



## Special Point Of Interest

### EPA Strengthens U.S. Air Quality Standards

EPA is protecting all Americans from effects of short-term exposure to inhalable coarse particles by retaining the existing daily PM<sub>10</sub> standard of 150 micrograms per cubic meter. This standard protects against premature deaths and increased hospital admissions.....

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- ◆ To better protect public health and welfare for millions of Americans across the country, EPA on September 21, 2006 issued the Agency's most protective suite of national air quality standards for particle pollution ever.
- ◆ Particle pollution, also called particulate matter or PM, is a complex mixture of extremely small particles and liquid droplets in the air. When breathed in, these particles can reach the deepest regions of the lungs. Exposure to particle pollution is linked to a variety of significant health problems. Particle pollution also is the main cause of visibility impairment in the nation's cities and national parks.
- ◆ The final standards address two categories of particle pollution: fine particles (PM<sub>2.5</sub>), which are 2.5 micrometers in diameter and smaller; and inhalable coarse particles (PM<sub>10</sub>) which are smaller than 10 micrometers. (A micrometer is 1/1000<sup>th</sup> of a millimetre; there are 25,400 micrometers in an inch).
- ◆ Scientific studies have found an association between exposure to particulate matter and significant health problems, including: aggravated asthma; chronic bronchitis; reduced lung function; irregular heartbeat; heart attack; and premature death in people with heart or lung disease.



First Indigo Agglomerator installed in Hot Side ESP.

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## Indigo Particle Agglomerators Reduce Mass and Visible Emissions on Coal Fired Boilers in the US

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### ABSTRACT

The Indigo Agglomerator has been installed at five power stations worldwide, providing a significant improvement in electrostatic precipitator performance that has proven consistent over time and a wide range of coals. The five power stations utilize a range of plant designs including European and American design electrostatic precipitators and various boiler combustion arrangements. The coals burned include a range of Australian, Columbian, and United States coals. By providing a reduction in mass emissions of 30% to 60% and a reduction in Opacity of 50% to over 80% across this range of operating conditions and over a period in excess of three years, the Indigo Agglomerator can now be considered as a proven technology for reducing emissions from electrostatic precipitators and the corresponding stack Opacity.

There are three full scale Indigo Agglomerators in operation on coal fired boilers in the US. This paper focuses on the reduction of total particulate matter (PM), PM<sub>2.5</sub> (PM less than 2.5 um in diameter), and visible emissions (Opacity) on the three US installations.

### HISTORY OF THE INDIGO AGGLOMERATION TECHNOLOGY

The construction and testing of a full-scale prototype of the Indigo Agglomerator started in 1999 and testing of various configurations continued through to late 2002. In mid 2002 a commercial design for the Indigo Agglomerator was developed, based on the extensive test data obtained over the previous three years. The first installation was in November 2002 at Vales Point Power Station in Australia, the site of the prototype tests.

At the invitation of the Southern Company, a second unit was installed at Plant Jack Watson in Mississippi in March, 2003. The Southern Company has carried out extensive testing over a three year period at Plant Watson while burning a wide range of coals with the Indigo Agglomerator showing a consistent improvement in electrostatic precipitator emissions.

## Technology

### Indigo Technologies and The Southern Company Joint Slipstream Filter—R&D

Built in Australia and shipped to the US, installation of the Indigo Technologies Filter Unit at the Southern Company's Plant Daniel, Alabama, USA in 2007 this slipstream unit provides a significant R&D testing rig.

The Indigo Filter is a slipstream unit designed to treat the plant process gasses at a rate of up to 30m<sup>3</sup>/sec and when installed the Indigo Filter will be used as a test facility jointly operated by Indigo Technologies and The Southern Company. This unit is to be used to investigate the mixing and filtration processes occurring within the *Indigo Agglomerator* to identify and optimize critical process variables including the injection of sorbents.

### Looking Inside the Agglomerator

The ability to view the inside workings of the *Indigo Agglomerator* (ESP, Fabric Filter, or other APC device) after commissioning and whilst the plant is on line has been developed using the Indigo HTC. The camera is mounted inside an insulated metal housing and inserted into the ESP or the *Indigo Agglomerator* through specially modified access doors, or through a portal in the outside skin, with a stream of cooled air pumped over the HTC through piping keeping it cool in the high temperature environment of up to 150° C. Output is run through a digitiser and downloaded to a computer for immediate viewing and recorded for further analysis.

## Installations

Name: **WIDOWS CREEK POWER STATION**  
Client: Tennessee Valley Authority  
Location: Tennessee, USA

The Tennessee Valley Authority (TVA) has awarded a contract to Indigo Technologies to design and supply one Indigo Agglomerator for installation at the Widows Creek Fossil Plant in Alabama. The Indigo Agglomerator will be installed on one of four passes of unit 8 which is a 500MW, twin furnace, tangentially fired unit. This project is being partially funded by EPRI to evaluate the performance of an Indigo Agglomerator upstream of a wet scrubber.

Name: **HAVANA POWER STATION**  
Client: Dynergy  
Location: Illinois, USA

March 2006 four Indigo Agglomerators were installed into Unit 6 at Havana Power Station, Illinois. Havana Power Station Unit 6 is a 480MW unit with a B&W wall fired boiler and Buell precipitators. This installation is unique for a number of reasons; it is the first installation on a boiler burning 100% PRB coal as the fuel source, the first hot side installation and the first time two Indigo Agglomerators were installed in series (per pass). Due to the height and location of the existing flue ducts, flue ducts above the precipitators, half of the Agglomerators were pre-assembled in the duct. The remaining sections were pre-assembled on the ground before being lifted into place, approximately 25 tonne per section. Emission reductions exceeding 50% have been recorded since the installation of the Indigo Agglomerators.



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