



Record of Decision

DEC 23-H102

In the Matter of

Applicant Ontario Power Generation Inc.

Subject Application for approval of revisions to the
Darlington Nuclear Generating Station
Integrated Implementation Plan

Date of
Decision April 27, 2023

RECORD OF DECISION – DEC 23-H102

Applicant: Ontario Power Generation Inc.

Address/Location: 700 University Avenue, Toronto, Ontario, M5G 1X6

Purpose: Application for approval of revisions to the Darlington Nuclear Generating Station Integrated Implementation Plan

Application received: June 28, 2022

Hearing: Public Hearing in Writing – Notice of Hearing in Writing published on November 17, 2022

Date of decision: April 27, 2023

Panel of Commission: V. Remenda, Presiding Member

Change in Licensing Basis: Accepted

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1.0 INTRODUCTION

1. Ontario Power Generation Inc. (OPG) has applied to the [Canadian Nuclear Safety Commission](#)¹ (CNSC), under subsection 24(2) of the [Nuclear Safety and Control Act](#) (NSCA),² for authorization to revise the Integrated Implementation Plan (IIP) for the Darlington Nuclear Generating Station (Darlington NGS). The Darlington NGS is located in the Municipality of Clarington, Ontario, and on the traditional territory of Wendat, Anishinabek Nation, and the territory covered by the Williams Treaties with the Michi Saagiig and Chippewa Nations. The Darlington NGS consists of four CANDU pressurized heavy water reactors, and associated equipment for the purpose of electricity generation. OPG's licence for the Darlington NGS, PROL-13.03/2025, expires on November 30, 2025.
2. The IIP includes actions arising from the Periodic Safety Review (PSR) OPG conducted in support of the [2015 licence renewal](#) for the Darlington NGS. The IIP forms part of the licensing basis for the current operating licence. A revision to the IIP represents a change in the licensing basis for the Darlington NGS and requires Commission authorization under the terms of the current operating licence issued under the NSCA.

Panel

3. Pursuant to section 22 of the NSCA, the President of the Commission established Dr. Victoria Remenda as a Panel of the Commission to consider the application. A [notice of hearing in writing](#) was published on November 17, 2022. The Commission, in conducting a public hearing based on written materials, considered written submissions from OPG ([CMD 23-H102.1](#)) and CNSC staff ([CMD 23-H102](#)). No interventions were received for this matter.

2.0 DECISION

4. Based on its consideration of the matter, as described in more detail in the following sections of this *Record of Decision*, the Commission concludes that the revised Darlington NGS IIP proposed by OPG will continue to meet the safety improvement objectives of the PSR. The Commission is satisfied that the specific changes requested would not take away from those objectives and remain within the safety case that was approved by the Commission when it renewed the licence. Therefore,

the Commission accepts the three specific modifications to the Integrated Implementation Plan as more fully described in this Record of Decision, thereby authorizing the change to the licensing basis.

¹ The *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.

² S.C. 1997, c. 9

5. With this decision, the Commission accepts the revisions to the following Darlington NGS IIP items, as detailed in CMD 23-H102:
 - IIP-CC 073 Task #3: revise the scope to replace catenary power cables based on inspection, sample testing and analysis, rather than replace the entire population.
 - IIP-CC 074 Task #3: revise the scope to replace catenary signal cables based on inspection, sample testing and analysis, rather than replace the entire population.
 - IIP-OI 060 Tasks #1 to 5: revise the scope to leave the existing ground fault protection in place and provide an alternate supply of firewater (independent of the operating booster pump), to ensure firefighter safety.
6. The Commission directs CNSC staff to update the Darlington NGS Licence Conditions Handbook (LCH) to reflect the Commission’s decision in this matter. The Commission also directs CNSC staff to report on the status of the revised IIP actions and on OPG’s sample testing results and consequent actions respecting the cables, as part of the periodic [*Regulatory Oversight Report for Nuclear Power Generating Sites*](#). CNSC staff shall present this report at a public proceeding of the Commission, where members of the public will be able to participate.

3.0 APPLICABILITY OF THE *IMPACT ASSESSMENT ACT*

7. In coming to its decision, the Commission first examined the applicability of the [*Impact Assessment Act*](#) (IAA).³ In its application, OPG submitted a request to revise three Darlington NGS IIP items, representing a change in licensing basis for the facility. The Commission finds that the proposed change to the licensing basis to revise IIP items is not a project, and not a designated project under section 81 of the IAA. The proposed changes to the IIP would not result in any change to the existing authorized activities.

