Mr. Richard Lindgren
Canadian Environmental Law Association
130 Spadina Avenue, Suite 301
Toronto, Ontario
M5V 2L4

May 30, 2009

Re: Proposed Richmond Landfill Certificate of Approval Amendment
MOE Reference Number 7421-74DHGZ

Dear Mr. Lindgren,

I have completed my review of documents related to the Ministry of the Environment (MOE) draft amendment to the Certificate of Approval for the Richmond Landfill site. **The draft amendment aims to improve and implement** the Waste Management of Canada Corporation (WM) "**Application for Approval of Closure Plan**" for the Richmond Landfill site.

I believe that the MOE would be making a major mistake if it proceeded toward issuance of the Amendment of the Certificate of Approval (CofA) as currently written, and **I recommend that our clients challenge the MOE's proposed CofA Amendment**.

The reasons for my recommendation to challenge the proposed Amendment of the Certificate of Approval follow below:

A) GENERAL REASONS FOR CHALLENGING DRAFT CofA AMENDMENT

1) The proposed Closure Plan for the Richmond Landfill is a deeply flawed document. It is entitled "Richmond Sanitary Landfill Site, Final Closure Plan", was prepared by Henderson Paddon & Associates Limited, and is dated June 2007.

I had provided our clients with a letter/report (dated September 12, 2007) outlining my concerns and my recommendations pertaining to the Closure Plan. That letter/report is attached to this submission as **Attachment 1**.

By and large, WM has failed to address my concerns and recommendations in the further submissions to the MOE - and the MOE has clearly tried but ultimately failed to satisfactorily address my concerns and recommendations in its draft Amendment to the Certificate of Approval. It is for this reason that I am recommending our clients challenge the proposed Amendment.

Overall, the WM Closure Plan and WM's subsequent submissions do not provide a complete or adequate foundation of information and planning, and it is my professional opinion that these documents do not provide the basis for a successful closure of the landfill.

2) The Closure Plan requires considerable further work including additional information and major revisions - in essence, a proper Closure Plan still needs to be prepared.

I recognize that in effect, the MOE through the draft CofA Amendment seems to have tried to do the job of drafting and implementing the details of a proper Closure Plan - but the Plan's original inadequacies are so great that this has not been possible. Although the MOE's draft Amendment to the CofA tries to compensate for the aforementioned shortcomings of WM's closure documentation - it is ultimately not adequate either to ensure a successful closure of the landfill.

In particular, I am concerned about the MOE's approach of allowing the Company to keep the landfill site open even though it is essentially at capacity, and at the same time to allow even more time to prepare and submit key components and plans which should have been part of the Closure Plan submission 2 years ago.

In this review I have provided recommendations for additional information and revisions which I consider necessary to be included in the final Closure Plan for the landfill.

B) SPECIFIC REASONS FOR CHALLENGING THE DRAFT CofA AMENDMENT

1) Substandard Leachate Containment and Collection Facilities Are Allowing Leachate Leakage

The single most important aspect of the landfill design is its ability to contain and collect the landfill's leachate.

The Richmond Landfill is an old landfill, which was not designed to modern standards. Section 1.4 of the Closure Plan provides a brief description of leachate containment/collection facilities. My understanding of that information can be summarized as follows:

- Phase 1 of the landfill has no liner or leachate underdrain system. As a result, most leachate in this portion of the landfill will be draining freely into the underlying groundwater flow system. Phase 1 comprises about 1/3 of the landfill footprint.

- Phases 2 and 3 of the landfill both have a clay liner, but do not have any underdrain system - though there is a perimeter collection system at the margins of these parts of the landfill. As a result leachate generated on these parts of the landfill will mound and then flow laterally through the landfill wastes. I anticipate that leachate from much of Phase 2 flows into Phase 1 and then drains into the subsurface via the unlined base of that part of the landfill. Most of the leachate from Phase 3 is likely to drain to the perimeter collection system.

