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Request for Ruling

The Canadian Environmental Law Association

In the Matter of

Ontario Power Generation Inc.

Proposed Environmental Impact Statement for OPG's Deep Geological Repository (DGR) Project for Low and Intermediate Level Waste

Joint Review Panel

September 16 to October 12, 2013

Demande de décision

The Canadian Environmental Law Association

À l'égard de

Ontario Power Generation Inc.

Étude proposée pour l'énoncé des incidences environnementales pour l'Installation de stockage de déchets radioactifs à faible et moyenne activité dans des couches géologiques profondes

Commission d'examen conjoint

Du 16 septembre au 12 octobre 2013

Canada

REQUEST FOR RULING

To the Joint review Panel re Ontario Power Generation Application for a Deep Geologic Repository for Low and Intermediate Waste (DGR):

The undersigned registered Oral Interveners hereby request a Ruling pursuant to the Hearing Directions of the Panel with respect to the following:

Whereas the project description for this DGR does not include decommissioning waste (see Appendix A);

And Whereas OPG has stated that decommissioning waste is not included in the current DGR project scope inventory in many statements including for example:

> "In addition to this, approximately 135,000 m3 of decommissioning low and intermediate level waste is expected to be generated in the future. As reported previously in OPG's response to Information Request EIS-04-102 (OPG 2012), this is not included in the current DGR project scope inventory. However, it is identified in the Cumulative Effects Assessment in the Environmental Impact Statement (OPG 2011, Section 10.4.1) as a "reasonably foreseeable" future project." (OPG Response to EIS-08-378); See also Appendix B (Excerpts related to Decommissioning waste from Information Requests and Responses compiled by Northwatch)

And Whereas a representative of OPG advised the CNSC at its meeting in Ottawa on August 21, 2013 that OPG intends to apply to place decommissioning waste in this DGR in the future in the following excerpt from the transcript:

> http://nuclearsafety.gc.ca/eng/commission/pdf/2013-08-21-Transcription-Meeting-e.pdf
> In the Transcripts for August 21, page 172-173:
>
> Page 172
> THE CHAIRMAN: Anybody else want to talk about OPG?
> MS. SWAMI: Laurie Swami, for the record.
> OPG has a plan for low and intermediate-level waste.
> Currently, all of the waste that's generated through our operations or refurbishment is either stored at our facilities through refurbishment or transferred to our nuclear waste management facility at our Kincardine location. That would be for wastes that are generated by OPG-owned or leased facilities.
> For low and intermediate-level waste that could be generated during decommissioning, our current plan would be to transfer that to the low and intermediate-level waste deep geologic repository that's currently going through the regulatory approval process.
>
> Page 173

That program, currently for regulatory approvals, specifies that it would be from operations and refurbishment waste.
However, we recognize that any low and intermediate-level waste that we generate would be stored in that facility and, when that waste is generated, we go -- we would proceed through a regulatory approvals process that would allow us to use that facility as well.

THE CHAIRMAN: So there is no question of a third DGR? Let me -- just to be really clear.

MS. SWAMI: Laurie Swami, for the record.
There is no plan for a third DGR operated by OPG or, for that matter, any other operator that I'm aware of.

And Whereas the approach taken amounts to improper ``project`` splitting whereby the decommissioning waste is being specifically excluded from meaningful assessment in the EIS.

And Whereas section 14 of the *Guidelines for the Preparation of the Environmental Impact Statement for the Deep Geological Repository for Low and Intermediate-Level Radioactive Wastes* (Guidelines), which were approved by the Minister of the Environment, following a public consultation process, specifically directs OPG to identify the *"cumulative adverse and beneficial environmental effects of the project in combination with other past, present or reasonably foreseeable projects and/or activities within the study area."*

And Whereas decommissioning waste from OPG's nuclear power operations are reasonably foreseeable and OPG is aware with a reasonable degree that the decommissioning wastes will arise from its activities in the near future, likely within the next seven (7) years.

And Whereas the Joint Review Panel cannot properly fulfill its mandate and members of the public and agency reviewers cannot meaningfully participate unless and until the proponent fulfills its requirements for the Environmental Assessment by filing a complete, comprehensive and frank statement of the true purpose and scope of the project, its potential environmental and socio-economic implications, and systematic comparison of alternatives to ensure the DGR is the environmentally preferred option for decommissioning waste.

We request that:

1. This Panel order the Applicant, OPG to clearly state whether or not decommissioning waste from Ontario nuclear power plants is intended to be placed in this DGR for Low and Intermediate Waste at any time in the future of this project;

2. If OPG confirms that it does have an intention to apply for regulatory approvals to permit decommissioning waste from Ontario nuclear power plants to be placed in this DGR for Low and Intermediate Waste at any time in the future, then we Request that this Panel adjourn this proceeding forthwith, and direct OPG to:

i. revise and resubmit its Environmental Impact Statement Assessment with the project properly described in accordance with all issues required in the EIS Guidelines;

ii. reassess all assessments of impacts and revise and resubmit all technical studies, design documents and hearing documents such as information responses that the proponent has provided, including but not limited to quantities of low and intermediate waste and the size and configuration of the facility from the addition of decommissioning waste to the DGR;

iii. provide classification of same;

iv. set out the amount, types and levels of contamination (radioactivity), of the waste being deposited to the DGR to the Panel including the additional or cumulative radiological effects of increases in quantities of radioactive materials to be placed in the site;

v. describe changes in construction process, impacts and risks caused by the addition of decommissioning waste to the facility as well as increases in waste to be stored on the site and trucked off the site from the increase in area required for the emplacement of the decommissioning waste; alter their description of the effect on the visual appreciation of environment and stigma as a result of larger areas of waste storage on the site;

vi. describe changes in timing for operation of the facility and emplacement of waste and provide an adjusted schedule in respect of same as a result of added decommissioning waste to the DGR;

vii. describe impacts on traffic, including changes in risk, as well as impacts on tourism from the addition of decommissioning waste to the DGR;

viii. describe impacts and risks arising from emplacement of decommissioning waste in the DGR given prior placement of low and intermediate level waste in the shafts and describe impacts and risks of drilling and blasting to create emplacement rooms to house decommissioning waste after the completion of the DGR that is described in the EIS documents;

ix. describe all changes to costs in every stage of the DGR as a result of inclusion of decommissioning waste in the DGR facility.

