24 April 2017

George Govier
Historic Saugeen Métis
<contact information removed>

Project No.: 209.40423

Dear Mr. Govier,

RE: REVIEW AND COMMENT ON ADDITIONAL OPG DEEP GEOLOGICAL REPOSITORY DOCUMENTS

1.0 INTRODUCTION

In February 2016 the federal Minister of Environment and Climate Change requested Ontario Power Generation (OPG) to provide additional information prior to making a decision on the Environmental Assessment (EA) regarding OPG's Low and Intermediate Level Waste (L&ILW)

Deep Geologic Repository (DGR) Project. In particular the Minister requested:

> a) A study that details the environmental effects of technically and economically feasible alternate locations for the Project, with specific reference to actual locations that would meet OPG's criteria for technical and economic feasibility. In conducting this study, OPG is to detail the thresholds for what is considered to be technically and economically feasible. In addition, OPG is to indicate what the incremental costs and risks would be for additional off-site transportation of the nuclear waste.
>
> b) An updated analysis of the cumulative environmental effects of the Project in light of the results of the Phase 1 Preliminary Assessments undertaken by the Nuclear Waste Management Organization, which identified three potential host communities that fall within the traditional territory of the Saugeen Ojibway Nations (SON).
>
> c) An updated list of mitigation commitments for each identified adverse effect under CEAA [Canadian Environmental Assessment Act] 2012. OPG shall identify out-dated or redundant commitments that were previously brought forward to the Panel.

OPG understood this requirement, in accordance with its terms, to be for a study, rather than the design and implementation of a new multi-year, multi-phased site selection process based on voluntarism and consent. To meet this requirement, OPG prepared a set of documents, which collectively meet the objective to show that the alternate locations meet technical and economic feasibility criteria.

OPG's technical feasibility criteria for an alternate site are:

- whether the depth and thickness of the rock is sufficient, and

- whether the rock is geologically stable for a DGR.

OPG's economic feasibility criterion is their ability to finance the cost of a DGR at the alternate location.

OPG responded to the request for additional information from the Minister of Environment and Climate Change in a letter dated 28 December 2016. The letter included enclosures addressing three main topics of the information request:

a) Study of Alternate Locations
    - *Study of Alternate Locations Main Submission*, 00216-REP-07701-00013
    - *Description of Alternate Locations*, 00216-REP-07701-00014
    - *Environmental Effects of Alternate Locations*, 00216-REP-07701-00015
    - *Cost and Risk Estimate for Packaging and Transporting Waste to Alternate Locations*, 00216-REP-03450-00001
b) Updated Analysis of Cumulative Environmental Effects
    - *Updated Analysis of Cumulative Environmental Effects*, 00216-REP-07701-00018
    - *Adaptive Phased Management (APM) Deep Geologic Repository (DGR) Preliminary Description*, 00216-REP-07701-00017
c) Mitigation Measures
    - *Mitigation Measures Report*, 00216-REP-07701-00019

OPG has identified two alternate locations that meet its technical and economic feasibility criteria:

- one in crystalline rock of the Canadian Shield in central to northern Ontario, and
- one in a sedimentary rock formation in southern Ontario.

SLR reviewed the seven documents listed above from a natural environment perspective focusing on terrestrial and aquatic aspects of the environment at the request of the Historic Saugeen Métis (HSM).

The SLR reviewers are:

- **Gord Wichert, Ph.D., R.P.Bio., P.Biol.,** Senior Aquatic Ecologist;
- **Dale Leadbeater, B.Sc., B.Ed., R.P.Bio., P.Biol.,** Senior Terrestrial Ecologist;

Our review addresses the three topics above. The criteria we have used to evaluate the content by topic include:

a) Study of Alternative Locations
    i) Is the model used to characterize terrestrial and aquatic ecosystems at the alternative locations appropriate including:
    ii) Identification of ecological constraints associated with each additional location
    iii) Appropriate sampling locations
    iv) Components representing key features and functions
    v) Components representing sensitivities of the sites

vi) Appropriate surrogates where information on key components is lacking
vii) Identification of environmental effects
viii) Appropriate mitigation measures

b) Updated Analysis of Cumulative Environmental Effects at Bruce Nuclear DGR and APM DGR
   i) Components representing key features and functions
   ii) Components representing sensitivities of the site
   iii) Appropriate surrogates where information on key components is lacking
   iv) Identification of cumulative environmental effects
   v) Appropriate mitigation measures

c) Mitigation Measures
   i) Identification of mitigation techniques and strategies appropriate for identified effects
   ii) Organization of measures to avoid gaps among environmental components

2.0 STUDY OF ALTERNATIVE LOCATIONS

As indicated above, OPG identified representative sedimentary and crystalline locations that meet their criteria as alternatives to the DGR at the Bruce Nuclear site. While these crystalline and sedimentary locations meet these feasibility criteria, further investigative steps and evaluation would be necessary before a site is selected. Those steps would include implementing a site selection process, which would impose additional criteria beyond the feasibility criteria described above.

SLR reviewed the following documents from terrestrial and aquatic environment perspectives using the assessment criteria listed above, however the cost and risk estimate report did not focus on natural environment considerations.

a) *Study of Alternate Locations Main Submission*, 00216-REP-07701-00013
b) *Description of Alternate Locations*, 00216-REP-07701-00014
c) *Environmental Effects of Alternate Locations*, 00216-REP-07701-00015
d) *Cost and Risk Estimate for Packaging and Transporting Waste to Alternate Locations*, 00216-REP-03450-00001

In the following sections we have identified the relevant text in the documents that describes the natural environment of the two alternatives and the predicted effects of the DGR. Note that the effects assessment is limited to

> *"… the VCs … as defined in section 5(1) (a) of CEAA 2012 (i.e., fish habitat and aquatic species are considered under the aquatic habitat and aquatic biota VCs, migratory birds are considered under the wildlife and wildlife habitat VC), and were also chosen to encompass the range of changes in environmental conditions that may be encountered. These VC groupings are also consistent with the VCs used in the EIS for the DGR Project at the Bruce Nuclear site, which was based on input from the public in preparing the EIS guidelines for the prior assessment [OPG 2011]. Table 5-1 presents the VCs that are the subject of this assessment."*

Table 5-1: Valued Components Identified for Evaluation of Alternate Locations Environmental Component Valued Component (VC)

Environmental Component	Valued Component (VC)
Atmospheric Environment	Air quality Noise levels
Surface Water	Surface water quality Surface water quantity and flow
Aquatic Environment	Aquatic habitat Aquatic biota
Terrestrial Environment	Vegetation communities, including upland and wetland Wildlife habitat and biota
Geology and Hydrogeology	Soil quality Groundwater quality Groundwater flow
Radiation and Radioactivity	Humans Non-human biota
Land and Resource Use (Traditional and Non-traditional)	Use of lands and resources

2.1 Natural Environment – Crystalline Location

The following statements are from the set of documents describing the alternate DGR locations. These statements are listed here and then summarized and assessed in Tables 1 and 2.

