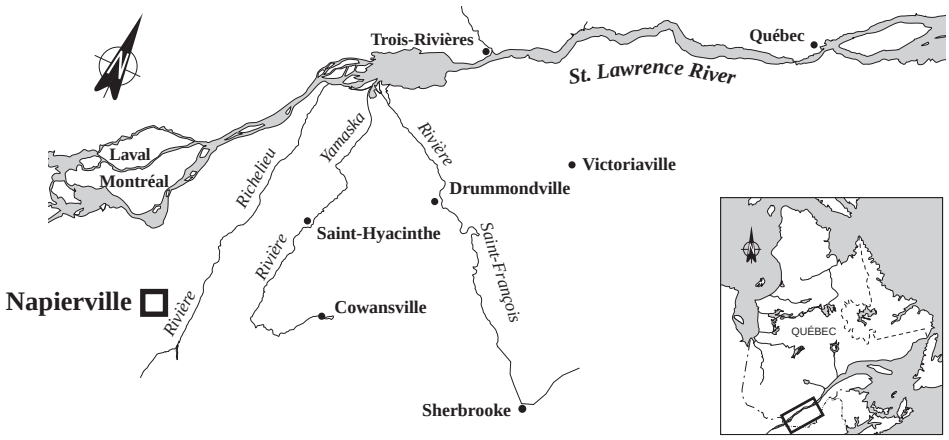
FACT SHEET 59

Napierville Refineries Inc.

175 de l'Église Street
Napierville, Quebec
J0J 1L0



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 NAPIERVILLE REFINERIES INC. plant in Napierville is in Group 1, comprising plants that discharge inadequately treated effluent.

The objective for Group 1 is to reduce toxic effluent discharges in targeted plants by 90%.

INDUSTRIAL PLANT

Naphthalene purification

The NAPIERVILLE REFINERIES INC. plant in Napierville purifies naphthalene and packages 1,4-dichlorobenzene and 1,2-dichlorobenzene as well as naphthalene. There are several steps in the purification process: crystallization, centrifugal solids separation, solids recovery, and distillation of the solvent used for crystallization. Certain process steps are sometimes repeated more than once depending on the desired degree of purity. A final distillation is performed to make the naphthalene whiter. The finished product (as well as 1,4-dichlorobenzene) is solidified and indirectly water cooled for packaging. 1,2-dichlorobenzene is received in liquid form by rail and placed in drums; it is not transformed in any way. Annual production capacity of the plant is 40 000 t (finished product). In 1997, the plant operated at 75% capacity and employed a work force of 39.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Raw naphthalene
- 1,4-dichlorobenzene
- 1,2-dichlorobenzene

FINISHED PRODUCTS

- Refined naphthalene
- 1,4-dichlorobenzene (packaged)
- 1,2-dichlorobenzene (packaged)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Dichlorobenzenes

According to biennial industrial wastewater analyses, in 1993 the plant discharged an average of 2117 m^3/d of effluent, containing notably:

- 0.74 kg/d of 1,4-dichlorobenzene
- 0.39 kg/d of 1,2-dichlorobenzene
- 0.14 kg/d of 1,3-dichlorobenzene

RESOURCES AND USES TO PRESERVE

Abundant and varied aquatic life

The NAPIERVILLE REFINERIES INC. plant empties its effluent into the L'Acadie River, a tributary of the Richelieu. Aquatic life is abundant and varied in the L'Acadie River, despite the mediocre quality of the water. The first drinking water intake downstream of the plant is on the Richelieu, opposite Otterburn Park; this intake belongs to the *Régie intermunicipale de l'eau de la vallée de la Richelieu* (the Richelieu valley intermunicipal water commission). According to surveys conducted by the Ministère de l'Environnement et de la Faune du Québec (MEF), 35 species of fish inhabit the L'Acadie River, and there are spawning grounds and rearing areas. Two spawning grounds were discovered close to the plant. The quick-water spawning grounds are also feeding areas. The L'Acadie River is suitable for commercial live-bait fishing and sport fishing (yellow walleye and northern pike), especially at the confluence with the Richelieu. There is also a campground and a cottaging area along the banks of the L'Acadie River downstream of the Brunelle bridge.

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 NAPIERVILLE REFINERIES INC. have been calculated and are available on request.

EFFLUENT TREATMENT

Treatment of chlorobenzenes, recovery of oil and settleable matter

Process water is sent to a stripper to treat the chlorobenzenes. Gases from the stripper are channelled to two biological filters. The NAPIERVILLE REFINERIES INC. plant empties its wastewater (cooling water and runoff) into a retention basin where entrained oils and settleable solids are recovered. The treated effluent is then discharged in the L'Acadie River. The plant's water supply comes from groundwater and rainwater. Domestic sewage is channelled to the Napierville wastewater treatment plant.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Introduction of chlorobenzene treatment and confinement of new areas

A stripper was installed to treat chlorobenzenes and two biological filters were put in place to treat gases. A retention basin was built around discontinuous distillation reservoirs. An asphalt cover confines the new area to reduce the infiltration of rainwater in the area of contaminated soil.

