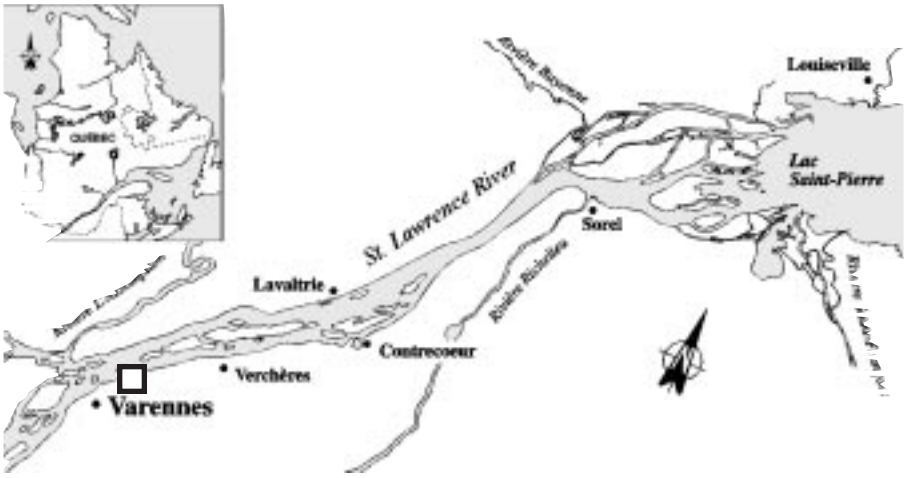
FACT SHEET No. 23

Petromont Inc.

2931 Marie-Victorin Road

Varennes, Quebec

J3X 1S7



***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 PETROMONT INC. plant, located in Varennes, 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

A petrochemical plant

The PETROMONT INC. petrochemical plant in Varennes produces olefins (ethylene and propylene). Olefin production involves the following processes: thermal cracking, direct cooling of refined fractions, compression and gas drying, as well as the fractionation and cryogenic separation of finished gaseous products. In 1995, the plant had an annual production capacity of 265 000 t, and operated at 75% of capacity. It has a work force of 246.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Refinery concentrates
- Propane
- Naphtha
- Distillate
- Butane

FINISHED PRODUCTS

- Ethylene, propylene
- Methylacetylene, propadiene
- Butene, butadiene
- Pyrolysis gasoline
- Acetylene
- Hydrogen
- Heavy oil
- Combustible gases

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

COD and O&G

According to the company's monthly data, in 1988 the plant had an effluent discharge of 2500 m^3/d, containing:

- 377 kg/d of chemical oxygen demand (COD)
- 60 kg/d of oil and grease (O&G)
- 55 kg/d of suspended solids (SS)
- 10.6 kg/d of total phosphorus
- 3.7 kg/d of chromium
- 3.3 kg/d of phenols
- 1.5 kg/d of zinc

RESOURCES AND USES TO PRESERVE

A commercial fishing zone

The PETROMONT INC. plant in Varennes discharges its effluent into Commune Brook, a tributary of the St. Lawrence River. The St. Lawrence between Montreal and Lake Saint-Pierre is an excellent habitat for Lake sturgeon, which is a major commercial species in the river. Cap Saint-Michel Bay, into which Commune Brook empties, is important for the Lake sturgeon population living between Lake Saint-Louis and Lake Saint-Pierre. The Verchères islands are approximately 5 km downstream from where PETROMONT INC. plant effluent is discharged on the north side of the Seaway. The islands' marshes and weed beds are used by waterfowl, for nesting and as a staging and feeding site during migration. There are also major spawning grounds for several fish species, and cottages. The town of Verchères draws its water from the river approximately 10 km downstream from Varennes' industrial sector.

ENVIRONMENTAL WASTE OBJECTIVES

Environmental protection

To protect resources and uses, environmental waste objectives are calculated in terms of concentrations and loads that should not be exceeded. These values serve as guidelines in the search for the cleanup solution best adapted to environmental protection needs. The water quality based objectives for PETROMONT INC. are available on request

EFFLUENT TREATMENT

Activated sludge treatment for phenolic wastewater

Four types of industrial wastewater are treated. Phenolic wastewater and olefinic blowdown are discharged into a regulating reservoir before being treated in a biological basin; a biological reactor that acclimatizes bacteria is operated in parallel. Effluent from the biological treatment is combined with storm water, pre-treated domestic wastewater and clean process water; these are all carried to a storm water settling tank through the storm drainage system. Process wastewater is treated in an API separator and then in a settling tank. Once treated, the final effluent is discharged into the river.

PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

Pilot project to make industry more environmentally accountable

Since 1988, several cleanup measures have been implemented. In October 1988, trisodium phosphate replaced zinc chromate as an anti-corrosion agent in the water cooling systems. This resulted in a reduction of chromium and zinc waste. In 1989, the transfer of lightly contaminated wastewater to the storm drainage system decreased the hydraulic load in the API separator. In 1990, the process water retention tank was cleaned and returned to service. To improve the efficiency of phenolic wastewater treatment, an equalizing basin and an on-site bioreactor were installed in 1991.

In June 1993, benzene, toluene and xylene loads in the effluent were decreased through a project to recover olefinic blowdown and recycle hydrocarbons for the process, and by the treatment of recovered water in tank A-600. Hydrocarbon interceptors were installed in the process water drainage system to reduce the contaminant load in the API separators; the work was completed in December 1993. Finally, in 1994, the automation of waste disposal and cooling tower concentration cycles and the discharge of the blowdown into the drainage system led to a decrease in the phosphate load and the effluent to be treated.

The PETROMONT INC. plant in Varennes has voluntarily agreed to take part in an environmental accountability pilot project initiated by the Ministère de l'Environnement et de la Faune du Québec (MEF).

