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Mid-Term Report

Rapport de mi-parcours

Ontario Power Generation

Ontario Power Generation

**Mid-Term Report on Results of
Compliance Activities and
Performance of Ontario Power
Generation's Darlington New
Nuclear Project**

**Rapport de mi-parcours sur les
résultats des activités de
conformité et le rendement du
nouveau projet nucléaire de
Darlington d'Ontario Power
Generation**

Public Meeting

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CNSC Staff

Le personnel de la CCSN

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Summary

On August 17, 2012, a panel of the Commission announced their decision to issue a *Licence to Prepare Site* for a new nuclear power plant at the Darlington Nuclear site for a period of ten (10) years.

The purpose of this Commission Member Document (CMD) is to address the request made in the *Record of Proceedings, Including Reasons for Decision* to provide a mid-term report to the Commission on:

- the results of compliance activities carried out during the first half of the licence term and the licensee's performance during that period
- detailed information on the control of land use around the site over the operating life of the nuclear generating station (Land Use Planning)
- implications of the findings from the CNSC Fukushima Task Force
- the environmental monitoring and follow-up program

There are no actions requested of the Commission. This CMD is for information only.

No attachments

Résumé

Le 17 août 2012, une formation de la Commission a annoncé sa décision de délivrer un *Permis pour préparer l'emplacement* d'une nouvelle centrale nucléaire sur le site de Darlington pour une période de dix (10) ans.

Le but du présent document à l'intention des commissaires (CMD) est de satisfaire à la demande formulée dans le *Compte-rendu de décision, incluant les motifs de décision* de fournir un rapport de mi-parcours à la Commission concernant :

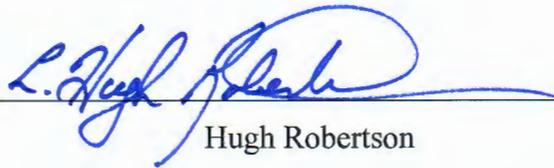
- les résultats des activités de conformité effectuées durant la première moitié de la période de validité du permis et le rendement du titulaire de permis
- des informations détaillées sur le contrôle de l'utilisation du territoire autour du site pour la durée de vie de la centrale nucléaire (Planification de l'utilisation territoriale)
- les implications des conclusions du groupe de travail sur Fukushima de la CCSN
- le programme de surveillance et de suivi environnemental

Aucune mesure n'est requise de la Commission. Ce CMD est fourni à titre d'information seulement.

Aucune pièce jointe

Signed/signé le

27 November 2018



Hugh Robertson

Director General / Directeur General

DRIMPM

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EXECUTIVE SUMMARY

On August 17, 2012, a panel of the Commission announced its decision to issue a *Licence to Prepare Site* for a new nuclear power plant at the Darlington Nuclear site for a period of ten (10) years.

The purpose of this Commission Member Document (CMD) is to address the request made in the *Record of Proceedings, Including Reasons for Decision* to provide a mid-term report to the Commission on:

- the results of compliance activities carried out during the first half of the licence term and the licensee's performance during that period
- detailed information on the control of land use around the site over the operating life of the nuclear generating station (Land Use Planning)
- implications from the findings of the CNSC Fukushima Task Force
- the environmental monitoring and follow-up program

Subsequent to the Government of Ontario's decision to defer construction of new reactors at the Darlington site in 2013, OPG's efforts have focused on the collection of information to assist site specific design activities and to confirm assumptions made in the environmental assessment. These activities included work on selecting the Condenser Cooling Technology, Bank Swallow assessment and Fish Habitat. During the period covered by this report, OPG has not commenced any licensed activities covered under section IV of the Power Reactor Site Licence (PRSL).

Following up on a commitment from the Government of Canada (GOC) in response to one of the Joint Review Panel (JRP) recommendations, CNSC staff engaged stakeholders in land use planning. This resulted in an amendment of the Ontario Provincial Policy Statement, which specifically addressed sensitive land uses around electricity generating facilities.

In addition, following the Fukushima Daiichi accident, the CNSC established a Task Force to examine the readiness of a Canadian Nuclear Power Plant (NPP) response to such an event. The CNSC has taken findings from the Fukushima task force into account in updating its regulatory framework. Through the Fukushima integrated action plan, regulatory documents pertaining to site evaluation, design, safety analysis, accident management, emergency preparedness and environmental protection have been updated. OPG has confirmed their intent to meet these updated requirements for their proposed new reactor project.

During the period covered by this report, OPG was compliant with the conditions of the licence. OPG has followed up on commitments made during the environmental assessment and licensing process, including continued control and maintenance of the Darlington New Nuclear Project (DNNP) site.

The current licence is set to expire in 2022. OPG has informed the CNSC of its intention to apply to renew the licence for another period of 10 years. CNSC staff will continue to carefully oversee DNNP activities and will be ready should the Government of Ontario decide to move forward with the new nuclear project at the Darlington site.

Referenced documents in this CMD are available to the public upon request.

1 OVERVIEW

1.1 Background

On September 2006, OPG applied for a Licence to Prepare Site. It was determined that an environmental assessment was required and this was referred by the Federal Minister of Environment to a JRP. The Joint Review Panel Environmental Assessment Report Summary [1], explains the mandate of the Panel as follows:

“The mandate of the Panel was to assess the environmental effects of the Project and to determine whether it is likely to cause significant adverse environmental effects taking into account the implementation of mitigation measures that are technically and economically feasible. The review of the Project was framed by the Canadian Environmental Assessment Act (1992) and the Nuclear Safety and Control Act. The Panel incorporated other federal, provincial and municipal policies and requirements, industry standards and best practices in its analysis and recommendations.”

On August 17, 2012, the panel of the Commission announced its decision to issue a nuclear power reactor site preparation licence (PRSL) to OPG for the new nuclear project at the Darlington site for a period of 10 years. This decision came after a thorough review of the licence to prepare site application and the environmental impact statement by the JRP, in accordance with the *Canadian Environmental Assessment Act* (CEAA) and the *Nuclear Safety and Control Act*. With regards to the CEAA, the Government of Canada (GOC) determined that the Darlington New Nuclear Power Plant (DNPP) Project is not likely to cause significant adverse environmental effects, taking into account the JRP recommendations and implementation of proposed mitigation measures.

As part of the Record of Proceedings and Reasons for Decision [2], the Commission directed CNSC staff to prepare a mid-term report on the first half of the licence term. This mid-term report fulfils this request.

Specifically, paragraphs 16, 17 and 84 of the Record of Proceedings direct CNSC staff to prepare a mid-term report on:

- the conduct of the licensed activities and implementation status of commitments made during the environmental assessment, which takes into account the findings of the CNSC Fukushima Task Force
- the results of compliance activities carried out during the first half of the licence term and OPG’s performance during that period
- detailed information on the control of land use around the site over the operating life of the nuclear generating station
- as well as detailed information on the environmental monitoring and follow-up program

1.2 Highlights

After the issuance of the licence, OPG has undertaken some activities to address the licence requirements and the JRP recommendations.

In January 2014, OPG informed CNSC staff that the Government of Ontario would defer the construction of new nuclear units at the DNNP site [3]. As a result of the Province of Ontario decision, OPG has not commenced any licensed activity covered by section IV of the PRSL. Nevertheless OPG has undertaken activities addressing long-lead items in support of satisfying the licence requirements.

Some key areas of continued effort by OPG include:

- bank swallow monitoring and mitigation
- condenser cooling water design selection
- studies related to surface water, aquatic and terrestrial environmental monitoring
- work on fish habitat compensation, including fish habitat offsetting plan and round whitefish action plan
- supporting the work on land use planning

Since the majority of activities to be undertaken in preparation of the DNNP site are dependent on selection of a nuclear reactor technology, CNSC staff activities were focussed on the monitoring of OPG's progress on the long lead items and commitments, and facilitating progress on the JRP recommendations relating to land use planning.

In parallel, the CNSC regulatory framework was being updated to include the lessons learned from the Fukushima Task Force.

During the first half of the licence term, OPG has continued to maintain the DNNP site in accordance with their licence.

In September, 2018, CNSC staff received a letter from OPG indicating their intent to renew the licence [4] for another period of 10 years.

2 ITEMS OF REGULATORY INTEREST

This mid-term CMD provides an update on the following items of regulatory interest:

- conduct of licensed activities
- status of commitments made during the environmental assessment
- actions to address findings from the CNSC Fukushima Task Force report
- detailed information on the control of land use around the site over the operating life of the nuclear generating station
- information on the environmental monitoring and follow-up program

2.1 Conduct of Licensed Activities

2.1.1 Licence to Prepare Site and Licence Condition Handbook

The nuclear power reactor site licence (PRSL 18.00/2022) [5] issued to OPG for the proposed Darlington New Nuclear Generating Station authorizes the following site preparation activities under section IV:

- construction of site access control measures
- clearing and grubbing of vegetation, excavation and grading of the site
- installation of services and utilities (domestic water, fire water, sewage, electrical, communications, natural gas) to service the future nuclear facility
- construction of administrative and support buildings inside the future protected area
- construction of environmental monitoring and mitigation systems
- construction of flood protection and erosion control measures

The PRSL contains a hold point whereby OPG cannot commence any of the site preparation activities until authorized by the Commission, or a person authorized by the Commission. This hold point is described in Licence Condition 1.1 [5] which states:

“The licensee shall have the documents required for site preparation accepted by the Commission, or a person authorized by the Commission, prior to the commencement of the licensed activities described in Part IV (i) of this licence.”

The documents referred to in the Licence Condition 1.1 include a number of procedures, plans, environmental monitoring and environmental assessment follow-up plan, training plan and security plans, etc. These documents were intended to be developed at a later date when OPG selects an Engineering, Procurement and Construction company (EPC Co.).

This licence condition provides CNSC staff the opportunity to review and independently verify that the documents necessary for site preparation are in place prior to the commencement of the licensed activities and prior to the EPC Co. starting site preparation work.

Other important licence conditions are Licence Condition 10.1 and 10.2.

Licence Condition 10.1 states:

“The licensee shall implement the mitigation measures proposed and commitments made during the Darlington Joint Review Panel process.”

Licence Condition 10.2 states:

“The licensee shall implement the applicable recommendations of the Darlington Joint Review Panel Report in accordance with the Government of Canada response.”

These two licence conditions ensure that all the commitments made during the JRP public review process as well as all the recommendations from the JRP are addressed by OPG. Section 2.1.2 of this CMD discusses OPG's approach to implement these licence condition requirements.

The regulatory expectations regarding OPG's compliance with the licence are provided in the Licence Condition Handbook (LCH) [6].

2.1.2 DNNP Commitments Report

Following the environmental assessment and licence application review, the JRP report [1] presented 67 recommendations directed across various responsible authorities including federal authorities, the Government of Ontario and the Municipality of Clarington. In its response to the JRP Report, the Government of Canada (GOC) has accepted or accepted the intent of all of the JRP recommendations within its jurisdiction [7]. A summary of the GOC Response to the JRP recommendations is presented in Appendix A.

Licence Condition 10.1 and 10.2 of the PRSL ensures that JRP recommendations and all mitigations measures and commitments made during the JRP process are addressed by OPG.

In order to comply with Licence Condition 10.1 and 10.2, OPG has organized all commitments into a comprehensive report [8] highlighting all commitments made during the JRP public review process. CNSC staff have reviewed the DNNP commitments report and ensured that it addressed all commitments made as part of the Environmental Impact Statement, the Licence to Prepare Site Application, related OPG correspondences, applications with other regulatory bodies and subsequent JRP public review process including the GOC's response to the JRP recommendations.

The commitments are organized in accordance with the licensing phase in which they must be completed. For instance, all commitments labeled D-P-XX must be completed during site preparation and commitments labeled D-C-XX must be completed during the site construction phase. It should also be noted that in the site preparation phase, some commitments can only be completed once an EPC Co. is chosen.

Appendix A also provides a cross-reference to each DNNP commitment deliverable with the JRP recommendation. A summary of the OPG list of DNNP commitments is given in Table 1. Many commitments have related sub-commitments.

TABLE 1: List of DNNP Commitments

Commitment Number	Key Deliverable
All Phases	
	OPG General Commitment Statements
Site Preparation Phase	
D-P-1	DNNP Management System and Implementing Documents
D-P-2	EPC Occupational Health and Safety Plan
D-P-3	EPC Environmental Management and Protection Plans
D-P-4	EPC Quality Management Plan
D-P-5	Emergency Management and Fire Protection Plans
D-P-6	Personnel Training Plan
D-P-7	Site Security Plan
D-P-8	EPC Level 1 and Level 2 Project Management Schedule
D-P-9	EPC Site Geotechnical and Seismic Hazard Investigation Program
D-P-10	EPC Traffic Management Plan
D-P-11	Archaeological Excavation Reports
D-P-12	Environmental Monitoring and Environmental Assessment Follow-up
D-P-13	Preliminary Decommissioning Plan and Financial Guarantee
D-P-14	Fish Habitat Compensation Plan
D-P-15	Round Whitefish Action Plan
D-P-16	Lake Infill Design
D-P-17	Communications, Consultation and Stakeholder Relations Program
Construction Phase	
D-C-1	EPC Condenser Cooling Water Design
D-C-2	Non-Radiological Effluent Management Program
D-C-3	Preliminary Safety Analysis and Design
D-C-4	Radiological Effluent Management Program

Commitment Number	Key Deliverable
D-C-5	Radiological and Non-Radiological Air Emissions Programs
D-C-6	Radiological Environmental Monitoring Program (REMP)
D-C-7	Contingency Plan for Flooding and Other Extreme Weather Hazards
D-C-8	Meteorological Monitoring Station
Operation Phase	
D-O-1	Radiation Protection Program
D-O-2	Radioactive Waste Management Plan
D-O-3	Nuclear Emergency Plan
D-O-4	Monitoring Program for Phase 4 St. Mary’s Cement Blasting Operations

The DNNP commitment report provides clear closure criteria for each deliverable. CNSC staff is monitoring progress on all deliverables pertaining to DNNP commitments, which includes progress on JRP recommendations.