3. If OPG advises that it does not have any intention to apply for regulatory approvals to permit decommissioning waste from Ontario nuclear power plants to be placed in this DGR for Low and Intermediate Waste at any time in the future, we request that this Panel require OPG to provide sworn evidence to this Panel to that effect and we further request that this Panel direct OPG to prepare a written submission to the CNSC correcting its statements made at the CNSC meeting of August 21, 2013.

All of which is hereby submitted by the following registered Oral Intervenors in this proceeding as of this 17th day of September, 2013:

Algoma Manitoulin Nuclear Awareness, Edward Burt
Algonquin Eco Watch, Mike Wilton
Beyond Nuclear, Kevin Kamps
Bluewater Coalition, Cheryl Grace
Bruce Peninsula Environmental Group, Ziggy Kleinau
Canadian Coalition for Nuclear Responsibility, Gordon Edwards
Canadian Environmental Law Association, Theresa McClenaghan
Citizens for Alternatives to Chemical Contamination, Kay Cumbow
Citizens Clearinghouse on Waste Management, John Jackson
Concerned Citizens of Renfrew County, Ole Hendrickson
Durham Nuclear Awareness, Janet McNeill
Future Generations, Deborah Mihalicz
Greenpeace Canada, Shawn-Patrick Stensil
Huron-Grey-Bruce Citizens Committee on Nuclear Waste, Sharen Skelly
International Institute of Concern for Public Health, Anna Tilman
Inverhuron Committee, Marti McFadzean
Justice and Global Issues Committee, South East Presbytery, Toronto Conference, United Church of Canada, Rev. Victoria Obedkoff
Northwatch, Brennain Lloyd
Nuclear Free Great Lakes, Michael Keegan
Nuclear Information and Resource Service, Diane DArrigo
Nukewatch, John LaForge
Ohio Sierra Club Nuclear Free, Patricia Marida
Save our Saugeen Shores, Jill Taylor
Sierra Club Canada, John Bennett
SisKinds LLP, Paula Lombardi, for Eugene Bourgeois
Women`s Healthy Environments Network, Dorothy Goldin Rosenberg

APPENDIX A

OPG's Deep Geologic Repository
for Low and Intermediate Level Radioactive Wastes
Environmental Impact Statement
March 2011

EXCERPTS RELATED TO DECOMMISSIONING WASTES

Environmental Impact Statement - 2-76 - March 2011
Greenpeace also asked questions about overall costs of the DGR Project, retrievability of the waste, accepting decommissioning waste, monitoring and the regulatory standards to which the DGR would be subject.

Environmental Impact Statement - 3-4 - March 2011
3.1 PURPOSE OF THE PROJECT
In the future, an additional approximately 135,000 m^3 of L&ILW is expected to be produced during the decommissioning of the reactors and the associated nuclear waste storage facilities. The majority of this waste (i.e., >85%) will likely be LLW. **The currently proposed DGR Project does not include management of decommissioning waste**. At the time that each generating station is decommissioned, an EA is expected to be required and it will address management of the decommissioning waste. The cumulative effects assessment presented in Section 10 considers the emplacement of decommissioning waste in the DGR at a conceptual level, as required by the EIS Guidelines.

In the early 1990s, OPG established a planning scenario for financial planning purposes that assumed that low and short-lived intermediate level radioactive waste would be emplaced in a low level waste repository. Management of selected long-lived intermediate level waste was assumed to be co-located with used fuel in a separate deep geologic repository. These planning scenarios did not include specific locations or plans for identifying a site for either facility.

Environmental Impact Statement - 3-6, 3.7 - March 2011
3.2.2 Long-term Planning by OPG
The WWMF was originally developed with the concept that it would provide interim storage for the L&ILW until such time as a long-term management facility was developed. The current structures have been designed for a minimum life of 50 years. These structures could, with proper maintenance, continue to safely store the waste much longer than 50 years. However, Canadians have indicated that they do not want to wait another generation for substantial progress to be made on developing long-term solutions for waste management.
OPG developed the financial plans on the basis that future generations should not bear the cost of today's operations. OPG makes financial contributions to segregated funds dedicated solely for the long-term management of waste and for the decommissioning of its generating stations. **These funds will pay the costs associated with developing and operating a facility for the longterm management of L&ILW, a facility for long-term management of used fuel, and the decommissioning generating facilities.** As of end of 2009, the fund was valued at approximately $10 billion [20].

Environmental Impact Statement - 4-18 - March 2011
4.5 WASTE TO BE PLACED IN THE DGR
The L&ILW are generated from a variety of activities. For the purposes of safety assessment and engineering, it is convenient to distinguish the operational L&ILW from refurbishment L&ILW. **A third general category, decommissioning L&ILW is not included in this discussion.**

Environmental Impact Statement - 4-27 - March 2011
The results for the assumed repository decommissioning date of 2062 indicate the total radioactivity will be dominated by tritium (H-3), carbon-14, niobium-94 and nickel-63. **A more complete listing of radionuclides in the waste is given in the Reference Inventory Report [**30].

