

October 17, 2024

CD# NK38-CORR-00531-25116 P

Ms. C. Salmon
Commission Registrar
Canadian Nuclear Safety Commission
P.O. Box 1046
280 Slater Street
Ottawa, Ontario
K1P 5S9

Dear Ms. Salmon:

Darlington NGS Refurbishment – Request for Commission Approval to Revise the Darlington NGS Integrated Implementation Plan (IIP)

The purpose of this letter is to request the Commission's approval to process a new revision of the *Darlington NGS Integrated Implementation Plan*, NK38-REP-03680-10185 R004. This request is in accordance with Darlington's PROL 13.04/2025 Licence Condition 15.3 and the associated Licence Conditions Handbook.

The Integrated Implementation Plan (IIP) includes actions arising from the Integrated Safety Review OPG conducted in support of the 2015 licence renewal of the Darlington NGS. A revision to the IIP represents a change in the licensing basis and requires Commission approval. The Commission last approved changes to the IIP in April 2023 (Reference 1), and IIP revision R004 was issued by OPG and accepted by CNSC staff in Reference 2.

The proposed revision to the IIP includes amendments to IIP-EA 012 "Aquatic Thermal Study" and IIP-EA 013 "Aquatic Impingement and Entrainment Study".

IIP-EA 012 is to confirm the accuracy of the predictions made in the Environmental Assessment concerning changes in lake water temperatures in the vicinity of the Condenser Cooling Water (CCW) discharge and their associated possible effects on survival rates of Round Whitefish embryos.

IIP-EA 013 is to characterize early life stages of fish and macro invertebrates entrained and impinged by station operation, to monitor at a level capable of detecting fish Species at Risk and to determine the total fish and macro invertebrate losses and associated impact.

These IIP line items are associated with aquatic studies comprising of actions prior to, throughout and following the completion of the Darlington Refurbishment Project. For both IIP-EA 012 and IIP-EA 013, the preceding tasks to the proposed amendments, which include actions prior to and throughout Refurbishment, have been completed within the committed timeline (Attachment 1, Table 1). The completion of the Darlington Refurbishment Project is a prerequisite to the outstanding four (4) IIP action plan tasks; therefore, these IIP tasks require an extension beyond the current IIP timeline (i.e., after the year 2028) to align with the current schedule of the Darlington Refurbishment Project, resource constraints, and the conditions of the amended Darlington Fisheries Act Authorization issued by Fisheries and Oceans Canada (Reference 3 and provided as Enclosure 1).

OPG would also like to add a new task to IIP-EA 013, which is driven by the commitment to complete a Best Available Technology Economically Achievable (BATEA) study during the Darlington Refurbishment Project and report to DFO and CNSC staff by December 31, 2026. This commitment was made in the approved Darlington Nuclear Generating Station Fisheries Act Authorization, Amendment of Darlington Nuclear Generating Station 14-HCAA-01267 (Reference 3), which is attached as Enclosure 1.

The proposed changes do not impact on the safety of the Darlington NGS, and continues to meet the objectives of the IIP-EA 012 and IIP-EA 013.

OPG and CNSC staff have discussed the IIP scope changes (Reference 4). CNSC staff did not find any technical concerns with OPG's proposed changes. CNSC staff accepted OPG's proposed schedule change for IIP-EA 013 Task 7, "Prepare sampling plan for impingement and entrainment," which remained within the current IIP timeline (Reference 5).

Attachment 1, Table 1 provides the tasks that have been completed to date for IIP-EA 012 and IIP-EA 013. Attachment 1, Table 2 provides the details of the proposed IIP scope change tasks, their due dates, original IIP activity description, the proposed activity description and the rationale for the change. If the refurbishment of the final unit is completed ahead of schedule, OPG will begin undertaking the activities subject of this request as soon as practicable. The dates proposed here are the latest completion dates barring unforeseen delays.

OPG requests the Commission's approval to process a new revision to NK38-REP-03680-10185 R004, "*Darlington NGS Integrated Implementation Plan*" beyond the current IIP timeline in accordance with Licence Condition 15.3.

Should you require further information or have any questions, please contact Ms. Aditi Bhardwaj, Senior Manager, Darlington Regulatory Affairs at 289-387-2110 or aditi.bhardwaj@opg.com

Sincerely,



Allan Grace
Senior Vice President
Darlington NGS



Boris Vulcanovic
Senior Vice President
Darlington Projects

Encl.

cc: A. Viktorov, A. Mathai
CNSC Site Supervisor
forms-formulaires@cnscccsn.gc.ca

- References:
1. Commission Record of Decision in the Matter of OPG's Application for Approval of Revisions to the Darlington Nuclear Generating Station Integrated Implementation Plan, April 27, 2023, DEC 23-H102, CD# NK38-CORR-00531-24289.
 2. CNSC Letter, A. Mathai to R. Geofroy and B. Vulcanovic, "Darlington NGS Refurbishment – Request for CNSC Acceptance of Integrated Implementation Plan (IIP) Revision 004", October 27, 2023, e-Doc 7153151, CD# NK38-CORR-00531-24864.
 3. DFO Letter, S. Eddy to R. Geofroy, "Amendment of Darlington Nuclear Generating Station 14-HCAA-01267-Notice of Amendment", October 27, 2023, Path No.: 14-HCAA-01267, CD# D-CORR-00539.4-00007.
 4. OPG Letter, R. Geofroy and S. Sinnathamby to J. Burta, "Darlington NGS Refurbishment – Integrated Implementation Plan (IIP) Change Request for IIP-EA 012 Tasks 6 & 7 and IIP-EA 013 Tasks 7 to 9", November 28, 2022, e-Doc 6927299, CD# NK38-CORR-00531-23690.
 5. CNSC Letter, A. Mathai to R. Geofroy, "Darlington NGS Refurbishment – Integrated Implementation Plan (IIP) Change Request for IIP-EA 012 Tasks 6 & 7 and IIP-EA 013 Tasks 7 to 9", December 19, 2023, e-Doc 7004531, CD# NK38-CORR-00531-25106.

