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Oral Presentation

Submission from the Canadian Environmental Law Association

In the Matter of

Bruce Power Inc. – Bruce A and B Nuclear Generating Station

Request for a ten-year renewal of its Nuclear Power Reactor Operating Licence for the Bruce A and B Nuclear Generating Station

Commission Public Hearing – Part 2

May 28-31, 2018

Exposé oral

Mémoire de l'Association canadienne du droit de l'environnement

À l'égard de

Bruce Power Inc. - Centrale nucléaire de Bruce A et Bruce B

Demande de renouvellement, pour une période de dix ans, de son permis d'exploitation d'un réacteur nucléaire de puissance à la centrale nucléaire de Bruce A et Bruce B

Audience publique de la Commission – Partie 2

28-31 mai 2018

Canada

Canadian Environmental Law Association
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Bruce Power's Proposed Life Extension and Refurbishment: Evaluating Emergency Preparedness and Environmental Protection

The Canadian Environmental Law Association's Submission to the Canadian Nuclear Safety Commission

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Contents

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION 1: The CNSC should adopt the findings of the Environmental Assessment Expert Panel and the National Energy Board Modernization Panel, as a starting point for its actions to address public trust and facilitate public confidence in its process.

RECOMMENDATION 2: CNSC Records of Decisions should include clearly justified reasons, demonstrating why the rationale of a intervenor's submission was either accepted or rejected, and expressly consider the public interest and how it factored into the review and analysis.

RECOMMENDATION 3: The CNSC must inquire into the sufficiency of Bruce Power's emergency response planning absent processes which are aligned with PNERP 2017. Given Bruce Power's proposal to increase its operating power and scope of onsite activities, Bruce Power must demonstrate enhanced emergency preparedness. The Commission should require the public release of documents from Bruce Power, which include reports related to offsite drills, after-action reports related to the Huron Resolve exercise, the Severe Accident Management Guidelines, the Waste Management Plan and the Winter Storm Transportation Plan.

RECOMMENDATION 4: Compliance with REGDOC-2.10.1 must be made a condition of licensing to ensure Bruce Power fulfills its transition plan by August 31, 2018.

RECOMMENDATION 5: References on pages 108 and 140 of the CNSC Staff's CMD should be updated to refer to SSR-2/2 (Rev. 1.), thereby making SSR-2/2 (Rev. 1.) part of the licence requirements. In light of this update, the CNSC must review whether the licensee is in compliance and if additional revisions are required to the proposed Licence and Licence Conditions Handbook.

RECOMMENDATION 6: The IAEA's SSR-2/2 was intended as a licensing requirement and thus the Commission should amend the proposed Bruce Power operating licence to reflect the original purpose of SS-2/2, and classify it as a compliance verification document, not guidance.

RECOMMENDATION 7: The CNSC should ensure the basis for emergency response plans is sufficient to mitigate the offsite impacts of an INES Level 7 accident at Bruce Power.

RECOMMENDATION 9: CELA recommends that in view of the experience at Chernobyl and Fukushima, the CNSC should extend the requirements of the Ingestion Planning Zone to a distance of 100 km. This should be done as part of detailed planning for severe accidents so that appropriate monitoring of food, agricultural products, milk, and water is established and in place in the event of such an accident.

RECOMMENDATIONS 8: At a minimum, if emergency preparedness for the Bruce Nuclear Generating Station were to reflect the global experience of severe offsite accidents that have occurred in other jurisdictions, the detailed planning zone (formerly called the primary zone) must be extended from the existing 10 km zone to a distance of 20 km and the contingency planning zone must require the same level of detailed planning as currently required in the DPZ.

RECOMMENDATION 10: CELA recommends that the Commission publicly review findings from the PNERP Technical Study, and the implications for the Bruce Power on-site and off-site emergency planning arrangements. CELA recommends that these arrangements be reviewed at a public meeting of the Commission at least annually. In the interim, CELA recommends that the Commission not grant a licence exceeding five-years.

RECOMMENDATION 11: The CNSC should require Bruce Power provide a public awareness strategic plan, per PNERP 2017, to be reviewed publicly on annual annually as a condition of licensing.

RECOMMENDATION 12: CELA recommends public notification and response systems be tested and operable within DPZ and CPZ, and not limited to immediate 3 km AAZ.

RECOMMENDATION 13: The need to test and review the efficacy of recent public alerting measures weighs in favour of granting a five, not ten-year licence to Bruce Power. With the new warning system efforts undertaken by Bruce Power, we recommend the Commission require an update at a public meeting within one year of the licence renewal date.

RECOMMENDATION 14: The CNSC should require Bruce Power provide an online KI-pill request mechanism which is equivalent to the current “Prepare to Be Safe” website used by OPG for the Pickering and Darlington nuclear power plants for all individuals in the 50 km zone.

RECOMMENDATION 15: The CNSC should extend KI stockpiles to 100 km and ensure stockpiles at places frequented by vulnerable groups, such as children and pregnant women, are maintained.

RECOMMENDATION 16: We recommend the CNSC review the adequacy of medical care that would be required during an evacuation. The CNSC should inquire if medical facilities within 100 km of the Bruce NGS have a long-distance nuclear disaster-specific evacuation plan, and whether these plans have been practiced at full-scale. Granting a shorter licence of five-years to Bruce Power is more fitting because of the need for the CNSC to review the applicable medical evacuation plans that could result from an accident at Bruce Power.

RECOMMENDATION 17: Prior to approving the license for continued operation, the CNSC must require assurance and demonstration that the offsite emergency response capability includes detailed medical planning which ensures healthcare facilities have multiple communication measures available and supervision by disaster specialists who are qualified in radiation protection.

RECOMMENDATION 18: It is incumbent that the CNSC inquire into Bruce Power's plan for implementing the revised Radiation Health Response Plan and, whether it has completed a deficiency review of its existing processes to propose actions for alignment with PNERP 2017 current to the time of relicensing. In order to facilitate the Commission's public review and examination of this Plan and its confluence with licensee activity, a five, not ten-year licence should be considered for renewal.

RECOMMENDATION 19: Offsite emergency planning must integrate extreme weather events into its response measures. The efficacy of all response actions must be considered in light of winter storms, varying wind speeds and visibility, which could inhibit the ability of the public safely evacuate and access essential services.

RECOMMENDATION 20: If the Commission is not satisfied that the ability to fully evacuate in all weather conditions has been demonstrated, the CNSC should require this issue to be considered as a condition of licensing and should require a report to the commission at a public meeting within one year of the date of license renewal.

RECOMMENDATION 21: CELA recommends that a supplementary ETE Report be completed for large-scale evacuations, including consideration of any schools,

retirement homes, daycares, hospitals and correctional facilities in the area, and identification of alternate reception centres outside of the IPZ or 50 km limit.

RECOMMENDATION 22: Prior to approval of the license application, the CNSC should require Bruce Power to demonstrate the adequacy of detailed planning within an expanded Detailed Planning Zone as well as within an expanded Ingestion Planning Zone, including planning for any schools, retirement homes, daycares, hospitals and correctional facilities in these areas. While adaptation may be required, CNSC should not accept the province's continued reliance on improvisation and adaptation as its main strategy for responding to large off-site accidents that require evacuation and other measures beyond the Detailed Planning Zone. These plans should be communicated publicly.

RECOMMENDATION 23: The CNSC should require Bruce Power to evaluate the impact of increased evacuation zones at a radial distance of 50 km on locations of Emergency Workers Centres, numbers of emergency workers required for evacuation management, traffic routes, size of evacuation centres, and locations and capacity of Decontamination and Monitoring Units, and to report its findings to the CNSC.

RECOMMENDATION 24: The CNSC should require as a condition of licensing that Bruce Power provide municipalities within the Detailed Planning Zone and Ingestion Planning Zone with financial resources to create and implement detailed evacuation plans up to 50 km away.

RECOMMENDATION 25: The CNSC should require demonstration that all evacuation plans, including all traffic control plans, have been updated and are adequate to fully protect the public from large scale nuclear accidents as a requirement for relicensing.

RECOMMENDATION 26: Bruce Power and the Municipality of Kincardine should work together to ensure that contingency plans are in place for individuals who have no access to transit in the event of an evacuation. These plans should be communicated to the public.

RECOMMENDATION 27: As a condition of licensing, a supplemental to the ETE Report should be provided to the Commission at a public meeting which reviews the impact of shadow evacuations on evacuation time estimates in the DPZ.

RECOMMENDATION 28: Bruce Power should be required to model the impact of car accidents and planned road improvements, both inside and outside of the evacuation zones, to assess how evacuation times will be impacted.

RECOMMENDATION 29: The CNSC must require the Environmental Monitoring Program to extend to a distance of 100 km as a condition of licensing, to account for revised IPZ zone and ensure the reduction and prevention of ingesting contaminated agricultural products in the event of an emergency.

RECOMMENDATION 30: The CNSC should require proof of adequate contingency planning for the protection of drinking water in the event of an emergency as a requirement for licensing. Drinking water monitoring is insufficient in scope to ensure that there are actually sufficient drinking water supplies available in the event of a major radioactive release.

RECOMMENDATION 31: Methods to review risks and obtain consent from workers to exceed maximum radiation exposure limits should be explicitly clarified in plans by the operator as a condition of licensing.

RECOMMENDATION 32: CELA recommends that CNSC staff be required to provide an update on Bruce Power's progress as it relates to the congestion and community expansion in the area surrounding the Emergency Worker Centre. The report should be made publicly available and open for public comment.

RECOMMENDATION 33: The CNSC should require Bruce Power to provide a public update on its corrective actions resulting from the Huron Resolve exercise at the Commission's annual meeting on the Regulatory Oversight of Nuclear Generating Stations.

RECOMMENDATION 34: CELA recommends the CNSC set a deadline for the completion of Bruce Power's transition to a fully automated system. This plan should be made a requirement of licensing and until implemented, reviewed annually at he Commission's regulatory oversight meeting.

RECOMMENDATION 35: CELA recommends a ten-year licence not be granted to Bruce Power because the environmental assessment under the *NSCA* is profoundly lacking and not proportionate to the public participation and expert review provided for the nearly analogous Bruce A refurbishment and life extension project. Instead, CELA suggests the CNSC should refer the matter to the Minister for review under *CEAA 2012.*

RECOMMENDATION 36: Until the CNSC has developed a follow-up monitoring program (FUMP) which is equivalent in scope to the FUMP required based on the Bruce A federal EA, the current FUMP should remain in place and not discontinued.

RECOMMENDATION 37: To ensure Bruce Power's compliance with the FUMP, the CNSC should incorporate the existing FUMP by reference as a required licence condition.

RECOMMENDATION 38: Due to the number of plans and standards which are not yet implemented, the CNSC lacks a sufficient basis for compliance and enforcement. Bruce Power should not be granted a licence beyond five years until all outstanding items are remedied and fully in force.

RECOMMENDATION 39: Consolidated licences, because of their broader scope and complexity, are not conducive to ten-year-licences. Absent Bruce Power providing the required information to support a consolidated licence application in advance of the hearing, and for public review, the CNSC should dismiss the request because of a lack of evidentiary basis.

EXECUTIVE SUMMARY

In June of 2017, Bruce Power submitted a licence application to the CNSC seeking a licence to refurbish and extend the operating life of the Bruce A and B reactors to 2064. If granted, it would be the first time in Canadian history for a nuclear facility to be refurbished without undergoing a federal environmental assessment.

The Canadian Environmental Law Association (CELA) does not support Bruce Power's application for a ten-year licence and requests the Canadian Nuclear Safety Commission (CNSC) reject this length of licence on the basis that:

- **The application does not support the conditions for democratic transparency and effective public engagement with the nuclear sector:** the significance of the proposal before the CNSC should trigger the most principled review of issues and a public hearing process which is the most conducive to building participatory review. A ten-year licence would limit the frequency of licencing hearings and thus, opportunities for the public to engage in a detailed review of licensee activity.

- **Whether Bruce Power is compliant with Ontario's revised *Provincial Nuclear Emergency Response Plan* remains unknown:** it is premature of the CNSC to conclude in its CMD that no new actions are required by Bruce Power in response to the revised PNERP. The Implementing Plan for Bruce Power was not publicly released prior to the public intervention submission deadline and Bruce Power is yet to align its Emergency Response Plan. Insufficient and incomplete information should not serve as a basis for a ten-year licence renewal.

- **The depth of environmental review is not proportionate to the risk and complexity of the undertaking:** Bruce Power's refurbishment would be the first of its kinds to not undergo a federal environmental assessment. Eliminating an environmental assessment for this project results in an unacceptable loss in transparency and public participation. CELA recommends the CNSC refer the matter to the Minister for an EA under the *Canadian Environmental Assessment Act, 2012.*

On this basis, we request the Commission only approve a licence with a five-year term.

INTRODUCTION

The Canadian Environmental Law Association (CELA) submits this report in response to the Public Notice dated September 1, 2017 requesting comments on the proposed licence to authorize Bruce Power to carry out refurbishment and life extension activities.[1]

CELA is a non-profit, public interest law organization. CELA is funded by Legal Aid Ontario as a speciality legal clinic to provide equitable access to justice to those otherwise unable to afford representation for their environmental problems. For nearly 50 years, CELA has used legal tools to advance the public interest, through advocacy and law reform, in order to increase environmental protection and safeguard communities across Canada. CELA has engaged in detailed research and advocacy related to the improvement of public safety and environmental protection by seeking improvements to nuclear emergency preparedness.

Scope of Review

In this report, CELA seeks to respond to Bruce Power's application for a ten-year licence with respect to the life extension and refurbishment of Units 3 to 8 at Bruce, B and the renewal of the operating licence for Bruce A and B.[2] [3]

Part 1 of our report reviews the role of the CNSC, the scope of issues, and the evidentiary basis which is required in order for the Commission to publicly consider the sufficiency of emergency preparedness and environmental protection in the context of this licence application. Part 2 highlights recent changes to emergency planning in the province while Part 3 identifies specific emergency planning gaps and recommends areas for improvement. Part 4 comments on the sufficiency of the environmental assessment performed by the CNSC under the *Nuclear Safety and Control Act* and Part 5

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[1] Canadian Nuclear Safety Comission, "Notice of Public Hearing and Participant Funding (Ref. 2018-H-02)" (1 Sept 2017), online: http://www.suretenucleaire.gc.ca/eng/the-commission/pdf/NoticePublicHearingPFP-2018-H-02-BrucePower-e.pdf

[2] CNSC, "*CMD 18-H4 Bruce Power Inc. - Bruce Nuclear Generating Station A and B"* (12 February 2018) at 8 ***[CNSC CMD]***.

[3] Please note, while the CNSC has chosen to use the revised phrase, "major component replacement" in place of the former "refurbishment," CELA will continue to use the term refurbishment throughout its submission.

critiques Bruce Power's readiness for renewal, given our recommendations and analysis in Parts 1 through 4.

1. THE ROLE OF THE COMMISSION

1.1 Regaining the Public's Trust

During Day 1 of the Pickering hearing (April 4, 2018), Commission members sought feedback from CNSC Staff and provincial authorities on "building [public] trust and confidence" and specifically, sought suggestions on how it "could be addressed in a more proactive way."[4] In response, the Office of the Fire Marshall and Emergency (OFMEM) stated "it's one that we struggle with on a daily basis" and CNSC Staff echoed, "it is a very difficult problem."[5]

The need for energy regulators to regain public trust is not isolated to the Commission. Indeed, the federal government recognized the need for reform and in 2016-17, appointed two expert panels with the express mandate of regaining public trust. One panel, known as the National Energy Board Modernization panel, sought to engage and consult with the public on issues of governance relevant to lifecycle regulation.[6] The second panel, known as the Environmental Assessment Expert Panel sought to consult with the public on federal environmental assessment.[7]

As the NEB Modernization expert panel concluded in its final report, Canadians suffered from a "crisis of confidence," as regulators had "fundamentally lost the confidence of many Canadians," and the "public's trust."[8] They had heard that "decisions must be transparent and open, and all documents and information considered by the decision-maker must be publicly available online and searchable," "the decision-maker must give

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[4]CNSC Member Velshi, Webcast - Pickering Hearing Day 1 April 4, 2018.