Environmental Impact Statement - 10-1 - March 2011
10. CUMULATIVE EFFECTS
The EIS Guidelines require the consideration of cumulative environmental effects in relation to the DGR Project. Cumulative effects are the combination of the incremental effects caused by the DGR Project with the effects caused by other projects or activities on-site as well as off-site, including past, present and reasonably foreseeable projects.
10.1 OVERVIEW
The method for assessment of cumulative effects is consistent with the EIS Guidelines and the Canadian Environmental Assessment Agency's Cumulative Effects Assessment Practitioners Guide [465]. The steps for the assessment of cumulative effects are detailed further in Section 10.2. The cumulative effects assessment builds on the results of the direct effects assessment completed in Section 7 and considers all of the incremental effects of the DGR Project that were assessed to have a likely residual adverse effect or beneficial effect on a VEC. Other projects that have the potential to act cumulatively with the DGR Project are then identified in three categories.

- Past and existing projects and activities. Although these activities occurred in the past, the effects from these projects may continue into the future. The effects from the past and existing projects and activities that have occurred in the past or are currently occurring are captured under the existing conditions (Section 6)
- Certain/planned projects and activities. These include projects that have been approved, but yet to start construction and/or operations. This category can also include projects that are well advanced in the planning process, but have not yet been approved.
- Reasonably foreseeable projects and activities. These are projects that have started in the approval process and are on the path to obtaining approval. This category would also include smaller routine activities that one can say, with a fair degree of certainty, will need to occur (e.g., routine building and infrastructure upgrades). In the case of the DGR Project, the EIS Guidelines require that emplacement of decommissioning waste at the Bruce nuclear site be included in the assessment of cumulative effects even though it is not a project that is planned or a project for which the schedule is in the reasonably foreseeable future.

Using professional judgement, the projects are then screened to focus the assessment of cumulative effects on those projects whose effects overlap in type of effect, time and space with those residual adverse effects of the DGR Project. The cumulative effects assessment is conducted at a more general level of detail than in previous sections of the EIS since the projects

are more remote in time and space. Consistent with EA practice, the cumulative effects assessment applies to activities during normal operations only

Environmental Impact Statement - 10-18 -

Table 10.4-3: Reasonably Foreseeable Project Descriptions (continued)

DGR for Decommissioning Waste at Bruce Nuclear Site

The decommissioning waste from OPG-owned or operated reactors will, at some point in the future, be relocated to a suitable long-term management site. The long-term management of decommissioning waste is not expected to start before 2050. Although no site has been identified, the DGR Hosting Agreement includes provision for decommissioning waste to be placed in the DGR Project and the EIS Guidelines stipulate that consideration of placing decommissioning waste in the DGR be included in the cumulative effects assessment. The assessment is based on emplacement of decommissioning waste in an extension of the DGR (approximately doubling the underground capacity). The extension could be accommodated within the DGR Project site (i.e., no additional site clearance would be required). Management of decommissioning waste at the DGR would require a separate EA process.

Environmental Impact Statement - 10-24 -

10.5.1.4 Air Quality

Likely residual adverse effects of the DGR Project on air quality were identified during the site preparation, construction, operations and decommissioning phases. Specifically, there is expected to be an increase in emissions of combustion products (i.e., NO_2 and CO) and particulate matter (i.e., SPM, PM_{10} and $PM_{2.5}$). Other projects that may cause an increase in combustion products or particulate matter will overlap in the type of effect with the DGR Project. Based on the information in Tables 10.4-1 to 10.4-3, the following other projects and activities are advanced for further assessment based on effects on air quality:

- Bruce A (operations and refurbishment);
- Bruce B (operations);
- WWMF;
- WUFDSF;
- centre of site facilities;
- Bruce Eco-Industrial Park;
- Heavy Water Plant decommissioning;
- Bruce to Milton transmission line;
- Bruce A decommissioning and safe storage;
- Bruce B decommissioning and safe storage;
- WWMF upgrades;
- municipal/county road upgrades;
- WUFDSF expansion;
- Bruce B refurbishment, continued operations, decommissioning and safe storage;
- additional transmission;
- centre of site additions and modifications; and
- **DGR for decommissioning waste at Bruce nuclear site.**

(last bullet repeated in subsequent sections)

Environmental Impact Statement - 10-33 - March 2011
Table 10.5.4-1: Summary of Effects that Overlap in Type of Effect, Time and Space (continued)
- includes "DGR for Decommissioning Waste at Bruce Nuclear Site"

Environmental Impact Statement - 10-34 - March 2011
10.6 ASSESSMENT OF CUMULATIVE EFFECTS
10.6.1 Surface Water Quantity and Flow
There were no other projects that may result in effects that overlap with the DGR Project effects in type, time and space. Therefore, there are no cumulative effects on surface water quantity and flow.
10.6.2 Terrestrial Environment
The residual adverse effect on eastern white cedar resulting from site clearing for the DGR Project was identified to interact with centre of site additions and modifications in type of effect, time and space. Additions to the centre of site facilities may result in additional land clearing. Forest areas (Figure 6.4.3-1) are located adjacent to the south of the centre of site facilities (Figure 1.1.1-3). It is likely that these projects would require relatively small areas of land clearing. The habitat loss as a result of these projects is expected to be small and is unlikely to result in adverse cumulative effects on eastern white cedar. **Extension of the DGR to accommodate decommissioning wastes would not require any additional land clearing**.

Environmental Impact Statement - 10-35
Long-term management of decommissioning wastes is considered to occur at some time in the future. This would require additional construction and emplacement activities. Effects from this would be assumed to be similar to those identified for the site preparation and construction phase of the DGR Project. However, these effects would occur after the site preparation and construction phase of the DGR Project, and would likely be after completion of the operations phase and installation of the closure walls in the current DGR layout. Therefore, the air quality effects from the construction of emplacement rooms for decommissioning wastes would not overlap with the air quality effects of the DGR Project. Thus, no measurable cumulative effects are likely from these emissions.

Environmental Impact Statement - 10-36 - March 2011
10.6.5 Noise Levels

Long-term management of decommissioning wastes in the DGR is considered as a potential project to occur at some time in the future. This would require additional construction and emplacement activities. However, it is unlikely that construction would occur concurrent with the operation of the DGR Project. Therefore, no cumulative effect is likely from these emissions.

