

FACT SHEET No. 31

Stone-Consolidated Corporation, Wayagamack Division

La Potherie Island

Trois-Rivières, Quebec

G9A 5E9

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. STONE-CONSOLIDATED CORPORATION, WAYAGAMACK DIVISION, located in Trois-Rivières, 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

Diversified production

The STONE-CONSOLIDATED CORPORATION mill in Trois-Rivières makes specialty papers, pulp sold in bales and directory paper from mechanical (groundwood) and kraft (sulphate) pulps.

Both types of pulp are made on site. The mill occasionally purchases de-inked pulp for custom jobs. The kraft pulp is bleached with peroxide and sodium hypochlorite. The facility has an annual production capacity of 215 500 t of specialty papers, 36 800 t of baled pulp and 10 500 t of newsprint. In 1995, it operated at 79% of capacity and had a work force of 640.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Logs (softwood and hardwood)
- Wood chips (softwood and hardwood)
- De-inked pulp in bales
- Starch
- Peroxide
- Sodium hypochlorite
- Colouring
- Biocides
- Lubricating oils
- Limestone
- Sodium carbonate

FINISHED PRODUCTS

- Directory paper
- Specialty kraft paper
- Semi-bleached groundwood pulp in bales
- Semi-bleached kraft pulp in bales
- Paper for paper bags
- Other thin papers

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

BOD₅ and ss

According to partial company data, the mill had an effluent discharge of 76 797 m³/d in 1988, containing:

- 12 821 kg/d of biochemical oxygen demand (BOD₅)
- 9902 kg/d of suspended solids (ss)

RESOURCES AND USES TO PRESERVE

Gateway to an extensive watershed

The STONE-CONSOLIDATED CORPORATION mill in Trois-Rivières is located on La Potherie Island, where the St. Lawrence and the Saint-Maurice meet (eastern side). It releases its industrial wastewater into the Saint-Maurice on both sides of the island. That effluent flows along the north shore of the St. Lawrence, then slowly mixes with the water in the shipping channel. Saint-Quentin Island, also at the confluence of the two rivers, is a park featuring recreational facilities (boating, golf, cruises, windsurfing, water skiing).

The St. Lawrence at Trois-Rivières has no extensive wildlife habitats, although a few hundred geese and ducks stop along its shores in spring and fall. The Saint-Maurice opens onto a vast system of rivers and lakes containing spawning grounds for several fish species (northern pike, yellow pike, burbot). There is a small commercial fishery (shad, catfish, tomcod) in the vicinity of the islands at the confluence of the Saint-Maurice.

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 STONE-CONSOLIDATED CORPORATION will be available on request by 1997.

EFFLUENT TREATMENT

Two primary clarifiers

Process wastewater from the barking shop is circulated to a primary clarifier. Surplus white water and the remaining process wastewater are treated in a second primary clarifier. Water from three of the paper machines (1, 2 and 6) undergoes oil separation before primary treatment. Wastewater from the bleaching shop and the spent liquor recycling unit goes directly to biological treatment. Part of the uncontaminated water is returned to the process stream. Sanitary sewage is mixed with the industrial wastewater.

PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

\$46 million invested

From 1988 to 1991, the SS load dropped about 50% through the implementation of a white-water recovery program (1988) and the addition of a second primary clarifier. In fall 1993, the pulp bleaching stages were modified. The chlorine, caustic soda and sodium hypochlorite cycle was replaced by a peroxide cycle, followed by two sodium hypochlorite stages. That change affected wastewater composition: loads of dioxins, furans and absorbable halogenated organic compounds (AHOCs) dropped; trihalomethane loads increased. In July 1994, however,

restart of the specialty paper machine (shut down in late 1991) increased BOD₅ and ss loads from 300 to 400 kg/d. From March 1994 to September 1995, part of the industrial wastewater was circulated to the treatment station (aerated lagoons) of the Greater Trois-Rivières inter-municipal waste board. Since September 1995, the mill has been separating largely uncontaminated cooling water and discharging it, untreated, into the natural environment (from outfalls 1 and 5). These effluent will be subject to monitoring.

In 1994, the company undertook construction of a biological secondary wastewater treatment system (R.B.S.) to improve effluent quality and thus meet the standards prescribed by the latest pulp and paper mill regulations. Overall, the secondary treatment measures are estimated at \$46 million.

REGULATORY COMPLIANCE - WATER COMPONENT

New standards

The STONE-CONSOLIDATED CORPORATION mill in Trois-Rivières is subject to the Quebec Regulations Respecting Pulp and Paper Mills and the federal Pulp and Paper Effluent Regulations. The company's treatment facilities enable it to meet the latest provincial regulatory standards, which took effect September 30, 1995.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mostly mineral oil and grease

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 supplied by the company in accordance with the Quebec Regulations Respecting Pulp and Paper Mills for the months of October to December 1995, as well as the Chimiotox values calculated therefrom, for an effluent flow of 78 707 m³/d. The figures show a predominance in the treated wastewater of mineral oil and grease, which make up 47% of the Chimiotox index, and dioxins and furans, which account for 35%.

Figure 1 is plotted from the 1990 and 1994 characterization data. The Chimiotox indices for 1988-1993 were extrapolated from the 1990 results. The projections for 1995 reflect the efficiency of the biological secondary treatment system implemented in compliance with the latest regulatory standards for pulp and paper mills. The Chimiotox index is down by 77% for the period from 1988 to 1995.