2.1.3 CNSC Compliance Program

In July 2018, CNSC staff completed the review of the DNNP commitments report and found that it adequately covered all deliverables mandated through the GOC’s response to the JRP recommendations. Additionally, CNSC staff have verified that commitments made by OPG in the Environmental Impact Statement (EIS), Licence to Prepare Site (LTPS) application and supporting documents, OPG responses, and transcript of the JRP hearing will be addressed and executed by the appropriate DNNP commitments deliverables [9].

CNSC staff continue to review OPG’s progress on their commitments, including coordinating review efforts with other Federal departments.

CNSC staff will continue to monitor the progress on deliverables associated with DNNP commitments as they pertain to each stage of the licence.

In addition, CNSC staff monitors compliance with all licence conditions, including annual reporting or abnormal event reporting requirements. Section 4 provides further information on applicable safety and control areas performance to date.

In September 2018, CNSC staff visited the DNNP site to verify, measures taken by OPG to address the JRP recommendations.

2.2 Status of DNNP Commitments

In this section, the commitments relevant to the work performed by OPG during the first half of the licensing term are discussed. The reference to relevant JRP recommendations and their respective Government of Canada's response is also provided. The section discusses only relevant work performed to date. As mentioned earlier, work on the project has been limited to a few key areas due to the deferral of new build projects in Ontario.

2.2.1 Bank Swallow Mitigation Measures and Plans

The JRP issued bank swallow mitigation recommendations with the following corresponding GOC response:

JRP Recommendation #27

The Panel recommends that prior to any destruction of the Bank Swallow habitat, the CNSC require OPG to implement all of its proposed Bank Swallow mitigation options, including:

- the acquisition of an off-site nesting habitat
- the construction of an artificial Bank Swallow nest habitat with the capacity to maintain a population which is at least equal to the number of breeding pairs currently supported by the bluff and as close to the original bluff site as possible
- the implementation of an adaptive management approach in the Bank Swallow mitigation plan, with the inclusion of a threshold of loss to be established in consultation with all stakeholders before any habitat destruction takes place

Government of Canada Response

“The Government of Canada accepts the intent of this recommendation to require OPG to implement the identified Bank Swallow mitigation measures using an adaptive management approach, and would support determining required mitigation based on reasonable estimates of actual burrow loss. The Government of Canada expects that the acquisition of offsite nesting habitat should only be necessary if follow-up monitoring shows that onsite mitigation is unsuccessful, and notes that onsite mitigation may also include the enhancement of potential natural nesting sites within the Site Study Area. Environment Canada can provide available scientific and technical expertise to the Canadian Nuclear Safety Commission, upon request, to assist in the implementation of this recommendation.”

DNNP Commitments

The commitments and deliverables linked to this JRP recommendation are found in DNNP Commitment D-P-3-8; EPC Bank Swallow Mitigation Measures and Plans.

Status

The JRP recommended that when the Project Site is developed, every effort be made to minimize the destruction of the natural bluff, using the best available technology economically achievable. The bluff should remain intact until all site layout options for the selected technology have been thoroughly evaluated. The bluff should only be removed if it is then determined that this is absolutely necessary for the development of the project. It is expected that if the bounding case scenario is realized, i.e. the bank swallow colony would be lost, then OPG should implement a plan that includes, but is not limited to, provision of artificial bank swallow habitat on the Darlington Nuclear site, as well as other compensatory/mitigating measures.

OPG has been conducting baseline field studies since 2007 in order to monitor the population of bank swallow colonies, develop a mitigation plan that includes provision of artificial bank swallow habitat, and undertake research into declining aerial foragers in Ontario. This work has been summarized and submitted to CNSC in OPG's annual Bank Swallow reports [10]. It should be noted that the protected status of the bank swallow has changed since the EA approval in 2012. Since that time, the bank swallow has been added as a threatened species to the Province of Ontario's Species at Risk list under the *Endangered Species Act* and on Schedule 1 of the *Federal Species at Risk Act*.

OPG has continued long-term monitoring through burrow occupancy counts of bank swallow colonies on an annual basis at the DNNP site and along a portion of the Lake Ontario shoreline which extends from Oshawa Creek to Wilmot Creek, referred to as the Bank Swallow Evaluation Area. Burrow occupancy studies to date show that occupancy rates of bank swallow colonies averaged 61%.

OPG has continued to design and construct artificial nesting structures such as an earthen mound and a "fixed face earthen embankment". There was no uptake of these structures by bank swallows. Based on key lessons learned in these experiments, the location and siting of these structures are planned to be located further away from prime occupied colonies to minimize the competition between the natural and artificial habitats. OPG is pursuing a suitable location for siting the artificial nesting structure.

Finally, OPG continues to engage with other groups to research the decline in aerial foragers, specifically the bank swallow, given its listing as a species at risk both provincially and federally.

The monitoring results of the bank swallow burrow counts, occupancy studies and artificial nesting structures development and monitoring have been reviewed by the CNSC annually.

CNSC will continue monitoring the progress on the Bank Swallow Mitigation Measures.

2.2.2 Site Geotechnical and Seismic Hazard Investigation Program

The JRP issued three related site geotechnical and seismic investigation program recommendations with associated GOC response:

JRP Recommendation #10

The Panel recommends that the Canadian Nuclear Safety Commission require OPG to undertake a detailed site geotechnical investigation prior to commencing site preparation activities. The geologic elements of this investigation should include, but not be limited to:

- collection of site-wide information on soil physical properties;
- determining the mechanical and dynamic properties of overburden material across the site;
- mapping of geological structures to improve the understanding of the site geological structure model;
- confirming the lack of karstic features in the local bedrock at the site; and
- confirming the conclusions reached concerning the liquefaction potential in underlying granular materials.

Government of Canada Response

“The Government of Canada accepts the intent of this recommendation to require OPG to undertake a detailed site geotechnical investigation, however, notes that this investigation may be performed concurrently with site preparation activities. Natural Resources Canada can provide available scientific and technical expertise to the Canadian Nuclear Safety Commission, upon request, to assist in the implementation of this recommendation.”

JRP Recommendation #38

The Panel recommends that the Canadian Nuclear Safety Commission require that the geotechnical and seismic hazard elements of the detailed site geotechnical investigation to be performed by OPG include, but not be limited to:

- prior to site preparation
 - demonstration that there are no undesirable subsurface conditions at the Project site. The overall site liquefaction potential shall be assessed with the site investigation data
 - confirmation of the absence of paleoseismologic features at the site and, if present, further assessment to reduce the overall uncertainty in the seismic hazard assessment during the design of the Project must be conducted
- during site preparation and/or prior to construction
 - verification and confirmation of the absence of surface faulting in the overburden and bedrock at the site.

(This recommendation also includes elements to be performed prior to construction and prior to operation which are not repeated here.)

Government of Canada Response

“The Government of Canada accepts the intent of this recommendation to require OPG’s detailed site investigation to include the noted geotechnical and seismic hazard elements, however, notes that this investigation may be performed concurrently with site preparation activities. Natural Resources Canada can provide available scientific and technical expertise to the Canadian Nuclear Safety Commission, upon request, to assist in the implementation of this recommendation.”

DNNP Commitment D-P-9

In response to the JRP recommendations, OPG committed to implement a Site Geotechnical and Seismic Hazard Investigation Program (DNNP Commitment D-P-9) with four deliverables, as follows:

- deliverable D-P-9.1: Site geotechnical and seismic hazard investigation program to be developed in consultation with the CNSC;
- deliverable D-P-9.2: Site geotechnical investigation report(s) detailing the findings and results from the site investigation program for excavation and stockpiling;
- deliverable D-P-9.3: Site geotechnical investigation report(s) detailing the findings and results from the site investigation program for detailed design of foundations and structures;
- deliverable D-P-9.4: Site seismic hazard investigation report(s) detailing the findings and results from the site investigation program.

Status

During the licence period, OPG conducted a preliminary geotechnical investigation of the DNNP site from December 2012 to March 2013, which was designed to obtain the required geotechnical data that will be needed for a potential EPC Co. to develop their bid to design and construct the DNNP. OPG will need to submit details on the site geotechnical and seismic hazard investigation program before it is implemented and details of the findings from the investigation program will need to be provided to CNSC prior to construction (i.e. before Licence to Construct). CNSC will continue monitoring the progress on site geotechnical and seismic hazard investigation program.

2.2.3 Hazardous Waste Management Plan / Procedure

The JRP issued two recommendations related to soil characterization and hazardous waste management plans with the following corresponding GOC response:

JRP Recommendation #2

The Panel recommends that prior to site preparation, the Canadian Nuclear Safety Commission require OPG to conduct a comprehensive soil characterization program. In particular, the potentially impacted soil in the areas OPG identifies as the spoils disposal area, cement plant area and asphalt storage area must be sampled to identify the nature and extent of potential contamination.

Government of Canada Response

“The Government of Canada accepts the recommendation to require OPG to conduct a comprehensive soil characterization program. The Government of Canada also notes that the recommended soil characterization program could also support future ecological risk assessment activities by OPG. Environment Canada can provide available scientific and technical expertise to the CNSC, upon request to assist in the implementation of this recommendation.”

JRP Recommendation #26

The Panel recommends that the Canadian Nuclear Safety Commission require OPG to develop a comprehensive assessment of hazardous substance releases and the required management practices for hazardous chemicals on site, in accordance with the *Canadian Environmental Protection Act*, once a reactor technology has been chosen.

Government of Canada Response

“The Government of Canada accepts this recommendation to require OPG to develop a comprehensive assessment of hazardous substance releases and the required management practices for hazardous chemicals on site once a reactor technology has been chosen. Environment Canada can provide available scientific and technical expertise to the Canadian Nuclear Safety Commission, upon request, to assist in the implementation of this recommendation.”

DNNP Commitments D-P 3.6, D-C-2 and D-C-5.2

The DNNP commitments linked to this JRP recommendation for site preparation are found in OPG sub-commitments D-P-3.6, EPC Hazardous Waste Management Plan/Procedures and for deliverables before construction under DNNP Commitment D-C-2, Non-Radiological Effluent Program and D-C-5.2, Non-Radiological Air Effluent Program.

Status

The development of a Hazardous Waste Management Plan is contingent upon the completion of a comprehensive soil characterization program prior to earth moving/excavation activities associated with site preparation. However, given that an EPC Co. has not been selected for site preparation activities at this time, there has been no soil characterization work done at the DNNP. When an EPC Co. is selected, it is expected that OPG will require, as part of the site preparation plan, the EPC Co. to conduct a comprehensive soil characterization program and develop a Hazardous Waste Management Plan for site preparation activities.

CNSC notes that in 2017 OPG performed work to remove waste and perform soil remediation in accordance with Ontario Ministry of the Environment, Conservation and Parks (formerly the Ministry of Environment and Climate Change) standards in areas identified in the EIS as potentially contaminated with non-radioactive substances. OPG notified CNSC of its completed decommissioning of OPG's temporary soil staging area in June 2018 [11].

CNSC will continue monitoring the progress on the Hazardous Waste Management Plan and Soil Characterization Program.

2.2.4 Fish Habitat Offsetting (Compensation) Plan

The JRP issued three recommendations related to fish habitat offsetting plan with the following corresponding GOC response:

JRP Recommendation #5

To avoid any unnecessary environmental damage to the bluff at Raby Head and fish habitat, the Panel recommends that no bluff removal or lake infill occur during the site preparation stage, unless a reactor technology has been selected and there is certainty that the Project will proceed.

Government of Canada Response

“The Government of Canada accepts this recommendation to avoid any unnecessary environmental damage to the bluff at Raby Head and fish habitat as recommended. DFO and Environment Canada can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. The Government of Canada further notes that authorization under the Fisheries Act will be required prior to any lake infill taking place, and confirms that DFO will work with OPG to ensure that as a condition of that authorization, that no lake infill occurs unless there is certainty that the Project will proceed and appropriate mitigation measures and habitat compensation have been implemented.”

JRP Recommendation #20

The Panel recommends that the CNSC require OPG to perform a thorough evaluation of site layout opportunities before site preparation activities begin, in

order to minimize the overall effects on the terrestrial and aquatic environments and maximize the opportunity for quality terrestrial habitat rehabilitation.

Government of Canada Response

“The Government of Canada accepts this recommendation to require OPG to perform a thorough evaluation of site layout opportunities before site preparation activities begin, as recommended. Environment Canada and Fisheries and Oceans Canada can provide available scientific and technical expertise to the Canadian Nuclear Safety Commission, upon request, to assist in the implementation of this recommendation.

As part of the conditions of authorization under the Fisheries Act, Fisheries and Oceans Canada also commits to working with OPG to ensure overall impacts to aquatic habitat are minimized with appropriate mitigation and habitat compensation.”

JRP Recommendation #31

Irrespective of the condenser cooling system chosen for the Project, the Panel recommends that Fisheries and Oceans Canada not permit OPG to infill beyond the two-meter depth contour in Lake Ontario.

