

ONTARIO MINISTRY OF ENVIRONMENT



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THE
ONTARIO WATER RESOURCES
COMMISSION
INDUSTRIAL WASTE SURVEY
of the
TOWN OF BRADFORD

1965

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REPORT

on

AN INDUSTRIAL WASTES SURVEY

of

THE TOWN OF BRADFORD

1965

by

Division of Industrial Wastes

ONTARIO WATER RESOURCES COMMISSION

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AN INDUSTRIAL WASTE SURVEY

of

THE TOWN OF BRADFORD

1965

The Town of Bradford, situated in the Holland Marsh area, is the centre of the vegetable washing and packaging industry of the area. There is a limited amount of potato chip production, but generally the bulk of industrial wastes originate from the vegetable washing operations. These operations are seasonal, being heavier in the summer and fall months than in the winter. Water consumption, and therefore waste disposal, is more of a problem in the summer when local produce is being processed. During the winter, vegetables imported from the United States are washed and generally, this produces wastewaters less highly contaminated since these vegetables are usually cleaned prior to shipment.

The wash waters contain significant amounts of organic material, either from the marsh or from vegetable skins, tops or leaves, in conjunction with silt and grit. These give the waste a significant BOD and a high suspended solids concentration. Potato chip manufacture presents a similar problem, but of greater magnitude since chip wash water contains appreciable amounts of starch which exert a high BOD.

The purpose of this survey has been to define the problem more clearly for each individual industry, establish waste loadings, and to promote action towards proper industrial waste control, with emphasis being placed on the treatment of these wastes in the municipal waste stabilization lagoon.


SUMMARY

The vegetable washing and packaging industries in the Bradford area were surveyed during the summer of 1965. A total of six industries were investigated, two of which produced potato chips and thus discharged stronger industrial wastes.

Waste disposal practices by these industries were unsatisfactory. Some industries had pretreatment facilities in the form of settling tanks, but in general these were not being maintained in a proper condition. As a result, almost all of the industries were found to be discharging poor quality effluents to ditches and canals in the area. As an example, the waste disposal basin at the rear of Holland River Gardens Limited is a situation which can not be considered as an acceptable form of treatment as it results in foul odours and septic unsightly conditions in the vicinity of the plant and is a potential source of gross pollution to the Holland River.

Little interest has been shown by some of the industries in carrying out proper pretreatment procedures. Greater emphasis should be placed on water pollution and waste disposal practices in Bradford. The report recommends that an attempt be made to redirect all industrial wastes into the municipal sanitary sewers for treatment at the municipal lagoon system--but only after adequate pretreatment facilities have been installed by the industries and are operated efficiently. The Town of Bradford should institute a by-law to ensure the proper maintenance of these facilities and carry out regular inspections to enforce the by-law.

Finally, the marsh is heavily dosed with pesticides at various periods of the year. In order to prevent crop failures due to pests, chlorinated hydrocarbons such as Aldrin, Dieldrin, Endrin, and DDT are applied to the fields in heavy doses. It is reasonable to expect that a portion of these



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materials leach into surface waters in the area. Fish kills have been reported, and the relationship between these kills and pesticides merits further investigation in the future. A monitoring programme on the Schomberg and Holland rivers and other waterways in the watershed should be set up by the OWRC as soon as possible, and the effects of pesticides on water quality and aquatic life be firmly established.

CONDUCT OF THE SURVEY

On the basis of work carried out in 1963 and 1964 by Commission personnel, and as a result of complaints received from the area, this present survey was carried out in the summer of 1965.

Information contained in this report was obtained by interview with company and municipal officials, and from investigations carried out by the Commission's Divisions of Plant Operations, Sanitary Engineering, and Industrial Wastes. Waste characteristics were determined by the collection and analysis of effluent samples. All samples were submitted to the OWRC Laboratory for analysis in accordance with the procedures described in "Standard Methods for the Examination of Water and Wastewater," eleventh edition, published by the United States Public Health Association.

Water consumption figures were supplied by the Bradford Public Utilities Commission.

SEWAGE TREATMENT

Sanitary sewage and some industrial waste is directed to the OWRC operated waste stabilization lagoon. Limited grab sampling programmes carried out over the past few years have shown the following results:

Year	No. Of Samples	Influent		Effluent	
		BOD	Susp. Solids	BOD	Susp. Solids
1962	1	-	-	18	32
1963	4	2.3	370	17	62
1964	5	201.	207	20	86
1965	1	146.	237	22	51

CONCLUSIONS

On the basis of limited sampling in 1963 and 1964, the BOD of the final effluent is in the order of 20 ppm and that of suspended solids about 74 ppm. The BOD is at the OWRC recommended maximum for discharge to a natural watercourse while suspended solids have consistently exceeded the recommended maximum since the lagoon's construction.

