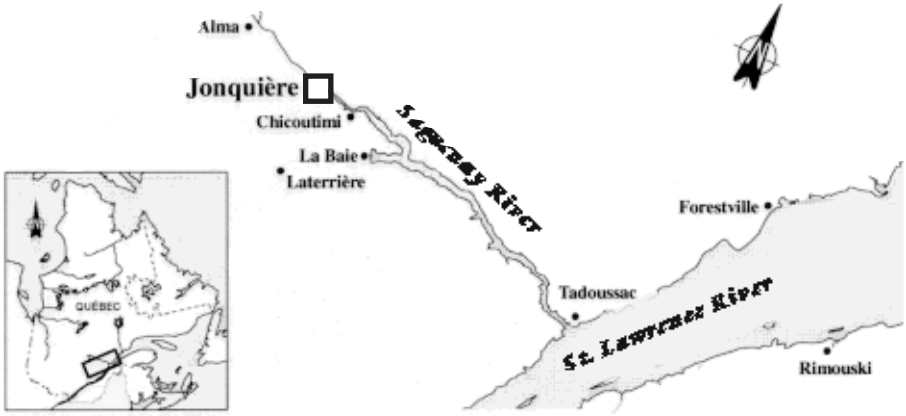
FACT SHEET No. 43

Cascades Jonquière Inc.

4010 Saint-André Road

Jonquière, Quebec

G7S 5K5



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 liquid toxic waste and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each of which has been given a specific objective. CASCADES JONQUIÈRE INC. is part of Group 4, comprising the 50 plants targeted under the St. Lawrence Action Plan.

The objective set for Group 4 is to pursue cleanup efforts and perform environmental monitoring to achieve a 90% reduction in liquid toxic waste. Between 1988 and 1995, the 50 plants reduced their toxic effluent discharges by 96%.

INDUSTRIAL PLANT

A paper mill engaged in recycling

The CASCADES JONQUIÈRE INC. mill produces multilayered paperboard (three-ply) from mechanical pulp, bleached kraft bought in bales, and secondary fibres (recycled cardboard and paper). In the mill, a mixture of wood chips and shavings is changed into pulp by means of refiners; the by-product is then sifted and cleaned. Bleached kraft bales, and cardboard and paper for recycling, are also sent to the paper mill to be transformed into pulp for the paperboard machine. The paperboard formed by this process is dried by steam-heated rollers and small ventilation nozzles, which use air heated by natural gas. The plant has an annual production capacity of 143 500 t. In 1995, the mill operated at 78% of rated capacity and employed a work force of 205.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Wood chips
- Wood shavings
- Baled kraft pulp
- Recycled paper and cardboard

FINISHED PRODUCTS

- Multilayered paperboard (3-ply)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

BOD_5 and SS

According to company data for 1988, the average effluent discharge was 35 678 m^3/d, containing:

- 5610 kg/d of biochemical oxygen demand (BOD_5)
- 4938 kg/d of suspended solids (SS)
- 2.4 g /yr of dioxins and furans

At the time the data was gathered, the kraft pulp and chlorine bleaching workshops were still in operation. In 1991, the effluent discharge was considerably reduced and there was substantial improvement in the quality of the effluent after these workshops were closed.

RESOURCES AND USES TO PRESERVE

A well-equipped recreational area

The effluent of the CASCADES JONQUIÈRE INC. paper mill empties into the Sables river near its confluence with the Saguenay River at the foot of the Price Dam. The mid-Saguenay is heavily used by recreational fishermen, water sports enthusiasts and vacationers. Downstream from the Shipshaw Dam, there are facilities along the banks for various recreational activities. In Jonquière, golfing, hiking, cross-country skiing and downhill skiing are all possible along the Saguenay. Geese are found in this region, attracted by the foreshore flats with their bulrushes. There are few fish in this section of the Saguenay, because of the strong current, tidal influence and industrial and urban pollution. However, all the fish species from lake Kénogami (brook char, ouananiche, rainbow smelt, sucker, lake chub, goatfish and stickleback) are found in the Sables river and, therefore, in the Saguenay, where the Sables river waters merge with those of the main current.

WATER QUALITY BASED OBJECTIVES

Environmental protection

In order to protect resources and uses, environmental objectives for toxic effluent are calculated in terms of concentrations and loads that must not be exceeded. These values are guidelines in seeking the most appropriate treatment solutions for protecting the environment. The water quality based objectives of CASCADES JONQUIÈRE INC. will be available on request by 1997.

