

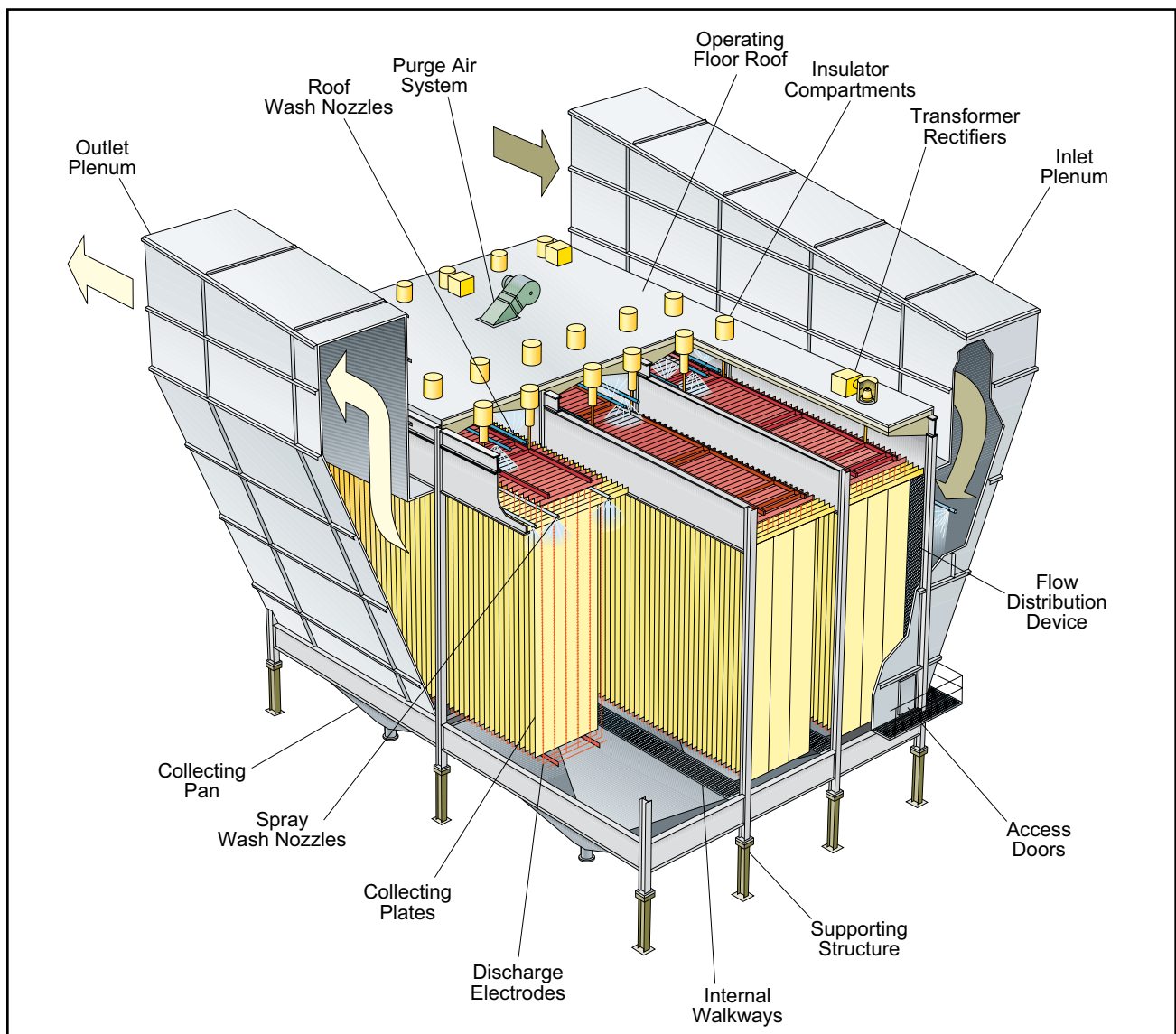
# Wet Electrostatic Precipitators for Utility Applications

Babcock & Wilcox (B&W) recognizes the importance of maintaining coal's status as a competitive fuel choice for our utility customers. We are aggressively researching and developing new technologies and advanced emissions control equipment and systems. In addition, acquisitions and licenses of environmental control

products have expanded our breadth of technology offerings and experience base.

With our purchase of Joy Environmental in 1995 and our exclusive worldwide licensing agreement in 2003 with SLF Romer XV ApS, an affiliated company of F.L. Smidth Airtech

A/S (FLS), for their wet electrostatic precipitator (ESP) technologies, we have added to our already strong ESP experience base and expertise. We continue to provide the industry's most proven pollution control equipment to keep coal-fired power plants competitive.



*Fig. 1 Capable of effectively capturing acid mist and fine particulates, B&W's wet ESP system uses a continuous washing feature for optimum cleaning and allows the use of lesser grade alloys to reduce overall cost.*

## ***Renewed interest in Wet ESPs***

The collection of acid mists consisting of fine particulate has been accomplished with wet ESPs for more than 100 years, primarily on industrial processes. However, with the emergence of expanded emission control requirements, reduced emission limits, use of non-traditional fuels, and the interactions of other emissions control equipment, there has been renewed interest in the use of wet ESPs to control selected emissions, especially sulfuric acid mist ( $\text{H}_2\text{SO}_4$ ) and fine particulates in utility applications.

