

Welland R



THE
ONTARIO WATER RESOURCES
COMMISSION
WATER RESOURCES SURVEY
of the
COUNTY OF WELLAND
PART 2
INDUSTRIAL WASTE SURVEY
1964

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THE
ONTARIO WATER RESOURCES
COMMISSION

INDUSTRIAL WASTE SURVEY

COUNTY OF WELLAND

A Survey of Industrial Water
Use and Waste Disposal

INDUSTRIAL WASTES BRANCH

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INTRODUCTION

This report is a review of water use and waste disposal practices of the industries located in Welland County. It is intended that this report be considered in conjunction with the Water Resources Survey of the County of Welland - Part 1. While Part 1 deals with municipal and private water and sewerage systems and stream water quality, Part 2 is concerned with the industries of Welland County.

Information contained in the last section of this report, "Data on Individual Industries", is a summary of material collected by Commission personnel in the past several years. Major surveys were conducted in Welland County in 1959, 1961 and the latest in the spring and summer of 1964. In conducting these surveys, emphasis was placed on industries discharging wastes to natural watercourses. The field surveys consisted of interviews with management personnel at the industries, and the sampling of waste effluents where waste flows were deemed to be significant.

The section titled "Conclusions and Recommendations" begins with "General" remarks that pertain to most of the municipalities covered in this report. These general remarks also outline a possible approach that could be used to solve many of the smaller and simpler industrial waste problems in the county. The remaining material in this section of the report refers to specific industrial waste loadings on municipal sewerage systems. Conclusions and recommendations pertaining to individual industries are included in the last section of the report, "Data on Individual Industries".

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SUMMARY

Early industrial development in Welland County was based, to a great extent, on the availability of hydro-electric power from Niagara River sources and low-cost waterborne transport of raw materials and finished products by the Welland Canal. Major industrial processing included the manufacture of pulp and paper and chemical, metallurgical and abrasive materials, the latter two depending on low-cost electric power for furnace operations.

Present-day industries in Welland County include not only these large basic industries, but widely diversified large and small industries ranging from food processing to metal fabrication and finishing.

The total industrial water consumption in Welland County is in the order of 125 million gallons per day. Less than 10 percent of this quantity is obtained from municipal supplies; the majority is supplied from private sources, usually the surface waters within the county. Accordingly, the volume of industrial wastes to be disposed of each day is of the same magnitude. Almost 95 percent is discharged through private drains to the surface waters of the county.

It is significant to note that 12 of the industries account for over 90 percent of the total industrial water used in the county, and similarly these 12 are responsible for over 90 percent of the industrial wastes being discharged.

The two charts included in this section of the report give an indication of the amount and sources of industrial water used, as well as

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the volume of waste waters and the names of the surface waters that receive them. The values on the charts are totals for industries in each of the listed municipalities. (Charts appear on pages 7 and 8)

It should be noted that changes in the flow pattern in the downstream portion of the Welland River that were brought about by the closing of the Chippawa Power Canal for repairs in 1964 directed waste materials that normally would reach the Niagara River at Queenston to the mouth of the Welland River just upstream from the City of Niagara Falls water supply intake. This was expected to continue through most of 1964, and perhaps recur in 1965.

Another change in flow in the Welland River was brought about by the reduction in the diversion of water from the Welland Ship Canal to the Welland River at the City of Welland. This diversion, until recently amounting to 250 cubic feet per second, was used to drive turbines at the City of Welland waterworks. With the conversion to electrically driven pumps, it is expected that the flow from the canal to the river will be reduced or terminated. During the dry summer period, the diversion water and wastes from the City of Welland comprise a large part of the flow in the Welland River. When the City of Welland builds a sewage treatment plant, the treated effluent will still require dilution, and the diversion should be maintained for this purpose.

In general, the industrial waste problems in Welland County can be separated into a number of groups: the pulp and paper mills; industries using large volumes of water, most of which is for cooling purposes;

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industries discharging wastes containing large organic loadings; and industries (such as metal finishing plants) that discharge wastes having a varying pH and containing toxic components (cyanide, heavy metal ions, etc.).

The most outstanding industrial pollution results from the discharge of wastes from the pulp and paper mills along the Old Welland Canal, and extending from Thorold Township through the Town of Thorold and into the City of St. Catharines. A practical solution to this problem is difficult to achieve, due to the large volume of waste involved and the strength and characteristics of the wastes. An indication of the physical size of the problem is given by a comparison of industrial and municipal waste flows. The wastes from the pulp and paper mills alone are in the order of two to three times greater than the sanitary wastes from all municipalities in the county. Since the volume of wastes involved is large, the capital cost for treatment facilities is also large. Added to this are the technical problems concerning the methods of treatment to be used. The need for a staged program of effluent improvement is apparent, beginning with prompt provision of facilities that can be built within present technical and economic capability, and followed by the provision of complete treatment or control within a period of five to seven years.

A second industrial waste problem concerns industries that discharge an appreciable volume of cooling water and a relatively small amount of contaminated process wastes. As a result, the effluents from these industries

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contain polluting components in concentrations slightly higher than the normally accepted standards for discharge to watercourses. The most economical solution to this problem would appear to depend on elimination of the polluting components by process changes at the sources or segregation for separate treatment. Examples of industries in this class are the basic chemical plants and the abrasive industry.

With a few exceptions, the industries discharging wastes with a high organic content (high Biochemical Oxygen Demand) are located in municipalities where their wastes can be discharged to the municipal sewerage systems. These are mainly food and dairy product processing plants. Combined treatment with municipal sanitary sewage is often the only practicable solution for the treatment of these wastes. Elimination of this industrial waste problem would therefore appear to depend on the provision of adequate municipal sewage treatment plants.

A final group of industries which have related industrial waste problems are plants that have metal finishing and plating operations, and that discharge wastes having a varying pH and containing materials such as cyanide, chromium, copper, lead, nickel, etc. Pollution control is generally practicable through elimination of contaminants at the source by industrial process changes or by segregation for suitable treatment or disposal.

Misuse of municipal sewers by industry has been noted in several instances where uncontaminated cooling water is discharged to municipal sanitary sewer systems and wastes which should receive treatment are discharged to storm sewers. Municipalities are urged to enact and enforce

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sewer-use by-laws under which the wastes can be regulated to control:

- (a) Unnecessary hydraulic loading on municipal sanitary sewerage facilities.
- (b) The content of wastes that may be discharged to sanitary sewers to avoid physical damage to the sewers or sewage works and to avoid interference with the treatment processes.
- (c) The content of wastes to be discharged to storm sewers requiring re-direction to the sanitary system, where necessary.

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SOURCE AND QUANTITY OF INDUSTRIAL WATER USED

(Imperial gallons per day)

	Municipal Supply	Private Well	Welland River	Hydro Canal	Welland Canal	Lake Erie	Total
Niagara Falls	1,500,000	300,000	19,600,000	11,000,000	-----	-----	32,400,000
Welland	2,300,000	-----	-----	-----	20,000,000	-----	22,300,000
Fort Erie	60,000	-----	-----	-----	-----	-----	60,000
Port Colborne	40,000	-----	-----	-----	16,000,000	7,900,000	23,940,000
Thorold	7,500,000	-----	-----	-----	-----	-----	7,500,000
Chippawa	20,000	-----	5,700,000	-----	-----	-----	5,720,000
Bertie Twp.	90,000	-----	-----	-----	-----	-----	90,000
Crowland Twp.	-----	-----	200,000	-----	-----	-----	200,000
Humberstone Twp.	60,000	-----	-----	-----	-----	-----	60,000
Thorold Twp.	140,000	-----	80,000	-----	31,500,000	-----	31,720,000
Total	11,710,000	300,000	25,580,000	11,000,000	67,500,000	7,900,000	123,990,000

VOLUME AND RECEIVING WATER FOR INDUSTRIAL WASTES
(Million Imperial gallons per day)

	Municipal Sewers	Welland River	Lyons Creek	12-Mile Creek	Old Wel- land Canal	Welland Canal	Hydro Canal	Niagara River	Lake Erie	Total
Niagara Falls	3.8	17.0	---	---	---	---	10.2	1.2	---	32.2
Welland	1.5	11.4	2.3	---	---	7.1	---	---	---	22.3
Fort Erie	.04	---	---	---	---	---	---	.02	---	.06
Port Colborne	.2	---	---	---	---	.07	---	---	23.7	2.40
Thorold	.09	---	---	---	7.4	---	---	---	---	7.49
Chippawa	.02	5.7	---	---	---	---	---	---	---	5.72
Bertie Twp.	---	---	---	---	---	---	---	.08	.01	.09
Crowland Twp.	---	.20	---	---	---	---	---	---	---	.20
Thorold Twp.	.04	.09	---	5.4	26.0	---	---	---	---	31.53
Total	5.69	34.39	2.3	5.4	33.4	7.17	10.2	1.30	23.71	123.55

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CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Individual industries have, generally, alternative methods for providing satisfactory treatment of their industrial wastes. These, however, depend on the location of the plant as well as on the volume and characteristics of the wastes involved.

Industries that do not have access to municipal sanitary sewerage systems have little alternative. Their wastes must meet the objectives of the Ontario Water Resources Commission. This can be accomplished by process changes to eliminate the offending constituents, or by installing waste treatment facilities. Industries with such large volumes of waste that it is unrealistic to combine these wastes with the municipal sanitary sewage are in this same position.

The remaining industries, those having access to municipal sewerage systems and having a limited volume of waste, have several alternatives. If the wastes are relatively uncontaminated and meet the Commission objectives, they may, and should be discharged to either storm sewers or natural watercourses. Should the wastes not meet these objectives, they could be discharged, with the consent of the municipality, into the municipal sanitary sewerage system. If neither of these proposals is acceptable, the wastes must be treated or modified to meet either the Commission objectives for natural watercourses or storm sewers, or the limits imposed by municipalities for discharge to sanitary sewers.

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Usually, the most practicable method for dealing with these wastes is to provide for their treatment with the local sanitary sewage at the municipal sewage treatment plant. This adds to the problems of the municipality in that some form of control is required to protect the sewage treatment processes as well as the physical components of the sewerage system from harmful or toxic components contained in some industrial wastes. The means of control can be a municipal sewer-use by-law. Usually, such a by-law contains a list of materials that should not be discharged to sewers, as well as the limits placed on certain waste components. These limits are required for various reasons such as - the pH of the wastes must be maintained in a certain range to prevent the acid or caustic attack of sewers and sewage treatment equipment; toxic components such as cyanide must be controlled because they present a health hazard especially to workers in the sewerage system; heavy metal ions must be controlled since they interfere with the sewage treatment processes, if discharged to sanitary sewers and can be toxic to human, animal or aquatic life if discharged to storm sewers. Different controls are usually applied to storm and sanitary sewers. Storm sewers are considered to be the same as natural watercourses, as, in fact, they are the same since the effluents from storm sewers receive no treatment. As a result of this, the limits on waste concentrations to be discharged to a storm sewer must meet the Commission objectives, while wastes to be discharged to sanitary sewers must meet the requirements necessary for the unimpaired operation of the sewerage system.

