

DGR Hearing Undertaking No. 72

Description:

Tie the corporate sustainability criteria measures to criteria used in the assessment of significance (ref. to IR EIS-03-44). To what extent does OPG go from general corporate policy issue measurements down to the specifics of the Environmental Impact Statement.

OPG Response:

As required by its *Environmental Policy (OPG-POL-0021)*, OPG is committed to a long-term objective of continual improvement in its environmental performance; to managing its sites in a manner that strives to maintain significant natural areas and associated species of concern; and to working with its community partners to support regional ecosystems and biodiversity through science-based habitat stewardship. In accordance with its *First Nations and Métis Relations Policy (OPG-POL-0027)*, OPG is committed to building long term, mutually beneficial working relationships with aboriginal communities proximate to its present and future operations. OPG is committed through its *Disclosure Policy (OPG-POL-0025)* to ensuring that its public communications are informative, timely, and accurate and disclosed in accordance with all applicable legal and regulatory requirements and appropriate best practices. OPG's *Nuclear Safety Policy (OPG-POL-0001)* makes nuclear safety the overriding priority in all activities performed in support of OPG nuclear facilities, with clear priority over schedule, cost and production. (These policies are all available on the Governance page of OPG's website: www.opg.com.)

In addition, OPG's Environmental Management System includes Significant Environmental Aspects such as emissions to air and water, fish impingement and entrainment, and habitat alteration, including biodiversity programs. OPG's policies and programs demonstrate its commitment to environment, sustainability and the precautionary principle.

These policies and commitments inform all of OPG's activities, including the planning process for the DGR Project, and are well aligned with the five guiding principles for environmental assessment set out in the EIS Guidelines (CEAA and CNSC 2009):

- Environmental Assessment as a planning tool
- Public participation and aboriginal engagement
- Traditional knowledge
- Sustainable development
- Precautionary approach

The sustainable development guiding principle is described in Section 2.4 of the EIS Guidelines (CEAA and CNSC 2009):

Sustainable development seeks to meet the needs of present generations without compromising the ability of future generations to meet their own needs.

Environmental assessment provides a systematic approach for identifying, predicting and evaluating the potential environmental effects of projects before decisions are made. In addition, environmental assessment provides the means to identify mitigation measures for adverse effects. Environmental assessment promotes sustainable development and contributes to decision making that can ultimately provide net ecological, economic and social benefits to society.

A project that is supportive of sustainable development must strive to integrate the objective

of net ecological, economic and social benefits to society in the planning and decision-making process and must incorporate citizen participation. The project, including its alternative means, must take into account the relations and interactions among the various components of the ecosystems and meeting the needs of the population. The proponent must include in the EIS consideration of the extent to which the Project contributes to sustainable development. In doing so, the proponent should consider, in particular:

- (a) The extent to which biological diversity may be affected by the Project; and*
- (b) The capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of present and future generations.*

The concept of sustainability is woven throughout the Environmental Impact Statement and supporting Technical Support Documents prepared by OPG. Consistent with the EIS Guidelines and OPG's focus on environmental stewardship, sustainability was a guiding principle for the environmental assessment of the DGR Project.

Consideration of sustainability concepts was incorporated into the definition of Valued Ecosystem Components (VECs), which form the foundation of the assessment of effects. For example, VECs in the terrestrial and aquatic environments were chosen using factors such as presence and abundance in study areas, ecological importance, and expressions of stakeholder interest, to represent indicators of ecosystem functions or important receptors in the ecosystem, which may be affected by the Project. In addition, the VECs used for assessing effects on the socio-economic environment were organized in a community well-being framework, which has been applied to sociological, economic and sustainable development planning studies in Canada and internationally.

Study areas were identified to reflect the areas that could reasonably be expected to be affected, or which were relevant to cumulative effects. For the terrestrial and aquatic environments, for example, the study areas were defined to represent the geographic scale at which the functions of sustainability, continuity, species movement and abundance can be interpreted.

Using the assessment framework created by the VECs and study areas, environmental effects were identified, mitigation measures were applied and the significance of predicted residual adverse effects was assessed. The extent to which biological diversity may be affected by the DGR Project is specifically described in Section 7.12 of the EIS (OPG 2011). The potential effects of the DGR Project on the capacity of renewable resources are specifically described in Section 11 of the EIS (OPG 2011). In addition, the responses to IR-EIS-01-15 (OPG 2012a), IR-EIS-08-379 (OPG 2013a) and IR-EIS-09-477 (OPG 2013b) discuss sustainability issues specifically in relation to aquatic species of natural conservation status, Lake Whitefish, and snapping turtles.

