

THE REGIONAL MUNICIPALITY OF HALTON

Report to Chairman & Members of the  
Solid Waste Management Committee

From Councillor Walter Mulkewich

Date 1983 10 21

Report No C-11/83

Re: Leachate Monitoring Program and Leachate Concerns,  
Burlington Sanitary Landfill Site

RECOMMENDATION:

1. THAT staff report back on the program necessary to obtain a more complete chemical analysis of leachate entering the sewage system.
2. THAT the Solid Waste Management Budget for 1984 be presented on the basis of total costing, including the costs of sewage disposal and treatment as well as perpetual care funds.

REPORT:

Introduction

Recently this Planning and Public Works Committee considered Report P.W. No. 188/83 re: "Monitoring Programs, Burlington, Oakville, and Halton Hills, Sanitary Landfill Sites".

Regional Council, at its meeting of October 5, 1983, approved your four recommendations adopting and implementing the 1982 Monitoring Reports at the three landfill areas. Regional Council also approved two amendments I proposed, as follows:

- 4.5 "That staff report back to Committee with respect to the Ministry of Environment analysis of the monitoring of the three landfill areas in Halton."
- 4.6 "That staff report back to Committee with respect to the parameter and program which Gartner and Lee select as their indicator of leachate contamination at the Burlington site."

I indicated to Council that I had concerns about the monitoring program and the leachate situation at the Burlington Sanitary Landfill site and that I would be reporting more fully on these concerns. This is the report.

The above amendments took care of some of my concerns. The recommendations in this report take care of other concerns. Obviously, there will need to be further follow-up.

Reports re: The Burlington Site:

Gartner Lee Associates have produced four reports since 1979 as follows:

(a) Hydrogeological Study, Final Report, Proposed Burlington Landfill, Site Expansion, September, 1979. This report was used by the Region to obtain approvals for the "interim" expansion of 1980. ←

(b) Monitoring Reports for each of 1980, 1981, 1982.

These reports have been filed with the Ministry of Environment and Regional Staff. I have never seen any detailed evaluation of these reports from either source. These reports have never had a Council or public circulation. Indeed, they are thick and technical.

I have tried to do a "layman's analysis" of these reports. A discussion follows under further headings. Previous to that discussion, I felt that note should be made of other current and relevant work.

Dr. Cherry's Work:

Dr. Cherry is well known as a hydrogeologist and for his work in landfill leachate movement. He has done considerable work in the immediate area.

Dr. Cherry did a report for Halton Region in October, 1980, Hydrological Suitability of the NSPL Landfill Site. He is currently involved in independent research on the Bayview Park Landfill. Progress Reports have been received, dated April 1983, July 4, 1983, and August 23, 1983.

It is understood that the Bayview Park Site was not an engineered site and that it has no leachate collection system. However, Dr. Cherry's work is relevant because of his methods, findings, and because the geological and subsoil conditions are common for the entire area.

Some quotes from Dr. Cherry's 1980 report are very relevant:

"The current guidelines and policies of the Ministry of Environment are not specific with regard to the hydrogeological aspects of the problem and, therefore, recommendations made by consultants on landfill suitability and design are unavoidably problematic."

"The inclusion of interceptor drains in the proposed landfill may be expected to alter the quantity of leachate which reaches the streams but not its quality. Quality may be expected to be a function of the types of material placed in the landfill, the flow path both within the ground and surface water system, and time."

In his independent research Dr. Cherry has determined that the shale in the wide area tested is a "moderately active environment for contaminant transport". He reports that current indicators of leachate (or parameters for detecting leachate) in the area are unsuited for detecting leachate because these markers occur naturally in large and variable amounts. Therefore, he sought new markers. He has used chlorinated hydrocarbons which are unique to landfill and do not occur naturally in background water. Using these parameters, he has been able to pin point more accurately the movement of the leachate plume. Research is continuing.

#### Upper Ottawa Street, Hamilton

A special study, funded through the Ministry of Health, has been ongoing for the past year at the Upper Ottawa Street Landfill Site, Hamilton. An Interim Report was published May 31, 1983. This report indicates that this Ottawa Street Study can be "viewed as a prototype with applications to problems at other landfills".

The leachate analysis in this project is a two stage program. The first stage is a "qualitative survey". This was done "by gas chromatography - mass spectrometry analysis". The analytical procedures that were used were adapted from those published by the United States Environmental Protection Agency and commonly referred to as "Priority Pollutant Analysis". The second stage, now in progress, is the "quantification work" to confirm the identity of selected compounds from the qualitative survey and to determine concentrations. There are further mutagenicity assays done on the leachate to determine the presence of mutagens. Hydrogeological investigations by Dr. Cherry and associates are also proceeding.

The points are made that it is necessary to analyze the leachate being put into the municipal sewage system. Also,

the point is made that even though the area residents use piped municipal water, it is important to study the movement of contaminated groundwater because of "the long term environmental problem".

Discussion and Analysis of the Gartner Lee Monitoring Program:

My concerns are expressed in my attached memo of 1983 09 21 to George Woodburn. I have enclosed also responses received from D. J. Corbett, George Woodburn, and Gartner Lee Associates.

① The 1979 Gartner Lee Report points out that phenols, which do not occur naturally, should be used as a unique indicator of leachate presence because many of the other substances monitored occur in high and variable concentrations in the water flowing throughout this area.

② Using this indicator, Gartner Lee concluded in their 1980 Report that "a plume of leachate contaminated groundwater exists beneath the filled area and extends down gradient from the site for a distance of about 150 M". I note that the phenol levels at the borehole midway to the North Service Road were above the recognized safe background levels.

