

FACT SHEET No. 16

Héroux Inc.

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Longueuil, Quebec
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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 HÉROUX INC. plant, located in Longueuil, 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

Hydraulic systems and landing gear

The HÉROUX INC. plant in Longueuil manufactures, overhauls and services hydraulic systems and landing gear. Its main activities are machining, disassembling, assembling, plating, anodizing, phosphating, painting, cleaning and inspecting. In 1995, the plant had an annual production capacity of 500 000 hours and operated at about 50% of that capacity. It employed a work force of 350.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Steel, aluminum and titanium alloys
- Trichloroethylene
- Caustic soda
- Acids
- Chromium salts
- Zinc and manganese phosphate
- Nickel sulfamate
- Cadmium
- Cuprous and sodium cyanide
- Tin
- Lead
- Epoxy paint
- Polyurethane

FINISHED PRODUCTS

- Landing gear
- New and reconditioned components for the aeronautics industry

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Heavy metals

Based on company data, in 1988 the plant had an effluent discharge of 136 m³/d, containing:

- 0.49 kg/d of chromium
- 0.212 kg/d of nickel
- 0.140 kg/d of cadmium

RESOURCES AND USES TO PRESERVE

Nesting and spawning areas

The HÉROUX INC. plant in Longueuil discharges its effluent into the Longueuil sewer system, which is connected to the south shore intermunicipal sewage treatment plant (CERS) on Charron Island. This facility, in operation since June 1992, empties the treated effluent into the Seaway, north of the island. The Boucherville Islands Provincial Park is located immediately below the outfall. These islands comprise large nesting areas for ducks and springtime staging areas for Canada geese. In addition, the area provides habitat for muskrat and has spawning and nursery grounds for several fish species. The Boucherville islands are also a popular recreational area.

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.

EFFLUENT TREATMENT

Metal treatment process

Industrial wastewater is treated before being discharged into the municipal sewer system. The treatment stages for metal consist of cyanide oxidation (standard process), chromium reduction and metal precipitation. The wastewater is channelled to a clarifier and then a sludge holding tank. Acid and alkaline rinse water containing no heavy metals or cyanides is neutralized in special tanks. Cooling water, largely uncontaminated process wastewater and sanitary sewage empty into the municipal sewer system and circulate to the south shore intermunicipal sewage treatment plant.

PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

Physicochemical treatment system

HÉROUX INC. carried out a 1985 wastewater treatment agreement (PAE) under the St. Lawrence Action Plan. In October 1990, it acquired equipment for the physicochemical treatment of its wastewater to comply with discharge standards for combined sewer systems. This system was modified in 1995 to monitor stages of cyanide oxidation and chromium reduction using ORP and pH probes.

REGULATORY COMPLIANCE - WATER COMPONENT

Discharges into municipal sewers

The HÉROUX INC. plant is subject to the municipal by-law on discharges into the Longueuil sewer system. In 1985, it committed to cleanup projects under a wastewater treatment agreement. Those projects were fully completed; the plant wastewater has been treated since October 1990. The metal treatment system was upgraded in 1995.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mostly heavy metals

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 Action Plan characterization data gathered in December 1990, as well as the Chimiotox values estimated from those figures, for an effluent flow of 128 m³/d. In testing for more than 120 substances, 16 were found. The figures show a predominance of heavy metals in the treated wastewater. Cadmium makes up 71% of the Chimiotox index, followed by cyanides (12%), chromium (9%) and copper (6%). The 1990 index calculated for HÉROUX INC.'s effluent is among the lowest of the indices for the Action Plan plants.

Figure 1 is plotted from the 1990 characterization data. The 1988 and 1989 Chimiotox indices were estimated from 1990 Action Plan data for the plant effluent before installation of the physicochemical treatment system. As no complete characterization was done following the modifications to the water treatment system carried out in 1995, the indices for the period 1991-1995 are based on figures produced by the 1990 characterization, after the treatment system went into operation. The index dropped more than 81% from 1988 to 1990 owing to the startup of physicochemical treatment in October 1990.