10.6.6 Radiation and Radioactivity
Environmental Impact Statement - 10-37 -

At some time in the future, used fuel and decommissioning wastes will be transferred to a longterm repository. The DGR is not for the long-term management of used fuel; therefore, the

repository will be located off-site. Any dose will be solely from the transport of used fuel, and as the used fuel is transferred off-site, will result in a net reduction of dose. **The Hosting Agreement does, however, include a provision for the long-term management of decommissioning wastes. If this is the case, the operational doses are expected to be similar to those of the DGR for operating waste. There would be no additive effect because panels in the DGR for operating waste would be closed. It would increase the radiological releases during the abandonment and long-term performance phase of the DGR. However, even if they were to double, doses would still be small (i.e., <2 μSv/a), and would be well below regulatory limits. Therefore, no further consideration is required.**

APPENDIX B

Information Requests and Responses Related to Decommissioning Wastes
IR Packages 1-10
2012 – May, 2013

EIS-04-102

Section 1.2.1.4, Scope of Project ***Information***

Request:

Clarify whether Low and Intermediate Level Waste from pending or approved OPG new build, refurbishment or closure operations will be placed in the DGR.

Context:

Reference Low and Intermediate Level Waste Inventory for the Deep Geologic Repository Report specifically notes in Section 1.3 page 9 that "waste projections from any proposed new-build reactors in Ontario are not included in this report".

The Executive Summary states on page 7, that: "future operational L&ILW will be shipped" (to WWMF for processing).

This statement could be interpreted as including waste from any new build

OPG Response:

The referenced sentence in the Context, on page 7 of the Executive Summary of the Reference Inventory Report (OPG 2010),

"*It is also assumed that the future operational L&ILW will be shipped in containers similar to those currently used to store the L&ILW.*" refers to low and intermediate level waste (L&ILW) that will be generated in future by the continued operation and refurbishment of OPG's existing reactors.

OPG's licence application is to prepare a site and construct a Deep Geologic Repository (DGR) for 200,000 m_3 (disposed volume) of L&ILW from the operation and refurbishment of OPG-owned or operated nuclear reactors in Ontario. This could include L&ILW from the operation and refurbishment of OPG-owned or operated new-build reactors.

It would need to be demonstrated to the Canadian Nuclear Safety Commission (CNSC), prior to the emplacement of any new-build L&ILW into the DGR, that the safety case for the DGR remains valid for such wastes and there were no significant additional environmental effects. L&ILW generated under an operating licence for a nuclear facility is considered operational or refurbishment waste. OPG's current licence application does not include decommissioning waste. If in future OPG decided it wished to put some forms of decommissioning waste into the DGR then it would need to apply to the CNSC for a licence amendment to allow this activity, and the associated regulatory process would be triggered.

Reference:

OPG. 2010. Reference Low and Intermediate Level Waste Inventory for the Deep Geologic Repository. Ontario Power Generation report 00216-REP-03902-00003-R003. Toronto, Canada. (CEAA Registry Doc# 300)

EIS-04-110

Section 14, Cumulative Effects ***Information***

Request:

a) Clarify why "the DGR for decommissioning Bruce Power waste" is "not a planned activity, but is included to meet guideline requirements".

b) Explain why the following other operations and potential projects were not included in the cumulative effects assessment:

- *Wastes from any new build of nuclear reactors;*
- *The potential for storing L&IL wastes from reactors other than OPG's fleet;*
- *Possible changes to the operations for minimizing waste, particularly incineration.*

Context:

The EIS Guidelines indicate that the management of decommissioning waste would be a potential future project that should be included in an assessment of cumulative effects.

In the EIS Summary, page 40, the chart lists cumulative impacts with other projects over the lifespan of the DGR. Past,Existing and Planned Projects (certainty) identified include for example, Decommissioning Bruce A and B, "WWMF upgrades" and Reasonably Foreseeable Projects

OPG Response:

Please note that the words within quotation marks in part a) of this Information Request are not the same words at the bottom of the chart on page 40 of the EIS Summary Report.

Table 10.4-3 (specifically, item 31 on page 10-18) of the Environmental Impact Statement (EIS) (OPG 2011) explains the context under which a ”DGR for Decommissioning Waste at Bruce Nuclear Site” was considered as a ‘reasonably foreseeable project’ under the cumulative effects assessment as required by the EIS Guidelines (CEAA/CNSC 2009).

The Guidelines (Section 14) identify the management of decommissioning waste in the DGR as a potential future project to be included in the assessment of cumulative effects. The ‘project’, for assessment purposes, is assumed to be an extension of OPG’s DGR for low and intermediate level waste. Given that decommissioning waste from reactor dismantlement is not expected to be generated before 2050, the exact facility(ies) and means by which decommissioning waste would be managed in the long term are not fully identified and hence any associated activities are not considered ‘planned’ at this time.

OPG’s response to Information Request EIS-04-102 indicates that new-build waste could be emplaced in the DGR if new-build wastes characteristics were consistent with the submitted environmental and safety assessments. As such, the environmental effects of including new-build wastes up to the licensed capacity of the DGR are already considered and there is no need to consider such effects under cumulative effects. Any significant expansion of the DGR’s capacity would need the approval of all applicable regulatory authorities following the required processes of the day.

Wastes from other reactors were not considered, as the DGR is only intended for wastes from OPG-owned or operated reactors.

As discussed in OPG’s response to Information Request EIS-04-104, incineration is a part of current waste processing at the WWMF. For the purposes of assessing cumulative effects, it is included in Table 10.4-3 (item 3, page 10-8) as ‘WWMF Operation’. EIS Table 10.4-3 (specifically, item 23 on page 10-16) addresses future planned ‘WWMF upgrades’, such as additional waste storage, in the assessment of cumulative effects.