Elevated levels of  $\text{SO}_3$  in the flue gas can result from the use of sulfur-bearing fuels, as well as the oxidation action of the catalyst on selective catalytic reduction (SCR) systems. When wet flue gas desulfurization (FGD) systems are used for sulfur control, significant levels of  $\text{H}_2\text{SO}_4$  mist tend to pass through the system and result in visibility issues at the stack. Wet ESPs

have demonstrated the ability to effectively collect the  $\text{H}_2\text{SO}_4$  and other condensables, along with fine particulates, in utility applications.

## ***System features and benefits of B&W's Wet ESP***

B&W's wet ESP system is based on our conservative design approach and established market leadership in particulate control experience, including both wet and dry ESP technology. Specific features and benefits of our wet ESP design and system offering include:

- low operating and maintenance costs
- ultra low particulate (solids, mist and fine particulate) emissions
- hazardous pollutant reduction
- optimized system design for sorbent injection technologies
- total system capability for integration with other pollution control devices
- well suited for new boiler installations as well as retrofit applications

## ***Design and operation***

B&W's wet ESP design is generally similar to that of dry ESPs. However, instead of a rapping system to remove the collected particulate, a water spray system removes the material deposited on the collection surfaces and discharge system. The continuous wash system for cleaning and pH modification allows use of lesser grade alloy steels, thus reducing overall cost.

The flue gas enters the wet ESP and is uniformly distributed by means of gas distribution devices across the individual casing cross-sections (see Fig. 1). Each gas passage contains a set of discharge electrodes and shared collecting electrodes or plates. The droplets contained in the gas will receive a negative electric charge from the high voltage electrodes and will migrate and collect onto the surfaces of the positively grounded collecting plates. The collecting plates are continuously washed to remove the collected acid mist and fine

<b><i>Features of B&amp;W's Wet ESP System</i></b>	<b><i>Benefits</i></b>
Continuous wash system	Effective cleaning and pH modification allow the use of lesser grade alloy steels, thus reducing overall cost.
Stand-alone wet ESP	Offers more flexibility in plants with existing scrubbers.
Low total particulate (solids, mist and fine particulate) emissions and hazardous pollutant reduction	Reduced emissions with lower capital costs in some applications.
Compatible with Wet FGD	Effluent from wet ESP can be neutralized in wet FGD to minimize demand on waste water treatment.

particulate. The collected material is gathered at the bottom pan of each wet ESP section and directed to tanks and pumps under the wet ESP.

A complete wet ESP system includes:

- Collecting electrode system
- Discharge electrode system
- Positive insulator vent system
- Internal wash systems
- Transformer rectifiers and controls
- Casing

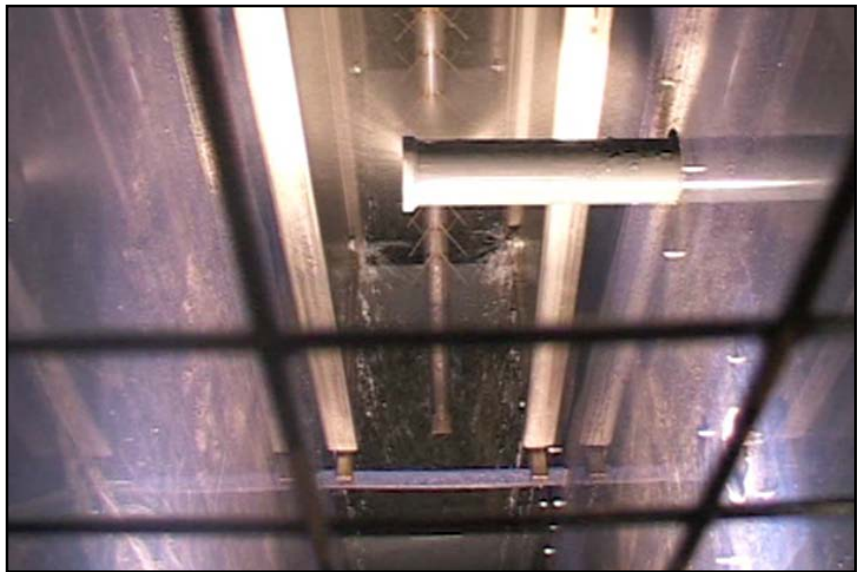
### **Experience and future development**

Wet ESP technology is not new. The combined B&W and FLS wet ESP reference plant list, which includes that of Joy/Western Precipitation and Lodge Sturtevant Limited, dates back to the first commercial ESP in North America installed in 1907. It comprises of North American electric utility power plants during the past two decades as well as hundreds of industrial wet ESP installations worldwide.

Highlights of B&W's extensive base of experience include:

- Most operational time on forced oxidation limestone wet FGD plants in North America
- Most operating wet ESPs on North American utility plants
- Experience with a variety of fuels, including coal, pet coke, oil and Orimulsion

B&W continues to look for ways to optimize performance and reduce the sizing requirements of the wet ESP product. Results of operating units are con-



*B&W's research is conducted on full-sized testing equipment to determine optimum cleaning efficiency and system design.*



*Based on our experience, B&W continually monitors the results of operating units and conducts extensive research to optimize wet ESP performance.*

tinually monitored to provide useful data for advancing the development of this technology. Research and testing continue through our R&D facility and at commercial host testing sites.

For equipment solutions, visit our website at [www.babcock.com](http://www.babcock.com) or contact your nearest B&W regional sales office.

For more information about B&W's wet ESP system, its complete list of reference plants, or any of its other pollution con-

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