

EXTRACTS FROM: Hydrological Suitability of the NSPL Landfill Site,
Burlington, Ontario

& 1983 update (paper on tracer methodology)

By: John A. Cherry and Donald L. Lush

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

"Regardless of the choice, many contaminants will eventually end up in Hamilton Bay."

C "It is necessary to assume leaching will occur for hundreds of years under a relatively high flow, and design the landfill accordingly." (p11)

"Based on the existing hydrogeological data from the Bayview landfill, it appears that a large plume of leachate-contaminated groundwater has developed in the shale and that the zone now extends beneath and beyond Highway 403." (1980)

D "These zones are migrating towards an urban section of Burlington and in future years they may cause gradual changes in the quality of streamflow in Burlington." (p12)

"Some emphasis should be placed on analysis of toxic organic chemicals and their breakdown products in addition to the inorganic constituents that have been included in previous monitoring of the area. There is reason to believe that numerous toxic organic compounds occur in landfill leachate and that some of these constituents may be relatively mobile in some groundwater flow systems. At present little is known about the types and concentration levels of organic compounds in

leachate from landfills."

11-16 (A) "The decision with regard to whether or not a site is hydrogeologically suitable is, to a significant degree, a matter of personal judgement. Personal judgement is an important factor largely because the Ontario Ministry of the Environment has almost no regulations, policies, or guidelines that are specific in a hydrogeological context." (p21)

"Based on the Gartner Lee report and the Phase II report by Morrison Beatty Associates Limited, it is expected that leachate that seeps downward beneath the landfill into the shale will gradually move at some depth, along primarily horizontal flow paths toward the southeast (i.e. towards Hamilton Bay)."

"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."

11-16 (B) "In the (Bayview) seepage areas the phenol equivalents were comparable to some of the highest groundwater values and accordingly these also exceeded the provincial objectives for surface waters. High phenol equivalent values persisted down into Burlington. Analyses carried out by MOE for chlorinated hydrocarbon compounds such as PCB's, herbicides, and a variety of pesticide residues indicated that these compounds are all at low but detectable levels and do not exceed federal maximum

acceptable surface water concentrations although their concentrations do exceed Ministry of the Environment surface water objective concentrations. The presence of these materials, many of which have been suggested as being carcinogenic, may result in public objection to any further landfill development unless it can be shown that water quality will improve as a result of future development." (p41)

"A sanitary landfill site of the type proposed for the NSPL property may be expected to have deposited within it either intentionally or unintentionally a variety of materials hazardous to life. These contaminants may be broadly classed into organic and inorganic materials. The organic materials are composed of a variety of pesticides, herbicides, and industrial products such as PCB's. The inorganic materials may be expected to consist of compounds of lead, zinc, copper, arsenic and other elements such as those which have been detected leaching from the closed Bayview landfill." (p47)

"Once in Hamilton Harbour most contaminants are expected to enter the sediment at some time in the future (and to be removed) from biological systems."

(As we know from Mercury in Northern lakes, Sediment seldom results in final removal - recycling through fish is long term)

"The total concentration of several metals in the Rambo-Hager Diversion are at present higher than that deemed to be acceptable by the federal and provincial governments."

Dr. Cherry: Survey Update, August 1983

"Several diagnostic compounds have been identified in the (Bayview) groundwater. These compounds are common chlorinated hydrocarbons produced by the chemical industry. A summary of the results pertaining to three of these compounds is provided in a table included with this letter.

The results indicate that a zone of leachate influence extends from the landfill at least to piezometer nest OW12 ^(half way to 403 from Bayview) and that the zone of influence extends to the deepest piezometers in the nests that were sampled. Of the various nests that were sampled, OW12 is the farthest from the landfill.

At present we do not have sufficient data to predict the fate of the chlorinated hydrocarbons in the hydrologic system."

	OW12. <u>ppb</u>	background	Δ (ppb)
Chlorobenzene	0.8	0.05	+0.75
paradichlorobenzene	0.05	ND	+0.05
1,1,1 trichloro ethane	10.0	0.5	+9.5

Aug 23/83

"I think that it is quite possible that the results (of a fall '83 sampling program) will indicate that there exists a large zone of contaminated groundwater in the shale at the Bayview site. By contamination, I am referring to groundwater that contains above background level (i.e. above blank levels) of chlorinated organic compounds