Government of Canada Response

“The Government of Canada accepts the intent of this recommendation. Fisheries and Oceans Canada will work with OPG to ensure that the harmful alteration, disruption or destruction (HADD) of fish habitat of fish habitat associated with the proposed lake infill is limited to the area within the two-meter depth contour of Lake Ontario. The extent of the HADD as well as appropriate mitigation and habitat compensation will be included in the conditions of authorization under the Fisheries Act.”

DNNP Commitments

DNNP commitment D-P-14 addresses the Fish Habitat Compensation Plan and ensures OPG provides the plan to DFO, for review and acceptance, no later than 60 days before commencement of lake infill activities.

Status

The DNNP project would necessitate lake infilling and shoreline protection work in a portion of the Lake Ontario shoreline within the project site to a water depth of about 2 meters in order to provide construction space and protect the facility from the effects of storm surge and flooding. To offset habitat losses, OPG committed to the creation of an offsetting plan.

The Big Island Wetland project, completed in 2014, was implemented as a Habitat Bank to address offsetting requirements of a future Fisheries Act Authorizations for the DNNP which would infill a portion of the Lake Ontario shoreline. It was subsequently used to satisfy in part, the offsetting requirements

of the *Fisheries Act* Authorizations for the Darlington and Pickering Nuclear Power Plants operational impacts to fish. On October 16, 2017, a workshop was held with Fisheries and Oceans Canada (DFO) and OPG staff to determine the Big Island Wetland monitoring requirements. The workshop resulted in the production of the final Monitoring Plan for the project, which OPG submitted to DFO and the CNSC on February 2, 2018. Monitoring of the Big Island Wetland began in 2018 and DFO conducted a site visit in the summer of 2018.

CNSC and DFO staff are satisfied with the current offsetting plans and will continue to monitor progress on this issue.

2.2.5 Round Whitefish Action Plan

The JRP issued three round whitefish action plan recommendations with the following corresponding GOC response:

JRP Recommendation #28

The Panel recommends that Fisheries and Oceans Canada require OPG to continue conducting adult fish community surveys in the site study area and reference locations on an ongoing basis. These surveys shall be used to confirm that the results of 2009 gillnetting and 1998 shoreline electrofishing reported by OPG, and the additional data collected in 2010 and 2011, are representative of existing conditions, taking into account natural year-to-year variability.

Specific attention should be paid to baseline gillnetting monitoring in spring to verify the findings on fish spatial distribution and relatively high native fish species abundance in the embayment area, such as white sucker and round whitefish. The shoreline electrofishing habitat use study is needed to establish the contemporary baseline for later use to test for effects of lake infill armouring, if employed, and the effectiveness of mitigation.

Government of Canada Response

“The Government of Canada accepts this recommendation. Fisheries and Oceans Canada will work with Environment Canada, the Canadian Nuclear Safety Commission, the Ontario Ministry of Natural Resources and OPG to develop the details of an ongoing fisheries monitoring program which will be included as a condition of a Fisheries Act authorization.”

JRP Recommendation #29

The Panel recommends that Fisheries and Oceans Canada require OPG to continue the research element of the proposed Round Whitefish Action Plan for the specific purpose of better defining the baseline condition, including the population structure, genome and geographic distribution of the round whitefish population as a basis from which to develop testable predictions of effects, including cumulative effects.

Government of Canada Response

“The Government of Canada accepts this recommendation. Fisheries and Oceans Canada will work with Environment Canada, Canadian Nuclear Safety Commission, Ontario Ministry of Natural Resources and OPG to develop and finalize the Round Whitefish Action Plan. This plan, as a condition of a Fisheries Act authorization, will form part of the ongoing monitoring program and feed into an adaptive management plan to protect the round whitefish population into the future.”

JRP Recommendation #33

The Panel recommends that Fisheries and Oceans Canada require OPG to conduct an impingement and entrainment follow-up program at the existing Darlington Nuclear Generating Station and the Project site to confirm the prediction of adverse effects, including cumulative effects, and the effectiveness of mitigation. For future entrainment sampling for round whitefish, a statistical probability analysis will be needed to determine if unbiased and precise sample results can be produced.

Government of Canada Response

“The Government of Canada accepts this recommendation. Fisheries and Oceans Canada will work with the Canadian Nuclear Safety Commission and Ontario Power Generation to develop an impingement and entrainment study on the existing Darlington Nuclear Generating Station and at the proposed Project site to confirm predicted adverse effects and will further ensure implementation through its regulatory process and conditions of authorization under the Fisheries Act.”

DNNP Commitment

DNNP Commitment D-P-15 addresses the Round Whitefish Action Plan. This commitment requires OPG to provide to DFO the Round Whitefish Action Plan 60 days before commencement of lake infill activities.

Status

OPG committed to undertake further studies of round whitefish spawning habitat in the vicinity of the proposed DNNP. Confirmation of the existence of round whitefish and if there are any impacts from thermal discharge will allow for appropriate thermal discharge mitigation options to be determined. OPG, nevertheless, has taken a precautionary approach in the assessment of thermal effects and assumed that a round whitefish habitat exists in the vicinity of the proposed DNNP and the occurrence and extent of the preferred round whitefish spawning habitat should be confirmed through the Round Whitefish Action Plan.

A number of meetings of stakeholders (CNSC, OPG, DFO, Environment and Climate Change Canada (ECCC), Ontario Ministry of Natural Resources and Forestry (MNR)) associated with the Round Whitefish Action Plan have occurred to determine priorities. Since 2011, several studies have been completed

to better understand round whitefish and to support the action plan. In 2014 and 2017 studies on effects of temperature on eggs were conducted. In 2012 and 2014 studies on thermal plumes at DNGS and PNGS were conducted, and in 2013 a potential spawning habitat was mapped. In addition, a genetic study on round whitefish was undertaken by the MNR with support from OPG. Results of these studies have been submitted to the CNSC and other government departments and have been used in support of risk assessments at both the Darlington and Pickering Nuclear Power Plants. In spring 2018, OPG began conducting aquatic community surveys around potential areas of the intake and diffuser for DNNP. The fish community surveys should help further characterize round whitefish habitat availability near DNNP.

As part of commitment D-P-15, OPG needs to provide to DFO for review and acceptance, their Round Whitefish Action Plan no later than 60 days prior to the commencement of lake infilling activities.

CNSC staff is satisfied with the current status of the Round Whitefish Action Plan and will continue to monitor the progress on this issue.

2.2.6 Condenser Cooling Water Design

The JRP issued three recommendations related to condenser cooling water design with the following corresponding GOC response:

JRP Recommendation #3

The Panel recommends that the Canadian Nuclear Safety Commission require that as part of the Application for a Licence to Construct a reactor, OPG must undertake a formal quantitative cost-benefit analysis for cooling tower and once-through condenser cooling water systems, applying the principle of best available technology economically achievable. This analysis must take into account the fact that lake infill should not go beyond the two-meter depth contour and should include cooling tower plume abatement technology.

Government of Canada Response

“The Government of Canada accepts the intent of this recommendation to require OPG to conduct a formal quantitative cost-benefit analysis for cooling tower and once-through condenser cooling water systems, as recommended, but acknowledges that this analysis may be required earlier than indicated in the recommendation given the relationship between site layout and the choice of condenser cooling technology.

Fisheries and Oceans Canada and Environment Canada can provide available scientific and technical expertise to the Canadian Nuclear Safety Commission, upon request, to assist in the implementation of this recommendation.

The Government of Canada further acknowledges the connection of this Recommendation with Panel Recommendation #31 and as such notes that Fisheries and Oceans Canada will work with OPG to ensure through its regulatory process and conditions of authorization under the Fisheries Act that

any Harmful Alteration, Disruption and Destruction (HADD) is limited to the 2 meter depth contour of Lake Ontario.”

JRP Recommendation #31

Irrespective of the condenser cooling system chosen for the project, the Panel recommends that Fisheries and Oceans Canada not permit OPG to infill beyond the two-meter depth contour in Lake Ontario.

Government of Canada Response

“The Government of Canada accepts the intent of this recommendation. Fisheries and Oceans Canada will work with OPG to ensure that the HADD of fish habitat associated with the proposed lake infill is limited to the area within the two-meter depth contour of Lake Ontario. The extent of the HADD as well as appropriate mitigation and habitat compensation will be included in the conditions of authorization under the Fisheries Act.”

JRP Recommendation #34

In the event that a once-through condenser cooling system is chosen for the Project, the Panel recommends that prior to construction, Environment Canada ensure that enhanced resolution thermal plume modeling is conducted by OPG, taking into account possible future climate change effects. Fisheries and Oceans Canada shall ensure that the results of the modeling are incorporated into the design of the outfall diffuser and the evaluation of alternative locations for the placement of the intake and the diffuser of the proposed condenser cooling water system.

Government of Canada Response

“The Government of Canada accepts the intent of this recommendation. Environment Canada is committed to reviewing the information provided by OPG, and will rely on Fisheries and Oceans Canada authorization for a HADD associated with the intake or outfall to ensure that OPG undertakes this modelling.

Fisheries and Oceans Canada will work with Environment Canada, and the Canadian Nuclear Safety Commission to incorporate the results from the thermal plume modeling into the determination of the appropriate location for the intake and diffuser structures to mitigate adverse effects. Fisheries and Oceans Canada will ensure implementation through conditions of a Fisheries Act authorization.”

DNNP Commitments D-C-1

There are three sub-commitments under this commitment: (1) D-C-1.1 Condenser Cooling Water Option Assessment report and OPG’s Final Decision on Best Available technology Economically Achievable (BATEA); (2) D-C-1.2 EPC Condenser Cooling Water Design; and (3) D-C-1.3 Evidence of OPG review and acceptance of EPC Condenser Cooling Water Design.

Status

Of the three sub-commitments listed above, OPG has completed one sub-commitment (D-C-1.1) regarding the condenser cooling water options assessment report.

The Condenser Cooling Water Option Assessment Report was finalized by OPG in 2013 [12]. The results of this analysis indicated that the once-through cooling option was the preferred cooling water system for the proposed DNNP. OPG has planned a conceptual design for a once-through condenser cooling water system for DNNP which seeks to improve upon the existing technology at the operating Darlington Nuclear Generating Station (DNGS) to reduce fish impingement. The conceptual design for the DNNP condenser cooling water system would include intake and discharge structures which are to be optimally located such that interaction with selected environmental variables would be minimized taking into account socio-economic and operational requirements. The location of these structures may be beyond the nearshore habitat zone, in areas deeper than the existing system at DNGS. Impact on fish species such as the round whitefish would be reduced and the operational requirement for colder water would be met.

In order to gain a better understanding of the aquatic ecology and to support detailed design of the once-through cooling water system for DNNP, research on the offshore aquatic community (10 to 30 m water depth) including but, not limited to, detailed substrate mapping, and surveys of adult fish, fish larvae, benthic invertebrates and zooplankton have been conducted by OPG between July 2012 and May 2013 [13]. This sampling program established preliminary ecological conditions within the deep water environment adjacent to the proposed DNNP. It was reported that while the substrate is variable throughout the study area with some areas dominated by sand or a mix of rocky substrates, there did not appear to be any unique habitat features such as rocky shoals or step drop-offs that would serve to congregate fish. The use of this area by the fish community was largely transient with many species migrating seasonally to shallower spawning areas in the lake or its tributaries or entering the area for foraging. The shallower portions of the study area may provide spawning habitat for some species of fish. Zebra mussels, an invasive species, were found to be abundant in the study area. Macrozooplankton and mysid species were also found, with seasonal variations and lake currents influencing their distribution and numbers in the study area.

CNSC staff have reviewed the Condenser Cooling Water Option Assessment Report and concurred that the analysis was acceptable [14], with several conditions that should be carried forward to the design stage. The results of CNSC's review were posted on the CNSC's website under "*CNSC Correspondence with OPG on Condenser Cooling Water Option Assessment for the Darlington New Nuclear Project*".

OPG needs to provide all information on Condenser Cooling Design prior to the licence to construct.

CNSC continues to monitor the progress on the activities to support the design of the once-through cooling water system for DNNP.

2.3 Fukushima Task Force Lessons Learned

The DNNP Site Preparation licence was issued prior to the Fukushima Task Force (FTF) initiative. The JRP recognized the fact that the FTF lessons learned would likely result in changes to the regulatory requirements and that these requirements should be incorporated into the Project.

CNSC has updated a number of Regulatory Documents (REGDOCs) to take into account the lessons learned from the event and OPG will need to demonstrate that they meet the new requirements in order to receive a renewed licence. These documents address design, safety analysis and emergency preparedness requirements.

Two regulatory documents are relevant to the site preparation licence, namely REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactors Facilities* [15] and REGDOC-2.10.1 *Nuclear Emergency Preparedness and Response, Version 2* [16].

REGDOC-1.1.1 was drafted to replace RD-346, *Site Evaluation for Nuclear Power Plants*. This revision addresses the findings from *INFO-0824, CNSC Fukushima Task Force Report* [17], and the subsequently issued action plans. Additions to the revised *REGDOC-1.1.1* focused on the need for robust characterization of the site to include:

- consideration of events to include multiple and simultaneous severe external events that could exceed the design basis
- multiple and simultaneous reactor accidents
- discussions around emergency planning and preparations for extreme events earlier in a project

The objective of the site preparation stage is to assess whether the site is suitable for the construction and operation of a nuclear facility. This includes whether it is feasible to undertake emergency measures given the population density, population distribution and other characteristics of the region (i.e., road infrastructure).