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The passage of such a by-law by the municipalities in Welland County is recommended. Although the by-law may not now be needed in some of the municipalities, its presence offers the means to correct industrial waste problems that may arise in the future. Once the by-law is enacted, its enforcement is the responsibility of the municipality. The by-law should also include provisions to allow private agreements between the municipality and industries where, even after reasonable steps have been taken, the wastes are still unacceptable under the by-law but are amenable to biological treatment.

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CITY OF NIAGARA FALLS

Only five industries in the City of Niagara Falls discharge significant wastes to natural watercourses. Two of these, Bissell Limited, and Lubrizol of Canada Limited, have taken positive steps to improve their situations and will be re-surveyed shortly. Chateau-Gai Wines Limited discharges wastes high in organic content. Proposed sewer extensions in the City of Niagara Falls will enable the latter industry to divert these wastes to the municipal sewerage system. This is the most practicable solution to the problem since the private treatment of wastes high in organic content (BOD) would involve a very large capital investment. The two other plants discharging significant wastes to surface waters are Cyanamid of Canada Limited, Welland and Niagara plants. The problem at the Niagara plant is the intermittent high suspended solids in the waste effluents. Agitation of the cooling pond by high winds seems to be the cause of this problem. The waste disposal problem at the Welland plant is much more complicated due to the many and varied processes being operated. The solution to this problem will depend on process changes now under consideration and improvements to the waste treatment facilities.

The remaining industrial waste discharges of consequence in the city are collected in the municipal sewerage system. Five food processing plants account for the major organic loading in the municipal system, and improvements other than in-plant changes (such as improved screening) would offer no economic advantage in the overall disposal of these wastes.

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The control of wastes from three plating plants and one industry discharging spent metal pickling acid could be improved. The improvements at the plating plants should be: elimination of cyanide by oxidation to at least cyanate; control of the heavy metals; and elimination of batch discharges of cleaners, brighteners, pickling acids, etc. The pickling acid should be neutralized or land dumped at a suitable location.

Several industries in Niagara Falls are discharging uncontaminated cooling water to the municipal sewerage system. Should the hydraulic loading in the system become a problem, this cooling water could be segregated for discharge to a watercourse.

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CITY OF WELLAND

Atlas Steels Limited, Page-Hersey Tubes Limited, Union Carbide Canada Limited, and Welland Tubes Limited, all discharge wastes to natural watercourses through private or municipal sewers. Even when the City of Welland proceeds with the construction of a municipal sanitary sewerage system and a sewage treatment plant, the wastes from these industries will probably not be taken into the system because of the volumes involved. Thus, the discharge of these wastes to the watercourses will be continued.

The wastes from Union Carbide Canada Limited are uncontaminated cooling waters, and are acceptable for discharge to a natural watercourse. Improved control of suspended solids at Atlas Steels Limited would essentially solve its problem. At Page-Hersey Tubes Limited, improved control over suspended solids, pH, iron and oil (ether solubles) is needed. Effluent samples from Welland Tubes Limited indicated the need for pH correction which would help in iron removal, and inspection of the waste treatment facilities revealed the need for improved oil removal from the pond. Process changes under consideration at Welland Tubes Limited should correct this situation. Replacing the pickling operation with a shot blasting process will eliminate the pH and iron problems as well as decrease the hydraulic loading on the waste lagoon which will provide increased oil separation.

Of the industries discharging wastes to the municipal sewerage system, only two, at the discretion of the City Engineer, may require pre-treatment to render their wastes safe and treatable at the municipal sewage

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treatment plant. Wastes from the cotton mill may require screening and equalization, while the wastes from the one plating plant should be treated to destroy cyanide and control the heavy metal ions.

The industrial organic loading (BOD) to the municipal sewerage system originates at the Wabasso Cotton Company, Limited, and a much lesser loading from the Welland Winery Limited. The only other sources of organic loading are two small meat packing plants where the wastes are adequately handled in septic tanks and field tile systems.

The volume of industrial waste being discharged to the municipal sanitary sewerage system is in the order of 1.5 million gallons per day, including sanitary sewage from Page-Hersey Tubes Limited and Union Carbide Canada Limited. Of this 1.5 million gallons, approximately one million is uncontaminated cooling water. In some instances, it may be a simple matter to divert this cooling water to a storm sewer and thus lower the hydraulic loading on the sanitary system.

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TOWN OF FORT ERIE

Only two of the industries in the Town of Fort Erie require improved waste control. Both discharge wastes to watercourses that eventually reach the Niagara River.

Gould National Batteries of Canada Limited discharges wastes containing excessive suspended solids having a very low pH and a high concentration of lead. Correcting the pH and providing settling of the wastes would solve this problem.

Wastes from the Hart and Cooley Manufacturing Company of Canada Limited originate in the phosphatizing and cadmium plating processes. Control of cyanide, metal ions and batch discharges is required.

A potential problem is the process wastes and storm water from the shops of the Canadian National Railways - Wabash Railway. These wastes pass through an oil separator and eventually reach the Niagara River. Control of these wastes depends on adequate maintenance of the oil separator.

The industrial wastes being discharged to the municipal sanitary sewerage system should cause no problems in the operation of the system.

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TOWN OF PORT COLBORNE

Five industries in the City of Port Colborne discharge significant wastes to Lake Erie and the Welland Ship Canal.

Wastes from the Canada Furnace plant are normally acceptable for discharge to a watercourse. On occasion, however, when a certain grade of product is in production, the concentration of suspended solids in the effluent increases markedly.

The International Nickel Company of Canada Limited discharges waste containing high concentrations of suspended solids and nickel. In-plant changes and improvements would seem to be the most practicable approach to this problem.

Improved waste control is required at the three grain elevators. The problem at National Harbours Board is the blowing of "dust" out to Lake Erie, while Maple Leaf Mills Limited and Robin Hood Flour Mills Limited discharge wheat-washing waste. This wheat-washing waste has a biochemical oxygen demand and suspended solids in concentrations comparable to those in strong sanitary sewage. These wastes require biological treatment.

No industrial wastes were found that would have a detrimental effect on the municipal sewerage system.

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TOWN OF THOROLD

The most significant industrial wastes in the Town of Thorold are from the three pulp and paper mills. These wastes, which were discussed in an early section of the report, are discharged to the Old Welland Canal which meets Twelve-Mile Creek in the City of St. Catharines.

The only other wastes of consequence are discharged from the York Electro-Plating Limited plant. The main process at this plant is hard chrome plating, and the wastes from this operation can be adequately handled in efficiently-operated still dragout tanks presently being used. Occasionally, other metals are plated, and these processes result in different wastes. Control of these wastes should be undertaken. Since the operations are intermittent, batch treatment of dragout tanks may provide sufficient treatment.

The remaining industrial wastes should not cause any problem in a municipal sewerage system.

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VILLAGE OF CHIPPAWA

The major industry in the Village of Chippawa, Norton Company, discharges process wastes to the Welland River. The wastes are essentially cooling water and are acceptable for discharge to a watercourse.

TOWNSHIP OF BERTIE

Fleet Manufacturing and Wallace and Tiernan Limited, Lucidol Division, discharge industrial wastes that eventually reach the Niagara River and Lake Erie.

The wastes from Fleet Manufacturing originate in metal finishing operations of phosphatizing and plating, and, periodically, contain high concentrations of chromium. In-plant controls should be sufficient to correct this problem.

An extensive sampling programme is required to determine what corrective measures are required at the Wallace and Tiernan Limited plant, but pH control will probably be a major concern.

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TOWNSHIP OF CROWLAND

The Ford Motor Company of Canada Limited, Glass Fabricating Plant is located in Crowland Township. The combined wastes from this plant, treated sanitary wastes and industrial wastes, contain suspended solids in concentrations exceeding the recommended objective for discharge to a watercourse.

TOWNSHIP OF HUMBERSTONE

Wastes from the Welland Works of John Deere are adequately contained in a septic tank and field tile system. All of the plant wastes, sanitary and industrial, are treated in this system.

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TOWNSHIP OF THOROLD

The two pulp and paper mills are responsible for the significant industrial waste discharges in Thorold Township. Effluent from the Beaver Wood Fibre Company, Limited, is syphoned under the Welland Ship Canal and reaches Twelve Mile Creek, while the Ontario Paper Company, Limited, wastes discharge under the Ship Canal to the Old Welland Canal. North from the Ontario Paper Company, Limited, the Old Welland Canal receives wastes from several other pulp and paper mills before joining Twelve Mile Creek.

Three other industries, Exolon Company, Hayes Steel Products Limited, and Nichols Chemical Company Limited, discharge wastes to the Gibson Lake - Twelve Mile Creek watershed. The effluent from the Exolon Company is mainly cooling water and occasionally contains excessive concentrations of suspended solids. The Nichols Chemical Company Limited has taken elaborate precautions to prevent the discharge of any wastes. At Hayes Steel Products Limited, a series of ponds have been built, and these appear to be adequate.

The B.F. Goodrich chemical plant discharges wastes to the Welland River. These wastes pass through a lagoon before discharge, and occasionally contain suspended solids in concentrations up to 40 parts per million.

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DATA ON INDIVIDUAL INDUSTRIES

CITY OF NIAGARA FALLS

AMERICAN CAN COMPANY

1695 Lewis Avenue

PERSONNEL - J.H.W. Bates - Plant Manager

R.E. Burke - Accountant *

Hermann Hofmann - General Foreman

OPERATING SCHEDULE - 5 days per week

2 shifts per day

140-160 employees

WATER CONSUMPTION - 9,000 - 15,000 gpd from the Niagara Falls
municipal system.

PROCESS - The company produces and repairs canning equipment. Other than cooling water, the industrial wastes originate in a cleaning and painting operation with a small water-walled paint booth.

DISPOSAL - All wastes are discharged to the combined city sewers. Wastes from the painting operation pass through a baffled settling tank (4 foot x 3 foot diameter) for solids and grease removal.

REMARKS - These wastes should not cause problems in the municipal sewerage system.

ANIMAL TRAP OF AMERICA

1781 Ellen Avenue

PERSONNEL - H.G. Payne, Manager

OPERATING SCHEDULE - 5 days per week
1 shift per day (2 or 3 shifts occasionally)
14 employees

WATER CONSUMPTION - 8,000 gpd from the Niagara Falls municipal system.

PROCESS - Steel animal traps and hand garden tools are formed and assembled in this plant. A pickling operation is no longer used since the steel used at the plant is pickled when purchased.

Moulded pulp flower containers are also produced. Scrap paper is pulped in a 2,000 gallon tank, and the white water draining from the moulds is collected for recycle in a 2,800-gallon tank, which occasionally overflows to the sewer.

DISPOSAL - All wastes are discharged to the municipal sewerage system. The wastes are cooling water and white water overflow.

REMARKS - These wastes will not have an adverse effect on the municipal sewerage system.

BISSELL LIMITED
2934 Montrose Road

PERSONNEL - O.E. Loberg - General Manager *
K.D. Martin - Engineering Manager *
P.A. Crow - Engineering Department *

OPERATING SCHEDULE - 5 days per week
1 shift per day
37 employees

WATER CONSUMPTION - approximately 18,000 gpd from the municipal supply.

PROCESS - This company produces carpet sweepers and formulated rug shampoos. Industrial wastes originate in cooling spot welders, a polyethylene extruder and a polystyrene injection moulding machine. Rinse water results from the plating of chromium and nickel, as well as from a cleaning - painting line.