③ In the 1981 Report Gartner Lee reverse their position on the leachate plume, apparently ignoring their own phenol data and their own 1979 requirements.

④ On their 1982 Report, Gartner Lee make no mention of a leachate plume and, infact, did not monitor for phenols. They do, however, recommend searching for "new parameters" in 1983-84. There was no discussion of this whole matter in the report.

Only under questioning at the Committee Meeting did the Consultant reveal that they had abandoned phenol as an indicator - leaving no unique marker to determine the leachate plume. The Consultant did say that there was "a probable plume" and, therefore, new paramaters are required to confirm or deny this possibility.

I did not find the oral responses at the Committee Meeting or the written response as enclosed either satisfactory or comforting. The written response does not address fully the phenol question. It is not clear what research showed that phenol was longer considered a good indicator. This information should be available. Also, there appears to have been no attempt made to take further tests in the area to confirm the decision to abandon phenol monitoring. Where did the phenol measured come from? Was the decision to

abandon phenol as an indicator premature and right? The answer is not clear.

The consultant's response to my question two indicates that we have not been looking for chlorinated hydrocarbons. Their response to question three presents some problems. I find that it is inconsistent to make the statement that "the presence of leachate contamination does not significantly degrade the existing water quality", because we simply have not had sufficient "parameters" in our monitoring program to determine what is in that leachate contamination. Further, the fact that there are no downgradient wells or ground water uses and that the area is serviced with municipal water is irrelevant. The point is that, as pointed out in Dr. Cherry's and the Hamilton Interim Report, it is a matter of quality", and "time", and "long term environmental problems". Eventually, this leachate contamination in whatever quantities will reach Burlington Bay and, therefore, Lake Ontario and the source of our drinking water.

After three years of monitoring and many Regional dollars, we are back at square one looking for new parameters. We still don't fully know what is happening with the leachate from that site and all of what is in it. We do know that there is "a probable plume" and that eventually leachate contamination will find its way down hill to the Bay.

The recommendation from Gartner Lee as follows is important:

"Samples of leachate and background surface and groundwater should be submitted for detailed analysis of organic compounds after discussion with the M.O.E. laboratory. The purpose of this recommendation is to find a parameter which is indicative of leachate contamination but does not occur in background ground water or surface water".

I see this recommendation as moving us in the same direction Dr. Cherry's research and the Hamilton project has taken. At this point in time, I do not know how critical one should be of the consultants, Gartner Lee Associates. Their reports are professional and they appear to be headed in the right direction.

There are at least two lessons to learn from this analysis. First, the best modern landfill technology is only the best that the "state of the art" has available and it may not be good enough. Second, we will need to spend more effort and money in monitoring, controls, and clean-up measures in the future. The \$10,000 figure mentioned for 1983 may be the tip of the iceberg only.

### Leachate and the Regional Sewage System:

The fact that leachate is collected into the sewage system has its obvious advantages. However, we are only now beginning to understand problems and costs involved. The enclosed 1982 Monitoring Report, Table 7, Sheet 1, contains a chemical analysis of the leachate going into our sewage system. The enclosed correspondence from D. J. Corbett and George Woodburn also deal with this topic.

The average monthly leachate flow appears to be 16,000 M<sup>3</sup> or 192,000 M<sup>3</sup> per year. This leachate apparently is quite concentrated and is further diluted by other liquid in the sewage system before it reaches the plant.

A comparison of the 1982 leachate analysis and the Region's By-law No. 97-79 indicates that apparently we have not analyzed for all the items listed in Schedules "A" and "B" of our own By-law. It also becomes obvious that in terms of B.O.D. content, the Region is breaking its own By-law No. 97-79.)

I understand that some five industries have entered into agreements with the Region pursuant to By-law No. 97-79 and that the Region has had a history of litigation with at least one other industry. (The Region has neither passed a By-law exempting itself nor has the Solid Waste Budget reimbursed the Sewer System Budget. The sewer system has been put entirely into a User Pay approach via the sewer surcharge rate. Mr. Woodburn's preliminary figures using 1982 figures mean that the cost of treating Regional leachate is at least \$120,104.00. This amount is presently being picked up by all those who pay the sewer surcharge.

Also, The Blueprint for Waste Management has suggested that municipalities should adopt a total or true costing method in calculating the actual cost of garbage disposal. This total costing method should include all costs of sewage treatment, as well as the establishment of funds to monitor, control, and clean-up leachate in the future.

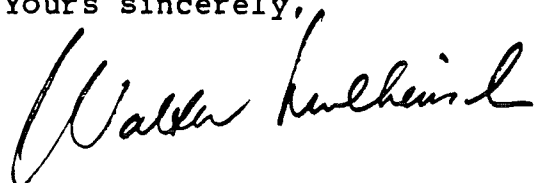
The leachate/sewage system issue has some unanswered questions. We know that our sewage treatment system does not treat all the toxic chemicals. Now that landfill leachate is reaching Lake Ontario via the sewage system, it is not clear what quantities of untreated toxic chemicals are contributed to the Lake. Also, it is not clear how the leachate contributes to the quality of sludge in the Skyway Plant. If staff has answers to these questions, I am sure the public would appreciate them.

### Conclusion:

This report has been an attempt to summarize the concerns and the background for the concerns I previously referred to when I made the amendments at Council. This report also presents material to support the above two recommendations. There are many problems and issues to resolve in the whole leachate question as it affects the Burlington Landfill Site. Hopefully, this report will make a contribution to the total effort of dealing with these problems and issues for the benefit of all of us and our successors. This report could also be helpful in dealing with the question of short term and long term garbage disposal in Halton.

I thank the Committee for your careful consideration.

