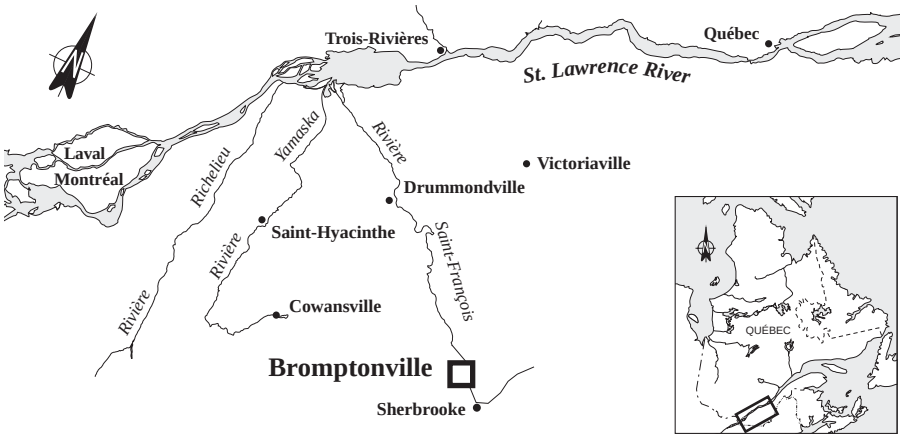
FACT SHEET 101

Kruger inc.

220 Windsor Road
Bromptonville, Quebec
J0B 1H0



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 4 groups, each with a specific objective. The KRUGER INC. mill in Bromptonville is part of Group 3, comprising the regulated industrial plants.

The objectives for Group 3 are to assess the toxic waste of regulated plants in terms of environmental objectives and establish corrective measures for optimum reduction of any harmful impact on the receiving environment.

INDUSTRIAL PLANT

Newsprint production

KRUGER INC.'S Bromptonville mill makes newsprint using two processes: thermomechanical grinding of spruce (60%) and pine chips (40%) in pressurized refiners, and de-inking of newspapers and magazines and pulping the fibres. The thermomechanical pulp is bleached with sodium hydrosulphite, while the de-inked pulp is bleached with hydrogen peroxide. A sodium sulphite solution is sometimes used in winter to soften frozen chips before grinding them. This technique results in the extraction of soluble materials, which boosts biochemical oxygen demand (BOD_5) and creates an imbalance in the wastewater treatment system. The annual production capacity is 346 750 t. In 1995, the mill operates at 84% of capacity and employs a work force of 430.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Spruce chips
- Pine chips
- Newspapers and magazines (de-inked fibres)

FINISHED PRODUCTS

- Newsprint
- De-inked pulp

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Mainly BOD_5

Based on company data, in 1993 the mill had an effluent discharge of 35 939 m^3/d, containing notably:

- 9591 kg/d of biochemical oxygen demand (BOD_5)
- 3762 kg/d of suspended solids (SS)

RESOURCES AND USES TO PRESERVE

A fishing area

Effluent from KRUGER INC.'s Bromptonville mill is discharged into the Saint-François river from two outfalls on the right bank. The section located between Bromptonville and the Domtar dam in Windsor is a habitat for wildfowl and various kinds of fish, and includes spawning grounds for yellow walleye and pike. A special fishing season applies in certain sectors for small-mouth bass, pike, walleye, and trout. The river is also used for kayaking, canoeing, boating, and sport fishing. Domtar has an industrial water intake in this area. Along the section running from the Domtar dam in Windsor to Drummondville is located the drinking water intake for Drummondville. Commercial fishing for bait fish is practised from Windsor to Drummondville. The Celanese company also has an industrial water intake in Drummondville.

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. The water quality based objectives for KRUGER INC. have been calculated and are available on request.

EFFLUENT TREATMENT

Sequential biological reactor

Discharge from the KRUGER INC. mill in Bromptonville comes mainly from the pulp plant and from paper-making machines. About one-tenth of the effluent volume is treated in a KROFTA-type flotation cell. Effluent from the de-inking plant is treated in another KROFTA-type flotation cell before being mixed with machine effluent. Wastewater has been channeled to a secondary sequential biological reactor (SBR) treatment system since 1995, before being discharged into the Saint-François river. Slightly contaminated water is reused in the process. Domestic sewage is handled separately and sent to the Bromptonville sewage treatment plant.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Secondary treatment

KRUGER INC. received permission to set up a secondary SBR treatment system on December 2, 1994. Work began in April 1994 and was completed in September 1995. The overall cost of the installation was $18 million.