DISPOSAL - Cooling water is pumped to a large sump that receives rinse water from the plating area and the rest of the plant. The total plant waste is then pumped to the ditch on Montrose Road and, eventually, reaches the Welland River.

Sanitary wastes are retained in a septic tank and field tile system.

REMARKS - Since this company was first contacted, plant personnel have eliminated cyanide, reduced the nickel in the plant effluent, and are treating the batch discharges. They are now improving the operation of the dragout tanks in the plating room in order to reduce the chromium and nickel in the plant effluent.

BRIGHT'S WINES LIMITED

Stamford

PERSONNEL - Mr. W.O. Hatch - President

Mr. V.J. Smith - Production Manager *

OPERATING SCHEDULE - Normal - 1 shift per day
5 days per week

During Vintage - (approx. 6 weeks)
24 hours per day
7 days per week

Employees - 100 (normally)
180 (during vintage)

WATER CONSUMPTION - The company obtains water from two sources. The Public Utilities supplies approximately 40,000 to 90,000 gpd for product make-up, etc., and 3,000 gpd for domestic purposes. A private well supplies 150,000 gpd cooling water.

PROCESS - The company produces wine from grapes harvested in the area. Water is used for product make-up, cooling, and washing.

WASTE DISPOSAL - Domestic wastes and wastes constituting wash-up of filter presses, grape presses and floors are discharged to the municipal sewer. Cooling water is discharged to a recharge well, and it is estimated that 85 to 100 percent of the cooling water is reclaimed in this manner. Pomace is land dumped on farms, while lees are settled and trucked to Toronto for alcohol recovery.

REMARKS - Wastes from this company should not be objectionable in the municipal sewerage system.

BURGESS BATTERY COMPANY

415 Buttrey Street

PERSONNEL - Mr. V.A. Lee - Plant Superintendent

OPERATING SCHEDULE - 5 days per week
1 shift per day
140 employees

WATER CONSUMPTION - 30,000 - 40,000 gpd from the Niagara Falls
municipal system.

PROCESS - This company produces various sizes of dry-cell batteries.
By far the largest use of water is to cool bearings.
Other wastes originate from cooling a grinder and welding
machines, and the only contaminated wastes are from inter-
mittent equipment and floor washing.

DISPOSAL - All wastes are discharged to the municipal sewerage
system.

CANADIAN CARBORUNDUM COMPANY, LIMITED

Stanley Street

PERSONNEL - Mr. J. Gregory, General Manager

Mr. Knapp, Plant Engineer *

OPERATING SCHEDULE - 24 hours per day

7 days per week

475 employees

WATER CONSUMPTION - The company receives approximately 40,000 gpd of water from the Public Utilities Commission, of which approximately 10,000 gpd are used for domestic purposes. The remaining 30,000 gpd, plus water pumped from the Welland River make up the industrial water. Average Welland River water consumption is 3.6 mgd and maximum consumption is 5.4 mgd.

PROCESS - The company produces crude abrasives (aluminum oxide) and moulded abrasives (wheels, rods, etc.) from bauxite, coke, and iron borings. The majority of the water used is for furnace cooling.

WASTE DISPOSAL - All domestic wastes are discharged to the municipal sewer and hence the Welland River. Approximately 75 percent of the industrial wastes is passed through a small settling lagoon to recover solids and is then discharged to the municipal sewer. The remaining industrial wastes are discharged untreated to a small creek at the rear of the plant.

REMARKS - At the time of sampling, the lagoon appeared to be quite full of solids and hence most effective settling of solids could not be attained. This was illustrated by sample results, which showed a solids concentration of 112 ppm. These wastes should not be discharged to the city sewer after this sewer has been routed to the sewage treatment plant.

CANADIAN HOME PRODUCTS

2651 Cropp Street

PERSONNEL - Mr. J. Reed - Production Manager

OPERATING SCHEDULE - 8 hours per day
5 days per week
54 employees

WATER CONSUMPTION - The company obtains approximately 60,000 gpd of water from the Public Utilities Commission, of which, about 1000 gallons are for domestic purposes and 59,000 gallons for industrial use.

PROCESS - The company produces canned foods which sell as "Boy-ar-dee" products. Raw materials include flour, frozen meat, and tomato paste. The major use of water is for cooling, with some being used for clean-up and cooking.

WASTE DISPOSAL - All wastes are discharged to the municipal sewerage system. Allsan is added to process waste for grease control.

REMARKS - No problems are expected to arise in the sewerage system as a result of the discharge of these wastes.

CANADIAN OHIO BRASS COMPANY LIMITED
1881 Thorold Road

PERSONNEL - Mr. R. Flagg, Plant Engineer

OPERATING SCHEDULE - 5 days per week
1 shift per day
210 employees

WATER CONSUMPTION - 14,000 - 19,000 gpd from the Niagara Falls
municipal system.

PROCESS - Porcelain insulators are produced from feldspar, clay and
sand. The largest use of water is for cooling a compressor
and vacuum pumps. Small amounts of water are used to mix
the porcelain and moulding compounds, and for clean-up
operations.

DISPOSAL - All wastes are discharged to the municipal sewerage
system. The relatively small flow of contaminated wastes
discharges to settling basins and overflows to the muni-
cipal sewers.

REMARKS - The wastes from this plant should be handled satisfactorily
by the municipal sewerage system.

CHATEAU-GAI WINES LIMITED

1375 Stanley Street North

PERSONNEL - Mr. D. Diston - Winery Superintendent

OPERATING SCHEDULE - 5 days per week

1 shift per day

60 employees

(For 5 weeks in September and October, the winery operates continuously with 150 employees).

WATER CONSUMPTION - 20,000 to 60,000 gpd from the Niagara Falls municipal system. The minimum is in the spring and the maximum in the fall. In addition to this, up to 150,000 gpd can be pumped from a private well.

PROCESS - The winery operations of pressing and fermenting take place in the late fall after the grape harvesting season. The operations during the remainder of the year are aging, blending, filtering and bottling.

Pomace is land dumped, and fermenter bottoms are trucked to Toronto for recovery of the alcohol by distillation. The remaining wastes are wash waters. Cleaning with caustic is a small operation using perhaps 20 gallons per year on the filters. When the filters are washed, the diatomaceous earth sludge is settled out and the overflow discharges to the winery sewers.

DISPOSAL - All wastes are discharged to a small creek that reaches the open-cut section of the Hydro Power Tunnel.

REMARKS - Winery wastes are variable, depending on the operations in the winery, but the main contaminated wastes are wash waters which are unsuitable for discharge to a natural watercourse.

Sewer construction in Niagara Falls should extend sewerage facilities to the winery by late summer. Diversion of the winery wastes to the municipal sewerage system will bring about a practicable solution to this problem.

CYANAMID OF CANADA LIMITED

PERSONNEL - J.B. Sheldon - Plant Manager
G.G. Bielby - Manager of Engineering
K. Keel - Engineering Superintendent *

OPERATING SCHEDULE - Continuous
700 employees

WATER CONSUMPTION - 170,000 to 290,000 gpd from the Niagara Falls municipal system. Some of this is used as process water. Between 10 and 12 mgpd of process water are pumped from Hydro Power canal. Due to maintenance work on the power canal, the process water will be pumped from the open-cut section of the power tunnel. There is a pond for cooling water on the company property, and this serves to recirculate much of the cooling water.

PROCESS - Coke and limestone react in electric furnaces to form calcium carbide, which is reacted with nitrogen (from air distillation) in ovens to produce calcium cyanamide. A small decreasing operation is the production of sodium cyanide by fusing calcium cyanamide with sodium chloride and coke. Production of melamine moulding compounds is a new process.

The processes are essentially dry, using a large quantity of cooling water.

Approximately 90 percent of the wastes are discharged west from the plant to the power canal. The remaining wastes (cooling pond overflow) travel east, up Victoria Street, and discharge to the Niagara River.

Sanitary wastes are discharged through septic tanks to the process sewers.

.... continued

Cyanamid of Canada Ltd. (cont'd)

REMARKS - The main concern with the wastes from this company is the suspended solids content of the waste effluents. Samples taken in August, 1961 showed 2 ppm suspended solids in the main sewers (discharging west), and 28 ppm in the sewer discharging to the Niagara River. In March, 1964, the main sewer contained 80 ppm suspended solids, and the sewer discharging to the Niagara River showed 60 ppm. However, the day these latest samples were taken was extremely windy. This could have stirred up sediment in both the swimming pool and cooling pond.

PROPOSALS - Due to maintenance work on the power canal, process water will be pumped from the open section of the power tunnel to the swimming pool. The main sewer (discharging west to the power canal) will be diverted to the cooling pond. Thus, all wastes will be discharged east to the Niagara River.

CYANAMID OF CANADA LIMITED

Welland Plant

- PERSONNEL - W.L. Bongard - Plant Manager
D. Acaster - Assistant Plant Manager *
E.F. Brady - Analytical and Administrative Sup't. *
P.R. Patterson - Project Leader, Process and
Development Department *
- OPERATING SCHEDULE - continuously
700 employees
- WATER CONSUMPTION - Sanitary water from the municipal supply of
Niagara Falls, and 16 mgpd from the Welland
River. Some Welland River water is treated by
flocculation with ferrous sulphate and lime.
- PROCESS - The processes at this plant are many and are inter-related.
However, the major operations are the production of
ammonia, nitric acid, ammonium nitrate, sulphuric acid,
dicyandiamide and phosphates.
- DISPOSAL - Approximately half of the wastes are discharged directly
to the Welland River, and the other half indirectly by
way of Thompsons (Miller's) Creek.
- Waste treatment consists of the following:
- settling of the sludge from the water treatment plant.
 - settling of the sludge from the dicyandiamide production.
 - refermentation of the fermenter liquor in the Aurolac
process.
 - flouride wastes from gas scrubbers in the phosphate
plant is impounded.
- REMARKS - Of major concern are the suspended solids carried by
Miller's Creek, and the ammonia and nitrogen content of
practically all the process sewers.
- Until recently, spent pickle liquor was disposed of in the
waste lagoons at this plant, and periodically this material
reached Miller's Creek causing adverse effects in the creek
as well as in the Welland River. This practice has stopped,
and thus these problems should no longer occur.

DOMINION CHAIN COMPANY LIMITED

800 Bender Hill

PERSONNEL - Mr. D.E. MacDonald, Plant Manager *
Mr. E. Manson, Maintenance Foreman *

OPERATING SCHEDULE - 1 to 3 shifts per day
5 days per week
(40 to 50 employees work on afternnon and
night shift)
260 employees

WATER CONSUMPTION - The company receives all its water from the
Public Utilities Commission. Approximately
5,000 gpd are required for domestic use and
90,000 to 95,000 gpd for industrial purposes.

PROCESS - The company manufactures chain and cable products from
steel, plastic, wire, etc. Processes resulting in waste
discharges include steel pickling and plating. Sulphuric
and hydrochloric acids are used in pickling and cadmium,
zinc, and brass plating are carried out.

WASTE DISPOSAL - All wastes are discharged directly to municipal
sewers without pretreatment.

