

WESP UPGRADE AT BOISE'S LAGRANDE PARTICLEBOARD MILL: THREE YEARS AND COUNTING

Preventative maintenance is critical to maximize uptime and reliability.

In the fall of 2003, TurboSonic supplied a wet electrostatic precipitator (WESP) upgrade to the Boise particleboard mill in LaGrande, Ore., to improve performance and eliminate droplet carryover to coincide with the installation of a Pro-Environmental regenerative thermal oxidizer (RTO) to control green dryer exhaust emissions. Prior to selecting TurboSonic's WESP upgrade, it was feared that at the WESP's existing performance level, RTO ceramic media would suffer from particulate deposits containing wood salts that would attack the ceramic media, shortening its life and resulting in replacement costs and downtime.

The upgrade addressed several primary deficiencies, and comprised the following:

- Improved water sprays at the system inlet, to ensure proper gas saturation and more efficient scrubbing, using Turbotak Atomizing Nozzles
- Improved gas flow distribution in the inlet "dropout chamber"
- Elimination of droplet carryover, using a TurboSonic mist hood (patent pending)
- Collection of in-duct condensation downstream of the WESP, using a mesh mist eliminator
- Improved power supply to the WESP with a high frequency transformer/rectifier

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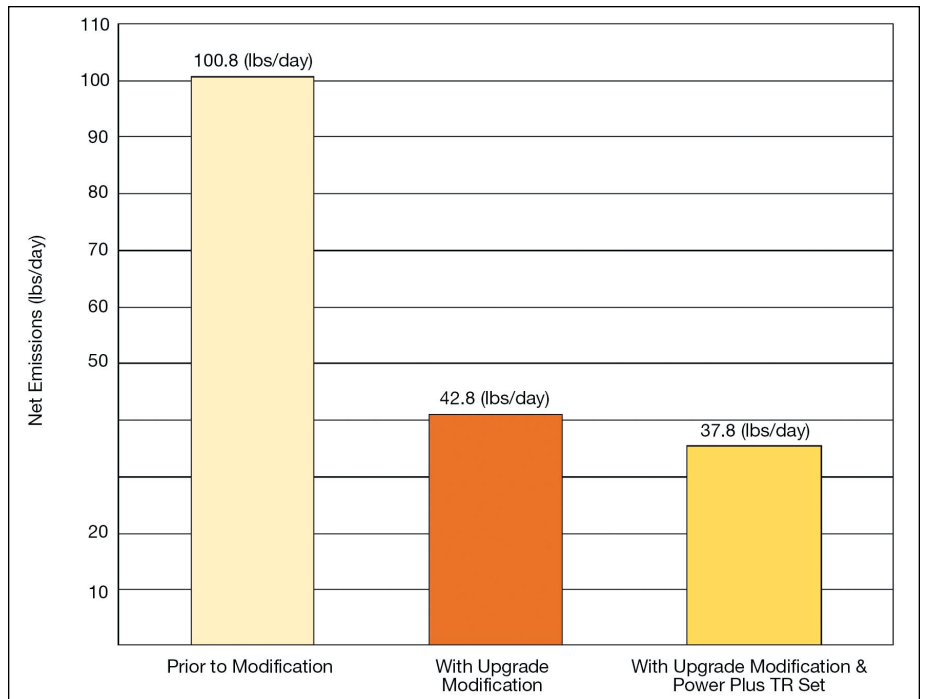


Figure 1. Performance improvements across the board shortly after installation in 2004

World, this installation was highlighted in an article entitled "Making Deficiency Corrections Can Improve Performance of Your WESP." A figure from that article, shown above, illustrates the dramatic improvement resultant from this WESP upgrade.

The purpose of this article is to provide long-term operability and maintenance results after three years of operation.

RTO OPERATION

After three years of operation, pressure drop in the RTO has remained constant. The RTO has required no washouts or burnouts during this period of time and it was determined that, through the use of catalyst test baskets over a nine-month period, the RTO could be converted with catalyst into a regenerative catalytic oxidizer (RCO). Catalytic conversion of the RTO would reduce fuel consumption by almost 50%.

WESP OPERATION

TurboSonic's WESP modifications have achieved the plant's objectives for process improvement. The droplet size of the Turbotak Atomizing Nozzle was adjusted to optimize saturation and pre-scrubbing prior to the WESP. The nozzle operated effectively for nine months before cleaning was required without maintenance. The LaGrande mill subsequently instituted a preventive maintenance

program, performing monthly inspection of atomizing nozzles with an automatic changeout to the spare atomizing nozzle every two months to ensure continued peak performance. This changeout is done very quickly and cleaning of the spare nozzle can be done at the convenience of mill personnel.

The original mesh mist eliminator in the bottom of the WESP was prone to plugging, increased pressure drop and droplet carryover. This was replaced with the TurboSonic Mist Hood, which has required no maintenance in three years of operation. The installation of the hood resulted in a pressure drop savings and was tested (EPA Methods 4 and 5) at "non-detect" for droplet carryover. New "engineered mesh" was installed in order to "polish" the exhaust gas prior to entering the RTO and to remove water condensation that could occur in the ductwork downstream of the WESP.

Initially, the mesh was changed out with a spare set for cleaning after six months of operation. The time between mesh change-outs has been decreased to four months due to the amount of condensation that occurs during winter months and due to the inability to clean the mesh to its pristine original condition. Accumulation on the mesh has been limited to a light film on the outside of the pads and a fine particulate build-up inside the pads. The pads are shaken to remove the fine particulate, and then soaked in a cleaning solution. The pads are then washed with a pressure washer

and air-dried. This process has not caused any operational issues.

A new NWL Power-Plus transformer rectifier (T/R) replaced the existing T/R to improve power input to the WESP. The secondary power input increased from approximately 37.5 KV at 121 mA to approximately 47.5 KV at 400 mA. The increased voltage was clearly of benefit, with a 12% increase in WESP performance, as illustrated in Figure 1. Though the increase in voltage is very beneficial to WESP performance, the increased

current from 121 to 400 mA is excessive and due to the unusual electrode design, which was modified by the original equipment manufacturer in an attempt to improve performance. However, it was felt that the high cost of electrode changeout was prohibitive relative

Second Catalyst Test



Catalyst Evaluation Test Report

Boise, La Grande – Oregon

“Clearly the TurboSonic package of particulate controls and mist elimination has been successful in cleaning up potential contaminate from reaching the inlet of the RTO.

Assuming the operation of the particulate control equipment continues to operate as it has in these first 10 months, we feel confident that the installation of PRO*RCO catalyst in the Pro-Environmental RTO would allow the unit to run successfully in catalytic mode for at least 5 years and likely approach 7 years based on the data identified in this report.

Certainly catalyst payback based on the gas and electrical savings running catalytically would be realized within the life of the catalyst predicted under these two tests.”

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PM PROGRAM

The upgrade of the Boise LaGrande dryer emission control system has achieved significant improvement in performance and reliability together with a reduction in maintenance. The key to sustained successful operation of the WESP/RTO system, in addition to selecting and installing an equipment upgrade that inherently offers improved reliability and reduced maintenance, is Boise's preventive maintenance program. Boise personnel monitored initial performance and developed in-

spection and maintenance frequencies to ensure continued optimum performance of each component of the system. **PW**

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