Attachment 1

OPG letter, A. Grace and B. Vulcanovic to C. Salmon, "Darlington NGS Refurbishment - Request for Commission Approval to Revise the Darlington NGS Integrated Implementation Plan (IIP)"

CD# NK38-CORR-00531-25116 P

Summary of Proposed Scope Changes for Integrated Implementation Plan (IIP) Tasks

Prepared by: Heather Innis

Reviewed by: Jeff Wright, Ilnaz Bayat-Barooni and Florin Musat

Table 1: Completed IIP Items Under IIP-EA 012 and IIP-EA 013

Item #	IIP Item Number	Activity Description	Date Completed	Completion Notes
1	IIP-EA 012 Task 1	Obtain and review the results of an in-progress CANDU Owners Group (COG) study examining thermal effects to round whitefish eggs over the two winter seasons (2011/2012 and 2012/2013).	2015	The COG study indicated that round whitefish are not as sensitive to thermal impact as previously suggested. The COG study also revised the predictive model developed by Environment Canada by incorporating this new data. OPG has determined that the risk of thermal emissions on round whitefish at Darlington Nuclear is low and no further mitigation or offsetting is warranted. This task is considered complete [A-1].
	IIP-EA 012 Task 2	Develop a sampling plan. A Thermal Monitoring Protocol Agreement established through consultations with regulatory agencies and other stakeholders will be included in the sampling plan. The Protocol should consider the results of the COG study in establishing: <ul style="list-style-type: none"> • Thermal benchmark(s) for comparison of measured values. • Determination of location(s) for ambient water temperature monitoring; and • Temperature thresholds that would trigger adaptive management response (e.g., increased thermal monitoring). 	2015	A sampling plan was developed and submitted to CNSC staff on April 17, 2015. This task is considered complete [A-2].
	IIP-EA 012 Task 3	Implement annual ambient water temperature monitoring.	2016	Darlington submitted an Ambient Temperature Monitoring plan to CNSC staff on April 17, 2015. This Plan proposed that the existing Darlington Lake Current Monitor to be used for the ambient water temperature monitoring. CNSC staff responded with their concurrence on August 26, 2016. The Darlington lake current monitor was

Attachment 1, OPG letter, A. Grace and B. Vulcanovic to C. Salmon, "Darlington NGS Refurbishment: Request for Commission Approval to Revise the Integrated Implementation Plan (IIP)", NK38-CORR-00531-25116

Item #	IIP Item Number	Activity Description	Date Completed	Completion Notes
				installed in the late 1990s and is in service. This task is considered complete [A-3].
	IIP-EA 012 Task 4	Conduct thermal monitoring during Refurbishment outage.	2020	Monitoring in the Darlington plume and reference location was conducted from December 2017 to April 2018. Data was analyzed and documented in a report which was sent to the CNSC staff on February 5, 2019. The operation of Darlington NGS during the refurbishment period has not resulted in an adverse condition to the survival of round whitefish eggs laid in the plume. This confirms the prediction made in the Environmental Assessment, and no additional mitigation measures or monitoring are required during the refurbishment period. These tasks are considered complete [A-4].
	IIP-EA 012 Task 5	Report monitoring data collected during Refurbishment outage and assess likely effects on the survival of round white fish embryos. If the performance threshold is exceeded, review available mitigation options to determine if additional technically and economically feasible opportunities are available to further reduce the potential for effects.	2021	
2	IIP-EA 013 Task 1	Develop a sampling plan for Benthic Invertebrate Community Study in the vicinity of DNGS intake.	2015	<p>The sampling plan was submitted to CNSC staff on May 11, 2015. Sampling methods were outlined to satisfy the actions to conduct a Benthic Invertebrate Community study and an Entrainment Monitoring study, prior to the restart of the DN units.</p> <p>On February 17, 2015, the sampling plan was revised to address stakeholder (CNSC staff, Environment Canada, Department of Fisheries and Oceans Canada (DFO)) review comments. This task is considered complete [A-5].</p>
	IIP-EA 013 Task 2	Conduct Benthic Invertebrates Community study.	2016	Field sampling for the Benthic Invertebrates Community Study is completed as of September 10, 2016. This task is considered complete [A-6].

Attachment 1, OPG letter, A. Grace and B. Vulcanovic to C. Salmon, "Darlington NGS Refurbishment: Request for Commission Approval to Revise the Integrated Implementation Plan (IIP)", NK38-CORR-00531-25116

Item #	IIP Item Number	Activity Description	Date Completed	Completion Notes
	IIP-EA 013 Task 3	Document and report findings including a comparison to the 2008 study in the vicinity of NND.	2016	Findings from the Benthic Invertebrate Community Study are documented and reported in the Benthic Study Final Report issued on December 16, 2016. The Benthic Invertebrate Community Study meets the objectives of the Darlington Nuclear Refurbishment and Continued Operation Environmental Assessment Follow-up program, Element 4.1 (Benthic Invertebrate Community Study). It has determined the baseline qualitative abundance and species diversity of benthic invertebrates in the area of the DNGS intake structure and compared the results of the current study to nearshore studies in 2008 in the vicinity of the proposed "New Nuclear at Darlington" project infill area. It can generally be concluded that the results of the November 2008 study have been corroborated by the more robust 2016 study and that the benthic invertebrate community in the vicinity of DNGS does not differ from community at the reference locations in a manner that reflects a station-related effect. This task is considered complete [A-7].
	IIP-EA 013 Task 4	Develop a sampling plan which includes entrainment sampling methodology. The selected methodology will consider methodologies from other jurisdictions.	2015	<p>The sampling plan was submitted to CNSC staff on May 11, 2015. Sampling methods were outlined to satisfy the actions to conduct a Benthic Invertebrate Community study and an Entrainment Monitoring study, prior to the restart of the DN units.</p> <p>On February 17, 2015, the sampling plan was revised to address stakeholder (CNSC staff, Environment Canada, Department of Fisheries</p>