The reason for this is evident from a comparison of current loadings and design criteria for the lagoon.

	<u>Design</u>	<u>Current loading</u>
Flow gpd	100,000	126,000
BOD lbs/day	200	252
Susp. Solids lbs/day	200	378
Population	1,350	2,400

It is clear that an expansion of the lagoon's capacity is dictated by the existing waste loadings. It is therefore recommended that feasibility studies be implemented by the town regarding the acceptance of industrial wastes into any future expansion of the existing sewage treatment facilities.

On the basis of an industrial waste volume of about 170,000 gpd, (total water consumption for the six industries), and projected maximum concentrations of BOD and suspended solids of 300 ppm, (OWRC recommended maximum for discharge to sanitary sewers), the expected industrial waste loadings would be as follows, provided adequate pretreatment facilities were installed by the industries: -

Flow - 170,000 gpd
BOD lbs/day - 525 510
Susp. Solids lbs/day - 525 510

Present waste loadings from the six industries are as follows: -

Industry	Flow gpd	BOD lbs/day	Susp. Solids lbs/day
W. A. Fuller	1,000	1 20	29
Dominion Farms	7,000	5 20	128
International Fruit	8,000	3 20	15
United Farms	21,000	38 100	79
Holland River Gardens Ltd.	130,000	1196 1200	1154
*L and L Gardens	1,000	-	-
Total	168,000	1243 1360	1405

*Not operating at time of survey.

From this table, it is apparent that the waste disposal practices of almost all these industries are inadequate to permit the discharge of wastewaters directly into the municipal system. With the exception of Holland River Gardens Limited, BOD loadings are not excessive. The problem, therefore,

20
= 68 acre extension / cement tank

appears to be poor control of suspended solids. The projected loadings are obviously outside the lagoon's present capacity to provide successful treatment. Additional sewer extensions, pumping stations and lagoons, and/or other treatment facilities are factors that will have to be determined. Based on the limited information available at present, an expansion of the lagoon system to a further ²⁵10 acres capacity appears to be indicated (20 lb BOD per acre per day). However, the success of such a project hinges on on the co-operation of the industries in pretreating their wastes to an acceptable degree. At the same time, the OWRC recommended maximum concentration of suspended solids of 300 ppm may require revision in view of the lagoon's inability to control existing suspended solids loadings.

W.A. FULLER AND SON LIMITED

DETAILS OF SURVEY

Personnel - Mr. W.A. Fuller, Proprietor
Number of employees - 10
Operating schedule - 8 hours per day
- 5 1/2 days per week
- 10 months per year
Water consumption - 247,000 gallons per year
- Daily average 900 gpd

PROCESS

This plant is engaged primarily in the washing and packaging of turnips and parsnips. Operations are seasonal and very little washing is done in June and July. Approximately 800 gallons of waste wash waters are discharged to the municipal storm sewer, and ultimately to an open ditch via a small concrete sump.

SAMPLING AND ANALYSIS

The plant was visited on May 5, 1965, and grab samples were obtained of the influent to and the effluent from the sump. These were submitted to the OWRC Laboratory for analysis for BOD and solids.

All analyses except pH reported in
ppm unless otherwise indicated

Date Sampled: May 5/65

	5-Day BOD	Total	Solids Susp.	Diss.
Influent to settling basin - Total effluent - Grab	290	1860	1322	538
Effluent to storm sewer from basin - Grab	62	3316	2924	592

CONCLUSIONS AND RECOMMENDATIONS

The analytical results on page 7 indicate that poor control of suspended solids is being achieved at the sump. Suspended solids concentrations, in the order of 3,000 ppm, are of sufficient magnitude to cause plugging of sewers if discharged on a continuous basis and represent gross pollution in the receiving stream. In view of the BOD of this waste, it is recommended that this company construct a settling basin of sufficient capacity to ensure efficient removal of suspended solids, and that application be made to the Town of Bradford for sanitary sewer service for these treated wastes. The success of such a project will depend on a regular schedule of cleaning for the proposed settling basin.