References:

CEAA/CNSC. 2009. Guidelines for the Preparation of the Environmental Impact Statement for the Deep Geologic Repository for Low- and Intermediate-Level Radioactive Waste. (CEAA Registry Doc# 150)

OPG. 2011. OPG’s Deep Geologic Repository for Low and Intermediate Level Waste - Environmental Impact Statement. Ontario Power Generation report 00216-REP-07701-00001-R000. Toronto, Canada. (CEAA Registry Doc#298)

EIS-04-120

Section 4.1, Scope of the Project

Information Request:

Provide a description of conceptual DGR extension plans that will be used to accommodate storage of additional L&ILW materials, or other permitted decommissioning wastes, beyond those volumes currently estimated for the DGR operation.

The description should include both temporal and spatial extension plans to the current proposed DGR design.

Context:

In the EIS (Section 4.10.2. p. 4-71) it is noted that: "there may be a need to increase the number of emplacement rooms …" and "The decommissioning waste from OPG-owned or operated reactors will, at some point in the future, be relocated to a suitable long-term management site … DGR Hosting Agreement includes provision for decommissioning waste to be placed in the DGR Project … in an extension of the DGR (approximately doubling the underground capacity)."

In Fig. 10.4-2 (EIS, p. 10-21) the timeline shown indicates that decommissioning waste from the Bruce Nuclear site will be placed into the DGR between 2054 and 2088, for an extended additional operational period approximating 35 years.

Inasmuch as current DGR operation is planned for completion by 2063, it may be anticipated that cumulative impacts created by extension of DGR operations will result. At a minimum, it may be anticipated that: (a) in order to extend panels within the DGR to permit construction of new rooms, the placement of planned shaft closure/sealing walls may have to be postponed in order to extend drifts away from shaft sites, if rooms progress in similar directions to those currently shown; (b) different ventilation strategies will be required to accommodate different excavation layouts; (c) room and drift walls, left open for longer periods and not reinforced using planned monolith materials, may suffer more extensive structural degradation during manned operations that may result in enlargement of excavation damage zones.

Additionally, the need to have workers operate within an underground facility of greater extent and that may suffer extended degradation in physical character for longer intervals than initially planned may present additional occupational hazards from ground falls and the like. There are also implications to surface operations. There will be a requirement for more waste rock storage space. There will also be an extension to the requirement for surface water management and treatment. The extensions to surface operations may in turn trigger requirements for additional mitigation of environmental impacts, e.g., habitat loss.

The "extension of the DGR (approximately doubling the underground capacity)" may present detrimental impacts on repository structural performance and worker safety. No consideration of these effects has been provided in the cumulative effects assessment review section of the EIS, as in Table 10.7-1 (Summary of Likely Adverse Cumulative Effects), EIS, p. 10-38.

OPG Response:

OPG notes, the second quote in the Context section is from Section 10 (page 10-18) of the EIS and is associated with the cumulative effects assessment which considered decommissioning waste in the DGR based on the direction of the EIS Guidelines (CEAA/CNSC 2009, Section 14).

EIS-05-203

Section 2.2,
Public Participation and Aboriginal

Information Request:

Describe how input from the SON was used to develop the methods for assessment of effects of the project on VECs (including the use of the burial site); in particular, the magnitude and overall significance of any effects as may be interpreted using Traditional Knowledge.

Context:

According to Section 2.3 of the EIS Guidelines, traditional knowledge can contribute to project siting and design, identification of issues, the evaluation of potential effects, and their significance, the effectiveness of proposed mitigation, cumulative impacts, and the consideration of follow-up and monitoring programs. Sections 2.3 and 7.16 of the EIS do not present information regarding how Traditional Knowledge obtained through consultation with the SON was incorporated into decisions regarding project siting and design, the evaluation of potential effects, their significance, the effectiveness of proposed mitigation and follow-up and monitoring.

OPG Response:

OPG and the NWMO encouraged the on-going participation of Aboriginal peoples in the DGR Project and initiated engagement with Saugeen Ojibway Nation (SON) early in the project. Specific information regarding Traditional Knowledge was not provided by SON throughout the Environmental Assessment (EA). Where feedback, insight and comments were provided, they were used to inform the EA methodology. Listed below are three examples which summarize the feedback and how it was used:
[goes on at length, includes three tables, relevant statement in Table 2, excerpt is below]

Table 2: Questions on the Engineering, Safety Assessment and Geoscientific Studies

Questions	**Answers/ Guide to Where Subject Matter Is Addressed in the EIS**
Is decommissioning waste being emplaced in the DGR?	The DGR Project is for operational waste, as discussed in the EIS (OPG 2011a, Section 4.5).

EIS-06-233

Section 14,
Cumulative Effects

Information Request:

Provide a temporal distribution of cumulative dose estimates for members of the public.

Context:

16 projects have been identified that may act cumulatively in the radiation and radioactivity environment. The projects should be described individually, along with expected doses resulting from each project. These doses should be summed to calculate the cumulative dose to a member of the public over time.

OPG Response:

As discussed in OPG's response to Information Request (IR) EIS-06-232, the Environmental Impact Statement (EIS) (OPG 2011, Tables 10.4-1, 10.4-2 and 10.4-3) provides a list of past and existing, certain and planned, and reasonably foreseeable projects that may overlap temporally or geographically with the DGR Project. These tables include a description of each individual project and the level of detail provided in each project description is consistent with environmental assessment practice. The EIS did not identify a residual adverse effect on radiation and radioactivity and hence an assessment of cumulative effects on radiation and radioactivity was not required. However, in keeping with a precautionary approach, the cumulative effects on radiation and radioactivity were assessed because the DGR Project may have a small additive effect with other future projects.

