THE

ONTARIO WATER RESOURCES

COMMISSION

INDUSTRIAL WASTES SURVEY

of the

TOWN OF TRENTON

1967 - 1968

A

REPORT ON

AN INDUSTRIAL WASTES SURVEY

of

THE TOWN OF TRENTON

1967 - 1968

by

Division of Industrial Wastes

ONTARIO WATER RESOURCES COMMISSION

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AN INDUSTRIAL WASTES SURVEY OF THE TOWN OF TRENTON

An industrial wastes survey was carried out in the Town of Trenton by the Division of Industrial Wastes of the Ontario Water Resources Commission. The majority of the industries were surveyed during the period extending from November, 1967 to February, 1968.

The purpose of the survey was to update information concerning the nature and quantity of industrial waste discharges to the municipal sewers and natural watercourses and to indicate, where necessary, if pretreatment and/or control measures are required.

SUMMARY

Twenty-one industries were visited, nine of which discharge significant quantities of contaminated wastes to either the municipal sanitary sewer or a natural watercourse. These nine industries were surveyed in detail and include two metal working and plating operations, one textile mill, five food processing manufacturers and one paper mill. Ten industries were essentially dry or had small flows of uncontaminated wastewater.

A planned trunk sanitary sewer to service the southwestern section of the town was approved in 1968. Some industries, not connected to the existing sewerage system, are planning to utilize these facilities when the trunk sewer has been completed. The loadings exerted on the municipal water pollution control plant from these additional waste sources may result in the overloading of the system. The municipality should consider enlarging the waste treatment works if the planned industrial waste diversions to the municipal sanitary sewers are to be made.

Methods for the Examination of Water and Wastewater", 12th edition.

SEWAGE TREATMENT

Municipal sewerage facilities in the Town of Trenton consist of a primary plant designed for a hydraulic capacity of 1 MGD. At present, the plant is operating at its design value. Several additional industries are planning to discharge their wastes to the sewerage facilities when the planned trunk sewer is completed. This could result in overloading of the municipal sewerage facilities.

TABLE I

SUGGESTED MAXIMUM LIMITS FOR DISCHARGE OF INDUSTRIAL WASTES TO SANITARY SEWERS AND COMMISSION OBJECTIVES FOR DISCHARGE TO STORM SEWERS OR NATURAL WATERCOURSES

	Sanitary Sewer	Storm Sewer or Natural Watercourse
Temperature	not to exceed 150° F	not to exceed 150° F
BOD	300 - 500 ppm	15 ppm
Suspended Solids	350 - 600 ppm	15 ppm
pH	5.5 - 9.5	5.5 - 10.6
Greases and Oils		
(a) Animal or Vegetable Origin	100 - 200 ppm	15 ppm
(b) Mineral Origin	15 ppm	15 ppm
Cyanide as HCN	2 - 5 ppm	0.1 ppm
Copper as Cu	3 - 8 ppm	1 ppm
Chromium as Cr	3 -10 ppm	1 ppm
Nickel as Ni	3 -10 ppm	1 ppm
Phenolic compounds	0.1 - 1 ppm	20 ppb

TABLE II

SUMMARY OF INDUSTRIAL WASTE LOADINGS BEING DISCHARGED TO SANITARY SEWER

WASTE LOADINGS IN LBS./DAY

Industry	Waste Volume gallons/day	BOD	Suspended Solids	Cyanide as HCN	Nickel as Ni	Copper as Cu
Benedict-Proctor Mfg. Co. Ltd.	9,900	-	3.2	0.6	0.8	-
Fabricon Manufacturing Company	12,000 (cooling water)	-	-	-	-	-
Morton Parker Limited	4,000	-	2.1	0.1	0.5	0.2
Trenton Riverside Dairy Products Ltd.	195,000 (average)	765	20	-	-	-
Quaker Oats Company of Canada Limited, Pet Foods Division	159,000	431	283	-	-	-
TOTAL	379,000	1,196	308	0.7	1.3	0.2

TABLE III

SUMMARY OF INDUSTRIAL WASTE LOADINGS DISCHARGED TO A NATURAL WATERCOURSE OR A STORM SEWER

WASTE LOADINGS IN LBS./DAY

Industry	Waste Volume gallons/day	BOD	Suspended Solids
Canada Creosoting Co. Ltd.		NO ESTIMATE AVAILABLE	
Domtar Newsprint Limited	1,150,000	14,800	8,000
Knox Gelatine Company of Canada Limited	120,000	205	573
Stokely-Van Camp of Canada Limited	260,000	4,500	2,000
Trenton Cold Storage Limited	33,000	970	200
Trenton Dyeing and Finishing Company Limited	110,000	125	30
Trenton Riverside Dairy Products Limited	125,000 (cooling water)	-	-
TOTAL	1,798,000	20,600	10,800

DISCUSSION OF RESULTS

In the Town of Trenton, the majority of the industries having substantial waste loadings are not connected to the sanitary sewerage facilities. Wastes from these industries are discharged to either municipal storm sewers, the Trent River or the Bay of Quinte. Included in this category are Trenton Cold Storage Limited, Stokely-Van Camp of Canada Limited, Knox Gelatine of Canada Limited, Trenton Dyeing and Finishing Company Limited and Domtar Newsprint Limited.

A trunk sanitary sewer is to be constructed by the municipality to service the southwestern section of the town. Except for Domtar Newsprint Limited, the remaining industries now discharging substantial waste loadings to a natural watercourse or a storm sewer are planning to utilize the municipal sewerage facilities when the trunk sewer has been completed. As a result, the hydraulic loading to the present water pollution control plant is expected to increase by 500,000 gpd or 50% of the designed value.

Domtar Newsprint Limited is currently involved in a staged pollution abatement programme. In conjunction with any planned expansion of the existing sewage treatment facilities, the Company has requested that consideration be given for inclusion of industrial wastes from its pulping operations into the municipal sanitary system.

Canada Creosoting Company Limited has been granted an approval for the modification and improvement of existing waste treatment facilities. It is expected that the plant effluents will meet Commission objectives when these improvements have been completed.

Of the industries presently using the sanitary sewer, the Trenton Riverside Dairy Products Limited and Quaker Oats Company of Canada Limited (Pet Food Division) discharge significant organic loadings to the system. The two plating operations of Morton Parker Limited and Benedict-Proctor Mfg. Co. Ltd. discharge wastes containing highly toxic contaminants to the municipal sanitary sewerage system.

Out of the twenty-one industries surveyed, ten were essentially dry or had small volumes of uncontaminated wastewater.

CONCLUSIONS AND RECOMMENDATIONS

The municipal sewage treatment facilities consist of a primary plant designed for a hydraulic loading of 1.0 MGD. If the planned industrial waste diversions are made, the present facilities will probably become overloaded.

Specific recommendations referring to the individual industries can be found in section II. General recommendations are as follows:

1. The municipality should implement a sewer-use by-law to regulate industrial waste discharges to the municipal sewers.
2. If the planned industrial waste diversions are made, the municipality should consider expanding the capacity of the existing water pollution control plant to accommodate the additional waste loading.
3. Where not presently doing so, all industries should provide for adequate disposal of their wastes.

BENEDICT-PROCTOR MFG. CO. LTD.
74 Ontario Street

The Company is engaged in the manufacture of silver holloware and copper finish holloware.

SUMMARY

All process wastes are discharged to the municipal sanitary sewerage system. The major source of contamination originates from the plating operations which were found to contain excessive cyanide and nickel concentrations. In addition, spent acid and potash cleaning baths are periodically dumped to the sewer untreated.