In the response to IR-EIS-03-44 (OPG 2012b), OPG explained how sustainability principles were used to derive the significance criteria levels described in Table 7.1-1 of the EIS (magnitude, extent, duration, frequency, irreversibility and probability) (OPG 2011). Those criteria are based on the categories listed in the EIS Guidelines for the assessment of significance of predicted effects. As stated in the response, sustainability is most important to the assessment of significance for the "degree of irreversibility" assessment measure. It is also a factor in the magnitude and extent criteria for some VECs.

In the response to IR-EIS-12-510 (OPG 2014), OPG used a narrative reasoned argument approach to assess the significance of the residual adverse environmental effects for air quality, noise, hydrology, the aquatic and terrestrial environments, and Aboriginal interests that had been identified through the environmental assessment process and documented in the EIS (OPG 2011). For each residual adverse effect, a hypothesis statement was formulated identifying the conditions that would make a residual adverse effect significant.

Each effect was then judged against the hypotheses in detailed narratives, based on the

evidentiary basis contained in the EIS (OPG 2011). The response to IR-EIS-12-510 (OPG 2014) also includes consideration of significance in terms of the significance criteria specified in the EIS Guidelines, but in a narrative form and not in terms of high, medium and low scoring.

While the concept of sustainability was not specifically discussed in the response to IR-EIS-12-510, it significantly influences the hypotheses for the terrestrial environment and the aquatic environment. All conditions for defining what would constitute a significant effect are related directly or indirectly to principles of sustainability.

Sustainability has less influence on the significance hypotheses for hydrology, near-surface geology and hydrogeology, and surface water quality. While those hypotheses are primarily focused on meeting standards or thresholds, they do account for the potential to affect sensitive or critical habitats on a long-term or continuous basis.

Sustainability has limited influence on the significance hypotheses for air quality, noise, and radiation and radioactivity, which are founded on quantitative thresholds, taking into account regulatory limits where available. In some cases, sustainability may be inherent in the regulatory thresholds, which are developed to be protective of the environment, sustaining it for future generations.

The Aboriginal interests residual adverse effect concerns the use of a cultural feature. As stated in the Aboriginal Interests TSD, Aboriginal peoples have stated that their traditional lands, waters, and resources are a fundamental part of their culture, identity, economy, and are essential to the sustainability of their communities.

The following table, based on the table in the response to IR-EIS-12-510 (OPG 2014), describes the consideration of sustainability in the development of the significance hypotheses. Where possible, the table notes the consideration of sustainability in the table attached to the response to IR-EIS-03-44 (OPG 2012b). (Note that the first three columns in the attached table are identical to Table 1A in the response to IR-EIS-510. For completeness, we have retained the third column from Table 1A, which captures the results of the significance assessment.)

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 Project 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 Previously Committed Responses to Information Requests", CD# 00216-CORR-00531-00126, August 9, 2012. (CEAA Registry Doc# 683)

OPG. 2012b. OPG Letter, A. Sweetnam to S. Swanson, "Deep Geologic Repository Project for Low and Intermediate Level Waste – Submission of Responses to Information Request (IR) Package #3", CD# 00216-CORR-00531-00117, July 9, 2012. (CEAA Registry Doc #608)

OPG. 2013a. OPG Letter, W. Robbins to S. Swanson, "Deep Geologic Repository Project for Low and Intermediate Level Waste – Submission of Responses to the Final Sub-set of Package #8 Information Requests", CD# 00216-CORR-00531-00171, March 15, 2013. (CEAA Registry Doc# 915)

OPG. 2013b. OPG Letter, A. Webster to S. Swanson, "Deep Geologic Repository Project for Low and Intermediate Level Waste – Submission of Responses to the Second Sub-set of Package #9 Information Requests", CD# 00216-CORR-00531-00180, April 15, 2013. (CEAA Registry Doc# 957)

OPG. 2014. OPG Letter, L. Swami to S. Swanson, "Deep Geologic Repository Project for Low and Intermediate Level Waste – Submission of Response to Information Request EIS-12-510", CD# 00216-CORR-00531-00225, March 28, 2014. (CEAA Registry Doc# 1836)

