

## **GEOENERGY<sup>®</sup> E-TUBE<sup>®</sup> WET ESPs FOR COAL FIRED UTILITY BOILERS**

The Geoenergy<sup>®</sup> Division of A. H. Lundberg Associates has been designing, supplying and installing E-Tube<sup>®</sup> Wet Electrostatic Precipitator systems for over 20 years. Presently, the installed base of Geoenergy<sup>®</sup>-designed wet ESPs is over 11,000,000 cfm in 40 different process applications on 5 continents. This includes full-scale installations on large-scale solid-fuel fired industrial boilers.

The Geoenergy<sup>®</sup> design is a vertical-flow tube type configuration with rigid mast discharge electrodes. This configuration was developed 30 years ago by Air Pollution Systems during work sponsored by EPRI and the US EPA for the development of a high intensity ionizer to be used as a pre-charging device for dry ESPs treating high resistivity fly ash from utility boilers. The E-Tube<sup>®</sup> Wet ESP was developed as part of this work.

Because it is compact and rugged, the Geoenergy<sup>®</sup> design is an ideal configuration to be used downstream of an FGD absorber treating flue gas from a coal-fired utility boiler. As an upflow, vertical wet ESP it can be added directly to the top of an FGD absorber tower with minimal additional pressure drop and no significant interference in the scrubbing process. Also, this design utilizes a building-block approach making fabrication and installation straightforward while insuring minimal scale up risk.

### **COMMERCIAL DEMONSTRATION UNIT AT FIRSTENERGY R. E. BURGER STATION**

Of particular importance in the evaluation of the Geoenergy<sup>®</sup> Wet ESP for utility service is the work done over the past two years with Powerspan Corporation at the FirstEnergy R. E. Burger Station near Shadyside, Ohio.

A Commercial Demonstration Unit (CDU) of a Powerspan ECO multi-pollutant control system was installed in the second half of 2003 and started up in early January 2004. The system includes a Geoenergy<sup>®</sup> E-Tube<sup>®</sup> Wet ESP as an integral part of the system. The wet ESP is an upflow design and utilizes 10-inch collecting tubes with rigid discharge electrode masts and two fields in series. Each field has two electric sections operating in parallel. The unit treats the gases from 50 MW of a 156 MW boiler fired with a variety of eastern coals.

The wet ESP treats up to 110,000 scfm of saturated gas downstream of a Powerspan ECO reactor and ammonia scrubber. Powerspan has reported that the wet ESP has demonstrated 95% removal of the particulate exiting the ammonia scrubber and that less than 0.01 lbs/MM BTU has been routinely achieved. The particulate matter collected is mostly sulfuric acid mist and a variety of ammonia salts.

Earlier this year the entire CDU including the wet ESP completed a 180 day endurance run with greater than 98% availability. None of the 2% down time during this endurance run was attributable to the wet ESP. On the basis of this successful operation of the CDU at the Burger Station, FirstEnergy Corporation has publicly announced its plans to install a full scale Powerspan ECO system at the 215 MW Unit 4 at its Bay Shore Plant in Oregon, Ohio. Work on this project is scheduled to begin in January 2006.

A smaller "test loop" absorber and Geoenergy® Wet ESP was also installed in parallel with the CDU absorber/wet ESP in the Spring of 2005. The purpose of this additional system was to demonstrate enhanced scrubbing and particulate removal performance with alternate scrubber packing arrangements and a **three field** wet ESP.

Testing of the independent three-field test loop wet ESP has demonstrated outlet particulate loadings (including acid mist) of less than 0.005 lb/MM BTU.

Geoenergy® believes that the combination of the our experience with wet electrostatic precipitation technology plus the proven performance and reliability of the E-Tube® design on a commercial coal fired boiler makes it an ideal candidate for future application on major utility projects requiring a wet ESP.