

HEAT RECOVERY SYSTEMS/HRSGs

More productivity pays off for northeast power plant

INTEK technology improves Conectiv's efficiency, saving energy marketer \$550,000 per year.

Conectiv Energy serves more than one million homes and businesses in the regulated electricity and natural gas markets. The company's service area includes regions of Delaware, New Jersey, Maryland and Virginia.

An ongoing efficiency challenge for Conectiv, as well as other energy providers, is maintaining proper condenser performance. When generating electricity with a steam turbine, a vacuum is needed in the plant's condensers to maximize plant thermal efficiency. However, says Conectiv's Bob Lattomus, a perfect vacuum is hard to create and even harder to maintain over time. "Air can enter into a system in a number of ways, including loose seals, cracks or holes," says Lattomus. "Even the slightest pinhole will draw air into the system. This reduces operation efficiency, which means a unit must burn more fuel to achieve the same output...a major drawback, especially with today's rapidly rising fuel costs."

In April 2004, a Conectiv plant in Edgemoor, Delaware, was experiencing trouble in one of its generating units. "We knew we had an expensive inefficiency in the plant and we needed to identify it," said Lattomus. "The air in-leak hadn't been a major problem in the past, but it was beginning to grow." Together with INTEK, an Ohio manufacturer of specialty condenser monitoring instrumentation, Lattomus examined the hotwell temperature, the load, and the gross load. "The RheoVac 950 system confirmed an air leak in the No. 5 condenser, servicing a Westinghouse

turbine generator, rated at 445MW. The unit burns a less refined oil, but still a costly fuel to waste," he said.

Air in-leaks are expensive

When air infiltrates a generating unit, vacuum pumps must be used to remove it. Typically, one pump is used to maintain vacuum conditions. As air-in leakage increases, overwhelming a single pump, additional pumps must be brought online to maintain the vacuum, also increasing operating costs. Finally, with outside airflow and the use of chemicals to treat it, come impurities, which are like a cancer to the generating unit. When contamination is introduced, corrosion sets in and spreads throughout the whole boiler feed water system. Problems resulting from this include acidic deterioration, metallic embrittlement, and

hydrogen damage, all of which can lead to downtime when failures occur.

Lattomus used the RheoVac 950 system to track the air in-leakage problem as it increased from 15-20 Standard Cubic Feet per Minute (SCFM) to 50 SCFM. "By using the RheoVac 950, we were able to first identify, and then make repairs to reduce the air in-leakage rate. The repairs were reflected by a 0.539" HgA pressure reduction. This is the excess condenser backpressure that we operated at before the air in-leakage problem was corrected." During this period, Conectiv's inlet circulating water temperature increased by 150 F, which should have caused an increase in condenser pressure. Backpressure decreased, however, further demonstrating the improvement gained by repair of the air in-leakage.

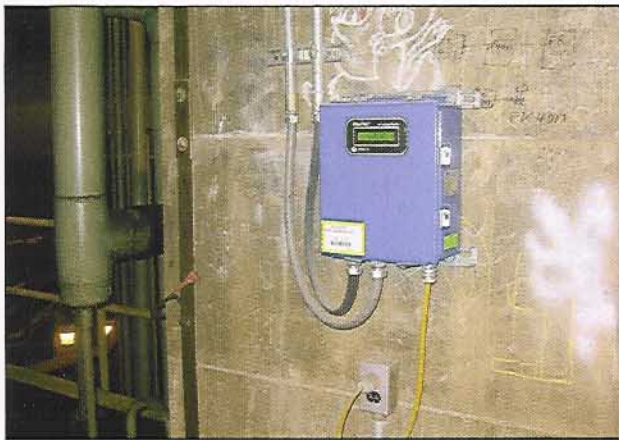
The RheoVac 950 system combines a multi-sensor probe with specially developed software to



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measure air in-leakage, water vapor flow, and up to eight additional performance parameters. The information can be used to troubleshoot condensers and vacuum systems and increase overall plant thermal efficiency.

"We had a real problem keeping a good vacuum on the system," Lattomus said. "We were running additional vacuum pumps to remove air from the system just to maintain vacuum. After additional searching utilizing the RheoVac 950 system data, a leak was detected behind pipes that surround the outside of the condenser. Upon further inspection, a three-inch hole was discovered on a turbine bearing slop drain line that penetrated the condenser housing. By identifying and repairing this hole, the condenser vacuum was reduced by 0.3 HgA, and we realized a savings of more than \$500,000 a year in lower fuel costs."