DOMINION FARM PRODUCE LIMITED

DETAILS OF SURVEY

Personnel	-	Mr. M. Cohen, Manager
	-	Mr. H.A. Fischer, Consultant
Number of employees	-	50
Operating schedule	-	8 hours per day 5 days per week Seasonal, reduced operations early summer
Water consumption	-	1,604,000 gallons per year
	-	Daily average - 7,000 gpd

PROCESS

A variety of local and imported produce is processed. Approximately 6,000 gallons of wash water are discharged to the municipal sanitary sewer daily. The plant has recently begun operations at its present location, and during construction, measures were taken to ensure that process wastes were adequately pretreated before discharge to the sanitary sewer. Basket-type removable screens have been inserted in plant floor drains and a portable wooden screen box is located below the rotary drum vegetable washer. This is a 5 ft x 2 ft x 2 ft deep box containing a series of removable screens which are regularly cleaned. After screening, the wash waters are discharged to two 600 gallon settling tanks connected in series. The influent and effluent openings of these tanks are baffled and the supernatant discharges to the sanitary sewer.

SAMPLING AND ANALYSIS

The plant was visited on August 31, 1965, and grab samples were obtained of the influent to and effluent from the settling basins. These were submitted to the OWRC Laboratory for analysis for BOD and solids.

UNIVERSITY OF TORONTO

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All analyses reported in ppm

Date Sampled: Aug. 31/65

	5-Day BOD	Solids		
		Total	Susp.	Diss.
Total plant effluent to #1 settling basin - Grab	68	2246	1830	416
Effluent to municipal sewer from #2 settling basin - Grab	50	978	584	394

CONCLUSIONS AND RECOMMENDATIONS

The analytical results (shown above) indicate that the waste treatment facilities are generally effective in reducing BOD and suspended solids in the final effluent to an appreciable degree. Suspended solids concentrations in the order of 500 ppm are, however, in excess of the OWRC recommended maximum of 300 ppm for discharge to a sanitary sewer. It is therefore recommended that this be investigated, and an attempt be made to improve the settling efficiency of the system.

HOLLAND RIVER GARDENS COMPANY LIMITED

DETAILS OF SURVEY

Personnel	-	Mr. G. Lloyd, General Manager
	-	Mr. H. Rhynsberger, Plant Manager
Number of employees	-	150
Operating schedule	-	8 hours per day
	-	5 1/2 days per week
Water consumption	-	32,229,000 gallons per year
	-	Daily average - 125,000 gpd

PROCESS

There are two distinct operations at this plant. Primarily, the plant is engaged in the processing and packaging of vegetables such as carrots, potatoes, parsnips, beets, and celery, and also the manufacture of potato chips.

Vegetable washing wastes, containing large amounts of soil and grit, and carrying vegetable skins, tops, etc., do not differ significantly from other similar operations in Bradford. Of more concern are the wastes from the potato chip manufacture. Wastes from this process contain significant concentrations of starch and therefore exhibit a high BOD. Larger vegetable pieces such as celery tops and potato peelings are removed by a mechanical screen conveyor and land dumped. A daily waste flow, in the order of 120,000 gallons, is discharged to a large ditch adjacent to the plant, which eventually flows to the Holland River.

Visual inspection of the ditch indicates clearly a septic and offensive odorous condition which has prompted numerous complaints to the town officials.

SAMPLING AND ANALYSIS

The plant was visited on May 5, 1965, and grab samples were obtained of the following waste streams:

1. Wash water tank - first vegetable wash
2. Spray rinse - second vegetable wash
3. Spray rinse - celery line
4. Potato wash water - first wash, chip room
5. Potato chip rinse water - first rinse
6. Potato chip rinse water - second rinse
7. Final effluent - combined wastewaters.

These were submitted to the OWRC Laboratory for analysis for BOD, solids, and pH.

All analysis except pH reported in ppm unless otherwise indicated

Date Sampled: May 5/65

	5-Day BOD	Solids			pH at Lab.
		Total	Susp.	Diss.	
Wash water tank - 1st vegetable wash - Grab	900.	2394	1580	814	-
Spray rinse - 2nd vegetable wash - Grab	3.2	270	11	259	-
Spray rinse - Celery line - Grab	900.	1880	1124	756	-
Potato wash water - 1st wash - Chip room - Grab	135.	732	558	174	7.4
Potato chip rinse water - 1st rinse - Grab	430.	1148	104	1044	-
Potato chip rinse water - 2nd rinse - Grab	100.	390	35	355	6.5
Final effluent - Combined waste waters - Grab - 2nd manhole west of plant (at tracks).	920.	2338	888	1450	6.8

CONFIDENTIAL - SECURITY INFORMATION

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CONCLUSIONS AND RECOMMENDATIONS

The analytical results on page 12 clearly indicate the sources of the gross pollution in the ditch. Concentrations of BOD and suspended solids, in the order of 900 ppm, are considerably in excess of the 20 ppm OWRC recommended maximum.