[5] *Ibid*

[6] Report of the Expert Panel on the Modernization of the National Energy Board, "*Forward Together: Enabling Canada's Clean, Safe, and Secure Energy Future: Volume I*" online: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/pdf/NEB-Modernization-Report-EN-WebReady.pdf ***[NEB Report]***

[7] Report of the Expert Panel for the Review of Environmental Assessment Processes, "*Building Common Ground - A New Vision for Impact Assessment in Canada*" online: https://www.canada.ca/content/dam/themes/environment/conservation/environmental-reviews/building-common-ground/building-common-ground.pdf ***[EA Panel Report]***

[8] *NEB Report, supra* note 6 at 7

full reasons that provide justification, transparency and intelligibility" and "processes [must be] designed and implemented in such a way as to maximize the inclusion of all parties."[9]

In specific reference to the CNSC, the Environmental Assessment Expert Panel noted in its final report:

> The apprehension of bias or conflict of interest, whether real or not, was the single most often cited concern by participants with regard to the NEB and CNSC as Responsible Authorities…The apprehension of bias on the part of these two Responsible Authorities has eroded confidence in the assessment process.[10]

The findings from both of these Expert Panels are directly relevant to the CNSC – both as a lifecycle regulator and as a designated authority to conduct environmental assessments under the *Canadian Environmental Assessment Act,* 2012 (CEAA 2012) – as we ask the CNSC to adopt the following final recommendations:

- Examine and reform processes to achieve a higher degree of engagement and flexibility toward an outcome that the public feel welcome; and, enable the participation of interested parties
- Restore trust and confidence in assessment processes, by allowing people to see and understand how the process is being applied, how assessments are being undertaken and how decisions are being made. Without this transparency, no process will be trusted[11]
- Facilitate transparent information sharing and decision-making[12]
- Embrace next-generation environmental law which includes providing accessible information and allowing a sufficient time for its review[13]

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[9] Report of the Expert Panel on the Modernization of the National Energy Board, "*Forward Together: Enabling Canada's Clean, Safe, and Secure Energy Future: Volume II*" online: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/pdf/NEB-Modernization-Annex-EN-WebReady.pdf at 200

[10] *EA Panel Report, supra* note 7 at 49

[11] *Ibid* at 13

[12] *Ibid* at 19

[13] *Ibid* at 90

CELA has previously asked the Commission to adopt the recommendations,[14] however, was informed at the time that they were beyond the scope of the hearing-matter and "no change" would result.[15] Considering the issue of public trust should be a starting in all CNSC hearings. To facilitate a trust-building process, we recommend the CNSC adopt the expert panels' recommendations.

RECOMMENDATION 1: The CNSC should adopt the findings of the Environmental Assessment Expert Panel and the National Energy Board Modernization Panel, as a starting point for its actions to address public trust and facilitate public confidence in its process.

1.2 The Issues to be Reviewed by the Commission

In deciding whether to grant the licence, in whole or in part as proposed by Bruce Power in its licence application, the Commission must apply section 24(4) of the *Nuclear Safety and Control Act* ("*NSCA*"). Section 24(4) sets out the legal test that Commission members must apply to any licence deliberation:

> **Conditions for issuance, etc.**
>
> **24 (4)** No licence shall be issued, renewed, amended or replaced — and no authorization to transfer one given — unless, in the opinion of the Commission, the applicant or, in the case of an application for an authorization to transfer the licence, the transferee
>
> > (a) is qualified to carry on the activity that the licence will authorize the licensee to carry on; and
> >
> > (b) will, in carrying on that activity, make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

Section 24(4) of the *NSCA* requires that the Commission carry out a comprehensive assessment of the applicant's ability and readiness to fulfill the licensing requirements imposed by the *NSCA* and its regulations, as well as any conditions set out in the licence

[14] CELA and Northwatch, "Review of the CNSC's Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2016" (20 Nov 2017)

[15] CNSC Staff, Presentation - Commission Meeting December 13, 2017 (CMD 17-M45-A).

and licence conditions handbook ("LCH"). Together, these rules and standards form the basis upon which the Commission has to determine whether the applicant will indeed make adequate provision for:

- the protection of the environment,
- the health and safety of persons and the maintenance of national security, and
- measures required to implement international obligations to which Canada has agreed.

In fulfilling its mandate, the Commission has wide discretion and, as stated in s.24(5), a licence may contain any term or condition that the Commission considers necessary for the purposes of the *NSCA*. Where the Commission is not satisfied by the draft licence, it may decide to impose further requirements, to ensure that the applicant fulfills the relevant rules and standards.

Crucial to the Commission's decision-making, is understanding the reasons or rationale which undergird its findings in its Record of Decision. In reaching a decision, we encourage the CNSC to adopt a number of best practices for effective adjudicator writing and decision-making. As the Supreme Court of Canada articulated in *Baker:*

> Reasons...foster better decision-making by ensuring that issues and reasoning are well articulated and, therefore, more carefully thought out. The process of writing reasons for decision by itself may be a guarantee of a better decision. Reasons also allow parties to see that the applicable issues have been carefully considered, and are invaluable if a decision is to be appealed, questioned, or considered on judicial review.[16]

We encourage the Commission to foster better decision-making in its Records of Decision. Currently, the depth of Commission decisions are not proportionate to the complexity of issues being decided.[17] They do not exemplify best practices of

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[16] *Baker v Canada (Minister of Citizenship and Immigration),* [1999] 2 SCR 817 at para 39.

[17] For instance, in the CNSC's *Record of Proceedings, Including Reasons for Decision* (9 July 2015) for the previous Bruce Power renewal, the issue as framed by the Commission referenced s 24(4) of the *NSCA.* While the Commission referenced comments by intervenors, such as CELA's comment that "CELA's intervention expressed the concern that the PNERP had not bee appropriately updated," (para 259) the Commission simply responded in its written decision by noting the response received in the oral hearing from the OFMEM and Municipality of Kincardine. What the written decision does not do, is connect its comments or summaries of intervenor comments back to the issue set out up front. The decision jumps from issues, presentation of information, to the conclusion that "the Commission is satisfied that…Bruce

adjudication and written decision-making, as they lack critical analysis and explanations which link the issues to the decision reached. In its Records of Decision, we respectfully recommend the Commission:

- Cleary state its reasons and justification upon which the decision is based;[18]
- Give careful consideration to the reasons for the decision;[19] and
- Expressly reference how the public interest factored into its reasoning and analysis.

RECOMMENDATION 2: CNSC Records of Decisions should include clearly justified reasons, demonstrating why the rationale of a intervenor's submission was either accepted or rejected, and expressly consider the public interest and how it factored into the review and analysis.

2. CURRENCY OF EMERGENCY PLANNING MEASURES AT THE BRUCE NUCLEAR GENERATING STATION

2.1 Pending Compliance with Ontario's Revised *Provincial Nuclear Emergency Response Plan*

Ontario's revised *Provincial Nuclear Emergency Response Plan* (*PNERP*) was released December 21, 2017 (herein, PNERP 2017). Despite an obligation to be reviewed every four years[20] the release of *PNERP 2017* marked its first revision since 2009. Due to CELA's active involvement in consultation and discussions regarding the *PNERP* and the Discussion Paper on Planning Basis Review and Recommendations and List of Proposed

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Power provides adequate protection to the environment. The Commission is satisfied that the applicant meets the requirements of subsection 24(4)" (paras 361, 362). This approach to decision writing lacks critical analysis as the Commission does not opine on the evidence, and its relevance and merits to the issue being decided.

[18] Adapted from: United Nations Economic Commission, "Aarhus Convention - Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters" (25 June 1998), online:http://ec.europa.eu/environment/aarhus/

[19] *Dunsmuir v New Brunswick,* 2008 SCC 9, [2008] 1 SCR 190 at para 151.

[20] Ontario, "*Provincial Nuclear Emergency Response Plan, Master Plan 2009*" online: https://www.emergencymanagementontario.ca/sites/default/files/content/emo/docs/PNERP%202%20Approved%20Plan%202009_PDFUA.pdf at 1.11.2. The 2017 PNERP has amended this obligation to every five years.

Changes to the PNERP 2009[21] and, our history reviewing the sufficiency of emergency preparedness in the context of nuclear power plant relicensing,[22] CELA has sought to:

- Compare Bruce Powers' emergency response plan with the revised, Provincial Nuclear Emergency Response Plan, highlighting gaps, areas for improvement and their effects on licensing; and
- Examine ways in Bruce Power's existing emergency response plans could be revised to conform with the 2017 PNERP.

A deficiency review is particularly needed in light of the CNSC Staff's finding[23] regarding the effects of the PNERP 2017 on relicensing at Bruce:

> The 2017 PNERP master plan did not impose any additional requirements on Bruce Power as the requirements for KI tablets, public alerting and communications, or the designation of emergency response centres remained the same. Bruce Power will only need to update their procedures to reference the 2017 PNERP master plan (emphasis added).[24]

In CELA's view, it is premature to reach this conclusion. First, a close reading of the materials demonstrates much of the basis upon which to make this conclusion is not currently available - nor will be for many months. While it may be the intent of Bruce Power to align with the new emergency planning regime - and indeed that of CNSC Staff - there is insufficient current evidence upon which to base this conclusion.

Secondly, the Implementing Plans for each of the power plants, required under the PNERP 2017 are yet to be finalized and publicly released. Even upon the release of the new Implementing Plan, Bruce Power estimates it will take a further 6 months to align its Emergency Response Plan with the revised provincial plan.

Third, while the CNSC has provided CELA with the opportunity to provide a supplemental submission on the Implementing Plan prior to the hearing,[25] this is not

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[21] Canadian Environmental Law Association, "*Discussion Paper on Planning Basis Review and Recommendations and List of Proposed Changes to the PNERP 2009"* (28 July 2017), online: http://www.cela.ca/publications/provincial-nuclear-emergency-response-plan-2009-disc-paper ***[CELA PNERP Discussion Paper]***

[22] *See* CELA's collection online: http://www.cela.ca/test-emergency-planning-around-canadian-nuclear-plants

[23] *CNSC CMD*, *supra* note 2.

[24] *Ibid* at 110

[25] Voicemail message, Marc Leblanc to Kerrie Blaise, 6 April 2018

equivalent to the CNSC ensuring all documents before the Commission have been revised and updated to reflect the latest version of the Implementation Plan.

For these reasons, the Commission should not grant a licence in excess of a five years to Bruce Power.

2.2 Limited Publicly Available Emergency Response Information

CELA sought plans and reports from Bruce Power which directly related to our sufficiency review of emergency planning and environmental protection at the Bruce Power Nuclear Generating Station. The following table summarizes the documents sought by CELA but denied by Bruce Power.

Table 1. Document and Information Requests

Document Sought	**Response from Bruce Power**
Reports related to offsite drills	Drill reports are not prepared for the public and will not be released; summaries of drills provided as a courtesy[26]
After-action reports related to the "Huron Resolve Exercise – 2016"	Summary of the after-action report provided as a courtesy; report is not prepared for the public and will not be released[27]
Severe Accident Management Guidelines	Contain "controlled nuclear information" and will not be released to the public[28]
Waste Management Plan	Internal document that will not be released to the public[29]
Winter Storm Transportation Plan	Internal document that will not be released to the public[30]

As Andrew Roman notes in the text, *Effective Advocacy before Administrative Tribunals,* it is central to the function of intervenors that they be able to review evidence before the tribunal, or in this case, the Commission:

> Until the interveners have seen and tested the evidence of the applicant it is often difficult for them to know what evidence of their own, if any, they should introduce. For this reason, a tribunal which requires that all the evidence of all

[26] Email correspondence, Bruce Power to Kerrie Blaise, 27 March 2018

[27] *Ibid*

[28] Email correspondence, Bruce Power to Kerrie Blaise, 6 April 2018

[29] *Ibid*

[30] *Ibid*

> parties be submitted before the evidence of the applicant or proponent has been heard is more likely to prolong its hearings with needless or premature evidence. Such a tribunal is perhaps a bit insensitive to the needs of interveners, or has simply failed to recognize that most of the relevant evidence in most cases is likely to be in the possession of the applicant (emphasis added).[31]

In light of the inability of members of the public to review the above noted plans, we urge the Commission to be satisfied of the sufficiency of the licensee's arrangements, particularly as the proponent seeks to increase its operating power[32] and the lifespan of operations. In our view this requires consideration of the above-noted documents and information. Furthermore, this information should be released for public review for the reasons discussed herein.

The CNSC's failure to ensure licensees provide open and public documentation directly lessens the degree to which members of the public can be informed and made aware of emergency planning measures, from transportation to evacuation scenarios. The differential in disclosure causes imbalances between the proponent, regulator and public intervenors. This lack of disclosure also implicitly extends to the members of the Commission and we urge the members not to accept these information denials by the applicant.

RECOMMENDATION 3: The CNSC must inquire into the sufficiency of Bruce Power's emergency response planning absent processes which are aligned with PNERP 2017. Given Bruce Power's proposal to increase its operating power and scope of onsite activities, Bruce Power must demonstrate enhanced emergency preparedness. The Commission should require the public release of documents from Bruce Power, which include reports related to offsite drills, after-action reports related to the Huron Resolve exercise, the Severe Accident Management Guidelines, the Waste Management Plan and the Winter Storm Transportation Plan.

2.3 Pending Compliance with REGDOC 2.10.1 Nuclear Emergency Preparedness and Response

In addition to PNERP 2017 which has triggered the need for updates to Bruce Power's emergency plans, Bruce Power is not yet in compliance with REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response.* Bruce Power is not expected to be in

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[31] Andrew J Roman, *Effective Advocacy Before Administrative Tribunals,* (Toronto: Carswell, 1989) at 25.

[32] *CNSC CMD*, *supra* note 2 at 2.

compliance with this REGDOC until August 2018, and has submitted a transition plan to meet the requirements.[33] We request the CNSC require the proponent to provide an update on each of the outstanding items which are to be completed by August 31, 018. This includes the development of a Bruce Recovery Plan, the completion of a communications project so that two independent means of communication are available to all emergency centres, updates to their off-site emergency response, and completion of KI pre-distribution to 50 km (see Appendix 1 for the Bruce Power's Implementing Plan).

On this basis, we request the CNSC make REGDOC-2.10.1 a Compliance Verification Document in the licence instead of a Guidance Publication, as noted in the proposed LCH, to ensure its implementation.

RECOMMENDATION 4: Compliance with REGDOC-2.10.1 must be made a condition of licensing to ensure Bruce Power fulfills its transition plan by August 31, 2018.

2.4 References to International Guidance Require Updating

2.4.1 Revised 2016 IAEA Standard No. SSR-2/2 (Rev. 1) has not been considered

CELA has reviewed the various international standards referenced in the CNSC Staff's CMD. In doing so, CELA noticed IAEA publication entitled *Specific Safety Requirements Series No. SSR-2/2,* which is mentioned in the Licence Conditions Handbook.[34] SSR-2/2 was issued in 2011. In 2016 it was replaced by a revised edition entitled *SSR-2/2 (Rev. 1)*.[35] The 2016-edition contains a number of amendments, that are partly a result of the lessons learned from Fukushima, and which are relevant particularly to Bruce Power's own emergency preparedness. The revisions to SSR /2/2 cover a range of issues, including:

- Periodic safety review and feedback from operating experience;
- Emergency preparedness;
- Accident management;

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[33] *Ibid* at 109

[34] *CNSC CMD*, *supra* note 2 at 409 and 441.