4.0 ISSUES AND COMMISSION FINDINGS

8. Licence condition 15.3 of PROL-13.03/2025 requires that “*The licensee shall implement the Integrated Implementation Plan*” and licence condition G.1 stipulates that the licensee shall conduct licensed activities in accordance with the licensing basis for the facility.⁴ Since the IIP forms a part of the Darlington NGS licensing basis, the Commission must approve, in writing, any changes to the IIP. In making its decision in this matter, the Commission considered the acceptability of OPG’s proposed alternate means for resolution for three IIP items in respect of their impact on safety of the Darlington NGS and meeting the previously-established safety improvement objectives for the facility.

³ S.C. 2019, c. 28, s. 1

⁴ Licence condition G.1 of PROL-13.03/2025 defines the licensing basis as (i) *the regulatory requirements set out in the applicable laws and regulations; (ii) the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence; and (iii) the safety and control measures described in the licence application and the documents needed to support that licence application; unless otherwise approved in writing by the Canadian Nuclear Safety Commission (CNSC, hereinafter “the Commission”).*

9. OPG is proposing changes to the following three IIP items:
- IIP-CC 073 Task #3: Revise the scope to replace catenary power cables based on inspection, sample testing and analysis, rather than replacing the entire population.
 - IIP-CC 074 Task #3: Revise the scope to replace catenary signal cables based on inspection, sample testing and analysis, rather than replacing the entire population.
 - IIP-OI 060 Tasks #1 to 5: Revise the scope to leave the existing ground fault protection in place and provide an alternate supply of firewater (independent of the operating booster pump), to ensure firefighter safety.

IIP-CC 073 Task #3

10. For IIP-CC 073 Task #3, OPG is proposing a revised scope to the replacement of the Fuel Handling Trolley catenary power cables based on inspection, sample testing and analysis, rather than the immediate replacement of all twelve cables. In Attachment 2 of CMD 23-H102.1, OPG submitted an alternate strategy for completing this task based on recent testing of nine cables taken from the fueling machine reactor bridge. OPG reported that the testing demonstrated that the cables had experienced minimal exposure to radiation and that minimal thermal aging had occurred. Further, OPG reported not having operational issues with the existing cables to date.
11. OPG proposed that two of the twelve catenary power cables be selected for replacement and submitted for laboratory evaluation. On the basis of the data arising from the evaluations of these two cables, OPG would then assess the condition of the population of catenary power cables.
12. CNSC staff's position is that OPG's proposed strategy is satisfactory and meets the requirements of the licence. In Appendix A.2, *Technical Basis*, of CMD 23-H102, CNSC staff submitted that OPG's proposed testing and inspection activities were comprehensive and expected to provide the information necessary to determine whether cables need to be replaced. CNSC staff noted that this is a more pragmatic approach to replacing the catenary cables.
13. The Commission concludes that OPG's proposed strategy to the replacement of the Fuel Handling Trolley catenary power cables based on inspection is appropriate for IIP-CC 073 Task #3. The Commission is satisfied that the proposed alternative scope of work meets the intent of the original IIP commitment and will not affect the safety case of the Darlington NGS. The Commission agrees with CNSC staff's assessment that OPG's proposed testing and inspection activities are comprehensive and expected to provide the information necessary to determine whether cables need to be replaced.

IIP-CC 074 Task #3

14. For IIP-CC 074 Task #3, OPG is proposing a revised scope to replacing Fuel Handling Trolley catenary signal cables based on inspection, sample testing and analysis, rather than the immediate replacement of all 48 cables. As explained in Attachment 2 of CMD 23-H102.1, OPG proposed that seven of the 48 Fuel Handling Trolley catenary signal cables be selected for replacement and submitted for laboratory evaluation. On the basis of the data

arising from the evaluations of these 7 cables, OPG would then assess the condition of the population of the catenary signal cables.

15. OPG reported that recent testing of 9 cable samples taken from the fueling machine reactor area bridge demonstrated that these cables had experienced minimal exposure to radiation and minimal thermal aging has occurred with no operational issues with the existing cables to date.
16. In Appendix A.2 of CMD 23-H102, CNSC submitted that OPG's proposed testing and inspection activities in respect of IIP-CC 074 Task #3 were comprehensive and would provide the information necessary to determine whether cables need to be replaced. CNSC staff found the sample size proposed by OPG to be appropriate for determining the overall condition of the signal cables. CNSC staff added that this approach is consistent with Task 2 of this IIP item.
17. The Commission concludes that OPG's proposed strategy for the replacement of the Fuel Handling Trolley catenary signal cables based on inspection is appropriate for IIP-CC 074 Task #3. The Commission is satisfied that the proposed alternative scope of work meets the intent of the original IIP commitment and will not affect the safety case of the Darlington NGS. The Commission agrees with CNSC staff's assessment that OPG's proposed testing and inspection activities are comprehensive and expected to provide the information necessary to determine whether cables need to be replaced.

