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**Written Closing Remarks from
Natural Resources Canada**

**Observations écrites finales de
Ressources naturelles Canada**

In the Matter of

À l'égard de

Ontario Power Generation Inc.

Ontario Power Generation Inc.

OPG's Deep Geological Repository (DGR)
Project for Low and Intermediate Level
Radioactive Waste

Installation de stockage de déchets radioactifs à
faible et moyenne activité dans des couches
géologiques profondes

Joint Review Panel

Commission d'examen conjoint

October 2014

Octobre 2014



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Deep Geologic Repository Joint Review Panel
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Sent via email: DGR.Review@ceaa-acee.gc.ca; OPG-DGR@cnscc-ccsn.gc.ca

Re: Natural Resources Canada's Closing Remark – Deep Geologic Repository Joint Review Panel

As outlined in your (June 3, 2014) *Amended Public Hearing Procedures* and (October 18, 2013) *Procedures for Closing Remarks by Proponent and Registered Hearing Participants*, Natural Resources Canada (NRCan) would like to summarize its position on Ontario Power Generation's (the proponent) proposed Deep Geologic Repository project as it relates to areas of scientific and technical information which we brought forward during the course of the environmental assessment.

As the Joint Review Panel is aware, in our July 23, 2013 written submission (CEAR #1256 – PMD 13-P1.10B), NRCan made six recommendations. Two of these recommendations were revised during the course of the first public hearings.

Upon completion of the first public hearings, the Joint Review Panel requested additional information from the proponent. NRCan reviewed the additional information and filed an additional written submission to the Joint Review Panel on July 7, 2014, with one additional recommendation. This recommendation was revised through subsequent public hearings.

In the attachment to this letter, for the Joint Review Panel's consideration we have compiled our final recommendations, with a brief rationale and supporting references for the changes.

Thank you for the opportunity to participate in this process.

Mark Pearson

original signed by

Director General
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cc :
Donna Kirkwood, Director General, Earth Sciences Sector
Niall O'Dea, Director General, Energy Sector



Attachment: NRCan's Recommendations for the Deep Geologic Repository Project

RECOMMENDATIONS INCLUDED IN NRCAN'S JULY 23, 2014 WRITTEN SUBMISSION

Recommendations which remain unchanged:

SHALLOW GROUNDWATER

- NRCan recommends that the proponent be required to continue to collect baseline data on shallow groundwater flows prior to and during construction in order to refine the groundwater model.
- NRCan recommends that the proponent be required to confirm that grouting will be required to stem groundwater inflows from the upper 20 m of the Bass Islands Formation, and based on the result develop mitigation measures (grout) to stem groundwater inflows .

GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK AND WASTE ROCK MANAGEMENT PLAN

- NRCan recommends that the proponent be required to continue to refine the results of the geochemical characterization program prior to and during the development phase of the DGR. This could include conducting additional shake flask tests, kinetic tests and field cell tests on the excavated material.

SEISMIC HAZARDS: CONTEMPORARY EARTHQUAKE SHAKING HAZARD

- NRCan recommends that the proponent consider mitigation strategies or plans for conditions of "beyond-design" ground motions in their detailed design.

Recommendation which has been clarified:

GEOLOGY: STRATIGRAPHY AND SEDIMENTOLOGY OF THE SANDSTONE AND SHALE BEDROCK GEOLOGY

- **Original Recommendation:** NRCan recommends that the panel consider what additional mitigation measures or institutional controls might be put in place to ensure restricted access to the DGR site for the long-term.

Revised Recommendation: NRCan recommends that to address the potential for future hydrocarbon exploration, mitigation measures or institutional controls be considered during future licensing, as appropriate, to ensure restricted access to the DGR site.

Rationale: At the public hearings on September 18, 2013 NRCan clarified that we were satisfied with the proponent's response to NRCan's recommendation. Specific to the assessment of



hydrocarbon potential, we indicated that we were satisfied with the proponent's response that institutional controls would be considered further at the time of licence to abandon the site¹.

Recommendations which no longer apply:

SEISMIC HAZARDS: CONTEMPORARY EARTHQUAKE SHAKING HAZARD

- **Original Recommendation (no longer applies):** Extra conservatism on the mean shaking levels should be considered during detailed design because of the low maximum magnitudes adopted and because of the kernel smoothing approach in the PHSA.

Rationale: Based on clarifications provided by the proponent during the public hearings, NRCan retracted its recommendation related to seismicity, specifically the recommendation concerning extra conservatism on the mean shaking levels. Based on the proponent's clarification, they had already taken NRCan's observations into account. As such, our recommendation no longer applies².

RECOMMENDATIONS INCLUDED IN NRCAN'S JULY 7, 2014 WRITTEN SUBMISSION

Recommendation which has been clarified:

SEISMICITY – UPDATES TO THE GEOSCIENTIFIC VERIFICATION PLAN

- **Original Recommendation** (July 7, 2014 Written Submission): NRCan recommends that the proponent consider including near-field micro-seismic monitoring as part of the GVP as this may provide timely information for the assessment of deformation and stress changes, should such changes exceed defined triggers.

Revised Recommendation: NRCan recommends that the proponent consider, should deformation issues arise (e.g., changes exceeded pre-defined triggers), including near-field micro-seismic monitoring as part of the GVP as this may provide timely information for the assessment of deformation and stress changes.

Rationale: On September 19, 2014 during the second public hearing, NRCan clarified that it does not consider a near-field microseismic monitoring system is needed at the DGR at the start of the construction phase. However, should deformation issues arise (e.g., changes exceeded pre-defined triggers), such a system could provide timely information about the redistribution of rock stresses to guide further excavation³.

¹ September 18, 2013. . Public Hearing Transcript for the Deep Geologic Repository for Low and Intermediate Level Radioactive Waste. Volume 3. P. 120. <http://www.ceaa-acee.gc.ca/050/documents/p17520/94504E.pdf>

² September 19, 2013. Public Hearing Transcript for the Deep Geologic Repository for Low and Intermediate Level Radioactive Waste. Volume 4. P. 207 <http://www.ceaa-acee.gc.ca/050/documents/p17520/94516E.pdf>

³ September 18, 2014. Hearing Transcript for the Deep Geologic Repository for Low and Intermediate Level Radioactive Waste. P. 59-60. <http://www.ceaa-acee.gc.ca/050/documents/p17520/100112E.pdf>

