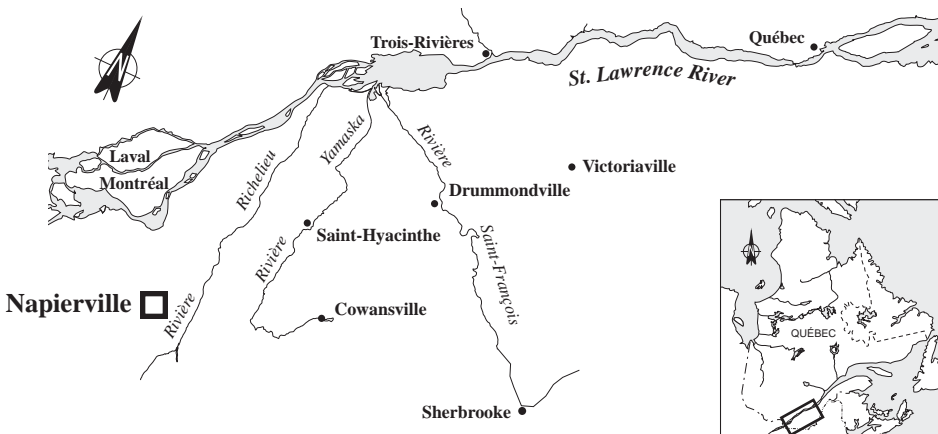


## FACT SHEET 59

# 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 general 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, which comprises plants whose effluent may contain toxic substances even though it is treated.*

*The objective for Group 1 is to reduce toxic effluent of 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 (and 1,4-dichlorobenzene too) 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 1995, the plant operates at 75% capacity and employs 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 2117 m<sup>3</sup>/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 L'Acadie River, a tributary of the Richelieu. Aquatic life is abundant and varied in 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 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. 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 L'Acadie River downstream of Brunelle bridge.

## ENVIRONMENTAL DISCHARGE OBJECTIVES

### *Environmental protection*

Environmental discharge objectives are established to preserve local resources and uses. Expressed as maximum permissible loads and concentrations for effluent released into the environment, these guidelines are used to select treatment methods which best promote environmental protection. Discharge objectives for the NAPIERVILLE REFINERIES INC. have been calculated.

## EFFLUENT TREATMENT

### *Oil and solids recovery*

The NAPIERVILLE REFINERIES INC. plant empties its wastewater (cooling water and stormwater) into a retention basin where entrained oils and settleable solids are recovered. The treated effluent is then discharged to L'Acadie River. The plant's water supply comes from groundwater and rainwater. Domestic sewage is channeled to the Napierville wastewater treatment plant.

## PREVENTION AND CLEANUP MEASURES IMPLEMENTED

### *No changes made*

Certain areas were paved with asphalt to prevent rainwater from infiltrating contaminated soil. No major changes to the manufacturing process or the industrial wastewater treatment system have been made since 1993.

## 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.

# 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 toxic contribution of each pollutant (Table 1).

Table 1 lists SLV 2000 characterization data collected in April 1995 and the Chimiotox values estimated from them assuming an effluent flowrate of 2117 m<sup>3</sup>/d. Six substances were selected in testing for more than 120. According to 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 based on SLV 2000 characterization data collected in 1995. The Chimiotox index calculated from these data was applied to the entire period from 1993 to 1998. No major changes have been made to the process and to the treatment system between 1993 and 1995.

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 x 10 <sup>-4</sup> **	10 000	3
1,2,3-trichlorobenzene	2.57 x 10 <sup>-4</sup> **	2 000	1

### CHIMIOTOX INDEX

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\* Assuming an effluent flowrate of 2117 m<sup>3</sup>/d (6 substances selected in testing for more than 120)

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

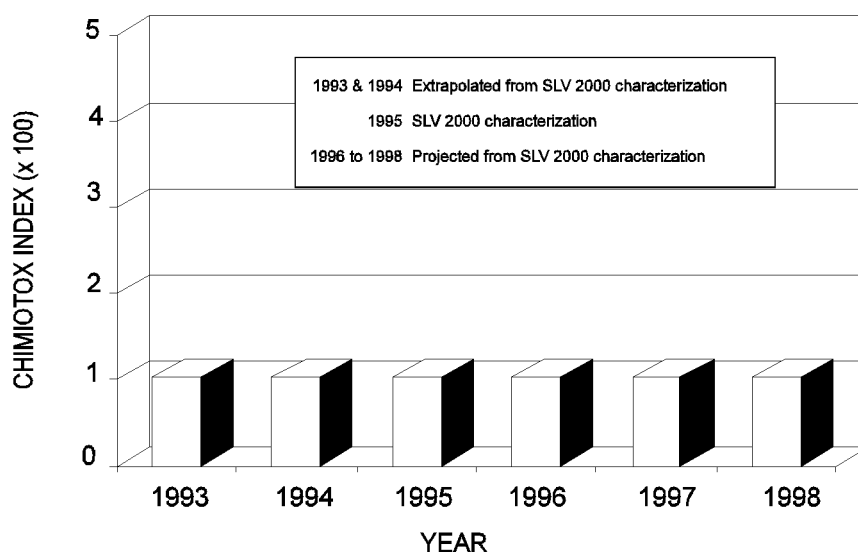


Figure 1 *Chimiotox Index Trends (1993 to 1998)  
Napierville Refineries Inc.*

## 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 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 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, or PEEP, combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale (1 to 10) of increasing toxicity and are used to monitor discharge trends over the years. A series of bioassays of effluent from the NAPIERVILLE REFINERIES INC. plant was conducted during the 1995 SLV 2000 characterization. The PEEP value obtained was 2.9, and the toxicity of the effluent for the organisms tested was low.

## REDUCTION IN SUBSTANCES MONITORED

### *Reduction in dichlorobenzenes*

According to the biennial industrial wastewater analyses, in 1995 the plant discharged an average 2117 m<sup>3</sup>/d of effluent, containing notably:

- 0.39 kg/d of 1,4-dichlorobenzene
- 0.12 kg/d of 1,2-dichlorobenzene
- 0.09 kg/d of 1,3-dichlorobenzene

Between 1993 and 1995, the 1,2-dichlorobenzene loads dropped 69%, and the 1,4-dichlorobenzene and 1,3-dichlorobenzene loads dropped 47% and 36% respectively. The asphalt pavement over certain areas prevents stormwater from coming in contact with contaminated soil.

## KEY POINTS

- Soil cleanup agreement signed in 1992

Based on December 1995 inventory

## ADDITIONAL INFORMATION

### **Chimiotox Index and PEEP:**

Gilles Legault, Environment Canada  
(514) 283-3452

### **Environmental discharge objectives:**

Francine Richard, MEF (418) 521-3820

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

Yvon Goulet (514) 370-3085

### **Environment officer at the NAPIERVILLE REFINERIES INC.:**

Yves Brosseau (514) 245-0040

### **Production team:**

*Environment Canada*

Isabelle Bouchard Thérèse Drapeau

Gilles Legault Lucie Olivier

Sylvie Roberge Marc Villeneuve

*Ministère de l'Environnement et de la Faune du Québec*

Francine Richard

François Rocheleau

*Somer*

François Thériault

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