[35] 2016 IAEA Standards Series No. SSR-2/2 (Rev 1), online: https://www-pub.iaea.org/books/iaeabooks/10886/Safety-of-Nuclear-Power-Plants-Commissioning-and-Operation ***[SSR-2/2 (Rev. 1)]***.

- Fire safety.[36]

CELA notes that the following amendment appears particularly significant:

> 5.8A. For a multi-unit nuclear power plant site, concurrent accidents affecting all units shall be considered in the accident management programme. Trained and experienced personnel, equipment, supplies and external support shall be made available for coping with concurrent accidents. Potential interactions between units shall be considered in the accident management programme.

CELA contacted Bruce Power to enquire about its compliance with the new and revised requirements in SSR-2/2 (Rev. 1). Bruce responded that "while IAEA SSR-2/2 (Rev.1) is not a requirement under our operating licence, the requirements of this document are covered through CNSC REGDOCs that are requirements in our licence." CELA also asked specifically about compliance with requirement 5.8A, to which Bruce Power stated that it believes requirement 5.8A is met through compliance with a number of other licence requirements. In doing so Bruce Power, however, also made it clear that it has taken no specific steps to meet requirement 5.8A.[37]

It is thus clear that no effort has been made by CNSC staff or by Bruce Power to review SSR-2/2 (Rev. 1.) and ensure compliance with the revised standard. Therefore, CELA recommends that the references on pages 108 and 140 of the CNSC Staff's CMD be updated to refer to SSR-2/2 (Rev. 1.), thereby making SSR-2/2 (Rev. 1.) part of the licence requirements. In this regard, CELA also recommends that CNSC staff review the updated document to confirm whether the additional revisions not mentioned here necessitate any further changes to the proposed Licence or Licence Conditions Handbook.

CELA furthermore recommends that the Commission request that CNSC ensure that Bruce Power meets all of the new or revised requirements in SSR-2/2 (Rev. 1). Such a requirement would be in line with the CNSC's stated goal of complying with all applicable international standards. CELA requests information in particular as to whether Bruce Power meets the requirements of this new paragraph 5.8A, including whether Bruce Power's new installations for back-up power and back-up water could be mobilized in the event of multi-unit accidents or multi-facility accidents in accordance

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[36] *SSR-2/2 (Rev. 1)* at 10-11.

[37] Email correspondence from Bruce Power dated April 10, 2018

with the requirements in paragraph 5.8A? If not, CELA requests information as to how, and by what date, Bruce Power expects to comply with paragraph 5.8A.

Lastly, CELA notes that in Licence Conditions Handbook, SSR-2/2 is listed as a guidance document, although IAEA clearly intended SSR-2/2 to serve as a set of requirements, rather than mere guidance.[38] As such, IAEA defines the *Safety Requirements* category of publications, to which SSR-2/2 belongs, in the following manner:

> [...] Safety Requirements publications establish the requirements that must be met to ensure the protection of people and the environment, both now and in the future. The requirements are governed by the objectives and principles of the Safety Fundamentals. If the requirements are not met, measures must be taken to reach or restore the required level of safety.[39]

CELA therefore submits that SSR-2/2 should not be listed as a guidance document but as compliance verification document, which most closely reflects the purpose of this publication.

RECOMMENDATION 5: References on pages 108 and 140 of the CNSC Staff's CMD should be updated to refer to SSR-2/2 (Rev. 1.), thereby making SSR-2/2 (Rev. 1.) part of the licence requirements. In light of this update, the CNSC must review whether the licensee is in compliance and if additional revisions are required to the proposed Licence and Licence Conditions Handbook.

RECOMMENDATION 6: The IAEA's SSR-2/2 was intended as a licensing requirement and thus the Commission should amend the proposed Bruce Power operating licence to reflect the original purpose of SS-2/2, and classify it as a compliance verification document, not guidance.

2.4.2 Planning Basis is not Equivalent to a Level 7 INES Accident

CELA submits that without detailed advance planning for an INES 7 level offsite accident, the province cannot be confident that the current plan would be responsive to a larger accident. The unfortunate disasters of Chernobyl and Fukushima have been classified as INES Level 7 accidents. Currently, the modelling on which the revised PNERP is based

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[38] CNSC CMD, *supra* note 2 at 409.

[39] See for example page 2 of IAEA's safety standard brochure, online: http://www-ns.iaea.org/downloads/standards/iaea-safety-standards-brochure.pdf. The same wording is included in SSR-2/2 (Rev. 1).

does not utilize an INES 7 level accident and thus it is not yet sufficient to determine the appropriate planning zones and resulting protective actions.

As noted by the Province of Ontario's Advisory Group in their final report on the PNERP, "the Advisory Group recommends that the ministry initiate a more detailed and definitive technical assessment…This would allow future PNERP review processes to rely on a significantly more robust model outputs for planning purposes."[40] In response to this finding, the OFMEM noted during Part 1 of the Pickering hearing on 4 April 2018 that there is a Technical Study now underway, to be completed by the end of 2018.[41]

RECOMMENDATION 7: The CNSC should ensure the basis for emergency response plans is sufficient to mitigate the offsite impacts of an INES Level 7 accident at Bruce Power.

3.0 SUGGESTED AMENDMENTS TO SPECIFIC EMERGENCY RESPONSE MEASURES

3.1 Size of Emergency Planning Zones

The 2017 update to the PNERP resulted in the inclusion of a new emergency planning zone, known as the Contingency Planning Zone (CPZ). This zone spans the 10 – 20 km area from a nuclear reactor facility. The planning zones are now as follows:

- Automatic Action Zone (AAZ): 3 km
- Detailed Planning Zone (DPZ): 10 km
- Contingency Planning Zone (CPZ): 20 km
- Ingestion Planning Zone (IPZ): 50 km[42]

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[40] Report of the Provincial Nuclear Emergency Response Plan Advisory Group, "*Provincial Nuclear Emergency Response Plan - Advisory Group Final Report*", online: http://www.mcscs.jus.gov.on.ca/english/Publications/PNERPProvincialAdvisoryGroupFinalReport.html.

[41] Office of the Fire Marshal and Emergency Management, Presentation - Commission Meeting April 4, 2018, "*Update on Emergency Management in Ontario and the Provincial Nuclear Emergency Response Plan (PNERP)*" (CMD 18-M21) at slide 16 ***[OFMEM Presentation]***.

[42] Ontario, "*Provincial Nuclear Emergency Response Plan, Master Plan 2017*" online: https://www.emergencymanagementontario.ca/english/emcommunity/response_resources/plans/provincial_nuclear_emergency_response_plan.html at 2.2.6 ***[PNERP 2017]***.

Unfortunately, the PNERP 2017 emergency planning zones still fail to meet the suggested emergency zone sizes as set by the International Atomic Energy Agency ("IAEA") in *Safety Guide GS-G-2.1*. The IAEA recommends:[43]

- Precautionary action zone: 3 - 5 km
- Urgent protective action planning zone: 5 - 30 km

The IAEA's suggested 3-5 km precautionary action zone is based on "expert judgement" and in consideration of the need to seek shelter, monitor, take protective actions and evacuate so as to avert doses exceeding thresholds for early death.[44] Likewise, the IAEA's recommended 5 -30 km urgent protective action planning zone is based on a radial distance within which monitoring and protective actions can be accomplished within a few hours following a release.[45]

Despite the recent update to the PNERP, the need to extend modelling to greater distances remains outstanding. The advisory panel tasked with reviewing Ontario's emergency response plans found that "planning zone sizes may require revision if the planning basis includes a multi-unit failure event where none of the post-Fukushima improvements or mitigating actions are credited in the source term calculation."[46] Consequently, the PNERP 2017 is currently undergoing a technical study, to be completed at the end of 2018, which will identify any requirements to expand planning zone distances. The OFMEM will not be proposing any options for revisions to the PNERP until the Technical Study is complete.[47]

We have learned since Fukushima that we also need to extend planning for emergency response and evacuation beyond our current emergency planning zones. This was affirmed by an independent investigation commission, who concluded that the Fukushima Daiichi Nuclear Power plant accident could not be regarded as a natural disaster, but was rather a profoundly manmade-disaster that could and should have been foreseen and prevented.

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[43] International Atomic Energy Agency, "*Arrangements for Preparedness for a Nuclear or Radiological Emergency No. GS-G-2.1*" (2007) online: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1265web.pdf at p 76 **[*IAEA GS-G-2.1*]**

[44] *Ibid* at 77

[45] *Ibid* at 78

[46] Office of the Fire Marshal and Emergency Management, Presentation - Commission Meeting April 4, 2018, "*Update on Emergency Management in Ontario and the Provincial Nuclear Emergency Response Plan (PNERP)"* at slide 15 ***[OFMEM Presentation]***

[47] *Ibid* at slide 16

Despite this past global experience, Ontario's emergency measures remain geographically limited to areas close to nuclear stations due to the current small-scale "reference accident". Only in the immediate 10 km zone surrounding a plant is detailed planning required. Outside of this boundary, evacuation planning, alerting systems, and potassium idodide (KI) pill distribution - to name a but a few protective actions - are not required.

RECOMMENDATIONS 8: At a minimum, if emergency preparedness for the Bruce Nuclear Generating Station were to reflect the global experience of severe offsite accidents that have occurred in other jurisdictions, the detailed planning zone (formerly called the primary zone) must be extended from the existing 10 km zone to a distance of 20 km and the contingency planning zone must require the same level of detailed planning as currently required in the DPZ.

RECOMMENDATION 9: CELA recommends that in view of the experience at Chernobyl and Fukushima, the CNSC should extend the requirements of the Ingestion Planning Zone to a distance of 100 km. This should be done as part of detailed planning for severe accidents so that appropriate monitoring of food, agricultural products, milk, and water is established and in place in the event of such an accident.

RECOMMENDATION 10: CELA recommends that the Commission publicly review findings from the PNERP Technical Study, and the implications for the Bruce Power on-site and off-site emergency planning arrangements. CELA recommends that these arrangements be reviewed at a public meeting of the Commission at least annually. In the interim, CELA recommends that the Commission not grant a licence exceeding five-years.

3.2 Public Alerting and Awareness

One of PNERP 2017's guiding principles is that "Preparedness activities should include a program of public awareness and education for people who might be affected, to inform them of emergency plans, how they should prepare for an emergency and what they should expect or do in an emergency."[48]

PNERP 2017 further recommends that "the public awareness and education program for the area surrounding each reactor facility should be documented as a strategic plan with

[48] *PNERP 2017, supra* note 41 at 1.2.10

a supporting action plan and program objectives. This documentation should be reviewed annually and updated as required by the subcommittees."[49] Thus, CELA recommends the CNSC incorporate this section of PNERP 2017 by reference as a licence condition within Bruce Power's LCH. We also request the public awareness program and strategic plan we posted publicly to facilitate ongoing and open its annual review.

As required by the 2017 PNERP, individuals in the DPZ will be given warning by the alerting system within 15 minutes "of the requirement for notification being recognized."[50] This includes 10 sirens in the 3 km zone which will alert the public to tune into radio and televised broadcast media to receive emergency information.[51] An autodialing system will also call everyone within this radius.[52] FM receivers are also being used to send text messages and an audible alarm to mobile receiver in the DPZ.[53] This system is backed up by police and firefighters, who will use their sirens, PA systems, and door-to-door notification and information delivery if broadcast media and other notification systems do not work.[54]

In addition, Canada has recently implemented a new emergency alert system designed to deliver alerts via television, radio and wireless devices. Federal, provincial and territorial governments are responsible for issuing emergency alerts.[55] The types of alerts that will be broadcast include emergencies related to fire, natural, biological, hazardous, environmental, terrorist or civil.[56] For alerts distributed via wireless, alerts can be issued in English and French, and can vibrate and be read to the recipient if the wireless device supports that accessibility feature.[57] The alerts will be limited to a specific geographical area, and all wireless devices connected to the LTE cellular network in that area will receive that alert.[58] The alerting authority determines what areas are affected and what areas will receive the alert.[59] Although this is a good step forward, this alerting system will still be limited geographically. It may not reach those

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[49] *PNERP 2017, supra* note 41 at 1.2.10

[50] *Ibid* at 2.7

[51] *Ibid* at 7.4.2 and 7.7.1

[52] Municipality of Kincardine Emergency Response Plan, Schedule A to By-Law No. 2006-009, Appendix B, at 7.4.3 ***[KERP]***.

[53] *Ibid*

[54] Bruce Power, "*Application for the renewal of the Power Reactor Operating Licence"* 30 June 2017 at B178 ***[Renewal Application]***

[55] *KERP, supra* note 52

[56] *Ibid*

[57] *Ibid*

[58] *Ibid*

[59] *Ibid*

who wish to evacuate outside of the DPZ, and needs to be accompanied by additional alerting from Bruce Power and the municipalities.

As CELA noted in section 3.1, the existing DPZ and IPZ are insufficient in size and should be expanded to 20 km and 100 km respectively. Detailed planning for public alerting should extend beyond the DPZ and be required within the CPZ. Given the size of plume dispersal in the Chernobyl and Fukushima accidents, the AAZ itself is too small an immediate response area and an available public alerting scheme, enabling quick response should be operable within the DPZ and CPZ.

The need to have multiple means of communication for public alerting cannot be overstressed, given that a considerable amount of exposure to the population could occur in the event of an early release in certain scenarios. For example, both cell phones and landlines should be utilized, in addition to auditory warnings. Any auditory communication will also need to account for non-English speakers which may be a concern given that the Bruce plant is located in an area with a large amount of seasonal tourism.

RECOMMENDATION 11: The CNSC should require Bruce Power provide a public awareness strategic plan, per PNERP 2017, to be reviewed publicly on annual annually as a condition of licensing.

RECOMMENDATION 12: CELA recommends public notification and response systems be tested and operable within DPZ and CPZ, and not limited to immediate 3 km AAZ.

RECOMMENDATION 13: The need to test and review the efficacy of recent public alerting measures weighs in favour of granting a five, not ten-year licence to Bruce Power. With the new warning system efforts undertaken by Bruce Power, we recommend the Commission require an update at a public meeting within one year of the licence renewal date.

3.3 Potassium Iodide (KI) Distribution

It well established that potassium Iodide (KI) is an effective blocker of thyroid radioiodine uptake and if ingested at the right time, can reduce the risk of thyroid cancer following an offsite release of radioactive molecules.[60]

[60] *Ibid*

According to Ontario's Ministry of Health and Long Term Care (MOHLTC) Potassium Iodide Guidelines (KI Guidelines), numerous governments and agencies, including the World Health Organization, the U.S. Food and Drug Administration, and Health Canada, short-term administration of KI is considered a low-risk protective measure for populations with normal thyroid function. Most importantly, it can provide protective benefits to individuals who are particularly vulnerable to thyroid disease, such as pregnant and nursing women, newborns and children.[61]

3.3.1 Online Availability of KI Pills

As stated in its licence renewal application, as of 2015 Bruce Power has distributed KI pills to all households and businesses within 10km around its site.[62] While Bruce Power states it has provided all residents within 50 km an information packages on KI pills and a voucher for the tablets and encouraged to obtain them, CELA recommends they be required to adopt Toronto's mechanism that allows people in the 50km area to order KI online via a joint City of Toronto-OPG site called "Prepare to be Safe".[63] The online Prepare to Be Safe site allows residents to enter their postal code and if located within the 50 km region, a link is provided to an online form where they can order KI pills. Within 6 weeks, KI pills are delivered to their mailbox. This online mechanism is much more accessible than having to arrange for a package of KI pills and physically pick them up at select locations, as is the current process outlined on the "Be Prepared Grey Bruce Huron" website. [64]

By facilitating the availability of KI in the 50 km region would allow Bruce Power to partially mirror what is already done in other jurisdictions who currently pre-distribute KI out to 50 km. For example, in Switzerland KI is distributed within 50km of each plant as a precautionary measure.[65] In 2016, Belgium's Superior Health Council recommended that "based on the experience of past accidents, the areas covered by the plan for sheltering, the distribution of stable iodine and evacuation [should] be extended to

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[61] "Prepare to be Safe," online: http://www.preparetobesafe.ca ***[Prepare to be Safe]***.