ENVIRONMENTAL COMPLIANCE - WATER COMPONENT

Adoption of internal standards

The PETROMONT INC. plant in Varennes is not subject to any industrial wastewater regulatory standards. The company has, however, adopted and is voluntarily observing internal standards patterned after the Montreal Urban Community's regulation 87 on sewer discharge.

POLLUTION REDUCTION

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Arsenic and phosphorus

The Chimiotox index gauges the load of all toxic substances present in industrial effluent, using the toxicity factor assigned to each substance. 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 monitoring characterization data gathered in 1993 pursuant to Action Plan requirements, as well as the Chimiotox indices estimated from those figures, for an effluent flow of 2909 m^3/d. In testing for more than 120 substances, 11 were found. The figures show a predominance of arsenic in the treated wastewater. Arsenic makes up 78% of the Chimiotox value, followed by total phosphorus (17%), phthalates (2%) and ammonia nitrogen (1%). The Chimiotox index for the plant is very low in comparison with the other Action Plan plants.

Figure 1 is plotted from the 1989 and 1993 characterization data. The 1988 Chimiotox index was obtained from the 1989 characterization data adjusted to the company's 1988 monthly data for phenols, total phosphorus, chromium and zinc. The significant decrease in the Chimiotox index between 1988 and 1989 is associated with the replacement of the zinc chromate treatment with the trisodium phosphate treatment in the water cooling systems in 1988 and internal recovery, separation and recirculation measures undertaken in 1989. The Chimiotox indices from 1990 to 1992 were extrapolated from the 1989 characterization data. The 1994 and 1995 projections are based on the 1993 characterization data.

From 1988 to 1995, the Chimiotox index of effluent discharges fell by 74%. The reduction was mainly due to the elimination of chromium and zinc from the effluent and a 98% drop in oils and greases.

Table 1 ***Chimiotox Index (1993) - Petromont Inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Arsenic	0.015	57 143	831
Total Phosphorus	3.719	50	186
Ammonia Nitrogen	19.098	0.8	15
Bis-(2-ethylhexyl)phthalate	0.009	1 667	5
1,1 - Dichloroethylene	0.020	541	11
Iron	1.242	3	4
Di-n-butylphthalate	0.014	250	4
Tetrachloroethylene	0.019	113	2
1,2 - Dichloroethane	0.272	4	1
1,4 - Dichlorobenzene	0.000	250	<1
1,2 - Dichlorobenzene	0.001	143	<1
CHIMIOTOX INDEX			**1 070**

* For effluent discharge of 2909 m^3/d (11 substances detected in testing for more than 120).

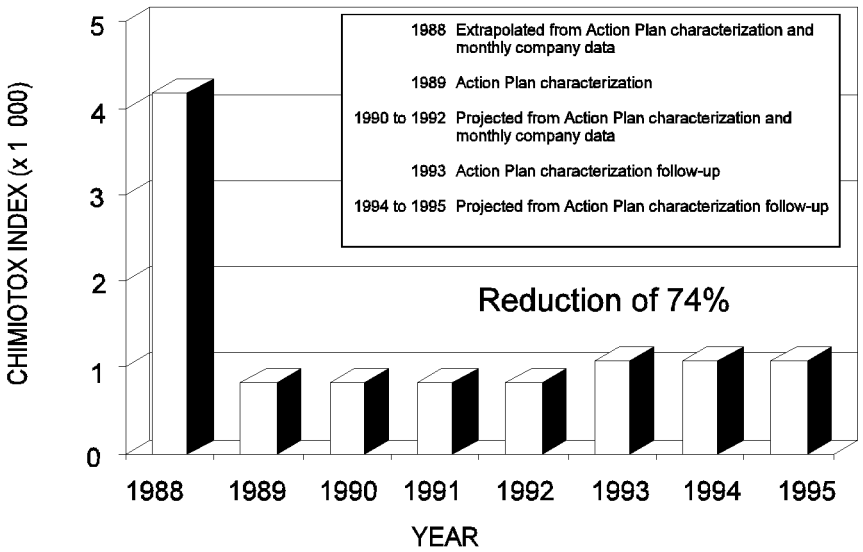


Figure 1 ***Changes in toxic effluent discharges, 1988-1995 - Petromont Inc.***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

No persistent toxic substances

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.

When the characterization studies were carried out under Action Plan in 1989 and 1993, no persistent toxic substances were detected.

PEEP TOXICITY REDUCTION

Average 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. Two series of bioassays were conducted for the PETROMONT INC. plant in Varennes. The 1991 PEEP was 3.8 while the 1993 figure was 3.6. The 1991 value was about average compared to the results from all 50 plants.

REDUCTION IN SUBSTANCES MONITORED

Significant decreases

Company data for 1995 show that the plant had an average effluent discharge of 1456 m^3/d, containing:

- 219 kg/d of chemical oxygen demand (COD)
- 32.8 kg/d of suspended solids (SS)
- 3.8 kg/d of total phosphorus
- 1.0 kg/d of oil and grease (O&G)

Company data for 1988 to 1995 show a 98% reduction in O&G, a 40% decrease in phenols, a 64% drop in SS and total phosphorus and a 42% reduction in COD. In addition, chromium and zinc were completely eliminated from the effluent. These reductions are attributable to the various cleanup measures taken by the company.

KEY POINTS

- **Zinc chromate replaced by trisodium phosphate as an anti-corrosion agent**
- **74% reduction in the Chimiotox index**
- **Implementation of several cleanup measures**

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

ADDITIONAL INFORMATION

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

Water quality based objectives: Francine Richard, MEF, (418) 644-3574.

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Published by authority of the Minister of the Environment

Catalogue No. En153-6/23-1996E
ISBN 0-662-23392-1

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