1980 + EAB rept. Transcripts

MEMORANDUM April 16, 1984

Memo To: Burlington Landfill File

From: Frank Giorno

Re: Burlington Land Site

Background

The Regional Municipality of Halton consisting of the City of Burlington, the Town of Oakville, the Town of Halton Hills and the Town of Milton was given complete jurisdiction for a waste disposal when it was formed in 1974.

2 and 3 Report of the Environmental Assessment Board. In 1974 there were five landfill sites in operation all but one of which have since been closed. The sole operating landfill site is the Burlington Site.

3 An expansion referred to as Phase I Expansion allowed the site to continue until the spring of 1981. The hearing which was held in 1980 was to consider what was referred to as the Phase II Expansion. The Phase I Expansion consisted of modifications to the land form and contours at the site. The expansion would provide one to four years of landfilling capacity for Halton Region.

4 Seventy-two acres of the Burlington's sites 111 total acres are being landfilled. The Phase II Expansion calls for an additional 58 acres to the north to be included to the total site of which only 17 acres would be used for landfilling. Therefore if approved the total site would be 169 acres and only 72 acres would be landfilled. The application before the Board was characterized by Dennis Perlin of the Region as being an application for the extension of 17 acres of landfilling.

4 Halton Region has contracted the operation of the landfill site to a private firm known as Environmental Handling Services Ltd. at St. Catharines.

4 → If the Burlington site becomes the regional site approximately 739 tonnes per day would be deposited by 1983.

4 Halton Region introduced 30 exhibits of documents at the hearing. Appendix I consists of the application for the site expansion.

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1. 1 Transcripts from the Environmental Assessment Board Hearing The expansion is constantly being referred to as a "Small expansion" by Dennis Perlin. Perlin explains this by saying that the expansion will only be from 1 to 4 years. Perlin

.../2

argues that expansion is desparately needed because of the declining waste capacity in Halton Region.

Vol. 1 P. 17 Perlin describes the expansion project as an interim project which is to provide a bridge between the existing sites and the hoped for longer term approved landfill capacity.

The Region's Witnesses

Halton Region called on three witnesses (1) Grant Anderson of the Hydrogeological Consulting Firm of Gartner Lee (2) Dennis Stevens an ecologist from M.M. Dillon (3) Mr. Wallace Wells. He is a solid waste management engineer with M.M. Dillon Ltd.

Exhibits

Vol. 1 P. 24 Mr. Perlin lists and describes all the thirty exhibits during most of the transcripts in Volume 1.

Exhibit 1

Appropriate pages of the regional municipality of Halton Act section 131

Exhibit 2A

Text, general long term solid waste policies of region, expressed through council resolutions.

Exhibit 2B

The main map of the regional Official Plan

Exhibit 2C is classified as being Map 6 of the regional Official Plan. Environmentally sensitive areas.

Exhibit 3

Medium and long term landfill component expressed through council resolution.

Exhibit 4 was a council resolution passed July 1978. The resolution called for an interim waste disposal feasibility study.

Exhibit 5 is the interim waste diposal feasibility study which was completed September 1978.

Burlington Land Site continued ...

Exhibit 6 is a resolution dated September 6, 1978 by Regional Council.

Exhibit 7A is the planning approval for Oakville

Exhibit 7B is the environmental approval of Oakville site

Exhibit 7C is the land acquisitions regarding the Oakville site

Exhibit 8 is Plan No. 20R. 4648 which consists of the area proposed for expansion for the Burlington site.

Exhibit 9 is the contour map of Burlington site before expansion of Phase I approval and Phase II.

Exhibit 10 is the provisional certificate approval for a waste disposal site dated January 31, 1980

Exhibit 11 is the monitoring report of Burlington Regional Landfill site for the regional municipality of Halton. Report 80-39 April 1980

Exhibit 12 is the Burlington Landfill site Phase I Expansion October 1979

Exhibit 13 is the implementation of Phase I programme

Exhibit 14 is the review of waste quantity characteristics report

Exhibit 15 the application for certificate of approval Number A 210102

✓ Exhibit 16
Burlington Landfill site design and operations report January 1980 M.M. Dillon

Exhibit 17 sheet with corrections

Exhibit 18 Burlington Landfill Site capacity scenarios

✓ Exhibit 19 Burlington Landfill Site Hydrogeological Study by M.M. Dillon September 1979.

✓ Exhibit 20 of the Parkway Belt West Plan with map

✓ Exhibit 21A
Ontario Regulation 482/73 Land use regulations

✓ Exhibit 21B
Ontario Regulation 263/79

Burlington Land Site continued ...