[62] Ontario, Emergency Management Branch, Ministry of Health and Long Term Care, "Potassium Iodide (KI) Guidelines," online: http://www.health.gov.on.ca/en/pro/programs/emb/rhrp/docs/ki_guidelines.pdf at 4 ***[KI Guidelines]***

[63] *Renewal Application*, *supra* note 54 at B14

[64] *Ibid* at B153; See *Prepare to be Safe, supra* note 61.

[65] Be Prepared Grey Bruce Huron, "Be Prepared for a Nuclear Emergency - Potassium Iodide (KI)", online: http://www.bepreparedgreybrucehuron.com/nuclear/ki-tablets/

cover realistic distances."[66] We continue to encourage the CNSC to require licencees to provide KI by way of pre-distribution within a 50 km radius, and pre-stock to 100 km.

RECOMMENDATION 14: The CNSC should require Bruce Power provide an online KI-pill request mechanism which is equivalent to the current "Prepare to Be Safe" website used by OPG for the Pickering and Darlington nuclear power plants for all individuals in the 50 km zone.

3.3.2 Expanding KI availability to 100 KM

The PNERP 2017 technical study currently being undertaken seeks to identify any requirement to expand protective measures, including KI pre-distribution[67] As this study will not be complete until the end of 2018 and thus its results not available in time for this relicensing, CELA recommends Bruce Power be required to expand its available of KI beyond its existing range. Specifically, given the risk to vulnerable groups, like pregnant women and children, we recommend stockpiles be maintained at places they frequent within the broader 100 km zone.

In 2014, the German Commission of Radiological Protection recommended preparing radiation monitoring programs out to 100 km to determine in the event of an accident whether additional evacuations, sheltering or KI consumption is required; and, preparations for KI consumption for children and pregnant women living beyond 100 km.[68] Further, the Province of New Brunswick's Point Lepreau Nuclear Off-Site Emergency Plan requires that KI pills be distributed to each residence within 20 kilometers of the Point Lepreau Nuclear Generating Site.[69]

RECOMMENDATION 15: The CNSC should extend KI stockpiles to 100 km and ensure stockpiles at places frequented by vulnerable groups, such as children and pregnant women, are maintained.

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[66] Swiss Federal Office for Civil Protection - National Emergency Operations Centre, online: https://www.naz.ch/index_en.html

[67] Conseil Supérieur de la Santé, Conseil Supérieur de la Santé Accidents nucléaires, environnement et santé après Fukushima. Planification d'urgence, AVIS DU CONSEIL SUPERIEUR DE LA SANTE N° 9235, février 2016 at 83

[68] *OFMEM Presentation, supra* note 41 at slide 16

[69] German Commission on Radiological Protection (SSK), "*Planning Areas for emergency response near nuclear power plants"* 2014 at 21

3.4 Medical Response and Treatment

3.4.1 Medical Evacuation and Care

A recent case study of the medical evacuation which occurred in the aftermath of the Fukushima accident concluded that the death of 50 patients from the Futaba Hospital (located within 5 km of the nuclear power plant) died "as a result of inappropriate medical care circumstances."[70] The study follows the experience of these patients, noting they were initially evacuated to a hospital within the 20-km zone but transported a second time, when the government decided the evacuation zone had to be extended beyond the 20 km limit. The study noted medical evacuation to be "difficult task" which was "absolutely beyond the capacity" of the scheme in place.[71]

The study found that while each of the four hospitals in the 20 km zone "should have had a concrete action plan and conducted drills as a part of prefectural disaster plan," in reality only one of the hospitals had an operative evacuation plan. A copy of the study's recommendations, based on its analysis, are copied in Table 2 below.[72] CELA requests that its findings be adopted by the CNSC.

We recommend the CNSC review the adequacy of medical care that would be required during an evacuation from Bruce. Granting a shorter licence of five-years to Bruce Power is more fitting, given the findings of this report and need for follow-up CNSC review of Bruce Power's medical evacuation plans.

Table 2

Recommendations	
1. Plan for long-distance evacuation	Medical facilities, including nursing homes, should have a plan for long-distance disaster-specific (over 100 km) evacuation. This plan should be practiced with full-scale exercises and when flaws are found, they should be evaluated and eliminated
2. Securement of transportation measures and designated hospitals	A disaster-specific evacuation plan should include the securement of transportation measures and designated hospitals where patients can be sent

[70] New Brunswick Department of Justice and Public Safety, "*Point Lepreau Nuclear Off-Site Emergency Plan"* August 2017 at s 1.53.1

[71] Tetsu Okumura abd Shinichi Tokuno, "*Case study of medical evacuation before and after the Fukushima Daiichi nuclear power plant acident in the great east Japan earthquake"* (2015) 1:19 Disaster Mil Med, online: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5330112/#CR8

[72] *Ibid*

3. Multiple communication measures	Healthcare facilities should have two or three independent communication measures such as a radio, satellite phone, amateur radio, and multi-channel access radio systems
4. Supervision by emergency physicians and disaster specialists	Hospital evacuation in disaster settings should be supervised by emergency physicians and be handled by disaster specialists who are accustomed to patient transportation on a daily basis
5. The presence of an emergency physician or disaster researcher in the central government	The presence and availability of an emergency physician or disaster researcher in the central government can greatly contribute to the governmental response, especially for disaster-specific medical transportation

RECOMMENDATION 16: We recommend the CNSC review the adequacy of medical care that would be required during an evacuation. The CNSC should inquire if medical facilities within 100 km of the Bruce NGS have a long-distance nuclear disaster-specific evacuation plan, and whether these plans have been practiced at full-scale. Granting a shorter licence of five-years to Bruce Power is more fitting because of the need for the CNSC to review the applicable medical evacuation plans that could result from an accident at Bruce Power.

RECOMMENDATION 17: Prior to approving the license for continued operation, the CNSC must require assurance and demonstration that the offsite emergency response capability includes detailed medical planning which ensures healthcare facilities have multiple communication measures available and supervision by disaster specialists who are qualified in radiation protection.

3.4.2 Radiation Protection

Ontario's *Radiation Health Response Plan* is currently being updated by the Ministry of Health and Long-Term Care in order to align with the PNERP 2017.[73] As the revised Plan was not made publicly available prior to the intervention submission deadline of April 16, 2018, CELA requests the opportunity to provide a supplemental should it become available before Part 2 of the Hearing. If it is not available by the Part 2 Hearing date, CELA recommends that the Commission require a report and update at a public meeting within one year of the license renewal date.

RECOMMENDATION 18: It is incumbent that the CNSC inquire into Bruce Power's plan for implementing the revised Radiation Health Response Plan and, whether it has completed a deficiency review of its existing processes to propose actions for alignment

[73] *OFMEM Presentation, supra* note 41 at slide 36

with PNERP 2017 current to the time of relicensing. In order to facilitate the Commission's public review and examination of this Plan and its confluence with licensee activity, a five, not ten-year licence should be considered for renewal.

3.5 Evacuation

Evacuation is one of the most immediate actions to be taken in the event of a general emergency at any nuclear generating station. The International Commission on Radiological Protection indicates that the purpose of evacuation is to provide "rapid, temporary removal of people from an area to avoid or reduce short-term radiation exposure in an emergency exposure situation."[74] ICRP states that it is "most effective if it can be taken as a precautionary measure before there is any significant release of radioactive material."[75] Similarly, according to Ontario's RHRP, evacuation is the rapid and controlled removal of people from an identified area to avoid or reduce high-level, short-term exposure to a hazard. Evacuation before emissions have started is the most effective protective measure in the event of a nuclear emergency because it protects the whole body from all radionuclides through all exposure pathways.[76]

CNSC REGDOC-2.10.1 requires the licensee to "collaborate with the municipal or regional authorities to develop and maintain public evacuation time estimates based on current census data, and future population growth projections on a per-decade estimation until end of life of the facility".[77] As part of its transition plan for compliance with REGDOC-2.10.1 Bruce Power contracted KLD Engineering to develop evacuation time estimates, which was completed on May 19, 2016 and is further discussed in the next section.[78]

As detailed in the sections below, Bruce Power's Development of Evacuation Time Estimates Final Report (herein, "ETE Report") is insufficient for a large-scale evacuation and does not account for all realistic scenarios when an evacuation must occur. It fails to

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[74] International Commission on Radiological Protection "*Publication 109 - Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations*" (2008) at 62-63 ***[International Commission on Radiological Protection]***.
[75] *Ibid* at 66.
[76] Ontario, Emergency Management Branch, Ministry of Health and Long Term Case, "*Radiation Health Response Plan"* (2014) at 58; *KI Guidelines, supra* note 62 at 4.
[77] CNSC, "*REGDOC-2.10.1-2 Nuclear Emergency Preparedness and Response, Version 2*" online: http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-10-1v2/index.cfm **[*REGDOC 2.10.1*].**
[78] KLD Engineering, "*The Bruce Power Site - Development of Evacuation Time Estimates"* (19 May 2016) ***[ETE Report]***.

consider evacuation outside of the DPZ, or weather scenarios resulting in a winter closure of the region's main highway, and it does not consider additional accidents or pre-existing road works which could impede flow.

3.5.1 Weather Contingency Planning

The Evacuation Time Estimate (ETE) report considers 14 scenarios which represent "different temporal variations (season, time of day, day of week) and weather conditions."[79] The scenarios include days with good weather, rain, and snow. One summer scenario even contemplates the closure of Highway 21 southbound.

The scenarios, however do not contemplate the winter road closure of Highway 21. Although one of the study assumptions was that eastbound routes would have sufficient capacity to evacuate the DPZ in the event of a Highway 21 road closure southbound, there was no scenarios with Highway 21 closed during the winter, and no scenario with Highway 21 closed during the winter and the eastbound routes also being snow covered due to weather. CELA submits the scenarios should be amended to include not only consideration of a Highway 21 closure, but that of the eastbound routes in snow and slow travel conditions.

Because of Bruce Power's proximity to Lake Huron, it is located within a snowbelt. As such, Highway 21 is often closed between Goderich and Owen Sound due to poor winter road conditions. Leaving this scenario out of the ETE peport is an inappropriate oversight. CELA is concerned about the evacuation time needed during common winter weather. CELA is additionally concerned that there was no discussion of how winter weather could adversely affect the evacuation of Amish families in the area.

CELA recommends that a supplementary ETE Report be completed outlining evacuation time estimates during winter weather where Highway 21 is closed due to winter road conditions, and when alternative evacuation routes are also experiencing winter road conditions. While CELA requested Bruce Power's Winter Storm Transportation Plan, as referenced in its licence application, Bruce Power denied its release on the basis that it was an internal document.[80] Thus, in the event satisfactory evidence cannot be provided to the Commission to demonstrate Bruce Power's ability to evacuate in *all* weather conditions, we recommend this be added as a condition of licensing.

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[79] *Ibid* at 2-2

[80] Email correspondence, Bruce Power to Kerrie Blaise, 6 April 2018

Bruce Power is also situated in an area that experiences potentially severe weather year-round. For example, in Goderich, just 70km away from the Bruce site, and also on Lake Huron, a tornadic waterspout on Lake Huron turned into an F3 tornado, severely damaging the downtown core and nearby homes. With increasingly severe weather expected due to climate change, these extreme weather events will become more common. It is more likely that a nuclear emergency could occur in severe weather conditions, no matter the season. Bruce Power should plan for the worst case scenario and adequately plan that an emergency could happen while there is ongoing inclement weather that will significantly impact evacuation times in the DPZ and IPZ.

RECOMMENDATION 19: Offsite emergency planning must integrate extreme weather events into its response measures. The efficacy of all response actions must be considered in light of winter storms, varying wind speeds and visibility, which could inhibit the ability of the public safely evacuate and access essential services.

RECOMMENDATION 20: If the Commission is not satisfied that the ability to fully evacuate in all weather conditions has been demonstrated, the CNSC should require this issue to be considered as a condition of licensing and should require a report to the commission at a public meeting within one year of the date of license renewal.

3.5.2 Planning Zones

An additional limitation of the ETE Report, is its failure to consider an evacuation needed beyond the DPZ (formerly the Primary Zone). The ETE Report only considers estimated times to evacuate the DPZ and various subsets of the DPZ.[81] As recommended above, the ETE Report should also consider larger-scale evacuations of the IPZ. Additionally, the Kincardine Nuclear Emergency Response Plan indicates that "[t]he Provincial Emergency Operations Centre will coordinate any evacuations that are required in the [IPZ] with the appropriate municipality."[82]

As noted earlier, CELA recommends expansion of the DPZ to 20 km and the IPZ to 100 km. Accompanying these recommended zone increases is the need to upgrade the existing evacuation plan to include detailed planning in the zones beyond the DPZ

Preparation for a larger-scale evacuation requires analysis of schools, retirement homes, daycares, hospitals and correctional facilities in the 50 km zone, and provisions would

[81] *ETE Report, supra* note 79 at ES-1..
[82] *KERP, supra* note 52at 9.3.6

have to be made to ensure that evacuation plans are in place for these facilities. As of right now, consideration is only given to the Bright Beginnings Child Care daycare and Tiverton Park Manor retirement home, both within the DPZ.[83]

The reception centres referenced in the ETE Report, the Kincardine Davidson Centre and the Saugeen District Secondary School[84], are both within the IPZ. Reception centres outside of the 50 km zone need to be identified in case of a large-scale evacuation.

Lastly, the Ministry of Transportation has not yet as of 2018 updated any traffic control plans to revise them into a Unified Transportation Management Plan.[85] Until this is done, the existing Joint Traffic Control Plans will be utilized.[86] Given that detailed evacuation planning should be required at ai radial distance of 50 km, CELA recommends that the Bruce licensing decision be deferred until appropriate evacuation plans, including traffic control plans, are updated and in place.

RECOMMENDATION 21: CELA recommends that a supplementary ETE Report be completed for large-scale evacuations, including consideration of any schools, retirement homes, daycares, hospitals and correctional facilities in the area, and identification of alternate reception centres outside of the IPZ or 50 km limit.

RECOMMENDATION 22: Prior to approval of the license application, the CNSC should require Bruce Power to demonstrate the adequacy of detailed planning within an expanded Detailed Planning Zone as well as within an expanded Ingestion Planning Zone, including planning for any schools, retirement homes, daycares, hospitals and correctional facilities in these areas. While adaptation may be required, CNSC should not accept the province's continued reliance on improvisation and adaptation as its main strategy for responding to large off-site accidents that require evacuation and other measures beyond the Detailed Planning Zone. These plans should be communicated publicly.