Attachment 1, OPG letter, A. Grace and B. Vulcanovic to C. Salmon, "Darlington NGS Refurbishment: Request for Commission Approval to Revise the Integrated Implementation Plan (IIP)", NK38-CORR-00531-25116

Item #	IIP Item Number	Activity Description	Date Completed	Completion Notes
				and Oceans Canada (DFO)) review comments. This task is considered complete [A-5].
	IIP-EA 013 Task 5	Using the methodology developed from activity 1), conduct entrainment study prior to start of the refurbishment outage.	2016	Field sampling for the Entrainment Study is completed as of September 28, 2016. This task is considered complete [A-6].
	IIP-EA 013 Task 6	Document and report findings.	2016	Findings from the entrainment study are documented in the Entrainment Study Final Report that was issued on December 1, 2016. The entrainment study met the objectives of the Darlington Nuclear Refurbishment and Continued Operations Environmental Assessment Follow-up Program, Element 4.2 (Entrainment Monitoring). It has characterized the station's entrainment of ichthyoplankton and invertebrates prior to DNGS refurbishment. A comparison to the 2008 study in the vicinity of the proposed New Nuclear at Darlington has also been made. The experimental design of the sampling program for this study was improved compared to the studies conducted in 2004 and 2006. This has resulted in the collection of more accurate and reliable data, and does not suggest higher levels of entrainment of larvae but higher entrainment of eggs than previous studies. There was no evidence of benthic populations being low in the vicinity of DNGS and it can be deduced that entrainment by DNGS is not negatively impacting local benthic invertebrate populations. This task is considered complete [A-8].

Table 2: IIP Scope Change Summary

Item #	IIP Item Number	IIP R004 Due Date	IIP R004 Original Activity Description	IIP R005 Proposed Activity Description	IIP R005 Proposed Due Date	Change Type / Technical Basis Documents
1	IIP-EA 012 Task 6	2026	Conduct thermal monitoring after restart of all reactors (i.e. Continued Operation phase)	Conduct thermal monitoring after restart of all reactors (i.e., Continued Operation phase) and report monitoring data collected during this phase and assess likely effects on the survival of round white fish embryos.	2030	Timeline extension beyond current IIP timeframe and task amalgamation with first half of Task 7. Refer to Overview below.
	IIP-EA 012 Task 7	2027	Report monitoring data collected during Continued Operation phase and assess likely effects on the survival of round white fish embryos. If the performance threshold is exceeded, review available mitigation options to determine if additional technically and economically feasible opportunities are available to further reduce the potential for effects.	If the performance threshold is exceeded, review available mitigation options to determine if additional technically and economically feasible opportunities are available to further reduce the potential for effects.	2031	Timeline extension beyond current IIP timeframe and task separation. Refer to Overview below.
2	IIP-EA 013 Task 7	2025	Prepare sampling plans for impingement and entrainment.	No Activity Description change.	2028	Extension previously accepted by CNSC staff. Refer to Overview below.

Attachment 1, OPG letter, A. Grace and B. Vulcanovic to C. Salmon, "Darlington NGS Refurbishment: Request for Commission Approval to Revise the Integrated Implementation Plan (IIP)", NK38-CORR-00531-25116

Item #	IIP Item Number	IIP R004 Due Date	IIP R004 Original Activity Description	IIP R005 Proposed Activity Description	IIP R005 Proposed Due Date	Change Type / Technical Basis Documents
	IIP-EA 013 Task 8	2027	Conduct impingement and entrainment monitoring according to the sampling plan.	Conduct two consecutive years of impingement monitoring and entrainment monitoring according to the DFO approved sampling plan, then document and report findings of impingement and entrainment monitoring field studies.	2030	Timeline extension beyond current IIP timeframe and task amalgamation with first half of Task 9. Refer to Overview below.
	IIP-EA 013 Task 9	2027	Document and report findings. If the performance threshold(s) are exceeded, review available mitigation options to determine if additional technically and economically feasible opportunities are available to further reduce the potential for effects (see Section 3.3).	If the performance threshold(s) are exceeded, review available mitigation options to determine if additional technically and economically feasible opportunities are available to further reduce the potential for effects (see Section 3.3).	2031	Timeline extension beyond current IIP timeframe and task separation. Refer to Overview below.
	IIP-EA 013 Task 10*	N/A*	N/A*	Complete the best available technically and economically feasible opportunity to mitigate the impingement and entrainment losses or further reduce the potential for effects.	2026	DFO Authorization Condition to complete a Best Available Technology Economically Achievable (BATEA) study during DNGS Refurbishment.
* OPG is requesting to include this additional task to IIP-EA 013.						

Overview of Proposed Scope Changes and Timeline Amendments

Introduction

This description provides details of the two IIP line items that require a change in their completion dates beyond the current IIP timeline (i.e., beyond 2028).

The proposed changes detailed in this overview do not impact on the safety of any Darlington Units, as the proposed timelines align with the completion of the Darlington Refurbishment Project. The proposed IIP Activity Descriptions either fully satisfy or meet the intent of the original IIP commitment. Furthermore, the proposed timeline amendments for impingement and entrainment align with the latest approved Darlington Nuclear Generating Station Fisheries Act Authorization, Amendment of Darlington Nuclear Generating Station 14-HCAA-01267 (Reference A-9). The DNGS Fisheries Act Authorization period spans from 2015 to December 31, 2031.

For both IIP-EA 012 and IIP-EA 013, preceding tasks to the proposed amendments have been completed within the designated timeline (see Attachment 1, Table 1). These IIP line items are associated with aquatic studies comprising of actions prior to, throughout and following the completion of the Darlington Refurbishment Project. As the comprehensive schedule for the Darlington Refurbishment project has evolved, the remaining timelines for these aquatic studies require an amendment.

This attachment identifies the proposed changes to the IIP tasks along with the justification for these changes.

Rationale

All of the new dates proposed are based on a Q4 2026 refurbishment completion date, which takes into account the adjustment in the comprehensive schedule for the Darlington Refurbishment project.