The crystalline alternate DGR location lies within the Boreal Shield ecozone. Consistent with typical Canadian Shield settings in central to northern Ontario, land cover is dominated by Boreal forest.

The physical topography has low relief as is typical of Canadian Shield, reflecting erosion over millions of years. There are numerous small water bodies as is typical of the Canadian Shield. Central to northern Ontario is generally well drained with an abundance of wetlands, lakes and rivers.

There are numerous small water bodies in this representative area as is typical of the Canadian Shield. Defined wetlands cover a small percentage of the surface area. Other areas may be transiently wet in the spring. The small lakes and wetlands feed streams that flow into the main river near the bottom of the area. This river corresponds with a topographic low. The presence of lakes, streams and rivers is consistent with typical Canadian Shield conditions. They act as discharge points for surface and groundwater flow.

Surface water quality in the area is generally good with limited anthropogenic influence. It is assumed that the repository surface facilities are placed at least 120 m from any provincially significant wetland consistent with provincial guidelines.

2.1.1 Aquatic Habitat and Drainage Features

All the lands and rivers in the crystalline alternate location lie within one of two main watersheds: the Great Lakes basin/watershed which ultimately drains towards the Atlantic Ocean, or the Hudson Bay basin/watershed which ultimately drains to Hudson Bay. With an appropriate geology and design, the proximity of a water body to the DGR is not relevant because the movement of water or gas, even if it was released from the DGR, would not reach the water body until the radioactivity of such water or gas had diminished to the levels generally found naturally occurring throughout Ontario.

The ecozone of the crystalline alternate location is generally well drained with an abundance of wetlands, lakes and rivers. Characteristic fish include species such as Lake trout, Northern pike, and Burbot. Water quality in this region is generally good with limited anthropogenic influences.

2.1.2 Vegetation and Wildlife

Consistent with typical Canadian Shield settings in central to northern Ontario, land cover is dominated by Boreal forest. The geology is defined by a layer of glacial drift, and lake and river sediments (i.e., clay, silt and sand), overlying the crystalline rock of the Canadian Shield. Crystalline rock is typically fractured, so the repository position within the rock would be dependent on the nature of the fractures.

Land cover in this area tends to be dominated by woodlands, including mixed, coniferous and deciduous forests. Anthropogenic influences such as cutovers and burns are also noted.

Characteristic wildlife species vary within the ecozone, but can include species such as American black bear, moose, snowshoe hare, bald eagle, yellow-rumped warbler, and western painted turtle.

2.1.3 Crystalline Predicted Effects

Overall effects on surface water quantity and flow are likely to be higher in magnitude for the DGR at the crystalline alternate location than for the Bruce Nuclear site, as it may be difficult to construct the waste rock pile and supporting infrastructure without affecting and/or encroaching to some degree on a creek or stream and changing drainage patterns (i.e., through redirection of streams or wetlands). In addition, initially there would be higher volumes of water to be managed from underground which would affect some drainage patterns in the area and would change flows at one or more locations.

For the site preparation and construction of the DGR, lands would have to be cleared and developed for necessary infrastructure. In general, the spatial extent of wetlands communities at the crystalline alternate location is extensive. Because of the large extent of wetland cover on the landscape, the removal of small pieces would not be considered as significant or detrimental to the function of wetlands at the regional scale.

As background noise levels are assumed to be lower, with few anthropogenic sources at

the crystalline alternate location, wildlife may not be habituated to the increased noise and activity levels from construction. It is also assumed that there are fewer existing light sources in this region and increased light levels may also contribute to effects on habitat quality.

As the location is in Central to Northern Ontario, it is likely that there would be a need to construct new road and power access to the site. For the purpose of assessing environmental impacts, a range of 0-20 km has been assumed for the establishment of road access, and 0-50 km to establish a high-voltage power corridor to the site.

Key terrestrial and aquatic features and predicted effects are summarized and reviewed in Table 1 and Table 2 below.

Table 1: Valued Component Selection and Rationale – Crystalline Rock Alternate DGR Location

Environmental Component	Valued Components	Features – Crystalline Location	Comments
Surface Water	Quality	High quality with limited anthropogenic influence.	OPG provides no information or references on measures such as relief, watercourse and water body density, catchment area, or position in catchment for the Bruce Nuclear site DGR or for alternate crystalline locations. Without this information high uncertainty around comparisons of water quality, quantity and flow for an alternate sedimentary location and the Bruce DGR limit any meaningful conclusions about the relative magnitude of effects to surface water.
	Quantity and Flow	Low relief, numerous small water bodies, abundance of wetlands, lakes and rivers typical of Canadian Shield	
Aquatic Environment	Aquatic Habitat	OPG considered small rivers, streams and wetlands. Assumed these features are influenced by agricultural and low intensity urban-industrial land use	OPG did not consider benthic invertebrates as an indicator of lower trophic level phenomena and a fundamental source of energy for higher trophic level feeders. Including forage based fish species and benthic invertebrates would result in a more complete representation of ecosystem trophic levels. Including forage species fish species from a broader range of feeding guilds, e.g. planktivores, invertivores, piscivores and feeding modes, would result in a more complete representation of ecosystem functions and trophic levels. Although cold water fish habitat may be abundant at the crystalline location, crystalline locations usually support cool and even warm water species in some locales which should be represented by appropriate species. Assessment of effects to aquatic biota is limited unless an appropriate and representative set of species is considered.
	Biota	No explicit consideration for characteristic water temperature but the following list of species implies cool and cold water: Lake trout, Northern pike, and Burbot	

Environmental Component	Valued Components	Features – Crystalline Location	Comments
Terrestrial Environment	Vegetation Communities	Mixed, coniferous and deciduous forests	The wetlands are characterized as being both covering “small percentage of the surface area” and “extensive”, making the predictions with respect to wetlands uncertain. This Ecozone comprises 9 ecoregions and 40 Ecodistricts that are defined by soils and vegetation diversity. To characterize the vegetation cover in such simple terms under estimates the importance of the resources Deciduous forests comprise only a small portion of the forest cover vs extensive mixed coniferous/deciduous stands, and extensive coniferous forest/swamp complexes. The effect of widespread logging operations, mining exploration, utility corridors and recreational access that has created extensive fragmentation is not acknowledged although “burns and cutovers” are mentioned.
	Wildlife Habitat and Biota	American black bear, moose, snowshoe hare, bald eagle, yellow-rumped warbler, and western painted turtle with possible caribou and gray [sic] wolf; large home ranges and movement corridors	An area known as “The Land Between” is included in Ecoregion 5E that provides the highest biodiversity in all of Ontario. While the species cited as representative do occur in this Ecozone, for the purposes of assessment, they don’t represent a nested food web nor the many Species at Risk that occur there. Representatives of western biomes have been omitted. Lack of specificity, even at a very high level, reduces the confidence of any predictions of effects.

