



1994 **Title:** **Combustion of Clarifier Underflow Solids in a Hog Fuel Boiler with a New High Energy Air System**

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ABSTRACT:

In July 1993, Boise Cascade Corporation started up a 250 tons/day recycle facility at their West Tacoma Mill. The facility processes post-consumer waste in the form of newsprint and magazine into pulp for use in the manufacture of newsprint.

One key to the financial success of the recycle facility is the economic disposal of up to 110 wet tons/day of clarifier underflow solids (CUS) that is produced from the recycle plant. To avoid excessive landfill costs, the underflow solids are sent to the No. 5 Hog Fuel Boiler for combustion. The No. 5 Hog Fuel Boiler is a water-wall, spreader-stoker unit equipped with a traveling grate and pneumatic fuel distributors. The boiler generates 150,000 PPH of saturated steam at 150 psig with peaks up to 170,000 PPH, which typically meets the mill's entire process steam requirements.

The unit also burns about 70 wet tons/day of the mill's primary and secondary CUS. To meet the demands of increase CUS burning in the boiler, a new, high energy, overfire air system was purchased from and installed by Jansen Combustion and Boiler Technologies, Inc. The improved air system has allowed the boiler to fire at maximum steam load, burn up to four and a half times as much CUS, and handle four times as much ash as before the upgrade. At the same time, combustion conditions have been excellent and overall stack emissions have improved.

Carbon in the ash is reduced to low levels so that ash from the multiclone dust collector is no longer reinjected into the boiler. Carbon monoxide (CO) emissions are typically below 300 ppm. Emissions of nitrogen oxides (NOx) are reduced. And, particulate emissions compliance test results have been below the boiler's allowable limit of 0.04 gr/DSCF @ 7% O₂ (the unit is equipped with a wet venturi scrubber).



This paper will review the objective and scope of the upgrade project, compare the boiler's performance after the upgrade to previous conditions, and discuss how the new, high energy, overfire air system has benefited the boiler and plant operations. The results of this project demonstrate a means of utilizing the energy content of recycle and papermill CUS and avoiding landfilling. With proper equipment and controls, CUS can be burned along with hog fuel without detrimental impact on boiler emissions or operations.