- Phases 4 and 5 of the landfill are lined and have an overlying passive drainage layer (but no collection lines) which is designed to convey leachate to the perimeter collection system. I anticipate that at least some leachate from Phase 5 and the west part of Cell 4 also drains into the subsurface via the unlined base of Phase 1 of the landfill - the remainder will be picked up by the perimeter collection system.

- Given the shortcomings described above, I estimate that in total about 50% of the waste footprint of the landfill is leaking leachate into the underlying groundwater flow system.

It should be noted that the parts of the landfill which are still open and generating leachate at a much higher rate (the top of Phases 1 and 2) are precisely those parts which are draining downward into the underlying groundwater flow system. As a result, the goal should be to close the landfill as quickly as reasonably possible, to prevent needless contamination of the groundwater flow system.

For whatever reason, the company is proposing to keep the site open and receiving a trickle of waste for an indefinite period which may last for years. Considered carefully, one quickly comes to the realization that this is a questionable course of action from an environmental perspective. The area of the landfill which is still open is in Phases 1 and 2 of the landfill - those parts of the landfill from which leachate is leaking freely into the underlying groundwater flow system.

While this area is open, it will be generating leachate at a much higher rate because precipitation simply soaks into the exposed wastes to form leachate. Once this area is closed and capped, leachate generation rates from this area will drop sharply because the sloped and vegetated final landform is designed to promote runoff and discourage infiltration of precipitation into the landfill. Thus, the sooner this area is capped the sooner the resulting drop in leachate generation rates will be achieved.

By proposing to keep this part of the landfill open for an indefinite period the company is in essence proposing to needlessly enhance the potential leakage of leachate from the landfill throughout that period. The MOE's draft CofA Amendment ignores this issue.

Recommendation 1

Given that about 50% of the landfill's waste footprint (including in particular the part of the landfill which is still open and generating excessive leachate) is leaking into the groundwater flow system, the Richmond Landfill should be closed in order to achieve closure-related reductions in leachate leakage as soon as possible.

2) The Landfill Is At Capacity

The 2008 Annual Report for the landfill confirms (on Page 3-2) that the landfill is licensed to receive 125,000 tonnes of waste per year, and also suggests (on Page 5-5) that as of March 2009 there are about 54,500 m3 of airspace left for incoming wastes. Whether this is actually the case is open to question (given the assertion that capacity "increased" from the year before, with no details or calculations provided), however remaining capacity is clearly very limited.

The assumed compaction rate at the landfill is 850 kg/m3, which (if the above estimate is correct) implies that there are only about 46,300 tonnes of capacity left at the landfill. Put another way, the landfill could easily be closed within a year.

The MOE's draft CofA Amendment is silent on the issue of when the landfill should be closed - I honestly believe that this is a mistake. It is my professional opinion that every landfill site has a natural life, and that when the end (ie. final capacity) is reached it should be closed.

Closure of a landfill which has reached capacity has numerous benefits:

- the application of final cover reduces rates of leachate generation and leachate leakage;
- the application of final cover reduces odour impacts and gas production;
- the vegetation of the final cover minimizes the visual impacts of the site;
- it eliminates the ongoing nuisance impacts associated with the active waste disposal operation including noise, dust, litter, and odours from incoming wastes;
- the closure of the site puts a clear end to the impacts which the landfill has had on neighbours of the site over its lifetime.

WM is arguing that it should be allowed to keep the site open indefinitely, perhaps in the hope that settlement of the landfill will allow the company to get in a few more tonnes of waste or perhaps in order to put off spending the money needed to properly close out the site. These minor potential benefits to the company need to be weighed against the much broader and real benefits to the environment and to the neighbours of the site - and it is my professional opinion that on balance it is in the public interest for any landfill which is filled so close to final capacity to be closed out properly as soon as possible.