Table 2: Environmental Effects and Mitigation, Alternate Crystalline Location Compared to DGR Project Location

Environmental Component	Valued Component	Crystalline Rock Location		Comments
		Environmental Effect	Mitigation	
Surface Water	Quality	OPG assumes similar effects as at DGR site because releases must meet guidelines	OPG assumes more restrictive discharge limits than for DGR because receiving water body has lower assimilative capacity than DGR receivers OPG assumes greater alteration of drainage patterns and larger volumes of water for management	OPG shows no data or references to support assumptions regarding assimilative capacity. OPG provides no information or references on watercourse or water body density that would confirm alteration of drainage patterns. Both the alternate crystalline and sedimentary locations would require new temporary and permanent watercourse crossings.
	Quantity and Flow	OPG indicates greater effects associated with surface water quantity and flow than for DGR site	Assumes additional mitigation to manage greater volumes of groundwater ingress in shafts and underground excavations	OPG provides no references to support general assumptions regarding groundwater ingress. SLR colleagues with groundwater expertise indicate that some crystalline locations would have low groundwater management requirements.
Aquatic Environment	Habitat	OPG assumes greater effects compared to DGR site	OPG assumes direct loss of aquatic habitat resulting from siting of surface facilities and infrastructure and probable discharge to a small waterbody or watercourse.	No evidence or reference provided to support assumptions regarding likelihood of habitat loss or discharge to small water body or watercourse receptor rather than to large features. The terms small and large are not defined. GIS exercise could provide information to characterize size ranges for features of interest and support these assumptions.

Environmental Component	Valued Component	Crystalline Rock Location		Comments
		Environmental Effect	Mitigation	
	Biota	OPG assumes similar effects as at DGR site, achieved through following approval processes	OPG assumes similar mitigation to achieve results of similar extent as effects at DGR site	OPG considers Lake trout, Northern pike, and Burbot characteristic species for crystalline locations. These species represent piscivorous feeding in lake and large river environments. OPG states that small waterbodies and watercourses are the likely receptors for project effects at crystalline locations yet provide no species commonly found in small waterbodies and watercourses. OPG included neither forage base species nor benthic invertebrates and cannot fully assess effects without considering multiple trophic levels.
Terrestrial Environment Potential interactions between the works and activities at the crystalline alternate location are similar to those identified in Table 4.4-1 and	Vegetation Communities	OPG assumes the location to be undeveloped natural lands; vegetation removal estimated at 40 ha plus corridors (20-50 km); More wetlands removed but of less significance (smaller pieces of extensive cover)	Surface facilities will not be located within a provincially significant wetland, as defined by the MNRF.	Very few PSWs have been identified in the Shield country. No specific mitigation was recommended for vegetation and/or wetland removal.

Environmental Component	Valued Component	Crystalline Rock Location		Comments
		Environmental Effect	Mitigation	
discussed in Section 4.4. pg 51	Wildlife Habitat and Biota	OPG emphasizes potential presence of species with larger home ranges and movement corridors wolverine, woodland caribou and eastern cougar; OPG assumes that habitat fragmentation will be an effect. Increased traffic, noise and light. Assumes that the lands are "undeveloped", however little of central and northern Ontario outside of protected parks remains untouched by primary industry and tourism. Increased effects on habitat connectivity.	Avoid habitat of threatened or endangered species, Significant Wildlife Habitat, Areas of Natural and Scientific Interest; Mitigation measures would be required to reduce or eliminate adverse effects if avoidance not possible. This may include avoiding construction/site clearing activities during sensitive timing windows (e.g., migratory bird nesting season) and habitat compensation measures (e.g., installation of bat boxes).	Designated features as listed are not well represented in central and northern Ontario, therefore avoidance is relatively meaningless. If mitigation only is applied within features of provincial and/or federal significance, and not elsewhere, then the mitigation plan will not adequately protect areas that should be identified but have not yet been subjected to investigation by the planning authority. Large home ranges, but if the same reasoning is applied to forest removal as wetland removal, there will be substantial residuals, and there is a commitment to avoid habitat of these rare and charismatic SAR. Actual removals limited to 40ha plus access/utilities with the remainder protected; could represent a long term benefit as a wildlife refuge as has happened at the Cape Canaveral site in Florida. Although disturbed, the natural cover is extensive, and "corridors" tend to be the roads and utility lines embedded in a matrix of forest, wetland and thicket, therefore effects on habitat connectivity are likely lower than predicted.

2.2 Natural Environment – Sedimentary Location

2.2.1 Sedimentary: Aquatic and Terrestrial Environment

The following statements are from the set of documents describing the alternate DGR location. These statements are listed here and then summarized and assessed in Tables 3 and4.

The physical topography is low relief, as is typical of southern Ontario. There are numerous small rivers or streams in the vicinity. Defined wetlands cover a small percentage of the surface area.

There are numerous small rivers or streams in the vicinity. Defined wetlands cover a small percentage of the surface area. Other areas may be transiently wet in the spring. The streams and rivers drain towards a main river that runs through this area. The river corresponds with a topographic low. The presence of lakes, streams and rivers is consistent with typical southern Ontario conditions. They act as discharge points for surface and groundwater flow.

Other areas may be transiently wet in the spring. The southern Ontario region is generally well drained. Most watercourses are cool to cold water. It is assumed that the repository surface facilities are at least 120 m from any provincially significant wetland as per provincial guidelines.

The repository surface facilities are assumed not to be located on a floodplain; therefore, it is expected that the nearby water courses are not large.