It is recommended that the Company take measures to determine means of reducing contaminant levels in the effluent to acceptable limits. Also, the spent acid and potash cleaner baths should be neutralized prior to discharge to the sanitary sewer.

DETAILS OF SURVEY

Benedict-Proctor Mfg. Co. Ltd. was visited on February 12, 1968.

Personnel Interviewed

Mr. G. C. Riley, Plant Superintendent

Mr. W. G. Critchell, Office Manager

Description of Processes

Metal sheets are formed into various holloware shapes by stamping, spinning, soddering, cutting, etc. The formed pieces are then buffed, cleaned

and acid dipped prior to plating. Copper, nickel and silver are the main metals plated. Gold and tin plating baths are also available when required. After plating the pieces are buffed, washed and packed.

Operating Schedule

Number of hours per day	-	8
Number of days per week	-	5
Number of employees	-	80

Water Usage and Distribution

Source	-	municipal
Volume	-	approximately 35,000 gallons/day
Estimated Distribution	-	33,400 gallons/day for process use
	-	1,600 gallons/day for domestic use

Sources of Liquid Wastes and Disposal

The major source of waste volume originates from the running rinses after the potash cleaners, plating and acid baths, and detergent washes. Estimated volumes are given below:

	Volume, gallons/day
#1 potash cleaner rinse	2,000
#2 potash cleaner rinse	2,200
#3 potash cleaner rinse	5,500
scratching wash water	6,400
rinse (after acid dip, Ni and Cu plating)	4,400
rinse (after silver plating)	5,500

	Volume, gallons/day
rinse (after detergent wash)	3,300
rinse (after bright dip)	3,300
domestic wastes	1,600

Remaining process wastes are essentially periodic batch discharges which are listed as follows:

	Waste Volume gallons	Discharge frequency
#1 potash cleaner	200	4 weeks
#2 potash cleaner	250	4 weeks
#3 potash cleaner	100	4 weeks
muriatic dip	20	3 weeks
bright acid dip	15	1 1/2 years
static hot rinse (after silver plating)	80	2 days

All industrial and domestic wastes are discharged to the municipal sanitary sewer.

Sampling and Analysis

Samples were taken of the following waste sources:

(1) rinse (after acid dip, Ni and Cu plating) - composite (1:00 p.m. - 4:30 p.m.)

(2) rinse (after silver plating) - composite (1:00 p.m. - 4:30 p.m.)

(3) static hot rinse (after silver plating) - grab (4:15 p.m.)

(4) bright acid dip - grab (1:30 p.m.)

The analytical results are reported in the following table:

WASTE CHARACTERISTICS

(ALL ANALYTICAL RESULTS IN PPM EXCEPT pH)

	Solids			pH	Cyanide as HCN	Nickel as Ni	Copper as Cu	Silver as Ag	Acidity as $CaCO_3$	COD
	Total	Susp.	Diss.							
Cold water rinse (after acid dip, Ni and Cu plating)	586	13	573	6.0	0.19	18.7	0.25	-	74	16.0
Cold water rinse (after silver plating)	718	47	671	7.1	11.2	-	-	4.8	30	36.0
static hot rinse (after silver plating)	752	32	720	9.3	25.0	-	-	22.7	-	90.0
bright acid dip	*	482	*	0	-	1,170	12,300	1.06	25,300	460

* Oily liquid - residue did not dry, test could not be performed.

WASTE LOADINGS

As the layout of in-plant sewers did not permit sampling of the total plant effluent, the waste loadings were calculated from the two major areas of contamination and are only representative of these areas.

	Rinse (after silver plating)	Rinse (after Ni and Cu plating, and acid dipping)	Total
Waste volume	5,500	4,400	9,900
Suspended solids	2.6	0.6	3.2
Silver	0.3	-	0.3
Acidity	1.6	3.3	4.9
COD	2.0	0.7	2.7
Cyanide	0.6	-	0.6
Nickel	-	0.8	0.8

DISCUSSION OF RESULTS

Hydraulic loading to the municipal sanitary sewer was estimated at 35,000 gallons/day. Waste loadings were only calculated for the two major sources of contamination which represented 28% of the total volume. These two sources were the cold water running rinses following the acid dip and the silver, nickel and copper plating baths. The remaining waste volume consists primarily of rinses after the potash cleaners, scratching operation and detergent washes.

Except for cyanide and nickel concentrations, the running rinses were suitable for discharge to the sanitary sewer. Although nickel and

cyanide levels were excessive in the individual rinses, dilution with the other plant wastes should reduce concentrations significantly.

High concentrations of cyanide (25 ppm) and silver (23 ppm) were present in the static hot water rinse following the silver plating bath. The hot rinse is emptied approximately every two days and the above analytical results are representative of the first operational day. It is expected, therefore, that contaminant levels will be higher than indicated, when the rinse is dumped.

There are three acid baths utilized. Two of these are discharged to the sewer when spent. The muriatic dip (20 gallons, 10% HCl) is dumped every three weeks and the bright dip approximately every one and a half years. A 2% pickling solution of H_2SO_4 (75 gallons) used about two times per week for treating annealed Ni-Ag alloys is not dumped.

Although no samples were taken of the concentrated alkali cleaning baths, pH values are expected to be high.

The following range of maximum concentrations are suggested for industrial waste discharges to municipal sanitary sewers:

Cyanides as HCN ...	2-5 ppm
Copper as Cu	3-8 ppm
Nickel as Ni	3-10 ppm
pH	5.5 to 9.5 ppm

CONCLUSIONS AND RECOMMENDATIONS

Even though dilution with other plant wastes will result in contaminant levels in the total plant effluent being lower than those in the individual

rinses, it is recommended that the Company investigate methods of minimizing drag-out from the contaminating baths.

The spent acid and potash cleaner baths should be neutralized prior to discharge to the municipal sanitary sewer.

DOMTAR CHEMICALS LIMITED
Canada Creosoting Division
126 Marmora Street

This plant applies wood preservatives to utility poles and railroad cross ties.

DETAILS OF SURVEY

Canada Creosoting, Division of Domtar Chemicals Limited, was visited on April 4, 1968, immediately after heavy precipitation in the area.

Personnel Interviewed

Mr. P. Matergio, Plant Superintendent

Description of Process

Wood preserving chemicals are applied to the poles and ties in pressure retorts. The wood is treated with pentachlorophenol, in a petroleum base oil or with a creosote-petroleum mixture.

Operating Schedule

Number of hours per day - 24

Number of days per week - 5

Number of employees - 60

Water Usage and Distribution

	Volume, gallons/day
(A) Trent River	
Steam	9,000
Cooling water	800

	Volume, gallons/day
(B) Town water	
Domestic purposes	200

Sources of Liquid Wastes and Disposal

	Volume, gallons/day
Pressure treating plant	
Exudation of preservative)) Leakage)) Wash-up water)	1,500
Boiler blow	200
Condensate from steam coils	1,700
Domestic wastes	1,500

Surface runoff from land drainage becomes contaminated with oils and phenols on crossing Company property.

Existing Treatment Facilities

1. Wastewater incinerator to burn effluent from processing plant. The system is not operating due to design defects.
2. Oil separating and skimming facilities.

Planned Improvements

1. Repairs and extensions of existing retaining wall to control contaminated runoff.
2. Rehabilitation of, and modifications to, existing incinerator.

3. Rehabilitation of existing oil separator.

4. Use of hay filters in separator outfall.

Disposal

At present, there are three ditches conveying surface runoff from plant property to the Trent River. One receives additional drainage from a municipal storm sewer. The remaining outfall to the river is from the oil separator.

Domestic wastes are discharged to the municipal sanitary sewer.

