PULP & PAPER

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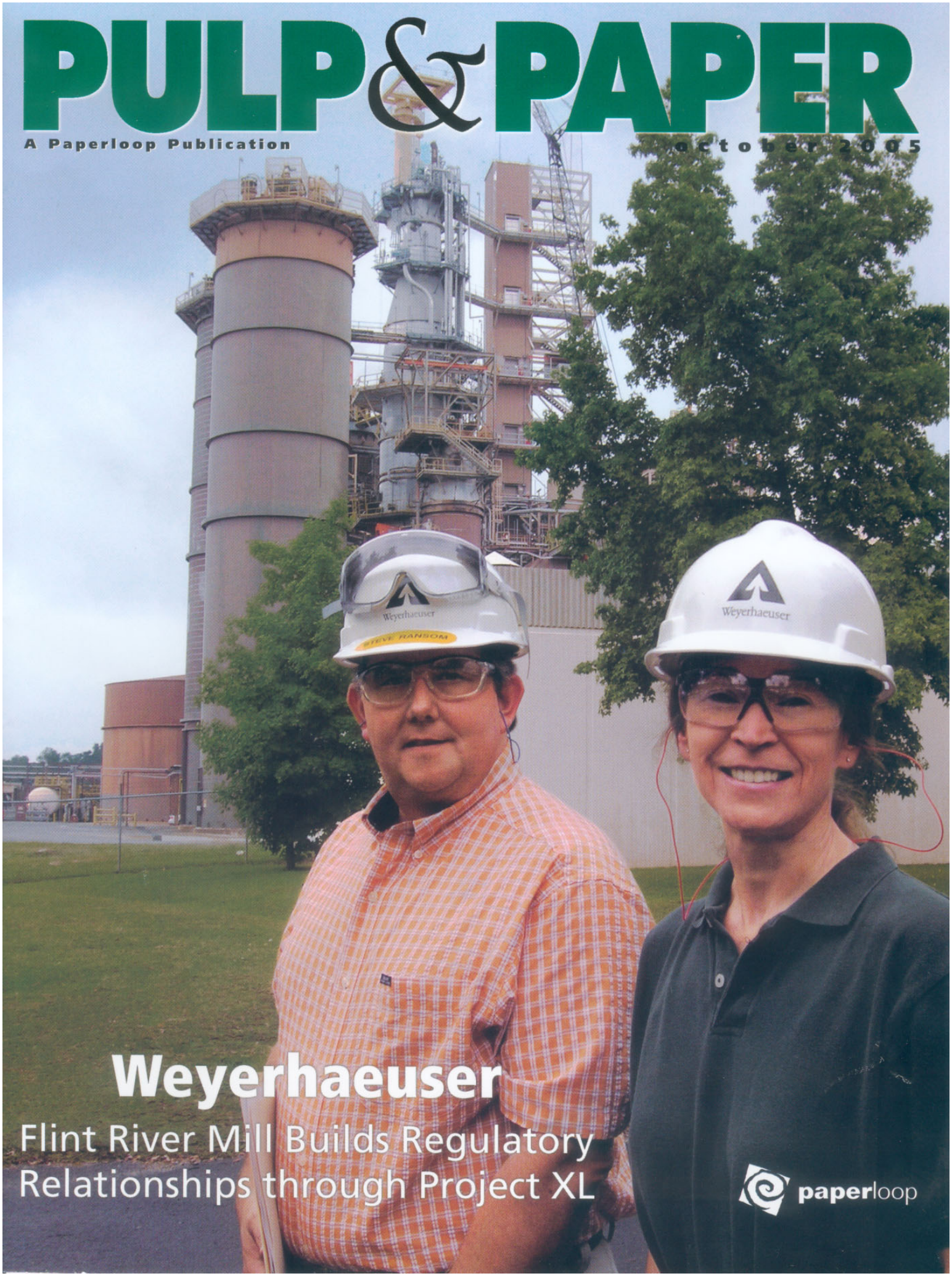

Weyerhaeuser

Flint River Mill Builds Regulatory Relationships through Project XL

paperloop

As a result of the trial at Cascades' Fjordcell mill in Jonquière, Que., no organochlorides or other objectionable compounds were measured at significant levels