Yours sincerely,



Walter Mulkewich  
Regional Councillor  
Ward 1, Burlington

### Enclosures:

1. Memo to George Woodburn
2. Reply from D. J. Corbett and Gartner Lee
3. Leachate Analysis
4. Letter from George Woodburn with attached By-law.

WM/ab

### C.A.O. COMMENTS

At this point I have no comment to make with respect to the Councillor's opinions but I would suggest that Recommendation #2 be changed to the following. This is because our 1984 Utility Budgets are about to be presented this week based on costing as in the past with the only outstanding information being which Option Regional Council is going to choose.

- "2. That the Regional Treasurer in consultation with the Director of Public Works and C.A.O. present options during the 1984 budget process, if at all possible, on variations for the Solid Waste Management Budget which would indicate the costs of leachate disposal, treatment, as well as a contribution towards the perpetual care."

REGIONAL MUNICIPALITY OF HALTON

INTEROFFICE MEMORANDUM

TO Cr. W. Mulkewich

FROM D.J. Corbett, P.Eng., Public Works DATE 1983 10 07

Re: Our File: SWM-Burl-05/83

Gartner Lee's response to the first three questions in your September 21, 1983 memo to Mr. Woodburn, P.Eng. is attached.

With respect to question 4 in your September 21 memo regarding the leachate collection system at the Burlington Landfill:

- Contruction costs to date, toe drains  
and underdrains. \$ 600,000
- Maintenance of system, toe drains  
underdrains, manholes, flow meter \$ 5,000/yr
- Leachate Flows  
February, 1983 6.6 litres/sec.  
= 16,000 m<sup>3</sup>/month

We have not yet been able to develop seasonal flow variations due to the limited time the flow metering equipment at the landfill has been operating. The February, 1983 reading is very likely above average because of the mild weather conditions that prevailed. The February figure is about half the capacity of the pipe transmitting the flow to the sanitary sewer on the North Service Road.

- Sewage Plant Treatment Hydraulic Flow Costs \$.041/m<sup>3</sup>

These costs include chemicals, labour, preventative maintenance, hydro etc. It is not possible to delineate leachate treatment because the leachate mixes in with the other sewage in the collection system on the way to the sewage plant. Substantial dilution takes place.

- Leachate Analysis

Can be found in Appendix II of the Gartner Lee 1982 Monitoring Report.

- Treatment at the Sewage Treatment Plant

Effluent quality is in accordance with M.O.E. requirements. Three parameters are tested for BOD, phosphorous, and total solids. Heavy metals will concentrate in the sludge.

- cc - D.Y. Perlin, C.A.O.  
- R.W.J. Moore, P.Eng.  
- G.N. Woodburn, P.Eng.  
- Cr. P. McLaughlin



# Lee Associates Limited

Toronto - Buttonville Airport ■ Markham, Ontario ■ L3P 3A9 ■ 416-477-8400  
Telex - 06-986278

THE REG

Engineering  
Geologists and  
Hydrogeologists

RECEIVED

October 4, 1983

The Regional Municipality of Halton,  
1151 Bronte Road,  
Oakville, Ontario.  
L6S 4Z3.

Attention: Mr. G. Woodburn, P.Eng.  
Manager Waste Disposal

Dear Sirs:

Re: Burlington Landfill  
GLAL 83-62

We are pleased to answer the questions raised by Councillor Walter Mulkewich on September 21, 1983 to Mr. George Woodburn, Manager of Waste Disposal. A copy of the questions is attached for your reference.

1. The 1979 Gartner Lee report indicated that phenols do not occur naturally and that they could be used as an indicator parameter for ground water contamination. At that time we believed that to be the case. (However, more recent work has shown that phenols can occur naturally in the environment, and in addition, they may be introduced into ground water samples from the actual ground water monitor.)

The high phenol levels of 3750 and 2860 ppb (parts per billion) mentioned by Councillor Mulkewich are from monitor 8A which is completed in the refuse ie. these are leachate samples.

continued....

The phenol levels of 17, 21 and 12 ppb were measured in monitor 16-I some 100 m downgradient of the landfill. These levels are raised above measured background levels of about 1 - 2 ppb. These elevated levels are (likely due) to leachate migration from the landfill, but could also be attributable in part to the monitor installation and background levels.

The "approximate extent of a leachate plume" mentioned in the 1980 report was interpreted from all available water velocities. In the 1981 report after additional monitoring and interpretation by Gartner Lee Associates Limited and the laboratory, it was found that certain chemical parameters which had been used to define the extent of the plume were too high due to chemical interference. eg. high chloride levels cause a positive interference on COD (chemical oxygen demand), high calcium levels cause elevated levels of nitrogen. The high chloride and calcium levels are naturally occurring in this area of very poor quality ground water.

Based on these data we could not be as certain of the extent of the plume as mentioned in the 1980 report and therefore did not attempt to present it graphically. We did not reverse our position, we refined our interpretation based on new facts and additional monitoring information.

2. Gartner Lee Associates Limited is aware of Dr. Cherry's research work at the Bayview Landfill site. We are supportive of this work. Gartner Lee has not analysed for similar chlorinated hydrocarbons at the Burlington Landfill site. We have recommended in our 1982 monitoring report that:

*Samples of leachate and background surface and ground water should be submitted for detailed analyses of organic compounds after discussion with the MOE laboratory. The purpose of this recommendation is to find a parameter which is indicative of leachate contamination but does not occur in background ground water or surface water.*

continued ....



