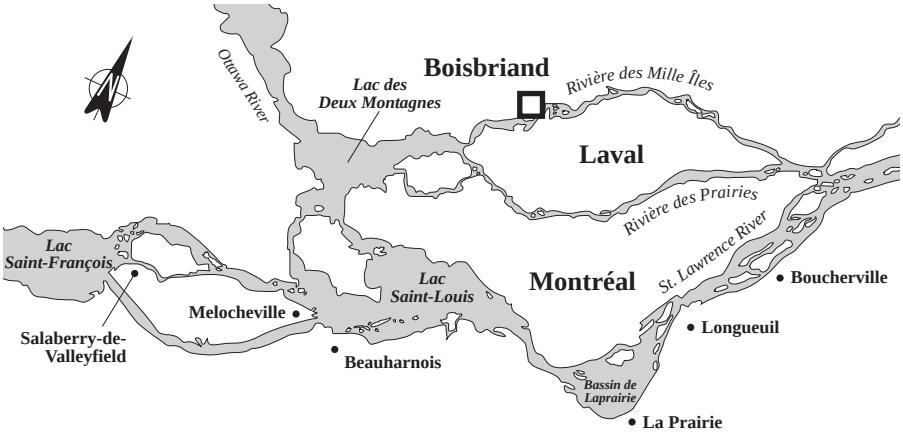
FACT SHEET 68

Général Motors du Canada Ltée

2500 Grande-Allée Street
Boisbriand, Quebec
J7E 4K6



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 GÉNÉRAL MOTORS DU CANADA LTÉE plant in Boisbriand 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

Automobile assembly

The GÉNÉRAL MOTORS DU CANADA LTÉE plant in Boisbriand assembles cars. The bodies and plastic components are first cleaned with an alkaline solution to remove oil, grease and dust. Phosphatizing protects the metal from corrosion and improves the adherence of paint primer. The base coat consists of a water dispersion enamel while the clear coating is a water solution enamel; both are thermosetting paints. Tightness tests are carried out on the vehicles. In 1997, the plant had a work force of 1800.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Metal parts
- Alkaline cleaners
- Nitric acid solutions
- Nickel salts
- Acids (phosphoric, hydrochloric, chromic, acetic and lactic)
- Phenolic and vinyl resins
- Resin solutions (epoxy and urethane)
- Inorganic pigments
- Sealers
- Lubricating oils
- Gasoline
- Antifreeze
- SUVA coolants
- Zinc phosphate
- Sodium nitrite
- Sodium hydroxide solution
- Paint paste
- Neutralizers
- Biocides and disinfectants
- Urea formaldehyde resin
- Butylcellosolve
- Surfactants

FINISHED PRODUCT

- Cars (Camaro and Firebird)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Mainly COD

According to company data, in 1993 the paint shop water treatment system discharged 835 m^3/d of effluent, containing notably:

- 286 kg/d of chemical oxygen demand (COD)
- 42 kg/d of suspended solids (SS)
- 17.4 kg/d of biochemical oxygen demand (BOD_5)
- 1.7 kg/d of oil and grease (O&G)
- 0.69 kg/d of metals (nickel, iron, copper, zinc, chromium, lead and titanium)

RESOURCES AND USES TO PRESERVE

Live-bait fishing

The GÉNÉRAL MOTORS DU CANADA LTÉE plant in Boisbriand is in the drainage basin of the Cachée River. The plant grounds are drained by Delisle and Juteau creeks, tributaries of this river. The area downstream from the discharge point is home to many species of live bait as well as muskrats and birds. Five species of minnow inhabit the area: white sucker, mud minnow, brook stickleback, creek chub and blackhead minnow. The minnows are important because they are harvested as live bait and sold in the Montreal area; they are also prey for certain fish that attract sport fishermen. There are also mallards in the region. Rosemère, Bois-des-Fillions, Lorraine and part of Terrebonne draw drinking water from the Milles-Îles River downstream from the mouth of the Cachée River.

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 the GÉNÉRAL MOTORS DU CANADA LTÉE plant are available on request.

EFFLUENT TREATMENT

Physico-chemical treatment

Wastewater from cleaning and preparing car body surfaces as well as some of the industrial wastewater undergoes physico-chemical treatment. The system comprises a storage basin, an emergency basin, four heavy metal electrodeposition cells, a lamellar clarifier that eliminates metal hydroxides, an alum addition system to precipitate phosphates, a lamellar clarifier to eliminate phosphates, two sand filters and two filter presses. Industrial wastewater comprising anolyte solution and effluents from deglazing and tightness testing is combined with domestic sewage and discharged into the Boisbriand public sewer system. Wastewater from the cafeterias is passed through oil separators before joining the rest of the domestic sewage. Wastewater from regenerating demineralization resins is neutralized and then discharged into the stormwater system together with roof drainage, surface water and runoff water.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Raw material substitution and changes in treatment

A certificate of authorization to substitute three chemicals used in the phosphatizing operations was issued in April 1994; the purpose of the change was to reduce biochemical oxygen demand at source.

The company also made changes in May 1996 to discharge water with high loads of BOD_5 from the electrophoresis process to the municipal sewage treatment plant.

