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### Heat recovery from recovery boiler smelt dissolving tank vent

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**Abstract** - Waste heat recovered from the exhaust was used to preheat boiler makeup water resulting in a reduction in the consumption of steam required to heat the boiler feed water and a reduction in greenhouse gas and other emission. It is designed that the Heat Recovery System from the smelt dissolving tank vent in the recovery boiler using spray condenser and heat exchanger. Due to the developing innovation, the proposed system specifies some new ideas and design in order to survive in this world. Due to the recent advances this system has been introduced. With an average heat recovery rate of 12 GJ/h, the project delivers significant energy cost savings as well as the added benefit of an 85% reduction produced by the smelt dissolving tank vent exhaust.

**Index words** - Smelt, Boiler, heat exchanger

#### I. INTRODUCTION

In 1958 the Thurso Pulp and Paper Company opened a 200 ton per day pulp mill in Thurso, Quebec. Now owned by Fraser Papers Ltd., the mill produces 700 tons per day of bleached hardwood Kraft pulp.

The mill has undertaken a number of measures to reduce their dependency on fossil fuel including the implementation of the smelt dissolving tank heat recovery project that is the subject of this paper.

The project was implemented on a turn-key basis by TEI and was completed on budget and on schedule with the system going into commercial operation in April 2008.

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#### LITERATURE REVIEW:

Richard R. Lunk and John D. Cunic has invested about the removal of  $SO_2$  from the exhaust gases. According to that the emission of  $SO_2$  in the exhaust vent can be controlled by adapting Flue Gas Desulphurization technique on the exhaust vent. In this method the Flue gas which comes out from the exhaust is sent through the port which is the bottom of the chamber. Limewater is used as a scrubbing reagent which will be sprayed through the nozzle and there by absorbs the supplied  $SO_2$ . At the end of this,

clean gas comes out through the outlet of the chamber. By adapting this technique 90% of the  $SO_2$  gases will be removed.

Prateek Verma has discussed about the condensing system in Automatic spray condensing system. He has given the clear information about the spray condenser which is widely used in refrigeration system for the purpose of condensing. According to that the steam is sent to the inlet port of the condenser and the water is sprayed through the nozzle and there by absorbing some amount of heat from the steam and consideration amount of water vapour will be released through the exhaust port.

G.F.Hewitt, G.L. Shires and T. Bott has investigated about the shell and tube exchanger in fundamental of heat and mass transfer. It is working under heat the principle of heat transfer between the hot fluid and cold fluid. Mostly the hot water contains some contaminants hence we won't use it directly and that's why cold fluid will be used in heat exchanger which just absorbs the heat from the hot fluid and thereby reducing the contamination.

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Williams D.B.G., and Lawton .M has investigated in drying of organic solvents about the desiccant wheel. The main function of the wheel is to absorb the heat and the moisture content by absorbing material such as silica gel. The desiccant wheel contains of the porous in the surface. When the gas passed through the wheel the heat as well as moisture will be absorbed.

#### PROJECT DESCRIPTION



Finally, the fly ash is removed electrostatic precipitation before the combustion exhaust to the atmosphere by an induced draft fan. Carry-over from the furnace causes deposits in the super heater, the boiler – bank and economizer to keep the heating surface clean. Some boiler also equipped with maintain steam production in the events a shortage of black liquor.

#### CONCLUSION

Thus the heat is successful recovered using the spray condenser and heat exchanger. And the pollutants like SO are removed with the help of flue gas desulphurization process. Hence the large amount of water vapour is condensed which can be used for other purpose. Finally the amount of heat recovered is 18MJ/hr and the mass of water recovered by using the spray condenser and the heat exchanger is 7650lit/hr.

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