility configurations.
- Flexibility – technology allows for a wider range of fuel choices, operations, and future plant modifications.
- Scalability – the techniques are easily scalable to accommodate small to large facilities.

- Low cost – they provide significant savings on sorbent and hardware costs.



*In response to regulatory mandates and industry needs, the EERC has taken the lead in mercury research, technology development, and field testing.*

## Background and Market Information

The U.S. Environmental Protection Agency has already regulated mercury emissions from coal-fired power plants, waste-to-energy facilities, hazardous waste combustion facilities, medical waste combustion facilities, amalgams from dental offices, lamp production, and several other applications. Regulations are also being formulated for cement kilns. While the recently promulgated federal Clean Air Mercury Rule (CAMR) requires some level of reduction by 2010, four states have already enacted stricter laws or rules (Massachusetts, Connecticut, New Jersey, and Wisconsin) with levels of reduction up to 90%. Within the next 5 years, several other states, including Illinois and Pennsylvania, will also require higher levels of mercury controls than the CAMR.

## Industry

These technologies are effective for industrial and commercial applications such as the steel industry, mini-mills, crematoriums, manufacturing firms, and other production facilities. The technologies are especially targeted for application at coal-fired power plants and have proven effective at a number of test sites.

## Development Stage

The technologies have been applied at the bench, pilot, and full scale for coal-fired utilities with excellent results. The same level of removal is likely in other commercial applications and is worthy of investigation and demonstration. Most of these technologies have been tested for a period of 1 month on a select number of coals and sites. More testing is under way to better understand the impacts of coal composition and plant configuration and the long-term impacts on the plant.

## Selected Partners

The Babcock & Wilcox Company



Corning



## Type of Collaboration

Together with its partners, the EERC actively seeks demonstration and commercialization opportunities for a variety of commercial applications.

## Intellectual Property (IP) Rights

The EERC Foundation is in the process of developing a comprehensive package of IP rights with partners for various applications and admixtures of mercury sorbents and additives. In addition, the EERC and the EERC Foundation offer a suite of supporting technologies and services for measurement, control, and process integration.



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