As discussed in the EIS (OPG 2011, Section 10.6.6), 16 projects located within the Bruce nuclear site have the potential to contribute to public dose and to act cumulatively with the DGR Project. Each of the 16 projects identified is, or would be, located within the Bruce nuclear site. The dose to the public resulting from projects located at the Bruce nuclear site is based upon measured levels of radioactivity in the environment, calculated from reported emissions, or calculated from estimated future emissions. The potential change to the dose resulting from each of the 16 projects that could act cumulatively with the DGR Project is described in the EIS (OPG 2011, Section 10.6.6). Estimated doses for the existing projects and the magnitude of change for planned and foreseeable projects are provided below.

<u>DGR Project</u>

1. Operation of DGR

A bounding assessment of doses to members of the critical group resulting from radiological releases due to operation of the DGR was presented in response to IR-EIS-06-245, providing an annual dose of 0.7 µSv.

<u>Existing Projects</u>

2. Existing Projects

Eight of the 16 projects — operation of Bruce A, Bruce B, refurbishment of Bruce A Units 1 and 2, operation of the Western Waste Management Facility (WWMF), operation of the Western Used Fuel Dry Storage Facility (WUFDSF), Douglas Point, Radioactive Waste Operations Site 1 (RWOS1) safe storage, and centre of site facility operation — are existing projects and the doses from these projects are included in the existing doses reported annually (BRUCE POWER 2010, Section 3.7). The doses reported in the EIS (OPG 2011, Table 6.6.10-2) present the cumulative dose to members of the public from all projects in place at the Bruce nuclear site for the reporting period.

Activities associated with Heavy Water Plant decommissioning were completed in 2011; dose contributions from the Heavy Water Plant site are not expected to increase relative to current because there are no on-going operations leading to releases of radioactivity.

The doses to the public over the period from 2001 to 2009 are provided in the EIS (OPG 2011, Table 6.6.10-2).

The highest existing dose among the nine potential critical groups representing members of the public over this period was 4 µSv/a (OPG 2011, Section 6.11.4.3). The 2010 dose to the public was 2.85 µSv/a (BRUCE POWER 2011, Section 2.0), and the 2011 dose was 1.53 µSv/a (BRUCE POWER 2012, Section 4.10.1). For the 20th consecutive year, the calculated dose to a member of the public is less than the 10 µSv/a value that is regarded as the lower threshold for relevance (*de minimus*) (BRUCE POWER 2012, Section 4.10.1).

The majority of radionuclide releases and the resulting doses were due to operation of the Bruce B nuclear generating station and Units 3 and 4 of the Bruce A nuclear generating station. Units 1 and 2 at Bruce A were out of service or undergoing refurbishment in recent years. All 8 units at the Bruce nuclear site were in operation during the period of 1991 to 1996. Maximum dose to the public during this period was 6.93 µSv/a, which was observed in 1994 (BRUCE POWER 2005, Section 5.8). A higher dose value was reported in 1991; however, this was calculated prior to the change to the current dose assessment procedures.
Based on this it can be estimated that with both the Bruce A and Bruce B nuclear generating stations operating at full capacity, total dose to members of the critical group will be less than 8 µSv/a, with each nuclear generating station contributing less than 4 µSv/a. This is a bounding estimate because doses due to operation of refurbished units are lower than prior to refurbishment.

Certain/Planned Projects

3. Bruce A and Bruce B Decommissioning

Emissions to the environment, and the resulting incremental dose due to decommissioning of each nuclear generating station, will be similar to those resulting from refurbishment as the activities resulting in potential emissions are of a similar nature. Incremental dose to members of the public during the refurbishment of Bruce A was estimated to be 0.035 µSv/a for an infant in the critical group (BRUCE POWER 2005, Section 6.2.1.6).
Estimated doses due to decommissioning are small compared to those due to operation of a nuclear power plant. Therefore, shutdown and decommissioning of the Bruce A and Bruce B nuclear generating stations will result in a net reduction in doses to potential critical groups compared to baseline.
Thus doses due to decommissioning of Bruce A and Bruce B will each be less than 0.04 µSv/a.

4. Bruce A and Bruce B Safe Storage

This project involves placing the nuclear generating stations into a safe storage configuration after initial decommissioning activities until the eventual dismantling and decontamination activities occur. There are no significant emissions associated with safe storage. This will result in a net reduction in doses to potential critical groups compared to baseline.

5. RWOS1 Safe Storage

The majority of radioactive waste has already been transferred from RWOS1. A small quantity of waste, which is encased in concrete, remains. The residual waste will be transferred to the DGR. This will be an activity of limited duration and it will involve removal of the waste and concrete and transfer to the DGR. The resulting dose will be negligible compared to baseline dose to the critical group at Bruce nuclear site.

6. WWMF Upgrades

OPG has approval for construction of additional refurbishment waste storage buildings. Emissions at WWMF currently account for less than 4% of radionuclide emissions from the Bruce nuclear site (OPG 2011, Section 6.6.4). Given that doses to members of the critical group from all releases at the Bruce nuclear site were 2 to 4 µSv/a (OPG 2011, Section 6.6.10; BRUCE POWER 2011, Section 2.0; BRUCE POWER 2012, Section 4.10.1), the WWMF contribution can be roughly estimated as below 0.2 µSv/a.
Based on a very conservative assumption that following WWMF upgrades, the radioactive inventory of stored waste would be doubled, the incremental dose to members of potential critical groups can be estimated as less than 0.2 µSv/a, resulting in doubling of the current dose due to operation of the WWMF.

7. WUFDSF Expansion

There are negligible public doses due to operation of the WUFDSF facility. There will be no measurable change in doses to potential critical groups due to expansion of this facility.

Reasonably Foreseeable Projects

8. Bruce B Refurbishment

Emissions to the environment, and therefore resulting incremental dose due to Refurbishment of Bruce B nuclear generating station will be similar to those resulting from refurbishment of the Bruce A nuclear generation station. Incremental dose to members of the public during the refurbishment of Bruce A was estimated to be 0.035 µSv/a for an infant in the critical group (BRUCE POWER 2005, Section 6.2.1.6).
Estimated doses due to refurbishment are small compared to those due to operation of a nuclear power plant. Therefore, refurbishment of Bruce B will result in a net reduction in doses to potential critical groups compared to baseline.

