FACT SHEET No. 7

EXPRO CHEMICAL PRODUCTS INC.

55 Masson Street

Saint-Timothée, Quebec

J6S 4V9

***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. The EXPRO CHEMICAL PRODUCTS complex, located in Saint-Timothée, 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

Commercial and military explosives

EXPRO CHEMICAL PRODUCTS currently manufactures propellant powders, igniters and nitroglycerine for civilian and military uses. Propellants are produced from a blend of nitrocellulose, nitroglycerine, nitroguanidine and additives. Nitroglycerine is obtained through a series of chemical reactions, chiefly the nitration of glycerine with nitric acid. In 1991, the company permanently shut down its nitrocellulose production unit (on July 27) and stopped making cyclonite (RDX). In 1995, the complex had an annual production capacity of 3176 t and operated at 43% of capacity with a work force of nearly 300.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Nitrocellulose
- Glycerine
- Nitric and sulphuric acids
- Organic solvents (ether, denatured ethanol, acetone)
- Additives (2,4-dinitrotoluene, dibutyl phthalate, diphenylamine, dimethyldiphenyl urea, diethyldiphenyl urea)

FINISHED PRODUCTS

- Propellant powders
- Igniters

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

COD and BOD_5

Based on company data, in 1988 the plant had a combined effluent discharge of 37 312 m^3/d, containing:

- 60 012 kg/d of chemical oxygen demand (COD)
- 24 031 kg/d of biochemical oxygen demand (BOD_5)
- 9714 kg/d of sulphates
- 894 kg/d of suspended solids (SS)
- 618 kg/d of nitrites and nitrates

RESOURCES AND USES TO PRESERVE

Cottaging and recreation

The EXPRO CHEMICAL PRODUCTS complex is located in Saint-Timothée, at the eastern tip of Salaberry Island, and discharges its effluent into the Saint-Charles River through an outfall about 3 km from the river mouth. The Saint-Timothée basin is a cottaging area and a popular spot for windsurfing and recreational boating. There is a beach downriver from the plant, on Papineau Island, which lies within the basin. The Saint-Charles River and Saint-Timothée basin comprise several fish spawning grounds, and there is a heronry on Villemomble Island, 1.5 km below the river mouth.

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.

In the case of EXPRO CHEMICAL PRODUCTS there are no water quality based objectives as the company's effluents are to be discharged into municipal sewers.

EFFLUENT TREATMENT

Delay in sewer connection

In 1987, the company committed to a wastewater treatment program (PAE); work under the agreement began that March and was to have been completed by December 1995. Improvements included separation and pre-treatment of industrial wastewater, modernization of the cyclonite production shops and connection of the discharge pipe to the Saint-Timothée municipal sewer system. The company has not carried out this work. Only a few shops' sanitary sewage empties into septic tanks complete with fields; wastewater from the plant laundry goes to the Salaberry de Valleyfield wastewater treatment plant.

PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

Major changes

Pursuant to the St. Lawrence Action Plan, EXPRO CHEMICAL PRODUCTS discontinued certain processes and introduced several changes, appreciably reducing the volume of pollutants discharged into the Saint-Charles River. In June 1991, it closed the nitric and sulphuric recovery and concentration unit; those processes are now handled outside the Saint-Timothée facility. In 1991, it also stopped making nitrocellulose and temporarily halted production of cyclonite (RDX), thus significantly reducing the volume of effluent. In 1993, the Ministère de l'Environnement et de la Faune du Québec (MEF) authorized projects that would have enabled the company to separate effluents and recover spent oil from the cooling units and compressors in order to cut O&G discharges. Another project was to catch and separate the water used to wash company trucks contaminated by explosives. None of this work has yet been done.

REGULATORY COMPLIANCE - WATER COMPONENT

Corrective measures to be taken

EXPRO CHEMICAL PRODUCTS committed to a wastewater treatment program in March 1987. Financial constraints prevented compliance with the main program requirements, although the shutdown of nitrocellulose and cyclonite production appreciably lessened the pollutant load. The work that remains to be done chiefly involves the reduction of effluent flows and connection of the plant drains to the Salaberry-de-Valleyfield wastewater treatment plant.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

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 characterization data gathered in 1992 pursuant to requirements, as well as the Chimiotox values estimated from those figures, for an effluent flow of 21 552 m^3/d. In testing for more than 120 substances, 18 were found. The figures show a predominance of oil and grease in the wastewater. Oil and grease make up 64% of the Chimiotox index, followed by silver (12%), 2,4-dinitrotoluene (12%) and di-(2-ethylhexyl)phthalate (5%).

Figure 1 is plotted from the characterization results for 1992. Monthly company data were used for backcastings (1988-1991) and projections (1993-1995) relative to the year of characterization. The 37% drop in the Chimiotox index observed between 1988 and 1995 is explained by the 1991 shutdown of the nitric and sulphuric acid concentration and nitrocellulose production processes and temporary suspension of cyclonite (RDX) production.