REMARKS - Analytical results of samples taken indicate that the
wastes would not generally be considered acceptable for
direct discharge to a municipal sewer. Toxic concentrations
of cyanide and metals are present and the pH indicates the
wastes may be aggressive to the sewerage system.

The company should attempt to reduce the loss of toxic
constituents in the waste through in-plant control and
raise the pH to within acceptable limits (5.5 - 9.5).

T. FLORENTINO AND SONS LIMITED
1299 Ottawa St., Niagara Falls

PERSONNEL - T. Fiorentino - Owner.

OPERATING SCHEDULE - 5 days per week (occasionally 4)
7 A.M. to 4:30 P.M. 1 shift
approximately 20 employees

WATER CONSUMPTION - 100,000 gpd from the municipal supply.

PROCESS - Approximately 9 or 10 thousand birds are processed daily. Birds are killed, scalded, plucked and manually eviscerated. Feathers and viscera are retained and trucked away.

Sources of waste are the killing area and eviscerating room. Wastes discharge from these areas via two drains to the city sewers. The drain in the eviscerating room is screened to remove large pieces of meat and fat, while the drain in the killing room is unscreened. Approximately 75% of the waste flow is from the eviscerating room, while the remaining 25% results from the cleaning of chicken boxes and general floor washing.

REMARKS - As can be seen from the analysis table, solids and BOD discharging from the killing room are excessive and this drain should be screened to remove feathers, etc.

Wastes in the form of BOD and solids are also fairly high from the eviscerating room, but this situation should improve after the installation of the proposed mechanical screen.

Analytical Results

	BOD	Total	<u>Solids</u> Susp.	Diss.	Ether Solubles
Eviscerating Room 5-hr composite	550	2178	1828	350	526
Killing Room 5-hr. composite	2150	6130	3962	2168	71

(All results parts per million by weight)

These wastes are discharged to the municipal sewerage system.

GERBER PRODUCTS OF CANADA LIMITED
1611 North Street

- PERSONNEL - Mr. M. Fortin - Plant Manager
Mr. I. Sagert - Plant Engineer *
- OPERATING SCHEDULE - General - 8 hours per day
5 days per week
- Cereal dep't - 24 hrs. per day on process
8 hrs. per day on packaging
- 150 employees
- WATER CONSUMPTION - The company obtains 100,000 to 200,000 gpd of water from the Public Utilities Commission for domestic and industrial purposes. Approximately 3,000 gpd are required for domestic use.
- PROCESS - The company is involved in the preparing and preserving of baby foods from raw fruits, vegetables, grains, flour, meat, eggs, etc. Water is used primarily for cooking with smaller amounts used for clean-up, product washing, and equipment washing.
- WASTE DISPOSAL - Domestic and industrial wastes are discharged to the municipal sewer. Industrial wastes are subjected to screening and settling of solids before discharge.
- REMARKS - No problems are anticipated by discharging these wastes to the municipal sewerage system.

N.C. JOSEPH (CANADA) LIMITED

Queen Elizabeth Highway

PERSONNEL - J.D. Armstrong, General Manager
A. Larsen, Production Manager *
Mr. Atkinson, Plant Foreman *

OPERATING SCHEDULE - 5 days per week
1 shift per day (Feb. to July - 2 shifts)
55 employees

WATER CONSUMPTION - 22,000 to 45,000 GPD from the municipal system.

PROCESS - The company forms and assembles components into barbecues. Industrial wastes originate in the plating room where zinc (cyanide), nickel and chromium are plated. The dragout of plating solutions to the sewer should not be excessive because the work being plated is tubular steel stock, and each plating line is equipped with a still dragout tank and a 2-stage rinsing programme. At one time, the processing of aluminum was a major process at this plant, but this has been discontinued.

DISPOSAL - All plant wastes are discharged to the municipal sewerage system.

REMARKS - At the discretion of the City Engineering Department, considering the proposed industrial waste by-law, improved handling of waste should be required at this industry. Improved operation of the still dragout tanks, with perhaps daily batch treatment of these tanks should produce an effluent that is acceptable under most by-laws.

Concentrated solutions, such as stripping acids and caustic cleaners should not be discharged to the municipal sewerage system.

KIMBERLY-CLARK CANADA LIMITED

431 Victoria Avenue

- PERSONNEL - Mr. G.E. Slater - Plant Manager
Mr. A. Harvey - Engineering Services Superintendent *
Mr. E. Butt - Chief Steam Engineer *
- OPERATING SCHEDULE - 2 to 3 shifts per day (95% - 2 shifts)
(5% - 3 shifts)
5 days per week
355 employees
- WATER CONSUMPTION - The company receives approximately 98,000 gpd of water from the Public Utilities Commission. Domestic consumption is in the range of 8000 gpd and the remainder is used for industrial purposes.
- PROCESS - The company produces kleenex tissues, toilet tissue, towels, etc., from sheet papers, cotton and nylon. Water is used for air cleaning, cooling and boiler make-up.
- WASTE DISPOSAL - The principal industrial wastes originate in air cleaning operations. A continuous discharge of 3.2 gpm comes from the Roto-clone, while weekly discharges of 880, 820, and 800 gallons issue from air cleaners 1, 2 and 3 respectively. All wastes are discharged directly to municipal sewers.
- REMARKS - Analytical results of samples taken indicate that wastes from this plant should not be objectionable in the municipal sewerage system. In the event of hydraulic overloading of the sewerage system, clean cooling water should be segregated and disposed of in the alternate manner.

LIONITE ABRASIVES LIMITED
193 Stanley Street North

PERSONNEL - J.A. Harvey - Superintendent *
W. Sharkey - Plant Engineer *

OPERATING SCHEDULE - continuous
150 employees

WATER CONSUMPTION - 210,000 to 280,000 gpd from the municipal system.

PROCESS - Abrasives, aluminum oxide and silica carbide, are produced in electrical furnaces. The only source of industrial waste is cooling water used on the furnace electrodes.

DISPOSAL - Cooling water is recirculated through two screened settling sumps in the aluminum oxide building, and four in silica carbide building. These six sumps overflow to the municipal sewerage system.

REMARKS - Grab samples from three of the sumps indicated suspended solids concentrations of 3, 6 and 29 ppm. With improved settling at some locations, these wastes would be suitable for discharge to a natural watercourse.

LUBRIZOL OF CANADA LIMITED

1800 Thorold Road

PERSONNEL - G.L. Baker - General Manager *
A.S. Jones - Production Manager

OPERATING SCHEDULE - 5 days per week
3 shifts per day
40 employees

WATER CONSUMPTION - 26,000 to 48,000 gpd from the municipal supply.
The variation is caused by cooling water requirements.

PROCESS - Sulphonation of alkyl benzene is the main process. Plant wastes are boiler blow-down, heating condensates, overflow from the recirculating cooling water system, process water and wastes from the daily washing of a tank truck.

DISPOSAL - Sanitary wastes are discharged to the municipal sewerage system. Industrial wastes discharge to an oil separator and settling tank. Lime is added to this effluent to adjust the pH for ether solubles removal, and the waste is piped to a 20 by 60 foot baffled and skimmed pond. The pond effluent discharges to a creek that reaches the hydro canal.

REMARKS - The pond is a new installation and its operation has not yet been standardized. At the present time, the ether soluble content of the effluent is probably excessive, but this should improve as the operation of the pond improves.

THE HERBERT MORRIS CRANE AND HOIST COMPANY
300 Stanley Street

PERSONNEL - J.S. Rossall - President
F. Nemeth - Shop Superintendent *

OPERATING SCHEDULE - 5 days per week
1 shift per day
50 employees

WATER CONSUMPTION - 4,000 to 5,000 gpd from the municipal system.

PROCESS - The company forms and assembles hoists and cranes. Water is used in boilers, for cooling and in a water wall spray booth which is not used very often.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

REMARKS - These wastes are handled satisfactorily.

NABISCO FOODS LIMITED

64 Lewis Avenue

PERSONNEL - V. Spironello - Plant Superintendent

OPERATING SCHEDULE - Cooking - 2 to 3 shifts

Baking - 1 to 2 shifts

153 employees

WATER CONSUMPTION - The company receives approximately 3000 gpd from the Public Utilities Commission for domestic purposes and 38,000 to 50,000 gpd for industrial use.

PROCESS - The company produces cereals from wheat, rice and bran. Operations include cleaning, cooking and baking. Wastes from the operation are comprised of wheat cooking liquor (11,000 gallons daily) and water used to boil out two kettles weekly. (1000 gallons each). The remaining industrial water is lost through evaporation.

WASTE DISPOSAL - All wastes are discharged to the municipal sewers without treatment.

REMARKS - Although the wastes show high concentrations of BOD and suspended solids, they are discharged in a number of small batches over the week and hence would present no problems at the sewage treatment plant.

NIAGARA RUG COMPANY, LTD.
580 Victoria Avenue

PERSONNEL - Mr. A. Bogomolny

OPERATING SCHEDULE - 5 days per week
1 shift per day
45 employees

WATER CONSUMPTION - 5,000 to 7,000 gpd from the municipal system.

PROCESS - This company produces woven and braided rugs. Wastes are spent dyes and rinse waters from the two dye kettles.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

COMMENTS - Waste handling at this plant is satisfactory.

NIAGARA WIRE WEAVING COMPANY, LIMITED

1400 Robinson Street

PERSONNEL - Mr. S. Scordino - Boiler-room Supervisor

OPERATING SCHEDULE - 5 days per week
3 shifts per day
250 employees

WATER CONSUMPTION - 80,000 to 120,000 gpd from the Niagara municipal water system.

PROCESS - Wire is drawn through dies to the required diameter, then woven into wire cloth mainly for the paper industry. Nearly all the water is used for cooling the dies, but there is a small pickling operation using a 50-gallon acid tank and a 5 gpm rinse.

COMMENTS - The company should control the pH of the pickle rinse to protect its sewers. However, dilution and neutralization in the city sewers should prevent adverse effects in the city sewerage system. Spent pickle acid should not be discharged to the municipal sewers. It should be neutralized or trucked to a suitable disposal area.

ONEIDA LIMITED
1705 Falls Avenue

PERSONNEL - Mr. H. Perkins - Superintendent *
Mr. G. Cant - Maintenance Foreman *

OPERATING SCHEDULE - 8 hours per day
5 days per week
173 employees

WATER CONSUMPTION - The company receives approximately 80,000 gpd of water from the Public Utilities Commission, of which 4,000 gpd is used for domestic purposes and the remainder for industrial use. About 15,000 to 20,000 gpd is used in plating operations and the remaining industrial water is used for cooling.

PROCESS - The company is involved in the fabrication and finishing of flatware for stainless and carbon steel. Nickel and silver plating are used in finishing. An oil-water mixture, used as a cutting lubricant on grinders, is dumped to the sewers approximately every three months when the oil goes sour. This consists of approximately 1000 gallons made up of 100 parts water to one part oil. Other wastes include discharges from the plating area and cooling water.

WASTE DISPOSAL - All wastes are discharged to the sanitary sewer, untreated.

REMARKS - Samples indicate that wastes from the plating operation are not objectionable. However, care must be taken to maintain concentrations of cyanide and metals below toxic levels so they will not interfere with treatment procedures at the sewage plant. The disposal of spent cutting lubricant is not in keeping with acceptable practices. Methods of reclaiming and/or burning these wastes should be investigated.