It is therefore recommended that the Company institute the following steps without delay:

- 1) In-plant control of highly contaminated waste streams by screening to remove large vegetable pieces and other solids on all lines.
- 2) Construction of a settling basin to ensure efficient removal of suspended solids with a view to the disposal of this treated effluent to the municipal sanitary sewer. If sewer service is not available in the near future, then some form of biological treatment process to reduce the BOD of this effluent to the order of 20 ppm should be actively considered.
- 3) The ditch at the rear of the plant should be covered over and filled in to eliminate septic and odorous conditions.

INTERNATIONAL FRUIT DISTRIBUTORS LIMITED

DETAILS OF SURVEY

Personnel - Mr. W. Scholl, Manager
Number of employees - 20
Operating schedule - 8 hours per day
5 days per week
Water consumption - 2,015,000 gallons per year
- Daily average - 8,000 ~~gpd~~

PROCESS

A variety of local and imported vegetables are washed and packaged. Operations are seasonal, and a daily average of 7,000 gallons of wash water are discharged to the ditch adjacent to Holland River Gardens Company Limited.

SAMPLING AND ANALYSIS

The plant was visited on August 6, 1965, and grab samples taken of the total plant effluent at the plant and at the culvert leading from the receiving ditch.

All analyses reported in ppm

Date Sampled: Aug. 6/65

	5-Day BOD	Total	Solids Susp.	Diss.
Total effluent from plant - Grab	35.	636	192	444
Effluent at culvert from ditch -	25.	658	314	344

CONCLUSIONS AND RECOMMENDATIONS

The analytical results on page 14 show that wastewaters from this plant are in excess of OWRC objectives in terms of BOD and suspended solids. In view of the high BOD of these wastes, treatment in the municipal system is the most logical solution to this problem. Pretreatment facilities, such as a settling tank, should therefore be installed to ensure adequate control of suspended solids prior to discharge to the municipal system. If sewer service is not available in the near future, then active consideration should be given to the provision of biological treatment works to reduce the BOD of this effluent to less than 20 ppm.

L AND L GARDENS LIMITED

DETAILS OF SURVEY

Personnel	-	Mr. L. Tosca, Proprietor
Number of employees	-	10
Operating schedule	-	8 hours per day 5 days per week (July to March)
Water consumption	-	247,000 gallons per year - Daily average - 1,000 gpd

PROCESS

This plant washes primarily carrots. About 1,000 gpd of wash water are discharged to the municipal sanitary sewer via a small settling tank.

SUMMARY

The plant was not operating during this survey. Reportedly, the settling basin is cleaned regularly. This should be continued since this is a prerequisite of the successful treatment of these wastes in the municipal system.