Exhibit 21C
Letter dated May 31, 1979 to the Chairman of the Region by Mr. Miller

Exhibit 22
A recommendation and resolution passed by the City Council of Burlington August 27, 1979.

Exhibit 23
Minutes of Development Committee Meeting City of Burlington

Exhibit 24
Regional co-operation with the City of Burlington Group letters

Exhibit 25
Documents, consultation with Halton Region, Conservation Authority

Exhibit 26
Consultation with present owner of lands on which expansion would take place and which region would acquire if environmental approval received.

Exhibit 27
A summary of evidence by Grant Anderson

Exhibit 28
Resume of Dennis Stevens

Exhibit 29
Summary of qualifications of Wallace Wells

Exhibit 30
Ontario Regulation 824

Examination in Chief of Mr. G. Anderson by Mr. Perlin

Anderson was called to explain the hydrogeological information regarding the site as outlined in Exhibit 19. Anderson also referred to the monitoring report dated April 1980 Exhibit number 11 and Exhibit number 27.

Anderson used the chart to outline his two hydrogeological concerns.

5 EAB Report

1. The movement of leachate and its potential impact on groundwater and surface water resources adjacent to the site.

2. The movement of gas and its potential impact on development adjacent to the site.

Burlington Land Site continued...

P.6 EAB Report — Anderson explained how leachate was formed and how it migrates to the water table at various velocities through different types of soils. Through sands and gravels leachate can travel at rates of a hundred to three hundred feet per year. Clay soil minimizes hydrogeological problems since leachate would move at less than 1 foot per year. Clay also naturally vents gas so that gas migration off the site is minimized.

P.126 Vol.1 — Anderson's chart is a schematic of waste disposed below the ground surface in a rather uncontrolled manner. The chart is used to illustrate the production and dispersion of leachate.

The hydrogeological setting

P.6 EAB Report
P.129-30 Vol.1 Transcripts — Anderson explains that leachate will follow the path of least resistance. Anderson explained that the rate of leachate flow depends on the type of soils. He explained that problems were minimized when a landfill was placed in clay soil since the leachate would move at less than a foot per year.

Soils

P.7 EAB
P.416-151 Vol. 1 Transcripts — The sites are on the slopes of the Niagara Escarpment and is composed of an average of about 7.8 metres (25 feet) of clay tilled soils over Queenston Shale bedrock. A minimum of 1.5 metres of till is located in the south and a maximum of 10.7 metres in the north. The shale bedrock is proportionately over 250 feet deep at this location. Most of the existing site is sitting directly on the Queenston Shale bedrock.

Exhibit 32A discusses the geology that was encountered in the proposed expansion land.

P.146 Vol.1 — Anderson explains three bore holes on top of the land form at something in the order of 7.8 metres (25 to 30 feet) of glacial till over the top of the shale bedrock. He classified the surface materials as being glacial clay silt till. Anderson did not conduct tests to find the depth of the shale bedrock. However according to geologic information it is well over 250 feet.

P.147.Vol.1 — Anderson refers to the varying depth of the glacial silt till found on the expansion location.

Burlington Land Site continued ...

P.148 Vol.1 The existing landfill site sits directly on Queenston Shale Bedrock.

Looking at a cross-section of the site listed as Exhibit 32C Anderson stated that the till deepens as it goes to the north. The northern most bore hole encountered a depth of 10.7 metres of till. The southern end of the property encountered a depth of a metre to a metre and one-half. The proposed northern end of the expansion lands has a depth of 10.7 metres.

To augment the bore hole tests Anderson ordered pits of five and one-half metres deep to look at the characteristics of the till at a broader scale with larger samples. This test showed the till was very blocky in nature.

P.149 Vol.1 * It is fractured and there are cracks in the soil itself and it would appear for the work that we have done that the fractures certainly in the southern part of the landfill extend from the ground surface down to the bedrock material.

P.149 Vol.1 ✓ These fractures become significant from the point of view of groundwater movement.

P.150 Vol.1 In areas where the glacial till was deeper than five and one-half metres Anderson was not able to determine positively if the fractures continued below that point other than the fact that fractures existed at the depth of five metres. Anderson suspected the fractures will go to the bedrock at this location.

✓ When groundwater flow is being considered one has to take into consideration the flow of water through these cracks in the soil as opposed to the flow of water through the soil drains.

Groundwater flow

P.149 Vol. 1 Water will move through the fractures much faster than it can move between the soil particles. It is the movement of water through these cracks that become significant.

Anderson explained the way water moved through the ground horizontally and also how it moved vertically.

Exhibit 33A, Exhibit 33B, Exhibit 34A, 34B 34C argues by Anderson to back up his testimony.

Burlington Land Site continued ...