IIP-OI 060 Tasks #1 to 5

18. IIP-OI 060 Tasks #1 to 5 arise from clause-by-clause comparisons of the as-built Darlington NGS against applicable [National Fire Protection Association \(NFPA\)](#) fire protection standards. A gap was identified regarding NFPA Clause 9.1.8.1, which appeared in the 2016 edition of NFPA 20 "*Standard for the installation of stationary pumps for fire protection*".⁵ As described in Attachment 2 of CMD 23-H102.1, OPG proposed to revise the scope of this IIP action to leave the existing ground fault protection in place and provide an alternate supply of firewater, to ensure firefighter safety.
19. In Table A.2 of CMD 23-H102, CNSC staff reported that the discrepancy related to NFPA Clause 9.1.8.1 *Interruption states* is requiring that "No ground fault protection interruption means shall be installed in any fire pump power or control circuit". The intent of this clause is to ensure that during a fire, manual suppression is uninterrupted.
20. CNSC staff reported that OPG had installed ground fault protection on fire water booster pumps at the Darlington NGS prior to the 2016 revision to the NFPA code. OPG discovered potential issues regarding both the electrical safety of workers and the potential for ground faults to cause cable overheating, and possibly fires, if the ground fault protection was to be disconnected. To remove this issue, OPG proposed to leave the ground fault protection in place, and to supply an alternate source of firewater, independent of the operating booster pump. According to OPG, this strategy would ensure firefighter safety, should the pump motor lose power due to the deployment of its ground fault protection.

⁵ National Fire Protection Association, NFPA 20 *Standard for the Installation of Stationary Pumps for Fire Protection*, 2016.

21. In Appendix A.2 of CMD 23-H102, CNSC staff reported that an independent third party reviewed OPG's strategy, on OPG's behalf, and provided an expert view that the proposed alternate strategy would satisfy the intent of the applicable codes and standards requirements, and would not compromise the safety of the four reactors at the Darlington NGS.
22. CNSC staff's assessment is that OPG's alternate strategy to removing the ground fault protection from the five fire water booster pumps at Darlington NGS is adequate and in accordance with Clauses 4.4 and 4.5 of CSA N293-12, *Fire protection for nuclear power plants*.⁶ CNSC staff determined that OPG's proposed alternate strategy is satisfactory, meets the intent of the IIP and the requirements of Licence Condition 5.1, which requires that OPG implement and maintain a design program.
23. The Commission concludes that OPG's proposed strategy to leave the ground fault protection in place, and to supply an alternate source of firewater, independent of the operating booster pump is appropriate for IIP-OI 060 Tasks #1 to 5. The Commission is satisfied that the proposed alternative scope of work meets the intent of the original IIP commitment and will not affect the safety case of the Darlington NGS. The Commission agrees with CNSC staff's assessment that the proposed alternate strategy is adequate and in accordance with Clauses 4.4 and 4.5 of CSA N293-12, *Fire protection for nuclear power plants*.

5.0 CONCLUSION

24. The Commission has considered OPG's request to revise 3 actions for the Integrated Implementation Plan for the Nuclear Power Reactor Operating Licence, PROL 13.03/2025 for the Darlington NGS. The Commission is satisfied that the proposed revisions to the 3 Darlington IIP actions will not adversely affect OPG's ability to meet the safety objectives of its IIP. The Commission is further satisfied that the safety case for the Darlington NGS will remain robust. Therefore, the Commission accepts the revisions to the following Darlington NGS IIP items, as detailed in CMD 23-H102: actions IIP-CC 073 Task #3, IIP-CC 074 Task #3 and IIP-OI 060 Tasks #1 to 5. The Commission directs CNSC staff to update the Darlington NGS Licence Conditions Handbook (LCH) to reflect the Commission's decision in this matter.

Victoria H. Remenda
Victoria Remenda
Member
Canadian Nuclear Safety Commission

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Victoria H. Remenda
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April 27, 2023
Date

⁶ CSA N293-12, *Fire protection for nuclear power plants*, 2012.