REGDOC- 2.10.1 was developed taking into consideration the lessons learned from Fukushima and provides requirements and guidance regarding the planning basis for emergency preparedness programs. The document specifically states:

“...ensure the planning basis considers the hazards that have, or could have, an adverse impact on the environment and the health and safety of onsite personnel or the public, and also considers:

- a. all accidents and internal or external events that have been analyzed as having an unacceptable impact on their facilities;

- b. *the inclusion of multi-unit accident scenarios for multi-unit power reactor facilities;*
- c. *extended loss of power.”*

OPG will need to demonstrate that it meets the requirements of these new and revised regulatory documents that take into account the lessons learned from the Fukushima Task Force, in order to renew its site preparation licence.

2.4 Control of Land Use

At the time of the initial licensing for OPG’s DNNP, the JRP took lessons learned from the Fukushima Daiichi accident into consideration and put forth recommendations with the intent to avoid future sensitive land uses being located within 3 km of a nuclear site.

The JRP issued four land use recommendations with the following corresponding GOC response:

JRP Recommendation #43

That the CNSC engage appropriate stakeholders, including OPG, Emergency Management Ontario, municipal governments and the Government of Ontario to develop a policy for land use around nuclear generating stations.

Government of Canada Response

“The Government of Canada accepts this recommendation for the CNSC to engage appropriate stakeholders in developing a policy for land use around nuclear generating stations.”

JRP Recommendation #44

That the Government of Ontario takes appropriate measures to prevent sensitive and residential development within 3 km of the site boundary.

Government of Canada Response

“This recommendation was directed to the Government of Ontario”

JRP Recommendation #45

That the Municipality of Clarington prevent, for the lifetime of the nuclear facility, the establishment of sensitive public facilities such as schools, hospitals and residences for vulnerable clientele within the 3 km zone around the site boundary.

Government of Canada Response

“This recommendation was directed to the Municipality of Clarington”

JRP Recommendation #59

That the Municipality of Clarington manage development in the vicinity of the Project site to ensure that there is no deterioration in the capacity to evacuate members of the public for the protection of human health and safety.

Government of Canada Response

“This recommendation was directed to the Municipality of Clarington”

Status

Following the JRP recommendations, significant effort regarding land use planning has been undertaken by the Ontario Ministry of Municipal Affairs and Housing, the Region of Durham, the Municipality of Clarington, OPG, several other key provincial ministries and the CNSC.

As part of CNSC activities carried out to address the JRP recommendations, CNSC met individually with municipal, regional and provincial stakeholders, culminating in the CNSC organizing a land use planning workshop held in Ajax, Ontario on June 12, 2013 [18]. The workshops Summary Report contained eight recommendations which have all been completed.

The key activities and progress to date:

- The Government of Ontario released the revised 2014 Provincial Planning Statement (PPS) land use planning policy [19] (which came into effect April 30, 2014). The statement included a new policy on land use compatibility, which was further supported by definitions for “sensitive land uses” and “major facilities” that include energy generating facilities such as NPPs.
- The Region of Durham has commenced revision of their official plan to align with the PPS. The Municipal Comprehensive Review(MCR) was initiated in June 2018 and this process is expected to be completed by 2022.
- The Municipality of Clarington revised its Official Plan [20] on November 1, 2016. It included municipal policies to align to the 2014 PPS land use planning policy.

OPG and the Municipality of Clarington maintain key points of contact and coordinate Land Use Planning. OPG and CNSC staff are monitoring the implementation of Clarington’s Official Plan which is scheduled to be completed by November 1st, 2019.

2.5 EA Follow-up and Monitoring Program

The purpose of an EA follow-up and monitoring program is to verify the accuracy of the EA predictions and to determine the effectiveness of any measures taken to mitigate the adverse environmental effects of a project.

OPG is responsible to develop a detailed follow-up and monitoring program and seek approval from the Responsible Authorities (RAs) that carried out the EA, prior to implementation. As the RAs, CNSC, DFO and Transport Canada (TC) are

responsible to ensure the follow-up and monitoring program is implemented. As the lead RA, CNSC will coordinate this process.

Eight (8) of the 67 JRP recommendations are to be included in the follow-up and monitoring program. These are JRP recommendations 8, 11, 13, 23, 33, 35, 37, 51 which are described in Appendix A.

As no licensed site preparation activities are currently planned and no EPC Co. has been contracted for site preparation, a detailed follow-up and monitoring program has not yet been developed. Once an EPC Co. for site preparation has been determined, OPG is required to develop the follow-up and monitoring program in consultation with the CNSC, DFO, TC, stakeholders and Indigenous communities and submit the proposed plan to the CNSC for review and approval at least three (3) months prior to any licensing activities taking place.

3 OTHER MATTERS OF REGULATORY INTERESTS

3.1 Financial Guarantees

Licence Condition 10.4 of the PRSL [5] states that “the licensee shall provide a financial guarantee that is acceptable by the Commission which shall be valid and in effect to adequately fund the preliminary decommissioning plan referenced in condition 8.2 of this licence.”

The current value of the financial guarantee for the DNNP represents \$0 given that the initial licence to prepare site does not authorize work that would require decommissioning of the site should the project not proceed.

Should OPG provide an updated Preliminary Decommissioning Plan (PDP), OPG will be required to submit a financial guarantee commensurate with the financial liabilities of the updated PDP.

3.2 Licensee Public Information Program

The availability and clarity of information pertaining to nuclear activities is essential to establishing an atmosphere of openness, transparency and trust between the licensee and the public. Since 2012, the CNSC requires NPP operators and other major licensees to maintain a Public Information and Disclosure program supported by a robust disclosure protocol that addresses stakeholders’ needs. The requirements build on previously established guidance put in place in 2004.

OPG maintains a public information and disclosure program which seeks to promote an open and transparent dialogue with their target audiences and stakeholders. Through various community engagement initiatives, OPG staff provides regular information on operations, major project activities and key milestones to their stakeholders, Indigenous communities and members of the public.

OPG's public information and disclosure program is well-established and meets the regulatory requirements of RD/GD 99.3, *Public Information and Disclosure Program* [21]. The program ensures information and health, safety and security of persons and the environment, along with other issues associated with the lifecycle of OPG facilities, is effectively communicated to their target audiences, available to the general public and reported on to the CNSC annually.

OPG staff continues to provide information to community groups, key stakeholders, industry partners and the general public and opens its doors to the general public through offering tours. The OPG Information Centre is a public venue where interested parties can learn more about the current and planned operations for DNGS and DNNP. OPG provides regular updates, community newsletters and special project-related information on their website.

3.3 Indigenous Consultation

As part of the review of the initial licence application for the PRSL, CNSC staff undertook focused engagement and consultation activities with Indigenous communities with interest in the proposed project. Activities included offering participant funding and opportunities for communities to identify and discuss issues, concerns, and any possible impact to potential or established Indigenous and/or treaty rights. All potentially interested or impacted Indigenous communities were encouraged to participate in the review process and in the JRP public hearings to advise the JRP directly of any concerns they had in relation to the licence application. Four Indigenous communities (Mississaugas of the New Credit First Nation, Métis Nation of Ontario, Saugeen Ojibway Nation, and Alderville First Nation) submitted interventions through the JRP hearing process.

The CNSC ensures that all of its licensing decisions under the *NSCA* uphold the honour of the Crown and consider Indigenous peoples' rights and interests. This mid-term licence CMD is for information only and there are no decisions being requested of the Commission. Therefore, no impacts to potential or established Indigenous and/or treaty rights are anticipated and there is no duty to consult in relation to this update to the Commission.

In order to maintain meaningful long-term relationships, CNSC recognizes that it is important to discuss topics of interest and address concerns with Indigenous communities over the life-cycle of facilities.

CNSC staff continues to develop a structured, formalized approach to ensure continued engagement and information sharing with all interested Indigenous communities and organizations regarding issues related to the Pickering and Darlington Generating Stations, as well as the DNNP. In the spirit of these long-term relationships, CNSC staff have informed the identified Indigenous communities regarding CNSC staff's DNNP mid-term report and have offered to provide more information should there be an interest.

OPG is working to strengthen its relationship with interested Indigenous communities regarding nuclear operations and projects. OPG continues to work with communities to resolve any issues and concerns, as well as to provide regular

information updates to interested Indigenous communities regarding its operations and activities. OPG has also involved Indigenous communities in environmental monitoring activities.

CNSC staff will continue to monitor, and, where appropriate, participate in OPG's engagement activities.

CNSC is committed to information sharing and maintaining long-term relationships with the Indigenous communities who have interests in relation to activities at the Darlington nuclear site.

4 SAFETY AND CONTROL AREAS

OPG has not performed any licensed activity during the period covered by this mid-term report and OPG has not indicated any intentions to start licensed activities in the short term. For this reason, only a few Safety and Control Areas (SCAs) are covered by this mid-term report.

The site preparation licensed activities include:

- construction of site access control measures
- clearing and grubbing of vegetation
- excavation and grading of the site
- installation of services and utilities (domestic water, fire water, sewage, electrical, communications, natural gas)
- construction of administrative and support
- construction of environmental monitoring and mitigation systems
- construction of flood protection and erosion control measures

4.1 Management System

OPG has not conducted any licensed activities during the period. In accordance with PRSL 18.00/2022 Licence Condition 2.1 [5], all licensed activities will have to be conducted in accordance with CSA N286-05, *Management System Requirements for Nuclear Power Plants* [22]. The DNNP management system is defined by OPG *DNNP Management System* document [23], which is commensurate with activities conducted to date and will further be developed when EPC Co. is selected and activities expand.

4.2 Operating Performance

As required by the PRSL and the associated Licence Conditions Handbook (LCH), OPG is expected to submit an annual report on licensed activities associated with the project. OPG is also required to report all adverse situations or events associated with the licensed activities.

In March 2013, OPG submitted its first annual report on site preparation activities in compliance with the PRSL. OPG has since reported annually on the site preparation activities [24].

There have been no events related to the DNNP reported during the licensed period.

OPG has notified the CNSC of their intent to temporarily use the DNNP site to store components and equipment related to the Darlington NGS refurbishment activities. In each instance, proper monitoring and or mitigation measures were in place to ensure that the site was returned to its original state after use. OPG has notified the CNSC of the termination of each temporary use.

Overall, CNSC staff determined that OPG has met the reporting requirements of this SCA.

4.3 Environmental Protection

During the first half of the licensing period, OPG has engaged in supporting work on the Environmental Management and Protection Plans as per Licence Condition 6.1. The supporting work included work towards the Hazardous Waste Management Plan, Fish Habitat as well as Bank Swallow Mitigation measures and plan.

Overall CNSC staff determined that OPG has met the requirements for environmental protection safety and control area.

4.4 Emergency Management and Fire Protection

Licence Condition 7.1 of the PRSL requires that “The licensee shall implement and maintain safety and control measures for emergency preparedness and fire protection.”

The EPC Co. will prepare an Emergency Response and Evacuation Plan. OPG will review and accept this plan prior to the commencement of site preparation activities such as excavation.

Since no licensed activities are currently performed and the site is unoccupied, there is no need for an emergency response plan.

CNSC staff notes that OPG is updating its Consolidated Nuclear Emergency Plan (CNEP) [25] to align with the new Provincial Nuclear Emergency Response Plan (PNERP) [26], and will be updating the evacuation time estimate studies. OPG will proceed with CNEP updates in 2019 after the Darlington NGS Site Specific Implementing Plan is issued, which is currently expected by the end of 2018. These enhancements in emergency management for the Darlington site are in-line with recently published CNSC REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities* [15].

Fire protection activities are to be conducted in accordance with National Building Code of Canada, National Fire Code of Canada and CSA N293, *Fire protection for CANDU nuclear power plants* [27]. Emergency fire response to the

New Build area on the Darlington Site will be by the Clarington Fire Department since this area is outside the Protected Area. The Clarington Fire Department is capable of responding to the Darlington site within approximately 6 minutes. Fire response capability can be expanded as the site develops. This would be expected as new hazards are introduced to the area and buildings/roads are constructed.

OPG will need to provide CNSC with their emergency preparedness plan, emergency response and evacuation plan and emergency fire protection plan three months before the start of any licensed activities.

4.5 Waste Management and Decommissioning

The Safety and Control Area “Waste Management” covers internal waste-related programs which form part of the facility’s (or licensed activities) operations up to the point where the waste is removed from the facility (or site) to a separate waste management facility.

In accordance with PRSL Licence Condition 8.1 [5], the activities encompassed under the licence do not involve the handling of radioactive materials and are not anticipated to generate any radioactive wastes; therefore there is currently no waste management program for radioactive wastes.

OPG is required to revise the Preliminary decommissioning plan (PDP) for DNNP every 5 years. In 2017, OPG reaffirmed their PDP for the site preparation of the DNNP [28]. CNSC staff reviewed OPG’s submission and accepted the reaffirmed PDP [29]. An updated PDP, in accordance with CSA N294-09, *Decommissioning of facilities containing nuclear substances* will be required before proceeding with more substantive site preparation work that would incur a decommissioning liability [28].

4.6 Security

The Security SCA covers the programs required to implement and support the security requirements stipulated in CNSC regulations, the Licence, Orders, or expectations for the facility or activity.

As the DNNP does not contain any category I, II, or III nuclear material and does not currently house any infrastructure that would apply to a high security site, the *Nuclear Security Regulations* do not apply. OPG maintains security in accordance with prudent management practices.