RECOMMENDATION 23: The CNSC should require Bruce Power to evaluate the impact of increased evacuation zones at a radial distance of 50 km on locations of Emergency Workers Centres, numbers of emergency workers required for evacuation management,

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[83] *ETE Report, supra* note 79 at 3-3
[84] *Ibid* at 10-1
[85] *OFMEM Presentation, supra* note 41 at slide 32.
[86] *Ibid* at slide 33

traffic routes, size of evacuation centres, and locations and capacity of Decontamination and Monitoring Units, and to report its findings to the CNSC.

RECOMMENDATION 24: The CNSC should require as a condition of licensing that Bruce Power provide municipalities within the Detailed Planning Zone and Ingestion Planning Zone with financial resources to create and implement detailed evacuation plans up to 50 km away.

RECOMMENDATION 25: The CNSC should require demonstration that all evacuation plans, including all traffic control plans, have been updated and are adequate to fully protect the public from large scale nuclear accidents as a requirement for relicensing.

3.5.3 Transient and Transit-Dependent Populations

CELA is concerned with the ability of people without cars to evacuate. The ETE Report assumed there was no transit dependent population in the DPZ based on a survey of 125 households.[87] CELA is concerned that by not preparing for transit-dependent residents in the DPZ, that individuals will get overlooked in the evacuation plans.[88] Even if there are currently no transit-dependent individuals within the DPZ, a contingency plan is needed in the event that transit is unavailable. For example, some people may be unable to drive during the emergency, seniors may have had to relinquish their licence, or some individuals may not, at the time of the mergency, have family or neighbours available to drive them. The transit-dependent population within the 50 km IPZ should also be adequately assessed and planned for. CELA recommends that a supplementary

[87] *ETE report, supra* note 79at 8-1

[88] For instance, The U.S. Nuclear Regulatory Commission, in its Criteria for Development of Evacuation Time Estimate Studies, requires explicit calculation of numbers of people who would need to be evacuated. This includes population estimates of:

1. Permanent Residents and Transient Population – Permanent residents include all people having a residence in the area. The transient population includes tourists, shoppers, employees, etc., who visit but do not reside in the area.
2. Transit Dependent Permanent Residents – Permanent residents who do not have access to a vehicle or are dependent upon help from outside the home to evacuate.
3. Special Facility Residents – Residents of nursing homes, assisted living centers, and those confined to hospitals, jails, prisons, etc.
4. Schools – All private and public educational facilities within the EPZ. Colleges and universities should be assessed on a case-by-case basis, recognizing that college students typically have access to a vehicle.

ETE Report be undertaken to evaluate evacuation times and put in place procedures for a transit-dependent population.

RECOMMENDATION 26: Bruce Power and the Municipality of Kincardine should work together to ensure that contingency plans are in place for individuals who have no access to transit in the event of an evacuation. These plans should be communicated to the public.

3.5.4 Shadow Evacuations

"Shadow evacuation" refers to the people who voluntarily leave an area following a nuclear incident or accident, beyond those who are asked by the authorities to do so. In the Fukushima accident, for example, there were considerable "shadow evacuation" populations, especially women and children. In the US, the Nuclear Regulatory Commission requires licensees to include a shadow evacuation of twenty percent of the public to a distance of 15 miles from the Nuclear Power Plant in its traffic estimates and planning.[89]

Thus, while the ETE Report completed for Bruce Power assumes twenty percent of the public will undertake voluntary evacuations in the "shadow region" of 15 km, a supplemental ETE Report shoud be done to analyze how shadow evacuations in the 50 km IPZ will impact evacuation times in the DPZ.

RECOMMENDATION 27: As a condition of licensing, a supplemental to the ETE Report should be provided to the Commission at a public meeting which reviews the impact of shadow evacuations on evacuation time estimates in the DPZ.

3.5.5 Accidents and road work

The ETE Report also does not consider how evacuation times will be impacted if there are car accidents or roadwork during the evacuations. In calculating the ETE, one of the study assumptions was that all "evacuees will drive safely, travel in directions identified in the plan, and obey all control devices and traffic guides."[90] However, it is not unlikely that during an evacuation, an accident could occur that would impede evacuations. It is also likely that car accidents outside of the evacuation zone could impede evacuations

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[89] U.S. Nuclear Regulatory Commission, *"Criteria for Development of Evacuation Time Estimate Studies, NUREG/CR-7002"* (2011) at 11, online: http://pbadupws.nrc.gov/docs/ML1130/ML113010515.pdf

[90] *ETE Report, supra* note 79 at 2-5.

from the DPZ. A scenario that considers car accidents impeding the flow of traffic out of the DPZ should be conducted.

Further, during the future year ETE, KLD did not model any roadway improvements because all planned roadwork is to occur outside the study area.[91] However, roadwork outside of the DPZ has the potential to impede the flow of traffic out of the DPZ. If any of the planned roadway improvements are to occur on or near an evacuation route, they should be modeled.

RECOMMENDATION 28: Bruce Power should be required to model the impact of car accidents and planned road improvements, both inside and outside of the evacuation zones, to assess how evacuation times will be impacted.

3.6 Decontamination

We request the Commission query the availability of decontamination centres and whether the public is aware of them; and where they would be in the event of a plume greater than 10 km. We recommend there be planning in advance in that respect.

3.7 Control of Agricultural Products

As PNERP 2017 notes in s 2.2.5(f), the Ingestion Planning Zone is a pre-designated zone for the purpose of (1) protecting the food chain, (2), protecting drinking water supplies and (3) restricting consumption and distribution of potentially contaminated produce, wild-grown products, milk from grazing animals etc. in the event of an emergency. Accordingly, ingestion control measures shall be directed as based on results from the monitoring of food, milk and water per s. 6.3.3.
Upon CELA's review of Bruce Power's existing Environmental Monitoring Program, it appears that the current boundaries of its monitoring are insufficient to monitor the IPZ which extends to 50 km. While the CNSC asserts Bruce Power's program is "comprehensive and robust," Bruce Power's current system to monitor radiological releases only extends to 10 km and data beyond this range is not available.[92] Additionally, in the CNSC's review of radionuclide exposure to members of the public who are most "likely to receive the highest exposures"[93] is a hunter-fisher who resides

[91] *Ibid* at M-3

[92] *CNSC CMD, supra* note 2 at 110

[93] *Ibid* at 250

at a distance of 20 km from the plant. However, as this person's location was outside the Environmental Monitoring Program boundary, the CNSC was unable to measure actual dose.

In addition to increasing the capacity to monitor within the IPZ, CELA reiterates the need to extend the IPZ to 100 km to account for weather contingencies and the concentration of agriculturalists in the region.

RECOMMENDATION 29: The CNSC must require the Environmental Monitoring Program to extend to a distance of 100 km as a condition of licensing, to account for revised IPZ zone and ensure the reduction and prevention of ingesting contaminated agricultural products in the event of an emergency.

3.8 Public Drinking Water

The 2017 PNERP states that within the IPZ, "plans or arrangements are made to …protect drinking water supplies."[94] Given that all of Ontario's nuclear reactors are located on the Great Lakes - which supplies the drinking water to 40 million Canadians and Americans – it is necessary to not only "protect drinking water supplies" but require contingency planning in the event of an accident.

Current monitoring of drinking water, under the Ministry of Environment and Climate Change's drinking water surveillance program assesses potential risks from existing nuclear power plant operations and activity. [95] While this program is needed to ensure plant operations due not exceed drinking water standards during the course of normal operation, there is no discussion of drinking water protection in the event of an emergency. CELA submits that detailed contingency planning in the event of accident is required, given the interconnectivity of the Great Lake system and the millions of people who rely on it as their source of drinking water.

In advance of relicensing, it is incumbent that the CNSC ensure that provisions are in place for an alternative source of drinking water is available for residents whose current drinking water source is from Lake Huron. There has not being a study on drinking water replacement in case of accident, nor has a contingency plan been developed.

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[94] *PNERP 2017, supra* note 42 at 2.2.5(f)

[95] *CNSC CMD, supra* note 2 at 102

Additionally, alternative drinking water sources must be identified, and logistical plans put in place to supply the impacted communities with water, indefinitely.

RECOMMENDATION 30: The CNSC should require proof of adequate contingency planning for the protection of drinking water in the event of an emergency as a requirement for licensing. Drinking water monitoring is insufficient in scope to ensure that there are actually sufficient drinking water supplies available in the event of a major radioactive release.

3.9 Worker Safety and Consent

Risks of exceeding maximum exposure limits must be discussed with workers in advance of any accident. While an operator's licence and Licence Condition Handbook refer to worker safety in the context of conventional health and safety, they do not discuss maximum exposure limits or consent. Therefore, methods to review risks and obtain consent from workers to exceed those limits should be explicitly clarified in plans by the operator.[96]

RECOMMENDATION 31: Methods to review risks and obtain consent from workers to exceed maximum radiation exposure limits should be explicitly clarified in plans by the operator as a condition of licensing.

3.10 Emergency Planning Exercises and Drills

From October 3 to 7, 2016, Bruce Power tested its emergency response capabilities as part of the Huron Resolve exercise. This exercise consisted of a multi-unit scenario, and involved the interaction of with numerous organizations at the municipal, provincial and federal level. This drill was subject to a CNSC inspection and led to the preparation of a CNSC inspection report.[97].

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[96] This request has previously been made by CELA, as noted in the following submissions: CELA, "*A Review of Canada's Nuclear Emergency Preparedness and Response Plan*" (17 July 2017) online: http://www.cela.ca/review-nuclear-emergency; *CELA PNERP Discussion Paper, supra* note 21; CELA, "*Emergency Planning at the Pickering Nuclear Generating Station*" (3 May 2013) online: http://www.cela.ca/sites/cela.ca/files/899PickeringEmergencyPlanning.pdf.

[97] CNSC, "*Type II Inspection Report: Huron Resolve Corporate Drill*" Report No. BRPD-A-2016-011. ***[Huron Resolve Inspection Report]***

Section 3.2.9 of the PNERP 2017 recognizes the important of emergency drills, noting "exercises provide an opportunity to identify emergency response strengths and weaknesses, and can be used to validate and improve emergency plans and procedures." It is on this basis that is crucial that after-action or lessons-learned reports following emergency exercises be made available to the public. This would not only facilitate the public's awareness of emergency actions, improve provide confidence in aspects which have been reviewed and tested.

Unfortunately, Bruce Power's after-action reports based on emergency drills and exercises are not made publicly available.[98] As a result of licensees not voluntarily providing this information, we request that the CNSC make it a requirement of licensing that after-action reports be produced for public dissemination.

3.10.1 Scope of CNSC Inspection

CNSC notes in its report on the Huron Resolve drill that:

> [t]his inspection reviewed a sample of Bruce Power's Emergency Response. Therefore this report should not be considered all-encompassing and the findings should be reviewed by the licensee with consideration to any wider potential applications.[99]

CELA submits that this suggests that the inspection should not be considered as a complete review of the Huron Resolve exercise. In its CMD, CNSC however states that "The exercise was observed by the CNSC staff and demonstrated Bruce Power's capability to deal with severe accidents effectively."[100]

CNSC furthermore adds that "Bruce Power has shown adequate response to a nuclear emergency scenario through completion of Huron Resolve exercise. In October 2016, CNSC identified in a type II inspection [49] some issues of low risk significance related to procedural non-compliance in the Bruce Power emergency operations centre (EOC) and validity of data reported in non-automatic data sharing system. Bruce Power submitted a corrective action plan to address these findings."[101]

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[98] *Ibid*
[99] *Ibid* at 5
[100] *CNSC CMD, supra* note 2 at 60
[101] *Ibid* at 119

These statements fail to reiterate the qualification from CNSC's Inspection Report, that the Type-II Inspection results should not be considered all-encompassing. By not doing so, they leave the impression that CNSC has carried out a more fulsome inspection, that its inspection has fully and conclusively reviewed Bruce Power's emergency response, and that no issues exist other than those listed in the CNSC inspection report.

CELA requests a clear description of exactly what sample of Bruce Power's emergency response was covered by CNSC's inspection, and consequently what aspects of this response were not covered. In this regard, CELA notes, for example, that the Environmental Protection SCA appears to be one area not covered.

CELA also recommends that CNSC expand its inspection and review of similar future exercises to ensure a more fulsome review of the Bruce Power's emergency response capabilities.

3.10.2 Scale of Exercise is Unclear

CNSC states that "[a] multi-unit Fukushima type scenario (including site blackout) was also incorporated into the response."[102] It is, however, not explained what is meant by a Fukushima type scenario. Such a scenario could be limited to the number of units affected, and may or may not include a similar type and size of off-site release of radioactive substances, and may or may not attempt to mirror the scope of the emergency response involved in the Fukushima accident. From what CELA has been able to gather regarding the size of the Huron Resolve exercise, and the size of the impact at Fukushima, may be a poorly fitting description, which risks giving the impression that the Huron Resolve exercise has shown a capability to respond to an emergency of similar proportion to that seen during the Fukushima accident. CELA therefore **requests** information as to how this scenario is defined.

CNSC mentions a scenario package, which was provided to to CNSC staff a few days prior to the drill, as well as a controller's copy highlighting all the objectives, timelines and drill progressions.[103] CELA asked Bruce Power to provide a copy of this scenario package. Bruce Power stated that the nature of the information contained in the scenario package was not intended for public release, and instead provided CELA with a cursory summary of what occurred during the 5-day emergency exercise. While CELA

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[102] *Ibid*
[103] *Huron Resolve Inspection Report, supra* note 98 at 19

appreciated the response, the detail provided lacked specific parametres which would have defined the scale of he event which triggered the exercise.[104]

CELA therefore reiterates its request for a copy of this scenario package, or alternatively a reasonably detailed summary of this scenario to allow CELA to assess its scope, and further submits that this information should be made available to the public, either in whole or in a redacted form, to allow the public to fully understand the scope of the emergency exercises.

3.10.3 Corrective actions findings following CNSC Staff review of Huron Resolve

Following the Huron Resolve Drill, the CNSC published a report documenting its inspection of the emergency response drill. A summary of findings is provided below, alongside Bruce Power's proposed corrective actions:

1. *Action notice BRPD-A-2016-011-AN01*, reviewed several procedural non-compliances in the Emergency Operations Center (EOC). The issues included:

    - Lack of proper follow-up on hydrogen leak (operators sent to stop the leak, but no follow-up, despite potential for explosion);
    - General lack of updating of priorities as they were completed; briefs were not periodic;
    - Status of units were never mentioned in briefs

    In relation to *BRPD-A-2016-011*-AN01, Bruce Power's Corrective Action Plan notes, inter alia, that "Bruce Power will review the training requirements of the leadership role in the Emergency Operations Centre (EOC) including the Emergency Shift Assistant (ESA)."[105]

2. *Action Notice BRPD-A-2016-011-AN2*, which dealt with two key issues related to protection of workers:

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[104] For instance, in email correspondence with Bruce Power (dated 13 April 2018), Bruce Power noted the exercise was a five-day event which was initiated in response to a seismic event (scale undefined). A firewater spill was experienced a couple of hours later (size undefined), a second seismic event occurred (scale undefined), a shipment of four barrels spilled, and a tanker leak occurred (size undefined).

[105] Bruce Power, "*Corrective Action Plan NK21-CORR-00531-13358*" March 2 2017 at 3 ***[Corrective Action Plan]***.

- Uncertainty as to protection of workers at from a radiation plume at the Security building;
- Delayed accounting for workers (took 51 minutes after emergency tone, rather than the maximum of 30 minutes).