1) Proposed change to IIP-EA 012 – Conduct thermal monitoring after restart of all reactors.

The committed task, per the IIP, is to confirm the accuracy of the predictions made in the Environmental Assessment concerning changes in lake water temperatures in the vicinity of the Condenser Cooling Water (CCW) discharge and their associated possible effects on survival rates of Round Whitefish embryos.

IIP-EA 012 Task 6 – Completion date extension from 2026 to 2030

This task is to complete thermal monitoring after the restart of all reactors. Task now includes documenting and reporting the findings of the thermal monitoring field study, which was previously in Task 7. This allows the completion of this one activity and provides a report submission to CNSC as the outcome of this task.

This extension allows:

1. The planned completion of refurbishment of all four DNGS units (Q4 2026).
2. OPG resources to be deployed in completing IIP-EA 013 on impingement and entrainment monitoring study (2027 to 2029) prior to completing thermal monitoring.
3. The thermal monitoring field study, the duration of which spans the spawning periods for Round Whitefish from December to March (December 2029 to March 2030).
4. Completion of documenting the findings in a thermal monitoring report (December 2030).

IIP-EA 012 Task 7 (Completion date extension from 2027 to 2031)

The removal of the documenting and reporting of the findings from the thermal monitoring from IIP-EA 012 Task 7, allows this task to be reduced to OPG's assessment of the best available technology economically achievable to further reduce the potential effects if the thermal performance threshold has been exceeded. This separation provides OPG the opportunity to distinctively state in Task 7 if OPG will assess BATEA to further reduce the potential for effects on the survival of round white fish embryos.

The extension is due to the three items listed in Task 6 above, as OPG will know if the performance threshold has been exceeded only after the thermal monitoring and report has been completed (December 2030).

2) Proposed change to IIP-EA 013 – Prepare and Complete Impingement and Entrainment Study

The committed task per the IIP is to characterize early life stages of fish and macro invertebrates entrained and impinged by station operation, to monitor at a level capable of detecting fish Species at Risk and to determine the total fish and macro invertebrate losses and associated impact.

IIP-EA 013 Task 7 – Completion date extension from 2025 to 2028

This task is to complete the individual sampling plans for impingement and entrainment.

This extension allows:

1. The planned completion of refurbishment of all four DNGS units (Q4 2026).
2. OPG to prepare the sampling plan for impingement and entrainment (December 2028).

The rationale for the extension is to align the completion dates with the current schedule of the Darlington Refurbishment Project. The completion of the refurbishment in Q4 2026 is a precursor to the impingement and entrainment studies. Furthermore, the completion dates for IIP-EA 013 need to align with the conditions of the Fisheries Act Authorization for Darlington Nuclear Generating Station. (Reference A-9), which is provided in Enclosure 1. Prior to this submission to the Commission, OPG requested CNSC staff acceptance on the extension of IIP-EA 013 Task 7 from 2025 to 2028 on the rationale provided in Reference A-10. CNSC staff found no technical concerns in the proposed extension date from 2025 to 2028 and therefore, accepted the IIP completion date for IIP-EA Task 7 from December 31, 2025 to December 31, 2028 (Reference A-11). OPG is currently targeting to complete the individual sampling plans for impingement and entrainment by December 2026.

IIP-EA 013 Task 8 – Completion date extension from 2027 to 2030

This task is to conduct impingement and entrainment monitoring and it now includes documenting and reporting the findings of the impingement and entrainment data, which was previously in Task 9. This allows the completion of this one activity and provides a final report as the outcome of this task.

This extension allows:

1. The sampling for impingement (2027-2028) and the sampling for entrainment (2027-2029).
2. Completion of documenting the findings in separate reports (March 2030).

IIP-EA 013 Task 9 (Completion date extension from 2027 to 2031)

The removal of the documenting and reporting of the findings from the impingement and entrainment monitoring from IIP-EA 012 Task 9, allows this task to focus on reviewing available mitigation options to determine if additional technically and economically feasible opportunities are available to further reduce the potential for effects if the performance threshold has been exceeded. This separation provides OPG the opportunity to distinctively state in Task 9 if OPG will review available mitigation options to determine if additional technically and economically feasible opportunities are available to further reduce the potential for effects.

The extension is due to the two items listed in Task 9 above as OPG will know if the performance threshold has been exceeded only after the impingement and entrainment monitoring report has been completed (December 2030).

IIP-EA 013 Task 10

The addition of IIP-EA 013 Task 10 is driven by the commitment to complete a BATEA study during the Darlington Refurbishment Project and report to DFO and CNSC by December 31, 2026. This commitment was made in the approved Darlington Nuclear Generating Station Fisheries Act Authorization, Amendment of Darlington Nuclear Generating Station 14-HCAA-01267 (Reference A-9), which is attached as Enclosure 1.

References:

- A-1 NK38-REP-03680-10230, "IIP-EA 012 – Task Completion – Thermal Effects of Whitefish eggs", April 2015.
- A-2 NK38-REP-03680-10294, "IIP-EA 012 Task Completion - Sampling Plan Including Thermal Monitoring Protocol Agreement", December 2015.
- A-3 NK38-REP-03680-10379, "IIP Completion Declaration For IIP-EA 012 Task 3", November 2016.
- A-4 NK38-REP-03680-11774, "Ea-012 Tasks 4 And 5", February 2019.
- A-5 NK38-REP-03680-10295, "IIP-EA 013 Task Completion - Benthic Invertebrate Community Study And Entrainment Sampling Methodology Sampling Plan", December 2015.
- A-6 NK38-REP-03680-10371, "IIP Completion Declaration Form - EA 013 Field Samplings", October 2016.
- A-7 NK38-REP-03680-10389, "IIP Completion Declaration Form - EA 013 Final Benthic Report", December 2016.
- A-8 NK38-REP-03680-10378, "IIP Completion Declaration Form - EA 013 Entrainment Study Final Report", December 2016.
- A-9 DFO Letter, S. Eddy to R. Geofroy, "Amendment of Darlington Nuclear Generating Station 14-HCAA-01267-Notice of Amendment", October 27, 2023, Path No.: 14-HCAA-01267, CD# D-CORR-00539.4-00007.
- A-10 OPG Letter, R. Geofroy and S. Sinnathamby to J. Burta, "Darlington NGS Refurbishment – Integrated Implementation Plan (IIP) Change Request for IIP-EA 012 Tasks 6 & 7 and IIP-EA 013 Tasks 7 to 9", November 28, 2022, e-Doc 6927299, CD# NK38-CORR-00531-23690.
- A-11 CNSC Letter, A. Mathai to R. Geofroy, "Darlington NGS Refurbishment – Integrated Implementation Plan (IIP) Change Request for IIP-EA 012 Tasks 6 & 7 and IIP-EA 013 Tasks 7 to 9", December 19, 2023, e-Doc 7004531, CD# NK38-CORR-00531-25106.

