From: Tracy Tucker [mailto:]
Sent: Wednesday, May 09, 2012 11:34 AM
To: DGR Review / Examen DFGP [CEAA]
Cc: Ramani Nadarajah
Subject: Re: Information Request

Dear Ms. Myles:

Attached please find, an Information Request from the Canadian Environmental Law Association.

Yours truly,

Tracy Tucker, PCP
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CANADIAN ENVIRONMENTAL LAW ASSOCIATION
L'ASSOCIATION CANADIENNE DU DROIT DE L'ENVIRONNEMENT

May 9, 2012

Debra Myles, Panel Co-Manager
c/o Canadian Environmental Assessment Agency
160 Elgin Street, 22nd Floor
Ottawa ON K1A 0H3
Email: DGR.Review@ceaa-acee.gc.ca

Dear Ms. Myles.

Re: Deep Geologic Repository Project for Low and Intermediate Radioactive Waste

On behalf of the Canadian Environmental Law Association (CELA) we are submitting to the Joint Review Panel the following information request to Ontario Power Generation (OPG).

1. The Salina Formation shows strong evidence for systematic and local removal of salt. The elevated hydraulic conductivity and low TDS in the Salina B carbonate suggests that under some circumstances (such as partial glacial cover), there has been significant circulation of water.

a) When and under what conditions was the Salina B salt horizon removed from the subsurface around the DGR site?

b) Are such circumstances unlikely to occur in future?

c) What might be the impact on the DGR?

2. The Cambrian Sandstone exhibits the highest vertical hydraulic gradients and hydraulic conductivity in the site. It is important to know what boundary condition (head) is responsible for this gradient as this implies an overall upward hydraulic gradient and flow through the site, possibly to the ground surface.

a) What is the cause of the high hydraulic heads at the base of the Cambrian sandstone?

b) What is the hydraulic head in the Precambrian bedrock and why is this not included in groundwater models?

3. The extremely low hydraulic conductivities of the barrier formations above and below the DGR imply that the DGR installed will have a significantly higher hydraulic conductivity than the bedrock in the undisturbed condition. The changes in local groundwater flow conditions resulting from the excavation, operation, and decommissioning of the DGR should be explicitly modelled in an assessment of future hydrogeology.

a) What is the impact of the deep geologic repository (including in particular the access shaft(s) and the exploration boreholes) on the site hydrogeology?

4) Existing oil and gas exploration boreholes may constitute the greatest factor in vertical permeability through barrier horizons, especially if improper decommissioning might allow casing corrosion and dissolution of evaporites.

a) What are the locations and depth of all known oil/gas exploration boreholes within 40 km of the DGR?

b) What is the decommissioning status of these boreholes?

c) What is the potential for groundwater flow through such boreholes to impact on the DGR?

5. The highly sculpted terrain under Lake Huron and Georgian Bay (and the other Great Lakes) indicates dramatic water erosion can take place during glaciation, particularly through the primary barriers for the DGR. The likelihood of such dramatic water erosion at the DGR site needs careful assessment. Moreover, the relatively young age and rugged relief of the lake bed means that there is risk of sublacustrine landslide and tsunami generation. The gently shelving coast at the site of the DGR would result in significant impact from any tsunami.

a) Please provide an explanation of the origin of the complex sub-lake topography under Lake Huron and Georgian Bay?

b) Why should such enhanced erosion not impact the DGR site under future glaciations?

c) Given features indicative of sublacustrine slope failure, what risk is there for tsunami impact on the DGR?

6. A substantial glacier located in Georgian Bay would impose very strong hydraulic head at the lake bed resulting in very strong hydraulic gradients across the DGR site. Recent data indicate that the upper Great Lakes (including Lake Huron) became closed drainage basins in the past 10,000 years. The behaviour of aquitards and aquifers under these conditions is poorly understood, although significant forces and flows are evidenced by ice-marginal landforms.

a) What would be the effect of partial glaciation on the integrity of the DGR site?

b) What is the anticipated effect of closure of the upper Great Lakes drainage due to future climatic desiccation?

7. Formations containing fractures, especially vertically oriented fractures may be prone to preferential flow. Those formations vulnerable to dissolution (probably 55% of the rock column) may develop solutionally enhanced permeability when subject to a significant flux of water. Flow through fractures and dissolutionally enlarged fractures drops the effective porosity by orders of magnitudewith a proportionate enhancement of groundwater velocities. This "worst-case" scenario deserves explicit modelling.

a) What evidence is there of the potential for preferential flow development from near surface exposures of the primary barrier and host formations in the areas where they approach the ground surface?

b) What would the impact of preferential flow be on hydrogeological simulations?

