FACT SHEET No. 18

Nacan Products Limited

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Boucherville, Quebec

J4B 1V5

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 NACAN PRODUCTS LTD., located plant in Boucherville, 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 industrial plants reduced their toxic effluent discharges by 96%.

INDUSTRIAL PLANT

An adhesives and resins plant

In Boucherville, NACAN PRODUCTS LIMITED operates a plant that produces polyvinyl acetate and adhesives using a non-continuous process. Polyvinyl acetate is formed in a polymerization reactor, mainly from polyvinyl alcohol and vinyl acetate. In the spring of 1993, the plant received equipment from the Varennes division and increased its polyvinyl acetate production capacity. The adhesives are manufactured by simply mixing raw materials in vats. The plant has a work force of 100.

PRODUCTION

PRINCIPAL RAW MATERIALS

- Vinyl acetate
- Dextrin
- Acrylate
- Polyvinyl alcohol

FINISHED PRODUCTS

- Adhesives
- Plastic resins (polyvinyl acetate)

TREATMENT MEASURES

INITIAL EFFLUENT VALUES

COD and SS

The company did not collect data in 1988, therefore the loads were estimated from the 1989 Action Plan characterization study. The discharge was estimated to be 60 m^3/d. In 1989, the effluent contained:

- 245 kg/d of chemical oxygen demand (COD)
- 41 kg/d of suspended solids (SS)
- 0.002 kg/d of phenols
- 0.001 kg/d of cyanides

RESOURCES AND USES TO PRESERVE

A provincial park in need of protection

After physicochemical treatment, the industrial wastewater from the NACAN PRODUCTS LIMITED plant empties into the Boucherville sewage system, which is connected to the south shore wastewater treatment plant on Charron Island. This municipal treatment plant has been in operation since October 1992; its effluent flows into the Seaway to the north of Charron Island. The Boucherville islands Provincial Park is downstream from the discharge point, about 500 m off Boucherville. The islands contain important nesting sites for ducks and staging areas for Canada geese in springtime. Within the confines of the Boucherville Islands Park, several species of fish have spawning and nursery grounds. Muskrats can be found there as well. The Boucherville islands are a recreation area (for picnics, bicycling, canoeing, and water sports); a channel for small boats runs along the south shore of the islands. Many fish species reproduce in the aux Pins River, which flows between Boucherville and Varennes.

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.

There are no water quality based objectives for NACAN PRODUCTS LIMITED, since the company's effluent is discharged into the municipal sewer system.

EFFLUENT TREATMENT

Physicochemical treatment since 1988

Industrial wastewater (20 m^3/d in 1995) is first sent to a pumping basin, then directed to two equalization basins. The water from the latter is emptied into a rapid mixing tank to which the treatment chemicals are added (alum, sodium aluminate, and anionic polymers). The pH is also adjusted. Coagulation then occurs in the flocculator-clarifier and the sludge is thickened. The filtrate is sent to two settling tanks, in sequence, before continuing to the south shore sewage treatment plant, and the sludge is incinerated. Rainwater and water from indirect cooling are untreated and are emptied directly into the storm sewer, which in turn empties into the St. Lawrence River.

PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

Reduced water intake

The physicochemical treatment system that was operating in 1988 has undergone no changes since that time. However, thanks to water conservation measures, the discharge of wastewater decreased from 60 m^3/d to 20 m^3/d between 1988 and 1995, despite increased production.

REGULATORY COMPLIANCE - WATER COMPONENT

Full compliance

The NACAN PRODUCTS LIMITED plant in Boucherville complies with the discharge standards of the 1993 certificate of authorization (CA) and those prescribed by the city of Boucherville for discharge into sewers.

POLLUTION ABATEMENT

CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

Mainly oil and grease

The Chimiotox index gauges the load of all the toxic substances in industrial effluent, using the toxicity factor assigned to each. 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 December 1992 pursuant to Action Plan requirements, as well as the Chimiotox values estimated from those figures for an effluent flow of 40 m^3/d. Sixteen substances were detected in testing for over 120. The data indicate that oil and grease were preponderant in the treated water and represented 86% of the Chimiotox index. They were followed by mercury (4%), ammonia nitrogen (3%), and bis-(2-ethylhexyl) phthalate (3%).