Gartner  
Lee  
Associates  
Limited

3. The phrase "the landfill has minimal impact on local ground water" means

- (a) that the local ground water quality is naturally so poor that it is unfit for human consumption therefore the presence of leachate contamination does not significantly degrade the existing water quality. This agrees with Dr. Cherry's report of August 1983 which states:

*"The chlorinated hydrocarbons can be used to identify groundwater that has been influenced by the landfill, but regardless of their presence or absence, the conclusion reached in earlier studies, which is that the natural groundwater as well as the leachate-influenced groundwater in general have poor quality and are unsuitable for human consumption is valid."*

- (b) There are no downgradient wells or ground water uses and the area is serviced with municipal water,

Since we have not been able to fully determine the extent of leachate movement on the site, any attempt to calculate the time for leachate to migrate towards Burlington Bay would be premature.

4. A chemical analysis of the Burlington Landfill leachate is presented in Appendix II of the 1982 monitoring report. Either M.M. Dillon Limited or the Regional Engineering staff would be better qualified to answer questions pertaining to the extent and cost of treatment at the sewage treatment plant.

continued ....

Page 4,  
The Regional Municipality of Halton,  
October 4, 1983

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We trust the above answers meet your present needs. Please call if you require further details.

Yours very truly  
GARTNER LEE ASSOCIATES LIMITED

*Rob Dickin*

R.C. Dickin, M.Sc.  
Senior Hydrogeologist

## WATER ANALYSIS RESULTS

SAMPLING LOCATION BURLINGTON LANDFILL SITE REMARKS LEACHATE FROM TOE-DRAIN, 1st MANHOLE SOUTH OF JUNCTION

| PROPERTY                         |                | Apr. 12<br>1983 |  |  |  |  |  |  |  |  |  |
|----------------------------------|----------------|-----------------|--|--|--|--|--|--|--|--|--|
| CONDUCTIVITY $\mu$ MHOS/CM.      |                | 6450            |  |  |  |  |  |  |  |  |  |
| pH                               |                | 7.2             |  |  |  |  |  |  |  |  |  |
| HARDNESS (Ca CO <sub>3</sub> )   |                | 2164            |  |  |  |  |  |  |  |  |  |
| ALKALINITY (Ca CO <sub>3</sub> ) |                | 2264            |  |  |  |  |  |  |  |  |  |
| CHLORIDES (Cl)                   |                | 108             |  |  |  |  |  |  |  |  |  |
| SULPHATES (SO <sub>4</sub> )     |                | 280             |  |  |  |  |  |  |  |  |  |
| PHOSPHOROUS<br>AS P              | Total          | .85             |  |  |  |  |  |  |  |  |  |
|                                  | Soluble        |                 |  |  |  |  |  |  |  |  |  |
| NITROGEN (N)                     | Total Kjeldahl | 129             |  |  |  |  |  |  |  |  |  |
|                                  | Free Ammonia   | 107             |  |  |  |  |  |  |  |  |  |
|                                  | Nitrite        | .05             |  |  |  |  |  |  |  |  |  |
|                                  | Nitrate        | .2              |  |  |  |  |  |  |  |  |  |
| Potassium (K)                    |                | 373             |  |  |  |  |  |  |  |  |  |
| Magnesium (Mg)                   |                | 235             |  |  |  |  |  |  |  |  |  |
| Calcium (Ca)                     |                | 480             |  |  |  |  |  |  |  |  |  |
| Sodium (Na)                      |                | 85              |  |  |  |  |  |  |  |  |  |
| Iron (Fe)                        |                | .59             |  |  |  |  |  |  |  |  |  |
| Phenols (ug/L)                   |                | 880             |  |  |  |  |  |  |  |  |  |
| BOD                              |                | 2260            |  |  |  |  |  |  |  |  |  |
| COD                              |                | 3010            |  |  |  |  |  |  |  |  |  |

NOTE: concentrations in p.p.m. unless otherwise noted.

Gartner Lee Associates Limited



THE REGIONAL MUNICIPALITY OF HALTON

Public Works Department

P.O. BOX 7000  
1151 BRONTE ROAD  
OAKVILLE, ONTARIO L6J 6E1  
416/827-2151

1983 10 19

Councillor W. Mulkewich  
Regional Municipality of Halton  
OAKVILLE, Ontario

Dear Sir:

Re: Leachate Flows, Burlington Sanitary Landfill Site

As per our recent telephone conversation, I am attaching a copy of the Regional Sewer Use By-Law No. 97-79, setting out the parameters for sewage discharge to the sanitary sewer.

In our discussion you questioned what the Regional position would be if the Burlington Landfill Site was considered as a private industry discharging sewage in the form of leachate to the sanitary sewer. By-Law No. 97-79 makes provision for Council to enter into a discharge agreement. Such discharge agreement is governed by a special discharge fee which is calculated as follows:

Surcharge Fee:  $S = F \times Q \times R$   
where F is the ratio of:

$$\frac{\text{Actual Concentration} - \text{Allowable Concentration}}{\text{Allowable Concentration}}$$

Q is the flow in millions of gallons or thousands of m<sup>3</sup>.

R is the cost of sewage treatment per million gallons or thousands m<sup>3</sup>.

The R value for sewage treatment costs is determined by our Finance Department on a Region wide basis and is representative of the total operating and capital costs to the Region to provide sewage treatment facilities. We have not as yet received the 1983 figure, but in 1982 it was \$113.12/1000 cu m<sup>3</sup>.

...2...

BURLINGTON  
639-4540

HALTON HILLS  
ACTON  
853-0501

HALTON HILLS  
GEORGETOWN  
878-8113

MILTON  
878-8113

OAKVILLE  
827-2151

The average leachate flow rate in 1983 from the Burlington Landfill Site was 6.6 l/s or 16,000 m<sup>3</sup>/month. The BOD loading as indicated in the 1982 monitoring report for a sample taken on April 12, 1983 was 2,260 ppm.

