

FACT SHEET No. 10

Domtar Security Papers

19 Mill Street

Beauharnois, Quebec

J6N 3B5

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. The DOMTAR SECURITY PAPERS mill, located in Beauharnois, 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

Specializing in fine papers

The DOMTAR SECURITY PAPERS mill in Beauharnois has an annual production capacity of 26 900 t of paper. Its output consists of fine paper and currency and security papers. Each year, it produces and consumes about 1920 t of rag pulp, made from denim that is shredded and cooked with chemicals in digesters. The pulp is then bleached, refined, purified, washed and formed into sheets. The sheets are reduced in a grinder and mixed with bought pulp and wastepaper pulp. Paper scraps are turned back into pulp by grinding. When bleaching is required, a non-chlorinated agent is used. All products are made by non-continuous processes. The end mixture is fed to Fourdrinier paper machines. In 1995, the mill operated at 35% of capacity for paper and 34% for pulp. It employed a work force of 220.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Kraft chemical pulp
- Blue and white denim
- Sodium hypochlorite
- Sulphuric acid
- Sodium hydroxide
- Alum

FINISHED PRODUCTS

- Fine papers
- Currency papers
- Security papers

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

BOD₅ and ss

According to company data, in 1988 the plant had an effluent discharge of 8776 m³/d, containing:

- 725 kg/d of biochemical oxygen demand (BOD₅)
- 299 kg/d of suspended solids (ss)

RESOURCES AND USES TO PRESERVE

Wildlife area to be protected

The DOMTAR SECURITY PAPERS mill in Beauharnois discharges its industrial wastewater into Lake Saint-Louis. The Îles de la Paix National Wildlife Area is located in Lake Saint-Louis, less than 2 km below Beauharnois. The marshes and plant communities on those islands provide sanctuary for aquatic birds and spawning grounds for Largemouth bass and Northern pike. The south shore of the lake and the riverbanks offer habitats for muskrat and beaver. The lake is also a popular area for commercial and recreational fishing; Yellow perch, Northern pike and Walleye are the main game species. The mouth of the Saint-Louis River is used for water-based activities. There are several public wharfs and boat-launching ramps along the south shore of Lake Saint-Louis between Beauharnois and Châteauguay. The Châteauguay water intake is 11 km below Beauharnois.

WATER QUALITY BASED OBJECTIVES

Environmental protection

Water quality based 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 the DOMTAR SECURITY PAPERS mill will be available on request by 1997.

EFFLUENT TREATMENT

Secondary treatment

In accordance with the wastewater treatment program (PAE) implemented in 1989, the cooking liquor is treated by a non-continuous activated-sludge process, then in a sequential bioreactor. This effluent is combined with all other process water and accumulates in a settling pond (primary treatment). Since August 1995 the resulting effluent from this process has been sent to the sequential bioreactor. Finally, it is discharged into Lake Saint-Louis. Sanitary sewage empties into the municipal sewer system and undergoes biological treatment at the Beauharnois municipal wastewater treatment plant.

PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

\$6 million investment

Since committing to a wastewater treatment program in 1989, the company has introduced several measures to reduce discharges at source. In 1993, the BOD₅ load was reduced by the addition of a wastepaper pulping process and the recovery and treatment of size waste together with the cooking liquor. Between 1988 and 1994, new purifiers and screens were installed to recover suspended solids. In May 1994, the company undertook construction of a sequential bioreactor. The secondary treatment system, which came on stream in August 1995, will enable it to meet the standards set out in the new pulp and paper mill regulations. The total cost of work related to the installation of bioreactors was \$6 million.

REGULATORY COMPLIANCE-WATER COMPONENT

Compliance with standards

The company is now in compliance with the present pulp and paper mill regulations and the interim authorizations issued. In 1995 it undertook construction of a sequential bioreactor in order to meet the latest regulatory standards, which came into effect September 30, 1995.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Chimiotox index falls sharply

The Chimiotox index gauges the load of all toxic substances present 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 provided by the company, in accordance with provincial regulations on pulp and paper mills, for the months of October to December 1995, with Chimiotox values calculated on the basis of those figures, for an effluent flow of 6074 m³/d. The figures show a predominance of aluminum in the treated wastewater, at 47% of the Chimiotox index, followed by copper at 26%.

Figure 1 is plotted from the 1990 characterization data. The 1990 Chimiotox index was carried over unchanged for the years from 1988 to 1993. The 1994 index was extrapolated from the 1990 characterization results adjusted to account for dioxin and furan data from the company. According to the Chimiotox index, the reduction in liquid toxic waste amounted to 88% for the period 1988-1995 thanks to the cleanup measures implemented.