By utilizing the RheoVac 950 for real-time accurate monitoring of the vacuum system, Conectiv was able to pinpoint the problem that had been nagging the company for some time. "The air in-leak problem existed on this unit for almost two years," said Lattomus. "By repairing the opening, we not only eliminated the air in-leakage, but we were also able to operate the unit using one vacuum pump to maintain vacuum on the system."

Stopping air in-leaks is just the start for end-user cost savings. Most condenser units maintain two exhausters, but are designed to use just one. Due to the air in-leakage, Conectiv had been running with two pumps for nearly two years. When considering additional wear and tear on the pumps as well as maintenance, the sheer-operating cost of the pumps was double what it should have been. "Our pumps maintain a continuous vacuum in the system," said Lattomus. "The pumps are basically air extractors, pulling

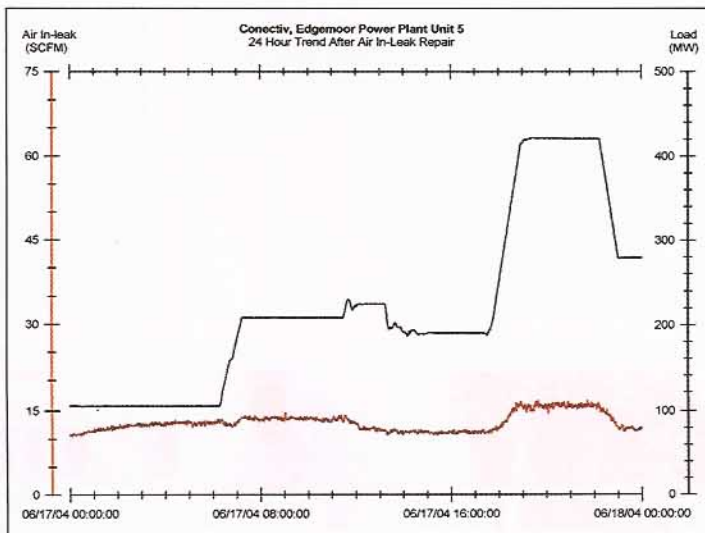
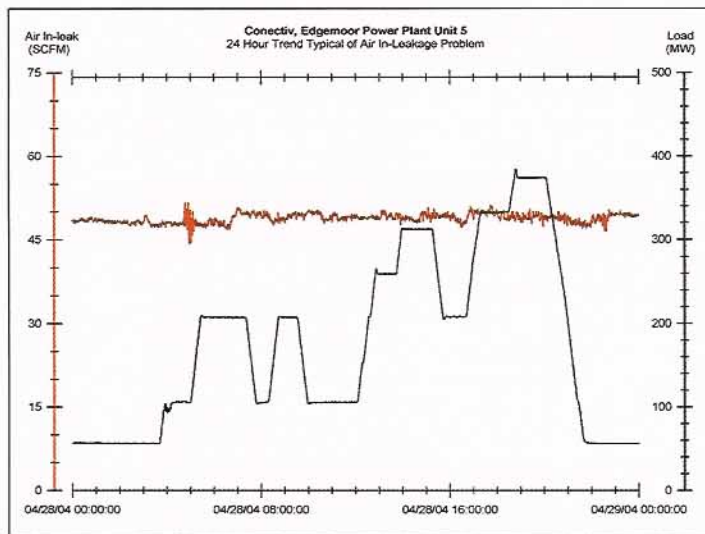
excessive air out of the unit, so that the system operates at very low pressure, or as low as we can get it."

INTEK also worked with Conectiv to better recognize and confront leaks in the future. Conectiv operates three units at the plant and utilizes a RheoVac 950 system on each generating unit. Air in-leakage is monitored on individual units and Conectiv associates are alerted when airflow issues exist. INTEK has regularly requested performance parameters from the plant, and performs comprehensive monitoring of this information to support Conectiv operations.

"The INTEK technical support has been great," says Lattomus. "We can download data, and email or call them for an evaluation. They've also given us many performance parameters to consider for future reference, such as, water inlet/outlet temps, and load on units. The result is a better operating unit at a lower operating cost."

About INTEK, Inc.

INTEK, Inc. has more than 25 years experience in manufacturing precision flow instruments for liquid and gas applications. INTEK provides solutions to help customers in power generation, chemical, aerospace, plastics, food, and pharmaceutical industries, achieve greater process efficiencies. Additional information can be found at www.intekflow.com.



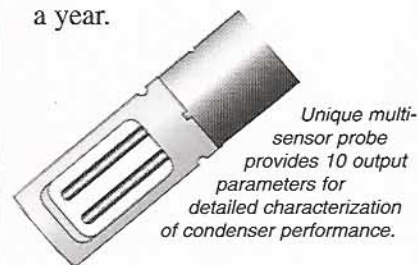
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