OPG provided a security plan for site preparation, which was accepted in October 2011 by CNSC staff. Since the issuance of the PRSL, there have been no reportable security events on the DNNP site. As no site preparation activities have been planned to date, there have been no other security enhancements made at the DNNP site.

5 OVERALL CONCLUSIONS

The DNNP PRSL allows OPG to commence site preparation licensed activities. Because the acquisition of a new nuclear plant has been deferred by the Government of Ontario, no licensed activities have been performed on the site.

Before any such activities can commence, OPG needs to address the prerequisites set forth in the PRSL and LCH [5][6].

OPG has undertaken a number of actions associated with the JRP recommendations.

These include work to support:

- developing a Round Whitefish Action Plan
- developing Bank Swallow Mitigation Measures
- selecting a preferred Condenser Cooling technology and associated deep water sampling
- communicating and consulting with stakeholders
- land use planning

CNSC staff have undertaken a number of readiness activities regarding new NPPs such as updating its regulatory framework for new nuclear power plants. A number of regulatory documents have been updated and published. REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities* and REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response* are particularly relevant to a site preparation licence and include the lessons learned from the Fukushima Task Force. OPG has indicated its intent to renew the site preparation PRSL when it expires, and indicated that they intend to meet requirements of these updated REGDOCs.

Other work performed during the first half of the licence term includes CNSC staff facilitating progress on land use planning surrounding the new NPP.

Recently, letters were sent to Indigenous communities to inform them of this mid-term report and of OPG's intent to renew their licence.

CNSC staff have monitored the work performed by OPG on the commitments under the licence. Necessary hold points are in place in the licence to ensure that proper documentation is provided before an EPC Co. start work on the site and to ensure that all licensing prerequisites are met.

CNSC staff will continue monitoring any activities related to DNNP commitments to meet the JRP recommendations.

At the mid-point of this 10 year term of the licence, OPG has been found to be compliant with the conditions of their licence. CNSC Staff continue to monitor OPG's work and provide an annual update in the Regulatory Oversight Report on NPPs.

REFERENCES

1. Joint Review Panel for the Darlington New Nuclear Power Plant Project, *Environmental Assessment Report*, August 2011, e-Doc 3784878
2. Record of Proceedings, Including Reasons for Decision, In the Matter of Ontario Power Generation Inc., *Application for the Issuance of a Licence to Prepare Site for a New Nuclear Power Plant at the Darlington Nuclear Site*, e-Doc 3990922
3. OPG letter, L. Swami to D. Miller, NK054-CORR-00531-10010, “OPG New Nuclear at Darlington – 2014 Work Program”, January 27, 2014, e-Doc 4312481
4. OPG letter, M. Knutson to C. Carrier, NK054-CORR-00531-10470, “DNNP - Notice of Intent to Renew Power Reactor Site Preparation Licence PRSL 18.00/2022”, September 24, 2018, e-Doc 5645678
5. Power Reactor Site Licence, PRSL 18.00/2022 , *OPG New Nuclear at Darlington Generating Station, Nuclear Power Reactor Site Preparation Licence. Licence to Prepare Site* e-Doc 3990795
6. Licence Conditions Handbook, *OPG New Nuclear at Darlington Generating Station, Nuclear Power Reactor Site Preparation Licence*, LCH-PRSL-DNNP-R002, e-Doc 4416070
7. Government of Canada’s Response to the Joint Review Panel Report for the Proposed Darlington New Nuclear Power Plant Project in Clarington Ontario, e-Doc 3994965
8. OPG letter, A. Webster to Dr. D. Miller, NK054-CORR-00531-10014- "2014 Submission of Revised Darlington New Nuclear Project Commitments Report", March 25, 2014, e-Doc 4410795
9. CNSC letter, C. Carrier to M. Knutson, “OPG Darlington New Nuclear Project Commitments Report”, July 9, 2018, e-Doc 5575396
10. OPG letter, L. Mitchell to C. Carrier, NK054-CORR-00531-10453, “2017 Darlington New Nuclear Project Bank Swallow Monitoring Results”, February 9, 2018, e-Doc 5459966
11. OPG letter, L. Mitchell to C. Carrier, NK054-CORR-00531-10462, “Decommissioning of Temporary Use of DNNP Site by Darlington NGS”, June 13, 2018, e-Doc 5593365
12. OPG letter, A. Sweetnam to D. Newland, NK054-CORR-00531-00248, “Submission of the Revised Condenser Cooling Water Assessment for the Darlington New Nuclear Project”, January 31, 2013, e-Doc 4082318
13. OPG letter, A. Webster to D. Miller, NK054-CORR-00531-10002, “2013 Darlington New Nuclear Project Aquatic Sampling Report”, February 25, 2014, e-Doc 4384194

14. CNSC letter, D. Newland to W. Robbins, “OPG Decision on the Condenser Cooling Water Option for Darlington New Nuclear Project”, March 28, 2013, e-Doc 4114145
15. REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactors Facilities*, July 2018
16. REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*, Version 2, February 2017
17. Canadian Nuclear Safety Commission (CNSC). 2011. CNSC Fukushima Task Force Report. INFO-0824. e-Doc 4764601.
18. Hardy Stevenson and Associates, Summary of Workshop discussion: *Requirements for policy development for land use around nuclear generating stations – Ontario*, June 12, 2013, e-Doc 4791866
19. Government of Ontario, *2014 Provincial Policy Statement (PPS)*
20. 2016 Municipality of Clarington Official Plan
21. RD/GD 99.3, *Public Information and Disclosure*, March, 2012.
22. CSA N286-05, *Management System Requirements for Nuclear Power Plants*
23. OPG Charter Document, A. Sweetnam, *DNNP Management System*, NK054-CHAR-0001 R004, e-Doc 3629494
24. OPG letter, L. Mitchell to C. Carrier, NK054-CORR-00531-10456, “2017 Darlington New Nuclear Project Annual Report”, March 22, 2018, e-Doc 5493418
25. OPG Program Document, S. Lesiuta, *Consolidated Nuclear Emergency Plan*, N-PROG-RA-0001 R016, e-Doc 5341718
26. Government of Ontario, *2017 Provincial Nuclear Emergency Response Plan (PNERP)*
27. CSA N293, *Fire protection for CANDU nuclear power plants*, 2012
28. OPG Letter, W.S. Woods to C. Carrier, NK054-CORR-00531-10454- “Darlington New Nuclear Project: Preliminary Decommissioning Plan”, December 1, 2017, e-Doc 5425939
29. CNSC Letter, C. Carrier to M. Knutson, “OPG Darlington New Nuclear Project Commitments Report”, July 9, 2018, e-Doc 5581380

GLOSSARY

BATEA	Best Available Technology Economically Achievable
CCW	Condenser Cooling Water
CEAA	Canadian Environmental Assessment Act
CLA	Construction Licence Application
CMD	Commission Member Document
CNEP	Consolidated Nuclear Emergency Plan
CNSC	Canadian Nuclear Safety Commission
DFO	Fisheries and Oceans Canada
DNGS	Darlington Nuclear Generation Station
DNNP	Darlington New Nuclear Project
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Statement
EMPP	Environmental Management and Protection Plan
EPC	Engineering, Procurement and Construction
EPC Co.	Engineering, Procurement and Construction company
FA	Federal Authority
FTF	Fukushima Task Force
GoC	Government of Canada
HADD	Harmful Alteration, Disruption or Destruction (of fish habitat)
JRP	Joint Review Panel
LCH	Licence Conditions Handbook
LTPS	Licence to Prepare Site
MCR	Municipal Comprehensive Review
MNRF	Ministry of Natural Resources and Forestry
NPPs	Nuclear Power Plants
NRC	Nuclear Regulatory Commission
NSCA	Nuclear Safety and Control Act

OPG	Ontario Power Generation
PDP	Preliminary Decommissioning Plan
PNERP	Provincial Nuclear Emergency Response Plan
PNGS	Pickering Nuclear Generation Station
PPS	Provincial Policy Statement
PRSL	Power Reactor Site Licence
RA	Responsible Authority
REGDOC	Regulatory Document
RWAP	Round Whitefish Action Plan
SCA	Safety and Control Area
TC	Transport Canada

A.1 JRP Recommendation / GoC Response / OPG Deliverable

#	JRP Recommendation	Government Response	OPG Deliverable	Status
1	<p>The Panel understands that prior to construction, the CNSC will determine whether this EA is applicable to the reactor technology selected by the Government of Ontario for the Project. Nevertheless, if the selected reactor technology is fundamentally different from the specific reactor technologies bounded by the Plant Parameter Envelope, the Panel recommends that a new environmental assessment be conducted.</p>	<p>The GOC accepts the intent of this recommendation, but acknowledges that any RA under the CEAA will need to determine whether the future proposal by the proponent is fundamentally different from the specific reactor technologies assessed by the JRP and if a new EA is required under the CEAA.</p>	N/A	Not Initiated
2	<p>The Panel recommends that prior to site preparation, the CNSC require OPG to conduct a comprehensive soil characterization program. In particular, the potentially impacted soils in the areas OPG identifies as the spoils disposal area, cement plant area and asphalt storage area must be sampled to identify the nature and extent of potential contamination.</p>	<p>The GOC accepts the recommendation to require OPG to conduct a comprehensive soil characterization program. The GOC also notes that the recommended soils characterization program could also support future ecological risk assessment activities by OPG. Environment Canada can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p>	D-P-3.6	Initiated
3	<p>The Panel recommends that the CNSC require that as part of the Application for a Licence to Construct a reactor, OPG must undertake a formal quantitative cost-benefit analysis for cooling tower and once-through condenser cooling water systems, applying the principle of best available technology economically achievable. This analysis must take into account the fact that lake infill should not go beyond the two-meter depth contour and should include cooling tower plume abatement technology.</p>	<p>The GOC accepts the intent of this recommendation to require OPG to conduct a formal quantitative cost-benefit analysis for cooling tower and once-through condenser cooling water systems, as recommended, but acknowledges that this analysis may be required earlier than indicated in the recommendation given the relationship between site layout and the choice of condenser cooling technology. DFO and EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. The GOC further acknowledges the connection of this Recommendation with Panel Recommendation #31 and as such notes that DFO will work with OPG to</p>	D-C-1.1	Complete

