

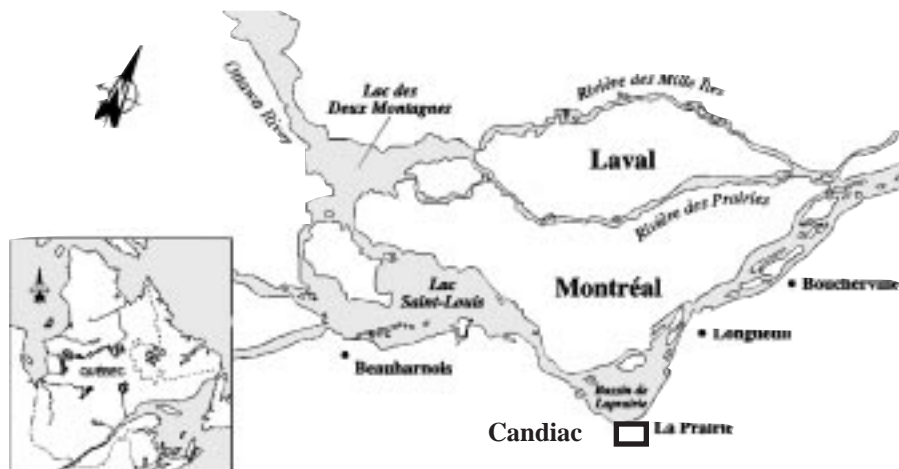
FACT SHEET No. 13

Locweld Inc.

50 Iberville Avenue

Candiac, Quebec

J5R 1D5



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 LOCWELD INC. plant, located in Candiac, 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

Galvanized tower members

The LOCWELD INC. plant manufactures and galvanizes steel structural tower members. Its annual production capacity is 40 000 t. The galvanizing process involves: alkaline cleaning, acid stripping, application of flux, hot galvanization, tempering and bromating. Each step is followed by a rinse generally. The parts are dipped in a bath of molten zinc, after which one-fourth of them are toxidized by a chromium compound. In 1995, the plant ran at 20% of capacity and employed a work force of 100.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Steel, aluminum, zinc
- Sulphuric acid
- Caustic soda (10% strength)
- Lead, iron
- Ammonium chloride
- Dichromate solution

FINISHED PRODUCTS

- Galvanized-steel tower members
- Steel parts
- Aluminum parts

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Low flow

Since no company figures on effluent discharges were available for 1988, the 1989 Action Plan characterization data were used to estimate flows at the start of the program. At that time, the average effluent discharge was 68 m³/d, containing:

- 18 kg/d of iron
- 15.2 kg/d of suspended solids (SS)
- 0.330 kg/d of zinc
- 0.170 kg/d of oil and grease (O&G)
- 0.030 kg/d of chromium
- 0.020 kg/d of copper

RESOURCES AND USES TO PRESERVE

Plant connected to municipal sewer

LOCWELD INC. discharges its effluent into the Candiatic municipal sewer system, which is connected to the wastewater treatment plant serving the La Prairie Basin. This plant dumps its effluent north of the Seaway embankment across from Sainte-Catherine. Many animal and plant species inhabit the La Prairie Basin, a staging and wintering site for migratory waterfowl. The local islands and aquatic plant communities comprise many fish spawning grounds. Boating, windsurfing and angling are among the recreational uses of the lesser basin. The La Prairie and Candiatic drinking water intakes are located north of the Seaway embankment.

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

Automated acid-base neutralization

After implementing a wastewater treatment program (PAE) in the early 1980s, the company automated the processes for neutralizing acid and base solutions and set up a metal flocculation and filtration system. It now reuses bath heating water as rinse water.

Since 1991, the plant has channelled treated process wastewater (21.6 m³/d in 1992) together with sanitary sewage to the La Prairie Basin wastewater treatment plant. Uncontaminated runoff and indirect cooling water flow into the municipal storm sewer, which empties into the St. Lawrence River.

PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

Treated effluent discharged to municipal system

A system was implemented in the summer of 1995 to recycle stripping solutions. As a result, less iron and zinc will be discharged into the municipal sewers and there will be much less waste sludge to dispose of. However, since the treatment system went into operation in 1991, plant wastewater has undergone activated sludge secondary treatment, together with sewage from the communities comprising the La Prairie intermunicipal waste management board.

REGULATORY COMPLIANCE - WATER COMPONENT

Program objectives achieved

Except for zinc, the company is in compliance with the discharge standards prescribed in the 1980 wastewater treatment program. Because plant effluent is processed at a municipal treatment plant (since 1991), it is also subject to the Candiatic by-laws on sewage discharges. In 1993, Environment Canada and the Ministère de l'Environnement et de la Faune du Québec commended LOCWELD INC. for the cleanup measures implemented since 1988.

