

# HBS Injection™ Technology:

Mercury Oxidation and Control  
for the Power Industry

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A new mercury oxidation and control technology that provides immediate control response, reduces reliance on costly powdered activated carbon (PAC) injection and selective catalytic reduction (SCR) catalyst and minimizes operating costs.



## Mercury Compliance Challenges

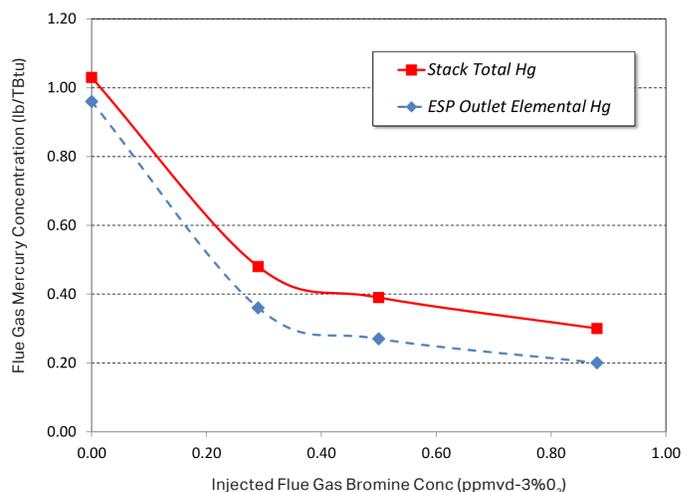
The U.S. EPA's Mercury and Air Toxics Standards (MATS) regulation requires all coal-fired power plants to significantly reduce their mercury emissions. Conventional control approaches typically rely on injection of expensive sorbents or the oxidation of elemental mercury so that it can be captured in a wet scrubber. However, plant-specific factors such as equipment configuration, operating conditions, and fuel composition, can significantly impact the effectiveness of these controls. As a result, many plants struggle to achieve compliance, or do so at very significant cost. Many of the conventional controls also result in adverse plant impacts such as increased equipment corrosion, fly ash contamination, or increased emissions of other pollutants.

## Case Study –

### Midwestern Power Plant

- 540 MW with SCR, ESP, and WFGD
- Hi-Sulfur Illinois Basin Fuel
- Fuel Hg Content ~ 7 lb/TBtu
- Baseline Hg Emissions ~ 2.5 lb/TBtu
  - With SBS Injection ~ 1 lb/TBtu
  - With SBS and HBS Injection ~ 0.30 lb/TBtu

Full-scale Test Results of HBS Injection at Midwestern Power Plant



## A New "Solution"

AECOM has been offering the patented SBS Injection™ technology for SO<sub>3</sub> control and mercury capture for more than a decade. We now introduce our patented HBS Injection™ technology for effective mercury oxidation and control. This new process injects halogen salt solutions into the flue gas, which react in-situ to form halogen species that effectively oxidize mercury. In full-scale tests, elemental mercury levels in the flue gas have been reduced by more than 75%, with a corresponding reduction in stack mercury emissions. The proprietary liquid injection system ensures effective dispersion and utilization of the injected solution, minimizing chemical costs and balance of plant impacts. Tests conducted in AECOM laboratories show effective mercury oxidation with or without SCR, and at both high and low flue gas temperatures; therefore, allowing for injection either before or after the air preheater.

## Lower Compliance Costs

HBS Injection offers several cost advantages over competing mercury control technologies. Based on plant-specific factors, AECOM can evaluate and recommend the most appropriate halogen salt, which can be competitively sourced from multiple suppliers, to minimize operating costs. With HBS Injection, power plants can avoid unnecessary SCR catalyst replacement, as well as the need to inject costly activated carbon or other sorbents. Furthermore, because the control response time is only minutes, the process can be used only when needed (e.g., when variations in plant operating conditions or fuel composition affect mercury oxidation, and thus emissions).

## Simple Implementation

The halogen salt solutions can be co-injected with the SBS Injection process, greatly simplifying the system design and capital cost; or it can be injected using a simplified stand-alone system. When combined with the SBS Injection process, mercury emission reductions of up to 90% can be achieved. Finally, the halogen salt solutions are benign non-hazardous chemicals that are easily transported and stored, further reducing plant operational and reporting requirements.



## Technology Benefits

### Effective Performance

- Effective mercury oxidation without SCR
- Excellent dispersion and utilization of injected halogen
- Not affected by operation of SNCR for NO<sub>x</sub> control

### Operational Flexibility

- Provides flexibility in fuel mercury and halogen content
- Provides immediate control response
- Can be co-injected with SBS Injection process
- Can be injected before or after APH
- Uses benign, non-hazardous chemicals

### Reduced Compliance Costs

- Offers competitive sourcing of halogen chemicals
- Reduces reliance on SCR catalyst for Hg oxidation
- Reduces reliance on costly PAC for Hg capture
- Maintains salability of fly ash

Example of HBS Injection Economics for 500 MW Power Plant