In relation to *BRPD-A-2016-011-AN2*, Bruce Power's Corrective Action Plan lists a number of initiatives to address the shortcomings, most of which require future actions by Bruce Power.[106]

3. *Action Notice BRPD-A-2016-011-AN03*, dealt with issues related to offsite data transfer. CNSC requested Bruce Power develop and implement correct actions to:
   - Improve their processes and systems to ensure the information being transferred to the CNSC is being consistently sent on an hourly basis
   - Ensure the information being transferred is as technically accurate as possible (p 16)

4. *Recommendation BRPD-A-2016-011-R13*, dealt with the decontamination of Emergency Vehicles. CNSC recommended Bruce Power staff ensure "to response as if it were real" to demonstrate necessary skill and technique in the event of an emergency (p 19) CNSC noted that During CNSC staff's visit to Reception Evacuee Center (REC) at the Davidson Center building, Bruce Power staff identified that they had "never flowed water for the decontamination of vehicles". Therefore it was not demonstrated that Bruce Power staff could safely handle, assemble and use the vehicle decontamination equipment.[107]

   In its Corrective Action Plan, Bruce Power states the following:

   > The above recommendation comes from the CNSC observation that during the Offsite Center component of Huron Resolve, Bruce Power staff had never flowed water for the decontamination vehicles at the Reception Evacuee Center (REC). The flow of water to decontaminate vehicles is executed by the Kincardine Fire Department although the water flow is the responsibility of the Municipality. Bruce Power will

[106] *Ibid* at 3.

[107] *Ibid* at 20.

investigate means to decontaminate / contain this water as part of its support to the Municipality.

CELA requests information as to whether this issue has been addressed, including the results of Bruce Power's investigation of means to decontaminate and contain the water used for decontamination.

5. *Station Condition Records indicating a number of unidentified corrective actions* - CNSC mentions a number of Station Condition Records (SCRs) that were raised by Bruce Power staff as a result of the Huron Resolve exercise, all of which have corrective actions assigned.[108] CELA requests a summary of what types of corrective action have been assigned in relation to these SCRs, in order to determine whether these SCRs identify issues not covered in CNSCs Inspection Report. CELA also requests a tentative timeline for the completion of these corrective actions.

6. *Issues related to location of Emergency Worker Center - risk of contamination and congestion* - CNSC notes that the Emergency Worker Center (EWC) is located at the Kincardine Fire Hall. CNSC also notes that this same location is used to monitor and control radiation exposure of external emergency workers.

   Given the location of many newly built homes near the fire hall, CNSC noted that "during a response, numerous potentially contaminated vehicles would be driving into a residential area" and that "directing numerous emergency vehicles to the fire hall may potentially cause congestion which may impede Kincardine Fire Response vehicles from efficient access to the roads." Finally, CNSC noted that "there is potential to contaminate the Fire Hall and cause municipal equipment and personnel to be removed from service due to cross contamination."[109]

   CNSC concludes by recommending "that Bruce Power review with community partners to confirm the current [emergency worker center] and [reception evacuee center] locations are still appropriate considering the community development and expansion in recent years."

   In response to this, Bruce Power made the following statement:

[108] *Huron Resolve Inspection Report*, *supra* note 98 at 8-9.
[109] *Ibid* at 18.

> Bruce Power will make arrangements with community partners to discuss the practicability of the current Emergency Worker Centre (EWC) and the REC locations regarding the recent residential development in the surrounding area.[110]

CELA requests the CNSC require Bruce Power to provide an update as to whether these issues have been resolved in a way that reduces the risk of contamination of the residential areas surrounding the fire hall. If these issues remain outstanding, CELA asks that the Commission to require Bruce Power to assist local community partners to the extent necessary, as a condition of licensing.

Such a licence condition would reflect the recent changes to paragraph 5.24 of IAEA SSR-2/2 (Rev. 1), which now states that the operating organization shall be responsible for ensuring that not only appropriate procedures are in place, but also appropriate equipment and staff, as needed to effectively coordinate and cooperate with all firefighting services involved.

Additionally, CELA recommends that CNSC staff be required to report to the Commission on the progress made by Bruce Power on these location and congestion issues, and also requests that such reporting on Bruce Power's progress be publicly disclosed along with an opportunity for the public to comment on the steps taken to resolve these issues.

RECOMMENDATION 32: CELA recommends that CNSC staff be required to provide an update on Bruce Power's progress as it relates to the congestion and community expansion in the area surrounding the Emergency Worker Centre. The report should be made publicly available and open for public comment.

3.10.4 Action Items should be kept open until adequacy of corrective actions confirmed

Bruce Power requests in its Licence Application that "based on the provision of a corrective action plan to address the CNSC staff inspection findings" these action items be closed.[111] While the CNSC notes in its CMD that "Bruce Power submitted a corrective action plan to address these findings," they stated that "CNSC staff will confirm the

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[110] *Corrective Action Plan, supra* note 105 at 6.

[111] *Renewal Application, supra* note 54 at D8.

adequacy of the corrective actions and their implementation in future exercises.[112] Thus, CELA submits it is premature to close the action items given it is not apparent that all corrective actions are sufficiently completed. We request the Commission inquire into the status of the enforcement actions listed in its Huron Resolve Inspection Report and the sufficiency of corrective actions provided by Bruce Power.[113]

CELA submits the Huron Resolve corrective actions must remain open until CNSC staff have had the opportunity to confirm the adequacy and ensure their implementation during future exercises. Furthermore, CNSC staff should be required to publicly disclose and report to the Commission its findings during such future exercises.

In light of CNSC Staff yet confirming their adequacy, CELA submits it is premature for Bruce Power to seek a licence renewal when existing matters which the proponent's existing licence are yet to be fulfilled.

RECOMMENDATION 33: The CNSC should require Bruce Power to provide a public update on its corrective actions resulting from the Huron Resolve exercise at the Commission's annual meeting on the Regulatory Oversight of Nuclear Generating Stations.

3.11 Communications and Automatic Data Transmission

Section 3.2.3 of the PNERP 2017 notes that "accurate, co-ordinated and timely communications within and between stakeholder organizations and the public are critical to effective emergency response and recovery. As such, stakeholder emergency plans shall implement and maintain communication procedures which provide emergency data and information." In response, CELA has examined the communication technologies used by Bruce Power for transferring plant data to provincial and federal authorities. Our review demonstrates that while Bruce Power transitioning from a fax-based to DisasterLAN system ("DLAN"), this process is not yet complete.

3.11.1 Manual Data Entry

Bruce Power has informed CELA that its DLAN system still requires manual data entry, rather than operating via automatic transmission. The CNSC's Huron Resolve Inspection

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[112] *CNSC CMD, supra* note 2 at 119.

[113] *Huron Resolve Inspection Report, supra* note 98, Appendix D.

Report suggests that even a manual DLAN system can introduce significant delays in the event of an emergency.[114] On the topic of manual data entry, CNSC staff note:

> Bruce Power currently has a Disaster LAN (DLAN) incident management electronic data transfer system in place to transfer the data to the CNSC [Emergency Operation Center (EOC)]. However, the DLAN system relied on human intervention to acquire and enter the data (i.e., non-automatic). CNSC staff highlighted in the lessons learned from Huron Resolve exercise the importance for automatic data transfer to the CNSC EOC in event of a nuclear emergency. In addition, automatic plant data transfer aligned with international best practices and is part of the lessons learned from the Fukushima nuclear accident.[115]

In August 2017, CNSC staff requested Bruce Power to provide a plan pertaining to automatic data transfer in the event of an emergency.[116] Bruce Power responded that it would commence a feasibility assessment to investigate options for connectivity between plant data and DLAN and 2018. This response is corresponds to comments in the Renewal Application,[117] where it is stated that initial tests were ongoing in 2017, and that a feasibility assessment was planned for 2018.

While CNSC staff discuss this implementation of DLAN, its current degree of readiness is not clear from the documents before the Commission. CNSC staff simply conclude:

> CNSC staff determined that automated data sharing is vital during a nuclear emergency and will review Bruce Power's plan to implement automatic data transfer over the next licensing period.[118]

At the very end of section 15.15.4, the following is said of the estimated timeline:

> Efforts over the next two years [from June 2017 to June 2019] will focus on plant data connectivity, ensuring a fully-redundant system that effectively shares real-time plant and emergency response data directly from plant systems outward to

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[114] *Ibid* at 17 and Appendix B, which states that delays of over an hour occurred on several occasions, with the longest delay lasting over 3 hours.

[115] *CNSC CMD, supra* note 2 at 119

[116] *CNSC CMD, supra* note 2 at 119.

[117] *Renewal Application*, supra note 54 at 255-256.

[118] CNSC CMD, supra note 2 at 119-20.

> off-site emergency response centres as well as federal and provincial agencies.[119]

According to information provided by Bruce Power to CELA, regarding the estimated timeline for the switch to an automated system:

> • Bruce Power is studying methods to link DLAN to the outputs from the Digital Control Computers. We will complete the study in 2018.
> • The timeline for implementation of the automated data input will be determined after the study, mentioned above, is complete and will be dependent on the timelines for the engineering, equipment and installation requirements.[120]

Bruce Power's most recent statements make it clear that no specific timeline or commitment has been made as to when an automated system will be fully functional. While the Licence Application mentions a two-year period (June 2017 to June 2019), this period is not reflected in Bruce Power's latest statements, which make it clear that no actual time line currently exists.

CELA therefore recommends that the Commission set clear deadlines for a transition to a fully automated system. Furthermore, while CELA supports the CNSC's view that "automated data sharing is vital during a nuclear emergency", and we note the CNSC "will review Bruce Power's plan to implement automatic data transfer over the next licensing period,"[121] we encourage the CNSC to require a plan for implementation as a requirement of licensing on Bruce Power.

3.11.2 Faxing

Finally, in its Corrective Action Plan, Bruce Power states that "Faxing will only be used as a backup in the event DLAN is unavailable." [122] This conflicts with information provided by Bruce Power to CELA. While Bruce Power that, while DLAN is now used when communicating with the CNSC, it still uses faxes to some degree when communicating with the Provincial Emergency Operations Centre (PEOC), and that work is being done to set a date for full transition to DLAN.[123] Bruce Power notes that "DLAN is fully available

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[119] *Renewal Application*, supra note 54 at 262.

[120] Email correspondence from Bruce Power dated April 10, 2018.

[121] CNSC CMD, supra note 2 at 119-20.

[122] *Corrective Action Plan, supra* note105 at 4.

[123] Email correspondence from Bruce Power dated April 10, 2018.

in the PEOC and faxes will remain as a backup system to DLAN."[124] As they noted in their Licence Application,

> Challenges
>
> Bruce Power provides plant data to the CNSC during drills and emergencies via fax. Filling out forms manually and sending faxes is time-consuming. In addition, it is difficult for the CNSC to conduct a trending analysis. As a result, Bruce Power is in the process of implementing a software application called DLAN (Disaster LAN; see Section 15.15). This will allow the Bruce Power Emergency Response Organization to complete emergency forms (plant data) electronically and send the data to the CNSC, who will be able to view and trend changing data by logging into the same application. For more details, see Section 15.15.[125]

As faxing introduces unnecessary delay in decision making, with potentially significant impacts on the ability of the provincial and federal authorities to respond quickly in case of an emergency and continually during such emergencies, CELA requests information on the likelihood that Bruce Power may have to revert to faxing, including information on the reliability of the DLAN system in its current form, likely causes for its unavailability, and what Bruce Power is doing to reduce the likelihood that faxing will have to be used. This response corresponds to comments in the Renewal Application,[126] where it is stated that initial tests were ongoing in 2017, and that a feasibility assessment was planned for 2018.

RECOMMENDATION 34: CELA recommends the CNSC set a deadline for the completion of Bruce Power's transition to a fully automated system. This plan should be made a requirement of licensing and until implemented, reviewed annually at he Commission's regulatory oversight meeting.

4. ENVIRONMENTAL ASSESSMENT AND PROTECTION

CELA has sought to examine the Bruce Powers' environment and health objectives as outlined in their licencing application and supporting materials, in tandem with CNSC guidance on environmental protection, pursuant to the environmental assessment component of the CNSC licensing process.

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[124] *Ibid*

[125] *Renewal Application*, *supra* note 54 at B135.

4.1 Comparing the "EAs" of Bruce A and Bruce B

A component of Bruce Power's licence application is the proposed refurbishment and extension of operation life of the Bruce B reactors to a contemplated date of 2064.[127] While the reactors at Bruce A were refurbished and subject to a screening-level EA under CEAA, 2012's predecessor, the *Canadian Environmental Assessment Act* ("CEAA"), the life extension and refurbishment of Bruce B is not subject to a similar federal EA process and is thus, Canada's first nuclear power plant rebuild to not undergo an environmental assessment.

In lieu of a federal EA under CEAA 2012 or predecessor legislation, the CNSC asserts that it conducts an environmental assessment within its relicensing and hearing process, pursuant to section 24(4) of the *Nuclear Safety and Control Act.* This provision states that no licence shall be issued, renewed, amended or replaced unless the Commission is of the opinion that the applicant will "in carrying on that activity, make adequate provision for the protection of the environment."[128] Upon this basis, the CNSC asserts its conducts an EA.

CELA submits that an EA conducted under the *NSCA* is not an adequate nor equal substitute for a federally directed EA, particularly as it relates to the level of public engagement and opportunities for review by technical experts. The following sections seek to highlight the differences in an EA carried out under *CEAA* (as occurred for the Bruce A rebuild in 2006), and the environmental assessment conducted pursuant to the *NSCA* for the currently proposed rebuild of the Bruce B reactors at the Bruce nuclear power station.

4.1.1 Scope of Environmental Assessments

When the units at Bruce A were subject to a federal EA under CEAA, the scope of the review pertained specifically to the activities and operations necessary to carry-out refurbishment and thereby extend the operating life of the units to 2043. The EA's screening-report strictly stated, "this project does not pertain to other separately

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[127] CNSC, *"CMD 18-H4, A Licence Renewal – Bruce Power Inc., Bruce Nuclear Generating Station A and B – Environmental Assessment Report*" (12 February 2018) at 11 ***[CNSC Report].***
[128] *Nuclear Safety and Control Act*, SC 1997 c 9 at s 24(4) ***[NSCA]***.

licenced facilities within the Bruce Power site, including the Bruce B reactors and the on-site radioactive waste management facilities."[129]

Now, Bruce Power is seeking a licence from the CNSC allowing it to refurbish the Bruce B reactors. The scope of the environmental assessment review of the conducted by the CNSC for its licensing process, however, has not been limited just to Bruce B's refurbishment and life extension. Instead, the CNSC also included in its EA review:

- Operations of Bruce A and B
- Operations of a Class II nuclear facility
- Operation of radiography throughout the site
- Import and export licences for nuclear substances
- Possession, management and storage of Cobalt-60 at Bruce B and fuel assemblies at Bruce A[130]

The length of extension being sought be Bruce Power also distinguishes Bruce A from Bruce B. Bruce A had sought an extension of operation life of 37 years from date of the screening report in 2006.[131] Conversely, the life extension sought for Bruce B would increase the units' lifespan by a proposed 46 years from the date of the CNSC's EA review under the *NSCA.*[132]

Despite the proliferation in the scope and span of time of the Bruce B project compared to Bruce A, there is not a demonstrated and accompanying increase in the level of technical review nor opportunities for participation. Each of these factors are reviewed, below.

4.1.2 Public Participation Opportunities

The CEAA-based environmental assessment for Bruce A provided 121 days for public comment. Eighty-one of the days were exclusively devoted to comments on the environmental assessment, including the draft screening report and guidelines for review (see Figure 1 below). Additionally, the 121 day public comment window was divided into three separate and distinct public comment opportunities.