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UNITED FARMS LIMITED

DETAILS OF SURVEY

Personnel - Mr. E. Delzotto, Plant Supervisor

Number of employees - Variable: - November to February - 60
- Remainder - 20

Operating schedule - 9 hours per day
6 days per week

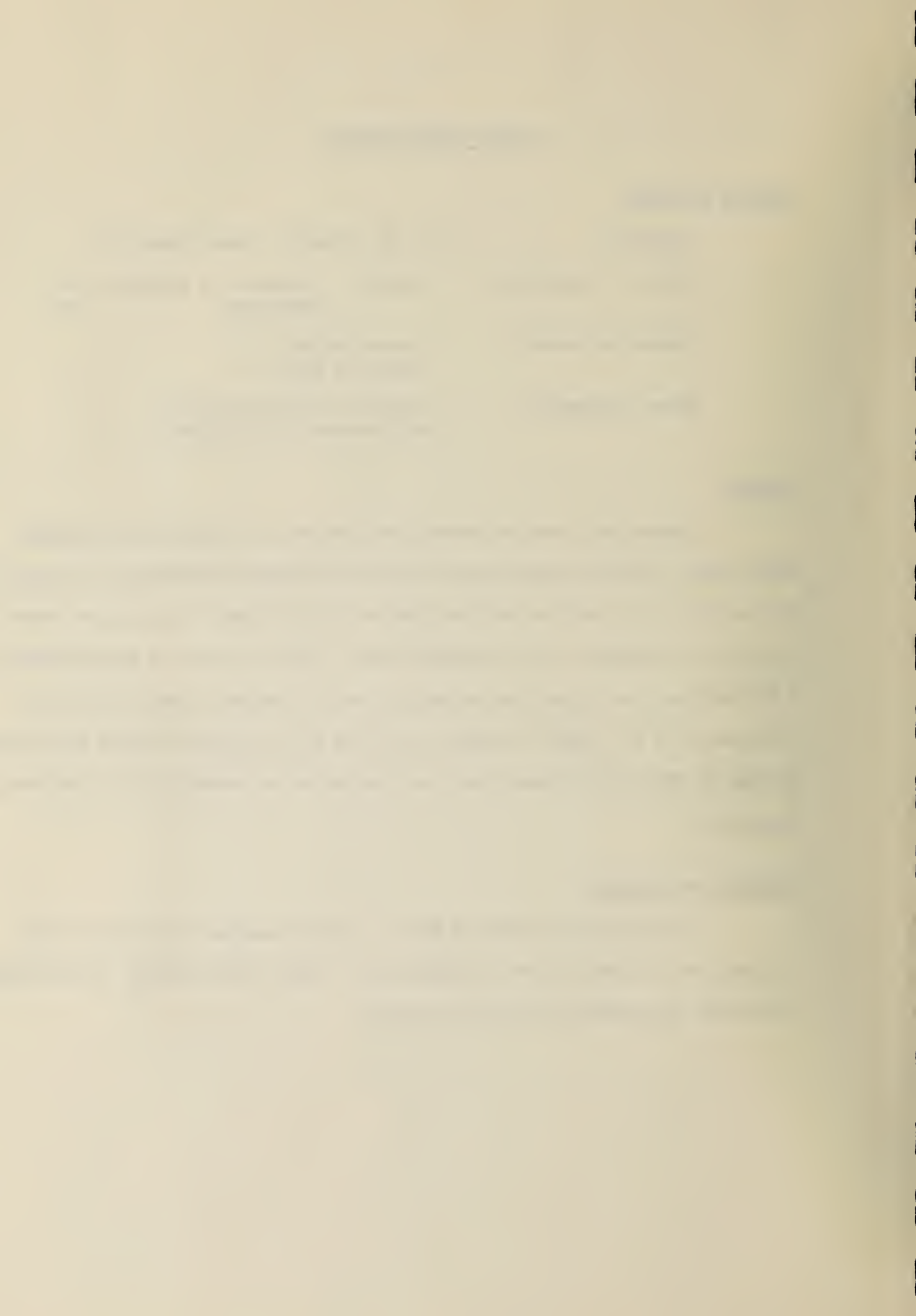
Water consumption - 6,394,000 gallons per year
- Daily average - 21,000 gpd

PROCESS

Vegetables, such as carrots and potatoes, are washed and packaged. Wash waters, totalling approximately 20,000 gallons, are discharged, at present, to a 40 ft x 10 ft-baffled settling tank with a 5 ft radial depth, and thence to a canal, tributary to the Schomberg River. With a volume of approximately 9,800 gallons, the theoretical retention time for wastes in this tank is in the order of 4 to 5 hours. However, the tank was filled with solids and other garbage on the date of inspection, and the system was essentially a flow through operation.

SAMPLING AND ANALYSIS

The plant was visited on May 5, and grab samples were taken of the influent and effluent of the settling basin. These were submitted to the OWRC Laboratory for analysis for BOD and solids.