8) The rock excavated during the construction phase of the site will initially contain high levels of anhydrite and salt as minerals and in pore waters. Leaching of this material will generate very high TDS leachate that should not be released undiluted into the environment. Water discharges from the DGR project may include the following:

- runoff and leachate seepage from unlined and uncontained waste rock piles;
- excavation water discharge (estimated at up to 5.3 L/s)
- sump water pumping (estimated at up to 2.3 L/s)

a) Please provide an estimate for the annual surface water and groundwater discharges from the unlined waste rock pile (including all calculations and assumptions)?

b) What are the precautions to be taken to ensure that saline leachate from rock spoil does not impact groundwater and surface water quality?

c) Please provide the calculations and assumptions behind the estimates of maximum excavation water discharge and sump water pumping?

d) Please provide a detailed estimate of the chemical quality of waters coming from excavation water discharge and sump water pumping, including estimates of contaminant levels in the waters for the following parameters:

- sodium;
- chloride;
- unionized ammonia;
- boron;
- toluene.

9. Existing surface water quality is discussed on pages 57 through 62 of the Hydrology and Surface Water Quality TSD. All that is provided is a brief verbal summary of past testing results.

a) Please provide all surface water quality monitoring data for the proposed DGR site and vicinity?

b) Please provide a full list of all parameters being monitored in the surface water quality assessment on the proposed DGR site and vicinity?

10) The evaluation of the effects of the DGR Project on surface water quality considered the following indicator parameters:
-total suspended solids;
-nutrients;
-metals;
-temperature;
-pH; and
-salinity.

a) Please provide an explanation for not including petroleum hydrocarbons and chemical residues from blasting operations in the indicator parameter list?

b) Please provide the following reference:
[10] Golder Associates Ltd. 2011. Results of Geochemical Testing of Rock Samples from the Deep Geologic Repository (DGR). Technical Memorandum from C.McRae to D.Barker (NWMO).

11) Section 8.3.3.4 (on page 97 of the Hydrology and Surface Water Quality TSD) reads as follows:
"8.3.3.4 Summary
Ultimately the quality of the water in the stormwater management pond will depend on the quality of other flows to the pond including groundwater pumped to surface and stormwater run-off. It is expected that some type of treatment for one or more parameters may be required in order for the final effluent to meet the applicable criteria. The project design (see Section 4 of the EIS) provides for water treatment. Provided that the certificate of approval discharge criteria are met, there are no adverse effects on surface water quality expected from the DGR Project."

a) Please provide the full list of proposed discharge criteria for the DGR stormwater management pond?

b) Please provide details of the proposed treatment of surface waters in the stormwater management pond?

12) Section 8.3.5 (on page 99 of the Hydrology and Surface Water Quality TSD) reads as follows:
"8.3.5 Additional Mitigation Measures
As described in Section 8.3.2, the preliminary design for the DGR Project stormwater management system provides for water treatment, including a stormwater management system and water treatment units (stormceptors). The system will control the release of water from the site up to the design storm capacity."

a) Please provide the design storm capacity and rationale for the DGR stormwater management pond.

13) Table 13.1-1 in Section 13.1 (on page 123 of the Hydrology and Surface Water Quality TSD) indicates that the objective of the surface water monitoring program for the DGR stormwater management pond is to:
"confirm site discharge meets certificate of a approval discharge criteria".

a) Please provide the full list of proposed Certificate of Approval discharge criteria for the DGR stormwater management pond?

14) There are commitments to long term monitoring indicated in the report. Monitoring in itself does not necessarily encompass important indicators without a mandate and appropriate design. Effective monitoring requires independent and open scrutiny. Effective management must be adaptive contingent on the monitoring data and outcome of review. Monitoring protocol must be adaptive to emergent issues in the monitoring data and in response to prevailing priorities and understanding of environmental hazards.

a) What level of support is provided for thorough independent scrutiny of construction and longer-term environmental monitoring and due process enabling critical public review and adaptive monitoring?

15) What is to prevent the transformation and use of the DGR for high-level waste disposal?

Yours truly,

<original signed by>
Ramani Nadarajah
Counsel

<original signed by>
Joesph F. Castrilli
Counsel

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