Cascades Uses Chlorine Dioxide for Chemical Oxidation of TRS in NCG

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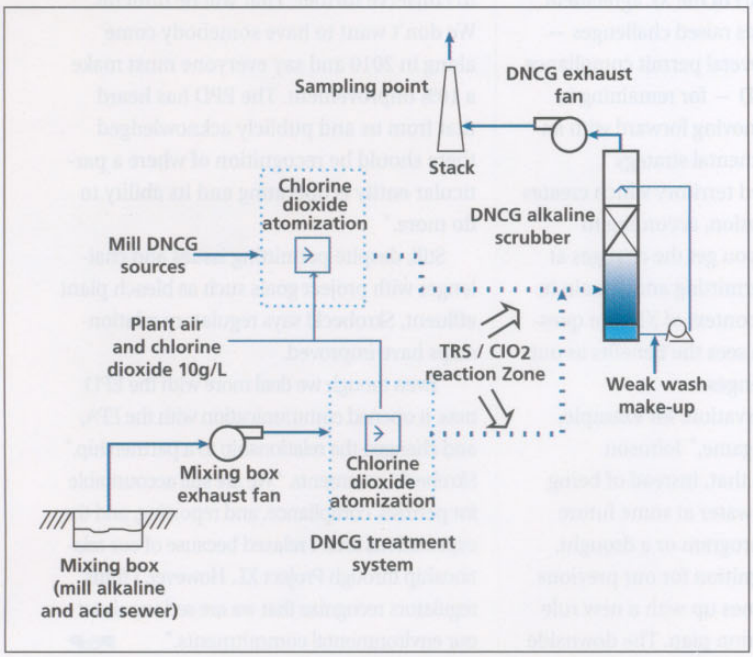
The total reduced sulfides (TRS) present in non-condensable gases (NCG) are partly responsible for the characteristic odor of kraft pulp mills. These odors originate mostly from the vents associated with pulp production equipment such as digesters, blow tanks and washers, or from black liquor recovery equipment. Since the early 1990s, the Canadian provinces[1] and the U.S.[2] have implemented regulations that force kraft pulp producers to collect and treat major vents containing TRS.

The traditional approach for treating these gases is incineration, either in a lime kiln, in the plant boilers, or in a dedicated incinerator. However, thermal incineration of NCG has several drawbacks, such as the risk of toxic gas inhalation (leakage points on existing boilers due to age), explosion risks, reluctance of the operating personnel, complexity of the security devices necessary to ensure safe injection of those gases into kilns or process boilers, high operating costs and high boiler modification costs.

FIGURE 1.

Process diagram showing the DNCG collection, transport and oxidation system at Fjordcell



Due to the costs involved with NCG incineration, alternate methods were developed in the beginning of the seventies by some mills[3], some equipment manufacturers[4,6,7] specializing in industrial emission treatment, and by research centres such as PAPRICAN[5]. Such methods chemically oxidize the contaminants present in the NCG using powerful oxidizers, such as sodium hypochlorite or chlorine dioxide, used to bleach the pulp. These oxidizers are therefore available to bleaching plants on site.

According to PAPRICAN's work and the stoichiometry of the reactions involved, the major components resulting from the reaction between chlorine dioxide and TRS are methanesulfonic acid and sulfonate salts. According to the authors, remaining components that may be formed with organic compounds are similar to those found in the bleach plant vent.

This text presents an extensive study on the reaction products resulting from the TRS chemical oxidation technique using chlorine dioxide atomization as implemented at the Cascades Fjordcell plant, in Jonquière, Que. Compared with traditional TRS treatment the technique is simple and low cost. It also provides environmental benefits for bleached kraft pulp mills.

Process Description

Cascades Fjordcell treatment of NCG using fresh ClO_2: The process oxidizes the TRS contained in the NCG coming from the brownstock washer and the combined vents are atomized with a solution of chlorine dioxide (10 g/L) (Figure 1).

The duct linking the vents to the washer, the foam tank and the ash mixing tank is connected to the vibrating screens' vents. The duct common to all four sources is connected to the existing diluted NCG alkaline scrubber. The connecting point for the injection of the chlorine dioxide has been installed as far as possible from the entry point of the NCG scrubber. The scrubber has been modified to optimize the contact time of the chlorine dioxide.

The spraying is done using a compressed air nozzle. This nozzle can spray a solution of fine droplets, as small as 5 to 50 microns in diameter. The chlorine dioxide is injected when a vacuum confirmation signal is sent along the diluted NCG (DNCG) duct. The vacuum is necessary to ensure that there are no dioxide emissions leaking into this sector of the plant.