#	JRP Recommendation	Government Response	OPG Deliverable	Status
		ensure through its regulatory process and conditions of authorization under the Fisheries Act that any Harmful Alteration, Disruption and Destruction (HADD) is limited to the 2 meter depth contour of Lake Ontario.		
4	The Panel recommends that the CNSC exercise regulatory oversight to ensure that OPG complies with all municipal and provincial requirements and standards over the life of the Project. This is of particular importance because the conclusions of the Panel are based on the assumption that OPG will follow applicable laws and regulations at all jurisdictional levels.	The GOC accepts this recommendation, however recognizes that it is the responsibility of provincial and municipal officials to ensure compliance with their own requirements and standards over the life of the Project.	N/A	Initiated
5	To avoid any unnecessary environmental damage to the bluff at Raby Head and fish habitat, the Panel recommends that no bluff removal or lake infill occur during the site preparation stage, unless a reactor technology has been selected and there is certainty that the Project will proceed.	The GOC accepts this recommendation to avoid any unnecessary environmental damage to the bluff at Raby Head and fish habitat as recommended. DFO and EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. The GOC further notes that authorization under the Fisheries Act will be required prior to any lake infill taking place, and confirms that DFO will work with OPG to ensure that as a condition of that authorization, that no lake infill occurs unless there is certainty that the Project will proceed and appropriate mitigation measures and habitat compensation have been implemented.	D-P-3.8 D-P-14.1 D-P-16.1	Initiated
6	The Panel recommends that prior to site preparation, the CNSC require OPG to update its preliminary decommissioning plan for site preparation in accordance with the requirements of CSA Standard N294-09. The OPG preliminary decommissioning plan for site preparation must incorporate the rehabilitation of the site to reflect the existing biodiversity in the event that	The GOC accepts the intent of the recommendation to require OPG to maintain a preliminary decommissioning plan for site preparation in accordance with the requirements of CSA N294-09, which provides direction on the decommissioning of licensed facilities and activities consistent with Canadian and international recommendations. The GOC accepts the recommendation	D-P-13.1	Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
	the Project does not proceed beyond the site preparation phase. OPG shall prepare a detailed preliminary decommissioning plan once a reactor technology is chosen, to be updated as required by the CNSC.	to require OPG to revise the preliminary decommissioning plan once a reactor technology is selected.		
7	The Panel recommends that prior to site preparation, the CNSC require that OPG establish a decommissioning financial guarantee to be reviewed as required by the CNSC. Regarding the decommissioning financial guarantee for the site preparation stage, the Panel recommends that this financial guarantee contain sufficient funds for the rehabilitation of the site in the event the Project does not proceed beyond the site preparation stage.	The GOC accepts the intent of this recommendation to require OPG to establish a financial guarantee for the site preparation stage, however, notes that the financial guarantee must be sufficient to cover the cost of decommissioning work outlined in the preliminary decommissioning plan referenced in Recommendation #6.	D-P-13.2	Initiated
8	The Panel recommends that prior to site preparation, the CNSC require OPG to develop a follow-up and adaptive management program for air contaminants such as Acrolein, NO ₂ , SO ₂ , SPM, PM _{2.5} and PM ₁₀ , to the satisfaction of the CNSC, Health Canada and Environment Canada. Additionally, the CNSC must require OPG to develop an action plan acceptable to Health Canada for days when there are air quality or smog alerts.	The GOC accepts this recommendation to require OPG to develop a follow-up and adaptive management program for air contaminants and a smog alert action plan. Health Canada and Environment Canada can provide available scientific and technical expertise to the CNSC, to assist in the implementation of this recommendation.	D-P-3.10 D-P-12.2	Not Initiated
9	The Panel recommends that the CNSC, in collaboration with Health Canada, require OPG to develop and implement a detailed acoustic assessment for all scenarios evaluated. The predictions must be shared with potentially affected members of the public. The OPG Nuisance Effects Management Plan must include noise monitoring, a noise complaint response mechanism and best practices for activities that may occur outside of municipal noise curfew hours to reduce annoyance that the public may experience.	The GOC accepts this recommendation to require OPG to develop and implement a detailed acoustic assessment. Health Canada can provide available scientific and technical expertise to the Canadian Nuclear Safety Commission, to assist in the implementation of this recommendation.	D-P-3.2	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
10	<p>The Panel recommends that the CNSC require OPG to undertake a detailed site geotechnical investigation prior to commencing site preparation activities. The geologic elements of this investigation should include, but not be limited to:</p> <ul style="list-style-type: none"> • collection of site-wide information on soil physical properties • determining the mechanical and dynamic properties of overburden material across the site • mapping of geological structures to improve the understanding of the site geological structure model • confirming the lack of karstic features in the local bedrock at the site • confirming the conclusions reached concerning the liquefaction potential in underlying granular materials 	<p>The GOC accepts the intent of this recommendation to require OPG to undertake a detailed site geotechnical investigation, however, notes that this investigation may be performed concurrently with site preparation activities. Natural Resources Canada can provide available scientific and technical expertise to the Canadian Nuclear Safety Commission, upon request, to assist in the implementation of this recommendation.</p>	D-P-9.1	Initiated
11	<p>The Panel recommends that the CNSC require OPG to develop and implement a follow-up program for soil quality during all stages of the Project.</p>	<p>The GOC accepts this recommendation to require OPG to develop and implement a follow-up program for soil quality. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p>	D-P-12.6	Not Initiated
12	<p>The Panel recommends that before in-water works are initiated, the CNSC require OPG to collect water and sediment quality data for any future embayment area that may be formed as a consequence of shoreline modifications in the vicinity of the outlet of Darlington Creek. This data should serve as the reference information for the proponent's post construction commitment to conduct water and sediment quality monitoring of the embayment area.</p>	<p>The GOC accepts this recommendation to require OPG to collect water and sediment quality data for any future embayment area. Environment Canada and Fisheries and Oceans Canada can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. The GOC notes that authorization under the Fisheries Act will be required prior to in-water works. Prior to the issuance of an authorization, Fisheries and Oceans Canada will require a water and sediment quality monitoring program. This program is required to assess</p>	D-P-12.3	Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
		whether OPG continues to meet the intent of section 36 of the Fisheries Act.		
13	The Panel recommends that the CNSC require OPG to collect and assess water quality data for a comprehensive number of shoreline and offshore locations in the site study area prior to commencing in-water works. This data should be used to establish a reference for follow-up monitoring.	The GOC accepts the intent of this recommendation to require OPG to collect and assess water quality data for a comprehensive number of shoreline and offshore locations in the site study area prior to commencing in-water works, and would further support the collection of sediment quality data as part of a comprehensive program. EC and DFO can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. The GOC notes that authorization under the Fisheries Act will be required prior to in-water works. Prior to the issuance of an authorization, DFO will require a water and sediment quality monitoring program. This program is required to assess whether OPG continues to meet the intent of section 36 of the Fisheries Act.	D-P-12.3	Initiated
14	The Panel recommends that following the selection of a reactor technology for the Project, the CNSC require OPG to conduct a detailed assessment of predicted effluent releases from the Project. The assessment should include but not be limited to effluent quantity, concentration, points of release and a description of effluent treatment, including demonstration that the chosen option has been designed to achieve best available treatment technology and techniques economically achievable. The CNSC shall also require OPG to conduct a risk assessment on the proposed residual releases to determine whether additional mitigation measures may be necessary.	The GOC accepts this recommendation to require OPG to conduct a detailed assessment of predicted effluent releases from the Project, as recommended. EC and DFO can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-P-12.9 D-C-2.1 D-C-4.1	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
15	The Panel recommends that following the start of operation of the reactors, the CNSC require OPG to conduct monitoring of ambient water and sediment quality in the receiving waters to ensure that effects from effluent discharges are consistent with predictions made in the environmental impact statement and with those made during the detailed design phase.	The GOC accepts this recommendation to require OPG to conduct monitoring of ambient water and sediment quality in the receiving waters as recommended. EC and DFO can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. The GOC notes that authorization under the Fisheries Act will be required prior to in-water works. Prior to the issuance of an authorization, Fisheries and Oceans Canada will require a water and sediment quality monitoring program. This program is required to assess whether OPG continues to meet the intent of section 36 of the Fisheries Act.	D-P-12.3	Not Initiated
16	The Panel recommends that prior to the start of construction, the CNSC require the proponent to establish toxicity testing criteria and provide the test methodology and test frequency that will be used to confirm that stormwater discharges from the new nuclear site comply with requirements in the Fisheries Act.	The GOC accepts the intent of this recommendation to require the proponent to establish toxicity testing criteria and provide the test methodology and test frequency for stormwater. The GOC would additionally support the application of this recommended testing for process effluents. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-P-3.4 D-C-2.1	Not Initiated
17	The Panel recommends that the CNSC require OPG to provide an assessment of the ingress and transport of contaminants in groundwater on site during successive phases of the Project as part of the Application for a Licence to Construct. This assessment shall include consideration of the impact of wet and dry deposition of all contaminants of potential concern and gaseous emissions on groundwater quality. OPG shall conduct enhanced groundwater and contaminant transport modeling for the assessment	The GOC accepts this recommendation to require OPG to provide an assessment of the ingress and transport of contaminants in groundwater on site during successive phases of the Project as recommended. For clarity, the GOC would support enhanced groundwater and contaminant transport modeling extending to appropriate model boundaries, which may not necessarily be site boundaries. NRCan and EC can provide available scientific and technical expertise to the CNSC, upon	D-P-12.6 D-C-2.1 D-C-4.1 D-C-5.1 D-C-5.2 D-C-6.1	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
	and expand the modeling to cover the effects of future dewatering and expansion activities at the St. Marys Cement quarry on the Project.	request, to assist in the implementation of this recommendation.		
18	The Panel recommends that based on the groundwater and contaminant transport modeling results, the CNSC require OPG to expand the Radiological Environmental Monitoring Program. This program shall include relevant residential and private groundwater well quality data in the local study area that are not captured by the current program, especially where the modeling results identify potential critical groups based on current or future potential use of groundwater.	The GOC accepts this recommendation to require OPG to update the Radiological Environmental Monitoring Program, based on the groundwater and contaminant transport modeling results. NRCan and EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-C-6.1	Not Initiated
19	The Panel recommends that the CNSC require OPG to expand the scope of the groundwater monitoring program to monitor transitions in groundwater flows that may arise as a consequence of grade changes during the site preparation and construction phases of the Project. The design of the grade changes should guide the determination of the required monitoring locations, frequency of monitoring and the required duration of the program for the period of transition to stable conditions following the completion of construction and the initial period of operation.	The GOC accepts this recommendation to require OPG to expand the scope of the groundwater monitoring program to monitor transitions in groundwater flows that may arise as a consequence of grade changes during the site preparation and construction phases of the Project. NRCan can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-P-12.6	Not Initiated
20	The Panel recommends that the CNSC require OPG to perform a thorough evaluation of site layout opportunities before site preparation activities begin, in order to minimize the overall effects on the terrestrial and aquatic environments and maximize the opportunity for quality terrestrial habitat rehabilitation.	The GOC accepts this recommendation to require OPG to perform a thorough evaluation of site layout opportunities before site preparation activities begin, as recommended. EC and DFO can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. As part of the conditions of authorization under the	D-P-3.7 D-P-14.1	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
		Fisheries Act, DFO also commits to working with OPG to ensure overall impacts to aquatic habitat are minimized with appropriate mitigation and habitat compensation.		
21	The Panel recommends that the CNSC require OPG to compensate for the loss of ponds, like-for-like, preferably in the site study area. The Panel also recommends that the CNSC require OPG to use best management practices to prevent or minimize the potential runoff of sediment and other contaminants into wildlife habitat associated with Coot's Pond during site preparation and construction phases.	The GOC accepts the recommendation to require OPG to use best management practices to prevent or minimize the potential runoff of sediment and other contaminants. The GOC accepts the intent of compensating for the loss of ponds, but would also support the CNSC requiring OPG to design compensation ponds that maximize ecological function, and not necessarily limited to "like for-like". EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-P-3.7	Not Initiated
22	The Panel recommends that the CNSC require OPG to develop a follow-up program for insects, amphibians and reptiles, and mammal species and communities to ensure that proposed mitigation measures are effective.	The GOC accepts the intent of this recommendation to require OPG to develop a follow-up program for insects, amphibians and reptiles, and mammal species and communities as appropriate, and would support a focus for this follow-up program on species at risk and the use of this follow-up program to verify the conclusions of the Ecological Risk Assessment. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-P-12.5	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
23	<p>The Panel recommends that EC collaborate with OPG to develop and implement a follow-up program to confirm the effectiveness of OPG’s proposed mitigation measures for bird communities should natural draft cooling towers be chosen for the condenser cooling system.</p>	<p>The GOC accepts the intent of this recommendation to collaborate with OPG to develop such a follow-up program for bird communities, and would further support the consideration of potential impacts from habitat disturbance, as well as from bird collision impacts, in the scope of that program. The GOC acknowledges that the CNSC has the statutory authority and powers to ensure such a follow-up program is implemented through future licensing under the Nuclear Safety and Control Act. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p>	D-P-12.5	Not Initiated
24	<p>The Panel recommends that during the site preparation stage, Environment Canada shall ensure that OPG not undertake habitat destruction or disruption between the period of May 1 and July 31 of any year to minimize effects to breeding migratory birds.</p>	<p>The GOC accepts the intent of this recommendation to avoid habitat destruction or disruption between the period of May 1 and July 31 of any year to protect most bird species’ nesting activities. However, EC does not have the ability to ensure that OPG conducts all of its land clearing activities when migratory bird nests are not active since the department does not have a regulatory permitting ability to bind the proponent. The GOC acknowledges that the CNSC has the statutory authority and powers to address this recommendation through future licensing under the Nuclear Safety and Control Act. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p>	D-P-3.7	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
25	<p>The Panel recommends that the CNSC require OPG to conduct more sampling to confirm the presence of Least Bittern before site preparation activities begin. The Panel recommends that the CNSC require OPG to develop and implement a management plan for the species at risk that are known to occur on site. The plan should consider the resilience of some of the species and the possibility of off-site compensation.</p>	<p>The GOC accepts this recommendation to require OPG to conduct more sampling to confirm the presence of Least Bittern and to develop and implement a management plan for species at risk, as may be appropriate. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p>	<p>D-P-3.7 D-P-12.5</p>	<p>Initiated</p>
26	<p>The Panel recommends that the CNSC require OPG to develop a comprehensive assessment of hazardous substance releases and the required management practices for hazardous chemicals on site, in accordance with the Canadian Environmental Protection Act, once a reactor technology has been chosen.</p>	<p>The GOC accepts this recommendation to require OPG to develop a comprehensive assessment of hazardous substance releases and the required management practices for hazardous chemicals on site once a reactor technology has been chosen. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p>	<p>D-P-3.6 D-P-12.9 D-C-2.1 D-C-5.2</p>	<p>Not Initiated</p>
27	<p>The Panel recommends that prior to any destruction of the Bank Swallow habitat, the CNSC require OPG to implement all of its proposed Bank Swallow mitigation options, including:</p> <ul style="list-style-type: none"> • the acquisition of off-site nesting habitat • the construction of artificial Bank Swallow nest habitat with the capacity to maintain a population which is at least equal to the number of breeding pairs currently supported by the bluff and as close to the original bluff site as possible • the implementation of an adaptive management approach in the Bank Swallow mitigation plan, with the inclusion of a threshold of loss to be established in consultation with all stakeholders before any habitat destruction takes place 	<p>The GOC accepts the intent of this recommendation to require OPG to implement the identified Bank Swallow mitigation measures using an adaptive management approach, and would support determining required mitigation based on reasonable estimates of actual burrow loss. The GOC expects that the acquisition of offsite nesting habitat should only be necessary if follow-up monitoring shows that onsite mitigation is unsuccessful, and notes that onsite mitigation may also include the enhancement of potential natural nesting sites within the Site Study Area. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p>	<p>D-P-3.8</p>	<p>Initiated</p>