Sampling and Analysis

Grab samples were taken of the runoff entering the river from the three drainage ditches and, also, of the municipal storm sewer effluent discharging to Company property.

Analytical Results
(all results in ppm except pH)

	Solids			pH	Phenols	Ether Solubles
	Total	Susp.	Diss.			
Municipal storm sewer to plant property	514	3	511	8.3	25	trace
Storm ditch entering river after passing across property	892	*705	187	8.5	50	5
North drainage ditch	634	69	565	8.6	12	4
South drainage ditch	638	8	630	7.6	40	4

* sand

DISCUSSION OF RESULTS

Phenol concentrations in the effluent from the south drainage ditch and the storm ditch were in excess of Commission objectives for discharge to a natural watercourse. Although the contaminant levels were not excessively high, the analytical results indicate that phenols and ether solubles from the Company property are contaminating the surface runoff.

On the day of the visit, there was no overflow from the oil separator.

CONCLUSIONS

On March 13, 1968, Canada Creosoting, Division of Domtar Chemicals Limited was issued an approval for the modification and improvement of treatment facilities which are to be completed by August, 1968. With

completion of the improvements, it is expected that the plant effluents will meet Commission objectives for discharge to a natural watercourse.

DOMTAR NEWSPRINT LIMITED
Marmora Street

The mill is involved in the manufacturing of corrugated paper from chemical pulp and waste paper.

SUMMARY

The contaminant levels in the mill effluent discharged to the Trent River were found to be in excess of Commission objectives for discharge to a natural watercourse.

It is recommended that the mill personnel continue in their pollution abatement programme. If permission is not granted for the utilization of the municipal system, the Company should proceed with the installation of its own treatment facilities to bring contaminant levels to within Commission objectives.

DETAILS OF SURVEY

Domtar Newsprint Limited was surveyed on October 31, 1967.

Personnel Interviewed

Mr. G. E. Boyce, Resident Manager

Mr. J. McKee, Quality Control Superintendent

Description of Process

Raw materials used in the manufacturing of the corrugated paper medium consist of 75% logs, 15% chips, and 10% waste paper. Logs are washed and chipped. The resulting chips are screened and conveyed to storage silos.

No debarking is done at the mill. Approximately 10% to 15% of the logs are prebarked.

The wood chips are digested using a neutral sodium sulphite cooking liquor. Spent liquor is squeezed from the chips, screened and pumped to storage lagoons. The partially pulped chips are then fiberized, and dirt and bark particles are removed in subsequent screening and cleaning operations.

After its consistency is regulated, the pulp is distributed on the table section of the fourdrinier paper machine. Water drains from the pulp as the sheet passes across the table. The remaining operations are essentially pressing, drying, winding, packaging and storing.

Operating Schedule

Number of hours per day - 24

Number of days per week - 7

Number of employees - 160

Water Usage

Process water is pumped from the Trent River. Water usage estimated by plant personnel was 900,000 gallons/day. The figure does not include log wash or dilution water.

Sources of Liquid Wastes

1. spent cooking liquor
2. discharge from disc filter
3. log wash water
4. tank and pump leakages.

Existing Waste Treatment Facilities

1. Screening Facilities

   Coarse solids from the log wash water are removed by a stationary screen.

2. Disc Filter

   The filter is used for recovering pulp fibres primarily from the white water. The initial cloudy filtrate and a portion of the clear filtrate is re-used in the system. An additional disc has been installed since the last survey in 1966 to improve the filter efficiency.

3. Spent Liquor Holding Ponds

   After screening, the spent cooking liquor from the pressafiners is pumped to three ponds. The overall capacity of the storage facilities is 12,100,000 gallons.

Disposal

Spent cooking liquor is trucked away in the summer and sprayed on roads. Solids from the log wash water are collected and dumped at a land disposal site.

All remaining liquid wastes, consisting of screened log wash water and filtered white water combine and discharge to the Trent River through a partially submerged outfall. At times, water is also used for diluting the plant effluent prior to entering the river.

Sampling and Analysis

Composite samples at half-hour intervals were taken of:

1. influent to the disc filter (before sweetener)
   composite (11:00 a.m. - 4:00 p.m.)
2. log wash water taken from floor trench in plant
   composite (10:00 a.m. - 4:00 p.m.)
3. total mill effluent to the river composite
   (10:00 a.m. - 4:00 p.m.)
4. effluent from the disc filter composite
   (8:00 a.m. - 4:00 p.m.)

The sample of the disc filter discharge was obtained from the Company's automatic sampler. In addition, a grab sample was taken of the raw river water.

Waste Characteristics

(all analytical results in ppm except pH)

	BOD	Solids			pH	COD	Lignins as tannic acid
		Total	Susp.	Diss.			
1. Influent to Filter Disc (before sweetener)	2,100	13,498	1,422	12,076	7.7	16,792	1,750
2. Effluent from Filter Disc	1,550	7,810	470	7,340	7.2	11,698	1,000

	BOD	Solids			pH	COD	Lignins as tannic acid
		Total	Susp.	Diss.			
3. Log Wash Water	270	2,606	1,566	1,040	7.0	1,547	150
4. Total Mill Effluent to River	960	4,838	830	4,008	7.1	5,283	500
5. River Water Supply	1.2	128	8	120	7.7	22.6	0.5

WASTE LOADINGS

	Waste Volume gal/day	BOD	Solids			Lignins	COD
			Total	Susp.	Diss.		
Discharge from disc filter	915,000	14,200	71,400	4,300	67,100	9,150	107,000
Log wash water	240,000	650	6,250	3,760	2,500	36	3,700
*Net total	1,150,000	14,840	76,170	7,970	68,200	9,128	110,440

* contaminant loadings in the raw river water have been subtracted.

DISCUSSION OF RESULTS

As the log washing operation was not continuous, waste loadings were calculated from the individual waste streams rather than from the total plant effluent. The discharge from the disc filter, estimated at 915,000 gallons/day, was responsible for 96% of the total BOD loading and 54% of the total suspended solids loading. Corresponding BOD and suspended solids concentrations

were 1,550 ppm and 470 ppm respectively. The log wash water sampled in the plant floor trench had an extremely high suspended solids concentration of 1,566 ppm.

The fibre recovered from the excess white water is approximately 9,500 lbs./day. This represents a removal efficiency of 67%. Literature values would indicate that with a properly sized disc filter the suspended solids concentration in the filtered white water could possibly be reduced to within a range of 80 ppm to 100 ppm. The concentration was found in this survey to be 470 ppm.

CONCLUSIONS AND RECOMMENDATIONS

The total mill effluent to the Trent River was in excess of Commission objectives for discharge to a natural watercourse. Therefore, it is recommended that the mill personnel continue in their programme of reducing the contaminant levels in the effluent to the river.

The Company has requested the Town of Trenton to give consideration to the acceptance of the mill wastes into the municipal sewage treatment facilities. If the wastes are not accepted, the Company should proceed with the installation of its own treatment facilities as soon as possible to render the wastes suitable for discharge to the river.

Plant personnel have indicated that the waste flow had been decreased to 200,000 gallons/day by greater water re-use, but that fresh water was required to control the temperature of the system. It is suggested that consideration be given to the installation of facilities, such as a cooling tower, to reduce the temperature and, thus, permit greater re-use

of water. Reduction of the waste flow would make treatment in the municipal sewerage system more economical.

FABRICON MANUFACTURING COMPANY
107 Wragg Street

The Company manufactures and coats copper and aluminium wire for use as electrical cable.