It is my opinion that the Napanee Landfill site should be closed out in an orderly fashion as soon as reasonably possible. The prerequisite for an orderly closure is a comprehensive Closure Plan, and that is missing at this point. In order to encourage the completion of the missing or unsatisfactory components of the Closure Plan to its satisfaction, I recommend that the MOE order the temporary closure of the Napanee Landfill site. The site would be reopened once all components of a proper Closure Plan are in place, and then would be kept open only as long as needed to implement the Plan and close the site (which would be at most 1 year).

Recommendation 2

a) The Richmond Landfill has less than 1/2 year's capacity left at the approved filling rate of 125,000 tonnes per year, and thus is effectively at capacity. The landfill can not however be closed, because the owner has failed to prepare a proper Closure Plan for the site.

b) The Napanee Landfill site should be ordered closed on a temporary basis, while WM prepares the components required to complete a proper Closure Plan (on the basis of what is being prescribed by the MOE in the draft CofA Amendment) and circulates it for MOE and stakeholder review/comment.

c) The site should only to be allowed to reopen once an MOE-approved Closure Plan is in place, and then with a fixed deadline for ultimate closure of 1 calendar year after reopening.

3) Failure to Adequately Address Groundwater Protection

The issue of groundwater protection is discussed in Section 1.7.1 of the Closure Plan. This is the only part of the Closure Plan to deal with groundwater issues, and in my opinion it is woefully inadequate.

Section 1.7.1 simply describes in general terms the existing leachate pumping infrastructure and indicates that the Napanee Sewage Treatment Plant (STP) receives the landfill leachate. There is no discussion of existing groundwater issues, no leachate balance for the landfill, and no discussion of the adequacy of current leachate collection/containment facilities and measures in terms of their ability to protect local groundwater from current and future impacts related to the landfill.

This entire section needs to be significantly expanded and rewritten to include the following:

- an estimate of the infiltration and leachate generation rates for the landfill;
- data regarding the annual volumes (for at least the last 5 years) of leachate being collected from the north and south pumping stations, and trucked off-site for treatment;
- an accurate description of the amount of leachate mounding in the landfill;
- an estimate of the amount of leachate which is leaking into the underlying groundwater flow system;
- an assessment of whether groundwater impacts from the landfill pose any current or long-term (post-closure) risks to groundwater quality on adjacent properties.

Each of these issues is discussed in detail in my original September 12, 2007 letter/report which outlines my concerns and my recommendations pertaining to the Closure Plan, and which is attached to this submission as **Attachment 1**.

Following is an updated overview of the status of each issue/recommendation at this point.

a) Leachate Generation Rate Needs to be Estimated

The leachate generation rate is directly dependent on the rate at which precipitation is infiltrating into the landfill. The Closure Plan does not provide estimates of the current and post-closure infiltration (ie. leachate generation) rates, so I will provide some basic estimates for discussion purposes. The exercise of calculating a leachate generation rate helps illustrate a strong argument in favour of closing the landfill as soon as possible.

> The landfill has a waste footprint of 16.2 hectares (ha). Of this, perhaps 15 ha is at final grade and slope and has received final cover. I estimate that it may have an infiltration rate (which is the same as the leachate generation rate) of 10 cm/year. Converting to meters and multiplying gives the following estimate of leachate generation from the final covered part of the landfill:
>
> 150,000 m2 x 0.1 m = 15,000 m3 or 15,000,000 litres of leachate per year.
>
> At present the remaining 1.2 hectares of the landfill are lacking final cover, and thus provide much greater opportunity for precipitation to infiltrate into the landfill and form leachate. I estimate that the infiltration rate across that area will be about 25 cm/year. Converting to meters and multiplying gives the following estimate of leachate generation from the uncompleted part of the landfill:
>
> 12,000 m2 x 0.25 m = 3,000 m3 or 3,000,000 litres of leachate per year.
>
> Thus my estimate is that currently the landfill may be generating about 18 million litres of leachate per year. Once the uncompleted part of the landfill is capped and final covered, the leachate generation rate for the closed landfill will be reduced significantly (by 1.8 million liters per year, or 10%) to about 16.2 million liters per year.