#	JRP Recommendation	Government Response	OPG Deliverable	Status
28	<p>The Panel recommends that DFO require OPG to continue conducting adult fish community surveys in the site study area and reference locations on an ongoing basis. These surveys shall be used to confirm that the results of 2009 gillnetting and 1998 shoreline electrofishing reported by OPG, and the additional data collected in 2010 and 2011, are representative of existing conditions, taking into account natural year-to-year variability.</p> <p>Specific attention should be paid to baseline gillnetting monitoring in spring to verify the findings on fish spatial distribution and relatively high native fish species abundance in the embayment area, such as white sucker and round whitefish. The shoreline electrofishing habitat use study is needed to establish the contemporary baseline for later use to test for effects of lake infill armouring, if employed, and the effectiveness of mitigation.</p>	<p>The GOC accepts this recommendation. DFO will work with EC, the CNSC, the Ontario Ministry of Natural Resources and OPG to develop the details of an ongoing fisheries monitoring program which will be included as a condition of a Fisheries Act authorization.</p>	<p>D-P-12.4 D-P-15.1</p>	Initiated
29	<p>The Panel recommends that DFO require OPG to continue the research element of the proposed Round Whitefish Action Plan for the specific purpose of better defining the baseline condition, including the population structure, genome and geographic distribution of the round whitefish population as a basis from which to develop testable predictions of effects, including cumulative effects.</p>	<p>The GOC accepts this recommendation. DFO will work with EC, the CNSC, the Ontario Ministry of Natural Resources and OPG to develop and finalize the Round Whitefish Action Plan. This plan, as a condition of a Fisheries Act authorization, will form part of the ongoing monitoring program and feed into an adaptive management plan to protect the round whitefish population into the future.</p>	<p>D-P-12.4 D-P-15.1</p>	Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
30	<p>In the event that a once-through condenser cooling system is chosen for the Project, the Panel recommends that prior to the construction of in-water structures, DFO require OPG to conduct:</p> <ul style="list-style-type: none"> • additional impingement sampling at the existing Darlington Nuclear Generating Station to verify the 2007 results and deal with inter-year fish abundance variability and sample design inadequacies. • additional entrainment sampling at the existing Darlington Nuclear Generating Station to better establish the current conditions. The program should be designed to guard against a detection limit bias by including in the analysis of entrainment losses those fish species whose larvae and eggs are captured in larval tow surveys for the seasonal period of the year in which they occur. A statistical optimization analysis will be needed to determine if there is a cost-effective entrainment survey design for round whitefish larvae. 	<p>The GOC accepts this recommendation. DFO will work with the CNSC, and the Ontario Ministry of Natural Resources to develop an impingement and entrainment sampling program. The GOC would also like to note that authorization under the Fisheries Act will be required prior to any lake infill taking place and commits that DFO will work with OPG to ensure that the impingement and entrainment sampling program is developed and implemented as a condition of that authorization.</p>	<p>D-P-12.4 D-P-15.1 D-C-1.2</p>	Initiated
31	<p>Irrespective of the condenser cooling system chosen for the Project, the Panel recommends that DFO not permit OPG to infill beyond the two-meter depth contour in Lake Ontario.</p>	<p>The GOC accepts the intent of this recommendation. DFO will work with OPG to ensure that the HADD of fish habitat associated with the proposed lake infill is limited to the area within the two-meter depth contour of Lake Ontario. The extent of the HADD as well as appropriate mitigation and habitat compensation will be included in the conditions of authorization under the Fisheries Act.</p>	<p>D-P-14.1 D-P-16.1 D-C-1.1</p>	Not Initiated
32	<p>In the event that a once-through condenser cooling system is chosen for the Project, the Panel recommends that DFO require OPG to mitigate the risk of adverse effects from operation, including impingement, entrainment and thermal excursions and plumes, by locating the system intake and diffuser</p>	<p>The GOC accepts this recommendation. DFO will work with EC and the CNSC to determine the appropriate location for the intake and diffuser structures, and to evaluate other mitigation options for both the intake and the diffuser structures, in order to mitigate adverse effects. DFO</p>	<p>D-C-1.2</p>	Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
	structures in water beyond the nearshore habitat zone. Furthermore, OPG must evaluate other mitigative technologies for the system intake, such as live fish return systems and acoustic deterrents.	will work with OPG to ensure implementation through its regulatory process and conditions of authorization under the Fisheries Act.		
33	The Panel recommends that DFO require OPG to conduct an impingement and entrainment follow-up program at the existing Darlington Nuclear Generating Station and the Project site to confirm the prediction of adverse effects, including cumulative effects, and the effectiveness of mitigation. For future entrainment sampling for round whitefish, a statistical probability analysis will be needed to determine if unbiased and precise sample results can be produced.	The GOC accepts this recommendation. DFO will work with the CNSC and OPG to develop an impingement and entrainment study on the existing Darlington Nuclear Generating Station and at the proposed Project site to confirm predicted adverse effects and will further ensure implementation through its regulatory process and conditions of authorization under the Fisheries Act.	D-P-12.4	Initiated
34	In the event that a once-through condenser cooling system is chosen for the Project, the Panel recommends that prior to construction, EC ensure that enhanced resolution thermal plume modeling is conducted by OPG, taking into account possible future climate change effects. DFO shall ensure that the results of the modeling are incorporated into the design of the outfall diffuser and the evaluation of alternative locations for the placement of the intake and the diffuser of the proposed condenser cooling water system.	The GOC accepts the intent of this recommendation. EC is committed to reviewing the information provided by OPG, and will rely on DFO authorization for a HADD associated with the intake or outfall to ensure that OPG undertakes this modelling. DFO will work with EC, and the CNSC to incorporate the results from the thermal plume modeling into the determination of the appropriate location for the intake and diffuser structures to mitigate adverse effects. DFO will ensure implementation through conditions of a Fisheries Act authorization.	D-C-1.2	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
35	<p>In the event that a once-through condenser cooling system is chosen for the Project, the Panel recommends that prior to operation, the CNSC require OPG to include the following in the surface water risk assessment:</p> <ul style="list-style-type: none"> • the surface combined thermal and contaminant plume; and • the physical displacement effect of altered lake currents as a hazardous pulse exposure to fish species whose larvae passively drift through the area, such as lake herring, lake whitefish, emerald shiner and yellow perch. If the risk assessment result predicts a potential hazard then the CNSC shall convene a follow-up monitoring scoping workshop with EC, DFO and any other relevant authorities to develop an action plan. 	<p>The GOC accepts this recommendation to require OPG to update a comprehensive surface water risk assessment as recommended, however would clarify that an assessment of the combined thermal and contaminant plume should consider not only the surface area of the plume, but its vertical extent as well. EC and DFO can provide available scientific and technical expertise to the CNSC, upon request, to assist in the design of the surface water risk assessment and any subsequent action plan development.</p>	<p>D-P-12.3 D-P-12.4 D-C-1.2</p>	<p>Not Initiated</p>
36	<p>In the event that a once-through condenser cooling system is chosen for the Project, the Panel recommends that during operation, the CNSC require OPG to undertake adult fish monitoring of large-bodied and small-bodied fish to confirm the effectiveness of mitigation measures and verify the predictions of no adverse thermal and physical diffuser jet effects.</p>	<p>The GOC accepts this recommendation to require OPG to undertake adult fish monitoring to confirm the effectiveness of mitigation measures and effect predictions. EC and DFO can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p> <p>DFO is committed to working with OPG to develop their fish and fish habitat monitoring and follow-up program and ensuring implementation through conditions of authorization under the Fisheries Act.</p>	<p>D-P-12.4 D-C-1.2</p>	<p>Not Initiated</p>
37	<p>In the event that a once-through condenser cooling system is chosen for the Project, the Panel recommends that prior to construction, the CNSC require OPG to determine the total area of permanent aquatic effects from the following, to properly scale mitigation and scope follow-up monitoring:</p> <ul style="list-style-type: none"> • the thermal plume + 2°C above 	<p>The GOC accepts the intent of this recommendation to require OPG to determine the total area of permanent aquatic effects from identified impacts. The GOC would further support inclusion of cumulative effects assessment in this assessment, including the effects of impingement and entrainment and climate change. EC and DFO can provide available</p>	<p>D-P-12.4 D-C-1.2</p>	<p>Not Initiated</p>

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	<p>ambient temperature;</p> <ul style="list-style-type: none"> • the mixing zone and surface plume contaminants; • physical displacements from altered lake currents; and • infill and construction losses and modifications. 	<p>scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. Further, DFO is committed to working with the CNSC and OPG to ensure that any permanent aquatic habitat effects are mitigated and appropriate habitat compensation is developed and implemented as a condition of any Fisheries Act authorization.</p>		
38	<p>The Panel recommends that the CNSC require that the geotechnical and seismic hazard elements of the detailed site geotechnical investigation to be performed by OPG include, but not be limited to:</p> <ul style="list-style-type: none"> • Prior to site preparation: <ul style="list-style-type: none"> - demonstration that there are no undesirable subsurface conditions at the Project site. The overall site liquefaction potential shall be assessed with the site investigation data; and - confirmation of the absence of paleoseismologic features at the site and, if present, further assessment to reduce the overall uncertainty in the seismic hazard assessment during the design of the Project must be conducted. • During site preparation and/or prior to construction: <ul style="list-style-type: none"> - verification and confirmation of the absence of surface faulting in the overburden and bedrock at the site. • Prior to construction: <ul style="list-style-type: none"> - verification of the stability of the cut slopes and dyke slopes under both static and dynamic loads with site/Project-specific data during the design of the cut slopes and dykes or before their construction; - assessment of potential liquefaction of the northeast waste stockpile by using the data obtained from the pile itself upon completion of site 	<p>The GOC accepts the intent of this recommendation to require OPG's detailed site investigation to include the noted geotechnical and seismic hazard elements, however, notes that this investigation may be performed concurrently with site preparation activities. NRCan can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.</p>	<p>D-P-9.1 D-P-9.4 D-O-4.1</p>	<p>Initiated</p>

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	<p>preparation;</p> <ul style="list-style-type: none"> - measurement of the shear strength of the overburden materials and the dynamic properties of both overburden and sedimentary rocks to confirm the site conditions and to perform soil-structure interaction analysis if necessary; - assessment of the potential settlement in the quaternary deposits due to the groundwater drawdown caused by future St. Mary's Cement quarry activities; and - assessment of the effect of the potential settlement on buried infrastructures in the deposits during the design of these infrastructures. <ul style="list-style-type: none"> • Prior to operation: <ul style="list-style-type: none"> - development and implementation of a monitoring program for the Phase 4 St. Mary's Cement blasting operations to confirm that the maximum peak ground velocity at the boundary between the Darlington and St. Mary's Cement properties is below the proposed limit of three millimeters per second (mm/s). 			
39	<p>The Panel recommends that prior to construction, the CNSC require OPG to prepare a contingency plan for the construction, operation and decommissioning Project stages to account for uncertainties associated with flooding and other extreme weather hazards. OPG shall conduct localized climate change modeling to confirm its conclusion of a low impact of climate change. A margin/bound of changes to key parameters, such as intensity of extreme weather events, needs to be established to the satisfaction of the CNSC. These parameters can be incorporated into</p>	<p>The GOC accepts this recommendation to require OPG to prepare a contingency plan to account for uncertainties associated with flooding, drought and other extreme weather hazards, as recommended. The GOC accepts the intent of the recommendation to conduct localized climate change modeling; however, if OPG uses reputable published studies to evaluate the anticipated impact of climate change for the Project area, localized climate change modeling may not be necessary. EC can provide available scientific and technical expertise to the CNSC, upon request,</p>	D-C-7.1	Not Initiated

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	hydrological designs leading up to an application to construct a reactor, as well as measures for flood protection. OPG must also conduct a drought analysis and incorporate any additional required mitigation/design modifications, to the satisfaction of the CNSC as part of a licence to construct a reactor.	to assist in the implementation of this recommendation.		
40	The Panel recommends that prior to construction, the CNSC require OPG to: <ul style="list-style-type: none"> • establish an adaptive management program for algal hazard to the Project cooling water system intake that includes the setup of thresholds for further actions • factor the algal hazard assessment into a more detailed biological evaluation of moving the intake and diffuser deeper offshore as part of the detailed siting studies and the cost-benefit analysis of the cooling system. 	The GOC accepts this recommendation to require OPG to establish an adaptive management program for algal hazards to the cooling water system intake, and factor that assessment into planned siting studies and cost-benefit analyses. DFO and EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-P-12.4 D-C-1.2	Not Initiated
41	The Panel recommends that prior to site preparation, the CNSC coordinate discussions with OPG and key stakeholders on the effects of the Project on housing supply and demand, community recreational facilities and programs, services and infrastructure as well as additional measures to help deal with the pressures on these community assets.	The GOC accepts the intent of this recommendation for the CNSC to initiate discussions with OPG and key stakeholders, however, notes that these discussions may occur concurrently with site preparation activities.	N/A D-P-17.1	Not Initiated
42	The Panel recommends that on an ongoing basis, OPG pursue its strategy to ensure that Aboriginal students can benefit from the permanent job opportunities that will be available during the lifetime of the Project. In this regard, OPG should collaborate with various secondary and post-secondary education institutions as well as Aboriginal groups to ensure that such programs would be successful.	The GOC supports this proposal and notes that such programs are consistent with OPG's presentation to the Panel on Aboriginal Interests on March 28, 2011 and with OPG's Aboriginal Relations Policy.	D-P-17.1	Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
43	The Panel recommends that the CNSC engage appropriate stakeholders, including OPG, Emergency Management Ontario, municipal governments and the Government of Ontario to develop a policy for land use around nuclear generating stations.	The GOC accepts this recommendation for the CNSC to engage appropriate stakeholders in developing policy for land use around nuclear generating stations.	N/A D-P-17.1	Complete
44	The Panel recommends that the Government of Ontario take appropriate measures to prevent sensitive and residential development within three kilometers of the site boundary.	This recommendation was directed to the Government of Ontario.	N/A	Complete
45	The Panel recommends that the Municipality of Clarington prevent, for the lifetime of the nuclear facility, the establishment of sensitive public facilities such as school, hospitals and residences for vulnerable clientele within the three kilometer zone around the site boundary.	This recommendation was directed to the Municipality of Clarington.	N/A	Initiated
46	Given that a severe accident may have consequences beyond the three and 10-kilometre zones evaluated by OPG, the Panel recommends that the Government of Ontario, on an ongoing basis, review the emergency planning zones and the emergency preparedness and response measures, as defined in the Provincial Nuclear Emergency Response Plan (PNERP), to protect human health and safety.	This recommendation was directed to the Government of Ontario.	N/A	Initiated
47	The Panel recommends that prior to site preparation, the CNSC ensure the OPG Traffic Management Plan addresses the following: <ul style="list-style-type: none"> • contingency plans to address the possibility that the assumed road improvements do not occur • consideration of the effect of truck traffic associated with excavated material disposal on traffic operations and safety • further analysis of queuing potential onto Highway 401 	The GOC accepts this recommendation to require that OPG's Traffic Management Plan consider elements related to contingency plans, truck traffic, queuing potential on Highway 401 and additional mitigation measures.	D-P-10.1	Initiated