Enclosure 1, OPG letter, A. Grace and B. Vulcanovic to C. Salmon, "Darlington NGS Refurbishment: Request for Commission Approval to Revise the Integrated Implementation Plan (IIP)", NK38-CORR-00531-25116

Enclosure 1

"Amendment of Darlington Nuclear Generating Station 14-HCAA-01267 - Notice of Amendment", Path No.: 14-HCAA-01267

OPG CD# D-CORR-00539.4-00007

(10 pages)



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Ontario and Prairies Region
Fish and Fish Habitat
Protection Program
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Région de l'Ontario et des Prairies
Programme de la protection
du poisson et de son habitat
867 Lakeshore Road
Burlington, ON L7S 1A1

October 27, 2023

Our file Notre référence

14-HCAA-01267

Ontario Power Generation
ATTENTION: Richard Geofroy
Senior Vice-President, Darlington Nuclear
1 Holt Road
Bowmanville, Ontario
L1C 3Z8

**Subject: Amendment of Darlington Nuclear Generating Station 14-HCAA-01267–
Notice of Amendment**

Dear Richard Geofroy:

The Fish and Fish Habitat Protection Program of Fisheries and Oceans Canada (DFO) would like to acknowledge receipt of your request made pursuant to section 5 of the *Authorizations Concerning Fish and Fish Habitat Protection Regulations* (the Regulations) to amend your authorization issued under paragraphs 34.4(2)(b) and 35(2)(b) of the *Fisheries Act* received on September 21, 2022.

The Program has reviewed the content of your amendment request and is notifying you that it is complete and that the authorization is hereby amended effective on this date.

The amendments are in regards to the valid authorization period, and study and monitoring report dates. Your authorization is now replaced by the amended and restated authorization attached to this letter.

Failure to comply with any of the terms or conditions of the authorization as amended may lead to prosecution under the *Fisheries Act*.

A copy of the amended authorization, and this letter containing the amendments should be kept on site while the work is in progress and upon request be provided to relevant federal or provincial officials. The authorization holder is responsible for ensuring work crews are familiar with, and able to adhere to, the conditions.



Fisheries and Oceans Pêches et Océans
Canada Canada

If you, or anyone conducting work on your behalf have any questions please contact Emily Morton at 289-983-6192, or by email at Emily.Morton@dfo-mpo.gc.ca.

Yours sincerely,

Sara Eddy
Regional Manager, Regulatory Review
Ontario and Prairie Region
Fisheries and Oceans Canada

CC:

Jeff Wright –Ontario Power Generation
Raphael McCalla –Ontario Power Generation
Nicole Frigault –Canadian Nuclear Safety Commission



AMENDED: PARAGRAPH 35(2)(b) *FISHERIES ACT* AUTHORIZATION

Authorization issued to:

Ontario Power Generation Inc.

(hereafter referred to as the "Proponent")

Attention to: ~~Brian Duncan~~ **Richard Geoffroy** Amended September 14, 2023, Senior Vice President

Darlington Nuclear
Ontario Power Generation Inc.
P.O. Box 4000 **1 Holt Road South** Amended September 14, 2023
Bowmanville, Ontario L1C 3Z8

Location of Proposed Project

Nearest community (city, town, village): Bowmanville
Municipality, district, township, county: Municipality of Clarington, Regional Municipality of Durham
Province: Ontario
Name of watercourse, waterbody: Lake Ontario
Longitude and latitude: 78° 43.775'W and 43° 51.605'N

Description of Proposed Project

The proposed project of which the work, undertaking or activity authorized is a part involves:

The operation of the Darlington Nuclear Generating Station, an existing facility that has four (4) CANDU pressurized heavy water reactor units that supply 3524 Megawatts to the electrical grid, which represents approximately 20 percent of Ontario's electricity needs. The operation of this facility includes the continual intake of cooling water from Lake Ontario for the heat exchange process in each of the four (4) CANDU reactor units. The valid Authorization period is intended to coincide with completion of refurbishment of all four reactor units and two consecutive years of monitoring for impingement and entrainment that commences once refurbishment is complete. It is acknowledged that to remain in compliance with the *Fisheries Act*, the proponent will be required to maintain a valid Authorization for the duration of the operation and decommissioning phases of the generating station.

Description of Authorized work(s), undertaking(s) or activity(ies) likely to result in serious harm to fish

The work(s), undertaking(s), or activity(ies) associated with the proposed project described above, that are likely to result in serious harm to fish, are:

- The continual intake of cooling water from Lake Ontario where the intake velocity at the screens is large enough to impinge or entrain fish.

The serious harm to fish likely to result from the proposed work(s), undertaking(s), or activity(ies), and covered by this Authorization includes

- Death of fish: the impingement and entrainment of approximately 1,742 kilograms to 2,200 kilograms of Age+1 equivalent fish per year that do not include any aquatic species at risk listed under the *Species at Risk Act*.

Conditions of Authorization

The above described work, undertaking or activity that is likely to result in serious harm to fish must be carried on in accordance with the following conditions.