The conclusion I reach from this exercise is that as long as the landfill remains open, there are an extra 1.8 million liters or so of leachate being generated annually in the open part of the landfill. The unfinished part of the landfill is on Phase 1 and the south half of Phase 2, where most if not all of the leachate is in my view leaking into the underlying groundwater flow system (as discussed in Section B1 above).

It is thus my expectation that most of the extra 1.8 million liters of leachate per year (which will continue to be generated for as long as the landfill remains open) will be leaking into the subsurface. In my professional opinion, this provides a strong argument for closing the Richmond Landfill as soon as possible.

The second bullet point of proposed Condition 115 in the MOE's draft CofA Amendment may be a step in the direction of requiring a leachate generation rate to be calculated, but it is not as clear as it could be and thus open to interpretation.

> **Recommendation 3**
>
> **The MOE's draft CofA Amendment should require the final Closure Plan for the site to include estimates of the current and post-closure rates of leachate generation for the Richmond Landfill. (An example of how to prepare such estimates is provided in this review.)**

b) Annual Volumes of Leachate Removal from the Landfill Need to be Provided by WM

There are no data in the Closure Plan to document how much leachate is being taken from the landfill to the Napanee STP, and neither is there a breakdown of how much is coming from the north pumping station or the south pumping station. This is essential information, because comparisons over time of the amount of leachate being collected from the landfill will provide insights into how well the leachate collection system is functioning post-closure.

In my earlier letter/report on the Closure Plan, I had recommended (in Recommendation 4) that the annual volumes of leachate collection and removal from the landfill should be provided for the past 5 years, with a breakdown for the amounts coming from each of the 2 pumping stations. I had also recommended further monitoring/reporting of leachate pumping volumes after closure.

The MOE has addressed the first part of my Recommendation 4 with proposed Conditions 85 and 115 (bullet point 2) in the MOE's draft CofA Amendment. The second part of my Recommendation 4 has been addressed through proposed Condition 9b.xiv and Condition 80 (bullet point 4) in the MOE's draft CofA Amendment. However the MOE's proposed Conditions do not require completion of a proper final Closure Plan by WM.

Recommendation 4

WM should be required to complete a final Closure Plan to the satisfaction of the MOE. That Plan should comprehensively address Conditions 85 and 115 (bullet point 2), and Conditions 9b.xiv and 80 (bullet point 4) of the MOE's draft CofA Amendment.

c) Leachate Mounding Not Being Measured

I am very concerned that there may be significant leachate mounding at the Richmond Landfill. Contrary to normal practice in Ontario, there are no leachate monitoring wells in the landfill at all - making it impossible to measure the extent of such leachate mounding.

While estimates of leachate generation rates can be compared to leachate collection rates, these comparisons may not provide a valid assessment of changes in leachate mounding (in particular, because the amount of groundwater getting into the collection system is unknown) and certainly will not give any measure of the actual leachate mounding occurring within the landfill.

On page 6-1 of the 2008 Monitoring Report for the landfill, WM's consultants make the unsupported assertion that:
"no leachate inventory is accumulating on site".

This assertion is purely speculative - the only way to determine whether leachate inventory is accumulating is to have leachate wells installed in the landfill, and the MOE should be requiring their installation. This issue is not addressed in the MOE's draft CofA Amendment.

Recommendation 5

a) The MOE's draft CofA Amendment should require at least 2 leachate monitoring wells to be installed in the Richmond Landfill to establish levels of leachate mounding within the landfill.

b) The final Closure Plan for the landfill should require regular post-closure monitoring of leachate levels in these wells in order to provide a concrete measure of trends in leachate mounding.

d) Leachate Leakage into the Groundwater System

Given that about 1/3 of the landfill is unlined and that the landfill is likely leaking an estimated 50% of its leachate into the underlying groundwater flow system, one would expect the landfill Closure Plan to provide a frank discussion of this issue and its implications including estimates of current and post-closure leakage.