Surface water quality in the area and where streams merge with other watersheds, is assumed to be influenced by agriculture. Most of the sedimentary alternate location is rural, non-urban, with former agricultural land, and no nearby industry as a source of noise or air emissions.

The DGR would occupy a direct surface facilities footprint of about 40 hectares, with capacity to allow for doubling of the underground facility in the future to accommodate decommissioning wastes. Surface water features could be altered if located within this area.

As this location is in southern Ontario, it is unlikely that there would be a need to construct extensive new road and power access to the site. For the purpose of assessing environmental impacts, a range of 0-5 km has been assumed for the establishment of road access, and 0-5 km to establish a high-voltage power corridor to the site.

Surface Water

All runoff from the DGR and associated lands is assumed to be captured in a stormwater management system, with discharge from the waste rock pile runoff at a single location since some level of treatment would be required (e.g., settling basin for solids removal or treatment plant).

Aquatic Environment

The ecozone (mixed wood plains) of the sedimentary alternate location is generally well drained. Most watercourses in the area are cool to coldwater and are considered to be more sensitive to disturbances than warmwater systems. The characteristic fish species include white sucker, smallmouth bass, walleye, northern pike, yellow perch, rainbow darter, emerald shiner and pearl dace, creek chub, Common Shiner.

Vegetation and Wildlife

The sedimentary alternate location lies within the Mixedwood Plains ecozone. Land cover is dominated by cropland, pasture and abandoned fields, with woodland cover at about 16%. The vegetation is diverse. Whether the site was previously brownfield or marginal agricultural, in either case, the land is not expected to have significant existing tree cover.

OPG considered the mixed wood plains as the relevant ecozone for the alternate sedimentary DGR location. Characteristic wildlife in this ecozone includes white-tailed deer, northern raccoon, striped skunk, great blue heron, field sparrow, American bullfrog, and snapping turtle.

Overall, it is assumed that a minimum of 9 ha (equivalent to area of woodland to be cleared at the Bruce Nuclear site), and up to 40 ha (equivalent to the total project surface facilities footprint) of natural vegetation would be removed as part of site preparation and construction. In addition, the full site would be fenced (up to 900 ha). The total controlled area around the DGR would include the underground and surface footprint of 40 ha, and any further area needed for post closure institutional control, for example, or up to about 900 hectares.

This may cause fragmentation of habitats and a potential effect on wildlife VCs. However, for the sedimentary alternate location, considering the regional setting, there is a high probability that the land has already been anthropogenically altered (i.e., agricultural, commercial or industrial).

Overall the above changes in the quantity and quality of vegetation communities and wildlife and wildlife habitat may have an adverse effect on biodiversity at the sedimentary alternate location. However, as the land cover in this ecoregion is fairly disturbed, it is likely that this effect would be of low magnitude.

Key aquatic and terrestrial features and predicted effects are summarized and reviewed in Table 3 and Table 4 below.

Table 3: Valued Component Selection and Rationale – Sedimentary Rock Alternate DGR Location

Environmental Component	Valued Components	Features – Sedimentary Location	Comments
Surface Water	Quality	Considered small rivers, streams and wetlands. Assumed these features are influenced by agricultural and low intensity urban-industrial land use	OPG provides no information or references on measures such as relief, watercourse and water body density, catchment area, or position in catchment for the Bruce Nuclear site DGR or for alternate sedimentary locations. Without this information high uncertainty around comparisons of water quality, quantity and flow for an alternate sedimentary location and the Bruce DGR limit any meaningful conclusions about the relative magnitude of effects to surface water.
	Quantity and Flow	Considered small rivers, streams and wetlands. Assumed low physical relief and wetland cover a small percentage of land	
Aquatic Environment	Aquatic Habitat	Considered water temperature characteristics and indicated most watercourses in the area are cool to cold water and are considered to be more sensitive to disturbances than warm water systems	OPG did not consider benthic invertebrates as an indicator of lower trophic level phenomena and a fundamental source of energy for higher trophic level feeders. Including forage species fish species from a broader range of feeding guilds, e.g. planktivores, invertivores, piscivores and feeding modes, would result in a more complete representation of ecosystem functions and trophic levels. Brook Trout – a cold water indicator – and Creek Chub – are widely distributed in Sedimentary region of south-central Ontario and would represent a broader range of feeding and trophic guilds than represented by the present list; Emerald Shiner is more prevalent in lakes than flowing water and not as widely distributed as a species such as Common Shiner. Burrowing crayfish can serve as an indicator of subtle changes in the shallow groundwater levels. Assessment of effects to aquatic biota is limited unless an appropriate set of representative species is considered.
	Biota	Identified the following species as characteristic of the sedimentary alternate location: White Sucker, Smallmouth Bass, Walleye, Northern Pike, Yellow Perch, Rainbow Darter, Emerald Shiner and Pearl Dace Burrowing Crayfish	

Environmental Component	Valued Components	Features – Sedimentary Location	Comments
Terrestrial Environment	Vegetation Communities	The vegetation is relatively diverse and includes hardwood forest species, lowlands including floodplain forests and peatlands. OPG states that smaller amount of wetland cover on the landscape… increase[s] the importance of each wetland community as it must perform the same biological, hydrological, social and cultural functions to ensure ecosystem integrity as regions with more extensive wetland cover.	2 Ecoregions and 11 Ecodistricts are represented in this study area, including the Carolinian Forest that provides the greatest diversity of rare species in Canada. The summary document notes coniferous forests in this zone, whereas the emphasis is on the rare deciduous forest and mixed forest. At 16% cover, removal of forest becomes a serious effect. Peatlands are not normally noted as a feature of this part of Ontario. Bogs are almost non-existent and fens rare. Organic swamps occur on sandy sites, but remain a much less frequent feature than wetlands on mineral soil. The rationale for loss of wetlands is flawed since the remaining wetlands cannot compensate for losses, hence the emphasis on avoidance and restoration of wetland function. High level characterization of vegetation and wetlands does not provide confidence in the conclusions.
	Wildlife Habitat and Biota	List of characteristic species for sedimentary location: White-tailed Deer, Northern Raccoon, Striped Skunk, Great Blue Heron, Field Sparrow, American Bullfrog, and Snapping Turtle	An area known as “Carolinian Canada” is defined by Ecoregion 7E that provides the highest percentage of rare species in all of Ontario, including rare prairie insects and birds. While the species cited as representative do occur in this Ecozone, for the purposes of assessment , they don’t represent a nested food web nor the many Species at Risk that occur there. Representatives of western biomes have been omitted. Lack of specificity, even at a very high level, reduces the confidence of any predictions of effects.