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[129] Canadian Nuclear Safety Commission, "*CMD 06-H12 Bruce A Refurbishment for Life Extension and Continued Operations Project"* (19 May 2006) at 6 ***[Screening Report]***

[130] *CNSC Report, supra* note 131 at 8-9

[131] *Screening Report, supra* note 133 at 3

[132] *CNSC Report, supra* note 131 at 4

The timeframe and number of opportunities provided for public review, is in contrast to the CNSC's *NSCA* directed EA, where only 61 days are provided for public comment. Of these 61 days, none of them are a specifically focused on the environmental assessment. Rather, the comment window pertains to the licencing hearing, generally. Unlike the CEAA-led EA, the CNSC did not release a draft environmental assessment report for review, with the potential for follow-up comments nor, did the CNSC seek the public's comments on guidelines or directives which should guide its EA review.

4.1.3 Technical and Expert Review

The CEAA-based screening report for the Bruce A refurbishment project notes that the project's assessment was "supported by expert technical review of the Draft EASR by CNSC Staff, as well as other federal departments including Health Canada, Environment Canada, Natural Resources Canada, Department of Fisheries and Oceans, and the Department of Indian Affairs and Northern Development."[133] The feedback from their technical review was made publicly available and consolidated in a 227-paged chart. The chart not only summarized the reviewers' comments but noted CEAA's response to the issues raise and how they
would be addressed.

The CNSC's *NSCA*-based EA process for the current Bruce B rebuild project lacks a similar or equal opportunity for expert review. As the CNSC states in its environmental review report, "Bruce Power's ERA was the primary source of information used to inform the Environmental Effects Assessment for Continued Operations and the Environmental Effects Assessment for MCR [refurbishment]…and various sections of this EA report."[134]

4.2 Summary of EA Deficiencies

If properly designed, an environmental assessment "offers the promise of correcting at lest some of the mistakes of past."[135] Environmental assessments are distinct from other forms of environmental protection mechanisms because the EA process facilitates people to think about the potential implications of a project *from the outset*. Most importantly the process offers better decision making, through the involvement and participation of the public.[136]

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[133] *Screening Report, supra* note 133 at 1
[134] *CNSC Report, supra* note 131 at 4.
[135] John Swaigen, "Environmental Rights in Canada," (Toronto: Butterworths, 1981), p 245
[136] *Ibid* at 246

While the CNSC has called its review of the Bruce Power's proposed life extension and refurbishment of Bruce an environmental assessment, this phrase is ill-fitted to the review undertaken and lacks all of the hallmarks of an actual environmental assessment. The public has not been involved setting the environmental assessment process, nor has it been solicited for comments until a final – not draft – review has been reported by the CNSC.

As side-by-side comparison of the legislated federal EA completed for Bruce A versus the environmental assessment review provided for Bruce B is provided in Figure 1, below.

RECOMMENDATION 35: CELA recommends a ten-year licence not be granted to Bruce Power because the environmental assessment under the *NSCA* is profoundly lacking and not proportionate to the public participation and expert review provided for the nearly analogous Bruce A refurbishment and life extension project. Instead, CELA suggests the CNSC should refer the matter to the Minister for review under *CEAA 2012.*

Figure 1. Comparing an EA under CEAA and the NSCA

Bruce A – CEAA Environmental Assessment (2006)	**Bruce B – CNSC's *NSCA* Environmental Assessment (2018)**
Scope of Environmental Assessment	
● EA limited to review of activities and operations necessary for refurbishment and life extension only; explicitly excludes other on-site licenced activities ● Screening Report with appendices numbers 420 pages ● Life extension sought spanned 37 years	● EA spans refurbishment and life extension project, and additionally operations at both Bruce A and B, import and export nuclear substance licences, operations of an on-site Class II nuclear facility, operation of radiography throughout the site ● Environmental Assessment Report numbers 85 pages ● Life extension sought spans 46 years
Public Participation Opportunities	

121 days for public comment **81 days pertain exclusively to the EA** ● EA Guidelines Public Comment: 43 days (Jan 14, 2005 to Feb 25, 2005) ● Screening Report Public Comment: 38 days (Jan 6, 2006 to Feb 13, 2006) ● Relicensing Hearing Public Comment: 40 days (March 9, 2016 – April 18, 2006)	**61 days for public comment** **0 days pertain exclusively to *NSCA*--led EA** ● CNSC Staff CMD was made publicly available February 15, 2018 to April 16, 2018 for a 61 day comment period. However, the EA Report is one component of a much larger licensing report.
Technical and Expert Review	
Experts Consulted: ● CNSC Staff ● Health Canada ● NRCan ● Department of Fisheries and Oceans ● Then, Department of Indian Affairs and Northern Development ● Comments from experts consolidated into 227-paged chart	Experts Consulted: ● No direct reference to consultation with Health Canada, Natural Resources Canada, ● 4 instances in which Environment and Climate Change Canada are referred to; 6 instances in which Department of Fisheries and Oceans is mentioned. In neither instance are their exact comments provided. ● No chart consolidating comments from expert review

4.2 Environmental Monitoring and Follow-Up Programming

The environmental assessment of the Bruce A refurbishment and life extension in 2006, resulted in the formation of a follow-up monitoring program ("FUMP"). The elements of program spanned monitoring of aquatic habitat and biota, air quality, wildlife communities and facilitated baseline population studies. Each of the program's monitoring activities, such as testing for select radionuclides in aquatic biota,[137] monitoring for tritium in shallow wells[138] and or hydrazine in spawning bass during plant outages were specific to a certain monitoring location (ie. the defined site or local

[137] *Screening Report, supra* note 133 at 90.
[138] *Ibid.*

area) and a certain frequency or timeframe (the chart illustrating the preliminary elements of the FUMP are reproduced in Appendix 2).

It is also evident, based on the information in the CNSC's CMD, that the FUMP not only served as a monitoring directive, but as a basis for continued consultation and engagement with concerned stakeholders during the current licensing period. The CNSC Staff CMD notes for instance, that resulting from the FUMP was a working group, formed for the express purpose of monitoring fish impingement and entrainment. And, on multiple occasions there were discussions with the Saugeen Ojibway Nation to identify and address issues related to components of the FUMP.[139]

In preparation of the proposed refurbishment and life extension of Bruce B, CELA has undertaken a parallel review of the findings resulting from the CNSC's EA conducted under the *NSCA* for the licence application currently before the Commission. Despite the clarity of monitoring for environmental effects put in place following the 2006 federal environmental assessment for Bruce A, an equivalent - in terms of detail and objectives - has not been identified for the proposed refurbishment.

The CNSC's CMD concludes that "Bruce Power has and will continue to make adequate provision for the protection of the environment and health of persons"[140] and thus, all but two elements of the FUMP are closed going forward. The CNSC also concludes that Bruce Power is in compliance, or is anticipated to be in compliance a later date, with REGDOC 2.9.1 (version 1.1), REGDOC 3.1.1, the CSA N288 series, ISO 14001: 2004 Environmental Management System. According to the CNSC, "environmental protection will continue under the NSCA."[141] These findings are reiterated in the CNSC's EA report, conducted under the *NSCA,* and its conclusion only notes five items which require "further monitoring" or "further information."[142] For the following reasons, we do not find REGDOC 2.9.1 (version 1.1), REGDOC 3.1.1, the CSA N288 series, ISO 14001: 2004 Environmental Management System to be an equivalent substitute for the FUMP put in place in 2006 and now discontinued.

First, unlike the detailed FUMP which accompanied the Bruce A environmental assessment, the CNSC's CMD has adopted a very narrow view of follow-up monitoring,

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[139] *CNSC CMD, supra* note 2 at 140
[140] *Ibid* at 101.
[141] *Ibid* at 133.
[142] *CNSC Report, supra* note 131 at 74

has not commented on the items' intended objective and is silent on the frequency or location of the monitoring.

Secondly, the CNSC has not provided any monitoring requirements unique to the project being proposed. The FUMP was not only species-specific in some instances, but also required certain monitoring to occur at different stages of refurbishment, such as "prior to receiving new fuel on site" or "once all four units are operational."[143]

Third, the details of the environmental planning which *may* be in place for the proposed refurbishment are buried in multiple external documents and require a cross-referencing of multiple standards and sources in order to piece together what may be required.

Fourth, the documents referenced by the CNSC as providing the basis for environmental protection do not contain a level of detail necessary to ensure enforcement. For instance, where the Bruce A's environmental assessment required there be "monitoring of the entrainment of lake whitefish depending on the result of planned larval tows and emergence trap data,"[144] REGDOC 2.9.1 (version 1.1) states the applicant should "include a description of the food chain and food web dynamics as a habitat component as this relates to fish populations, and potential effects...(such as impingement and entrainment."[145] These are not equivalent statements and nor, does the latter have the same degree of enforceability as it the former under the Bruce A FUMP.
Lastly, the majority of data which informed the CNSC's environmental assessment under the *NSCA* was provided by the licensee. This does not qualify as independent, expert opinion which is necessary to inform an environmental assessment. Furthermore, Bruce Power was part of the Technical Committee which created CSA Standard N288.6-12, *Environmental risk assessment at class I nuclear facilities and uranium mines and mills* and thus, was able to set the standard to which the CNSC requires it to comply.

RECOMMENDATION 36: Until the CNSC has developed a follow-up monitoring program (FUMP) which is equivalent in scope to the FUMP required based on the Bruce A federal EA, the current FUMP should remain in place and not discontinued.

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[143] *Screening Report, supra* note 133 at 91.
[144] *Ibid*.
[145] *See* CNSC, "*REGDOC-2.9.1 Environmental Protection: Environmental Principles, Assessments and Protection Measures, Version 1.1"* online: http://www.nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-9-1-new-v1.1/index.cfm

RECOMMENDATION 37: To ensure Bruce Power's compliance with the FUMP, the CNSC should incorporate the existing FUMP by reference as a required licence condition.

5. READINESS OF BRUCE POWER FOR RELICENSING

The core mandate of the CNSC is the protection of the public. While this responsibility is shared with the province, who has responsibility for emergency management and planning, Parliament has declared that it has jurisdiction over:

> [a]ny work or undertaking constructed for the development, production or use of nuclear energy or for the mining, production, refinement, conversion, enrichment, processing, reprocessing, possession or use of a nuclear substance or for the production, possession or use of prescribed equipment or prescribed information.[146]

The CNSC has obligations as the regulator, to ensure all necessary measures are in place for the public and the environment to be protected. It is the regulator, not the licensee, that bears the onus of ensuring all safety concerns are addressed before it exercises its jurisdiction and responsibility to grant a licence. As identified in sections 1 – 4 of this report, there are a number of remaining gaps in Bruce Power's actions related to emergency preparedness and environmental protection.

As the following two sub-chapters highlight, many requirements remain outstanding at the time of licensing and, neither Bruce Power's nor the CNSC's Staff review of the consolidated licence request contain the requisite information necessary to proceed. On this basis, CELA submits it would the Commission does not have the requisite level of information before it to grant a ten-year licence.

5.1 Requirements outstanding at time of licence renewal

The following is a non-exhaustive list of items which are documented as being outstanding and not completed in time for the proposed licence renewal date. Because of the 'pending compliance' status of many RegsDocs and CSA standards, the enforceability of the licence and LCH can be undermined. For instance, if a breach of a licence condition were to occur but it related to a plan that was not required to be fully in place until 2020, the CNSC may lack the basis to require remedial action or issue an

[146] *NSCA, supra* note 132 at s. 71; *Constitution Act, 1867,* ss 91(29) and 92(10)(c)

order. Until the following items are in force, the Commission will not have the necessary compliance basis to enforce the licence's conditions, program and plan requirements.

July 1, 2018	CSA N291-15, Requirements for safety-related structures for CANDU nuclear power plants[147]
August 2018	Transition plan to meet the requirements of REGDOC-2.10.1, Nuclear Emergency Preparedness and Response[148]
Sept 1, 2018	CSA N289.1-18, General requirements for seismic design and qualification of CANDU nuclear power plants; CSA N289.2-10, Ground motion determination for seismic qualification of CANDU nuclear power plants; CSA N289.3-10, Design procedures for seismic qualification of CANDU nuclear power plants; CSA N289.4-12, Testing procedures for seismic qualification of nuclear power plant structures, systems, and components; CSA N289.5-12, Seismic instrumentation requirements for nuclear power plants and nuclear facilities; CSA N290.12-14, Human factors in design for nuclear power plants; CSA N290.14-07, Qualification of pre-developed software for use in safety-related instrumentation and control applications in nuclear power plants; REGDOC-2.6.1, Maintenance programs for nuclear power plants; REGDOC-2.6.2, Reliability programs for nuclear power plants[149]
Dec 31, 2018	CSA Standard N288.5-11, Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills; CSA N288.4-10 (2015), Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills; CSA standard N288.6-12, Environmental risk assessments at Class I nuclear facilities and uranium mines and mills; Implementation strategy for CSA standard N286-12, Management system requirements for nuclear power plant [150]
End of 2018	*Fisheries Act* authorization submission to the DFO[151]
2019	Municipal plans updated in accordance with the Implementing Plans (IP) one year from date IP is published
2019	Revised Emergency Response Plan (3 – 6 months after issuance of IP)
Mar 29, 2019	CSA N285.7-15, Periodic inspection of CANDU nuclear power plant balance of plant systems and components[152]

[147] *CNSC CMD, supra,* note 2 at 85
[148] *Ibid* at 109
[149] *Ibid*, at 69 and 85
[150] *Ibid* at 101, 102, 104 and 321
[151] *Ibid* at 135
[152] *Ibid* at 85

June 2019	Full implementation of REGDOC-2.4.2[153]
End of 2019	Revisions and safety improvements to Fukushima action items, specifically SCC and enhancements to procedures (CNSC CMD 137)
Dec 2020	Version 1.1 of REGDOC-2.9.1; Full implementation of cyber security program and compliance with CSA N290.7-14[154]
Date Unknown	Monitoring of corrective action plan following Type II Inspection[155]
Date Unknown	Monitoring of corrective action plan related to worker dose control and radiation protection procedures[156]

RECOMMENDATION 38: Due to the number of plans and standards which are not yet implemented, the CNSC lacks a sufficient basis for compliance and enforcement. Bruce Power should not be granted a licence beyond five years until all outstanding items are remedied and fully in force.

5.2 Information lacking for consolidated licence request

In addition to the refurbishment and life extension of its reactors, Bruce Power has also requested to consolidate its site activities into one licence which would include:

- operation of the Bruce A and B nuclear facilities
- operation of a Class II nuclear facility and prescribed equipment for the purpose of calibration
- operation of radiography throughout the Bruce site
- import and export nuclear substances, except controlled nuclear substances, that are required for, are associated with, or arise from the three (3) activities listed above
- possess, manage and store Cobalt-60 at Bruce B
- possess, manage and store booster fuel assemblies at Bruce A[157]

[153] *Ibid*, at 58
[154] *Ibid* at 100 and 121
[155] *Ibid* at 97
[156] *Ibid* at 98
[157] *Ibid* at 8

In CELA's view, Bruce Power has not met the requisite components a consolidated licence and application and therefore this request should be severed from its licence application, or deferred until all necessary information has been obtained. CELA has reviewed all licensing documentation and the CNSC Staff's CMD and finds the following requirements of a consolidated licence request to be absent: [158]

1. Licences must submit a written request to the CNSC to consolidate a licence – **Not Fulfilled**

   CELA reviewed the licencee's application documentation and cannot locate this request. In its application, Bruce Power notes "going forward, Bruce Power plans to work with the CNSC to consolidate some of these licences" (Licensing App, p 18).