Instead Section 1.7.1 of the Closure Plan (with the heading "Groundwater Protection") simply states:

> *"Through the use of the leachate collectors and the landfill liners, groundwater protection is expected to continue."*

The fact that 1/3 of the landfill is unlined (and that this is also the majority of the area which is not final covered) is not mentioned. Nor are estimates of leachate leakage provided. These need to be developed by WM and included in the final Closure Plan, and this was in fact recommended in Recommendation 6 of my original letter/report (please see page 5 of **Attachment 1** of this review).

The MOE's draft CofA Amendment does not really address this issue.

Recommendation 6

a) The MOE's draft CofA Amendment should require estimates of the current and post-closure rates of leachate leakage from the Richmond Landfill to be calculated as part of Condition 115.

b) The final Closure Plan should include estimates of the current and post-closure rates of leachate leakage from the Richmond Landfill.

e) Assessment of Groundwater Impacts

There is no assessment of possible current or future groundwater impacts in the Closure Plan. Given the fact one third of the landfill is unlined and that the landfill is leaking an estimated 50% of its leachate (and will continue to do so following closure), this is in my opinion a major omission.

In addition, the Closure Plan is silent about a known major impact on groundwater quality, namely the salinization of groundwater in the landfill area. This salinization is caused by upwelling of briny groundwater from deeper bedrock layers beneath the site, with the upwelling due to the cut-off of infiltration by the landfill and the operation of landfill leachate collection systems. A much more extensive discussion of this issue can be found in Section 4 of my review comments on 2006 Monitoring Report for the site. A copy of that report is provided in **Attachment 2** of this review.

The final Closure Plan needs to be revised to provide a full discussion of current and potential future groundwater impacts, and how the landfill owner proposes to deal with any off-site impacts which may result. This was the subject of Recommendation 7 of my original letter/report (please see pages 6 and 7 of **Attachment 1** of this review).

Proposed Condition 115 in the MOE's draft CofA Amendment which requires a Groundwater and Surface Water Impact Contingency Plan addresses my original Recommendation 7. However the MOE's draft CofA Amendment does not require completion of a proper final Closure Plan by WM.

Recommendation 7

WM should be required to complete a final Closure Plan to the satisfaction of the MOE, and that Plan should comprehensively address Condition 115 of the MOE's draft CofA Amendment.

4) Surface Water Protection

The issue of surface water protection is discussed in Section 1.7.2 of the Closure Plan. This is the only part of the Closure Plan to deal with surface water issues, and it is also woefully inadequate.

The full text of Section 1.7.2, which is titled "Surface Water Protection", simply states the following:

> *"The landfill site is equipped with three (3) sedimentation ponds which receive stormwater run-off from the waste mound, prior to discharge to the receiving waters. Sedimentation ponds are intended to reduce sediment loadings from surface water prior to discharge to the Beechwood Ditch and Marysville Creek. Surface water monitoring of these surface water courses will be adequate in determining if surface water protection is being managed."*

This entire section needs to be significantly expanded and rewritten to include the following:

- a discussion of historical surface water issues for the landfill, including a detailed description of leachate seeps and springs which have been detected at the landfill;
- a description of current measures to ensure surface water protection from the landfill, and justification for any proposed changes to such measures;
- a discussion of whether leachate containment/collection facilities of the landfill are adequate to prevent any long-term (post-closure) risks to off-site surface water quality.

These issues are discussed in more detail below.

a) Historical Surface Water Issues

Surface water monitoring results for the landfill provide strong evidence that surface water contamination has occurred on a regular basis, in particular on the south side of the site - and the obvious sources of such contamination are the landfill's leachate springs and seeps. The monitoring reports for the site have neglected to properly document leachate seeps and springs, so locations and durations of impacts are unknown and it is unclear whether there are any chronic problem areas.

I should note that on my only tour of the site in 1998 I observed numerous leachate springs and seeps, in particular on the south side of the landfill which drains to the surface water pond which has historically shown signs of unacceptable contamination on a regular basis.