PROVINCIAL CUT STONE

490 Buttrey Street

- PERSONNEL - Mr. E. Geard - Superintendent
- OPERATING SCHEDULE - 5 days per week
1 shift per day
6 employees
- WATER CONSUMPTION - very variable, depending on production.
- PROCESS - Stone is cut to the desired sizes and shapes with water-cooled blades.
- DISPOSAL - Sanitary wastes are discharged to the sanitary sewer and process wastes discharge to a creek leading to a swampy area, then to the Niagara River.
- COMMENTS - The only contaminants in these wastes are heavy solids which settle in the creek on railroad property before reaching the swampy area.

PROVINCIAL ENGINEERING LIMITED

674 Ferguson Avenue

PERSONNEL - E.G. Boehm - Vice-President and General Manager
G. Johnson - Plant Superintendent

OPERATING SCHEDULE - 5 days per week
1 shift per day
200 employees

WATER CONSUMPTION - 10,000 to 16,000 gpd from the Niagara Municipal supply.

PROCESS - The plant produces hoists and cranes.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

COMMENTS - This plant has no industrial wastes, and Plant # 2, which had metal finishing wastes is no longer in operation.

STRATEGIC-UDY METALLURGICAL AND CHEMICAL PROCESSES LTD.

3527 Stanley Street

- PERSONNEL - Mr. R.O. Denman - Executive Vice-President
Mr. H. Book - Personnel Superintendent *
- OPERATING SCHEDULE - At the time of the survey, the plant was not operating. Normal operation is 24 hours per day, 5 days per week.
2 to 150 employees.
- WATER CONSUMPTION - The company obtains 90 to 1000 gpd of water from the Public Utilities Commission for domestic purposes. Industrial water is supplied from a well on the premises. Well pump capacity is 200 gpm. Re-use of water is practised and well water is used for make-up only.
- PROCESS - The company carries out studies in metallurgical research, and recently was involved in the melting of low-grade ores of iron, copper, nickel, chromium and magnesium to produce ferro alloys. Water is used for scrubbing stack gases and for furnace cooling.
- WASTE DISPOSAL - All wastes discharge to a concrete, circular settling basin which also functions as a water supply reservoir. Well water is pumped to this basin as required for make-up. Any overflow from the basin proceeds to a low-lying area on the premises and likely seeps away.
- REMARKS - This company should be revisited when a full operation is in progress in order to assess the effects of its wastes.

ZIPPO MANUFACTURING CO. (CANADA) LIMITED
2158 Allen Avenue

PERSONNEL - H.G. Griffiths - Office Manager

OPERATING SCHEDULE - 5 days per week
1 shift per day
20 employees

WATER CONSUMPTION - 1000 gpd from the municipal system.

PROCESS - Lighters are assembled after etching designs on the cases.
A silk screen process is used for etching. A vapour degreaser, a spot welder and a small rinse tank are the only sources of wastes.

DISPOSAL - All wastes are discharged to the municipal sewers.

COMMENTS - The industrial wastes from this plant are negligible.

CITY OF WELLAND

ATLAS STEELS COMPANY

A Division of Rio Algom Mines Limited
Centre Street

PERSONNEL - Mr. P.B. Mackenzie - Utilities Engineer

OPERATING SCHEDULE - Continuous
2700 - 2800 employees

WATER CONSUMPTION - 400,000 gpd from the municipal system.
10 to 12 mgpd from the Welland Canal.

PROCESS - The plant processes are based on the production of tool and alloy steel from scrap metal in electric furnaces. Subsequent operations of rolling, cleaning, heat treating and finishing produce sheet, rod, wire and tube products.

The uses for water and resulting wastes can be described briefly as - cooling, quenching, flushing and rinsing.

DISPOSAL - All plant wastes are discharged to the Welland River through three sewers. Two of these are municipal sanitary sewers and the other is a private sewer. Spent pickle liquor (averaging 1500 gallons per day) is trucked to the company slag area for land disposal.

COMMENTS - The sample points used to evaluate the wastes from this company were not truly representative since sanitary wastes from the City of Welland, in the area of this plant, were included in the waste samples. In spite of this, the analyses of waste samples revealed that only the concentrations of suspended solids exceeded the concentration recommended for discharge to a natural watercourse. Although the analyses do not indicate so, periodic discharges are high in iron and other solubles.

CANADA FOUNDRIES AND FORGINGS LIMITED

Canada Forge Plant

Empire Street

PERSONNEL - Mr. D. Donnelly - Superintendent

OPERATING SCHEDULE - 5 days per week
1 shift per day (2 shifts January to April)
125 employees

WATER CONSUMPTION - 100,000 gpd from the municipal supply.

PROCESS - The company produces steel castings and forgings. The main uses of water are cooling and in hydraulic equipment.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

COMMENTS - The wastes from this plant are adequately handled.

CANADA FOUNDRIES AND FORGINGS LIMITED

Drop Forge Plant

Major Street

PERSONNEL - Mr. T.P. Misener - Superintendent

OPERATING SCHEDULE - 5 days per week
2 shifts per day
100 employees

WATER CONSUMPTION - 40,000 gpd from the municipal supply.

PROCESS - This company produces steel forgings, and the wastes are cooling water.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

COMMENTS - The wastes from this plant are being handled satisfactorily.

GENERAL TIRE AND RUBBER COMPANY OF CANADA LIMITED
Industrial Products Division

PERSONNEL - Mr. L.E. Souchotte - Plant Engineer

OPERATING SCHEDULE - 5 days per week
3 shifts per day
650 employees

WATER CONSUMPTION - 650,000 gpd from the municipal supply.

PROCESS - This company moulds and extrudes rubber and plastic components. Water is used in the hydraulic systems of stamping machines and for cooling. Just recently a refrigeration system was installed to reduce the amount of cooling water, and another similar installation is planned.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

COMMENTS - The wastes from this company contain no significant waste concentrations.

NIAGARA SAUSAGE MEAT PRODUCTS LIMITED
Ontario Road

PERSONNEL - Mr. S. Chojnicki - Manager

OPERATING SCHEDULE - 5 days per week
1 shift per day
4 employees

WATER CONSUMPTION - Estimated less than 5000 gpd from the municipal supply.

PROCESS - This company produces fresh meat and sausage from the slaughtering of pigs and cows.

DISPOSAL - All wastes are discharged to a septic tank and field tile system. The field tile system was recently enlarged and has presented no operating problems.

COMMENTS - The wastes from this plant are adequately handled.

PAGE-HERSEY TUBES LIMITED

Dain Avenue

- PERSONNEL - Mr. J. Horvath - Plant Engineer *
Mr. H. Kennedy - Assistant Engineer *
- OPERATING SCHEDULE - Continuous
1200 employees
- WATER CONSUMPTION - 250,000 gpd from the municipal supply.
2 mgpd from the Welland Canal (1500 gpm).
- PROCESS - The company produces pipe and tubing in three essentially different operations - seamless tubing, continuously welded pipe and pipe welded by electrical resistance. Pickling, galvanizing and finishing are the remaining operations.
- DISPOSAL - Sanitary wastes are discharged to the municipal sewerage system or are contained in septic tanks and field tile systems. Almost all industrial wastes are discharged to a 36" municipal storm sewer that discharges to Lyons Creek.
- A small volume of industrial waste from the "North Plant" is discharged to a government drain that enters the Welland Canal. This flow consists of cooling water, hydraulic press water and land drainage. Spent pickle liquor, amounting to one load per week (4000 gallons), is trucked to the slag pile of the Canadian Furnace Company at Port Colborne. Sumps and drag-lines have been installed in the plant sewers for the removal and recovery of scale.
- COMMENTS - Analyses of effluent samples indicated that the main waste stream contained excessive concentrations of suspended solids, oil (ether-solubles) and iron when the pH was low.

PLYMOUTH CORDAGE COMPANY OF CANADA LIMITED
229 Plymouth Road

PERSONNEL - Mr. G.A. Bennett - Plant Manager

OPERATING SCHEDULE - 5 days per week
up to 3 shifts per day
150 employees

WATER CONSUMPTION - 23,000 gpd from the municipal supply.

PROCESS - This company produces a variety of rope and twine. Industrial water is used to moisten the products during processing, but the only wastes are cooling water and boiler blow-down.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

COMMENTS - The waste disposal practices at this plant are satisfactory.

RELIANCE ELECTRIC AND ENGINEERING (CANADA) LIMITED
130 Denistown Street

PERSONNEL - Mr. N. Marcov - Maintenance Superintendent

OPERATING SCHEDULE - 5 days per week
3 shifts per day
100 employees

WATER CONSUMPTION - 20,000 gpd from the municipal supply.

PROCESS - This company produces electrical transformers, and the only industrial waste is cooling water from a compressor.

DISPOSAL - All plant wastes are discharged to the municipal sewerage system.

COMMENTS - This plant has no contaminated industrial wastes.

SWITSON INDUSTRIES LIMITED

201 Major Street

PERSONNEL - Mr. K.K. O'Hara - President

Mr. J. Finlayson - Factory Manager *

OPERATING SCHEDULE - 5 days per week

1 shift per day

200 employees

WATER CONSUMPTION - 40,000 gpd from the municipal supply.

PROCESS - This company produces a variety of items including vacuum cleaners and floor polishers. The industrial wastes are as follows:

A detergent wash.

Plating wastes resulting from the plating of copper, nickel and chromium. A dragout tank is used following each plating tank.

A batch discharge from a water wall paint booth.

Cooling water from a vapour degreaser and from compressors.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

COMMENTS - Wastes from this plant are handled adequately only as long as the dragout tanks are operated efficiently. The situation could be improved by batch treatment of the dragout tanks. Concentrated solutions, such as stripping aids, caustic cleaners or bright dips should not be discharged, untreated, to the sewers.

UNION CARBIDE CANADA LIMITED
Metals and Carbon Division
Canal Bank

PERSONNEL - Mr. J.M. Trott - Plant Manager

OPERATING SCHEDULE - continuous
1000 employees

WATER CONSUMPTION - 90,000 gpd from the municipal supply.
7 mgpd from the Welland Canal.

PROCESS - Mixed ores are smelted in electric furnaces to produce ferro alloys. The wastes from this operation are cooling waters that are discharged to the south (number 4) outfall.

Carbon electrodes are produced by moulding or extruding the carbon-binder mixture into the desired shape then processing them in electric graphitizing furnaces. Some are further processed in calcining furnaces. Cooling water from the graphitizing furnaces discharges to the central (number 3) outfall, and from the calcining furnaces to the north outfall (number 1).

DISPOSAL - Sanitary wastes are discharged to the municipal sewerage system. Industrial wastes are discharged to the Welland Canal through three outfalls equipped with flow-recording weirs.

COMMENTS - Samples taken from the three outfalls indicated that the wastes from this company were suitable for discharge to a natural watercourse.

WABASSO COTTON COMPANY LIMITED

Hagar Street

PERSONNEL - Mr. T.J. Connelly - Plant Engineer

OPERATING SCHEDULE - 5 days per week (or more)
3 shifts per day
700 employees

WATER CONSUMPTION - 400,000 gpd from the municipal supply.