Figure 1 is plotted from the characterization data for March 1989 and September 1992. Because the Chimiotox index remained virtually unchanged between 1988 and 1991, the 1989 index was applied to the entire period. A reduction was factored into the data for the 1992 characterization to take into account the treatment of industrial wastewater by the south shore sewage treatment plant. The 1992 Chimiotox index was applied to the entire period from 1993 to 1995, since no change was noted during these years. The Chimiotox index shows that the toxicity of effluent discharge increased 162% between 1988 and 1992. The increase can be linked to increased production in the Boucherville plant after the operations of the NACAN PRODUCTS LIMITED plant in Varennes were transferred there. In any case, because both the discharge and the load were very low, the variations observed were not very significant. The total Chimiotox value was one of the lowest among the fifty plants targeted by Action Plan.

Table 1 ***Chimiotox Index (1992) - Nacan Products Ltd.****

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total Oil and Grease	1.791	100	179
Mercury	4.93×10^{-05}	166 667	8
Ammonia Nitrogen	9.172	0.8	7
Bis-(2-ethylhexyl)phthalate	0.004	1 667	7
Di-n-butylphthalate	0.008	250	2
Total Phosphorus	0.028	50	1
Total Phenols	0.006	200	1
Zinc	0.116	9	1
Cyanides	0.003	200	1
Lead	0.001	424	<1
Xylenes (o,m and p)	6.861×10^{-03}	25	<1
Nitrites-Nitrates	0.015	5	<1
Iron	0.012	3	<1
Benzene	5.100×10^{-04}	25	<1
Nickel	0.001	10	<1
Toluene	7.840×10^{-04}	10	<1
CHIMIOTOX INDEX			**208**

* For effluent discharge of 40 m^3/d (16 substances detected in testing for more than 120).

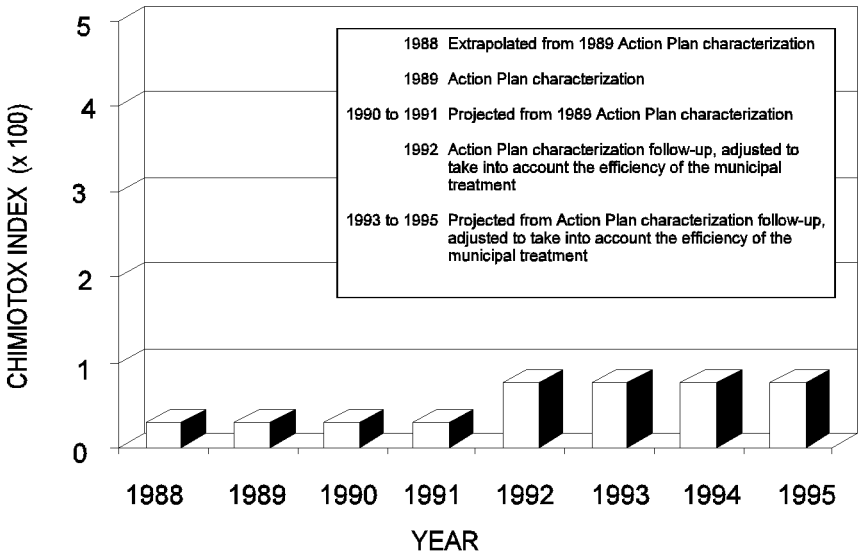

Figure 1 ***Changes in toxic effluent discharges, 1988-1995 - Nacan Products Limited***

VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

Traces of mercury

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.

In 1992, at the time of the last characterization study for Action Plan, mercury was detected. At that time, the mercury load was 0.0183 g/d. This load is reduced when the effluent is sent to the south shore sewage treatment plant before it is discharged into the St. Lawrence.

PEEP TOXICITY REDUCTION

Low toxicity

The Potential Ecotoxic Effects Probe, or PEEP, combines the 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. In the case of NACAN PRODUCTS LIMITED in Boucherville, two series of bioassays were carried out. The PEEP value in 1989 was 2.9, whereas in 1994 it was 2.1. These were among the lowest PEEP values found in the 50 plants.

REDUCTION IN SUBSTANCES MONITORED

Significant reductions

According to 1995 monthly company data, the effluent averaged 20 m^3/d, containing:

- 195 kg/d of chemical oxygen demand (COD)
- 34 kg/d of biochemical oxygen demand (BOD_5)
- 20 kg/d of suspended solids (SS)
- 0.02 kg/d of phenols

Between 1988 and 1994, SS decreased 51% and COD decreased 20%. On the other hand, after Varennes activities were transferred to Boucherville, the phenol load increased from 0.002 kg/d to 0.02 kg/d.

KEY POINTS

- **Physicochemical treatment since 1988, followed by another treatment in the municipal sewage treatment plant since October 1992**
- **Transfer of polyvinyl acetate production from Varennes to Boucherville in 1993**

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

ADDITIONAL INFORMATION

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

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