9. Operation of Bruce B Nuclear Generating Station Following Refurbishment

Following refurbishment, releases from the Bruce B nuclear generating station will be at least as low as or lower than at the present time. There will be no net increase in doses to members of the public.

10. Centre of Site Additions and Modifications

Centre of site emissions are very low as compared with emissions from Bruce A and Bruce B. There are negligible public doses due to current operation of the Central Maintenance and Laundry Facility. There will be no measurable changes in public doses resulting from potential additions and modifications.

11. Transfer of Used Nuclear Fuel to a Long-term Repository

It is reasonably foreseeable that used fuel will be transported to a deep geologic repository outside of the Bruce nuclear site. Effective doses to members of the public due to off-site transportation of used nuclear fuel are estimated to be 0.2 µSv/a (NWMO 2012, Table 6). It should be noted that these doses are estimated for those members of the public sharing a transport route and only a small fraction may be incurred by members of the same potential critical groups as those considered in the baseline assessment for the Bruce nuclear site.

12. DGR for Decommissioning Waste at Bruce Nuclear Site

By the time decommissioning waste could possibly be received at the DGR, the majority of operational low and intermediate level waste would be in place in the DGR and access tunnel closure walls would have been constructed, eliminating all radioactive emissions from this waste. Therefore the total emissions from the DGR from operational wastes will reduce to virtually zero. The contribution to dose from the possible emplacement of decommissioning waste in a DGR at the Bruce nuclear site is not expected to be higher than the previous phase for operational waste. The incremental dose due to disposal of decommissioning waste at DGR will be approximately 0.7 µSv/a.

Summary

Table 1 summarizes the expected trend in change to dose resulting from future projects. Table 2 (provided at the end of the responses to EIS IRs) provides a timeline of cumulative doses.

Table 1: Projected Dose Changes as a Result of Future Projects

Project		Projected Net Change Relative to Current Dose	Estimated Project Dose
DGR Project Operations		▲	< 0.7 µSv/a
Existing Projects		∅	Included in baseline radiological environment < 8 µSv/a
Certain/Planned Projects			
Bruce A	Decommissioning	▼	< 0.04 µSv/a
	Safe Storage	▼	Negligible compared to baseline
Bruce B	Decommissioning	▼	< 0.04 µSv/a
	Safe Storage	▼	Negligible compared to baseline
RWOS1 Safe Storage		∅	Negligible compared to baseline
WWMF Upgrades		▲	< 0.2 µSv/a
WUFDSF Expansion		∅	No change
Reasonably Foreseeable Projects			
Bruce B	Refurbishment	▼	< 0.04 µSv/a
	Operation	∅	No change
	Decommissioning	▼	< 0.04 µSv/a
	Safe Storage	▼	Negligible compared to baseline
Centre of Site Additions and Modifications		∅	No change
Transfer of Used Fuel to Long-term Repository		▲	< 0.2 µSv/a
DGR for Decommissioning Waste at Bruce Nuclear Site		∅	<0.7 µSv/a

Notes: ▲ Increase
▼ Decrease
∅ No change

The overall public dose due to facilities/projects at the Bruce nuclear site will vary temporally as a result of projects that may act cumulatively with the DGR Project, increasing at times and at other times decreasing. The temporal sequence of the projects is provided in Figure 1 (Figure 10.4-2 of OPG 2011, reproduced below). It can be seen from Table 1 and Figure 1 that the highest potential for cumulative radiological effects could take place after operation of the DGR commences, at the same time as the Bruce A and Bruce B nuclear generating stations are operational following WWMF Upgrades and WUFDSF Expansion. The peak annual total cumulative dose from all these projects will be less than 10 µSv/a. This overestimates the cumulative dose because the existing projects/activities are assumed to continue to 2080, which is not the case. As these projects/activities are discontinued the associated dose

would also. These decreases are not reflected in the cumulative doses in the table. Total cumulative dose will reduce after shutdown of, for example, Bruce B nuclear generating station.
Therefore, it is not expected that the dose to the public from the Bruce nuclear site at any time over the life of the DGR Project will reach the lower, *de minimus*, threshold of 10 µSv/a. OPG's response to IR-EIS-06-232 provides further information on the doses to the public relative to regulatory limits and background doses.

EIS-08-341

Section 8.1,
General Information and Design
Description

Information Request:

Provide the maximum expansion capacity of the proposed DGR.
Discuss any obstacles to expansion and how these could conceivably be overcome.

Context:

Given that the safe storage and decommissioning of reactors such as Bruce (in approximately 2024) and Bruce A (in approximately 2046) overlap the operational phase of the DGR, future EAs (addressing decommissioning) could conceivably propose disposal of low and intermediate level decommissioning waste at the DGR.

OPG Response:

OPG's application is for a site preparation and construction licence for a repository with a capacity of approximately 200,000 cubic metres for OPG's operational and refurbishment low and intermediate level waste.

In accordance with the requirements of the Environmental Impact Statement Guidelines (CEAA and CNSC 2009, Section 14), OPG undertook an assessment of the cumulative effects of an expansion of the repository to include OPG's reactor decommissioning wastes, with results reported in the Environmental Impact Statement (OPG 2011, Section 10).

Furthermore, OPG's responses to Information Requests EIS-04-120 (OPG 2012a) and EIS-04-145 (OPG 2012b) discuss the maximum expansion potential of the DGR that has been assessed, as well as some of the factors that would be involved in constructing such an expansion.