REGULATORY COMPLIANCE - WATER COMPONENT

Compliance with standards

KRUGER INC.'s Bromptonville mill is subject to federal and provincial regulations on pulp and paper mills. Cleanup efforts have enabled KRUGER INC. to comply with the standards laid down by new Quebec regulations that came into force on September 30, 1995.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Significant reduction in Chimiotox Index

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

Table 1 shows monthly data for the last three months of 1995, supplied by the company under the provincial regulation governing pulp and paper mills, and Chimiotox values estimated using these figures, assuming an effluent flowrate of 27 976 m^3/d. Based on these data, mineral oil and grease make up 80% of the Chimiotox index.

Figure 1 is based on March 1992 Industrial Effluent Abatement Program (PRRI) characterization data, along with monthly company data for the last three months of 1995. The Chimiotox index calculated from the PRRI characterization data was used as is for 1993 and 1994. Forecasts for 1996 to 1998 are based on company data for October to December 1995. The 99% reduction in the Chimiotox index is mainly due to the efficiency of the secondary treatment system.

Table 1 ***Chimiotox Index (1995) - Kruger Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Mineral oil and grease	4.965	100	497
Total copper	0.099	451	45
Total zinc	4.270	9.4	40
Total aluminum	1.986	11	22
Dehydroabietic acid	0.120	77	9
Nickel total	0.298	10	3
Stearic acid	0.155	19	3
Linoleic acid	0.072	19	1
Oleic acid	0.072	19	1
Abietic acid	0.066	19	1
CHIMIOTOX INDEX			**622**

* For an effluent flowrate of 27 976 m^3/d.

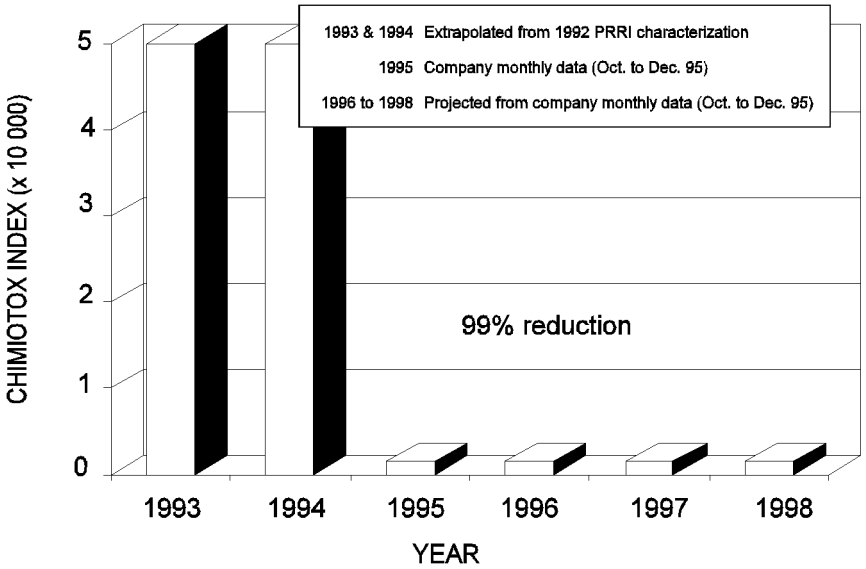


Figure 1 ***Chimiotox Index Trends 1993 to 1998 Kruger Inc.***

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.

Based on data from the self-regulating effluent monitoring program for the last three months of 1995, none of the eleven persistent toxins were detected.

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. For the KRUGER INC. mill, the implementation of new cleanup measures has helped reduce the effluent toxicity. Data for October to December 1995 show that final effluent is not toxic.

REDUCTION IN SUBSTANCES MONITORED

Load reduction

According to company data for the last four months of 1995, the average effluent discharge was 28 084 m^3/d, containing notably:

- 260 kg/d of suspended solids (SS)
- 257 kg/d of biochemical oxygen demand (BOD_5)

Between 1993 and 1995, biochemical oxygen demand decreased by 97%, while the suspended solid loads decreased 93%. The reduction in toxic loads is mainly due to the start-up of the secondary biological treatment system.

KEY POINTS

- **Chimiotox index reduced by 99%**
- **Installation of a sequential bioreactor secondary treatment system; investment of $18 million**
- **Non-toxic effluent**

Based on December 1995 inventory

ADDITIONAL INFORMATION

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Published by authority of the Minister of the Environment

Catalogue No. En153-6/101-1996E
ISBN 0-662-23317-4
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)