REGULATORY COMPLIANCE - WATER COMPONENT

A soil cleanup agreement

In 1992, NAPIERVILLE REFINERIES INC. signed an agreement to clean up contaminated soil which could affect the groundwater supplying indirect cooling water used in the plant process. The next set of effluent standards will stem from this agreement, valid until the year 2000.

In 1998, the company will continue to monitor its effluent to determine the effectiveness of its treatment process and make any changes required.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Chlorobenzenes

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 shows SLV 2000 characterization data collected in April 1995 and the Chimiotox values estimated from them, assuming an effluent flowrate of 2117 m^3/d. Six substances were selected in testing for more than 120. Based on these data, 1,4-dichlorobenzene accounts for 52% of the Chimiotox index, 1,3-dichlorobenzene for 28%, and 1,2,4-trichlorobenzene for 11%.

Figure 1 is plotted from SLV 2000 characterization data and data collected in 1997. The Chimiotox index calculated from these data was reported unchanged for 1993 to 1998. The reductions reported in 1997 and 1998 are related to cleanup measures introduced by the company.

Table 1 ***Chimiotox Index (1995) - Napierville Refineries Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
1,4-dichlorobenzene	0.212	250	53
1,3-dichlorobenzene	0.072	400	29
1,2,4-trichlorobenzene	0.006	2 000	11
1,2-dichlorobenzene	0.034	143	5
1,2,3,5-tetrachlorobenzene	3×10^{-4}**	10 000	3
1,2,3-trichlorobenzene	2.57×10^{-4}**	2 000	1
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* Assuming an effluent flowrate of 2117 m^3/d (6 substances selected in testing for more than 120).

**Load calculation based on analytical data which are near methodological detection limits.

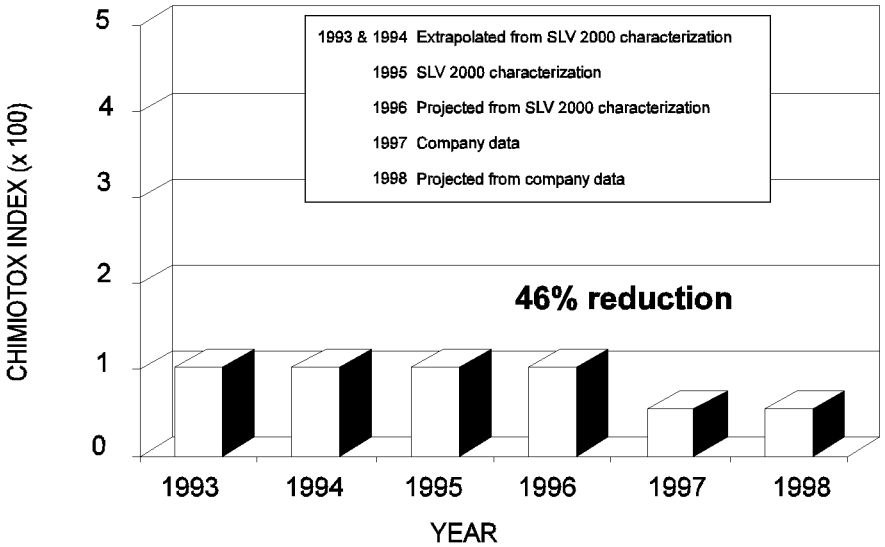

Figure 1 ***Chimiotox Index Trends (1993 to 1998) Napierville Refineries Inc.***

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 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 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 the eleven targeted persistent and bioaccumulative toxic substances were detected in effluent from the NAPIERVILLE REFINERIES INC. plant during the 1995 SLV 2000 characterization.

PEEP TOXICITY REDUCTION

Low toxicity

The Potential Ecotoxic Effects Probe (PEEP) combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scaleof increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the NAPIERVILLE REFINERIES INC. plant, a series of bioassays was carried out during the 1995 SLV 2000 characterization, yielding a PEEP of 2.9, and showing low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Reduction in dichlorobenzenes

According to the biennial industrial wastewater analyses, in 1997 the plant discharged an average of 2117 m^3/d of effluent, containing notably:

- 0.148 kg/d of 1,4-dichlorobenzene
- 0.008 kg/d of 1,2-dichlorobenzene
- 0.043 kg/d of 1,3-dichlorobenzene

Between 1993 and 1997, the 1,2-dichlorobenzene loads dropped 98%, and the 1,4-dichlorobenzene and 1,3-dichlorobenzene loads dropped 80% and 70% respectively. These reductions are the result of cleanup measures introduced by the company.

KEY POINTS

- **46% reduction in Chimiotox index due to cleanup measures introduced**

Information revised January 1998

ADDITIONAL INFORMATION

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