Also, in standard special discharge agreements presently in effect an implementation factor of 0.5 has been applied to the sewage treatment cost to reflect the sewer surcharge used for all effluents discharged to the sanitary sewer which are below by-law limits. The 0.5 factor therefore reflects the additional costs of treatment necessitated by the overstrength sewage.

Applying the special discharge formula and recognizing that for a given industry considerably more data would be required for any agreement, the formula would yield the following costs based on an allowable discharge of 300 ppm BOD as specified in the by-law.

$$\begin{aligned}
 S &= F \times Q \times R(0.5) \\
 &= \frac{2260 - 300}{300} \times 16,000 \times \$113.12(0.5) \\
 &= \$5,912/\text{month} \\
 &\quad \text{or } \$70,944/\text{year}.
 \end{aligned}$$

Since the Burlington site is not serviced by municipal water, an additional calculation is required for that portion of the flow which is within by-law limits and which would otherwise have been charged on the water bill as the sewage surcharge rate. This is calculated as follows on a monthly basis.

$$\begin{aligned}
 1st \ 910 \text{ m}^3 &= \$30.33\text{¢}/\text{m}^3 \\
 \text{Balance} &= \$26.97\text{¢}/\text{m}^3
 \end{aligned}$$

For an average monthly flow of 16,000 m<sup>3</sup> the cost would be:

$$\begin{aligned}
 910 \text{ m}^3 \times 30.33\text{¢} &= 276.00 \\
 15,190 \text{ m}^3 \times 26.97\text{¢} &= 4,096.74 \\
 \text{Total:} &\$4,372.74/\text{month} \\
 \text{or} &\$49,160/\text{year}
 \end{aligned}$$

Therefore, the total cost of treatment of the leachate from the Burlington site would be \$70,944 + \$49,160 = \$120,104.

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It should be noted that this cost is based on the existing flow component from the landfill site which would occur regardless of any expansion plans for the site.

If I can be of any further assistance, please do not hesitate to contact me.

Yours very truly,



G. N. Woodburn, P.Eng.,  
Manager of Waste Disposal

GNW:nw  
Encl.

cc: Mr. D.Y. Perlin, C.A.O.  
Mr. R.W.J. Moore, P.Eng.  
Councillor P. McLaughlin

BY-LAW NO.97-79

A BY-LAW TO PROHIBIT, REGULATE AND CONTROL DISCHARGES INTO BODIES OF WATERS WITHIN THE REGIONAL AREA OR INTO THE REGIONAL SANITARY SEWERS, STORM SEWERS, SANITARY SEWAGE WORKS AND ALL TRIBUTARY SEWER SYSTEMS,

WHEREAS The Regional Municipality of Halton has the sole responsibility for the collection and disposal of all sewage in the Regional Area including the establishment, construction, maintenance, operation and financing thereof and all the provisions of any general act relating to such collection and disposal of such sewage and the financing thereof by a municipal corporation or local board thereof and all provisions of any special act relating to such collection and disposal of such sewage apply mutatis mutandis to The Regional Corporation,

pursuant to Section 77 subsection (1) of The Regional Municipality of Halton Act S.O. 1973, Chapter 70;

AND WHEREAS every municipality which discharges, deposits, causes, or permits the discharge or deposit any material of any kind into any well, lake, river, pond, spring, stream, reservoir or other water or watercourse that may impair the quality of the water of any well, lake, river, pond, spring, stream, reservoir or other water or watercourses is guilty of an offence,

pursuant to Section 32 subsection (1) of the Ontario Water Resources Act, R.S.O. 1970, Chapter 332;

AND WHEREAS the Regional Council may pass by-laws requiring and regulating the filling up, draining, cleaning, clearing of any grounds, yard and vacant lots, and the altering, relaying or repairing of private drains, and for making any other regulations for sewage or drainage that may be considered necessary for sanitary purposes,

pursuant to sub-subsection 69 and 71 of subsection (1) of Section 354 of The Municipal Act, R.S.O. 1970, Chapter 284;

NOW THEREFORE THE COUNCIL of the REGIONAL MUNICIPALITY OF HALTON enacts as follows:

1. In this by-law

1. "biochemical oxygen demand" means the quantity of oxygen utilized in the biochemical oxidation of matter in five (5) days at twenty (20) degrees Celsius;
2. "combined sewer" means a sewer intended to function simultaneously as a storm sewer and a sanitary sewer;

3. "drainage works" includes a drain constructed by any means including the improving of a stream, creek or watercourse, and includes works necessary to control the water table or level within or on agricultural lands or to regulate the level of the waters of a drain, reservoir, lake or pond, and includes a dam, embankment, wall, protective works or any combination thereof as defined in the Drainage Act, R.S.O. 1970, Chapter 136 as amended;
4. "matter" includes any solid, liquid or gas;
5. "Municipality" means the Regional Municipality of Halton;
6. "Municipal Employee" includes the contractor, agent and servant of the Regional Municipality of Halton;
7. "person" includes a corporation and the heirs, executors, administrators or other legal representatives of a person to whom the context can apply according to law as defined in the Interpretation Act, R.S.O. 1970, Chapter 225 as amended;
8. "pH" means the logarithm to the base 10 of the reciprocal of the concentration of hydrogen ions in grams per litre of solution;
9. "phenolic compounds" means those derivatives of aromatic hydrocarbons which have a hydroxyl group directly attached to the ring;
10. "sanitary sewer" means a sewer under the jurisdiction of the Regional Municipality of Halton for the collection and transmission of sanitary sewage;
11. "sanitary sewage" means any liquid waste containing animal, vegetable or mineral matter in solution or in suspension, except storm water and uncontaminated water;
12. "sanitary sewage works" means any works under the jurisdiction of the Regional Municipality of Halton for the collection, transmission, treatment or disposal of sanitary sewage, or any part of any such works, including sanitary sewers;
13. "sewage" means sanitary sewage, storm water, and uncontaminated water;
14. "Standard Methods" means a procedure set out in "Standard Methods for the Examination of Water and Wastewater" published jointly by American Public Health Association, American Water Works Association, and Water Pollution Control Federation, current at the date of testing, or a procedure approved by an analyst of the Ministry of the Environment;