Table 1 *Chimiotox Index (1995) - Stone-Consolidated Corporation, Wayagamack Division**

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Mineral Oil and Grease	92.929	100	9 293
2,3,7,8-T ₄ CDD equivalent	0.97x10 ⁻⁷	71 428 571	6 928
Total Lead	3.325	314	1 044
Dehydroabietic Acid	7.217	77	556
Abietic Acid	23.066	19	438
Linolenic Acid	20.818	19	396
Total Aluminium	23.256	11	256
Total Copper	0.281	451	127
Dichlorostearic Acid	6.096	19	116
Oleic Acid	6.067	19	115
Palustric Acid	4.705	19	89
Linoleic Acid	4.367	19	83
4,5-Dichloro guaiacol	0.075	1 000	75
Stearic Acid	3.854	19	73
Isopimaric Acid	2.269	19	43
Total Nickel	3.235	10	32
Total Zinc	3.094	9.4	29
Neoabietic Acid	1.305	19	25
Pimaric Acid	0.787	19	15
Levopimaric Acid	0.611	19	12
Sandaracopimaric Acid	0.573	19	11
CHIMIOTOX INDEX**			19 755

* For effluent discharge of 78 707 m³/d.

**October to December 1995.

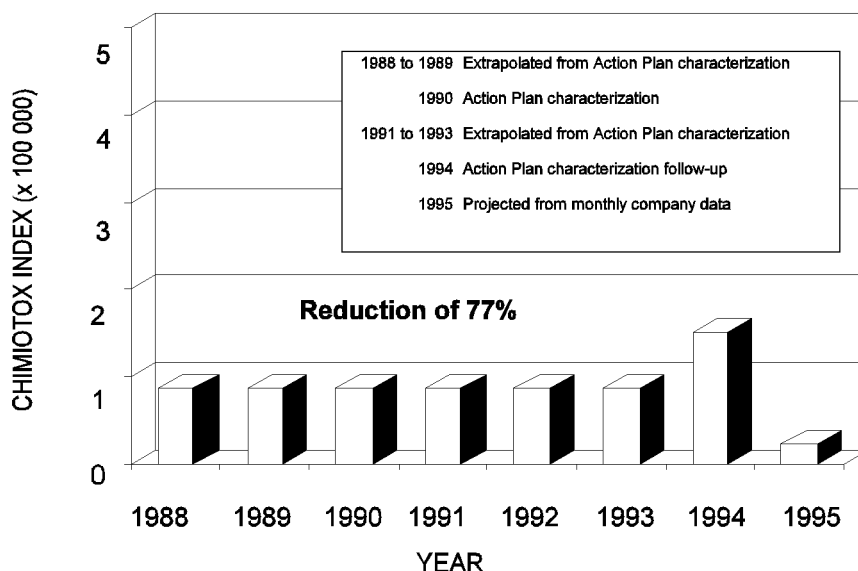


Figure 1 *Changes in toxic effluent discharges, 1988-1995 - Stone-Consolidated Corporation, Wayagamack Division*

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

Dioxins and furans

One long-range objective of SLV 2000 is the virtual elimination of 11 persistent 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.

According to the monthly data for October to December 1995, two of the 11 persistent toxic substances, dioxins and furans, were detected. An average concentration of 1.64 pg/L was measured, which corresponds to a load of 0.97×10^{-7} kg/d. For the period of the new action plan (1993-1998), industry will be obliged to meet the standards laid down by the new provincial regulations respecting pulp and paper mills. Provincial regulations call for a maximum of 15 pg/L and refer to a measurable concentration of dioxins and furans.

PEEP TOXICITY REDUCTION

Non-toxic effluent

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. Three series of bioassays were conducted for the STONE-CONSOLIDATED CORPORATION mill in Trois-Rivières. The 1994 PEEP value of 6.0 is similar to the values obtained for 1990 and 1989.

As of September 30, 1995, the provincial Regulations Respecting Pulp and Paper Mills prohibit discharging 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. Compliance with the new standards should lower the PEEP value by the time of the next evaluation. The implementation of new cleanup measures at the STONE-CONSOLIDATED CORPORATION mill has helped reduce the toxicity of the effluent. According to the data for October to December 1995, the effluent is non-toxic.

REDUCTION IN SUBSTANCES MONITORED

Lower SS and effluent flow

According to monthly company data for October, November and December 1995, the mill had an effluent discharge of 80 142 m³/d, containing:

- 2200 kg/d of suspended solids (ss)
- 1410 kg/d of biochemical oxygen demand (BOD₅)

Company data for 1988-1995 show suspended solids reduced by 83% and biochemical oxygen demand by 90%, a performance explained by the treatment measures implemented during that time.

KEY POINTS

- 77% reduction in the Chimiotox index
- Start-up of secondary wastewater treatment system in June 1995 (\$46 million investment)

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

ADDITIONAL INFORMATION

Chimiotox index and PEEP:

Gilles Legault, Environment Canada (514) 283-3452.

Water quality based objectives:

Francine Richard, MEF (418) 644-3574.

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):

Julie-Anne Bourret (819) 373-4444.

Environment officer at STONE-CONSOLIDATED CORPORATION INC.:

Pierre Lacoursière (819) 373-9230, extension 237.

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