Table 4: Environmental Effects and Mitigation, Alternate Sedimentary Location Compared to DGR Project Location

Environmental Component	Valued Component	Alternate Sedimentary Rock Location		Comments
		Environmental Effect	Mitigation	
Surface Water	Quality	OPG assumes similar effects as at DGR site because water quality characteristics and releases would be similar to DGR site and releases must meet guidelines	OPG assumes additional mitigation to achieve results if receiving water body has lower assimilative capacity than DGR receivers	No evidence was provided to support assumptions on assimilative capacity. Based on water quality assumptions presented, OPG could equally assume less mitigation if receiving water body has greater assimilative capacity than DGR receivers.
	Quantity and Flow	OPG assumes similar effects as at DGR site because similar water volumes require management	OPG assumes additional mitigation may be required to minimize effects at the alternate location but provides no rationale for this assumption	No evidence was provided to support assumptions on mitigation requirements. Based on lack of evidence OPG could equally assume that less mitigation would be required to minimize effects at the alternate location.
Aquatic Environment	Habitat	OPG assumes similar effects as at DGR site, achieved through following approval process	OPG assumes additional mitigation to achieve results if discharge storm water to smaller watershed	No evidence was provided to support assumptions on watershed size. Based on lack of evidence, OPG could equally assume less mitigation if storm discharge flows to a larger watershed. A GIS exercise could provide information on the likelihood of whether an alternate site is located in a larger or smaller watershed and the range of likely watercourse density. Both the alternate crystalline and sedimentary locations may require new temporary and permanent watercourse crossings.

Environmental Component	Valued Component	Alternate Sedimentary Rock Location		Comments
		Environmental Effect	Mitigation	
	Biota	OPG assumes similar effects as at DGR site, achieved through following approval process	OPG assumes similar mitigation to achieve results similar extent of effects as at DGR site	Limited evidence to support for assumptions on level of environmental effect and amount of mitigation for several reasons. OPG included neither a representative cold water fish species in the list of representative VC species nor invertebrate species representing lower trophic levels. Cold water species typically are more sensitive to disturbance than cool and warm water species and often require more mitigation to achieve similar level of environmental effect. Abundance of benthic invertebrates indicates available food and nutrients to organisms occupying lower and higher trophic levels. Changes in abundance and species composition of benthic invertebrates may indicate project effects.
Terrestrial Environment	Vegetation Communities	These wetlands have the potential to be more sensitive to the incremental effects of further development such as a DGR. Effects of vegetation removal on a "disturbed" landscape expected to be low.	Avoid and set back 120m from PSW, and Areas of Natural and Scientific Interest If a listed feature (above), avoid construction/site clearing activities during sensitive timing windows (e.g., migratory bird nesting season) and habitat compensation measures (e.g., installation of bat boxes)	No data are presented to justify the identification of effects, nor the magnitude of ranks (high, low). No data are presented to indicate that wetlands are at risk given that so many have been drained resulting in large areas of farmland and/or pastures (note: probable habitat for SAR birds). Only features of provincial and/or federal interest are to be mitigated for, implying that features of regional and/or local interest would not be mitigated. On a landscape where these features are increasingly under pressure, this could result in serious losses. Conclusion of "No significant adverse effects" to terrestrial VCs is not substantiated.

Environmental Component	Valued Component	Alternate Sedimentary Rock Location		Comments
		Environmental Effect	Mitigation	
	Wildlife Habitat and Biota	900 ha fenced area may cause habitat fragmentation and associated effects Assumed fewer existing light sources in this region and increased light levels may also contribute to effects on habitat quality Transport would result in an increased potential for wildlife strikes	Avoid habitat of threatened or endangered species and Significant Wildlife Habitat; Location-specific mitigation would be required depending on the amount and nature of habitat removed and the specific VCs affected. Should avoidance of sensitive environmental features not be possible, further mitigation measures would be required to reduce or eliminate effects.	Relatively generic mitigation presented. Limited certainty associated with the assessment of effectiveness of mitigation owing to level of detail associated with mitigation as presented. Many agricultural regions have fenced areas smaller than 900 ha. Potential that the 900 hectares controlled by Ontario Power Generation will succeed to a more natural environment owing to restricted use of the land and may result in enhanced habitat for some species. There is high potential to remove habitat for SAR species, especially grassland birds, given that a site with lower impacts otherwise could be pasture. Conclusion of “No significant adverse effects” to terrestrial VCs is not substantiated.

3.0 UPDATED ANALYSIS OF CUMULATIVE ENVIRONMENTAL EFFECTS

This chapter provides a review of the second topic regarding cumulative effects. The following documents were reviewed:

- *Updated Analysis of Cumulative Environmental Effects,* 00216-REP-07701-00018
- *Adaptive Phased Management (APM) Deep Geologic Repository (DGR) Preliminary Description,* 00216-REP-07701-00017

The following statements are from the set of documents describing the cumulative effects and adaptive phase management deep geological repository. These statements are listed here and then summarized and assessed in Tables 5 and 6.

3.1 Site Facilities

An Adaptive Management Phased Management Deep Geological Repository for used nuclear fuel (APM DGR) as opposed to the repository of low and intermediate level radioactive waste proposed for the Bruce nuclear site in the Municipality of Kincardine.

NWMO would not proceed without the involvement of the interested community, First Nation and Métis communities, and surrounding communities working to implement the project.

The site for the Adaptive Management Phased Management (APM) Deep Geological Repository (DGR) has not been selected. For the purposes of this assessment, the assumed location for the APM DGR is in one of the following three communities: Huron-Kinloss, South Bruce or Central Huron. As this siting process has not been completed, it is not possible to identify a more specific site for an APM DGR within these communities at this time.

The site surface facilities provide processes and equipment for receiving, inspecting, repackaging and moving used fuel to the main shaft for transfer underground and placement in the repository.

The water supply system would provide water for domestic water use, for process use, and for emergency use (fire-fighting). The domestic water system would supply potable water for both surface and repository level facilities. Process water would be primarily used for preparation of sealing materials, notably the concrete and clays.

Water for the DGR facility would be sourced from a local river or water body. The siting would consider the capacity of the local water body to supply sufficient water and to take back treated discharge water. A water supply rate of about 100 m^3/day may be needed.

