FACT SHEET 88

Cascades Inc., Paper Division; Papier Kingsey Falls, Cascades Inc. Division; Cascades Forma-Pak Inc. and Industries Cascades Inc.

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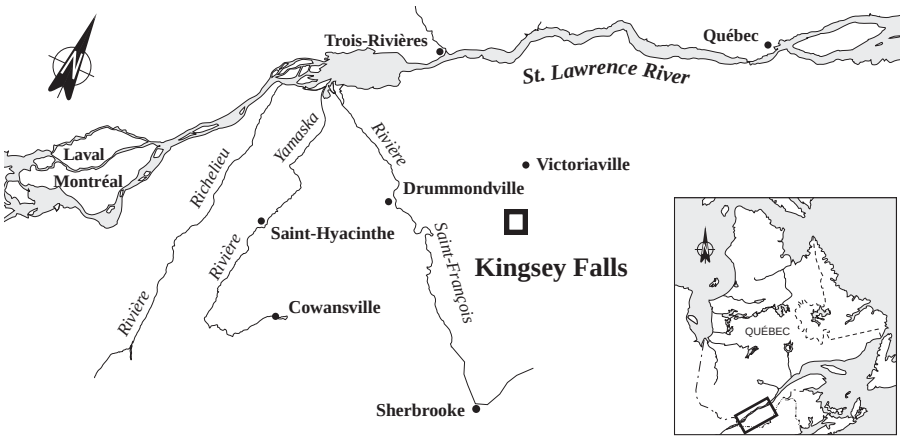
A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.

The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The CASCADES complex in Kingsey Falls is in Group 3, comprising regulated industrial plants.

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



INDUSTRIAL PLANT

A four-mill complex

The CASCADES group complex in Kingsey Falls comprises four mills: CASCADES INC., PAPER DIVISION - PAPIER KINGSEY FALLS, CASCADES INC. DIVISION - INDUSTRIES CASCADES INC. and CASCADES FORMA-PAK INC. Pulp is made in each of the mills from recycled paper and paperboard, and screened on site. CASCADES INC., PAPER DIVISION manufactures linerboard, tube paper or coreboard, and reel protection paper. PAPIER KINGSEY FALLS; CASCADES INC. DIVISION produces unbleached multilayer paperboard on a cylinder machine for manufacture of coreboard, partition board and containerboard. INDUSTRIES CASCADES INC. makes tissue paper and towel paper. This mill contains a de-inking facility and three hygienic paper conversion units. CASCADES FORMA-PAK INC. manufactures single-use products for hospitals and produces egg trays by moulding. Together the four mills employ a work force of 300.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Recycled paper and paperboard
- Caustic soda
- Dyes
- Biocides
- Formamidinesulphinic acid
- Hydrogen peroxide
- Lubricating oils

FINISHED PRODUCTS

- Linerboard
- Unbleached multilayer paperboard
- Tissue paper
- Paper towel
- Egg trays
- Single-use products for hospitals

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

BOD_5 and SS

Based on company data, in 1993 the complex discharged 6274 m^3/d of effluent containing notably:

- 4530 kg/d of biochemical oxygen demand (BOD_5)
- 731 kg/d of suspended solids (SS)

RESOURCES AND USES TO PRESERVE

Fish species

The CASCADES group complex in Kingsey Falls discharges its effluent into the Nicolet sud-ouest River, a river seeded with three species of salmonidae upstream of Kingsey Falls since 1978. Many other fish species are found around the effluent discharge point; the most important, apart from minnows, are alewife, silver mullet, silver redhorse, white sucker, rock bass, brown bullhead, northern pike and yellow walleye. There is a large walleye spawning ground immediately upstream of the discharge point, and another immediately downstream of it. The area downstream of the discharge point attracts sport fishermen looking for salmonidae, walleye and pike. The Domaine Beaudoin, a cottaging area, is less than a kilometre downstream of the discharge point. Canoeing is a favourite pastime on this stretch of the river. Downstream, the closest drinking-water intake is in the municipality of Sainte-Perpétue, about 50 km from Kingsey Falls.

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 CASCADES group complex will be available by 1997.

EFFLUENT TREATMENT

Flotation and clarification

Effluent from the mills is neutralized and then stripped of ss by flotation on Poseidon cells. The treated water is emptied into the Nicolet sud-ouest River. Sanitary sewage is discharged into the public sewerage system and then treated in the Kingsey Falls wastewater treatment plant.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Secondary treatment system

In 1994 and 1995, changes were made to allow reuse of filtered white water in the different mills. Effluent flowrate decreased as a result. In addition, an activated sludge secondary treatment system was introduced in 1995, and the primary treatment sequence was modified to increase ss stripping capability. These improvements cost more than $3.5 million.