SUMMARY

Process wastes consist primarily of uncontaminated cooling water. The main source of contamination originates from the periodic dumping of wire drawing solutions containing extremely high concentrations of COD, ether solubles, BOD_5, Anionic detergents and copper. It is recommended that these solutions not be discharged to the storm sewer.

DETAILS OF SURVEY

The Company began operations in the fall of 1967 and was surveyed on February 14, 1968. The Plant Engineer, Mr. J. Sayre, was interviewed.

Operating Schedule

Number of hours per day - 24

Number of days per week - 6

Description of Operation

The process consists essentially of the drawing of copper and aluminium rods into wire, followed by annealing and coating operations. Three plastic extruders and a molten tin bath are available for coating purposes. Remaining operations consist of the winding and wrapping of the wire strands to produce an electrical cable.

Water Usage and Distribution

Source - municipal

Volume - 37,000

Process - 35,500

Domestic - 1,500

Sources of Liquid Wastes and Disposal

Uncontaminated cooling water from the plastic extruders is responsible for the major volume of wastewater. Cooling water resulting from two of the extruders is directed to a storm sewer, while that from a third is discharged to the municipal sanitary sewer. The storm sewer drains to the Bay of Quinte.

Drawing solutions from the #17 dye rod machine and the fine wire machine, estimated at 2,000 gallons each, have not as yet been dumped but it is expected that they will have to be replaced about once per year. Plant personnel were planning to discharge these to the storm sewer.

Domestic wastes are discharged to the sanitary sewer.

Sampling and Analysis

Grab samples were taken of the drawing solutions from the #17 dye rod machine and the fine wire machine. The analytical results are reported below:

	BOD ppm	Ether Solubles %	Ionic Detergents as ABS ppm	Copper as Cu ppm	COD ppm	pH
17 dye rod machine	3,600	6.33%	5,100	1,660	260,000	8.9
fine wire machine	1,400	4.05%	2,000	2,360	180,000	9.0

WASTE LOADINGS

Waste loadings originating from the batch discharges are estimated as follows:

	lbs./Batch Discharge				
	Ether Solubles	Anionic Detergents	Copper	BOD	COD
17 dye rod machine	1,300	100	33	72	5,200
fine wire machine	800	40	48	28	3,600

CONCLUSIONS AND RECOMMENDATIONS

The drawing solutions were found to contain extremely high contaminant levels. Therefore, it is recommended that the solutions should not be discharged to the storm sewer and it is suggested that they either be pretreated and discharged to the municipal sanitary sewer or dumped at a suitable land disposal site.

KNOX GELATINE OF CANADA LIMITED
Carrying Place Road

The Company manufactures commercial gelatine from bone chips.

SUMMARY

Contaminated wastes from the processing operations are discharged to a ditch which drains into the Bay of Quinte. It is recommended that the Company take measures to correct the disposal problem. Plant personnel have indicated that the wastes will be discharged to the municipal sewerage system when the proposed trunk sewer to service the area has been completed.

DETAILS OF SURVEY

The plant was surveyed and sampled on November 2, 1967, with additional samples taken on February 15 and 16 and April 4, 1968.

Personnel Interviewed

Mr. J. B. Kraeze, Vice-President and General Manager

Description of Process

A brief outline of the steps involved in manufacturing gelatine is presented below:

1. Liming of bone chips
2. Rinsing lime from the bone
3. First acid sour;

   Second acid sour
4. Rinsing (3 to 4 hours)

5. Leaching to extract gelatine

6. Purification of gelatine

7. Evaporation to concentrate gelatine

8. Finishing operations - cooling, air drying and grinding of gelatine.

Operating Schedule

Number of hours per day - 24

Number of days per week - 5

Number of employees - 25

Water Usage

	Approximate Volume gallons/day
Municipal	*120,000
Bay of Quinte	250,000
Total	370,000

* Based on monthly P.U.C. water usage figures

Sources of Liquid Wastes and Volumes

(A) Town Water

New Ossein Building

lime bath - 4,000 gallons/batch, 3 batch dumps/week

water rinse - 140,000 gallons/rinse, 3 rinses/week

#1 acid sour - 2,500 gallons/batch, 3 batch dumps/week

#2 acid sour - 2,500 gallons/batch, 3 batch dumps/week

water rinse - 20,000 gallons/rinse, 3 rinses/week

Main Plant

evaporator wash - 45 gallons/wash, 4 washes/week

evaporator rinse - 35 gallons/rinse, 4 rinses/week

cellulose wash - 625 gallons/wash, 7 1/2 washes/week

cellulose rinse - 1,420 gallons/rinse, 7 1/2 rinses/week

kettle washing - 65 gallons/wash, 15 washes/week

ion exchanger - 2,000 gallons/day

Miscellaneous

general equipment and floor wash water - 13,000 gallons/day

domestic wastes 100 gallons/day

(B) Bay Water

cooling water (large evaporator) - 170,000 gallons/day

cooling water (small evaporator) - 80,000 gallons/day

Disposal

Wastes from the new ossein building are discharged to a small equalization basin. The effluent from the basin flows across a field to a ditch which drains to the Bay of Quinte. Uncontaminated cooling water and process water from the main plant are directed to a storm sewer.

The bone residue remaining after the leaching operation is pumped to a tank truck and dumped at a land disposal site.

Sampling and Analysis

Except for the evaporator cooling water, wastewater discharges from the new ossein building and the main plant are essentially periodic.

In an effort to obtain representative effluent characteristics, samples were taken of the individual waste sources.

The analytical results are listed in the table on analytical results on page 36.

WASTE LOADINGS

Waste volumes were calculated on a 5-day/week operating schedule and the corresponding loadings are shown in the table on waste loadings on page 37.

DISCUSSION OF RESULTS

The total volume of wastewater discharged to the Bay of Quinte was estimated at 370,000 gallons/day. Approximately 68% of the total is uncontaminated cooling water.

Operations within the new ossein building were responsible for 95% of the BOD loading and 90% of the suspended solids loading. Contaminated wastes from the main plant were confined mainly to washing and rinsing operations and were relatively small in comparison.

As it was impossible to obtain a representative sample of the equipment and floor wash water, the total loading figures on page 37 are probably slightly greater than indicated.

CONCLUSIONS AND RECOMMENDATIONS

The waste characteristics of the plant effluent discharged to the Bay of Quinte are in excess of Commission objectives for discharge to a natural watercourse. It is recommended, therefore, that measures be taken to correct the waste disposal problem.

Company personnel have indicated that they plan to proceed with arrangements to connect to a municipal trunk sanitary sewer as soon as it has been completed. To minimize the hydraulic loading on the municipal system, uncontaminated cooling water should continue to be discharged directly to the bay.

