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## **ZERO DISCHARGE: TECHNOLOGICAL PROGRESS TOWARDS ELIMINATING PULP MILL LIQUID EFFLUENT**

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### **Abstract**

The goal of this paper is to examine the potential for ecologically and economically sustainable kraft pulp mills. This paper reviews technical and scientific literature on a wide range of factors that will influence the overall impact of a pulp mill on its total environment. The emphasis is on efforts to achieve "closed-loop," or *Totally Effluent Free* (TEF) mills which eliminate all liquid effluent and minimize the quantity and environmental impact of air and land discharges. An attempt is made to draw conclusions about which areas of research and practical experience indicate the best pathways to move towards a kraft pulp industry with the lowest possible negative influence on its surroundings. Areas addressed include: effluent volume and toxicity, pulping and bleaching methods, environmental impact. Current progress on closed loop mills is reviewed and evaluated with a particular focus on non-bleach plant improvements, non-process element control, bleaching chemical choices and effects on mill equipment. Finally, treatment methods of effluent discharged from kraft pulp mills are presented.

*Keywords:* effluent, emissions, environmental impact, pulp and paper mill, sustainability

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