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 characterization data gathered in September 1992 pursuant to Action Plan requirements, as well as the Chimiotox values estimated from those figures, for an effluent flow of 163 m³/d. In testing for more than 120 substances, 18 were found. The figures show iron contributing the most (33%) to the Chimiotox index, the other major pollutants being chromium (29%) and thallium (14%). The Chimiotox index of 180 is among the lowest for the industrial plants targeted by the St. Lawrence Action Plan.

Figure 1 is plotted from the February 1989 and September 1992 characterization data. The 1991, 1992 and 1993 indices take account of the efficiency of the wastewater treatment plant. The 66% drop in the index between 1988 and 1991 is explained by the plant linkup to the municipal sewer system (connected to the treatment plant) and the ensuing drop in O&G and metal loads. Part of the subsequent gain in the Chimiotox index stems from heavier flow, which rose from 68 m³/d to 163 m³/d in 1991-1992. In 1995, however, there was a sizeable decrease in the flow, from 68 m³/d to 21.66 m³/d, because of a drop in production. The 1995 Chimiotox index decreased in line with the lessened flow.

Table 1 *Chimiotox Index (1992) - Locweld Inc. **

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Iron	18.040	3	60
Chromium	0.104	500	52
Thallium	0.200	125	25
Zinc	1.437	9	14
Copper	0.025	424	11
Total Oil and Grease	0.068	100	7
Lead	0.013	314	4
1,2-dichlorobenzene	0.017	143	2
Xylenes (o, m and p)	0.090	25	2
Tetrachloroethylene	0.013	113	1
Nickel	0.080	10	1
Trichloroethylene	0.028	12	<1
Bis-(2-ethylhexyl)phthalate	1.5x10 ⁻⁰⁴	1667	<1
Selenium	0.001	200	<1
Cyanides	0.001	200	<1
1,1,1-trichloroethane	0.018	9	<1
Nitrites-Nitrates	0.008	5	<1
Di-n-butylphthalate	5.8x10 ⁻⁰⁵	250	<1
CHIMIOTOX INDEX			180

* For effluent discharge of 163 m³/d (18 substances detected in testing for more than 120).

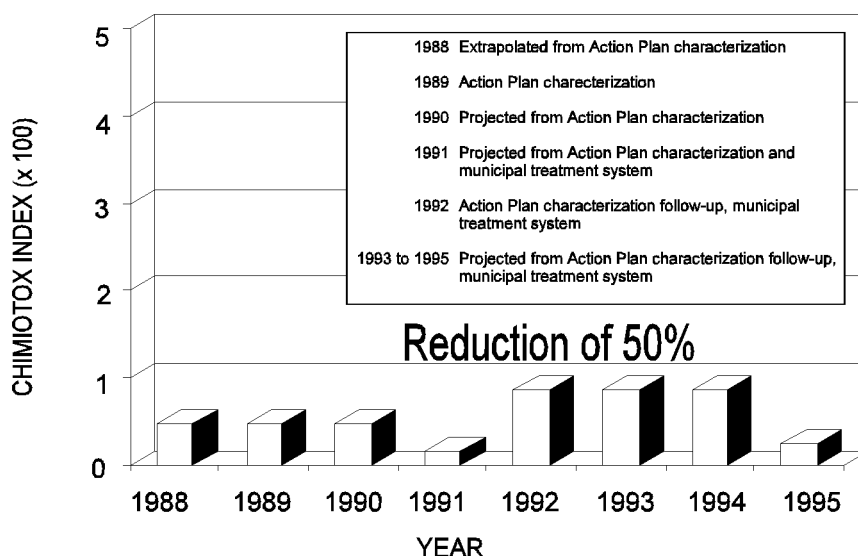


Figure 1 *Changes in toxic effluent discharges, 1988-1995 - Locweld Inc.*

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

No target substance detected

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.

The plant effluent contains none of the targeted substances.

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 LOCWELD INC. plant, during the 1989 Action Plan characterization study. The results give a value of 1.7, among the lowest of the PEEP indices found for the 50 plants. Since the effluent is discharged to a municipal treatment station, toxicity is even lower by the time it reaches the St. Lawrence.

REDUCTION IN SUBSTANCES MONITORED

Minimal discharge

Given the small loads involved, no regular measures have been instituted for monitoring discharges into the municipal sewer network. The only available data, from the 1989 and 1992 Action Plan characterization studies, corroborate the small volume of pollutants released into this sewer system. The low discharges clearly illustrate the efficiency of the present treatment system.

KEY POINTS

- Since 1991, the plant has been directly connected to the municipal treatment plant via an outfall
- In 1993, Environment Canada and the Ministère de l'Environnement et de la Faune du Québec commended LOCWELD INC. for the cleanup measures implemented by the plant since 1988

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

ADDITIONAL INFORMATION

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