1. Conditions that relate to the period during which the work, undertaking or activity that will result in serious harm to fish can be carried on

The work, undertaking or activity that results in serious harm to fish is authorized to be carried on during the following period:

From: Date of Issuance of the Authorization to December 31, ~~2027~~ **2031** Amended September 14, 2023

If the Proponent cannot complete the work, undertaking or activity during this period, Fisheries and Oceans Canada (DFO) must be notified in advance of the expiration of the above time period. DFO may, where appropriate, provide written notice that the period to carry on the work, undertaking or activity has been extended.

The periods during which other conditions of this Authorization must be complied with are provided in their respective sections below. DFO may, where appropriate, provide written notice that these periods have been extended, in order to correspond to the extension of the period to carry on a work, undertaking, or activity.

2. Conditions that relate to measures and standards to avoid and mitigate serious harm to fish

2.1 List of measures and standards to avoid and mitigate serious harm to fish:

- 2.1.1 Subject to condition 2.2.2, the current location of the Cooling Water System intake and the design features (e.g. porous veneer intake) shall be maintained in proper working order.
- 2.1.2 A review of available impingement and entrainment avoidance and mitigation options shall be undertaken by the Proponent, to the satisfaction of DFO, to determine those, if any, that may be technically and economically feasible to further avoid or mitigate impingement and entrainment losses (death of fish) associated with continued operation of the CANDU Cooling Water System. This review shall be completed during the refurbishment period and reported to DFO **and Canadian Nuclear Safety Commission (CNSC) by December 31, 2026** Amended September 14, 2023 prior to the continuing operations phase ~~in 2024~~ Amended September 14, 2023. If additional avoidance and/or mitigation measures are determined technically and economically feasible, the Proponent shall consult with DFO on measures **that may be** Amended September 14, 2023 implemented.

- 2.2 Contingency measures: (described below) shall be put in place if monitoring required in condition 3 below indicates that the measures and standards to avoid and mitigate serious harm to fish are not successful:
- 2.2.1 The Proponent shall notify Fisheries and Oceans Canada (DFO) within 5 business days providing monitoring data that has triggered contingency measures.
 - 2.2.2 Within 60 days of notification subject to 2.2.1, the Proponent shall submit plans to DFO for contingency measures required to avoid, mitigate and or offset the additional residual serious harm to fish. Contingencies shall include and are not limited to the Proponent undertaking complementary offsetting measures and or additional debit from the Habitat Bank.
- 2.3 Dates by which these measures and standards shall be implemented: Measures and standards to avoid and mitigate serious harm to fish:
- 2.3.1 Measures described under condition 2.2.1 (above) shall continue for the duration of this Authorization unless modifications subject to condition 2.2.2 are approved by DFO.
 - 2.3.2 Measures described under condition 2.2.2 (above) shall be implemented within 60 days upon DFO approval, unless otherwise specified and approved by DFO.
3. **Conditions that relate to monitoring and reporting of measures and standards to avoid and mitigate serious harm to fish**
- 3.1 Monitoring of avoidance and mitigation measures:
- 3.1.1 The Proponent shall monitor the implementation of avoidance and mitigation measures referred to in condition 2 of this Authorization and report to DFO and to the CNSC, and indicate whether the measures and standards to avoid and mitigate serious harm to fish were conducted according to the conditions of this Authorization. This shall be done, by:
 - 3.1.1.1 Implementing an Adaptive Management Strategy, as described in section 7.7 of the report titled “Submission to DFO for an Authorization under the *Fisheries Act* for the Darlington Nuclear Generating Facility” (including all references in the report), herein referred to as the Proponents’ Offsetting Plan, dated February 3, 2015, approved by DFO. This strategy will determine when residual impacts from impingement and entrainment are beyond the calculated amount of impinged and/or entrained Age 1+ fish totalling 2200 kg, which shall represent an upper threshold for natural variability in expected impingement and entrainment (I&E), triggering the need to implement contingency measures. The monitoring aspects of this strategy are outlined below in conditions 3.1.1.2 and 3.1.1.3 of this Authorization. As a component of the strategy, contingencies shall be developed in consultation with DFO for consideration in the event that the avoidance and mitigation measures do not perform as expected or the effects of the water intake(s) are greater than expected.
 - 3.1.1.2 Conducting impingement monitoring in ~~2024 and 2025~~ **2027 and 2028** ^{Amended September 14, 2023} (2 years of back-to-back monitoring) as described in sections 7.6 to 7.7 of the Proponents’ Offsetting Plan, dated February 3, 2015, **or in any subsequent later version of the offsetting plan that has been approved by DFO in writing,** ^{Amended September 14, 2023} and submit a report to DFO and to the CNSC by ~~the end of the following year, by December 31, 2026~~ **March 31, 2030** ^{Amended September 14, 2023}, and