EFFLUENT TREATMENT

Recovery of fibres

Wastewater containing fibres is collected and then directed to recovery tanks. The water is first filtered through four tilted sieves and a filter with a rotating drum. The filtrate then passes through an Albany filter before being sent to a Poseidon-type air flotation cell, which separates out the solids so that the treated wastewater can be reused in the process. The wood shavings wash water is also recycled in the fibre recovery system.

PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

Better use of water

Since 1988, various cleanup measures have been instituted to reduce the volume of wastewater and its pollution level. The changes made in the bleaching workshop (1988, prior to the closure of the kraft pulp and bleaching workshops), the installation of a recovery system for black liquor (1989), and the implementation of primary treatment for certain effluents (1990), are a few examples. Furthermore, a program for reducing the consumption of fresh water was launched in 1991.

In 1993, the plant reduced its discharge of cooling water by reusing the water from the refiners and compressors. During the same year, recovery of the sealing liquid for the vacuum pumps (in some instances replacing fresh water with white water) and increased use of recovered fibres reduced the concentration of suspended solids (SS) in the wastewater.

In September 1995, CASCADES JONQUIÈRE INC. implemented a biological secondary treatment system.

REGULATORY COMPLIANCE - WATER COMPONENT

A successful treatment program

The CASCADES JONQUIÈRE INC. plant in Jonquière is subject to the Quebec Regulations Respecting Pulp and Paper Mills, as well as to the federal Pulp and Paper Effluent Regulations.With the introduction of the new biological secondary treatment, CASCADES JONQUIÈRE INC. has complied with the latest provincial standards, which came into force on September 30, 1995.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

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

Table 1 gives the data supplied by the company, in accordance with provincial regulations governing pulp and paper mills, for the months of October to December 1995, as well as the Chimiotox values calculated from them for an effluent discharge of 4296 m^3/d. The data show that PCBs were preponderant in the treated water, representing 50% of the Chimiotox index.

Figure 1 is plotted from the 1990 and 1994 Action Plan characterizations and monthly company data (Oct. to Dec.1995). For 1988, the Chimiotox index reflects the 1990 characterization, adjusted 30% to take into account the period prior to the changes in the bleaching workshop (1988). The Chimiotox indices for 1991 to 1993 were projected from the 1990 characterization, taking into account the closure of the kraft pulp workshop and the discontinuation of the chlorine bleaching process in November 1991. The 1994 Action Plan characterization confirmed the reduction in effluent toxicity after the closure of the kraft pulp sector.

The change in the Chimiotox index shows that the closure of the kraft pulp workshop, the discontinuation of the chlorine bleaching process, and other cleanup measures caused the index to fall 99.9% from 1988 to 1995.

Table 1 ***Chimiotox Index(1995) - Cascades (Jonquière) Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
PCB	7.09×10^{-07}	12 658 228	9
Dehydroabieiti Acid	0.067	77	5
Stearic Acid	0.063	19	1
Abietic Acid	0.073	19	1
Linoleic Acid	0.004	19	<1
Oleic Acid	0.023	19	<1
Isopimaric Acid	0.011	19	<1
Levopimaric Acid	0.012	19	<1
Palustric Acid	0.005	19	<1
Pimaric Acid	0.008	19	<1
Sandaracopimaric Acid	0.005	19	<1
CHIMIOTOX INDEX**			**18**

