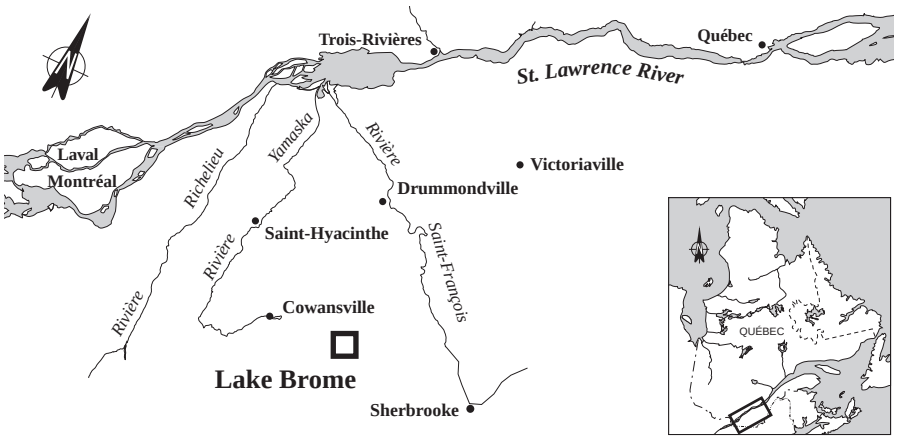
FACT SHEET 66

Les Emballages Knowlton inc.

315 Knowlton Road
Lake Brome, Quebec
J0E 1V0



***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 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 LES EMBALLAGES KNOWLTON INC. plant in Lake Brome 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

Cosmetic manufacturing and packaging

The CLAIROL CANADA plant purchased by LES EMBALLAGES KNOWLTON INC. on May 6, 1991 manufactures cosmetics. The products are prepared on site by mixing raw materials; no chemical reactions are involved. The raw materials are stored in tanks and fed to stationary or mobile mixing tanks. The production line is organized to suit the product being manufactured. Product quality is checked before packaging. Containers are filled, cased and shipped out. Annual production capacity of the plant is 15 000 t. In 1997, the plant operated at 66% design capacity and employed a work force of 406.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Propylene glycol
- Ethanol
- Liquid silicone
- Detergent bases
- Surfactants
- Lauryl sulphate
- Sulphates

FINISHED PRODUCTS

- Shampoos and conditioners
- Stick and lotion deodorants
- Hair sprays
- Skin lotions
- Moisturizing creams and lotions
- Bubble bath
- Toothpaste

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

Low effluent flowrate

Based on company data, in 1993 the plant discharged 58 m^3/d of effluent, containing notably:

- 91.0 kg/d of chemical oxygen demand (COD)
- 38.9 kg/d of biochemical oxygen demand (BOD_5)
- 14.6 kg/d of suspended solids (SS)

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. There are no environmental discharge objectives for LES EMBALLAGES KNOWLTON INC. because the effluents are treated at the municipal wastewater treatment plant. However, environmental discharge objectives have been calculated for effluent at the municipal wastewater treatment plant and are used to calculate discharge objectives for the company's effluent.

EFFLUENT TREATMENT

Aerated pond

Industrial effluent is stored in a tank and then transported by vacuum truck to an aerated pond with a capacity of 5682 m^3 (1 250 000 imperial gallons); the pond is equipped with seven diffusers. The treatment reduces chemical oxygen demand by 80% and cuts biochemical oxygen demand to 500 mg/L. From April to November, the treated water is pumped to an aerated pond in the Lake Brome wastewater treatment plant. In winter, industrial effluent stays in the company's aerated pond. The diffusers go into operation in spring; pH is controlled and nutrients are added. The company's facilities also include a 682 m^3 (150 000 imperial gallon) emergency pond. Slightly contaminated water, composed mainly of cooling water, is discharged into Mill Pond stream. Domestic sewage is emptied into the municipal sewer system.

PREVENTION AND CLEANUP MEASURES IMPLEMENTED

Facility closed

In May 1994, the plastic bottle-moulding facility was closed. Six storage tanks and one mixing tank were added.

REGULATORY COMPLIANCE - WATER COMPONENT

Standards met

LES EMBALLAGES KNOWLTON INC. made improvements between November 1980 and December 1982 as part of a wastewater treatment program (PAE). The company meets the standards stipulated by the PAE. Effluent treated at the Lake Brome wastewater treatment plant is subject to municipal bylaws. In december 1997, the company applied for a certificat of authorization (CA) for the entire plant. It will have to comply with the standards stipulated in the CA, which should be issued for 1998.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly total oil and grease

The Chimiotox index gauges the load of all toxic substances in industrial effluent using the 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 September 1995 along with the Chimiotox values estimated from them, assuming an effluent flowrate of 44.4 m^3/d.Seventeen substances were selected in testing for more than 120. According to these data, total oil and grease account for 52% of the Chimiotox index, and total mercury accounts for 30%.