Table 1 ***Chimiotox Index (1992) - Expro Chemical Products Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox.Units (CU)
Oil and Grease (total)	37.000	100	3 700
Silver	0.070	10 000	700
2,4-dinitrotoluene	6.198	110	681
Di-(2-ethylhexyl)phthalate	0.168	1 667	280
Nitrites-Nitrates	14.970	5	75
Mercury	3.300×10^{-04}	166 667	55
Bromodichloromethane	0.750	64	48
Di-n-butyl phthalate	0.178	250	45
Total Phosphorus	0.790	50	40
Nitroso-n-diphenylamine	0.523	62	32
Cyanides	0.120	200	24
Chloroform	0.296	64	19
Iron	4.020	3	13
Ammonia Nitrogen	12.520	0,8	10
Thallium	0.046	125	6
Zinc	0.440	9	4
Toluene	0.263	10	3
Benzene	0.021	25	1
CHIMIOTOX INDEX			**5 735**

* For effluent discharge of 21 552 m^3/d (18 substances detected in testing for more than 120).

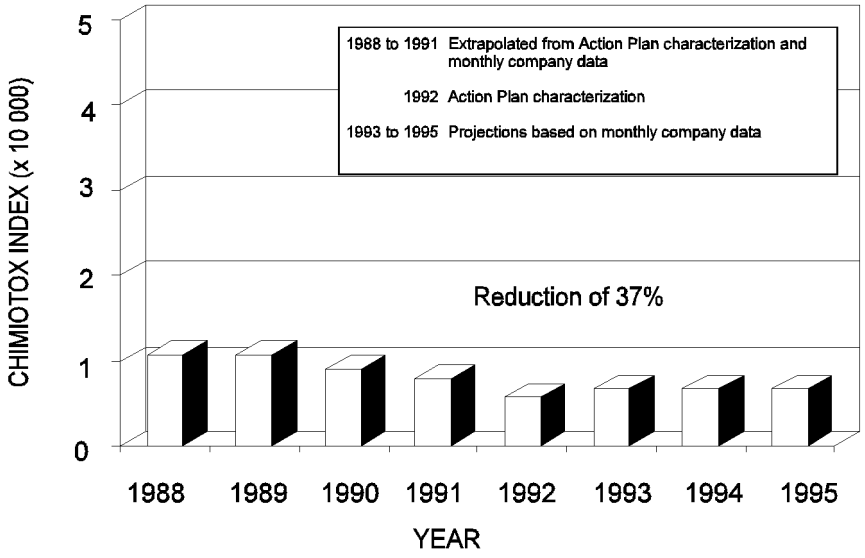

Figure 1 ***Changes in toxic effluent discharges, 1988-1995 - Expro Chemical Products Inc.***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

Mercury detected

One long-range objective of SLV 2000 is the virtual elimination of 11 persistent bioaccumulative toxic substances from the river 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.

Traces of mercury (0.3 g/d) were detected during the characterization study of 1992. The monitoring characterization planned under SLV 2000 will confirm or rule out the presence of mercury and determine measures for virtual elimination of this toxic substance.

PEEP TOXICITY REDUCTION

Fairly low toxicity

The Potential Ecotoxic Effects Probe, or PEEP, combines results from 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. One series of bioassays was conducted for the EXPRO CHEMICAL PRODUCTS complex in Saint-Timothée. The 1992 PEEP index was established at 3.4. It was among the lowest of the PEEP indices found for the 50 plants.

REDUCTION IN SUBSTANCES MONITORED

Significant improvement

Based on company data, in 1995 the plant had a combined effluent discharge of 19 300 m^3/d containing:

- 1280 kg/d of chemical oxygen demand (COD)
- 500 kg/d of biochemical oxygen demand (BOD_5)
- 320 kg/d of sulphates
- 110 kg/d of suspended solids (SS)
- 42 kg/d of nitrites and nitrates

Overall discharge volume fell 48% from 1988 to 1995, while chemical oxygen demand (COD) dropped by 98% and biochemical oxygen demand (BOD_5) by 98% also. During the same period, the loads of sulphates, suspended solids (SS) and nitrites-nitrates dropped 97%, 88% and 93%, respectively.

KEY POINTS

- **37% reduction in the Chimiotox index**
- **Commitment to a wastewater treatment program in 1987**
- **Shutdown of three polluting processes in 1991**
- **Marked reduction in effluent discharges since 1991**

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

ADDITIONAL INFORMATION

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Published by authority of the Minister of the Environment

Catalogue No. En 153-6/7-1996E
ISBN 0-662-23385-9

(Aussi disponible en français sous le titre *Établissements industriels - faits saillants).*