References:

CEAA and CNSC. 2009. Guidelines for the Preparation of the Environmental Impact Statement for the Deep Geologic Repository of Low- and Intermediate- Level Radioactive Wastes. (CEAA Registry Doc# 150) OPG. 2011. OPG's Deep Geologic Repository for Low and Intermediate Level Waste – Environmental Impact Statement. Ontario Power Generation report 00216-REP-07701-00001 R000. Toronto, Canada. (CEAA Registry Doc# 298)

OPG. 2012a. OPG Letter, A. Sweetnam to S. Swanson, "Deep Geologic Repository Project for Low and Intermediate Level Waste – Submission of Responses to a Sub-set of Package #4 Information Requests", CD# 00216-CORR-00531-

EIS-08-378

Section 7.1,
Purpose and Need for the Project

Information Request:

Provide a specific break down of waste volumes per reactor and per activity, in the form of a pie chart. Identify whether any decommissioning waste is in the current proposed project description.

Context:

On page 3-2, in section 3.1 'Purpose of the Project' it states if the fleet of 20 reactors each operate to the end of life (a nominal 50 years), which assumes refurbishment of each of the generating stations, approximately 200.000 m^3 (emplaced volume) of operational and refurbishment L&ILW would be produced".

On page 3-4 of the EIS, it states "...as a result of the refurbishment and improvements activities it is expected the life of each reactor unit will be extended for up to 25 to 30 years." "About 21,000 m3 of radioactive waste will be generated from the planned refurbishment activities".

It is not evident if the amount of 21,000 m3 is the waste generated from each of the 16 reactors (20 minus 4 at Pickering B) or a combined amount for all ongoing and possibly planned refurbishments.

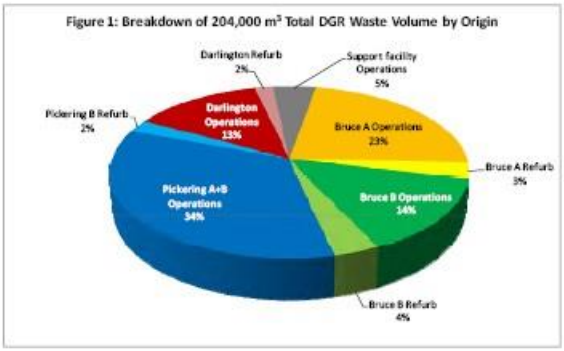
Also, on the page 3-4, OPG states that, "in the future, an additional approximately 135,000 m3 of L&ILW is expected to be produced during the decommissioning of the [20] reactors and the associated nuclear waste storage facilities." The next sentence reads: "The currently proposed DGR Project does not include management of decommissioning waste".

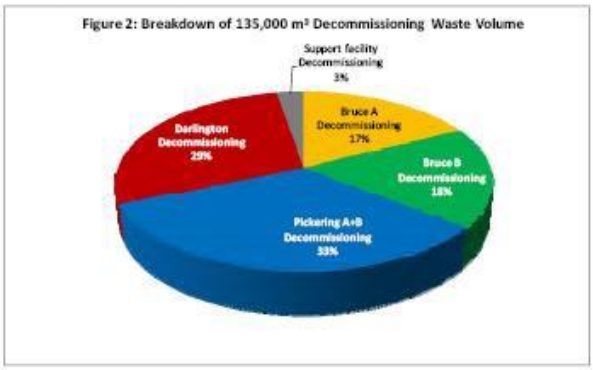
OPG Response:

As documented in the DGR reference inventory report (OPG 2010, Tables 2.1 and 3.1), the amount of waste to be placed in the DGR within the scope of the application is approximately 182,300 m^3 of "operational" low and intermediate level waste plus 21,700 m^3 of "refurbishment" low and intermediate level waste, for a total of 204,000 m^3. This represents the total of all as-packaged waste from OPG owned or operated reactors for emplacement in the DGR, and uses the radiologically-conservative assumption that all reactors except for Pickering A are refurbished for continued operation. (In this context, radiologically-conservative" means maximizing the radionuclide inventory of the waste for postclosure safety assessment purposes.)

The breakdown of the 204,000 m^3 by station and activity is given in Figure 1 below. The "operational" waste includes both the pre- and post-refurbishment periods. The OPG owned or operated support facilities include the waste management facilities at the Pickering, Darlington, and Bruce sites; and the Darlington Tritium Removal Facility, health physics labs, the Central Maintenance and Laundry Facility at the Bruce nuclear site, and other similar facilities required to directly support the operation of the nuclear generating stations.

In addition to this, approximately 135,000 m^3 of decommissioning low and intermediate level waste is expected to be generated in the future. As reported previously in OPG's response to Information Request EIS-04-102 (OPG 2012), this is not included in the current DGR project scope inventory. However, it is identified in the Cumulative Effects Assessment in the Environmental Impact Statement (OPG 2011, Section 10.4.1) as a "reasonably foreseeable" future project. As shown below in Figure 2, the 135,000 m^3 of decommissioning waste can be allocated as approximately 17% Bruce A, 18% Bruce B, 33% Pickering A + B, 29% Darlington, and the remaining 3% for the miscellaneous support facilities.

IR#	EIS Guidelines Section	Information Request and Response
		



References:

OPG. 2010. Reference Low and Intermediate Level Waste Inventory for the Deep Geologic Repository. Ontario Power Generation report 00216-REP-03902-00003-R003. Toronto, Canada. (CEAA Registry Doc# 300) OPG. 2011. OPG's Deep Geologic Repository for Low and Intermediate Level Waste - Environmental Impact Statement. Ontario Power Generation report 00216-REP-07701-00001-R000. Toronto, Canada. (CEAA Registry Doc# 298)

OPG. 2012. OPG Letter, A. Sweetnam to S. Swanson, "Deep Geologic Repository Project for Low and Intermediate Level Waste - Submission of Responses to a Sub-set of Package #4 Information Requests", CD# 00216-CORR-00531- 00134, August 27, 2012. (CEAA Registry Doc# 704)