There is a more extensive discussion of the landfill's current surface water impacts to be found in Section 5 of my review comments on 2006 Monitoring Report for the site. A copy of my comments is provided in **Attachment 2** of this review.

In my professional opinion, the final Closure Plan needs to be amended to provide a frank discussion of the current and historical surface water impacts of the Richmond Landfill, including documentation of the leachate seeps and springs which will be contributing to these recurring problems.

Bullet Point 3 of proposed Condition 115 in the MOE's draft CofA Amendment addresses my original Recommendation 8 on this topic.

Recommendation 8

The final Closure Plan should provide a full discussion of current surface water impacts, including documentation of all observations of leachate springs and seeps for the past 5 years.

b) Description of Current and Post Closure Surface Water Protection Measures

Page 17 of the 2006 Monitoring Report indicated that:

> "*Surface water is not discharged from the sedimentation pond unless testing indicates that the water quality meets the PWQOs*".

Information in the 2008 Reports indicates that this procedure has now evolved such that all 3 landfill stormwater retention ponds have their contents held back pending prior testing for toxicity and also compliance with the Provincial Water Quality Objectives (PWQO). However it appears that the only criterion for discharge is whether or not the pond contents pass the toxicity testing.

Page 6-2 of WM's 2007 Closure Plan documented the intent to eliminate this protection measure, by decommissioning (ie. filling) the stormwater ponds. No justification for this measure was provided, and it has rightfully been ignored by the MOE in their draft CofA Amendment.

I note however that there is a discrepancy between what is required in Conditions 60 and 61 of the draft CofA Amendment, vs. what is required by Conditions 8 and 9 of the site's OWRA Approval.

- The Amendment requires toxicity testing of the Southwest Stormwater Pond only, with discharge permitted only if the test is passed and the MOE Director approves the discharge in writing.
- The August 19, 2008 OWRA Approval requires testing of prior testing of all 3 ponds for both toxicity and numerous indicator and PWQO parameters, and specifies that discharges are only permitted if the contents pass the toxicity testing.

The proposed CofA Amendment weakens the more comprehensive environmental protection which is currently provided by the OWRA Conditions, and should be challenged on that basis. In my professional opinion, the pond contents should in fact only be discharged if they meet **both** the toxicity test and the PWQO (accounting for background conditions).

Recommendation 9

a) The proposed Amendment to the CofA should be harmonized with the requirements of the August 19, 2008 OWRA Approval, by requiring prior testing of all 3 stormwater retention ponds for both toxicity as well as indicator and PWQO parameters.

b) The proposed Amendment to the CofA should be improved, by allowing the pond contents to only be discharged if they meet both the toxicity testing and the PWQO (accounting for background conditions).

c) The final Closure Plan should comprehensively document the surface water protection measures in place at the Richmond Landfill.

5) Post-Closure Inspections and Maintenance

An important aspect of ensuring successful closure of a landfill are regular scheduled programs of post-closure inspection and maintenance. This aspect of site closure is discussed in Section 6.0 of the Closure Plan, which was not adequately specific about key details of necessary post-closure inspection and maintenance.

I discussed my concerns and provided my recommendations regarding post-closure inspection and maintenance in Section 5 and Recommendation 11 of my original letter/report which is provided in **Attachment 1** of this review.

The MOE's draft CofA Amendment outlines required post-closure inspections and maintenance in proposed Conditions 129 through 134. I support the details of the required inspections and maintenance in these conditions.

Recommendation 10

The final Closure Plan should provide recommended frequencies of inspections and response times for remediation of problems noted during inspections which are consistent with the requirements of proposed Conditions 129 through 134 of the MOE's draft CofA Amendment.

6) Post-Closure Complaints

The issue of post-closure complaints is discussed briefly in Section 4.9 of the Closure Plan, which does not provide any specific details on the complaints procedure to be followed.

The MOE's draft CofA Amendment outlines the required procedure for handling complaints before closure in proposed Condition 108. The issue of post-closure complaints is touched on in Condition 128 (bullet point 5), but it is my position that not enough detail is provided.