ANALYTICAL RESULTS

Source	Date sampled	BOD_5	Solids			Total Kjeldahl Nitrogen	pH at lab
			Total	Suspended	Dissolved		
3rd liming	April 4/68	6,200	10,696	507	10,189	1,318	11.8
4th liming	Nov. 1/67	440	2,624	544	2,080	78	12.6
5th liming	Feb.15, 16/68	4,000	9,728	1,010	8,718	1,154	12.5
Rinse (23 hours)	Nov. 1/67	156	1,122	976	146	100	9.1
Rinse (23 hours)	Nov. 2/67	43	688	47	641	51	7.4
Rinse (23 hours)	April 4/68	84	644	121	523	13	7.4
Acid batch dump #1	Feb.15, 16/68	32	1,236	500	736	24	6.8
Acid batch dump #2	Feb.15, 16/68	680	2,642	812	1,830	71	5.7
Rinse (3-4 hours)	Nov. 1/67	83	600	278	322	12	7.2
Evaporator wash	Nov. 1/67	1,460	3,980	820	3,160	6,250	13.5
Evaporator rinse	Nov. 1/67	265	3,018	62	2,956	31	12.5
Cellulose wash	Nov. 1/67	565	1,784	962	822	22	7.8
Cellulose rinse	Nov. 1/67	128	890	504	386	13	7.8
Kettle washing	Nov. 1/67	8.6	396	70	326	5.8	7.9

All results in ppm except pH

WASTE LOADINGS

Source	Approximate Waste Volume gallons/day	BOD_5 Loading lbs./day	Suspended Solids Loading lbs./day
Lime bath	2,400	84	17
Rinse (23 hours)	84,000	92	482
#1 acid sour	1,500	-	8
#2 acid sour	1,500	10	12
Rinse (3-4 hours)	12,000	10	33
Evaporator wash	70	1	1
Evaporator rinse	60	-	-
Cellulose wash	900	5	9
Cellulose rinse	2,100	3	11
Kettle washing	200	-	-
Ion exchanger	2,000	-	-
Miscellaneous	13,000	-	-
Total (approx.)	120,000	205	573

MORTON PARKER LIMITED
Dufferin Avenue

Morton Parker Limited is engaged in the manufacture of silver-plated holloware.

SUMMARY

Batch discharges to the municipal sanitary sewer from the pickling and plating operations constitute the major source of contamination. The cyanide and acid dipping baths which are periodically dumped had extremely high contaminant levels. As the toxic nature of the baths can adversely affect operating conditions at the sewage treatment plant and is a potential hazard to sewage plant personnel, the Company should take measures to reduce contaminant levels to acceptable limits prior to discharge.

DETAILS OF SURVEY

The Company was surveyed on February 12, 1968, and the Plant Superintendent, Mr. A. Chivas, was interviewed.

Operating Schedule

Number of hours per day - 8 (plating room - 16 hours/day)

Number of days per week - 5

Number of employees - 75

Description of Processes

Copper and nickel sheets are formed into various holloware shapes by a series of metal working techniques such as stamping, drawing, spinning,

soddering and cutting. The formed pieces are then buffed, cleaned, dipped in an acid or cyanide bath and plated. Plating operations consist of a dull nickel flash, a silver strike and a silver plate. Gold plating is also done when required.

Water Usage and Distribution

Source - municipal

Volume - 11,000 gallons/day

Estimated Distribution - 9,500 gallons/day for process

- 1,500 gallons/day for domestic

Sources of Liquid Wastes and Disposal

The major continuous source of wastewater originates from the cold running rinses located in the plating and pickling areas. This includes running rinses after the potash cleaners, dull nickel flash, silver plate and acid dips. However, the most contaminated wastes are the "spent" batch dumps which are listed as follows:

	Volume, gallons	Frequency of discharge
Potash cleaner	300	2 weeks
Potash cleaner	200	2 weeks
Potash cleaner	150	2 weeks
Acid dip (plating area)	15	3 to 4 weeks
Acid dip (pickling area)	25	2 to 3 weeks
Cyanide dip	100	*2 to 3 months
Static rinse (after silver plate)	100	daily
Static rinse (after cyanide dip)	50	-

* expected dumping frequency

All industrial as well as domestic wastes are directed to the municipal sanitary sewer. Sludge removed from the vapor degreaser is land dumped.

Sampling and Analysis

Composite samples were collected from two locations in the plating room between 12:00 noon and 4:00 p.m. One is a sump which drains the area surrounding the plating baths and the other a trough from the cleaning operations. In addition, grab samples were obtained from the various batch solutions which are periodically discharged to the sewer.

The analytical results are shown on page 43.

WASTE LOADINGS

	Waste Loadings from Plating Room		
	Effluent to Sump	Cleaning Area	Total
Waste volume, gallons/day	3,000	1,000	4,000
Suspended solids, lbs./day	0.8	1.3	2.1
Cyanide, lbs./day	0.1	-	0.1
Nickel, lbs./day	0.5	-	0.5
Copper, lbs./day	0.2	-	0.2

The waste loadings resulting from the batch discharges to the municipal sanitary sewer are estimated as follows:

	LBS./BATCH DISCHARGE				
	CN as HCN	Nickel	Copper	Acidity	Alkalinity
Cyanide dip	10	-	4	-	-
Acid dips	-	0.25	-	178	-
Potash cleaners	-	-	-	-	71

Since the batch solutions were sampled before being completely spent, the Ni and Cu loading would be expected to be appreciably higher than indicated.

DISCUSSION OF RESULTS

Analytical results indicate that the effluent to the sump had a high nickel concentration (16 ppm) and a low pH of 2.2. Wastes from the potash cleaner area, however, were found acceptable for discharge.

The baths which are dumped when spent had exceedingly high contaminant levels. High concentrations of cyanide (10,000 ppm) and copper (4,450 ppm) were found in the potassium cyanide dip. The acid dip had acidity and nickel concentrations of 445,000 ppm and 625 ppm, respectively. Also, the potash cleaners had high pH valves.

The following are suggested ranges of maximum concentrations in discharges to municipal sanitary sewers:

Cyanides as HCN ...	2-5 ppm
Copper as Cu	3-8 ppm
Nickel as Ni	3-10 ppm
pH	5.5 to 9.5

CONCLUSIONS AND RECOMMENDATIONS

The continuous running rinses in the plating room were found to contain a high nickel concentration and to have a low pH. The spent baths which are periodically dumped to sewer were found to contain excessively high contaminant levels. It is recommended that the Company investigate in-plant control measures to minimize drag-out from the various baths and that the spent baths be treated before discharge or bled to sewer over an extended period of time in order to maintain the contaminant levels below the maximum suggested limits.

WASTE CHARACTERISTICS
(all analytical results in ppm except pH)

	Solids			pH	Cyanide as HCN	Acidity as $CaCO_3$	Alkalinity as $CaCO_3$	Nickel as Ni	Silver as Ag	Copper as Cu	COD
	Total	Susp.	Diss.								
Combined Rinses from cleaning area (composite)	902	130	772	8.0	0.06	-	329	0.30	0.68	2.56	196
Sump in plating room (composite)	1,280	27	1,253	2.2	4.6	620	0	15.6	1.82	5.92	28
Acid dip (pickling area) (grab)	*	448	*	0	-	445,000	-	625	-	-	88
Cyanide dip (grab)	4,256	18	4,238	12.1	10,000	-	-	-	0.75	4,450	8,200
Potash cleaner (grab)	21,206	82	21,124	12.3	-	-	10,920	-	-	-	140

* Boils over while drying. No test could be performed.

QUAKER OATS COMPANY OF CANADA LIMITED
Pet Foods Division

107 Dufferin Avenue

The plant is engaged in the manufacture of various canned and gibbled pet foods.

DETAILS OF SURVEY

Quaker Oats-Pet Foods Division was surveyed on March 11, 1967.

Personnel Interviewed

Mr. N. Harris, Plant Manager

Mr. R. Moffat, General Superintendent

Description of Process

Preparation of the canned food involves grinding and blending of meat and cereals, followed by pre-cooking and can filling. The cans are then cooked, cooled, labelled and packed in cartons.

Gibbled foods consist of a number of cereals and minor ingredients. The mixture is blended, extruded and dried in ovens.

Operating Schedule

Hours per day - Bakery	-	24
Cannery	-	16
Days per week	-	5 1/2
Number of employees	-	130

Water Usage

Source	-	municipal
Volume	-	162,000 gallons/day
Estimated Distribution	-	159,000 gallons/day for process
	-	3,000 gallons/day for domestic

Sources of Liquid Wastes

Spillage, over-filling and minor clean-ups in the canning area represent the main waste sources. A general clean-up of floors and equipment in the above area is carried out on the night shift, when operations have ceased.

