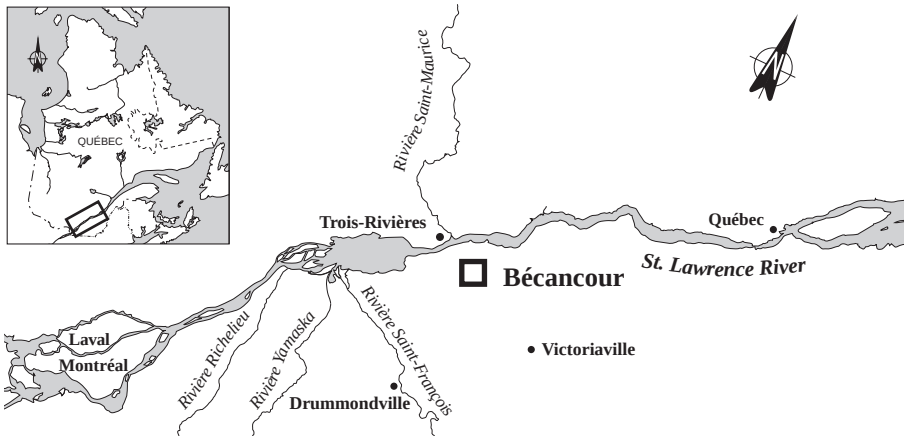
FACT SHEET 64

Chemprox Chemicals Inc.

655 Alphonse-Deshaies Blvd.
Bécancour, Quebec
G0X 1B0



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 CHEMPROX CHEMICALS INC. plant in Bécancour is in Group 2, comprising plants that have already implemented treatment measures but whose effluent may contain toxic substances.

The objective for Group 2 is maximum reduction of toxic effluent of targeted plants.

INDUSTRIAL PLANT

Hydrogen peroxide plant

The CHEMPROX CHEMICALS INC. plant in Bécancour produces hydrogen peroxide in a three-stage process. Quinone dissolved in a solution of organic solvents is first hydrogenated in the presence of a catalyst to form hydroquinone. The hydroquinone is oxidized in air and an aqueous solution of hydrogen peroxide is obtained by water extraction. The quinone released is recycled. Annual production capacity of the plant is 73 000 t. In 1997, the company increased its annual production capacity to 73 000 t and the plant directly and indirectly employed a work force of 50.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Anthraquinone
- Hydrogenation catalyst
- Aromatic solvent
- Hydrogen
- Polar solvent

FINISHED PRODUCT

- Hydrogen peroxide (35%, 50% and 70%)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Low charges

Based on company data for 1993, the plant discharged 206 m^3/d of effluent, containing notably:

- 41 kg/d of total organic carbon (TOC)
- 14.6 kg/d of suspended solids (SS)
- 0.3 kg/d of trimethylbenzene

RESOURCES AND USES TO PRESERVE

Rich and diversified habitat

The CHEMPROX CHEMICALS INC. plant is located in the Bécancour Industrial Park on the shores of the St. Lawrence, in an area where the natural complexity of the river results in a wide variety of wildlife habitats. The infralittoral area facing the park contains water plant communities. A large mud flat rises in the middle of the St. Lawrence immediately downstream from the Bécancour wharf. The water plant communities in the area are considered attractive spawning and nursery areas for northern pike, perch, brown bullhead and smallmouth bass. Over 70 fish species and at least 26 species of water birds may be found in the vicinity. Hunting and fishing enthusiasts visit the Bécancour area and sport fishing and trapping are particularly popular around the mouth of the Gentilly River. The nuclear power plant draws drinking water and industrial water a short distance downstream from the Bécancour wharf.

ENVIRONMENTAL DISCHARGE OBJECTIVES

Environmental protection

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. Environmental discharge objectives for CHEMPROX CHEMICALS INC. have been calculated and are available on request.

EFFLUENT TREATMENT

Biological treatment

Industrial effluent is first neutralized and then channelled to the aerobic biological treatment system, the sludge from which is recirculated. The effluent then undergoes sedimentation before being sampled and discharged into the St. Lawrence. Domestic sewage is discharged into the municipal sewer system.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Plant expansion project

CHEMPROX CHEMICALS INC. has begun construction work to enlarge the plant to increase the annual production capacity to 73 000 t and clean up liquid effluents. This work has been completed at the beginning of 1997. The project was aimed at reducing the discharge load per tonne of hydrogen peroxide produced.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

The CHEMPROX CHEMICALS INC. plant in Bécancour is subject to the standards in the certificate of authorization issued on January 21, 1997. The company complies with all applicable standards.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly nitrites and nitrates

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 gives data from the SLV 2000 characterization carried out in August 1995 along with Chimiotox values estimated from them, assuming an effluent flowrate of 337 m^3/d. Eleven substances were selected in testing for more than 120. Based on these data, nitrites and nitrates account for 53% of the Chimiotox index.