Given this site's history of leachate recirculation and the resulting severe odour issues, there is a real possibility that there may be serious post-closure complaints. My recommendation regarding post-closure complaints is provided below.

Recommendation 11

The MOE's draft CofA Amendment and the final Closure Plan should provide specific details of the post-closure complaint procedure including:

- **signage to be posted at gate outlining the complaint procedure, including a phone number and e-mail address for filing complaints;**
- **deadline for initial response to complainants;**
- **deadline for detailed response to complainants (in the case of complex issues arising from complaint);**
- **procedure for notifying MOE of complaints.**

7) Financial Assurances and Contaminating Lifespan

The contaminating lifespan of a landfill is the duration (in the years after closure) over which a landfill's leachate must be collected and treated in order to prevent unacceptable groundwater and/or surface water impacts.

The correspondence between the MOW and MOE surrounding the Closure Plan suggests that for some reason WM appears (at least from the perspective of calculating financial assurances) to be trying to downplay its responsibility to properly manage the Richmond Landfill site throughout its contaminating lifespan. It has been suggesting that there is only a 25-year post-closure period which it should be held to.

I have been working on landfill issues throughout Ontario over the entire course of my professional career, and it is my experience that the contaminating lifespans of modern landfills of the size of the Richmond Landfill are measured in centuries - not a couple of decades as WM appears to be suggesting.

I note with interest the fact that WM has been arguing that Regulation 232/98 does not apply to it, given that the landfill predates the Regulation. I would like to point out the older 1993 MOE Landfill Guidance Manual (which does apply to this site) states the following:

> *"All engineered control facilities, including monitoring facilities, are normally required to function for the contaminating lifespan of the landfill; they should be maintained, repaired or replaced where they are necessary".*

If the landfill's engineered features are required to be maintained throughout its contaminating lifespan (which as I indicated above will be measured in centuries), then it is absurd to argue that only a 25-year period should be used when making provision to cover the costs of maintaining, repairing and replacing those features.

Recommendation 12

The full contaminating lifespan should be applied to any financial assurances which WM is required to post for the post-closure monitoring and maintenance of the Richmond Landfill.

Critical contaminants will need to be identified for both groundwater and surface water in order to properly calculate the contaminating lifespan of the site. This will necessitate more thorough testing of leachate, groundwater, and surface water for a wider range of potentially hazardous organic contaminants.

8) Environmental Monitoring of the Landfill

The Closure Plan itself does not include any details of environmental monitoring, but Appendix C of the Closure Plan is an unsigned draft "Post-Closure Environmental Monitoring Plan" which is hereafter referred to as the "Post-Closure Monitoring Plan". The Post-Closure Monitoring Plan is dated June 2007 and was prepared by Water and Earth Science Associates Ltd (WESA).

In my professional opinion that Post-Closure Monitoring Plan was neither complete nor adequate, and required substantial revision due to massive and unjustified proposed reductions in the site monitoring programs. My concerns and recommendations pertaining to that Post-Closure Monitoring Plan were provided in Section 8 of my original letter/report, which is provided in **Attachment 1** of this review.

In its draft CofA Amendment, the MOE has appropriately ignored the Post-Closure Monitoring Plan prepared by WESA. Instead it has more or less taken the current "voluntary" monitoring program which is being followed at the site and made it a default requirement of the CofA through proposed Condition 8 and Schedules B, C, and D. I think that under the circumstances this was a reasonable course of action for the MOE to take.

Proposed Conditions 8b, 8c, and 8d of the MOE's draft CofA Amendment require WM to provide an Environmental Monitoring Program (EMP) to the MOE Director within 90 days of the issuance of the Amendment. The EMP will govern the future monitoring of the site, and is thus a critical document.

While I can understand the MOE not wanting to delay the implementation of the many necessary conditions in its draft CofA Amendment, there is one problem. By allowing WM to submit the EMP 90 days after the issuance of the Amendment, the MOE appears to be precluding any process of stakeholder review/input/appeal regarding the details of the EMP.