PROCESS - The operations at this plant are typical of a cotton mill processing baled cotton into finished cotton fabrics. Most of the industrial wastes originate in the dye house where the washing, dyeing and rinsing operations take place.

DISPOSAL - All plant wastes are discharged to the municipal sewerage system.

COMMENTS - Although no waste samples were taken, the wastes from this plant would be expected to be equivalent to sanitary sewage with respect to its biochemical oxygen demand, and should offer no problems in the operation of a secondary sewage treatment plant. Screens to remove excess fibre and a surge tank to even out the batch discharges would certainly make the wastes treatable in a conventional sewage treatment plant.

WELLAND ELECTRIC STEEL FOUNDRY LIMITED
Welmet Industries Limited
123 Victoria Street

PERSONNEL - Mr. R.C. O'Dell - Vice-President, General Manager
Mr. T. Stack - General Foreman *

OPERATING SCHEDULE - 5 days per week
1 shift per day
200 employees

WATER CONSUMPTION - 125,000 gpd from the municipal supply.

PROCESS - The company produces stainless and alloy steel castings.
The industrial wastes are cooling waters from welding
units, air compressors and arc furnaces.

DISPOSAL - Sanitary wastes and an estimated 90 percent of the
industrial water are discharged to the municipal sewerage
system, and the remaining industrial waste is discharged
to a municipal storm sewer.

COMMENTS - No contaminated industrial wastes are discharged from this
plant.

WELLAND PACKERS LIMITED

310 Riverside Drive

PERSONNEL - Mr. J. Kaczmarek - Owner

OPERATING SCHEDULE - 5 days per week
1 shift per day
3 employees

WATER CONSUMPTION - Estimated less than 4000 gallons per day from the municipal supply.

PROCESS - This company produces fresh meat from a slaughter-house operation.

DISPOSAL - All plant wastes are contained in a septic tank and field tile system.

COMMENTS - Wastes from this company are being handled satisfactorily.

WELLAND TUBES LIMITED

Little Road

- PERSONNEL - Mr. J. Horvath - Plant Engineer *
Mr. H. Kennedy - Assistant Engineer *
(both from Page-Hersey Tubes Limited)
- OPERATING SCHEDULE - 5, 6 or 7 days per week
3 shifts per day
250 employees
(production can be extremely variable)
- WATER CONSUMPTION - 110,000 gpd from the municipal supply.
- PROCESS - Large diameter pipe is formed, welded, then hydraulically expanded into shape. Wastes originate in the pickling process and in the hydraulic expanding. These latter wastes contain oil. Forming of pipe takes place, 2 shifts per day, while finishing continues for 3 shifts per day.
- DISPOSAL - Sanitary wastes are contained in a septic tank and field tile system. The industrial wastes are discharged to a lagoon equipped with an oil separator, and then overflow to Lyons Creek. Waste pickle liquor (80,000 gallons per week) is trucked to the slag dump of the Canadian Furnace Company at Port Colborne.
- COMMENTS - Analysis of the waste effluent indicated a low pH and high iron concentration in the lagoon effluent.
- The company is planning to replace the pickling process with a shot-blasting operation. This should eliminate

.... continued

Welland Tubes Limited (continued)

the low pH and high iron concentration in the waste effluent, as well as provide longer retention periods in the lagoon for oil and solids removal. This conversion will also eliminate most of the pickle liquor now being trucked to Port Colborne. It is difficult to determine if this disposal area is completely satisfactory for the large volume of pickle liquor that it is now receiving. Elimination of pickle liquor from Welland Tubes Limited would leave the relatively small amount from Page-Hersey Tubes, which could be satisfactorily disposed of at this site.

During the investigation of this company, a fairly large amount of oil was seen on the surface of the lagoon, and the direction of the wind was keeping this oil from overflowing to Lyons Creek. A baffled outfall (or more frequent cleaning of the oil trap) would increase the oil removal efficiency of the lagoon.

WELLAND WINERY LIMITED

268 King Street

PERSONNEL - Mr. F.J. Cooper - Manager
Mr. R. Mantesso *

OPERATING SCHEDULE - 5 days per week
1 shift per day
1 or 2 employees

WATER CONSUMPTION - Estimated maximum of 3000 gpd from the municipal supply.

PROCESS - In the fall, grapes are crushed and the juice fermented, and in the spring, juice concentrates are fermented. During the rest of the year, the operations are storing, blending, filtering, pasteurizing, cooling and bottling. The heaviest production period is in the fall, when the water consumption could exceed 200 gallons per hour.

DISPOSAL - All liquid wastes are discharged to the municipal sewerage system. Pulp from pressing grapes is trucked away and the lees (fermenter sludges) are trucked away for recovery of the alcohol.

COMMENTS - Although the wastes from this winery could be high in biochemical oxygen demand at certain times of the year, the volume is small and thus should not have an adverse effect on the municipal sewerage system even if it included a secondary sewage treatment plant.

WHITING CORPORATION (CANADA) LIMITED

Alexander Street

PERSONNEL - Mr. W.J. Wickenden - Plant Superintendent
Mr. R. Epps - Order Department *

OPERATING SCHEDULE - 5 to 7 days per week
1 to 1 and 1/2 shifts per day
45 employees

WATER CONSUMPTION - 2000 - 14,000 gpd (depending on production)
from the municipal supply.

PROCESS - The company produces large size industrial equipment,
and the only use for water is to pressure test the
finished equipment.

DISPOSAL - All wastes are discharged to the municipal sewerage
system.

COMMENTS - This company produces no contaminated industrial waste.

TOWN OF FORT ERIE

CANADIAN NATIONAL RAILWAYS - WABASH RAILWAY

Fort Erie

PERSONNEL - A.A. Fritz - Locomotive Foreman

OPERATING SCHEDULE - continuous

56 employees

WATER CONSUMPTION - Estimated at 50,000 gallons per month from the municipal supply.

PROCESS - This operation is a service and repair shop for diesel locomotives. Up to four locomotives per day are washed, whereas a few years ago, up to 20 were washed each day.

The roundhouse is now only rarely in use and has been partially torn down.

DISPOSAL - Sanitary wastes are discharged to a septic tank and field tile system, while industrial wastes reach the Niagara River by way of a drainage ditch.

COMMENTS - Land drainage and industrial water pass through an oil separator that receives good maintenance.

GOULD NATIONAL BATTERIES OF CANADA, LIMITED
275 Lewis Street

PERSONNEL - Mr. W. Maratz - Plant Engineer

OPERATING SCHEDULE - 5 days per week
1 shift per day
40 employees

WATER CONSUMPTION - Estimated 7000 gpd from the municipal supply.

PROCESS - This company produces a variety of lead storage batteries. Wastes are from floor washing and a water spray to remove acid fumes from the charging room.

DISPOSAL - Sanitary wastes are discharged to the municipal sanitary sewer, and the process wastes are discharged to a ditch that reaches the Niagara River.

COMMENTS - Analyses of effluent samples from this plant indicated the industrial wastes contained excessive concentrations of suspended solids and lead, and that pH was very low. Neutralization and settling should be provided before these wastes are discharged to an open watercourse.

HARBER MANUFACTURING LIMITED

74 Idylewylde Place

PERSONNEL - Mr. H. Minor - Assistant Manager

OPERATING SCHEDULE - 5 days per week
1 shift per day
50 employees

WATER CONSUMPTION - Estimated at 7000 gpd from the municipal supply.

PROCESS - This company originally produced lawn chairs, and the wastes resulted from pickling and anodizing operations. The main product is now aluminum boats, and the wastes are cooling water and a batch discharge from a water-wall paint booth. The pickling and anodizing processes operate perhaps one day per month.

DISPOSAL - Sanitary wastes are discharged to the municipal sanitary sewer. Process wastes discharged through a limestone bed to a ditch that empties into the Niagara River. The limestone bed was installed when pickling and anodizing were major operations.

COMMENTS - Waste effluent samples revealed that the wastes from this plant were being adequately handled.

HART AND COOLEY MANUFACTURING CO. OF CANADA LTD.

Wood Street

PERSONNEL - Mr. K. Souder - General Manager

OPERATING SCHEDULE - 5 days per week

1 shift per day (maximum 2 shifts occasionally)

100 employees

WATER CONSUMPTION - Estimated 8000 gpd from the municipal supply.

PROCESS - The company produces air distribution equipment. Process wastes originate in phosphatizing and cadmium plating operations. Other than the normal rinses in these operations, the wastes consist of the following batch discharges - 500 gallons daily of 1/2 percent chromic acid sealer, and 1000 gallons twice yearly of the phosphate solution.

DISPOSAL - Sanitary wastes are discharged to the municipal sewerage system, and the process wastes are discharged to a swampy area, from which there may be an overflow to Frenchman Creek.

COMMENTS - Analysis of the industrial waste effluent indicated concentrations of cadmium and cyanide in excess of the recommended limit for discharge to a watercourse. In-plant controls, such as operating one of the rinse tanks as a still treatment or dragout tank, may reduce the contaminants to acceptable limits. Otherwise treatment, especially of the cyanide, should be implemented. Batch sources of wastes, such as the chromic acid sealer, should not be discharged to a natural watercourse.

HORTON STEEL WORKS LIMITED

40 Jennet Street

PERSONNEL - Mr. A.W. Sherwin - Plant Engineer

OPERATING SCHEDULE - 5 days per week
1 shift per day (2 shifts in summer and fall)
320 employees

WATER CONSUMPTION - Estimated 15,000 gpd from the municipal supply.

PROCESS - This company produces plate steel tanks. Water is used to pressure test the tanks, and the only contaminated waste is calcium carbide from the acetylene generator. This waste is piped to a lagoon which has no overflow. This plant does not pickle steel, but uses a shot-blasting process.

DISPOSAL - All plant wastes are discharged to the municipal sewerage system.

COMMENTS - The wastes from this company are being adequately handled.

RICH PRODUCTS OF CANADA LIMITED

Queen Elizabeth Highway

PERSONNEL - Mr. R. Sider - Plant Manager

OPERATING SCHEDULE - 5 days per week
1 shift per day
3 employees

PROCESS - The company will produce milk substitute products from vegetable oils. The wastes will be equipment wash water and cooling water from refrigeration equipment.

DISPOSAL - The plant wastes will be discharged to the municipal sewerage system.

COMMENTS - At the time the field work for this survey was carried out, this plant was under construction.

The wastes from this plant are expected to have a fairly high biochemical oxygen demand (similar to the operation of a dairy), but should cause no problem in the operation of the municipal sewerage plant.

STRONG COBB ARNER OF CANADA, LIMITED

575 Niagara Boulevard

PERSONNEL - Mr. E. Lain - Chief Chemist

OPERATING SCHEDULE - 5 days per week
1 shift per day (2 in parts of the plant)
70 employees

WATER CONSUMPTION - Estimated 20,000 gpd from the municipal supply.

PROCESS - The company packages pharmaceuticals in tablets, pills, capsules, etc. The process wastes are cooling water and wash water.

DISPOSAL - All wastes are discharged to the municipal sewerage system.

COMMENTS - The wastes from this plant are adequately handled.

