

# Absorption Plus (Hg)<sup>TM</sup> Injection to Control Mercury Emissions from Wet FGD Systems

Babcock & Wilcox (B&W) has actively researched, developed and commercialized mercury mitigation solutions since the early 1990s.

The form, or speciation, of mercury present in flue gas is a key factor in developing integrated emissions control strategies. Recognizing that elemental mercury is only sparingly soluble, B&W developed the Absorption Plus (Hg)<sup>TM</sup> system, a patented technology to precipitate mercury from the liquid phase and to increase the total mercury captured and retained in a wet flue gas desulfurization (FGD) system.

## The chemistry behind the technology

Since oxidized mercury is several orders of magnitude more soluble than elemental mercury, wet FGD absorbers easily remove mercury which enters in the oxidized form. However, there is a small portion of elemental mercury that remains within the liquid phase, which is significant when compared to the allowable mercury limits under the Mercury and Air Toxics Standards (MATS). Since the vapor pressure of elemental mercury is much higher than its oxidized form, by precipitating the aqueous mercury, the liquid can be sub-saturated with respect to elemental mercury, avoiding what is commonly referred to as *mercury re-emission*. In our practical field experience, an initial loading dose of the Absorption Plus (Hg) chemical is required to sub-saturate the entire water system, after which a maintenance dose can be injected.

## Absorption PLUS (Hg)<sup>TM</sup>

**Controlling mercury emissions from power plants with wet FGD systems**

- Achieves elemental mercury sub-saturation
- Precipitates aqueous mercury from solution
- Does not affect SO<sub>2</sub> removal
- Does not affect gypsum purity

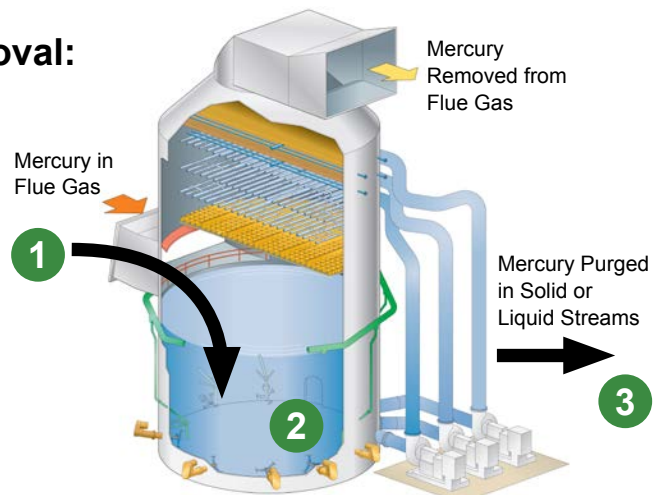
B&W's Absorption Plus (Hg) technology utilizes trace amounts of a proprietary additive injected directly into the wet FGD absorber. This provides an optimal environment in which to react with the aqueous mercury and form an insoluble chemical species that is subsequently precipitated and removed from the scrubber.

## System design provides efficient and reliable operation

The Absorption Plus (Hg) system supplies the additive solution to each absorber module. The solution is typically injected into the absorber recirculating (AR) pump piping through an existing connection supplied for this service. The system is typically tied into the AR pumps that feed the upper spray level(s). At least

## Cost-Effective Mercury Removal: A 3-Step Process

- 1 Mass transfer of mercury from gas to liquid
- 2 Elemental mercury sub-saturation of the circulating liquid
- 3 Addressing water treatment requirements of FGD liquid



(Continued on reverse side)



*B&W can provide both delivered and erected (D&E) and turnkey mercury project solutions on new wet FGD installations or as stand-alone systems for existing wet scrubbers.*

two injection points are installed, one serving as the primary feed point and the other(s) as backup if the first pump is taken out of service.

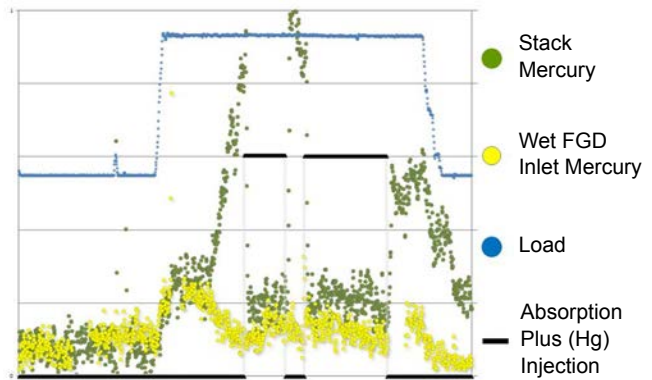
The chemical additive is delivered to the site via tank trucks. The storage and delivery system for each FGD absorber module includes a dedicated storage tank and pumping skid equipped with two 100% metering pumps (one operating and one spare) which are used to control the distribution of the additive. Interconnecting piping between the tank and pump skid is included. The additive's inventory is monitored through the plant's distributed control system.

The tank and pump skids are located within a common containment area equipped with appropriate safety devices. In addition, the storage tank and associated piping are heat traced to protect against freezing. The small bore piping from the metering pump discharge to the absorber module recirculation pump is typically included as part of an installation package but can be supplied as part of a turnkey project.

## ***Put our experience to work for you***

The Absorption Plus (Hg) system has been proven at numerous full-scale field tests as well as a number of commercial installations.

Each Absorption Plus (Hg) system is factory assembled and skid mounted for ease of installation. In addition to supplying complete system hardware, we offer both delivered and erected (D&E) and turnkey projects. By understanding the inter-relationship between various control technologies as well as the co-benefits achieved with existing air quality control systems, B&W has the expertise and experience to provide a cost-effective and integrated mercury control solution.



*The graph represents inlet and stack mercury levels (vertical scale) over a 24-hour period (horizontal scale). As load increases in the morning, mercury re-emission begins (stack mercury is higher). The injection of the Absorption Plus (Hg) additive controls re-emission.*

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Established in 1867, Babcock & Wilcox is a global leader in advanced energy and environmental technologies and services for the power and industrial markets, with operations, subsidiaries and joint ventures worldwide.

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