All analyses reported in ppm

Date Sampled: May 5/65

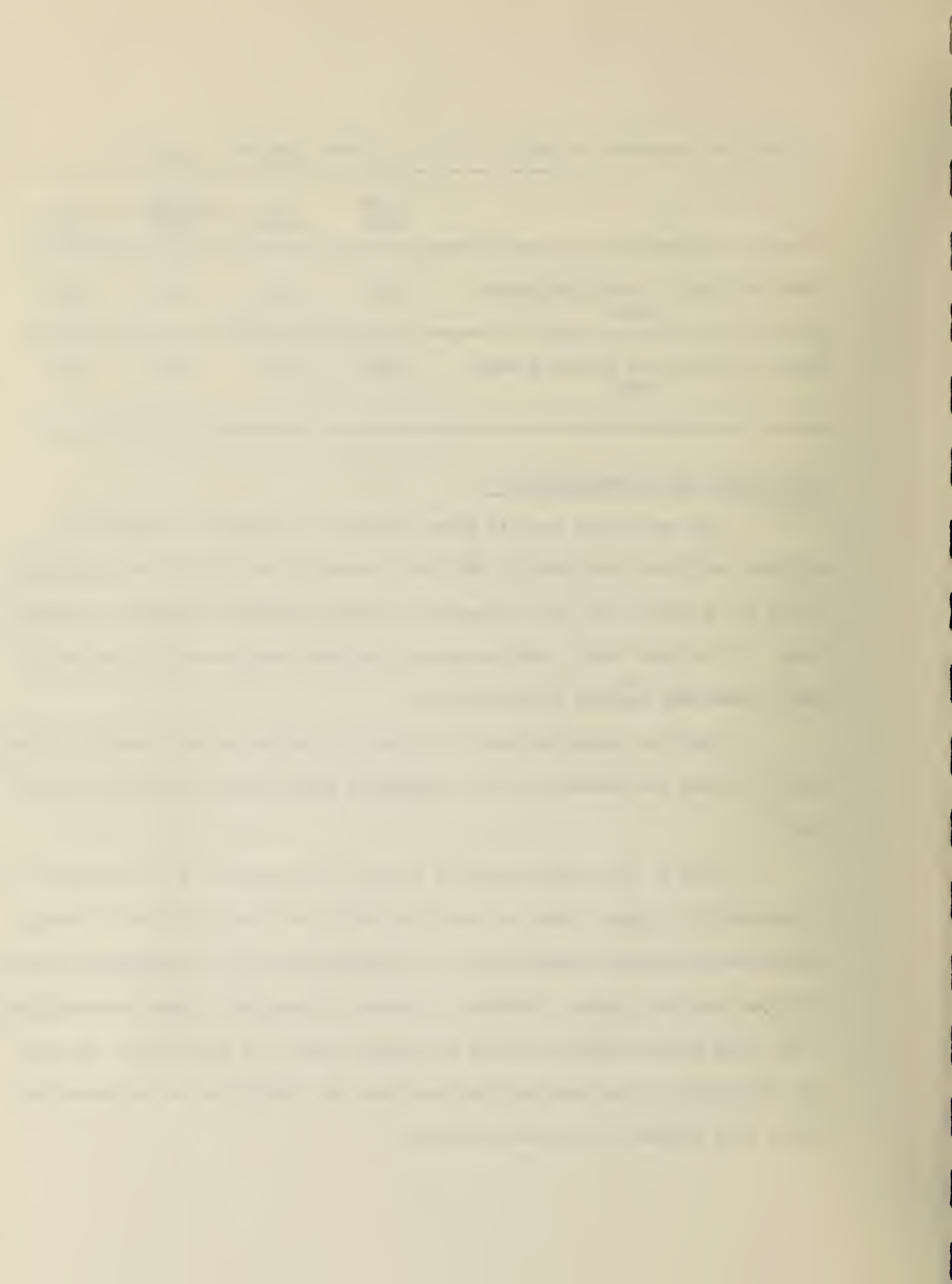
	5-Day BOD	Solids		
		Total	Susp.	Diss.
Total influent to settling basin - Grab	60.	504	178	326
Final effluent from settling basin - Grab	180.	800	376	424

CONCLUSIONS AND RECOMMENDATIONS

The analytical results above indicate the extent to which the settling basin was overloaded. Effluent concentrations of BOD and suspended solids are greater than the influent, indicating negative treatment efficiencies. At the same time, these concentrations are considerably in excess of OWRC recommended maximum concentrations.

Previous investigations by Industrial Wastes Division staff confirm these findings and demonstrate this Company's indifference to pollution control.

With an estimated retention time in the region of 4 to 5 hours, it is reasonable to expect that the settling basin would be efficient in reducing suspended solids concentrations to acceptable levels for discharge to the municipal sanitary sewer. However, on several occasions, visual examinations of the tank indicate that this has not been cleaned for some time. Malodorous conditions in the tank confirm this, and the conditions in the receiving stream give evidence of severe pollution.



During the time that wastes from the settling tank were discharged to the municipal sanitary sewer, numerous complaints were received of plugging of sewers such that the sanitary sewer connection was closed off by the municipality.

It is therefore evident that a more conscientious operation of the settling basin is a prerequisite for the successful treatment of these wastes in the municipal system.

It is recommended that these wastes be again accepted into the municipal system, with the proviso that the Company ensure that its waste treatment facilities are operated satisfactorily.

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF INDUSTRIAL WASTES

INDUSTRIAL WASTE SURVEY OF THE
TOWN OF BRADFORD.

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