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Bowater's Catawba Mill Broadens Product Mix

Innovative Technique Reduces Odorous Emissions at Cascades Fjordcell Mill

SPECIAL REPORT:
COATED GROUNDWOOD: Supply Limits May Boost North American Market

Cascades Mill Uses Atomized ClO_2 to Oxidize TRS, Optimize NCG Treatment

TRS is being reduced by atomizing a fresh solution of 10-g/l ClO_2 directly into the kraft mill's NCG duct, significantly reducing odorous emissions.

By André Normandin, Luc Belley, and Jacques Lévesqu

The characteristic odor of an operating kraft pulp mill is due to the total reduced sulfur (TRS) in non-condensable gases (NCG) that emanate from various pulping equipment vents. Digesters, blow tanks, and evaporators produce NCG with high concentrations of TRS, whereas mechanically ventilated equipment such as brown stock washers, vibrating screens, and foam tanks produce NCG with low concentrations of TRS (usually the largest volume of gases produced).

Traditional NCG treatment involves oxidation of TRS using heat, either by injecting the gases into the lime kiln, recovery boiler, or dedicated incinerator. However, incinerating these gases has several drawbacks, such as the risk of inhaling toxic fumes (air tightness of existing boilers), risks of explosion, personnel reluctance, complexity of security systems required to ensure the injection of such gases in the ovens or process boilers, and high boiler operation and modification costs.[1,2]

Also, because NCG incineration costs can be relatively high, alternate methods were developed by some mills in the early 1970s[3] as well as several equipment manufacturers who specialized in industrial emissions treatment [4,6] and research centers such as Paprican.[5] These methods involve chemical oxidation of contaminants in the NCG stream using powerful oxidizers such as sodium hypochlorite or chlorine dioxide, readily available at mills with onsite pulp bleach plants.

Such a technique, for example, was successfully implemented at the Nexfor Fraser Paper mill in Thurso, PQ, Canada.[7] At this mill, NCG gases to be treated are mixed with gases coming from the bleach plant washer vent, in order to use the residual oxidizer present in these gases to oxidize contaminants in the gas phase.

This article describes an innovative TRS chemical oxidizing technique involving chlorine dioxide atomization that was recently implemented at the Cascades Fjordcell mill in Jonquière, PQ, Canada. Working with Mesar/Environair Inc., the Fjordcell mill designed a program to optimize its existing NCG treatment system and reduce emissions coming from its sewer mixing box, even though such processes are not yet under the sulfate pulp plant regulations of the Québec province.[8]

This article demonstrates the simplicity and low cost of such an approach compared with the traditional method of TRS treatment for kraft pulp mills having integrated bleaching processes.

Diluted NCG System

Fjordcell's process involves oxidation of TRS contained in diluted NCG coming from the mill. Four vents in particular are covered by the regulations on sulfate pulp plants, and the diluted NCG produced by these vents is atomized with a solution of 10 g/l of chlorine dioxide (see Figure 1).

Originally, the diluted NCG system was an alkaline scrubber using E_OP effluent coming from the bleaching process, which contained residual peroxide. Recently, the capacity of the diluted NCG system was increased, as the amount of TRS coming from the process had increased as well, and there had been modifications to the system (DNCG fiber filter).

Four NCG sources are treated—vents from the vibrating screens, from the foam tank, from the ash mixing tank, and from the brown stock washers.