Table 1 *Chimiotox Index(1990) - Héroux Inc.**

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Cadmium	0.070	909	64
Cyanides	0.054	200	11
Chromium	0.016	500	8
Copper	0.012	424	5
Nitrites-Nitrates	0.268	5	1
Dichloromethane	0.011	64	1
Nickel	0.039	10	<1
Bis-(2-ethylhexyl)phthalate	1.3x10 ⁻⁰⁴	1667	<1
Zinc	0.016	9	<1
Chloroform	8.79x10 ⁻⁰⁴	64	<1
Trichloroethylene	0.003	12	<1
Bromodichloromethane	3.5x10 ⁻⁰⁴	64	<1
Phenol	7.0x10 ⁻⁰⁵	200	<1
Acetone	0.004	2	<1
Naphthalene	9.0x10 ⁻⁰⁵	34	<1
Toluene	1.7x10 ⁻⁰⁴	10	<1
CHIMIOTOX INDEX			90

* For effluent discharge of 128 m³/d (16 substances detected in testing for more than 120).

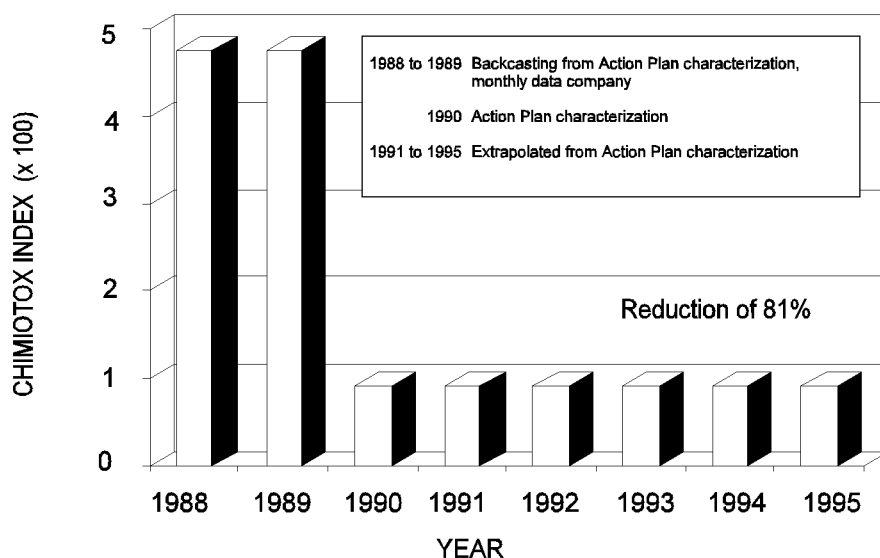


Figure 1 *Changes in toxic effluent discharges, 1988-1995 - Héroux Inc.*

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 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 alkyl, benzo(a)pyrene and hexachlorobenzene.

None of the targeted substances was detected in the effluent from the HÉROUX INC. plant.

PEEP TOXICITY REDUCTION

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 HÉROUX INC. plant in Longueuil. The 1990 PEEP index was estimated at 2.7. It was among the lowest of the PEEP indices found for the 50 plants.

REDUCTION IN SUBSTANCES MONITORED

Reduction in heavy metals

Based on company data, in 1995, after improvements were made to the treatment system, the discharge of effluent from metal treatment amounted on the average to 21 m³/d, containing:

- 0.035 kg/d of cadmium
- 0.035 kg/d of chromium
- 0.019 kg/d of nickel
- 0.003 kg/d of copper
- 0.002 kg/d of cyanides
- 0.001 kg/d of zinc

The heavy-metal content of the effluent dropped from 1988 to 1995, by 75% for cadmium, 93% for chromium and 91% for nickel, owing chiefly to the wastewater treatment system implemented in 1990.

KEY POINTS

- 81% reduction in the Chimiotox index
- Physicochemical treatment system implemented in 1990 under a wastewater treatment agreement

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

ADDITIONAL INFORMATION

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