Ponds would be established on the APM DGR site to manage mine water, process water and stormwater run-off. All of the ponds would be lined, as required, over their base and embankments for protection and to prevent water infiltration back into the ground. The ponds would be designed to settle out suspended particles with any collected mud and silt deposits.

Collected flows would be quality monitored and potentially treated before being discharged off the site. Water quality would be in compliance with the applicable limits for any water released to a natural watercourse.

Mine water pumped from the underground sumps would be piped to a dewatering settling pond. An estimated 500 m^3/day of groundwater has been assumed to be pumped from the sumps and discharged to the settling pond (this value would depend on the site). Process water would be directed to this pond.

This mine water may contain sediment, nitrogen compounds (arising from blasting residue of excavated rock), high salinity (especially sedimentary rock, due to saline groundwater inflow) and possibly dissolved uranium from the rock (generally low in sedimentary rock). If concentration of these potential contaminants is above acceptable levels, then the mine water would be treated to meet applicable limits before discharge.

A perimeter ditch around the site surface facilities would direct precipitation to a few storm water management ponds. These ponds would collect and manage surface water. Run-off from the excavated rock management area also would be controlled in the storm water management system, monitored and if required, treated to meet provincial water quality standards prior to discharge.

3.2 APM Description – Aquatic and Terrestrial Features

[The area is] predominantly [an] agricultural landscape located at the transition of Ontario forest zones within the Deciduous Forest Region where woodlands consist primarily of American beech and sugar maple, together with basswood, red maple and oak on the northern limit of the Carolinian Forest. Eastern white cedar is also a common tree species in the area. Woodlands cover approximately 8.5-10% of the land area.

Most of the northern part of Central Huron is within the Maitland tertiary watershed while the southern part is within the Ausable tertiary watershed. Fish that are commonly found in the Maitland River include Rainbow Trout, Chinook Salmon and Smallmouth Bass.

Most of the eastern parts of the Huron-Kinloss and South Bruce areas are within the Saugeen tertiary watershed while the western part along the Lake Huron shoreline lies within the Penetangore tertiary watershed. The Saugeen River's feeder streams and lakes are prime waters for Brook Trout, Brown Trout, Bass and Northern Pike.
Drainage for both the Maitland and Saugeen Rivers generally is from east to west into Lake Huron.

Key terrestrial features noted include:

- Bird migration routes following the eastern shore of Lake Huron;
- Trapping of fur-bearers;
- Predominantly privately owned lands; and
- Game hunting common in permitted areas.

Federally and provincially listed species at risk occur in both of the potential host communities for the APM. Species at risk include mammals ranging from Eastern cougar and American badger to bats; birds, reptiles, amphibians, fish and mussel species, insects and plants.

3.2.1 Potential Mitigation

Mitigation measures provided in the *APM DGR Preliminary Description* document are very general and focus on avoidance – spatial and temporal – and commit to satisfying approvals

and permits. Siting emphasis is on avoiding tree cover, whereas habitat for SAR that includes non-treed habitat will be a concern and has not been addressed. Little detail is provided for proposed location, site conditions, in-water work and activities, thus a detailed evaluation of mitigation seems premature. A review of the proposed environmental management plan, when available, will contribute to resolution of this problem.

3.3 OPG Method for Identification of Cumulative Effects

OPG used the following process to identify and assess cumulative effects:

A potential cumulative effect is only identified when the same VEC is affected within the same spatial and temporal boundaries. If an overlap of effects on a VEC is identified, the potential cumulative effect is identified and described to determine if additional mitigation measures are warranted, and taking into account the mitigation, whether residual adverse cumulative effects are likely to occur, and their significance.

Key terrestrial and aquatic features and predicted effects are summarized and reviewed in Table 5 and Table 6 below.

Table 5: Valued Component Selection and Rationale – APM Location

Environmental Component	Valued Components	APM Location	Comments
Surface Water	Quality Quantity and Flow	Although water quality, quantity and flow may be influenced by existing activities, additional activities associated with the APM may result in additional surface water effects.	Estimated daily volumes for potable water supply and process water discharge provide the basis for comparative effects assessment.
Aquatic Features and Fish	Maitland River – Central Huron	OPG listed fish commonly found in the Maitland River including Rainbow Trout, Chinook Salmon and Smallmouth Bass Provincially endangered: American Eel, Redside Dace, Shortnose Cisco Federally endangered: Lake Chubsucker, Pugnose Shiner and Wavy-rayed Lampmussel	Rainbow Trout and Chinook Salmon are migratory and introduced fish species representing cool-cold water temperature conditions. Inclusion of additional native species of various trophic levels to represent cool-cold water conditions would enhance the list of species. Including forage species and fish species from a broader range of feeding guilds, e.g. planktivores, invertivores, piscivores and feeding modes, would result in a more complete representation of ecosystem functions and trophic levels.
	Saugeen River – Huron-Kinloss and South Bruce	OPG listed Saugeen River's feeder streams and lakes as prime waters for Brook Trout, Brown Trout, bass and Northern Pike. Endangered: American Eel, Pugnose Shiner, Redside dace, Shortnose Cisco, Hungerford's Crawling Water Beetle	The list of fish species represents piscivores and fishes found in cool and cold water environments. Including warm water species, forage species and fish species from a broader range of feeding guilds, e.g. planktivores, invertivores, piscivores and feeding modes, would result in a more complete representation of ecosystem functions and trophic levels.

Environmental Component	Valued Components	APM Location	Comments
Terrestrial Environment	Vegetation Communities	OPG predicts loss of mixed wood forest containing eastern white cedar … estimated to be 8.9 to 60 hectares Wetland and forest cover is very low on a largely agricultural landscape.	General mitigations through adherence to permit requirements and "migratory birds breeding season". Comment above with respect to vegetation clearing and nest surveys apply here. Permitting only references local Conservation Authority or municipal bylaws whereas the province will also be involved for permitting under ESA, 2007, and the federal government under SARA for birds. Lack of specificity will require close scrutiny of the environmental management plan. HSM may request copies for review and comment.
	Wildlife Habitat and Biota	Proximity to the Lake Huron coast implies potential to affect known migration route for bats and birds. The APM-DGR report notes the following SAR: Central Huron: provincially endangered American Badger, Eastern Cougar, Eastern Small-footed Myotis (bat), Little Brown Myotis (bat), Northern Myotis (bat), Barn Owl, Henslow's Sparrow, Loggerhead Shrike, Yellow-Breasted Chat, Queensnake, Wood Turtle, American Eel, Redside Dace, Shortnose Cisco, Gypsy Cuckoo Bumble Bee, American Ginseng and Butternut, and the federally endangered Tricolored Bat Huron Kinloss and South Bruce: provincially endangered American Badger, Eastern Cougar, Little Brown Myotis (bat), Northern Myotis	

Environmental Component	Valued Components	APM Location	Comments
		(bat), Barn Owl, King Rail, Yellow Rail, Loggerhead Shrike, Piping Plover, Yellow-breasted Chat, Queensnake, Blanding's Turtle, Spotted Turtle, Wood Turtle, Rusty-patched Bumble Bee, American Ginseng, Butternut, Eastern Prairie Fringed Orchid, Gattinger's Agalinis and Small White Lady's Slipper and the federally endangered Pitcher's Thistle.	