I can imagine that this was not intended by the MOE, and thus I would like to recommend that the MOE include in the final CofA Amendment the details of a process which will facilitate stakeholder review/input/appeal regarding the details of the EMP (once that document is issued).

Recommendation 13

Before finalizing its proposed CofA Amendment, the MOE should consult with stakeholders and then develop and add to the Amendment the details of a process which will facilitate stakeholder review, input, and (if necessary) appeal regarding the details of the EMP once that document is issued.

9) Landfill Contingency Plans

Contingency planning was only briefly discussed in general terms in Section 8 of the Closure Plan (under Financial Assurances). It would be more appropriate to have a dedicated section of the Closure Plan to deal with Contingency Planning.

The only contingency plan presented is for a blast-induced fracture trench to be used in the event of leachate collector failure. This would not be appropriate. Such a trench would greatly exacerbate the already existing salinization of the groundwater flow system (this issue is discussed in detail in Section 4 of my review comments on 2006 Monitoring Report for the site, with a copy of that report provided in **Attachment 2** of this review). New Contingency Plans obviously need to be developed for the landfill.

The MOE's draft CofA Amendment requires a Contingency Plan for failure of the leachate collection system to be developed through proposed Condition 84, and a Groundwater and Surface Water Impact Contingency Plan to be developed through proposed Condition 115. In both cases, the deadline for completion of the Contingency Plans is within 90 days after the issuance of the Amendment.

Like the EMP, these Plans will be critical documents which stakeholders will very much want to have the opportunity to review, comment on, and (if necessary) appeal. As with the EMP, I would like to recommend that the MOE include in the final CofA Amendment the details of a process which will facilitate stakeholder review/input/appeal regarding the details of the Contingency Plans (once these documents are issued).

Recommendation 14

Before finalizing its proposed CofA Amendment, the MOE should consult with stakeholders and then develop and add to the Amendment the details of a process which will facilitate stakeholder review, input, and (if necessary) appeal regarding the details of the post-closure Contingency Plans once those documents are issued.

This concludes my comments on the MOE's draft CofA Amendment. To summarize, it is my professional opinion that the 2007 Closure Plan and the Post-Closure Monitoring Plan are not complete, and do not provide an adequate basis for guiding successful closure activities and post-closure management and monitoring for the Richmond Landfill. Both reports require significant revision, and this work should be completed as soon as possible. The recommendations provided in this review will give detailed guidance in this regard.

It appears that the MOE through the draft CofA Amendment has tried to do at least part of the job of preparing a proper Closure Plan - but the Plan's original inadequacies are so great that this has not been possible. Critical components of the Closure Plan are simply missing or inappropriate, and the MOE is now proposing that these components be completed within 90 days of approval of the proposed Amendment.

The critical components which are to be approved include:

- the EMP;
- the Leachate Collection System Failure Contingency Plan;
- the Groundwater and Surface Water Impact Contingency Plan;
- a Financial Assurance Plan which is based on an appropriate contaminating lifespan for the landfill.

My recommendation to our clients is that they should challenge the proposed CofA Amendment, unless the MOE includes in the final CofA Amendment the details of a process which will facilitate stakeholder review/input/appeal regarding these critical components of the landfill's Closure Plan.

Please feel free to contact me if you have any questions arising from my comments and recommendations. I wish you all the best in the meantime.

Yours sincerely,

Wilf Ruland (P. Geo.)

APGO Stamp
(on original)

766 Sulphur Springs Road
Dundas, Ontario
L9H 5E3
(905) 648-1296
deerspring@hwcn.org

Attachment 1

Letter/Report with Review Comments

of Wilf Ruland (P. Geo.)

on the 2007 Closure Plan for the Richmond Landfill

Attachment 2

Review Comments of Wilf Ruland (P. Geo.)

on the 2006 Annual Monitoring Report

for the Richmond Landfill Site