15. "storm water" means water from rainfall or other natural precipitation or from the melting of snow or ice;
  16. "storm sewer" means a sewer under the jurisdiction of the Regional Municipality of Halton for the collection and transmission of uncontaminated water, storm water, drainage from land or from a watercourse or any of them;
  17. "suspended solids" means solid matter in or on a liquid which matter is removable by filtering;
  18. "uncontaminated water" means water to which no matter has been added as a consequence of its use, or to modify its use by any person;
  19. "garbage" means solid wastes from the preparation, cooking and dispensing of food and from the handling, storage and sale of produce.
2. 1. No person shall discharge or deposit or cause or permit the discharge or deposit into any:
- a) sanitary sewage works;
  - b) combines sewer,
  - c) storm sewer,
  - d) building drain,
  - e) building sewer,
  - f) building storm drain,
  - g) building storm sewer
- matter of any type or of any temperature or in any quantity which may be or may become harmful to sanitary sewage works or which may interfere with the proper operation of ssanitary sewage works, or which may impair or interfere with any sanitary sewage treatment process, or which may be or may become a hazard to persons, animals or property.
2. Without limiting the generality of subsection 1 above, matter of any type includes the following:
- (a) Sanitary sewage having a pH less than 6.0 or greater than 10.5 or which due to its nature or content, become less than 6.0 or greater than 10.5 within a sanitary sewage works;
  - (b) Explosive matter, gasoline, benzene, naptha, fuel oil, solvents or sanitary sewage containing any of these in any quantity;
  - (c) Sanitary Sewage which consists of two or more separate liquid layers;

- (d) Radioactive materials except as may be permitted under the Atomic Energy Control Act, R.S.C., 1970 and amendments thereto and regulations thereunder.
  - (e) Sewage that may cause an offensive odour to emanate from a sanitary sewage works; and without limiting the generality of the foregoing, sewage containing hydrogen sulphide, mercaptans, carbon disulphide, other reduced sulphur compounds, amines or ammonia;
  - (f) Storm water, water from drainage of roofs or lands or from a watercourse or uncontaminated water; except that which may be discharged into a combined sewer;
  - (g) Sewage at a temperature greater than 65 degrees Celsius (149° Fahrenheit);
  - (h) Sewage containing more than 100 milligrams per litre of solvent extractable matter of animal or vegetable origin;
  - (i) Sewage containing more than 15 milligrams per litre of solvent extractable matter of mineral or synthetic origin;
  - (j) Sewage of which the biochemical oxygen demand exceeds 300 milligrams per litre;
  - (k) Sewage containing more than 350 milligrams per litre of suspended solids;
  - (l) Drainage from uncontaminated industrial processes or water from air-conditioning, cooling or condensing systems;
  - (m) Garbage, but the Director of Public Works may give his consent in writing which may be revoked at any time without notice for the installation of a garbage shredder or grinder in any premises wherever he is satisfied that the capacity of the main sewer and the flow in the same is such that there is no likelihood of any accumulation in the main sewer;
  - (n) Sewage containing any of the matter described in Schedule A attached hereto and forming a part of this by-law, in excess of the indicated concentrations.
3. (1) No person shall discharge or deposit or cause or permit the discharge or deposit into any:
- (a) drainage works
  - (b) storm sewer
  - (c) building storm drain
  - (d) building storm sewer

matter of any type or at any temperature or in any quantity which may interfere with the proper operation of a storm sewer, or which may obstruct a storm sewer or the flow therein, or which may be or become a hazard to persons, animals or property, or which may impair the quality of the water in any well, lake, river, pond, spring, stream, reservoir, or other water or watercourse.

(2) Without limiting the generality of subsection 1 above or the foregoing, matter of any type includes any of the following:

- (a) Sewage having a pH less than 6.0 or greater than 9.5 or which due to its nature or content becomes less than 6.0 or greater than 9.5 within a sewage works;
- (b) Explosive matter, gasoline, benzene, naptha, fuel oil, solvents or sewage containing any of these in any quantity;
- (c) Sewage which consists of two or more separate liquid layers;
- (d) Radioactive materials except as may be permitted under the Atomic Energy Control Act, R.S.C., 1970 and amendments thereto and regulations thereunder;
- (e) Sewage which may cause an offensive odour, and without limiting the generality of the foregoing, sewage containing hydrogen sulphide, mercaptans, carbon disulphide, other reduced sulphur compounds, amines or ammonia.
- (f) Uncontaminated water at a temperature greater than 65 degrees Celsius (149° Fahrenheit);
- (g) Sewage at a temperature greater than 65 degrees Celsius (149° Fahrenheit);
- (h) Sewage containing more than 15 milligrams per litre of solvent extractable matter;
- (i) Sewage of which the biochemical oxygen demand exceeds 15 milligrams per litre;
- (j) Sewage containing any matter which will not pass through a screen having openings not larger than 3.35 millimetres square (No. 6 standard sieve);
- (k) Sewage containing coloured matter, which sewage would require a dilution in excess of four (4) parts of distilled water to one (1)

part of such sewage to produce a mixture the colour of which is not distinguishable from that of distilled water;