Table 6: Cumulative Effects between APM DGR and Bruce Nuclear DGR

Environmental Component	Valued Components	Residual Effect	Comments
Surface Water	Quantity and Flow	Residual effects are anticipated at both the Bruce Nuclear DGR and APM DGR. Bruce nuclear DGR will reduce flow in one watercourse while increasing in another during construction and operating phases. Process and potable water supply sourced from a local watercourse or water body will be required for the APM DGR at a rate of 100 m^3/day. Mine water pumped from the underground dewatering sumps will be piped and discharged to a dewatering settling pond at an assumed estimated rate of 500 m^3/day. These activities may contribute to a change in flow in local drainage areas in the vicinity of the selected site for the APM DGR. Decommissioning and closure activities are expected to be similar to those encountered during site preparation and construction, and may also contribute to a change in surface water quantity and flow.	Although residual effects to surface water quantity and flow are anticipated at both DGRs, due to the location of the APM DGR with respect to the DGR Project at the Bruce Nuclear site, an overlap of effects on surface quantity and flow will occur in time but not in space. Both of these two DGRs will discharge to Lake Huron; however they will do so through different watersheds, thus no cumulative effects are anticipated. Section 5.1.2 of the Cumulative Effects report states: *Although the extent of in-water work cannot be evaluated until the selected site for the APM DGR is known, the siting and design would seek to avoid or mitigate effects on surface water quantity and flow around the APM DGR site.* Thus, given that the extent of in-water work cannot be evaluated at this time, conclusion on potential effects at the APM DGR and level of mitigation required to address those potential effects seems premature. If water quality issues associated with the APM DGR cannot be managed adequately and discharge to Lake Huron, these discharges could affect fish migrating to and from Lake Huron and watercourses at the Bruce Nuclear DGR, however low the likelihood.
Aquatic Environment	Aquatic Habitat and Biota	Section 5.3.3 of the Cumulative Effects document considered the following residual effects associated with Burrowing Crayfish habitat: Removal of a portion of burrowing crayfish habitat in the South and North Railway Ditches, as well as other ditches and the abandoned rail spur in the western portion of the Project Area, during site preparation and construction	Section 5.3.1 of the Cumulative Effects report states that '*loss or alteration of aquatic habitat, or both, as a result of the DGR Project at the Bruce Nuclear site accounts for less than 1% of non-critical habitat in the Project Area*', however the loss of critical habitat for Burrowing Crayfish is not recorded. General and non-site specific mitigation is listed in

Environmental Component	Valued Components	Residual Effect	Comments
		Section 5.3.3 of the Cumulative Effects document considered the following residual effects associated with Redbelly dace, Creek Chub, Variable Pondweed, Benthic invertebrates: Removal of a portion of non-critical habitat in the South Railway Ditch during construction of the rail bed crossing.	Section 5.3.2 of the Cumulative Effects report no commitments for monitoring the effectiveness of mitigation. Section 5.3.3: Assessment of cumulative effects states that the VECs affected at the Bruce Nuclear DGR are resilient species. This assessment seems to minimize potential effects to sensitive migratory salmonid species known to utilize watercourses at the Bruce site (AMEC Foster Wheeler 2016). This section also states it is '*unlikely that the APM DGR will result in loss or disturbance of the same aquatic communities or habitat in the Local Study Area for the DGR Project at the Bruce Nuclear site communities or habitat in the Local Study Area for the DGR Project at the Bruce Nuclear site*'. Another OPG report (AMEC Foster Wheeler 2016) documented spawning of migratory species including Rainbow trout, Chinook Salmon and White sucker in watercourses in the Bruce Nuclear DGR study area. Movements of these species can be substantial; for example seasonal movements for Rainbow trout can be greater than 20 km often moving several kilometers each day (James and Kelso 1995) and Chinook salmon undertake seasonal movements up to 400 to 500 km (Alderstein et al. 2007). Information on presence of migratory fish species occurrence in APM DGR study area watercourses or water bodies would inform whether activities at APM DGR may disturb the same aquatic communities as observed at the Bruce nuclear DGR.

Environmental Component	Valued Components	Residual Effect	Comments
Terrestrial Environment	Vegetation Communities	OPG predicts *loss of mixed wood forest containing eastern white cedar as a result of the DGR Project at the Bruce Nuclear site is estimated to be 8.9 hectares (ha) of an isolated and fragmented portion of the woodlot*, and 60ha in forest that may include mixed wood forest. No additional land uses requiring removal of this forest type were identified. There may be an overlap in time with DGR, but not in space. Therefore OPG concludes that *there are no likely adverse cumulative effects on the eastern white cedar VEC in consideration of the APM DGR*	The spatial location of vegetation removals in the landscape context is likely more important than the quality and quantity of the vegetation type itself. Removals should be evaluated in the context of the potential to increase fragmentation of woodlands as opposed to the representation of that vegetation type. The definition of cumulative impact used by OPG does not address this type of cumulative effect that could alter wildlife movement corridors.
	Wildlife Habitat and Biota	No residual effect was determined for this criterion. Not discussed with respect to cumulative effects	This VC is not included in assessment of cumulative effects because it was concluded that no residual effects occur. However, the APM-DGR includes a migratory flyway not present at Bruce Nuclear. The potential for occurrence of SAR and SAR habitat has not yet been assessed nor potential Significant Wildlife Habitat.

4.0 MITIGATION MEASURES

CEAA made a total of 1003 statements that included commitments, mitigation measures and monitoring activities that OPG agreed to undertake for the DGR Project to minimize or reduce adverse environmental effects, as well as other actions to be undertaken as part of the normal evolution of the project.

SLR reviewed the document in which the commitments were screened for redundancy and organized in tables by Environmental Component and then by Valued Component within each Environmental Component. Each table included the applicable mitigation measures and monitoring, as well as the Agency's conditions as accepted by OPG.