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	<ul style="list-style-type: none"> consideration of a wider range of mitigation measures, such as transportation-demand management, transit service provisions and geometric improvements at the Highway 401/Waverley Road interchange 			
48	<p>In consideration of public safety, the Panel recommends that prior to site preparation, the CNSC coordinate a committee of federal, provincial and municipal transport authorities to review the need for road development and modifications.</p>	<p>The GOC accepts the intent of this recommendation to support a federal, provincial and municipal review of the need for road development and modifications, however, notes that this review may be performed concurrently with site preparation activities.</p>	N/A	Not Initiated
49	<p>The Panel recommends that prior to construction, Transport Canada ensure that OPG undertake additional quantitative analysis, including collision frequencies and rail crossing exposure indices, and monitor the potential effects and need for mitigation associated with the Project.</p>	<p>The GOC accepts the intent of this recommendation to require OPG to undertake additional rail safety studies, monitor the potential effects and determine the need for mitigation. The Railway Safety Act (RSA) places crossing safety responsibilities on the Railways and the Road Authorities. This policy reflects the objectives of Section 3 of the RSA. Ultimately, the Railway and the Road Authority must take the responsibility of performing the crossing assessment. Transport Canada is committed to provide assistance and expertise to the interested parties if required during the risk assessment and in the evaluation of any proposed mitigation measures.</p>	D-C-3.1	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
50	<p>The Panel recommends that prior to construction, Transport Canada require OPG to conduct a risk assessment, jointly with Canadian National Railway, that includes:</p> <ul style="list-style-type: none"> • an assessment of the risks associated with a derailment or other rail incident that could affect the Project • an analysis of the risks associated with a security threat, such as a bomb being placed on a train running on the tracks that bisect the Project • a comparative evaluation of the effectiveness of various mitigation measures or combination of measures (e.g., blast wall, retaining wall, recessed tracks, berm and railway speed restrictions within the vicinity of the site) • a determination of the design criteria necessary to ensure the effectiveness of these measures (e.g., the appropriate height, strength, material and design of a blast wall) • a critical analysis to confirm that these measures, when properly designed and implemented, would be sufficient to provide protection to the Project site in the event of a derailment at full speed or other adverse event 	<p>The GOC recognizes that the CNSC has the statutory authority and powers to address this recommendation through future regulatory activities under the Nuclear Safety and Control Act.</p> <p>Transport Canada is committed to provide assistance and expertise to the Canadian Nuclear Safety Commission and other parties if required during the risk assessment and in the evaluation of any proposed mitigation measures.</p>	D-C-3.1	Not Initiated
51	<p>In the event that a once-through condenser cooling system is chosen for the Project, the Panel recommends that prior to construction, Transport Canada work with OPG to develop a follow-up program to verify the accuracy of the prediction of no significant adverse effects to boating safety from the establishment of an increased prohibitive zone. OPG must also develop an adaptive management program, if required, to mitigate potential effects to small watercraft.</p>	<p>The GOC accepts the intent of this recommendation. Transport Canada will provide guidance and support to OPG to assist in their development of a follow-up program to confirm that boating safety will not be significantly adversely affected. If an adaptive management program is required, Transport Canada can provide support and expertise to OPG in its development.</p>	D-P-12.8	Not Initiated

#	JRP Recommendation	Government Response	OPG Deliverable	Status
52	The Panel recommends that prior to construction, the CNSC require OPG to make provisions for on-site storage of all used fuel for the duration of the Project, in the event that a suitable off-site solution for the long-term management for used fuel waste is not found.	The GOC accepts the intent of this recommendation to the extent that it is the responsibility of waste owners for managing and funding the safe and secure operation of their own wastes. Canada’s 1996 Radioactive Waste Policy Framework states that the owners of radioactive waste are responsible for developing and implementing solutions, including all costs associated with safely and securely managing their wastes.	D-O-2.1	Not Initiated
53	The Panel recommends that prior to construction, the CNSC require OPG to make provisions for on-site storage of all of low and intermediate-level radioactive waste for the duration of the Project, in the event that a suitable off-site solution for the long-term management for this waste is not approved.	The GOC accepts the intent of this recommendation to the extent that it is the responsibility of waste owners for managing and funding the safe and secure operation of their own wastes, in accordance with CNSC's regulatory requirements. Canada’s 1996 Radioactive Waste Policy Framework states that the owners of radioactive waste are responsible for developing and implementing solutions, including all costs associated with safely and securely managing their wastes.	D-C-9.1	Not Initiated

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54	<p>The Panel recommends that during operation, the CNSC require OPG to implement measures to manage releases from the Project to avoid tritium in drinking water levels exceeding a running annual average of 20 Becquerel’s per liter at drinking water supply plants in the regional study area.</p>	<p>The GOC accepts the intent of this recommendation to safeguard drinking water; however, it notes that any proposed limits should be consistent with the tritium standards put in place by the relevant regulatory authorities. Health Canada's Guidelines for Canadian Drinking Water Quality, based on the recommendations of the International Commission on Radiological Protection and the World Health Organization, establish a safe consumption guideline limit of 7,000 Bq/L for tritium in drinking water. This limit has been accepted as a standard by the Province of Ontario. Since water quality is primarily a provincial responsibility in Canada, the provinces may adopt federal guidelines, or may establish their own criteria.</p> <p>The GOC further notes that the CNSC regulates potential releases of tritium to the environment from nuclear facilities by imposing regulatory limits as well as precautionary action levels for tritium releases into air or water on a licence-specific basis. These limits are set with a goal to protect human health. The CNSC's Radiation Protection Regulations require that releases are kept "As Low As Reasonably Achievable" (ALARA), social and economic factors taken into account.</p>	D-C-4.1	Not Initiated
55	<p>The Panel recommends that Health Canada and the CNSC continue to participate in international studies seeking to identify long-term health effects of low-level radiation exposures, and to identify if there is a need for revision of limits specified in the Radiation Protection Regulations.</p>	<p>The GOC accepts the recommendation to continue its participation in international studies seeking to identify long-term health effects of low-level radiation exposures. The GOC accepts the intent of the recommendation to identify if there is a need for revision of limits specified in the Radiation Protection Regulations based on the results of international studies. Health Canada and the CNSC will continue to</p>	N/A	Initiated

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		participate in international studies dealing with long-term health effects of low-level radiation exposures; participate in committees/working groups with relevant international organizations; and, regularly review the reports published by these international groups for developments in radiation protection. Health Canada can provide expertise to the CNSC, upon request, in support of the review of limits specified in the Radiation Protection Regulations.		
56	The Panel recommends that over the life of the Project, the CNSC require OPG to conduct ambient air monitoring in the local study area on an ongoing basis to ensure that air quality remains at levels that are not likely to cause adverse effects to human health.	The GOC accepts this recommendation to require OPG to conduct ambient air monitoring to ensure that air quality is not likely to cause adverse effects to human health. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-P-12.2	Not Initiated
57	The Panel recommends that prior to construction, the CNSC require OPG to undertake an assessment of the off-site effects of a severe accident. The assessment should determine if the off-site health and environmental effects considered in this environmental assessment bound the effects that could arise in the case of the selected reactor technology.	The GOC accepts this recommendation to require OPG to undertake an assessment of the off-site effects of a severe accident. EC can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation.	D-P-12.9 D-C-3.1	Not Initiated
58	The Panel recommends that prior to construction, the CNSC confirm that dose acceptance criteria specified in RD-337 at the reactor site boundary—in the cases of design basis accidents for the Project's selected reactor technology—will be met.	The GOC accepts this recommendation to ask the CNSC to confirm that dose acceptance criteria specified in RD-337 will be met.	D-C-3.1	Not Initiated
59	The Panel recommends that the Municipality of Clarington manage development in the vicinity of the Project site to ensure that there is no deterioration in the capacity to evacuate members of the public for the	This recommendation was directed to the Municipality of Clarington.	N/A	Initiated

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	protection of human health and safety.			
60	The Panel recommends that prior to construction, the GOC review the adequacy of the provisions for nuclear liability insurance. This review must include information from OPG and the Region of Durham regarding the likely economic effects of a severe accident at the Darlington Nuclear site where there is a requirement for relocation, restriction of use and remediation of a sector of the regional study area.	The GOC accepts the intent of this recommendation, that the GOC review the adequacy of the provisions for nuclear liability insurance. In bringing forward modernized nuclear civil liability legislation to replace the current Nuclear Liability Act, the GOC will continue to review the adequacy of the provisions for nuclear liability insurance, taking into consideration the risk of Canadian nuclear installations and other relevant factors.	N/A	Complete
61	The Panel recommends that during operation, the CNSC require OPG to monitor aquatic habitat and biota for potential cumulative effects from the thermal loading and contaminant plume of the discharge structures of the existing Darlington Nuclear Generating Station and the Project.	The GOC accepts this recommendation to require OPG to monitor aquatic habitat and biota for potential cumulative effects from the thermal loading and contaminant plume. EC and DFO can provide available scientific and technical expertise to the CNSC, upon request, to assist in the implementation of this recommendation. The proponent will also be required to undertake an aquatic monitoring program as a condition of any Fisheries Act authorization.	D-P-12.4	Initiated
62	The Panel recommends that prior to site preparation, Environment Canada evaluate the need for additional air quality monitoring stations in the local study area to monitor cumulative effects on air quality.	The GOC accepts this recommendation to evaluate the need for additional air quality monitoring stations in the local study area to monitor cumulative effects on air quality. If this evaluation finds that additional air quality monitoring stations in the local study area are required, the GOC acknowledges that the CNSC has the statutory authority and powers to address the findings of this recommendation through future licensing under the Nuclear Safety and Control Act.	N/A	Not Initiated

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63	The Panel recommends that prior to construction, the CNSC require OPG to evaluate the cumulative effect of a common-cause severe accident involving all of the nuclear reactors in the site study area to determine if further emergency planning measures are required.	The GOC accepts the intent of this recommendation to require OPG to evaluate the cumulative effect of a common-cause severe accident in the site study area. The GOC notes that the CNSC has established a task force to examine the lessons learned from the Japan Earthquake and will evaluate the operational, technical and regulatory implications of the nuclear event in Japan in relation to Canadian nuclear power plants.	D-C-3.1	Not Initiated
64	The Panel recommends that the CEAA revise the Canadian Environmental Assessment Agency Cumulative Effects Practitioner's Guide to specifically include consideration of accident and malfunction scenarios.	The GOC accepts this recommendation. The CEAA is in the process of updating its suite of instruments in support of cumulative effects assessment under the CEAA. An operational policy statement, scheduled for completion by December 2012, will provide core guidance to practitioners and include the consideration of accidents and malfunctions.	N/A	Complete
65	The Panel recommends that the GOC make it a priority to invest in developing solutions for long-term management of used nuclear fuel, including storage, disposal, reprocessing and re-use.	The GOC accepts the intent of this recommendation that priority be given to invest in solutions for the long-term management of used nuclear fuel. It is the responsibility of waste owners to fund and manage the safe and secure operation of their wastes. The NWMO, established by the nuclear energy corporations, is responsible for implementing the government-selected plan for managing nuclear fuel waste over the long-term. The GOC is committed to ensuring that an appropriate and properly funded long-term safe and secure solution is in place for the managing nuclear fuel waste over long term.	N/A	Initiated
66	The Panel recommends that the GOC update the Nuclear Liability and Compensation Act or its equivalent to reflect the consequences of a nuclear accident. The revisions must address damage from any ionizing radiation	The GOC accepts the intent of this recommendation, that the GOC update the Nuclear Liability and Compensation Act or its equivalent to reflect the consequences of a nuclear accident. The GOC recognizes the	N/A	Complete

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	and from any initiating event and should be aligned with the polluter pays principle. The revised Nuclear Liability and Compensation Act, or its equivalent, must be in force before the Project can proceed to the construction phase.	importance of bringing forward modernized nuclear civil liability legislation to bring compensation in line with internationally-accepted levels, and will decide on the timing of the next introduction of the Nuclear Liability and Compensation Act bill in Parliament.		
67	The Panel recommends that the GOC provide clear and practical direction to the application of sustainability assessment in environmental assessments for future nuclear projects.	The GOC accepts the intent of this recommendation. However, the scope of the assessment and the factors to be considered in future EAs for nuclear projects are decisions that should be taken on a project-by-project basis by future Responsible Authorities. Recognizing that sustainable development is a principle of the Canadian Environmental Assessment Act, should a separate sustainability assessment be required by Responsible Authorities for future nuclear projects, the GOC agrees that it would be desirable for those Responsible Authorities to provide clear and practical direction to proponents and the public on how a sustainability assessment should be conducted.	N/A	Initiated