Table Associated with OPG Response to DGR Hearing Undertaking No. 72

Residual Adverse Effect	Hypothesis	Significance Assessment	Consideration of Sustainability
Hydrology – Section 2			
Reduction in surface water quantity and flow in the existing North Railway Ditch prior to the confluence with Stream C (31%)	For an effect on an existing engineered channel (e.g., a ditch) to be assessed as a significant adverse effect, <i>a decrease in flow must be sufficient to alter the capacity of the engineered channel through excessive sediment deposition.</i>	Not significant. The current flow in the North Railway Ditch is already low and the decrease is not expected to increase the amount of sediment deposition such that it will affect the design capacity enough to cause flooding. Additionally, the sediment deposition can be readily addressed through maintenance.	Sustainability was generally considered in the effects assessment. The <i>hypothesis</i> relating to natural streams (provided in the body of the response to IR-EIS-12-510 but not applied as all predicted residual effects related to engineered channels) included the potential to alter habitat for sensitive aquatic species. The nature of the identified residual adverse effects to engineered channels did not necessitate specific consideration of sustainability in determining the <i>hypothesis</i> . As noted in the response to IR-EIS-03-44, reversibility was a factor in the EIS significance assessment.
Increase in surface water quantity and flow in the existing drainage ditch at Interconnecting Road (114% during the site preparation and construction phase and 61% during the operations phase)	For an effect on an existing engineered channel (e.g., a ditch) to be assessed as a significant adverse effect, <i>an increase in flow must exceed the design capacity of the channel sufficiently to cause flooding and/or erosion.</i>	Not significant. While the predicted increase in flow has the potential to exceed the existing design capacity of the ditch, the flow capacity will be assessed and the ditch re-sized during the final design process, if necessary, to ensure that increases in flow will not cause flooding and/or erosion.	
Terrestrial Environment – Section 3			
Loss of eastern white cedar caused by the removal of 8.9 ha of mixed woods	For the loss of eastern white cedar in the Local Study Area to be considered a significant adverse effect, one or more of the following would be required: <ul style="list-style-type: none"> • <i>the sustainability and productivity of the local population of eastern white cedar would be compromised;</i> • <i>woodland attributes (e.g., edge-area ratio, stand size, shape and age), species or ecological functions that are unique in the Local Study Area would be affected;</i> • <i>habitat connectivity and movement within the ecosystem would be disrupted; and/or</i> 	Not significant. The removal of 8.9 ha of mixed woods is not large enough to affect the sustainability or productivity of eastern white cedar in the Local Study Area and is reversible with time following closure of the DGR Project. The three small, fragmented stands of mixed woods that will be removed are comprised of regenerating common species with no notable age or size characteristics, do not support any sensitive species or provide unique ecological functions that would be lost, and adjacent woodland populations and communities will not be compromised.	A broad range of VECs was selected to represent important and susceptible receptors. Sustainability is specifically considered in each part of the significance <i>hypothesis</i> . As noted in the response to Information Request EIS-03-44, magnitude was considered in the EIS significance assessment to ensure that a sustained population of the VEC remains. The Local Study Area was established to ensure that the effects of the change on the overall communities, within the

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	<ul style="list-style-type: none"> <i>sustainability in the Local Study Area of other species that have dependence on the specific areas affected (or dependence on the Local Study Area communities containing the VEC) would be compromised by the loss (i.e., they have an obligate dependence).</i> 	<p>The loss of the three mixed wood stands will have no measurable effect on regional connectivity or biophysical processes, and will not cause or contribute to fragmentation in the Local Study Area.</p> <p>There are no sensitive wildlife species or wildlife habitat use patterns that could be compromised by the loss.</p>	<p>ecological context of the species affected, were considered. Reversibility, in the context of whether an affected species would be able to recover, was important to both the EIS significance assessment and the development of the <i>hypothesis</i>.</p>
Aquatic Environment – Section 4			
<p>Removal of burrowing crayfish habitat present in the North Railway Ditch, other drainage ditches and ephemerally wet low areas during site preparation activities</p>	<p>For an effect on aquatic VECs to be considered a significant adverse effect, one or more of the following would be required:</p> <ul style="list-style-type: none"> <i>habitat that is critical to the sustainability and productivity of the aquatic VECs is removed and there is no suitable habitat found elsewhere in the Site Study Area;</i> <i>removal and/or alteration of habitat causes changes to the ecological function of the aquatic community or the aquatic habitat in the Site Study Area; and/or</i> <i>aquatic habitat connectivity and movement of aquatic VECs within the Site Study Area is disrupted.</i> 	<p>Not significant. The area of aquatic habitat loss is not large enough to affect the sustainability or productivity of the local populations of affected aquatic VECs in the Site Study Area.</p> <p>The habitat loss is not expected to cause changes to the ecological function of the aquatic community or the aquatic habitat in the Site Study Area.</p> <p>The habitat loss is not expected to affect watercourse habitat connectivity or disrupt flow movement or migration within the study areas.</p>	<p>A broad range of VECs was selected to represent important and susceptible receptors. Sustainability of the local community is specifically considered in each part of the <i>hypothesis</i>. The <i>hypothesis</i> is focused on effects in the Site Study Area because the affected aquatic VECs have limited geographic range. The <i>hypothesis</i> is focused more on quality rather than quantity of habitat affected. As noted in the response to Information Request EIS-03-44, magnitude was assessed in the EIS significance assessment in a manner that put a higher value on critical habitat. Reversibility, in the context of whether an affected species would be able to recover, was important to both the EIS significance assessment and the development of the <i>hypothesis</i>.</p>
<p>Alteration of aquatic habitat for redbelly dace, creek chub, burrowing crayfish, variable leaf pondweed and benthic invertebrates in the South Railway Ditch caused by</p>	<p>For an effect on aquatic VECs to be considered a significant adverse effect, one or more of the following would be required:</p> <ul style="list-style-type: none"> <i>habitat that is critical to the sustainability and productivity of the aquatic VECs is removed and there is no suitable habitat found elsewhere in the Site Study Area;</i> <i>removal and/or alteration of habitat</i> 	<p>Not significant. The affected habitat is of marginal (non-critical) quality for the aquatic VECs when compared to the quality and availability of habitat elsewhere in the Site and Local Study Area.</p> <p>The habitat alteration is not expected to cause changes to the ecological function of the aquatic community or the aquatic habitat in the Site Study Area.</p>	<p>Reversibility, in the context of whether an affected species would be able to recover, was important to both the EIS significance assessment and the development of the <i>hypothesis</i>.</p>