* For effluent discharge of 4296 m^3/d

** October to December 1995.

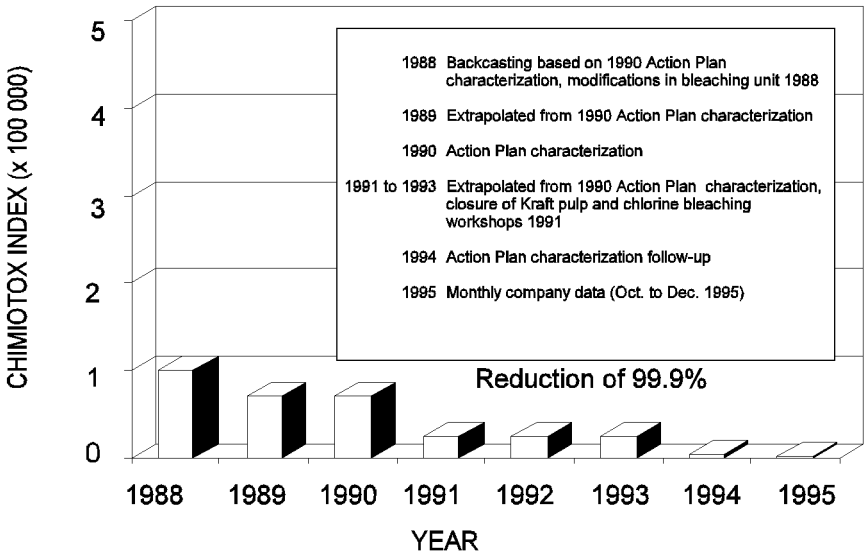


Figure 1 ***Changes in toxic effluent discharges, 1988-1995 Cascades (Jonquière) Inc.***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

Elimination of dioxins and furans

One long-range objective of SLV 2000 is the virtual elimination of 11 persistent and bioaccumulative toxic substances from 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 alkyl, benzo(*a*)pyrene and hexachlorobenzene.

At the time of the first Action Plan characterization study in 1990, two of the eleven persistent toxic substances were detected: dioxins and furans. At that time, the combined load of these substances (TCDD equivalent) was 0.196 mg/d. At the time of the second characterization study for Action Plan in February 1994, no dioxins or furans were detected. The disappearance of these substances can be explained by the closure of the kraft pulp workshop and the chlorine bleaching workshop in 1991.

PEEP TOXICITY REDUCTION

Zero toxicity

The Potential Ecotoxic Effects Probe, or PEEP, combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the CASCADES JONQUIÈRE INC. plant in Jonquière, two series of bioassays were carried out. The PEEP value of 5.6 obtained in 1994 was the same as that for 1990.

Since September 30, 1995, the provincial Regulations Respecting Pulp and Paper Mills prohibit the discharge of a final effluent whose toxicity has reached an acute lethality level (as demonstrated by bioassays with rainbow trout) into a storm sewer or elsewhere in the environment. The implementation of new cleanup measures at the CASCADES JONQUIÈRE INC. plant have helped reduce the toxicity of the effluent. According to the figures for October to December 1995, the effluent is non-toxic.

REDUCTION IN SUBSTANCES MONITORED

A significant reduction in SS and BOD_5

Based on company data for October, November and December 1995, the average effluent discharge was 4568 m^3/d, containing:

- 218 kg/d of biochemical oxygen demand (BOD_5);
- 247 kg/d of suspended solids (SS).

Since the Action Plan program was started in 1988, pollution from suspended solids and biochemical oxygen demand have been greatly reduced. Company data for 1988 to 1995 show a 95% reduction in SS and a 96% reduction in BOD_5 because of the new biological secondary treatment that came on stream in September 1995.

TECHNOLOGICAL DEVELOPMENT

Technological adaptation of an activated-sludge flotation unit

The results from a previous flotation project, "Technological adaptation of a dissolved air flotation unit to clarify the mixed treatment liquor from paper de-inking plants using activated sludge or aerated effluent lagoons", show that there is great potential for flotation technology in activated-sludge systems. The proposed project will explore how the technology for an activated-sludge flotation unit can be adapted to treat the effluent from coated paperboard and fine paper plants. CASCADES JONQUIERE INC. and Rolland Inc. in Saint-Jerôme want to conduct trials, in collaboration with the Centre for Pulp and Paper Research of the University of Quebec in Trois-Rivières (UQTR) and Poseidon Wastewater Treatment Inc., to examine the feasibility of using this treatment for their effluent. Environment Canada, the Ministère de l'Environnement et de la Faune du Québec (MEF) and the Quebec Centre for Biomass Recovery (CQVB) contributed 26%, 25% and 15% respectively toward the project's financing. The project began in March 1994 and ended in March 1995.

KEY POINTS

- **Implementation of several cleanup measures: water reduction at source, recirculation and installation of several treatment systems**
- **Biological secondary treatment system came on stream in 1995**
- **99.9% reduction in the Chimiotox index**
- **Closure in November 1991 of the kraft pulp and chlorine bleaching workshops**

Based on December 1995 inventory.Information reviewed by Gilles Legault, SLV 2000.

ADDITIONAL INFORMATION

Chimiotox index and PEEP:
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