Figure 1 was plotted from the SLV 2000 characterization data collected in 1995. The Chimiotox index estimated from the 1995 data was reported unchanged for 1993 to 1998.

Table 1 ***Chimiotox Index (1995) - Les Emballages Knowlton inc.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total oil and grease	4.902	100	490
Total mercury	0.002	166 667	286
Total sulphides	0.260	500	130
Total phosphorous	0.342	50	17
Diethylphthalate	0.002	5 000	9
Total aluminum	0.353	11	4
Total copper	0.002**	451	1
Ammonia nitrogen	0.007**	0.8	<1
Nitrites-nitrates	0.001**	5	<1
Total iron	0.083	3.3	<1
Total manganese	0.003	10	<1
Total zinc	0.019	9.4	<1
Phenol	0.002	200	<1
1,2-dichlorobenzene	0.001	143	<1
1,3-dichlorobenzene	0.001	400	<1
1,4-dichlorobenzene	0.001	250	<1
Ethylbenzene	0.001	33	<1
CHIMIOTOX INDEX			**947**

* For an effluent flowrate of 44.4 m^3/d (17 substances selected in testing for more than 120).

**Load calculation based on analytical data which are near methodological detection limits.

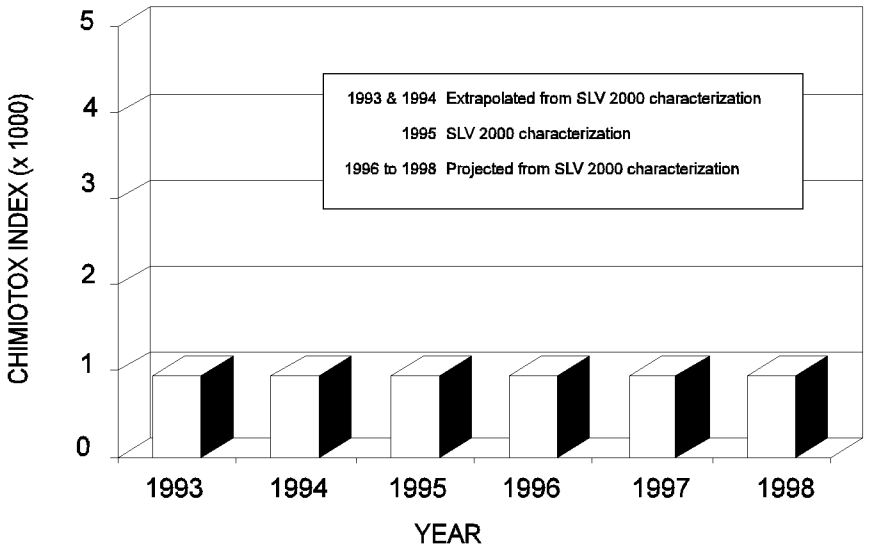


Figure 1 ***Chimiotox Index Trends (1993 to 1998) Les Emballages Knowlton inc.***

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.

Mercury was detected during the 1995 SLV 2000 characterization. An environmental discharge objective has been calculed for mercury in the effluent of the municipal wastewater treatment plant. The objective has been set at the threshold of the methodological detection limit of 0.0001 mg/l.

PEEP TOXICITY REDUCTION

Low toxicity

The Potential Ecotoxic Effects Probe, or PEEP, combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale (1 to 10) of increasing toxicity and are used to monitor discharge trends over the years. A series of bioassays of effluent from the LES EMBALLAGES KNOWLTON INC. plant was conducted in 1995; a PEEP index of 1.5 was obtained, indicating low toxicity for the organisms used. In the case of the LES EMBALLAGES KNOWLTON INC. plant, a series of bioassays was conducted in 1995, yelding a PEEP of 1.5 and showing a low toxicity for the organisms tested.

REDUCTION IN SUBSTANCES MONITORED

Increase in organic load

According to company data, in 1997 the plant discharged 65 m^3/d of effluent, containing notably:

- 277 kg/d of chemical oxygen demand (COD)
- 108 kg/d of biochemical oxygen demand (BOD_5)

Figures for suspended solids (ss) are unavaible. Between 1993 and 1997, biochemical oxygen demand increased 179% and chemical oxygen demand 204%.

KEY POINTS

- **Plastic bottle-moulding facility closed in 1994**

Infomation revised January 1998

ADDITIONAL INFORMATION

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