P.154 Vol.1 The bedrock becomes the important receiver of the contaminants we have to concern ourselves with. Also page 8 of the EAB Report referred to Exhibit 33B.

The direction of leachate flow: it will move through the shale in a southerly direction away from the site with minor components moving towards Falcon Creek. This is for the existing site.

Leachate direction from the proposed expansion of lands will be moving towards Falcon Creek. Some of the water will be going back underneath the lands that are already landfilled.

P.155 Vol.1 Exhibit 34A shows when water moves through the till into the Queenston Shale bedrock it will be moving fairly nearly vertically downwards.

The lands considered for Phase II Expansion are a groundwater recharge area. That means that the water is going into the ground and moving from the site.

P.156 Vol.1 Some of the water will come out and discharge into Falcon Creek. Some will move parallel to the creek going southerly.

P.157 Exhibit 34C shows there is a groundwater recharge area north of Highway 43. The water is trying to move downwards and then laterally out towards Highway 403.

Rate of Groundwater Flow

Movement in the glacial till through the fractures is about fifty feet per year moving vertically downwards, also in page 8 of the EAB Report. The fractures are very important. If there were no fractures water would be theoretically moving through the clay till at a rate of 1/10th of a foot per year.

Groundwater movement through Queenston Shale: it is much more difficult to analyze because between each layer of shale there is a small opening calling the bedding plane through which water moves in a lateral direction. The Queenston Shale also has vertical fractures which water moves through. Anderson's investigations found that permeability varied significantly from one spot to the next within an order of magnitude ten times as fast at one location as at the other. Anderson could not find a predictable pattern to that variability. Dispite difficulties at estimating the rate of velocity through the shale Anderson used the number 70 feet per year in his report.

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Burlington Land Site continued ...

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Burlington Land Site continued ...

P.160 Vol.1 P. 8 EAB Report — The movement through the shale is difficult to predict.

P.160 Vol.1 — Groundwater movement in the existing landfill would be southerly away from the site towards Highway 403 or the north Service Road. Some leachate doesn't go into the shale rock and forms leachate springs on surface water.

Water Quality

P.8 EAB Report — The bore holes were terminated before they reached the leachate, the bottom of the leachate contamination, so Anderson does not know at this point the extent of the contaminants below the existing landfill. The reference if page 164 volume 1. The leachate appears to be moving below the monitors Anderson installed. Anderson states we know about the leachate movement and that it is getting into the rock and it can move through the rock, we know the directions it can be moving in, we don't know how far it has moved laterally south of the site, therefore, an extended monitoring program to further investigate the leachate movement to the south is required.

P.166 Vol.1 — Anderson states that if expansion is going to take place on Phase II land some measure should be taken to protect the exits of leachate out of the bottom of the site through the shale to Falcon Creek. It is recommended that an underdrain system be placed below Phase II site.

P.167 — It is difficult to put an underdrain in the existing site because of 15 metres of garbage over the top of the shale. The only design of a drain that will work is one that is termed TOE drain system.

Vol.1 P.169 — Water quality through the Queenston Shale is naturally poor in quality. It wouldn't meet the drinking water quality standards natural conditions. The quality varies from point to point. At one place you may draw a hole and get good water and in another spot ten feet away it would be very poor.

P.9 EAB Report P.170 Vol.1 — Anderson concludes that the proposed expansion area may be developed for solid waste disposal provided the facility is properly engineered and operated to minimize the impact of leachate on the ground and surface waters. Anderson maintains that there are no significant operational

Burlington Land Site continued ...

constraints from a hydrogeological view point on the proposed facility.

Conclusions

P.9 EAB Report
P.172 Vol.1 Contaminant Migration from proposed site would be principally towards Falcon Creek though, seasonal migration may be under the existing site.

P.170 A Contingency Plan for an interceptor drain on the east side of the Falson Creek Valley.

Recommendations

P.170 Vol.1
P.10 EAB Report A landfill may be developed on lands northwest of the existing site.

P.172 Vol.1 -Adequate setbacks from the brow of the valley
P.173 -No waste should be placed north of the groundwater divide. See sec. 4.2.1 p.23 exhibit 19
-Halton Conservation Authority wanted 50 ft. setback Anderson says 10 metres will be fine.

Vol.1 P.174 -A leachate collection underdrain to handle 5.7 litres per minute that is half a gallon per minute per acres of operation flows. Spacing every 45 metres 146 ft.

TOE drain system should be installed already in place through Phase I - extending to tie along the western edge to pick up the leachate springs.

Recommends monitoring program - Exhibit 11

P.176 Phase 2 expansion can take place if lands can be designed and operated along the measures described in exhibit 19.