

Executive Summary (page 1)

Steam Turbine Efficiency and Heat Rate Improvements for Fossil-Fired Operating Plants

By Michael W. Smiarowski and James Auman, Siemens Energy, Inc.

Projections made by the Energy Information Administration estimate that around one-third of U.S. generation will still be based on coal in the coming years. These coal plants will be the “survivors”, which are typically the larger (200MW+) and newer units that are equipped with pollution control equipment. This article will provide an overview of some of the available efficiency improving options for fossil-fired power plants.

Full Story....

High Ratio Fabric Filters with 12m Long Bags for Large Coal Fired Power Plants

By Peter Wieslander, Stephen L. Francis and Ajay Vajpeyi, Alstom Power

This article presents information on key issues that need to be considered when designing and evaluating a HRFF with 12m long bags for a large coal fired boiler installation. Aspects of gas/dust flow distribution to the individual compartments of the filter as well as the concerns regarding large flow/loading into the bag nest in each compartment will be discussed. A very efficient, newly developed, cleaning system has been incorporated in the filter to clean the bags properly without increasing dust emissions, and allowing the system pressure drop to be kept as low as possible. The reduction in HRFF first cost with 12m as compared to 10m long bags, and tighter bag row pitch, is estimated at approximately 10%.

Full Story....

Innovative On-site SCR Catalyst Pluggage Removal Method

By Mike Dunker and Dorothee Seidel, STEAG Energy Services

STEAG's has developed and patented a unique process for in-situ cleaning of all SCR catalyst types i.e. corrugated, honeycomb, or plate inside the SCR reactor without removing the modules. This process utilizes dry Ice Blasting which cost effectively removes the channel pluggage which reduce SCR pressure drop and effectively increases the catalytic potential as more catalyst surface area becomes available without the pluggage.

Full Story....

ModuPower Reduces Particulate Matter Emissions from Undersized ESPs

By Jason Horn, Stock Equipment

Stock Equipment recently supplied ModuPower SMPS's for two 135 MW pulverized coal generating units located in Tocopilla, Chile. To control PM (Particulate Matter) emissions each unit was originally equipped with a 1990's vintage Mitsubishi electro-static precipitator powered by conventional TR sets (Transformer Rectifiers). The original design collection efficiency of the ESPs was 98% which resulted in an estimated 211 mg/Nm³ emission rate at full load when using an imported bituminous coal with 10.6% ash content. Changes to government regulations would require compliance with a reduced PM emission limit of 50 mg/Nm³ in 2014.

Full Story....

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Changes to government regulations would require compliance with a reduced PM emission limit of 50 mg/Nm³ in 2014. The Chilean power customer had planned to meet the new requirements by replacing the ESP with a bag house. However in late 2013 the customer was informed of significant delays in delivery of the bag house and an accelerated schedule to meet the 50 mg/Nm³ PM emission rate limit by the end of January 2014. In response, the customer was forced to source an alternate 6% ash coal and reduce production to 120 MW or below to stay in compliance.

The customer contacted Stock Equipment in December 2013 to discuss potential solutions for further reducing emissions and recover production capacity using Stock's ModuPower SMPS (Switch Mode Power Supply). The ModuPower SMPS reduces PM emissions by increasing the overall power input to the precipitator versus conventional TR sets. Stock was able to utilize their process expertise to provide the customer with performance estimates for a variety of scenarios. They then leveraged the global assets of their parent company, Schenck Process Group, to source trial equipment from their Chinese affiliate for delivery in January 2014. The confidence generated by this analysis prompted the customer to quickly exercise the proposed solution and successfully lower the PM emission rate.

The scope of the project consisted of replacing 3 of 4 conventional TR sets with ModuPower SMPS on each of the two units. The ModuPowers were installed at grade using 100 kV rated HV cable to connect the high voltage output with the precipitator discharge electrode frame.

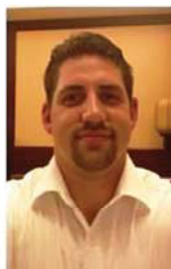
This remote mounting capability is unique to the ModuPower allowing for flexibility in the final location of the equip-

ment. Stock also provided a ground switch designed to mate up with the customer's existing insulator compartments. The combination of these features allowed for the majority of the installation to be performed with the ESP's in service and without removing of the existing TR sets. The final ModuPower tie in was performed during brief outages on each unit. Comprehensive support was provided throughout the duration of the project by performing pre-outage site evaluation, providing service engineers for installation support and commissioning, and additional support.

The customer was able to increase generation to full output while maintaining a PM emission rate below the 50 mg/Nm³ limit after a successful startup of the boiler, ModuPower tuning, and refinement of the rapper control program. No other changes or repairs were made to the precipitator during the installation. The resulting performance improvement was better than expected and allowed the plant to resume full production.

The ModuPowers will remain in operation at the Chilean plant until the bag houses are installed. The ModuPower's then may be transported elsewhere within the customer's system to reduce particulate emissions at another facility.

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Jason Horn is the Director of Environmental Controls for Stock Equipment Company in Chagrin Falls, Ohio. He began his career in the power industry in 2005 as a corporate air emissions control engineer with American Electric Power. Since joining Stock Equipment in 2007, Jason has held various positions of increasing responsibility within the environmental controls product line. He currently serves as the secretary for the Worldwide Pollution Control Association and holds a Bachelor of Science degree in electrical engineering from Ohio Northern University.