- 3.1.1.3 Conducting entrainment monitoring in 2015-2016, a 12 month time period, and then conduct future entrainment monitoring **from 2027 to 2029** Amended September 14, 2023 ~~concurrently with future impingement monitoring, in 2024 and 2025~~ Amended September 14, 2023 as described in sections 7.6 to 7.7 of the Proponents' Offsetting Plan, dated February 3, 2015, **or in any subsequent later version of the offsetting plan that has been approved by DFO in writing,** Amended September 14, 2023 and submit a report to DFO and to the CNSC ~~by the end of the following year,~~ Amended September 14, 2023 ~~December 31, 2017, and December 31, 2026~~ **March 31, 2030** Amended September 14, 2023.
- 3.1.2 Demonstration of effective implementation and functioning: Providing reports to demonstrate effective implementation and functioning of mitigation measures and standards described above to limit the serious harm to fish to what is covered by this Authorization. Reporting shall be in conjunction with the reports and dates described under conditions 3.1.1.2 and 3.1.1.3.
- 3.1.3 Contingency measures: Providing details of any contingency measures that were followed, to prevent impacts greater than those covered by this Authorization in the event that mitigation measures did not function as described. Reporting shall be in conjunction with the reports and dates described under conditions 3.1.1.2 and 3.1.1.3.
- 3.2 Other monitoring and reporting conditions:
- 3.2.1 The incidental death of any individual of an aquatic species at risk (SAR) fish or mussel resulting from activities authorized by this Authorization shall be reported within 72 hours to ~~DFO Fisheries Protection Program~~ **Fish and Fish Habitat Protection Program** Amended September 14, 2023.
 Fisheries and Oceans Canada
 Attention: ~~Fisheries Protection Program~~ **Fish and Fish Habitat Protection Program** Amended September 14, 2023
 867 Lakeshore Rd
 Burlington, ON L7S 1A1
- 3.2.2 ~~If an aquatic SAR fish or mussel is impinged or entrained, they shall be preserved in 95% ethanol and forwarded to the Royal Ontario Museum with field sheets. Vouchers for all baitfish species and digital vouchers (i.e., digital photographs) of other taxa must be taken with distinguishing characteristics clearly photographed (see photographic instructions for fish SAR in Portt *et al.* (2008)). A report identifying all species caught by site (including number caught, date of capture, latitude, and longitude) and a spreadsheet using provided format and a map clearly indicating all collection sites (identified by site code) should be sent to the Fisheries Protection Program's Burlington office within one month of the species at risk being discovered.~~ **If a listed aquatic SAR, fish or mussel is impinged or entrained, vouchers (digital or physical) for each species at risk must be collected following the protocol outlined in Mandrak et al. 2022 (Mandrak, N.E., Bouvier, L.D., Colm, J.E., Enders, E.C., Watkinson, D., Holm, E., Morris, T.J., and Drake, D.A.R. 2022. Voucher collection guidance for freshwater fishes in DFO's Ontario and Prairie, and Arctic regions. Can. Manusc. Rep. Fish. Aquat. Sci. 3235: iv + 30 p.). The applicant shall retain vouchers unless/ until requested by DFO; if desired, vouchers may be disposed of after one (1) year from the time of collection. A report identifying all SAR fish species caught by site (including number caught, date of capture, latitude, and longitude), a SAR reporting spreadsheet and a map clearly indicating all collection sites shall be sent to the Fish and Fish Habitat Protection Program Burlington Office within one month of the SAR being positively identified.**
 Amended on September 14, 2023

3.2.3 Should monitoring indicate that an aquatic SAR fish or mussel is impinged or entrained, the Proponent shall enter into discussion with DFO on how to avoid and or mitigate the impact to the species at risk.

4. Conditions that relate to the offsetting of the serious harm to fish likely to result from the authorized work, undertaking or activity

4.1 Letter of credit: DFO may draw upon funds available to DFO as the beneficiary of the letter of credit provided to DFO as part of the application for this Authorization, to cover the costs of implementing the offsetting measures required to be implemented under this Authorization, including the associated monitoring and reporting measures included in condition 5, in instances where the Proponent fails to implement these required measures. N/A

4.2 Scale and description of offsetting measures: A coastal wetland habitat was restored at the Big Island-East Marsh in the Bay of Quinte in 2013 and 2014 as part of a Habitat Bank Program established in agreement between the Proponent and DFO. An offset of 2.40 hectares (24,000 square metres) of the coastal wetland shall be debited from Part 1 of the Habitat Bank in accordance with the measures set out in sections 9.0 to 9.7 of the Proponents' Offsetting Plan dated February 3, 2015, approved by DFO.

4.3 Offsetting criteria to assess the implementation and effectiveness of the offsetting measures: All fish habitat offsetting measures shall be completed and functioning in accordance with the measures set out in sections 9.0 to 9.7 of the Proponents' Offsetting Plan dated February 3, 2015, approved by DFO.

4.4 Contingency measures: If the results of monitoring as required in condition 5 indicate that the offsetting measures are not functioning according to the above criteria in condition 4.3, the Proponent shall give written notice to DFO and shall implement the contingency measures and associated monitoring measures, as described in sections 7.7 and 9.7 of the Proponents' Offsetting Plan (referenced in condition 4.2), to ensure the implementation of the offsetting measures are functioning as required by this Authorization.

4.4.1 Scale and description of contingency measures: Contingencies shall be developed in consultation with and approved by DFO in the event that the offsetting measures do not perform or function as expected. Contingencies shall include: the Proponent undertaking maintenance dredging or vegetation removal in the offsetting habitat features (channels and open water pond wetland habitats) to restore their form and function; undertaking complementary offsetting measures; further debiting of available credit from the Habitat Bank; and/or undertaking of additional measures developed in consultation with DFO. If the results of the monitoring required under condition 5.1.1.3 indicate that the offsetting measures have experienced a 30% or greater degree of vegetation encroachment in to the open water channel and or pond features, the Proponent shall give written notice to DFO and shall implement the contingency measures and associated monitoring specified below. The contingency measure for vegetation encroachment is maintenance activities (such as dredging or vegetation removal), in consultation with and approved by DFO to return the offset to its' original (as-built) functional state.

4.4.2 Monitoring measures to ensure offsetting contingency is completed and/or functioning as required: Monitoring of any additional habitat physical works for contingency measures implemented subject to 4.4.1 shall be completed the following year of which it has been completed and a report submitted to DFO and to the CNSC by December 31 of that year. Further monitoring and reporting shall be completed in accordance with the criteria and dates specified under conditions 5.1.1 and 5.2.

4.5 The Proponent shall not carry on any work, undertaking or activity that will adversely disturb or impact the offsetting measures.

4.6 Other conditions related to offsetting: N/A

5. Conditions that relate to monitoring and reporting of implementation of offsetting measures (described above under condition 4):

5.1 Schedule(s) and criteria: The Proponent shall conduct monitoring of the implementation of offsetting measures according to the approved timeline and criteria below and in accordance with the measures set out in the Proponents' Offsetting Plan dated February 3, 2015, approved by DFO:

5.1.1 List of timeline(s) and monitoring and reporting criteria:

5.1.1.1 A photographic record shall be taken documenting the completed construction of the offsetting fish habitat. All photographs shall be clearly labelled with the date, location and viewing direction. The photographic locations and viewing directions shall be indicated on a plan view drawing of the work site and clearly indexed to the photographs.