WILLIAMS GOLD REFINING COMPANY OF CANADA LIMITED
30 Courtwright Street

PERSONNEL - Mr. L.C. Williams - Manager

OPERATING SCHEDULE - 5 days per week
1 shift per day
15 employees

WATER CONSUMPTION - from the municipal supply - quantity unknown.

PROCESS - Plating of precious metals is carried out at this plant.
All contaminated wastes are treated for recovery of the
precious metals.

DISPOSAL - All wastes are discharged to the municipal sewerage
system.

COMMENTS - Due to the nature of the operations at this plant, no
significant contamination is expected in the wastes.

TOWN OF PORT COLBORNE

THE ALGOMA STEEL CORPORATION
Canadian Furnace Division
Lake Road

PERSONNEL - Mr. J.T. Crichton - Assistant Superintendent

OPERATING SCHEDULE - continuous
150 employees

WATER CONSUMPTION - 8000 gpd from municipal supply.
16 mgpd from the Welland Ship Canal.

PROCESS - This company produces pig iron in a blast furnace operation. Other than cooling water, there are two main sources of waste. One is the gas scrubbing system on the blast furnace gases, and the other is quench water from the pig moulds which contains some lime.

DISPOSAL - Sanitary wastes are discharged to the municipal sewerage system, and process wastes are discharged east to a creek to Lake Erie.

COMMENTS - Grab samples of the waste from this plant indicated an effluent suitable for discharge to a natural watercourse. However, perhaps once a year, a type of pig iron is produced that results in higher suspended solids concentrations in the waste effluent.

CANADA CEMENT COMPANY LIMITED

Maple Street

PERSONNEL - Mr. R.M. Brannen - Plant Superintendent

OPERATING SCHEDULE - 5 days per week
1 shift per day (part of plant operates
continuously)
90 to 110 employees
(the plant operates approximately 6 months
per year).

WATER CONSUMPTION - approximately 30,000 gpd from the municipal
supply. The fire protection water system has
its source at the Welland Canal.

PROCESS - This company produces cement and cement materials. The
wastes from the industrial operations are cooling water,
equipment wash water and quarry pumpage.

DISPOSAL - Sanitary wastes and cooling water are discharged to the
municipal sewerage system. Quarry pumpage and overflow
from the fire protection system discharge to a creek that
flows south to Lake Erie.

COMMENTS - The only waste of significance is the quarry pumpage
which at times contains excessive concentrations of
suspended solids.

INTERNATIONAL NICKEL COMPANY OF CANADA LIMITED

Davis Street

PERSONNEL - Mr. J.H. Tuck - Manager
Mr. W.V. Barker - Assistant Manager
Mr. A.D. Finlayson - Engineering Dep't, Copper Cliff. *

OPERATING SCHEDULE - continuous with 1,700 employees.

WATER SUPPLY - approximately 7.8 million gallons per day from the Welland Canal. The supply is chlorinated.

PROCESS - The company is involved mainly with the electrolytic refining of nickel. Simplifying the process, the operation is similar to a nickel plating operation where the dragout (initial rinse water) is used as make-up water. The company also operates processes for the recovery of precious metals from the cathode sludges, but these are not liquid waste-producing operations.

DISPOSAL - Sanitary wastes (34,000 gpd), are discharged to the municipal sewerage system, and process wastes are discharged to Lake Erie (7.65 mgpd).

COMMENTS - A grab sample of the waste effluent to Lake Erie contained suspended solids and nickel in concentrations exceeding those recommended for discharge to a water-course.

MAPLE LEAF MILLS LIMITED

Lake Shore

PERSONNEL - Mr. T. O'Neil - Operations Manager
Mr. L. Butt - Chief Engineer *

OPERATING SCHEDULE - 5 days per week
3 shifts per day
110 employees

WATER CONSUMPTION - Lake Erie water is filtered and chlorinated.

PROCESS - Grain is milled into flour at this plant. Boiler room wastes are discharged through a two-compartment settling tank that acts as an oil separator. The main waste is from the wheat washers and could amount to 4000 gallons per hour. This waste is screened and occurs approximately 75 percent of the time.

DISPOSAL - Sanitary wastes are discharged to septic tanks and tile beds. Process wastes are discharged to Lake Erie.

COMMENTS - Wastes from the wheat washers contained 225 ppm biochemical oxygen demand and 238 ppm suspended solids, and, as such, should not be discharged to a natural watercourse.

NATIONAL HARBOURS BOARD
West Pier

PERSONNEL - Mr. A.J. O'Neil, Manager

OPERATING SCHEDULE - 7 days per week
3 shifts per day
40 - 110 employees

WATER CONSUMPTION - chlorinated Lake Erie water is used.

PROCESS - This company handles and stores grain. Cooling water is the only process waste, but the discharge of grain dust to the lake is a problem.

DISPOSAL - Sanitary wastes are discharged to septic tanks, while cooling water is discharged to Lake Erie.

COMMENTS - Dust, resulting from handling grain, is blown out onto Lake Erie. The plant has dry dust-collecting equipment, but the equipment is not being used because of difficulties in trucking the collected dust away.

ROBIN HOOD FLOUR MILLS LIMITED

Ramey's Bend

PERSONNEL - Mr. W.H. Lewis - Manager

Mr. S.E. Ceply - Assistant Manager *

OPERATING SCHEDULE - 5 days per week

3 shifts per day

250 employees

WATER CONSUMPTION - estimated 70,000 gpd. Sanitary water is filtered and chlorinated canal water. Process water is usually pumped from a private well, but chlorinated canal water is sometimes used.

PROCESS - Wheat is ground, separated and bleached to produce flour, cake mixes and animal feeds. The liquid wastes are cooling water and wastes from the wheat washers.

DISPOSAL - Sanitary wastes are treated in a septic tank and field tile system, while industrial wastes are discharged to the Welland Canal.

COMMENTS - Wastes from wheat washing operations are equivalent to sanitary sewage with respect to biochemical oxygen demand and suspended solids, and are not acceptable for discharge to natural watercourses.

TOWN OF THOROLD

DOMTAR PULP AND PAPER LIMITED
Kraft and Boxboard Division
Division 58

PERSONNEL - Mr. J.E. Cash - Resident Manager
Mr. C.J. Sullivan - Plant Superintendent *

OPERATING SCHEDULE - 6 days per week
3 shifts per day
60 employees

PRODUCTION - Roofing felt - 50 tons per day.

WATER CONSUMPTION - 460,000 gpd from the Town of Thorold.

PROCESS - The company repulps screen rejects, sawdust, waste paper and other materials for the production of roofing felt on a cylinder board machine. Wastes consist essentially of white water from the cylinder machine and wash water from the repulping systems.

DISPOSAL - All wastes are discharged through one sewer to the Old Welland Canal.

COMMENTS - The wastes from this mill contain excessive loadings of biochemical oxygen demand and suspended solids. Mill personnel are investigating methods of improving the situation.

INTERLAKE STEEL PRODUCTS COMPANY LIMITED

Wellington Street

PERSONNEL - Mr. B.L. Kniffen - Foreman

OPERATING SCHEDULE - 5 days per week
1 shift per day
50 employees

WATER CONSUMPTION - estimated 2000 gpd from the municipal supply.

PROCESS - Screws and hooks of various sizes and shapes are produced from steel wire. The only industrial waste is the cleaning solution that is dumped approximately every three months, and a still rinse tank that is dumped more often.

DISPOSAL - All plant wastes are discharged to the municipal sewerage system.

COMMENTS - The cleaning solution is an alkaline cleaner having a high pH.

LAST MINUTE MANUFACTURING COMPANY LIMITED
Wellington Street

PERSONNEL - Mr. L. Rapchuk - Plant Foreman

OPERATING SCHEDULE - 5 days per week
2 shifts per day
25 employees

WATER CONSUMPTION - 60,000 gpd from the municipal supply.

PROCESS - The company produces white metal, zinc and aluminum castings. Cooling water is the only industrial waste.

DISPOSAL - All plant wastes are discharged to the municipal sewerage system.

COMMENTS - This company produces no contaminated industrial waste.

PROVINCIAL PAPER LIMITED

John Street

PERSONNEL - Mr. S.J. Leishman - Mill Manager
Mr. J.S. Sinclair - Senior Chemist

OPERATING SCHEDULE - 6 days per week
3 shifts per day
750 employees

PRODUCTION - Fine paper - 250 tons per day.

WATER CONSUMPTION - Treated water 90,000 gpd.
Raw water 6.5 mgpd.
Both supplies are obtained from the Town of
Thorold.

PROCESS - The mill de-inks waste paper and repulps kraft, sulphite and groundwood pulps for the production of fine papers on five paper machines. The wastes consist of the normal white water overflows, bleach plant wastes and wastes from the de-inking operation.

DISPOSAL - All wastes are discharged through one sewer to the Old Welland Canal. Sanitary wastes have been segregated from the mill wastes but until a municipal sanitary sewer is constructed, the sanitary wastes are discharged with the process wastes.

COMMENTS - Mill personnel are investigating methods of reducing the waste loading. The wastes from this mill contain excessive loadings of biochemical oxygen demand and suspended solids.

THOROLD PULP COMPANY LIMITED
Front Street

PERSONNEL - Mr. R.N. Foster

Mr. O. Chenard - Production Superintendent *

OPERATING SCHEDULE - 6 days per week

3 shifts per day

13 employees

PRODUCTION - Groundwood pulp - 18 tons per day.

WATER CONSUMPTION - 380,000 gpd from the municipal supply.

PROCESS - This company produces groundwood pulp on two grinders, and dries it on three wet machines. Wastes consist of white water overflows and screen rejects.

DISPOSAL - All plant wastes, including sanitary wastes, are discharged to the Old Welland Canal.

COMMENTS - Wastes from this mill contain high concentrations of biochemical oxygen demand and suspended solids. Since the mill was last visited, an additional screen has been installed.

YORK ELECTRO-PLATING LIMITED

51 Ormond Street North

PERSONNEL - Mr. C.H. York - Manager

OPERATING SCHEDULE - 5 days per week
1 shift per day
15 employees

WATER CONSUMPTION - 28,000 gpd from the municipal supply.

PROCESS - The plating of hard chromium is the main process at this plant, but copper, cadmium, nickel and zinc are also plated on some occasions. The operations at this plant are typical of a plating room operation with still drag-out tanks in each plating line.

DISPOSAL - All plant wastes are discharged to the municipal sewerage system.

COMMENTS - Should a sewage treatment plant be built in Thorold, the wastes from this plant could be reviewed. The concentrations of heavy metals and cyanides, if found to be excessive, could be reduced by improving the efficiency of the dragout tanks and eliminating batch discharges of alkaline cleaners and acid strippers.

Since the main process is hard chrome plating, dragout losses will be less than from a conventional decorative plating process.

VILLAGE OF CHIPPAWA

NORTON COMPANY

PERSONNEL - Mr. W.G. Barr - Plant Engineer

OPERATING SCHEDULE - 7 days per week
3 shifts per day
400 to 500 employees

WATER CONSUMPTION - 20,000 gpd sanitary water from the municipal supply.

PROCESS - Abrasives are produced in electric furnaces from bauxite, silica and coke. Industrial wastes arise from cooling the furnaces and transformers. An acid wash (H_2SO_4) process produces about 40 gpm of low pH waste, but this is well-diluted with the remaining 4000 gpm of cooling water.