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Residual Adverse Effect	<i>Hypothesis</i>	Significance Assessment	Consideration of Sustainability
construction of the rail bed crossing	<p><i>causes changes to the ecological function of the aquatic community or the aquatic habitat in the Site Study Area; and/or</i></p> <ul style="list-style-type: none"> <i>aquatic habitat connectivity and movement of aquatic VECs within the Site Study Area is disrupted.</i> 	The habitat alteration is not expected to affect watercourse habitat connectivity or disrupt flow movement or migration within the study areas.	
Air Quality – Section 5			
Increase in calculated maximum ambient concentrations of 1-hour NO ₂ , 24-hour NO ₂ , annual NO ₂ , 1-hour CO, 24-hour CO, 24-hour SPM, annual SPM, 24-hour PM ₁₀ and 24-hour PM _{2.5}	To have a significant effect on the air quality VEC, <i>the DGR Project would need to result in ambient air concentrations beyond the Site Study Area that exceed relevant established ambient air quality criteria more than 10% of the time.</i>	<p>Site Preparation and Construction and Decommissioning Phases: Not significant. The predicted maximum ambient concentrations of SO₂, NO₂ and CO do not exceed the relevant ambient air quality criteria beyond the Site Study Area (i.e., the Bruce nuclear site fence line). The maximum 24-hour ambient concentrations of PM_{2.5}, PM₁₀ and SPM were predicted to exceed relevant criteria on an infrequent basis and in a relatively small area immediately adjacent to, but beyond, the Site Study Area.</p> <p>Operations Phase: Not significant. None of the predicted maximum ambient concentrations exceed the relevant ambient air quality criteria.</p>	Sustainability was generally considered in the effects assessment. The nature of the identified residual adverse effect did not necessitate specific consideration of sustainability in determining the <i>hypothesis</i> . However, the <i>hypothesis</i> is founded on relevant established ambient air quality criteria, which are developed to be protective of the environment, sustaining it for future generations. As noted in the response to IR-EIS-03-44, reversibility was a factor in the EIS significance assessment.

