NEUNDORFER
PARTICULATE KNOWLEDGE

Case History Success Story

Proactive Maintenance and Upgrades Yield Substantial Monetary and Emissions Payoffs

Proactive maintenance at electric generating stations is often complicated by regulatory uncertainty and/or limited budgets. Often, it takes time and patience to create justification for upgrades that will, in the long run, save money and reduce emissions. Yet the payoff can be huge.

Expectations Exceeded

At **ecomaine**, a waste-to-energy plant in Portland, Maine, an upgrade project on back-end, pollution-capture equipment was a long time in the making but, when it finally happened, had positive effects far exceeding expectations.

The project involved installing new electrostatic precipitator power controls and rapping controls from Neundorfer. This was a relatively minor capital upgrade, intended to replace obsolete technology, ensure consistent compliance with recently updated heavy-metal emission limits, and hopefully save some energy. As it turned out, the new equipment had a much larger, positive impact than expected.

After installing the new controls, ecomaine was able to get a lot more power into the precipitator (power is 2.5 times higher than pre-upgrade), especially in the outlet fields—greatly improving collection efficiency. Some intermittent opacity spiking issues were also eliminated.

The biggest win, though, was reduction of heavy-metal emissions (mercury, lead, cadmium, particulate matter). Stack testing performed shortly after the upgrade showed that collection efficiency improved 30% for mercury, 74% for particulate matter, 79% for cadmium, and 80% for lead. That equates to collection efficiency for these pollutants in the range of 94.32% to 99.76%.

Another round of stack testing several months later proved continued positive effects from the upgrade. Tests performed at the inlets prior to the air pollution control system, and at the outlets after the controls, indicated the following removal efficiencies: mercury (Hg) 96.5%, lead (Pb) 99%, cadmium (Cd) 99%. (No data for particulate matter.)

What seemed to be a simple upgrade translated into something much more beneficial.

New electrostatic precipitator controls from Neundorfer contributed to the greatly improved collection efficiency at ***ecomaine****.*

Technology Changes

ecomaine previously used controls from another manufacturer. For many years, those controls worked just fine and helped maintain emission levels within state and federal guidelines. Over time, though, three things changed.

First, as is the case with all equipment, the old controls began to wear out and replacing the boards cost almost as much as buying entirely new units. Second, as emission limits tightened for mercury, particulate matter, and other heavy metals, ecomaine saw an opportunity to improve the removal technology. A feasibility study recommended either adding a baghouse (fabric filter), which would have been very expensive, or upgrading the electrostatic precipitator controls.

Third, controls technology advanced—but not at the same pace from all providers. By the time this upgrade project got underway, control technology and support offered by Neundorfer looked like the most viable option. The new controls are much faster, and offer much better response time when adjusting to changing load and process conditions. In the waste energy industry, opacity limits are considerably stricter than for coal-powered units (10% compared with 20% for coal), but fuel conditions change on a daily basis. To maintain compliance, it is vital to have technology that supports this variability.

Decisions

In addition to the need for consistent compliance with emission regulations, ecomaine is certified to ISO 14001, an environmental standard that dictates it continuously strive to improve operations. This added strength to justification for the upgrade project.

After weighing available options, ecomaine decided to go ahead with purchasing and installing 12 Neundorfer MVC4 ESP power control units, two Neundorfer MicroRap rapping control units, and Neundorfer's Precipitator Optimization System.

This plan view from Neundorfer POS 8 shows the new "Electrical Field Mapping" feature which allows users to see the performance of individual sections of their precipitator.

Installation of Neundorfer controls began in January 2010, and was completed by the summer. A Neundorfer technician visited ecomaine, installed three of the 12 power controls, and showed technicians how to put in the new units so they could finish the job on their own. Change-out of the controls was done creatively to minimize downtime. For example, one of the units was installed during a single-day furnace maintenance outage.

Impact

Stack tests performed before and after the power controls were installed show just how significant a difference the project made: 2.5 times more power into the precipitator, between 94.32 and 99.76 collection efficiency for heavy-metal emissions, and reduction of opacity spiking issues. Installation of the two MicroRap units also had a positive effect, helping ecomaine fine-tune rapping systems in response to particulate load changes.

Reducing PM emissions as ecomaine did by installing new ESP power controls is a key objective for any facility seeking to comply with new emission rules such as MACT. Since PM contains hazardous air pollutants (HAPs) regulated by the EPA, compliance requires achieving the highest possible level of collection efficiency. Examination of a given plant's baseline emission status may point to relatively minor equipment upgrades, as was the case here.

NEUNDORFER
PARTICULATE KNOWLEDGE

4590 Hamann Parkway
Willoughby, OH 44094
(440) 942-8990
Fax: (440) 942-6824

www.neundorfer.com