Figure 1 is plotted from 1995 SLV 2000 characterization data. The Chimiotox values estimated from these data were reported unchanged for 1993 to 1998. The impact of the changes made by the company to its process in 1997 has not been quantified and does not appear in the figure.

Table 1 ***Chimiotox Index (1995) - Chemprox Chemicals Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Nitrites-nitrates	36.436	5	182
Total phosphorus	0.867	50	43
Total cyanides	0.174	200	35
Total arsenic	0.001**	57 143	32
Total oil and grease	0.234	100	23
Total mercury	1.4×10^{-4}**	166 667	23
Xylenes	0.140	25	3
Total aluminum	0.131	11	1
Total iron	0.384	3.3	1
Ammonia nitrogen	0.255**	0.8	<1
Total zinc	0.052	9.4	<1
CHIMIOTOX INDEX			**343**

* Assuming an effluent flowrate of 337 m^3/d (11 substances selected in testing for more than 120).

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

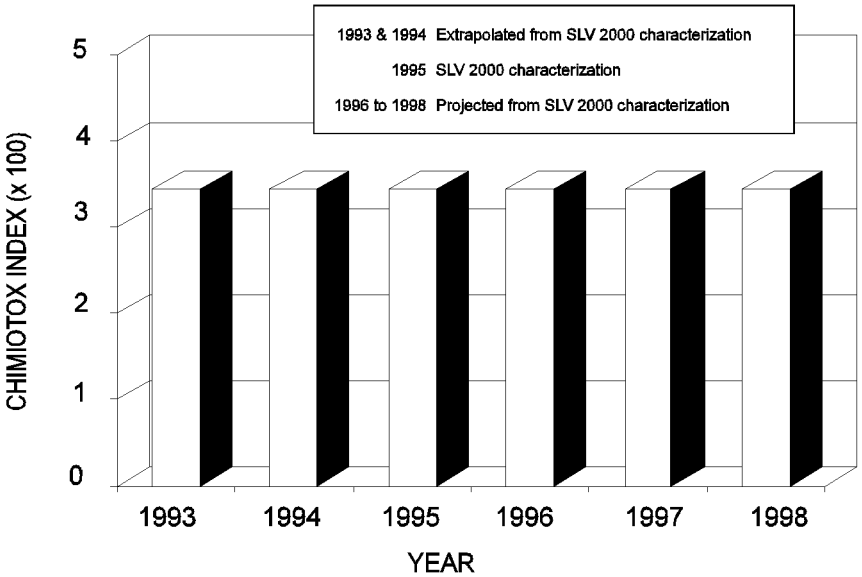


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Chemprox Chemicals Inc.***

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 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.

The 1995 SLV 2000 characterization showed that a very small quantity of mercury was present. No environmental discharge objective has been calculated for this substance.

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 scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of CHEMPROX CHEMICALS INC., a series of bioassays was carried out in 1995, yielding a PEEP of 2.9, and showing a low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Increased production

Based on company data, since the plant reopened in May 1997, it has discharged an average of 646 m^3/d of effluent, containing notably:

- 85 kg/d of total organic carbon (TOC)
- <0.1 kg/d of trimethylbenzene

From 1993 to 1997, the increase in total organic carbon loads was due to an increase in production from 25 600 t/y to 73 000 t/y.

KEY POINTS

- **Aerobic biological treatment in operation**
- **Production capacity increase in 1997 and reduction in loads per tonne of H_2O_2 produced**

Information updated January 1998

ADDITIONAL INFORMATION

Chimiotox Index and PEEP:
Gilles Legault, Environment Canada
(514) 283-3452

Environmental discharge objectives:
Francine Richard, MEF (418) 521-3820 # 4767

Records officer at the Ministère de l'Environnement et de la Faune du Québec (MEF):
Pierre Chaîné (819) 371-6581 # 2007

Environment officer at CHEMPROX CHEMICALS INC.:
Michelle Poirier (819) 294-9965

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

Internet address :
http://www.slv2000.qc.ec.gc.ca/

Published by authority of the Minister of the Environment
 Catalogue No. En153-6/64-1998E
ISBN 0-662-26532-7
(Aussi disponible en français sous le titre *Établissements industriels : faits saillants*)