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Noise – Section 6			
Increase in noise levels at four residences near receptor R2 (Baie du Doré) during the quietest hour.	For a noise effect to be considered a significant adverse effect, <i>the change in ambient noise would need to be disturbing (i.e., >10 dB change in the quietest hour).</i>	Not Significant. Noise effects would not be perceived as disturbing as the predicted change in ambient noise levels at the four residences near Baie du Doré is less than 10 dB. Adverse effects were predicted only during the site preparation and construction and decommissioning phases and only in areas immediately adjacent to the Site Study Area, a short distance into the Local Study Area.	Sustainability was generally considered in the effects assessment. The identified residual adverse effect is based on human disturbance, so there was no specific consideration of sustainability in determining the <i>hypothesis</i> . As noted in the response to IR-EIS-03-44, reversibility was a factor in the EIS significance assessment.
Aboriginal Interests – Section 7			
Diminishment of the quality or value of activities undertaken by Aboriginal peoples at the Jiibegmegoong burial site located within the Bruce	For an effect on Aboriginal heritage resources, specifically the Jiibegmegoong burial site, to be considered a significant adverse effect, <i>the Project would need to prevent or interfere with the performance of ceremonies at, or observation of, the burial site.</i>	Not significant. The DGR Project is not anticipated to further restrict access to the burial site for ceremonial purposes or prevent or interfere with ceremonies at the burial site. While the waste rock pile and other Project-related structures will be visible at the burial site, they are not expected to prevent or interfere with ceremonial activities. In addition, indirect effects from noise and dust are expected primarily during the site preparation and construction and decommissioning phases of the project, and would be reversible with time	The predicted effect relates to the use of a cultural feature. As stated in the Aboriginal Interests TSD, Aboriginal peoples have stated that their traditional lands, waters, and resources are a fundamental part of their culture, identity, economy, and are essential to the sustainability of their communities. As noted in the response to IR-EIS-03-44, sustainability was considered in the EIS significance assessment in terms of the reversibility of the effect on Aboriginal interests. This is inherent in the consideration of whether the effect prevented or interfered with the cultural activity.

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Radiation and Radioactivity – Section 8			
No residual adverse effects on radiation and radioactivity identified	For a significant adverse effect of radiation and radioactivity to occur, <i>the DGR Project would need to cause radiological releases that result in doses to human or non-human biota in excess of the relevant Canadian Nuclear Safety Commission (CNSC) regulatory requirements.</i>	As all predicted doses are less than established dose criteria, no residual adverse effects as a result of radiological releases from the DGR Project were predicted to occur, and no significance assessment was performed.	Sustainability was generally considered in the effects assessment. The nature of the potential adverse effect did not necessitate specific consideration of sustainability in determining the <i>hypothesis</i> . However, the <i>hypothesis</i> is founded on relevant CNSC regulatory requirements, which are developed to be protective of human health and the environment. As noted in the response to IR-EIS-03-44, reversibility was a factor in the EIS significance assessment.
Near-surface Geology and Hydrogeology – Section 9			
No residual adverse effects on near-surface geology and hydrogeology identified	For an effect to near-surface groundwater to be considered a significant adverse effect, the following would be required: <ul style="list-style-type: none"> • <i>migration of contaminants of potential concern in excess of established criteria and/or guidelines relevant to human or ecological health, on a frequent and/or continuous basis; or</i> • <i>alteration of the shallow groundwater flow regime to an extent that it would alter sensitive or critical habitats on a frequent and/or continuous basis.</i> 	The Project will not have an effect on the overall site groundwater regime or sensitive ecological features located near the site, therefore, OPG concluded that there would be no measurable change to the near-surface geology and hydrogeology that would result in an adverse environmental effect, and thus no residual adverse effects.	Sustainability was generally considered in the effects assessment. The first element of the <i>hypothesis</i> is focused on meeting established criteria and/or guidelines relevant to human or ecological health. The second element of the <i>hypothesis</i> accounts for the potential to affect sensitive or critical habitats on a long-term or continuous basis, and is therefore more relevant to sustainability considerations. As noted in the response to IR-EIS-03-44, reversibility was a factor in the EIS significance assessment.

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Surface Water Quality – Section 10		
<p>No residual adverse effects on surface water quality identified</p>	<p>For an effect to surface water quality to be considered a significant adverse effect, the following would be required:</p> <ul style="list-style-type: none"> • <i>releases of indicator compounds at concentrations in excess of the relevant Provincial Water Quality Objectives or Canadian Environmental Quality Guidelines protective of human or ecological health in receiving waters; or</i> • <i>alteration of the surface water quality regime to an extent that it would adversely affect sensitive or critical habitats on a long-term or continuous basis.</i> 	<p>The project design and the commitments made by OPG provide for water treatment where required to meet applicable criteria (OPG 2012, EIS 04-130). The parameters that may need treatment are well understood, common in industrial environments and are easily managed with common treatment technologies. Ensuring that the discharge criteria are met prevents adverse effects on surface water quality. Therefore, OPG concluded that the DGR Project will not result in residual adverse effects to surface water quality.</p>
		<p>Sustainability was generally considered in the effects assessment. The first element of the <i>hypothesis</i> is focussed on meeting Provincial Water Quality Objectives or Canadian Environmental Quality Guidelines protective of human or ecological health. The second element of the <i>hypothesis</i> accounts for the potential to affect sensitive or critical habitats on a long-term or continuous basis, and is therefore more relevant to sustainability considerations.</p> <p>As noted in the response to IR-EIS-03-44, reversibility was a factor in the EIS significance assessment.</p>