Although the gibble operation is essentially dry, small quantities of wastes may originate during clean-up.

Waste Disposal

All process and domestic wastes are discharged to the municipal sanitary sewer. Wastes from the canning operations discharge to a sewer running along the west side of the building and, also, to a sump located on the east side. Retort exhaust and can cooling water enter the west sewer, while wastes from the gibble operation discharge to the east sewer.

The following table gives estimates of flows into the various sumps:

	Gallons/day
West Sewer (north sump)	38,000
	12,000
	18,000

	Gallons/day
Retort Exhaust (south sump)	1,000
East Sewer	52,000
Pre-cook	10,000
Included in product, evaporation, canning, wash-up, etc.	31,000

Sampling and Analysis

Composite samples were taken from 10:00 a.m. to 4:00 p.m. of the south sump in the west sewer and of the north sump in the east sewer. A grab sample was also obtained from the retort exhaust.

Waste Characteristics
(all analytical results in ppm except pH)

	BOD	Solids			pH	Total Kjeldahl Nitrogen
		Total	Susp.	Diss.		
West sewer	320	670	218	452	6.5	68
East sewer	410	620	260	360	6.8	30
Retort exhaust	17	64	8	56	7.7	-

WASTE LOADINGS

	Waste Volume gallons/day	BOD lbs/day	Suspended Solids lbs/day
West sewer	68,000	218	148
East sewer	52,000	213	135
Retort exhaust	1,000	-	-
Approximate total		431	283

It should be noted that the total loading from this plant, as given in the above table, does not include wastes discharged to the sewer during the night clean-up.

DISCUSSION OF RESULTS

The BOD loading to the sanitary sewer was estimated to be 431 lbs. per day and the suspended solids loading to be 283 lbs. per day. Pieces of meat and gibble which were present in the effluent and responsible for high BOD and suspended solids concentrations could possibly be removed by coarse screening.

Although a sample was not collected of the can cooling water, it should not be contaminated and could possibly be diverted to a storm sewer in order to reduce the hydraulic loading to the sewage treatment plant.

RECOMMENDATIONS

It is recommended that in-plant controls be improved to minimize losses and thus minimize the wastes loadings in the discharges to the municipal sewerage system.

STOKELY-VAN CAMP OF CANADA LIMITED
Dufferin Avenue

The canning plant operates seasonally, processing peas and corn.

SUMMARY

All process wastes are screened prior to discharge to the Bay of Quinte. Contaminant concentration levels in the effluent exceed Commission objectives for discharge to a natural watercourse. Company personnel have stated that the wastes will be discharged to the municipal sewerage system as soon as the proposed trunk sewer is completed.

DETAILS OF SURVEY

On July 6, 1967 and August 28, 1967, industrial waste surveys were conducted during the pea and corn canning periods respectively.

Personnel Interviewed

Mr. J. B. Harder, Plant Manager

Description of Process

Pea Pack

Shelled peas, brought to the plant from the viners, are first passed through a fanning mill for stone removal. The peas are then sent through a float tank, washed and blanched. Following the blancher the peas are cooled, graded in salt brine, washed and conveyed to the inspection tables. After inspection, they proceed to the can filling and closing area. The canned peas are cooked in closed steam heated retorts, conveyed through a cooling trough, and packed.

Besides manufacturing canned peas, the Company processes peas for freezing at a local cold storage plant.

Corn Pack

Corn is husked at the plant, spray washed in a rotating drum and split into two lines, one for canning and the other for freezing. In the canning line, the corn is cut from the cob, screened, washed, graded, blanched, cooled, inspected and conveyed to fillers. In the freezing line, whole and cut cobs are steam blanched, cooled and sent to cold storage for freezing and packaging.

Water Usage

Process water is obtained from the Town of Trenton and usage figures for the 1967 operating months are as follows:

	Gallons/month
June	3,270,000
July	8,200,000
August	7,300,000
September	3,250,000

Based on meter readings, water usage on the individual days of this survey were:

	Gallons/day
July 6 (pea)	180,000
August 28 (corn)	300,000

Additional water is pumped directly from the Bay of Quinte for use as cooling water. No usage figures were available.

Operating Schedule

	Pea	Corn
Number of employees	75	100
Operating period	3-4 weeks	6-7 weeks

Sources of Liquid Wastes and Disposal

(1) wastewater not recirculated from dewatering screens in hydraulic pumping systems

(2) overflow from blanchers

(3) brine from quality grader

(4) flumed solids from inspection tables and screening areas

(5) floor and equipment wash water

(6) overflow from cooling troughs

(7) domestic wastes

All process wastes are discharged to a sump and pumped to a vibrating screen. Solids are collected and used as animal feed or land dumped, while the screened effluent is discharged to the bay. Water from the cooling trough is uncontaminated and discharged directly to the bay by-passing the screening facilities.

Domestic wastes are discharged to a septic tank system.

Sampling and Analysis

During the pea pack, composite samples were taken of the screened plant effluent, the combined overflow from the blanching and washing area, the cooling water overflow after blanching and the main sewer from the closing

area. Only the plant effluent to the bay was composite at the time of the corn pack.

WASTE CHARACTERISTICS
(all analytical results in ppm except pH)

	BOD	Solids			pH	Total Kjeldahl Nitrogen
		Total	Susp.	Diss.		
Pea Pack						
1. Screened plant effluent comp. (1:45 p.m. - 4:15 p.m.)	795	3,846	636	3,210	4.0	94
2. Blanching and washing area comp. (1:45 p.m. - 4:15 p.m.)	2,725	4,716	728	3,988	3.8	150
3. Cooling tank overflow comp. (1:45 p.m. - 4:15 p.m.)	595	1,142	228	914	5.2	45
4. Blanching overflow Grab 3:15 p.m.	8,050	13,790	1,956	11,834	5.7	288
5. Sewer from closing area	640	4,994	140	4,854	4.6	38
Corn Pack						
1. Screened plant effluent comp. (3:00 p.m. - 4:20 p.m.)	2,075	2,368	744	1,624	3.9	42
2. Screened plant effluent comp. (6:30 p.m. - 9:30 p.m.)	2,000	2,668	834	1,834	3.8	45

WASTE LOADINGS

	Pea		Corn	
	July 6	Maximum*	August, 28	Maximum*
Waste volume, gallons/day	180,000	286,000	300,000	500,000
BOD, lbs./day	1,430	2,280	6,080	10,000
Suspended solids, lbs./day	1,150	1,830	2,410	4,000
Total Kjeldahl nitrogen, lbs./day	169	270	132	220

*Assuming waste volume and loading figures vary in proportion to production.

DISCUSSION OF RESULTS

Contaminant concentration levels in the canning wastes entering the bay were extremely high. At present, the treatment facilities available at the plant consist only of a vibrating screen. Although appreciable quantities of solids are removed, the screened effluent still has BOD and suspended solids concentrations of 2,000 ppm and 834 ppm, respectively.

During pea processing, the BOD loading was estimated to be 1,430 lbs./day. This compares to 6,080 lbs./day of BOD for the canning of corn. In order to estimate maximum loading figures, it was assumed that waste loadings varied in proportion to production. At maximum production, therefore, waste loadings could be 60% to 70% greater than those found in this survey.

RECOMMENDATIONS

It is recommended that the discharge of contaminated wastes to the Bay of Quinte be discontinued. Company personnel have stated that the wastes

will be discharged to the municipal sewerage system when the proposed trunk sewer to service the area has been completed.