- (1) Sewage containing any of the matter indicated in Schedule B, attached and forming a part of this by-law, in excess of the indicated concentrations.
4. Except as otherwise specifically provided in this by-law, all tests, measurements, analyses and examinations of sanitary sewage, storm water and uncontaminated water for characteristics and contents shall be carried out in accordance with Standard Methods.
5.
  - (1) The owner or occupant of institutional, commercial or industrial premises with one or more connections to the sanitary sewage works or a combined sewer works, shall install and maintain in good repair in each connection a suitable manhole to allow observation, sampling and measurement of the flow of sewage therein, provided that where installation of a manhole is not possible, an alternative device or facility may be substituted with the approval of the Council of the Municipality.
  - (2) The owner or occupant of institutional, commercial or industrial premises with one or more connections to a storm sewer or drainage works shall install and maintain in good repair in each connection a suitable manhole to allow observation, sampling and measurement of the flow of storm drain water and contaminated water therein, provided that where the installation of a manhole is not possible, an alternative device or facility may be substituted with the approval of the Council of the Municipality.
  - (3) Every manhole, device or facility installed as required by Sections 5(a) and 5(b) a) of this by-law shall be designed and constructed in accordance with good engineering practice and the requirements of the Municipality, and shall be constructed and maintained on the lands of the owner or occupant of the premises at his expense.
  - (4) The owner or occupant of institutional, commercial or industrial premises shall at all times ensure that every manhole, device or facility installed as required by Sections 5(1) and 5(2) of this by-law is at all times accessible to the Municipality for the purpose of observing, sampling and measuring the flow of sewage therein.

- (5) The Municipality may require the owner or occupant of institutional, commercial or industrial premises to install devices to monitor sewage discharges and to submit regular reports regarding the discharges to the Municipality.
6. (1) The owner or occupant of any institutional, commercial or industrial premises may submit to the Council of the Municipality a program to prevent or to reduce and control the discharge or deposit of sanitary sewage or uncontaminated water into connections to a sanitary sewage works or to a combined sewer.
- (2) The Council of the Municipality may grant an approval to be known as a 'Program Approval' to the owner or occupant who has submitted such a program.
7. (1) Except as hereinafter provided, the Council of the Municipality, if it deems it advisable to do so, may by written Discharge Agreement, permit the discharge of matter of any type, quantity or temperature otherwise prohibited by this by-law.
- (2) Such Discharge Agreement may, among other things, require payment to the Municipality of Special Discharge Fees, and may also require a Program Approval as described in section 6, and may also require private treatment works or may require any combination of the foregoing.
- (3) Where a person enters into an agreement as set out in subsections 1 and 2 above, the Special Discharge Fee to be made will be determined using the following formula:

$$S = F \times Q \times R$$

Where S means Special Discharge Fee in dollars  
F means the ratio of:

$$\frac{\text{Actual Concentration} - \text{Allowable Concentration}}{\text{Allowable Concentration}}$$

of the parameter or whichever is greatest in excess of the respective by-law limits.

Q means the volume measured in millions of gallons.

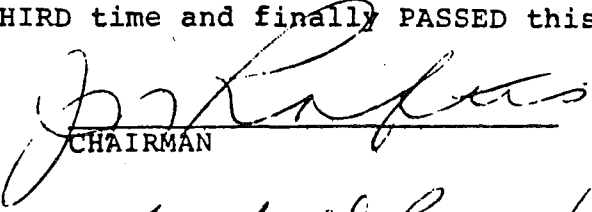
R means the rate for sewage treatment in dollars/million gallons as set out from time to time by the Region.

8. In granting a Program Approval pursuant to Section 6 wherein authorizing a Discharge Agreement pursuant to Section 7, the Council of the Municipality may authorize exemption from any or all of the provisions set out in Sections 2 and 3 hereof, except in no event shall the Council of the Municipality grant exemptions from the provisions of 2.2(a), 2.2(b), 2.2(c), 2.2(d) and in no event shall Council of the Municipality grant exemption from the provisions of 3.2(a), 3.2(b), 3.2(c), 3.2(d), the provisions of which constitute absolute prohibitions pursuant to this by-law.
9. For the purpose of the administration of this by-law, a municipal employee may, upon production of his identification, enter any institutional, commercial or industrial premises to observe, measure and sample the flow of sewage to any sanitary sewer, sanitary sewage works, storm sewer or drainage works.
10. No person shall break, damage, destroy, deface or tamper with:
  - (a) Any part of a sanitary sewer, sanitary sewage works, storm sewer or drainage works;
  - (b) Any device whether permanently or temporarily installed for the purpose of measuring, sampling and testing of sewage.
11. Every person who contravenes any provision of this by-law is guilty of an offence and on summary conviction is liable to a fine of not more than one thousand (\$1,000.00) dollars for each offence.
12. Where there exists reasonable and probable grounds to believe that a person is contravening the provisions of Sections 2 or 3 of this by-law, the Director of Public Works may, upon two days' notice to the person or the owner of the lands from which the prohibited discharge apparently emanates, order the sanitary sewer, sanitary sewage works, combined sewer, storm sewer or drainage works carrying the prohibited discharge to be stopped up until such time as arrangements are made by such person or owners to eliminate the prohibited discharge.
13. An Application for Approval of Discharge of Sewage into a sanitary sewer, sanitary sewage works, combined

sewer, storm sewer, or drainage works shall be completed and submitted to the Public Works Department of the Regional Municipality of Halton for approval of such discharge prior to actual discharge by the owner or occupant of all industrial, commercial or institutional premises.

