

## FACT SHEET 86

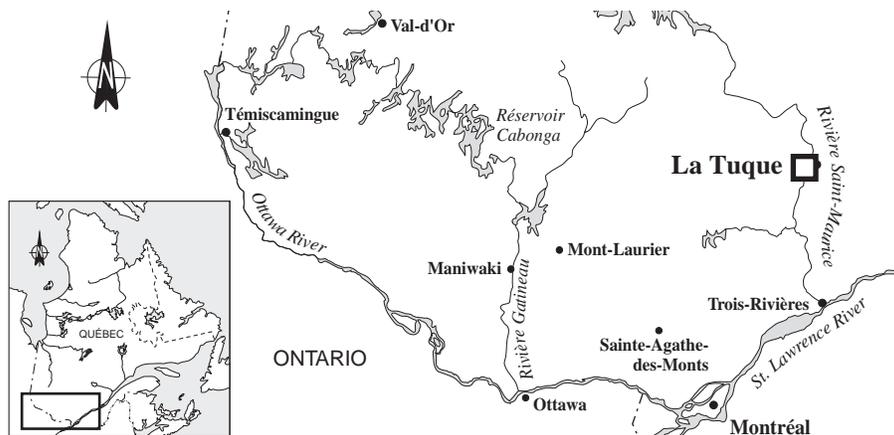
# St. Laurent Paperboard Inc., La Tuque Mill

1000 de l'Usine Road  
La Tuque, Quebec  
G9X 3P8

*A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

*The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The ST. LAURENT PAPERBOARD INC., LA TUQUE MILL is in Group 3, comprising regulated industrial plants.*

*The objective for Group 3 is to check toxic discharges of regulated plants against environmental objectives and to establish corrective measures for maximum reduction of deleterious effects on the receiving environment.*



## INDUSTRIAL PLANT

### *Paperboard mill*

The ST. LAURENT PAPERBOARD INC., LA TUQUE MILL manufactures unbleached and bleached paperboard from wood fibres. The mill can also produce market pulp. A kraft process is used for pulping; three continuous digesters and 19 batch digesters are used. About 65% of the pulp produced is bleached in a three or four-step operation. Chlorine, sulphur dioxide, caustic soda, hydrogen peroxide, oxygen and chlorine dioxide are used for bleaching. The unbleached or bleached pulp is fed to two machines that produce containerboard. The cooking liquor is regenerated by a variety of operations (evaporation, concentration, combustion, and causticizing). In 1995, the mill employs a work force of 700.

## PRODUCTION

### PRINCIPAL RAW MATERIALS

- Wood fibres (chips and sawdust)
- Diverse chemicals

### FINISHED PRODUCTS

- Bleached paperboard
- Unbleached paperboard
- Market pulp

# TREATMENT MEASURES

## INITIAL EFFLUENT VALUES

*Mainly BOD<sub>5</sub>*

Based on company data, in 1993 the mill discharged an average 179 808 m<sup>3</sup>/d of effluent containing notably:

- 29 960 kg/d of biochemical oxygen demand (BOD<sub>5</sub>)
- 8190 kg/d of suspended solids (ss)

## RESOURCES AND USES TO PRESERVE

*Cottaging area*

The ST. LAURENT PAPERBOARD INC., LA TUQUE MILL discharges its effluent into the Saint-Maurice River. Downstream of the hydroelectric dam, there is a sucker spawning ground. Another 5 km further downstream is an area favourable for perch spawning. Sport fishing is a popular pastime upstream of the mill and in the Grandes-Piles region, which is much further downstream. Île aux Goélands, 3 km downstream of the discharge point, provides a nesting ground for gulls. Some 8 km downstream of the discharge point is a bay favourable for waterfowl and semiaquatic mammals. The wharf close to La Tuque park is used by international participants in the *Classique internationale de canots de la Mauricie*. Opposite La Tuque, a cottaging area runs along the shoreline for close to a kilometre. The region is known for its recreation and tourist activities. Trois-Rivières draws its water from the Saint-Maurice, 7 km upstream of the mouth.

## ENVIRONMENTAL DISCHARGE OBJECTIVES

*Environmental protection*

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for the ST. LAURENT PAPERBOARD INC., LA TUQUE MILL will be available by 1997.

## EFFLUENT TREATMENT

*Biological treatment*

Alkaline industrial effluent is mixed in a mixing chamber, decanted and treated in an oxygen activated sludge biological treatment system before discharge into the Saint-Maurice River. Sanitary sewage is emptied into the sewerage system and then treated in the La Tuque wastewater treatment plant.

## PREVENTION AND CLEANUP MEASURES IMPLEMENTED

*Diverse measures*

In 1994, a number of changes in water management were made, and average flowrate dropped to 145 600 m<sup>3</sup>/d as a result, that is about 35 000 m<sup>3</sup>/d less than the preceding year. In 1995, a project to separate uncontaminated water was completed, reducing the flowrate by an additional 55 000 m<sup>3</sup>/d. A number of cleanup measures have been introduced since 1993: recovery wells were installed in certain parts of the mill, helping to significantly reduce high biochemical oxygen demand, and a mixing tank was built to mix acid and alkaline effluent; pH in the tank is automatically controlled by adding CO<sub>2</sub> or NaOH. In 1995, the ST. LAURENT PAPERBOARD INC., LA TUQUE MILL built a biological oxygen treatment system. These improvements, which cost a total of \$37 million, allow to reduce biochemical oxygen demand by more than 95%.