TRENTON COLD STORAGE LIMITED
21 Albert Street

The plant is involved in the quick freezing and storing of peas, whole and cut corn cobs and the storing of apples.

DETAILS OF SURVEY

Trenton Cold Storage Limited was surveyed on July 6, 1967.

Personnel Interviewed

Mr. E. James, President

Mr. M. F. James, General Manager

Mr. J. Foley, Plant Engineer

Description of Plant and Processes

Shelled peas are received either ready for immediate freezing or directly from the farmers and requiring processing. The operations are fanning, washing, blanching, cooling, grading, inspecting and freezing. A brief description of these is outlined below.

Shelled peas are placed in a hopper and conveyed to a vibrating screen or fanning mill. The screen removes dirt clumps, stones and foreign materials. After fanning, the peas are washed in a flotation tank and hydraulically pumped to a steam blancher. The blanched peas are cooled, dewatered and then chilled in a closed refrigerated water circuit. Cooling water immediately after the blancher is reused in the washing operation. After dewatering, the chilled peas are passed through a brine quality grader and separated into choice and fancy grades. The graded peas are conveyed to

inspection tables and then held in refrigerated water tanks. From the tanks, the peas are pumped in slurry to the freezing area, dewatered, placed on the freezing belts and individually frozen by cold air. The frozen peas are either bagged or placed in boxes for cold storage.

Cut and whole corn cobs received at the plant are ready for immediate freezing.

Water Usage

Process water, chlorinated at the plant, is obtained from the municipality. Water usage on July 6, 1967, was 72,000 gpd. Monthly consumption figures over the 1967 processing period are as follows:

	Volume, gallons/month
June	925,000
July	2,210,000
August	775,000
September	820,000

Bay water is also used but no estimate of quantity was available.

Operating Schedule

Number of employees - 18 (on day of survey)

Pea period - 4 to 6 weeks

Corn period - 4 to 5 weeks

Sources of Liquid Wastes and Disposal

(1) pea washing water

(2) blancher effluent

(3) brine from quality grader

(4) solids flumed from inspection tables

(5) effluent from dewatering screen in freezing area

(6) compressor cooling water

(7) ammonia condenser cooling water

(8) discharge from defrosting freezing tunnels

(9) domestic wastes

(10) boiler wastes

Cooling water from the compressors and the ammonia condensers are discharged along with boiler wastes directly to the Bay of Quinte. Water from the defrosting and washing of the freezing tunnels and the effluent from the dewatering screen in the freezing area are also discharged directly to the bay. The remaining processing wastes are directed to a sump and, hence, to a vibrating screen before entering the watercourse. Solids removed by the screen are collected and land dumped.

Domestic wastes are discharged to the municipal sanitary sewer.

Sampling and Analysis

Composite samples were taken of the plant effluent before and after screening. In addition, grab samples were obtained from the blancher and the dewatering screen in the freezing area.

The analytical results are shown on the following page.

WASTE CHARACTERISTICS
(all analytical results in ppm except pH)

	BOD	Solids			pH	Total Kjeldahl Nitrogen
		Total	Susp.	Diss.		
Plant effluent to vibrating screens Comp. (2:30 p.m. - 9:30 p.m.)	2,250	4,760	700	4,060	4.0	180
Discharge from screens to Quinte Bay Comp. (2:30 p.m. - 9:30 p.m.)	2,900	4,158	576	3,582	3.9	140
Discharge from freezing area to Quinte Bay Grab	3,800	16,706	1,248	15,458	4.0	576.8
Blanching effluent Grab	18,500	33,646	5,660	27,986	5.5	741.6

WASTE LOADINGS
(for pea processing line)

	July 6, 1967		
	Screened effluent	Dewatering screen	Total
Waste volume, gallons/day	34,000	1,000	35,000
BOD, lbs./day	985	38	1,023
Suspended solids, lbs./day	196	12	208
Total Kjeldahl Nitrogen, lbs./day	48	6	54

	*1967 Average	*1967 Maximum
Waste volume, gallons/day	33,000	53,000
BOD, lbs./day	970	1,560
Suspended solids, lbs./day	197	316
Total Kjeldahl nitrogen, lbs./day	51	82

*Assuming that waste volume and loadings vary in proportion to production

DISCUSSION OF RESULTS

Approximately 69% of this year's pack was composed of peas which required no processing before freezing. Calculated waste loading figures are, however, essentially representative of only the processing line. Since the main source of wastes originate in the washing and blanching operations, average daily loading figures are not expected to show a substantial increase when the freezing line is operating. At periods of maximum production, estimated BOD and suspended solids loadinga are 1,560 lbs./day and 316 lbs./day respectively.

Compared to literature valves, the waste volume was only 25% of the expected flow. Recirculation of pumping and cooling water as well as the re-use of cooling water in the washing step is primarily responsible for the lower consumption rate. Wastewater going to the bay and, therefore, not included in the total volume would be the wash water used for defrosting the freezing tunnels, boiler wastes and uncontaminated cooling water.

CONCLUSIONS AND RECOMMENDATIONS

The contaminant levels in the screened effluent discharging to the Bay of Quinte were found to exceed the Commission objectives for discharge to a natural watercourse. Therefore, it is recommended that the discharge of contaminated wastes to the watercourse be discontinued. Company personnel have stated that they are investigating methods of reducing the waste volume to 10,000 gpd and have requested permission from the Town of Trenton to discharge the contaminated wastes to the municipal sewerage system.

TRENTON DYEING AND FINISHING COMPANY LIMITED
Film Street

The plant is involved in the weaving, scouring and dyeing of various fabrics.

SUMMARY

All process wastes enter a municipal storm sewer which discharges to the Bay of Quinte. Analytical results indicate that excessive contaminant concentration levels are present in the plant effluent. It is, therefore, recommended that measures be taken to correct the waste disposal problem. Company personnel have indicated that they have requested permission from the Town of Trenton to discharge the contaminated wastes to the municipal sewerage system.

DETAILS OF SURVEY

Trenton Dyeing and Finishing Company Limited was visited on November 1, 1967.

Personnel Interviewed

Mr. J. H. Owens, Vice-President

Mr. N. Hill, Maintenance Foreman

Operating Schedule

Number of employees	-	96
Hours/day	-	10
Days/week	-	5

Busy season (June - October)

Washing (7:00 a.m. - 11:00 p.m.)

Dyeing (7:00 a.m. - 6:00 p.m.)

Water Usage

Water is obtained from the Town of Trenton. Based on monthly P.U.C. figures, water usage on the day of the survey was estimated at 110,000 gallons/day.

Description of Processes

Cloth is woven in a new section of the plant.

Sizing and conditioning materials present in the woven cloth are removed by scouring with a detergent and soda ash solution. After scouring, the cloth is rinsed and some of it is carbonized in an acid bath to remove foreign fibres. The dyeing step consists primarily of soaking the cloth in a hot dye bath until the desired colour is obtained and, then, rinsing. Remaining operations are drying, sorting and storing.

Sources of Liquid Wastes and Disposal

(a) Scouring

- spent scouring baths
- hot rinse
- cold rinse

(b) Carbonizing

- rinse

(c) Dyeing

- spent dye baths
- dye bath rinses

Process wastes are discharged to a municipal storm sewer which drains into the Bay of Quinte.

Sampling and Analysis

The total plant effluent to the municipal storm sewer was sampled at a manhole outside the plant. Samples were composited quarter hourly over two and a half hour periods from 9:00 a.m. to 5:00 p.m.

The analytical results are shown on page 64.