14. On the day that it is passed this by-law comes into force and by-law 71-76 and by-law 96-77 are thereby repealed.

READ a FIRST, SECOND AND THIRD time and finally PASSED this 15th day of August , 1979

  
CHAIRMAN

  
CLERK

SCHEDULE A

| <u>Matter</u>      | <u>Expressed as</u> | <u>Concentrations<br/>in Milligrams<br/>per Litre</u> |
|--------------------|---------------------|-------------------------------------------------------|
| Aluminum           | Al                  | 50                                                    |
| Arsenic            | As                  | 1.0                                                   |
| Barium             | Ba                  | 5.0                                                   |
| Cadmium            | Cd                  | 2.0                                                   |
| Chloride           | Cl                  | 1500                                                  |
| Chromium           | Cr                  | 3.0                                                   |
| Copper             | Cu                  | 3.0                                                   |
| Cyanide            | HCN                 | 2.0                                                   |
| Fluoride           | F                   | 10                                                    |
| Hydrogen Sulphide  | H <sub>2</sub> S    | 2.0                                                   |
| Iron               | Fe                  | 50                                                    |
| Lead               | Pb                  | 3.0                                                   |
| Mercury            | Hg                  | 0.1                                                   |
| Nickel             | Ni                  | 3.0                                                   |
| Phenolic Compounds |                     | 1.0                                                   |
| Phosphorus         | P                   | 100                                                   |
| Sulphate           | SO <sub>4</sub>     | 1500                                                  |
| Sulphide           | S                   | 2.0                                                   |
| Tin                | Sn                  | 5.0                                                   |
| Zinc               | Zn                  | 3.0                                                   |

SCHEDULE B

| <u>Matter</u>      | <u>Expressed as</u> | <u>Concentrations<br/>in Milligrams<br/>per Litre</u> |
|--------------------|---------------------|-------------------------------------------------------|
| Aluminum           | Al                  | 1.0                                                   |
| Ammonia            | N                   | 10.0                                                  |
| Arsenic            | As                  | 1.0                                                   |
| Barium             | Ba                  | 0.1                                                   |
| Cadmium            | Cd                  | 0.1                                                   |
| Chlorine           | Cl <sub>2</sub>     | 1.0                                                   |
| Chromium           | Cr                  | 1.0                                                   |
| Copper             | Cu                  | 1.0                                                   |
| Cyanide            | HCN                 | 0.1                                                   |
| Fluoride           | F                   | 2.0                                                   |
| Iron               | Fe                  | 1.0                                                   |
| Lead               | Pb                  | 1.0                                                   |
| Manganese          | Mn                  | 1.0                                                   |
| Mercury            | Hg                  | 0.001                                                 |
| Nickel             | Ni                  | 1.0                                                   |
| Phenolic Compounds |                     | 0.02                                                  |
| Phosphorus         | P                   | 1.0                                                   |
| Suspended Solids   |                     | 15                                                    |
| Tin                | Sn                  | 1.0                                                   |
| Zinc               | Zn                  | 1.0                                                   |

REGIONAL MUNICIPALITY OF K. TON

INTEROFFICE MEMORANDUM

TO George Woodburn, Manager  
Waste Disposal

c.c. D.Y. Perlin

FROM Councillor Walter Mulkewich DATE 83 09 21

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Re: Monitoring of Burlington Landfill Site

I would like the following questions answered as quickly as possible, with respect to the Gartner Lee Associates Monitoring Program for the Burlington Landfill Site. I assume that Gartner Lee would have to be approached for the answers.

1. In the 1979 Gartner Lee Burlington Landfill Site Hydrogeological Study it is pointed out that phenols, which do not occur naturally, should be used as an indicator of leachate presence.

The 1980 Gartner Lee Monitoring Report (Table II, Sheets 6 and 21) show phenols at 3750 parts per billion (ppb) at borehold 8A and 19 ppb at borehold 16.

The 1981 Gartner Lee Monitoring Report (Table 6, sheets 6 and 21) show phenols at similarly high amounts of 2860 ppb and 12 ppb.

Using the 1980 data, Gartner Lee concluded that "a plume of leachate contaminated groundwater exists beneath the filled area and extends down gradient from the site for a distance of about 150 m". The plume migration rate is estimated at 15 - 25 metres per year with a downward extension to 30 m.

In the 1981 Report, Gartner Lee reverse their position on the leachate plume (p. 15, 16), apparently ignoring their own phenol data and their own requirements as set out in the 1979 Study.

Why then have they reversed their position? Why have they ignored their own requirements of 1979 as well as their own phenol data of 1980 and 1981?

2. Dr. Cherry's Report of August, 1983, identifies a variety of chlorniated hydrocarbons in the leachate plume extending from the old Bayview site. Has Gartner Lee identified similar chlorinated hydrocarbons in the leachate plume extending from the existing Burlington Landfill site?

3. Gartner Lee in their 1981 Monitoring Report Conclusions on page 1 state that "the landfill has minimal impact on local ground water". What is the interpretation which should be given to the term minimal? Given the results of Dr. Cherry's work that the area is "a moderately active environment for contaminant transport", how long before this "minimal impact" will be transported to the urban areas and to Burlington Bay?
4. The 1981 Monitoring Report states on page 1 that the leachate collection system "collects in the order of 48,000 square meters per year of leachate which is discharged to the Burlington sanitary system". What are the various chemicals which are found in this leachate and to what extent does the Burlington sewage plant treat these chemicals before discharge to Lake Ontario? What is the cost of collection and treatment of this leachate?