DISPOSAL - Sanitary wastes are discharged to the municipal sewers. Industrial wastes are discharged to the Welland River through three sewers, two directly to the river and one to Pell Creek which flows into the Welland River.

COMMENTS - Wastes from this plant can be considered to be cooling water.

Due to the closing of the Chippawa power canal, this company has installed a new watermain from the municipal supply. Thus, if it becomes necessary, the company can change from river water to municipal water for various processing needs.

TOWNSHIP OF BERTIE

FLEET MANUFACTURING

Gilmore Road - Bertie Township

PERSONNEL - W. Baker - General Manager
W. Pfeiffer - Plant Engineer *

OPERATING SCHEDULE - 5 days per week
1 shift per day
400 employees

WATER CONSUMPTION - estimated 80,000 gpd from the municipal supply.

PROCESS - This plant produces aircraft, radar and sonar components. The industrial wastes of significance originate in a cadmium plating line, a phosphatizing process and a chromium sealing dip. Cooling water is used on spot welders, hydraulic presses, an air compressor, a vapour degreaser and a vacuum pump.

DISPOSAL - Sanitary wastes are discharged to a septic tank and trickling filter, and the effluent is chlorinated. The combined wastes, sanitary and industrial, flow through a golf course to Frenchman's Creek and then to the Niagara River.

COMMENTS - Samples taken from the plant effluent indicated that at times the cadmium and chromium concentrations were excessive. These could probably be reduced to acceptable limits by relatively simple in-plant operating changes.

WALLACE AND TIERNAN LIMITED

Lucidol Division

Garrison Road

PERSONNEL - Mr. A. Spear - Plant Foreman

OPERATING SCHEDULE - 5 days per week
1 shift per day
7 employees

WATER CONSUMPTION - estimated 7,000 gpd from Bertie Township (not including the acid scrubber).

PROCESS - The company produces organic peroxides. Process wastes originate in three locations, as follows:-

Building I - 4500 gallons per day cooling water.
2000 gallons per day of equipment and product wash water.
This is a batch discharge of acid and caustic wastes.

Building 4 - A hydrochloric acid gas scrubber operates one hour every second day at approximately 300 gpm.
Phosphate sludge, resulting from neutralizing the product is land dumped.

Building 5 - The wastes here are small batches (60 - 70 gallons of product and equipment wash water).

DISPOSAL - Sanitary wastes are discharged to septic tanks and field tile systems, while all process wastes are discharged to a ditch that flows south to Lake Erie.

COMMENTS - An extensive sampling programme is required to determine the effects of the wastes from this company. It may be possible to segregate the uncontaminated cooling water from the contaminated wash water. The small volume of wash water could then be impounded and the cooling water discharged to the ditch. It may be necessary to neutralize the scrubber water.

TOWNSHIP OF CROWLAND

FORD MOTOR COMPANY OF CANADA LIMITED

Glass Fabricating Plant

Montrose Road

PERSONNEL - Mr. C.D. Stark - Plant Engineer *

Mr. G. Koss - Assistant Plant Engineer *

OPERATING SCHEDULE - 5 days per week

1 shift per day (mainly)

250 employees

WATER CONSUMPTION - Approximately 200,000 gallons per day from the Welland River. This water is clarified and a portion is filtered and chlorinated. Potable water is further treated in a carbon filter.

PROCESS - This company produces laminated windows for automobiles. Wastes originate in washing the glass and the polyvinyl film used in manufacturing the windows. A large volume of cooling water is also used in the plant.

DISPOSAL - Sanitary wastes are treated in a "Septi Robic" unit and then chlorinated. All plant wastes including the treated sanitary wastes are discharged through one sewer to the Welland River.

COMMENTS - Analytical results indicated that the plant effluent contained excessive concentrations of suspended solids.

TOWNSHIP OF HUMBERSTONE

JOHN DEERE, WELLAND WORKS

PERSONNEL - Mr. Lyburner - Superintendent *
Mr. E. Haley - Plant Engineer *

OPERATING SCHEDULE - 5 days per week
1 shift per day to a maximum of 3
500 employees

WATER CONSUMPTION - 60,000 gpd from the Welland municipal supply.

PROCESS - This company produces agricultural equipment. The industrial waste is cooling water from air conditioning equipment, compressors and oil coolers on hydraulic equipment.

DISPOSAL - All wastes are discharged to a septic tank and field tile system.

TOWNSHIP OF THOROLD

THE BEAVER WOOD FIBRE COMPANY LIMITED

Allanburg Road

PERSONNEL - Mr. J.W. Hart - Vice-President and General Manager
Mr. F.H. Cowan - Plant Superintendent *

OPERATING SCHEDULE - 6 days per week
3 shifts per day
350 employees

PRODUCTION - newsprint - 120 tons per day
paper board - 190 tons per day
wallboard is another product

WATER CONSUMPTION - 12,000 gpd from the township supply,
4.5 mgpd from the Welland Ship Canal.

PROCESS - The company produces groundwood pulp, and repulps scrap paper and sulphite pulp for use on one newsprint machine and two board machines. Wastes are mainly white water from the waste paper pulping process.

DISPOSAL - All plant wastes, including sanitary wastes, are discharged through three sewers to Beaver Dams Creek. They siphon under the Ship Canal, and are pumped to Lake Gibson and eventually Twelve Mile Creek.

COMMENTS - Wastes from this mill contained high loadings of biochemical oxygen demand and suspended solids. Mill personnel are investigating methods of reducing the waste loading.

EXOLON COMPANY

Queen Street

PERSONNEL - Mr. R. Ewing - Plant Manager

OPERATING SCHEDULE - continuous
200 employees

WATER CONSUMPTION - 40,000 gpd from the Town of Thorold
9000,000 gpd from the Welland Canal (via the
third canal)

PROCESS - Abrasives are produced in electric furnaces from coke,
sand and bauxite. The industrial wastes are cooling
waters from furnaces and transformers.

DISPOSAL - Sanitary wastes are discharged to a Town of Thorold
sanitary sewer. The industrial wastes are discharged to
Morlatt's Pond, and eventually reach 12-Mile Creek.

COMMENTS - Waste effluent samples from this company indicated that,
at times, the concentration of suspended solids in the
effluent exceeded the recommended limit for discharge
to a watercourse. The analyses indicated 18 and 61 parts
per million suspended solids.

B.F. GOODRICH, CHEMICAL, CANADA
Division of B.F. Goodrich Canada Ltd.
Chippawa Creek Road

PERSONNEL - Mr. E.R. Clayson - Manager
Mr. R.W. Gregory - Plant Engineer
Mr. G.H. Thomson - Maintenance Foreman

OPERATING SCHEDULE - 7 days per week
3 shifts per day
60 employees

WATER CONSUMPTION - 10,000 gpd from the Niagara Falls municipal supply.
80,000 gpd from Cyanamid of Canada Limited.
This water is treated by flocculation and chlorination. Boiler water is treated by ion exchange.

DISPOSAL - Process water and septic tank overflow are discharged to a lagoon having a capacity of approximately one million gallons. The lagoon effluent combines with the cooling water flow, then discharges to the Welland River.

COMMENTS - Analytical results indicated that suspended solids in the total plant effluent were very slightly above the recommended limit for discharge to a natural watercourse, (36 versus 20 parts per million).

HAYES STEEL PRODUCTS LIMITED

Hayes Road

PERSONNEL - Mr. N. Richards - Engineering Department
Mr. L. Edwards - Engineering Department *

OPERATING SCHEDULE - 6 days per week
3 shifts per day
750 employees

WATER CONSUMPTION - The plant receives water from the township supply and also from the Welland Canal. Estimates of the consumption were not available.

PROCESS - The main process is machining automotive components. The industrial wastes are cooling waters from compressors and coolers, as well as soluble oils from the machining operations.

DISPOSAL - Industrial wastes are discharged to two ditches (east and west of the plant) that join the pass under the Welland Canal by means of Beaver Dams culvert. The wastes eventually reach 12-Mile Creek.

Sanitary wastes are contained in a septic tank and field tile system.

COMMENTS - Analyses of waste samples indicated that the ether solubles concentration in one of the ditches was excessive, and that the suspended solids concentrations in both ditches were higher than the recommended limit for discharge to a natural watercourse.

The company is presently building a series of settling ponds to treat the contaminated waste flows. It is estimated that the treated effluent, less than 10,000 gpd, will contain suspended solids and oil at concentrations of less than 15 ppm. The treated effluent will then be mixed with the cooling water before discharge to the watercourse.

NICHOLS CHEMICAL COMPANY LIMITED

Beaver Dams Road

PERSONNEL - Mr. A.J. Wallace - Manager

OPERATING SCHEDULE - 5 days per week
1 shift per day
3 employees

WATER CONSUMPTION - 20,000 gallons per day from the St. Catharines municipal supply.

PROCESS - Liquid aluminum sulphate is produced from the leaching action of sulphuric acid on bauxite. Part of the daily water consumption ends up in the product and the rest is discharged to a series of ponds as sludge and waste acid.

DISPOSAL - Sanitary wastes are retained in a septic tank and field tile system. Industrial wastes are discharged to a series of holding lagoons. In normal operation there is no overflow, but during this investigation there was an overflow. This resulted from the necessity of cleaning out the first pond, diversion of the waste, and a mistake by a contractor building a retaining dyke between the plant and Marlatt's Pond.

COMMENTS - Precautions taken by this company should result in the wastes being contained on company property. These wastes should not be discharged to a watercourse unless the pH is corrected and suspended solids removed.

ONTARIO PAPER COMPANY LIMITED

Allanburg Road

PERSONNEL - Mr. J.G. Jones - Vice-President

Mr. W.F. Fell - Control Superintendent

OPERATING SCHEDULE - 7 days per week

3 shifts per day

1400 employees

PRODUCTION - newsprint - 675 tons per day

WATER CONSUMPTION - 60,000 gpd from the municipal supply,

26 mgpd from the Welland Canal.

PROCESS - This mill has all the operations of an integrated newsprint mill, with the exception of a barking operation in the woodroom. Groundwood and sulphite pulps are produced for use on the five paper machines, and some sulphite pulp is sold in dry laps.

Also, this mill is one of the few in North America that operates a by-product recovery process for the utilization of spent sulphite liquor. Ethyl alcohol and vanillin are the products from the recovery processes.

DISPOSAL - All plant wastes are discharged through two sewers, one serving the pulp and paper mill and the other serving the by-product plant. Wastes are discharged to Shriner's Creek, syphon under the ship canal and flow down the Old Welland Canal to Twelve-Mile Creek.

COMMENTS - The company has arranged for the segregation of sanitary and process wastes, and has planned changes in the mill for the reduction of suspended solids. The by-product plant is under study to try to reduce its biochemical oxygen demand loading.

The wastes from this company contain excessive loadings of biochemical oxygen demand and suspended solids.

Prepared by:

R. C. Stewart
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R.C. Stewart, P.Eng.,
District Industrial Wastes Engineer.

Supervised by:

R.H. Millest
.....
R.H. Millest, P.Eng.,
Supervisor, Industrial Wastes Branch,
Division of Laboratories.

RCS/as