WASTE LOADINGS

	To Bay of Quinte	
	Minimum	*Maximum
Waste volume, gallons/day	110,000	180,000
BOD, lbs./day	125	200
Suspended solids, lbs./day	30	49
COD, lbs./day	305	500

* During busy period - June to September

CONCLUSIONS AND RECOMMENDATIONS

It is recommended that the discharge of contaminated wastes to the municipal storm sewer be discontinued and that a satisfactory method of disposal be adopted. Company personnel have indicated that they are planning to discharge the process wastes to the municipal sanitary sewer as soon as the

municipality has completed construction of the proposed trunk sewer. Uncontaminated water such as cooling water should continue to be discharged to the storm sewer to minimize the hydraulic loading on the municipal sanitary system.

WASTE CHARACTERISTICS
(all analytical results in ppm except pH)

	BOD	Solids			pH	Alkalinity as $CaCO_3$	COD
		Total	Susp.	Diss.			
Plant effluent to municipal storm sewer	97	1,076	34	1,042	8.2	11	232
Plant effluent to municipal storm sewer	75	1,050	4	1,046	9.3	388	168
Plant effluent to municipal storm sewer	168	1,090	42	1,048	8.0	439	440

THE TRENTON RIVERSIDE DAIRY PRODUCTS LIMITED
69 Front Street

The dairy is involved in producing bottled milk, butter and cheese.

SUMMARY

All process wastes except uncontaminated cooling water are discharged to the municipal sanitary sewer. Whey from the cheese manufacturing operations is the major source of contamination. BOD loadings resulting from the whey dumping are estimated at from 540 lbs./day (winter) to 970 lbs./day (summer).

It is recommended that consideration be given to finding a more suitable method for disposing of the milk processing by-products.

DETAILS OF SURVEY

The Trenton Riverside Dairy Products Limited was surveyed on April 2, 1968.

Personnel Participating

Mr. A. Quickert, President

Mr. J. Patterson, Plant Supervisor

Description of Process

Raw milk is delivered to the plant in cans or by bulk carriers and processed into butter, cheese and bottled milk. Some of the operations involved in the process are weighing, storing, filtering, separating, pasteurizing, cooling and churning.

Operating Schedule

Hours/day - 7

Days/week - 7

Number of employees - 27

Water Usage

All water is obtained from the Trenton P.U.C. Two meters are employed in the plant, one records the total water usage and the other measures the uncontaminated cooling water discharging to the Trent River. The maximum, average and minimum water usage figures from May, 1967 to April, 1968 along with the corresponding volume for cooling purposes are as follows:

	Total Water Usage (gallons/month)	Cooling Water Trent River (gallons/month)
Maximum (July)	480,000	238,000
Average	320,000	125,000
Minimum (March)	184,000	37,000

Sources of Liquid Wastes and Disposal

Source	Waste Volume gallons/day	Disposal
Can washing	250	sanitary sewer
Bottle washing	700	sanitary sewer
Separated whey - winter	1,000	sanitary sewer
summer	2,200	sanitary sewer and animal feed

Source	Waste volume gallons/day	Dispsal
Cooling water - winter	1,000	Trent River
summer	8,000	Trent River
*Buttermilk (farm cream)	150 gal./churn	sanitary sewer and animal feed
Floor and equipment wash water	4,500	sanitary sewer
Domestic wastes	500	sanitary sewer

* Ordinarily the buttermilk is employed in standardizing the cheese. When farm cream is churned, the resulting buttermilk is either discharged to the sanitary sewer or used as animal feed.

Sampling and Analysis

Grab samples were taken from the following waste sources:

1. Can washing water
2. Bottle washing water
3. Butter wash water
4. Whey after separator

The analytical results are shown on the following page.

WASTE CHARACTERISTICS
(all analytical results in ppm except pH)

	BOD	Solids			pH	Total Kjeldahl Nitrogen
		Total	Susp.	Diss.		
Can washing water	4,200	3,678	1,658	2,020	7.0	130
Bottle washing water	260	1,082	173	909	11.3	6.60
Butter wash water	17,000	16,512	9,592	6,920	5.3	742
Whey after separator	54,000	46,320	1,142	45,178	4.6	1,236

WASTE LOADINGS

	To Sanitary Sewer, lbs./day	
	BOD	Suspended Solids
Separated whey - winter	540	11
summer	970	20
Can washing	4	2
Bottle washing	2	1
Butter wash water	4	2

Although buttermilk is not usually discharged to the sanitary sewer, when this does occur expected BOD loadings would be 90 lbs./churn.

DISCUSSION OF RESULTS

Total water usage in the plant varies from 6,000 gallons/day to 16,000 gallons/day with the maximum occurring in the period from May to September. Cooling water represents 50% of the total usage during the summer and 20% during the winter. The uncontaminated cooling water is segregated and discharged to the Trent River. Contaminated process wastes and domestic wastes are directed to the municipal sanitary sewer.

As it was impossible to obtain representative waste characteristics for each individual floor and equipment wash-up, loadings from these sources were not calculated. Although the wash water is responsible for approximately 75% of the waste volume discharged to the sanitary sewer, the corresponding waste loadings are not expected to alter the total values significantly.

Whey is passed through a separator for the removal of fat before disposal to the sanitary sewer. BOD loadings from the separated whey were

estimated at from 540 lbs./day (winter) to 970 lbs./day. In the summer, approximately 20% or 4,000 lbs./day of whey is collected for use by farmers as animal feed.

Buttermilk is usually utilized in the standardization of cheese. When farm cream is used, however, the buttermilk is either collected for animal feed or dumped to the sanitary sewer. From literature valves, it is estimated that 90 lbs. of BOD/churn results from the butter-making operations.

Although facilities are available for collecting whey and buttermilk, the capacity of the holding tank (approximately 500 gallons) is insufficient to contain the daily volumes.

CONCLUSIONS AND RECOMMENDATIONS

The Trenton Riverside Dairy Products Limited discharges excessive BOD loadings to the municipal sanitary sewer. To give an indication as to the effect of dumping whey to the sanitary sewer, BOD loadings expressed as population equivalents are as follows:

Whey to Sanitary Sewer	Population Equilvalents
Maximum (1,800 gallons)	5,800 persons
Minimum (1,000 gallons)	3,200 persons

The above values show that the dumping of whey by the dairy creates a BOD_5 loading on the municipal sewerage system equivalent to that from a population of 3,000 to 6,000 people.

It is recommended that the Company give consideration to finding a more suitable method of disposal for the milk processing by-products.

SUMMARY OF INDUSTRIES WITH RELATIVELY UNCONTAMINATED WASTES

Company	Water Usage	Waste Disposal	Remarks
Canadian Flight Equipment Co. Ltd.	3,000	Municipal sanitary sewer	- cutting oils and lubricants land dumped approximately once every 1 1/2 years
Canadian General Electric Co. Ltd.	137,000	Municipal sanitary sewer	- water used to cool casting machines, annealing furnaces and compressors - paint spray booth land dumped once every 3 months - sludge from vapor-degreaser land dumped once every month
Pyrotenax of Canada Limited	12,000	Municipal sanitary sewer	
Trenton Machine Tool Limited	1,000	Septic tank	
Wimco Ltd., Central Bridge Division	19,000	Municipal sanitary sewer	- water used for cooling spot welders and for hydraulic pressure testing

MANUFACTURING INDUSTRIES USING LITTLE OR NO PROCESS WATER

1. S. H. Camp and Company of Canada Limited
2. DCA Food Industries Limited
3. Erie Technological Products of Canada Limited
4. Essex Electronics of Canada Limited
5. Trent Cotton Co. Ltd.


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