In general mitigation and monitoring revealed that mitigation associated with surface water and groundwater, aquatic habitat and biota appeared to address conditions intended to protect habitat and biota, that would be associated with approvals and permits, and address habitat rehabilitation or enhancement following construction activities. In some cases additional refinement on monitoring frequency, duration and location could assist in evaluating the effectiveness of mitigation and the need to adapt mitigation measures or project activities if monitoring reveals project effects to natural environment features or functions.

SLR comments on several mitigation measures and monitoring activities appear in Table 7 below.

Table 7: Mitigation Measures – Grouped by Discipline

Mitigation Code	Description	Comment
MIT-Hydrology-09	OPG will, before the stormwater management system is fully functional and to the satisfaction of the CNSC, prepare a contingency plan to mitigate effects of severe storm-related uncontrolled overland flow to Stream C, Baie de Doré, and MacPherson Bay during site preparation	Examples of potential specific contingency options would increase the confidence in the effectiveness of mitigation
MIT-Hydrology-10	OPG will, during site preparation and to the satisfaction of the CNSC, develop and implement a follow-up program for flow reduction rates in the North Railway Ditch and Stream C that includes the identification of mitigation measures that shall be implemented, if necessary, to address adverse effects on surface water quantity.	Examples of potential specific contingency options would increase the confidence in the effectiveness of mitigation
MON-H-04	Groundwater levels will be monitored in the shallow groundwater well closest to the marsh to determine water table fluctuations.	Frequency and location of monitoring assist in identifying effectiveness of mitigation or whether adaptation to activities or mitigation is appropriate.
MIT-T-02	Exclusionary fencing to prevent additional loss *[beyond that which cannot be avoided]* during construction surrounding the DGR Project site will be installed.	Identification of vegetation to be protected (including the marsh area (MIT-T-01) should be identified and protected by fencing, rather than default to a "cannot be avoided" and "minimize disturbance" (MIT-T-04) direction that is less definitive and not as protective.
	Terrestrial Monitoring Commitments It is not clear what is being proposed in terms of monitoring without cross-referencing to several documents.	Request a Table of monitoring events that includes: Purpose; method and frequency; threshold for performance; conclusion and outcome. Encounters with wildlife should be documented using data records to be submitted to the environmental monitor and shared with HSM. Request that reports be shared with HSM to verify that the predictions of the effects and effectiveness of mitigation.

Mitigation Code	Description	Comment
MIT-T-06.	OPG will, prior to site preparation and to the satisfaction of the CNSC, install barriers to prevent turtles and snakes from entering the DGR Project site.	Fence placement may capture wildlife inside the fence therefore provisions must be made for monitoring, allowing the animal(s) to disperse if possible and/or safe capture/removal/release (in consultation with EC/OMNRF) of any animals if necessary.
MIT-T-12.	OPG will carry out all pre-closure phases of the Project in a manner that protects and avoids harming, killing or disturbing migratory birds or destroying or taking their nests or eggs.	EC provides advice with respect to the breeding periods for listed species and expects that harming, killing or disturbing migratory birds or destroying or taking their nests or eggs will be avoided at any time. OPG recommends clearing May 1st to July 31st, however there will be nesting birds in April (Black-capped Chickadee; woodpeckers; raptors) and August (second attempts for failed nests). EC does not support nest surveys as being adequate mitigation for clearing during the most likely probability of nesting due to the difficulty in seeing the nests, and if contractors are not in compliance they may be charged.

5.0 SUMMARY AND CONCLUSIONS

A review of OPG submission documents related to Study of Alternate DGR locations, to an Analysis of Cumulative Effects associated with the DGRs and Mitigation resulted in the following summary and conclusions:

- Information of a relatively low level of detail was provided for alternate DGR locations in crystalline and sedimentary rock locations
- Limited level of certainty associated with effects assessment conclusions is based on the low level of detail in the information provided for assessment
- The reason for the low level of detail is understood because no detailed site selection process occurred. Rather alternate DGR locations representing typical characteristics for crystalline and sedimentary locales were assessed.
- Criteria for siting the DGRs does not include natural heritage criteria;
- Narrow range of trophic levels, feeding guilds and feeding modes were considered to represent aquatic biota in effects assessment.
- The use of a narrow range of trophic levels limits the completeness of assessment of potential project effects to biota and limits the ability to design effective mitigation measures and plans.
- Cumulative effects assessment could benefit from consideration of the migratory nature of some fishes in Saugeen and Maitland River systems – associated with potential APM DGR location – and watercourses associated with the potential DGR at the Bruce Nuclear site. Owing to their migratory nature, these biological communities may be affected by cumulative effects at the APM DGR and Bruce Nuclear DGR in spite of geographical separation.
- The review of mitigation and monitoring showed that mitigation and monitoring appeared to address conditions intended to protect habitat and biota, which would be associated with approvals and permits, and addressed habitat rehabilitation or enhancement following construction activities.
- In some cases additional refinement of monitoring frequency, duration and location could improve evaluation of the effectiveness of mitigation and the need to adapt mitigation measures or alter project activities if required.
- A Table of monitoring events should be provided that includes: Purpose; method and frequency; threshold for performance; conclusion and outcome. This table can be used to identify monitoring of features proposed for different study criterion in order to integrate effort and outcomes, and provide greater transparency in reporting.
- HSM should receive copies of the reports for review.

6.0 REFERENCES

Alderstein, S.A., E.S. Rutherford, D. Clapp, J.A. Clevenger, and J.E. Johnson. 2007. Estimating Seasonal Movements of Chinook Salmon in Lake Huron from Efficiency Analysis of Coded Wire Tag Recoveries in Recreational Fisheries. North American Journal of Fisheries Management 27: 792-803.

Amec Foster Wheeler. 2016. Environmental Risk Assessment for the Western Waste Management Facility.

James, G.D, and J.R.M. Kelso. 1995. Movements and habitat preference of adult rainbow trout (Oncorhynchus mykiss) in a New Zealand montane lake. New Zealand Journal of marine and Freshwater Research 29: 493-503

Yours sincerely,
SLR Consulting (Canada) Ltd.

<Original signed by>

Dale Leadbeater, B.Sc., B.Ed., P.Biol., R.P.Bio.
Senior Ecologist

<Original signed by>

Gord Wichert, Ph.D., M.Sc., B.Sc. Bio
Senior Ecologist