Table 1 *Chimiotox Index (1995) - Domtar Security Papers**

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total Aluminum	6.753	11	74
Total Copper	0.093	451	42
2,3,7,8-T4CDD	4.85x10 ⁻¹⁰	7.143E+10	35
Total Zinc	0.536	9.4	5
Stearic acid	0.056	19	1
Dehydroabietic acid	0.008	77	1
Total Nickel	0.047	10	<1
Oleic acid	0.005	19	<1
CHIMIOTOX INDEX**			158

* For effluent discharge of 6074 m³/d.

** October to December 1995.

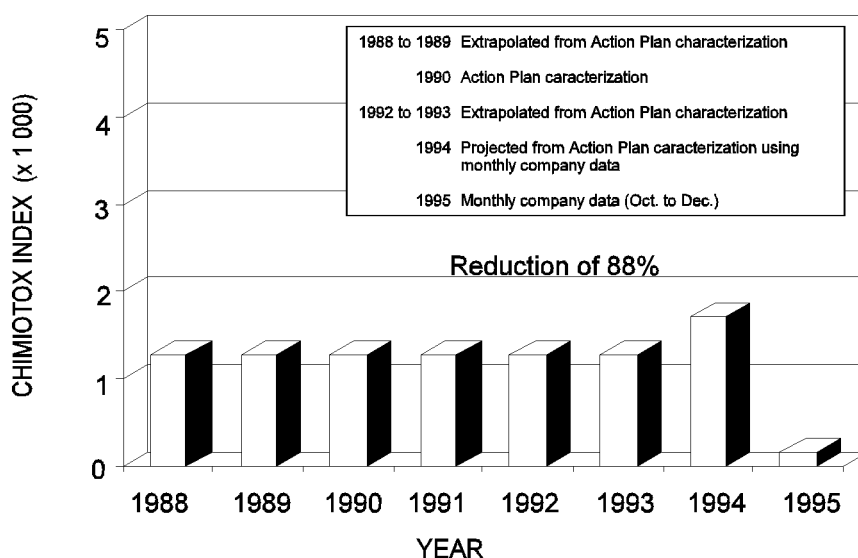


Figure 1 *Changes in toxic effluent discharges, 1988-1995 - Domtar Security Papers*

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of 11 persistent bioaccumulative toxic substances from the effluent of the 106 priority 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 alkyl, benzo(a)pyrene and hexachlorobenzene.

According to the monthly data for October to December 1995, two of the 11 targeted substances, dioxins and furans, were detected during the 1990 characterization study. The average measured concentration was 0.08 pg/L and the daily load, therefore, was 4.85×10^{-10} kg/d. For the period of the 1993-98 Action Plan, the industry was required, as an intermediate goal, at least to meet the standards set in the new pulp and paper mill regulations. The concentrations stipulated in the provincial regulations are equivalent to 15 pg/L, while the federal regulations refer to a measurable concentration of dioxins and furans.

PEEP TOXICITY REDUCTION

Non-toxic effluent

The Potential Ecotoxic Effects Probe, or PEEP, combines results from 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. One series of bioassays was conducted for the DOMTAR SECURITY PAPERS mill in Beauharnois. The 1990 PEEP index was estimated at 4.8.

Since September 30, 1995, the provincial regulations respecting pulp and paper mills have prohibited 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 DOMTAR SECURITY PAPERS mill has helped reduce the toxicity of the effluent. Data for October to December 1995 indicate the effluent is non-toxic.

REDUCTION IN SUBSTANCES MONITORED

Appreciable drop in ss and BOD₅

Averaging company data for the month of October, November and December 1995 yields a final effluent discharge of 5040 m³/d, containing:

- 134 kg/d of suspended solids (ss)
- 50 kg/d of biochemical oxygen demand (BOD₅)

Since implementation of the St. Lawrence Action Plan in 1988, the DOMTAR SECURITY PAPERS mill in Beauharnois has achieved an appreciable reduction in discharges of suspended solids and biochemical oxygen demand. Company data for the period 1988-1995 show BOD₅ and ss in the final effluent reduced by 93% and 55%, respectively.

KEY POINTS

- **88% reduction in the Chimiotox index**
- **Several treatment measures: reduction at source and biological treatment of the cooking liquor**
- **Late 1995 start-up of a secondary treatment system costing \$6 million**

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

ADDITIONAL INFORMATION

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