REGULATORY COMPLIANCE - WATER COMPONENT

Effluent meets standards

The CASCADES group complex in Kingsey Falls is subject to provincial and federal pulp and paper regulations. With the implementation of the environmental 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

Low Chimiotox index

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 5656 m^3/d. According to these data (supplied by the company in compliance with the provincial pulp and paper regulation), total lead accounts for 58% of the Chimiotox index.

Figure 1 was plotted from characterization data collected in February 1992 for the industrial effluent abatement program (PRRI) and from company monthly data for the last quarter of 1995. The Chimiotox index estimated from the 1992 PRRI characterization data was applied to 1993 and 1994. Projections for 1996 to 1998 are based on company data for the last quarter of 1995. The decrease in effluent toxicity is due mainly to the secondary treatment system introduced in 1995 and other cleanup measures implemented in 1994 and 1995.

Table 1 ***Chimiotox Index (1995) - Cascades group complex in Kingsey Falls****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total lead	0.379	314	119
Total aluminum	3.984	11	44
Total copper	0.076	451	34
Total zinc	0.322	9.4	3
Dehydroabietic acid	0.036	77	3
Stearic acid	0.042	19	1
Total nickel	0.038	10	<1
Linoleic acid	0.018	19	<1
Linolenic acid	0.012	19	<1
CHIMIOTOX INDEX			**205**

* For an effluent flowrate of 5656 m^3/d

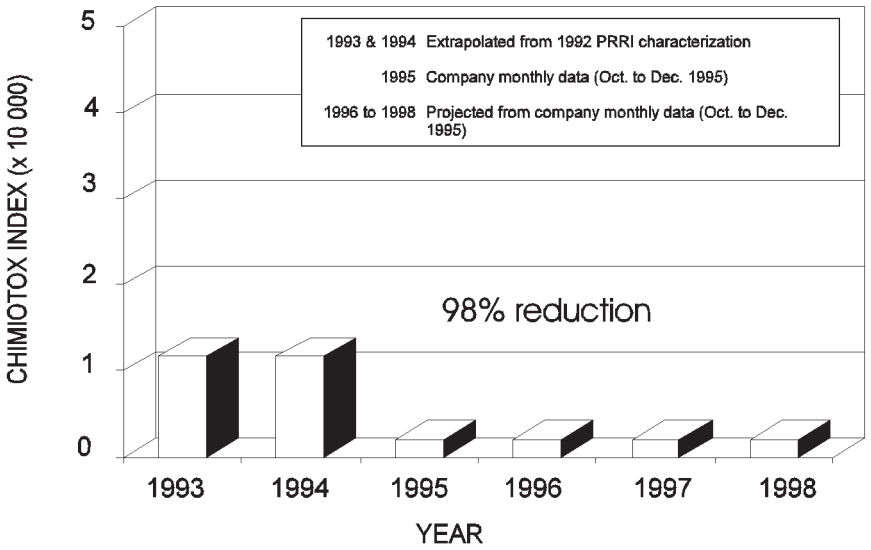


Figure 1 ***Chimiotox Index trends (1993 to 1998) Cascades group complex in Kingsey Falls***

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.

None of these eleven persistent toxic substances were detected in final effluent from the CASCADES industrial complex during the self-monitoring program activities of the last quarter of 1995.

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 CASCADES group mills have helped to reduce effluent toxicity. Company data from the last quarter of 1995 indicate final effluent is not toxic.

REDUCTION IN SUBSTANCES MONITORED

Drop in biochemical oxygen demand

According to company data, during the last quarter of 1995 the mill discharged 5656 m^3/d of effluent containing notably:

- 1119 kg/d of suspended solids (SS)
- 1058 kg/d of biochemical oxygen demand (BOD_5)

Between 1993 and 1995, biochemical oxygen demand dropped 77%, mainly because of the activated sludge secondary treatment system introduced. The increase in suspended solids stems from temporary difficulties encountered during startup of the secondary treatment system at the end of 1995.

TECHNOLOGICAL DEVELOPMENT

Activated sludge treatment assessment

The CASCADES group participated in several projects designed to characterize effluent from the recycled-paper de-inking plant and to evaluate (on a pilot scale) and then perfect an activated sludge treatment system. The system design and operating criteria developed through these projects have made it possible to eliminate effluent toxicity and meet the requirements of the new pulp and paper regulations. The laboratory and pilot-scale tests were performed at CASCADES subsidiary facilities. The main pilot tests were conducted at the Pulp and Paper Research Centre of the *Université du Québec à Trois-Rivières* (UQTR). The projects began in October 1991 and ended in December 1994.

KEY POINTS

- **98% reduction in Chimiotox index**
- **Activated sludge treatment system started up and primary treatment modified; more than $3.5 million invested**
- **Participation in assessments of activated-sludge and flotation effluent-treatment systems**
- **Non-toxic effluent**

ADDITIONAL INFORMATION

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Published by authority of the Minister of the Environment

Catalogue No. En153-6/88-1996E
ISBN 0-662-23319-0
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)