FACT SHEET 67

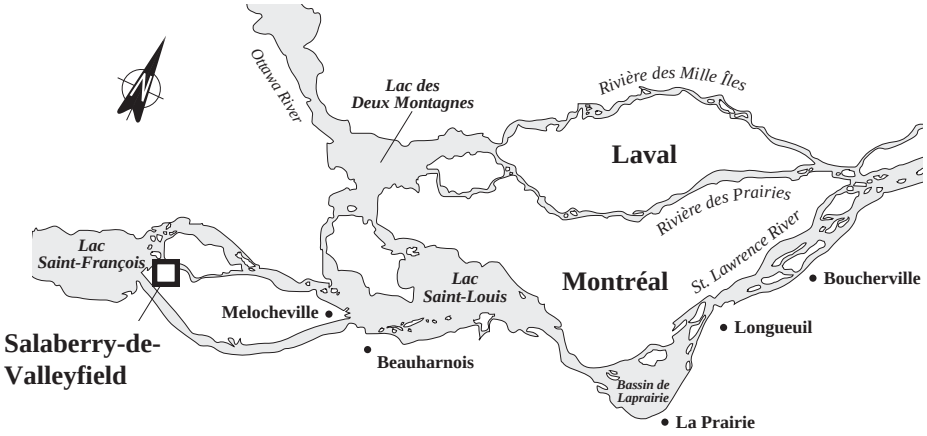
Eka Chimie Canada Inc.

640 des Érables

Salaberry-de-Valleyfield,

Quebec

J6T 6G4



***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 EKA CHIMIE CANADA INC. plant in Salaberry-de-Valleyfield is in Group 2, comprising plants that have already implemented treatment programs but whose effluent may contain toxic substances.

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

INDUSTRIAL PLANT

Sodium chloride production

The EKA CHIMIE CANADA INC. plant in Salaberry-de-Valleyfield produces sodium chlorate. Rock salt dissolved in recycled water is purified by a physico-chemical process. The brine obtained is evaporated and decanted, then centrifuged to concentrate the salt crystals. The salt is next dissolved in a chlorate liquor and mixed with other solutions before entering the reactors. The sodium chlorate generated by electrolysis of the solution is purified, crystallized, and then concentrated by decanting and centrifuging. The plant uses some of the hydrogen released through electrolysis as a source of energy; the surplus is discharged into the air. Hydrogen peroxide at 70% is stored, diluted (35% to 50%) and shipped to customers. Annual production capacity of the plant is 113 399 t of sodium chlorate. In 1995, the plant works at 100% design capacity and employs a work force of approximately 60.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Sodium chloride
- Hydrochloric acid
- Sodium hydroxide
- Sodium dichromate
- Sodium bicarbonate
- Calcium chloride
- Hydrogen peroxide (70%)

FINISHED PRODUCTS

- Sodium chlorate crystals
- Hydrogen peroxide in solution (35% to 50%)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Mainly dissolved solids

Based on company data, in 1993 the plant discharged 20 580 m^3/d of effluent, containing notably:

- 3900 kg/d of dissolved solids (DS)
- 84 kg/d of suspended solids (SS)
- 0.96 kg/d of chlorates

RESOURCES AND USES TO PRESERVE

Migration route for many fish species

Part of the wastewater from the EKA CHIMIE CANADA INC. plant in Salaberry-de-Valleyfield is treated at the municipal sewage treatment plant. The plant is located on the Beauharnois canal, which is a migration route for many fish species (yellow sturgeon, shad, smallmouth bass, perch, white sucker and longnose sucker, whitenose sucker and shorthead redhorse, cyprinids, etc.). Fishing enthusiasts (pike, perch, walleye) come regularly to the canal, particularly near Highway 132 and in the power plant park near the mouth of the canal. There is a large spawning ground for brown bullhead on the north shore, in the bay upstream from the Saint-Louis-de-Gonzague bridge. Two other spawning grounds are located at the canal entrance and near the locks. The water-plant communities on either side of the bridge are very attractive to waterfowl. A 4200-hectare area has been designated by federal authorities as a rest area for migrating birds. Water for the Beauharnois water supply system is taken on the south shore of the canal, upstream from the dam, about 15 kilometres downstream from the effluent discharge point of the EKA CHIMIE CANADA INC. plant.

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 EKA CHIMIE CANADA INC. have been calculated and will be available by 1997.

EFFLUENT TREATMENT

Process water recirculated

Effluent from the EKA CHIMIE CANADA INC. plant is recirculated. Sewage and purge water from the cooling towers are discharged into the Salaberry-de-Valleyfield public sewerage system and carried to the municipal sewage treatment plant (activated sludge). Primary indirect cooling water is discharged into the municipal storm sewer network which releases untreated water into the Beauharnois canal. Purge water from the secondary indirect cooling system on the crystallization circuit is re-used as primary cooling water.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Groundwater quality measurement

In November 1990, a certificate of authorization was issued to increase the production capacity of the plant; at this time the company installed four groundwater sampling wells. Groundwater quality analyses are carried out on a regular basis. In 1995, the company obtained authorization to modify the sodium chlorate solution purification process.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

The EKA CHIMIE CANADA INC. plant in Salaberry-de-Valleyfield is subject to and satisfies the standards of the certificate of authorization issued in 1990.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Negative Chimiotox index

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 and determine the toxic contribution of each pollutant (Table 1).

Table 1 gives data from the characterization carried out in August 1995 under SLV 2000 along with the Chimiotox values estimated from them, assuming an effluent flowrate of 65 m^3/d. Eleven substances were selected among over 120 parameters analysed.

The Chimiotox index estimated from the characterization under SLV 2000 is negative. Industrial wastewater from the plant is recirculated in the process and effluent discharged into the municipal sewerage system is of better quality than the plant's water supply.

Table 1 ***Chimiotox Index (1995) - Eka Chimie Canada Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total oil and grease	-0.606	100	-61
Nitrites-nitrates	0.104	5	1
Total sulphides	0.049	500	24
Total aluminum	-0.720	11	-8
Total antimony	-0.107	1.6	0
Total beryllium	0.005	15 601	78
Total copper	0.028	451	12
Total iron	-0.202	3.3	-1
Total mercury	-0.002	166 667	-389
Total vanadium	0.301	71	21
Total zinc	-0.339	9.4	-3
CHIMIOTOX INDEX			**-324**

* Assuming an effluent flowrate of 65 m^3/d (11 substances selected in testing for over 120)

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.

Based on SLV 2000 data for 1995, none of the eleven persistent and bioaccumulative substances were detected in the company's effluent.

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 of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. A series of bioassays of effluent from the EKA CHIMIE CANADA INC. plant was conducted in 1995; PEEP index was 2,2, indicating low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Increased production

Based on company data for 1995, the plant discharged 24 900 m^3/d of effluent, containing notably:

- 4600 kg/d of dissolved solids (DS)
- 62 kg/d of suspended solids (SS)
- <0.25 kg/d of chlorates

From 1993 to 1995, dissolved solids and suspended solids increased, as did the effluent flowrate. The increases were mainly due to increased production rates in 1995.

KEY POINTS

- **Recirculation of industrial wastewater and connection to municipal sewerage system**
- **Negative Chimiotox index**

Based on December 1995 inventory

ADDITIONAL INFORMATION

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