## REGULATORY COMPLIANCE - WATER COMPONENT

*Standards met*

The ST. LAURENT PAPERBOARD INC., LA TUQUE MILL is subject to the provincial regulation respecting pulp and paper mills and the federal pulp and paper effluent regulation. With the implementation of cleanup measures, the company has complied with the latest provincial standards, which came into force on September 30, 1995.

# POLLUTION ABATEMENT

## CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

*Mainly resin acids*

The Chimiotox index gauges the load of all toxic substances in industrial effluent using toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives monthly data for the last quarter of 1995, along with the Chimiotox values estimated from them assuming an effluent flowrate of 93 675 m<sup>3</sup>/d. According to these data (supplied by the company in compliance with the provincial pulp and paper regulation), resin acids account for 43% of the Chimiotox index.

Figure 1 was plotted from characterization data collected in May 1992 for the industrial effluent abatement program (PRRI) and from company monthly data for the last quarter of 1995 (except for the data on dioxins and furans, which were collected in the first half of 1996). The Chimiotox index estimated from the 1992 PRRI characterization was applied to 1993 and 1994. Projections for 1996 to 1998 are based on company data for the last quarter of 1995 (dioxins and furans excepted).

Table 1 *Chimiotox Index (1995) - St. Laurent Paperboard Inc., La Tuque Mill\**

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Dehydroabietic acid	38.144	77	2 937
Total aluminum	245.002	11	2 695
Mineral oil and grease	26.064	100	2 606
Abietic acid	106.308	19	2 020
3,4,5-trichloroguaiacol	0.869	1 000	869
Total copper	1.448	451	653
4,5-dichlorocatechol	0.547	1 000	547
2,3,7,8-T <sub>4</sub> CDD equivalent	7 x 10 <sup>-9</sup>	71 428 571 429	529
4,5-dichloroguaiacol	0.425	1 000	425
Palustric acid	17.851	19	339
Isopimaric acid	15.193	19	289
Chlorodehydroabietic acid	14.713	19	280
Pimaric acid	11.386	19	216
6-chlorovanillin	0.210	1 000	210
Oleic acid	10.940	19	208
Neoabietic acid	10.717	19	204
4,5,6-trichloroguaiacol	0.203	1 000	203
3,4,5-trichlorocatechol	0.175	1 000	175
Total zinc	9.846	9.4	93
Sandaracopimaric acid	4.817	19	92
Stearic acid	4.421	19	84
Linoleic acid	4.376	19	83
Dichlorostearic acid	1.837	19	35
Dichlorodehydroabietic acid	0.525	19	10
Total nickel	0.869	10	9
<b>CHIMIOTOX INDEX</b>			<b>15 811</b>

\* For an effluent flowrate of 93 675m<sup>3</sup>/d

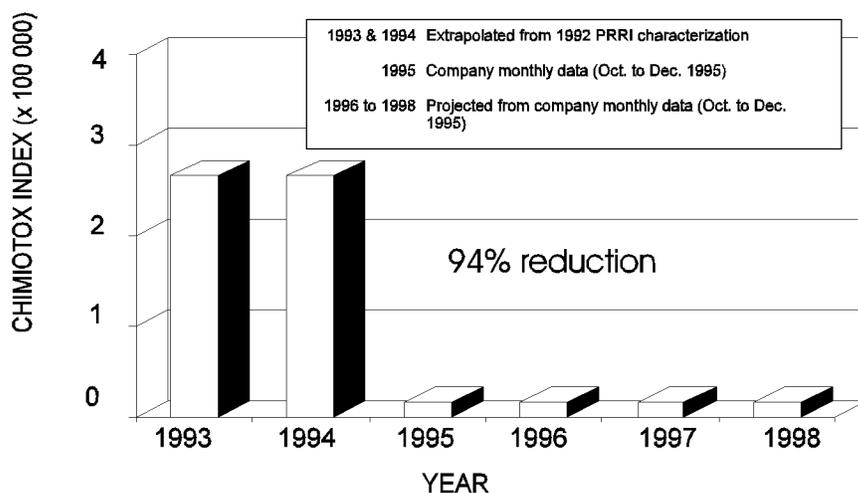


Figure 1 *Chimiotox Index Trends (1993 to 1998)  
St. Laurent Paperboard Inc., La Tuque Mill*

## VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 targeted plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(a)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

Two of these eleven persistent toxic substances were detected during the effluent self-monitoring program activities of the last quarter of 1995: dioxins and furans. The environmental discharge objective for these substances will be available soon.

## KEY POINTS

- 94% reduction in Chimiotox index
- Biological treatment system built in 1995 at a cost of \$37 million
- Better control of effluent load and flowrate
- Non-toxic effluent

## ADDITIONAL INFORMATION

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## EFFLUENT TOXICITY

### *Non-toxic effluent*

Since September 30, 1995, it has been illegal under the Quebec pulp and paper regulation to release into the environment or a storm sewer a final effluent that is acutely lethal to rainbow trout, as demonstrated by bioassays. New cleanup measures implemented at the ST. LAURENT PAPERBOARD INC., LA TUQUE MILL have helped to reduce effluent toxicity. Company data from the last quarter of 1995 indicate the final effluent is not toxic.

## REDUCTION INSUBSTANCES MONITORED

### *Drop in flowrate and loads*

According to company data, during the last quarter of 1995 the mill discharged 86 158 m<sup>3</sup>/d of effluent containing notably:

- 5131 kg/d of suspended solids (SS)
- 1578 kg/d of biochemical oxygen demand (BOD<sub>5</sub>)

Between 1993 and 1995, biochemical oxygen demand dropped 95%, effluent flowrate dropped 52%, and suspended solids 37%. The decreases are due mainly to the cleanup measures implemented between 1993 and 1995.

Based on December 1995 inventory

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