5.1.1.2 Element 1: monitoring of spawning, rearing, and forage utilization through various sampling methodologies (as described in section 9.6.1 of the Proponent's Offsetting Plan)-shall be completed in the spring and fall for two (2) consecutive years in 2015 and 2016, ~~then in 2018, and in 2024~~ ^{Amended September 14, 2023}. The assessment and reporting shall include information on the presence/absence of fish species, their life stages, adult spawning activity, community structure, and general habitat utilization. **In 2018, 2024, and in 2030 sampling will consist of three-season boat electrofishing and summer larval fish tows (as described in the letter 'Methods for DFO requested additional offset monitoring at the Big Island Wetland, dated April 14, 2023). The assessment and reporting shall include production modelling for the entire wetland** ^{Amended September 14, 2023}.

5.1.1.3 Element 2: monitoring of vegetation encroachment **and perimeter** ^{Amended September 14, 2023} of the excavated channels and open water areas shall be completed every two (2) years commencing in 2016 and completed for the duration of this Authorization. The assessment and reporting shall include mapping **using high resolution satellite imagery and lake Ontario water level data to determine** ^{Amended September 14, 2023} the vegetative growth to inform on the degree of impact (vegetation encroachment into open water channel and pond features) and to determine if maintenance activities are necessary to return the form and function of the offset.

5.1.1.4 Element 3: monitoring of the HEAT model parameters including water depth, substrate and vegetative types used for the HEAT model input for Part 1 of the Habitat Bank shall be completed at multiple locations within the offset area (similar to previous assessments) commencing in 2018, ~~and then in 2024~~ **2024, and then in 2030** ^{Amended September 14, 2023}.

5.2 List of reports to be provided to DFO and to the CNSC: The Proponent shall report to DFO on whether the offsetting measures were conducted according to the conditions of this Authorization by providing the following:

5.2.1 A report including results of monitoring criteria under condition 5.1.1.1 shall be submitted to DFO and to the CNSC no later than March 31, 2016.

5.2.2 Two annual summary reports including results of monitoring criteria under condition 5.1.1.2 shall be submitted to DFO and to the CNSC by March 31, 2016 and March 31, 2017.

5.2.3 Monitoring reports including results of monitoring criteria under condition 5.1.1.3 shall be submitted to DFO and to the CNSC by March 31 every two (2) years commencing in 2017 and for the duration of this Authorization. **With the exception of the 2022 vegetation encroachment and perimeter report which will be submitted to DFO and to the CNSC by October 31, 2023.** Amended September 14, 2023

5.2.4 Monitoring reports including results of monitoring criteria under conditions 5.1.1.2 and 5.1.1.4 shall be submitted to DFO and to the CNSC by March 31, 2019 ~~and March 31, 2025,~~ **March 31, 2025 and March 31, 2031** Amended September 14, 2023.

5.3 Other monitoring and reporting conditions for offsetting: N/A

Authorization Limitations and Application Conditions

The Proponent is solely responsible for plans and specifications relating to this Authorization and for all design, safety and workmanship aspects of all the works associated with this Authorization.

The holder of this Authorization is hereby authorized under the authority of Paragraph 35(2)(b) of the *Fisheries Act*, R.S.C., 1985, c.F. 14 to carry on the work(s), undertaking(s) and/or activity(ies) that are likely to result in serious harm to fish as described herein. This Authorization does not purport to release the applicant from any obligation to obtain permission from or to comply with the requirements of any other regulatory agencies.

This Authorization does not permit the deposit of a deleterious substance in water frequented by fish. Subsection 36(3) of the *Fisheries Act* prohibits the deposit of any deleterious substances into waters frequented by fish unless authorized by regulations made by Governor in Council.

This Authorization does not permit the killing, harming, harassment, capture or taking of individuals of any aquatic species listed under the *Species at Risk Act* (SARA) (s. 32 of the SARA), or the damage or destruction of residence of individuals of such species (s. 33 of the SARA) or the destruction of the critical habitat of any such species (s. 58 of the SARA).

At the date of issuance of this Authorization DFO has determined that impacts from the work, undertaking, or activity proposed, to aquatic species listed under the *Species at Risk Act* are not likely.

The failure to comply with any condition of this Authorization constitutes an offence under Paragraph 40(3)(a) of the *Fisheries Act* and may result in charges being laid under the *Fisheries Act*. This Authorization must be held on site and work crews must be made familiar with the conditions attached.

This Authorization cannot be transferred or assigned to another party. If the work(s), undertaking(s) or activity(ies) authorized to be conducted pursuant to this Authorization are expected to be sold or transferred, or other circumstances arise that are expected to result in a new Proponent taking over the work(s), undertaking(s) or activity(ies), the Proponent named in this Authorization shall advise DFO in advance.

Date of Issuance: ~~June 24, 2015~~ October 18, 2023

Approved by:

Sara Eddy
Regional Manager, Regulatory Review
Ontario and Prairie Region
Fisheries and Oceans Canada

**Summary of Regulatory Commitments, Regulatory Obligations and Regulatory
Management Actions Made/Concurrence Requested**

CD# NK38-CORR-00531-25116 P

Submission Title: **Darlington NGS Refurbishment - Request for Commission Approval to
Revise the Darlington NGS Integrated Implementation Plan (IIP)**

Regulatory Commitments (REGC):

No.	Description	Date to be Completed
	None	

Regulatory Management Action (REGM):

No.	Description	Date to be Completed
	None	

Regulatory Obligation Action (REGO):

No.	Description	Date to be Completed
	None	

Concurrence

Requested: OPG requests Commission approval to revise the Darlington NGS IIP and its
incorporation into the next revision of the Darlington LCH.