2. The request must include the licence numbers which are to be consolidated – **Not Fulfilled**

   Neither the licence application nor CNSC Staff's CMD provide this information. CELA instead sought this information from the Commission on April 9, 2018 and was provided the following information:

Licence Name	**Number**	**Expiry**
Dosimetry Service Licence	13152-7-23.0	2023.03.31
Class II Nuclear Facilities and Prescribed Equipment Licence	13152-6-27.2	2027.04.30
Class II Nuclear Facilities and Prescribed Equipment Licence	13152-3-20.2	2020.05.31
Waste Nuclear Substance Licence Central Maintenance and Laundry Facility	Not provided	Not provided
Nuclear Substances and Radiation Devices Licence	13152-2-21.1	2021.10.31

[158] *See* online: CNSC, "*Consolidated Facility Licence"* (2 February 19) online: http://nuclearsafety.gc.ca/eng/nuclear-substances/licensing-class-II-nuclear-facilities-and-prescribed-equipment/consolidated-radiotherapy-facility-licence/index.cfm

Nuclear Substances and Radiation Devices Licence	13152-1-20,6	2020.04.03

As a result of a request for a 10-year, many of these licence would be extended up to eight years past their current expiry date.

3. Copies of the radiation safety manual and procedures applicable to all licences being consolidated – **Not Fulfilled**

   The CNSC discusses the radiation protection safety control area ("SCA") in its CMD and finds "Bruce A and B met or exceeded performance objectives."[159] It does not discuss Bruce Power's performance in this SCA as it relates to Class II facilites or nuclear substances, which would be consolidated under the licence. No discussion or reference to existing radiation safety programs which presumably exist were referenced.

4. A detailed description of the appended licence documents that still apply – **Not Fulfilled**

   While the proposed licence includes new licence conditions due to the consolidation of the licence (see for instance licence conditions 15.11 and 15.12), CELA subits a condition which states "the licensee shall implement and maintain a program for the operation of the Class II nuclear facility" is not sufficient in scope to cover what is currently, a standalone licence.[160]

5. A request to revoke all of the operating licences being consolidated once consolidated licence has been issued – **Not Fulfilled**

While the CNSC Staff's CMD and Bruce Power's licence application demonstrate an intent to consolidate, CELA could not identify an express request to revoke the various licences if the proposed consolidation occurs.

A consolidated licence would result in the extension of current licences, many of which expire in the next two or three years, up to an additional eight years. CNSC's consolidated licence application guide, which is only available in draft form, notes that consolidated operating licences are typically valid for 10-year period while "all other

[159] *CNSC CMD, supra* note 2 at 94
[160] *CNSC CMD, supra* note 2 at 193

licences are typically valid for five years".[161] In light of number of licences being consolidated, their cumulative scope and increased in complexity, a shorter not *lengthier* licence should be granted.

The creation of a ten-year consolidated licence would reduce public transparency and capacity to engage. Therefore, a consolidated licence not spanning greater than five years could be provided by the CNSC, only if Bruce Power provides the necessary application requirements. Furthermore, as the scope of activities being brought under one licence merits greater review by the Commission and analysis which is not currently present in the CNSC's CMD, this matter should be severed from the licence application. The request for a consolidated licence should be deferred until the Commission is provided all requisite information and the public has been provided an opportunity to engage in its review.

RECOMMENDATION 39: Consolidated licences, because of their broader scope and complexity, are not conducive to ten-year-licences. Absent Bruce Power providing the required information to support a consolidated licence application in advance of the hearing, and for public review, the CNSC should dismiss the request because of a lack of evidentiary basis.

CONCLUSION

CELA respectfully the Canadian Nuclear Safety Commission reconsider its 10-year approach to nuclear power plant licensing, in light of Bruce Power's request for a licence to refurbish and consolidate its operations at Bruce A and Bruce B.

For the following reasons, we submit Bruce Power's request for a 10-year licence is premature:

- **Pending compliance is not a basis for renewal -** Granting a 10-year licence would allow Bruce Power to undertake actions with a projected operating date to 2064, while being non-compliant with a significant number of regulatory documents and standards at the time of licensing. This not only diminishes the CNSC's basis for enforcement, but delegates oversight of these issues to CNSC Staff (see section 5.1). Secondly, the Implementing Plan for Bruce Power was not

[161] CNSC, "*REGDOC-1.4.1 Class II Nuclear Facilities and Prescribed Equipment: Licence Application Guide (DRAFT)"* at s 2.5, online: http://nuclearsafety.gc.ca/pubs_catalogue/uploads/REGDOC1-4-1-licence-application-guide-class-II-nuclear-facilities-eng.pdf

publicly released prior to the public intervention submission deadline and nor, has Bruce Power aligned its Emergency Response Plan with the Implementing Plan. Insufficient and incomplete information should not serve as a basis for review for a ten-year licence renewal (see sections 2 and 3)

- **Conditions which advance democratic transparency and effective public engagement must guide the Commission -** Commission members have a duty to act in the public interest and promote the conditions for democratic transparency and effective public participation. This means, that in face of complexity and greater scope, the CNSC's process should be proportionately *more* supportive of public involvement, information sharing and independent expert review (see section 1).

- **No environmental assessment has been completed -** When Bruce Power last sought to refurbish and extend the operating life of its reactors, the public was provided over 120 days to provide comments, spanning three-separate opportunities for involvement, ranging from consultation on draft environmental assessments reports to review guidelines. Today, the refurbishment is not subject to an EA and thus the public only has a 60-day window to comment on *all* issues before the Commission for relicensing (see section 4). CELA recommends the CNSC refer the matter to the Minister for an EA under the *Canadian Environmental Assessment Act, 2012*

For the foregoing reasons, CELA requests the Commission not to grant a licence exceeding five years to Bruce Power.

All of which is respectfully submitted this 16th day of April, 2018:

CANADIAN ENVIRONMENTAL LAW ASSOCIATION
Per

Theresa A. McClenaghan
Executive Director and Counsel

APPENDIX I

OFFICIAL RECORD

Bruce Power

June 29, 2015

NK21-CORR-00531-12154
NK29-CORR-00531-12566
NK37-CORR-00531-02428

Mr. K. Lafrenière
Director, Bruce Regulatory Program Division
Canadian Nuclear Safety Commission
P.O. Box 1046
280 Slater Street
Ottawa, Ontario
K1P 5S9

Dear Mr. Lafrenière:

Bruce Power Transition Plan for Regulatory Document
REGDOC-2.10.1 *Nuclear Emergency Preparedness and Response*

The purpose of this letter is to provide Bruce Power's Transition Plan for REGDOC-2.10.1 *Nuclear Emergency Preparedness and Response* in accordance with Section 10.1 of the Bruce A and B Licence Conditions Handbook (LCH-BNGS-R000). A detailed gap analysis has been completed and a transition plan has been developed to close the identified gaps.

The main effort will be to conduct a detailed review of the Bruce Power Nuclear Emergency Plan (BP-PLAN-00001) and associated documents as part of the three year documentation review cycle. Revisions to these documents will be completed to ensure compliance with REGDOC-2.10.1.

The key milestones of the transition plan are as follows:

a. Develop a Bruce Power Recovery Plan
b. Complete the On-Site/Off-Site Emergency Response Communications Project to ensure that two independent means of communication are available to all emergency centres.
c. Update the Bruce Emergency Response Code to predict off-site radiation dose to the public for severe and multi-unit accident scenarios.
d. Complete KI pill pre-distribution out to 50 kilometers
e. Establish a contract to complete public evacuation time estimates

Bruce Power will be in full compliance with REGDOC-2.10.1 *Nuclear Emergency Preparedness Response* by Aug 31, 2018.

Bruce Power Frank Saunders Vice President - Nuclear Oversight and Regulatory Affairs
P.O. Box 1540 B10 4th floor W Tiverton ON N0G 2T0
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frank.saunders@brucepower.com

If you require further information or have any questions regarding this submission, please contact Mr. Doug Claggett, Department Manager, Emergency Preparedness, at 519-361-2673 extension 19183, or doug.claggett @brucepower.com.

Yours truly,

Frank Saunders
Vice President Nuclear Oversight and Regulatory Affairs
Bruce Power

cc: CNSC Bruce Site Office (Letter only)

NK21-CORR-00531-12154
NK29-CORR-00531-12566
NK37-CORR-00531-02428

Table 10.1
PRELIMINARY ELEMENTS OF PROJECT FOLLOW-UP PROGRAM

EA Component	Effect	Description	Suggested Location for Monitoring	Suggested Duration or Frequency of Monitoring	Objective/Status
Radiation and Radioactivity	Dose to workers	Monitor dose to workers, to ensure that doses are ALARA: • Measure contact dose for fuel channel handling, and primary heat transport waste management • Measure ambient dose rate within reactor vault	Site Study Area	Ongoing during Refurbishment Phase	• Confirm effectiveness of mitigation • Confirm assumptions in EA • Verify predicted effects
		Perform analysis and demonstrate that an approved margin of sub-criticality for safety will not be violated under normal and credible abnormal conditions – accidents or accident sequences, - that have frequency of occurrence equal to or more than one in a million years.	Site Study Area	Prior to receiving New Fuel on site	• Confirm effectiveness of prevention • Confirm assumptions in EA
	Dose to public	Monitor annual dose to critical group members	Local Study Area	Ongoing. Part of existing Radiological Environment Monitoring Program (REMP)	• Confirm assumptions in EA • Verify predicted effects
		Perform analysis of inadvertent criticality events and demonstrate that consequences of the events do not violate criteria established by international standards and national guidance as a trigger for a temporary public evacuation.	Local Study Area	Prior to receiving New Fuel on site	• Confirm effectiveness of mitigation Confirm assumptions in EA
	Dose to aquatic biota	Monitor activity of selected radionuclides in fish	Site and Local Study Areas	Ongoing. Part of existing REMP	Verify predicted effects
	Groundwater quality	Monitor tritium activity in shallow wells	Site and Local Study Areas	Ongoing. Part of existing REMP	Verify predicted effects

EA Component	Effect	Description	Suggested Location for Monitoring	Suggested Duration or Frequency of Monitoring	Objective/Status
Surface Water Resources	Lake water quality	Monitor discharges from Active Liquid Waste Management System (ALWMS)	Site Study Area	Ongoing, following the restart of Units 1 and 2. Part of the ongoing MISA monitoring	Confirm that the ALWMS continues to perform within regulatory criteria
		Monitor discharges from Inactive Drainage System: Turbine Hall Sumps, Pumphouse Sumps and Active Drainage System leak to Reactor Auxiliary Bay Unit 4 Sump (foundation drainage)	Site Study Area	Ongoing, following the restart of Units 1 and 2. Part of the ongoing MISA monitoring	Confirm effectiveness of the implemented and proposed corrective measures
Aquatic Environment	Aquatic biota	Monitoring of the entrainment of lake whitefish depending on the result of planned larval tows and emergence trap data, as well as pending information on populations within Lake Huron. Refer to Aquatic Habitat monitoring below.	Site Study Area (intake channel)	Once all four units are operational	Verify predicted effects
		Monitor hydrazine and morpholine levels during planned plant outages (all four units) occurring in smallmouth bass spawning and development season (May through June)	Site Study Area (discharge channel)	Ongoing. During planned plant outages (all four units) occurring in May through June of any given year following the restart of Units 1 and 2	Confirm that levels of hydrazine and morpholine remain within the range of normal operating concentrations (i.e., all four units operating)
		Review population and conservation status of deepwater sculpin, as characterized by regulatory agencies: • Initiate focussed entrainment monitoring if current impingment monitoring and/or regulatory review requires[12]	Site Study Area (intake channel)	• Status review conducted annually • Once all four units are operational. Frequency for entrainment monitoring determined based on results of annual review	Verify predicted effects

[12] Deepwater sculpin currently have Schedule 2 status under the COSEWIC Species at Risk Act (SARA). They are scheduled for reassessment by COSEWIC in 2006 and if the legal listing process is initiated, this species could be uplisted to Schedule 1 of SARA as early as 2007. If the species attains level 1 listing and is added to Schedule 1 as either endangered or threatened, it will be afforded protection under SARA and the prohibitions under Sections 32, 33 and 58. If this occurs then monitoring of entrainment potential would occur upon listing.

EA Component	Effect	Description	Suggested Location for Monitoring	Suggested Duration or Frequency of Monitoring	Objective/Status
		Monitoring of the impingement of spottail shiner and lake whitefish	Site Study Area	Ongoing, following restart of Units 1 and 2. Integrate with existing monitoring programs	Verify predicted effects
		Monitor fishing pressure: • Discharge channel boat counts • Creel census	• Site Study Area (discharge channel) • Local Study Area	• Ongoing from April to September • Pre- and post-restart of Units 1 and 2	Verify predicted effects
		Smallmouth bass nesting and recruitment survey	Site Study Area (discharge channel)	Ongoing (annually). Part of ongoing biodiversity program	Verify predicted effects
		Monitor dissolved oxygen	Site Study Area (discharge duct and discharge channel)	Quarterly for one year after restart of Units 1 and 2	Verify that there is no adverse effect due to gas bubble trauma
	Aquatic habitat	Monitor effects of thermal plume: • Mark and recapture study of whitefish populations • Whitefish spawning evaluation • Whitefish larval monitoring (tows and larval traps)	• Local Study Area • Local Study Area • Local and Site Study Areas	Integrate with on-going site monitoring program as defined in the May 16th 2005 Technical Working Group on Whitefish [57]	Verify predicted effects
		Monitor substrate temperatures	Local Study Area	During the winter following restart of Units 1 and 2	Verify predicted effects
Atmospheric Environment	Air quality	Develop increased certainty in estimate of hydrazine emissions to the atmosphere	Site Study Area	Prior to the restart of Units 1 and 2	Confirm assumptions in EA
		Particulate ($PM_{2.5}$) monitoring with using a TEOM analyzer	Within the Site Study Area at the Bruce Power site property line where the maximum concentration is predicted to occur	For a duration of three months during the most active period of refurbishment activities	• Verify predicted effects • Confirm effectiveness of mitigation

EA Component	Effect	Description	Suggested Location for Monitoring	Suggested Duration or Frequency of Monitoring	Objective/Status
		NOx monitoring with a $NO/NO_2/NO_X$ analyzer	Within the Site Study Area at the Bruce Power site property line where the maximum concentration is predicted to occur	For a duration of three months during the most active period of refurbishment activities	• Verify predicted effects • Confirm effectiveness of mitigation
Geology, Hydrogeology and Seismicity	Groundwater quality	Tritium monitoring in the Unit 4 inactive drainage foundation sump	Site Study Area	Ongoing (monthly)	To provide an estimate of the tritium emission rate and verify predicted effects
		Tritium monitoring in the Unit 2 inactive drainage foundation sump	Site Study Area	Ongoing. Monthly following the return to service of Unit 2	To determine if tritium is an issue at Unit 2
Terrestrial Environment	Wildlife communities and species	Monitor vehicular collisions with white-tailed deer	Site Study Area	Ongoing throughout the Refurbishment Phase	Verify predicted effects
Socio-economic Conditions	Population and economic base	Review available statistics on visitation to Inverhuron and MacGregor Provincial Park and the Bruce Power Visitors' Centre	Local Study Area	Ongoing (annually)	Verify predicted effects
		Formal survey of tourist accommodation operators	Local Study Area	• Prior to peak on-site employment during Refurbishment Phase • Following restart of Units 1 and 2	Verify predicted effects regarding average annual and peak season occupancy rates
	Residents and communities	Public attitude research, directly comparable to the 2005 survey	Regional Study Area	At the following intervals: • During peak year of on-site employment during Refurbishment Phase • Within one year of the commencement of operations of four units at Bruce A • Subsequent to any accidents or malfunctions	Verify predicted effects

EA Component	Effect	Description	Suggested Location for Monitoring	Suggested Duration or Frequency of Monitoring	Objective/Status
				at Bruce A resulting in the release of radioactive contaminants to the environment	