REGULATORY COMPLIANCE - WATER COMPONENT

Sewer discharge standards and certificate of authorization

The GÉNÉRAL MOTORS DU CANADA LTÉE plant is subject to standards for discharges to the Boisbriand sewer system and those in its certificate of authorization. The company is subject to a standard of 30 mg/L of BOD_5 for its discharges to the stormwater sewer. Since the company made changes, the process effluent standard has almost never been exceeded and the company is considering other related projects.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly oil and grease

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 SLV 2000 characterization data collected in May 1996 along with Chimiotox values estimated from them, assuming an effluent flowrate of 1505 m^3/d. Sixteen substances were selected in testing for more than 120. Based on these data, total oil and grease account for 87% of the Chimiotox index.

Figure 1 is plotted from SLV 2000 characterization data collected in 1996. The Chimiotox index calculated from these data was reported unchanged for 1993 to 1998. Treatment of effluent (domestic sewage and some industrial wastewater) at the municipal wastewater treatment plant is producing an additional decrease in the Chimiotox index that has not been quantified and does not appear in the figure.

Table 1 ***Chimiotox Index (1996) - Général Motors du Canada Ltée****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total oil and grease	9.100	100	910
Total phosphorus	1.096	50	55
Total sulphides	0.079	500	39
Total lead	0.034	314	11
Total copper	0.019	451	8
Total mercury	0.00004	166 667	7
Total silver	0.001	10 000	6
Total iron	1.136	3.3	4
Total zinc	0.254	9.4	2
Total aluminum	0.142	11	2
Ammonia nitrogen	1.900	0.8	2
Total chromium	0.001	500	1
Total manganese	0.025	10	<1
Total molybdenum	0.099	1	<1
Nitrites-nitrates	0.0002	5	<1
Total nickel	0.0001	10	<1
CHIMIOTOX INDEX			**1 046**

*Assuming an effluent flowrate of 1505 m^3/d. (16 substances selected in testing for more than 120).

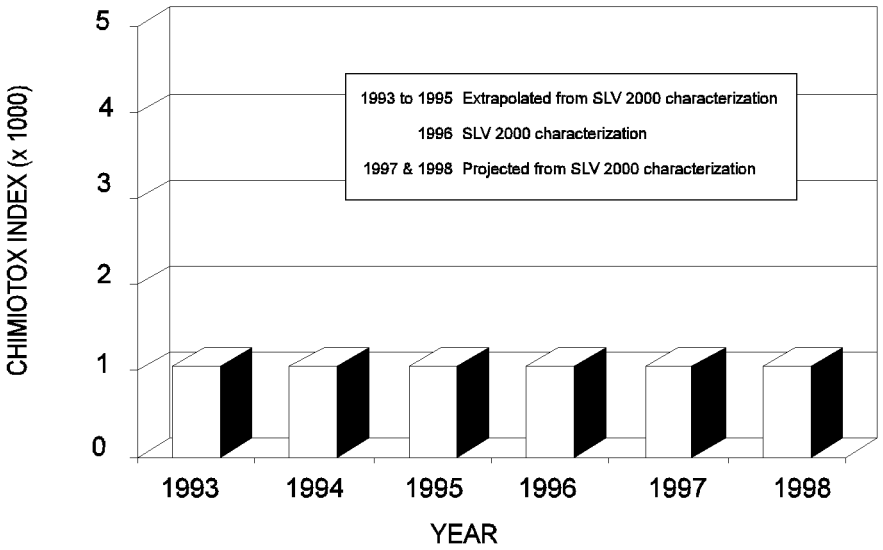


Figure 1 ***Chimiotox Index Trends (1993 - 1998)***
Général Motors du Canada Ltée

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 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 1996 SLV 2000 characterization detected the presence of one of the eleven persistent toxic substances, mercury, in one of the company's three effluents. The concentration measured (0.7µg/L) is greater than the environmental discharge objective temporarily calculated for this substance (0.1 µg/L).

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 the GÉNÉRAL MOTORS DU CANADA LTÉE, a series of bioassays was carried out in 1996, yielding a PEEP of 2.7, and showing low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Reduction in several loads

According to company data, in 1997 the paint shop water treatment system discharged an average of 571 m^3/d of effluent, containing notably:

- 79.5 kg/d of chemical oxygen demand (COD)
- 4.0 kg/d of suspended solids (SS)
- 12.5 kg/d of biochemical oxygen demand (BOD_5)
- 2.1 kg/d of oil and grease (O&G)
- 0.38 kg/d of metals (nickel, iron, copper, zinc, chromium, lead, and titanium)

Between 1993 and 1997, the COD and BOD_5 decreased by 72% and 28% respectively and SS and metal loads also dropped by 90% and 45%. Oil and grease increased by 24% over the same period. The reductions are attribuable to changes made by the company.

KEY POINTS

- **Measures taken under a certificate of authorization (April 1994) to reduce BOD_5 at source**
- **In 1996, segregation of the electrophoresis process effluent with BOD_5 load to the municipal wastewater treatment plant**
- **More than 60% reduction at source of a non-ionic surfactant**
- **Additional reduction of Chimiotox index at the municipal wastewater treatment plant**

Information updated January 1998

ADDITIONAL INFORMATION

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