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**Written Closing Remarks from
Canadian Environmental Law
Association**

**Observations écrites finales de
Canadian Environmental Law
Association**

In the Matter of

À l'égard de

Ontario Power Generation Inc.

Ontario Power Generation Inc.

OPG's Deep Geological Repository (DGR)
Project for Low and Intermediate Level
Radioactive Waste

Installation de stockage de déchets radioactifs à
faible et moyenne activité dans des couches
géologiques profondes

Joint Review Panel

Commission d'examen conjoint

October 2014

Octobre 2014

**FINAL SUBMISSIONS OF THE CANADIAN ENVIRONMENTAL LAW ASSOCIATION
RE: PROPOSED DEEP GEOLOGICAL REPOSITORY**

“Nuclear waste is dangerous enough. Attempting to permanently store it deep underground only makes it more dangerous.” – Dr. Frank Greening (Transcript, September 10, 2014, pages 137-138)

PART I - OVERVIEW

1. These are the final submissions of the Canadian Environmental Law Association (CELA) to the Joint Review Panel (JRP) regarding the Deep Geological Repository (DGR) proposed by Ontario Power Generation (OPG) for the disposal of low- and intermediate-level radioactive waste (L&ILRW).

2. In summary, CELA submits that contrary to the requirements of the *Canadian Environmental Assessment Act, 2012* (CEAA), the Environmental Impact Statement (EIS) Guidelines, and the JRP Agreement (as amended):

- (a) there is insufficient information available to the JRP to adequately identify and evaluate a reasonable range of functionally different “alternatives to” the DGR;
- (b) the failure or refusal by OPG to conduct an appropriate site selection process leaves the JRP with insufficient information to adequately identify and evaluate “alternate means” of carrying out the DGR;
- (c) there is insufficient information available to the JRP to adequately identify and evaluate the likelihood and/or significance of the DGR’s environmental effects;
- (d) there is insufficient information available to the JRP to adequately describe, at an appropriate level of detail, technically and economically feasible mitigation measures that will be effective in preventing significant adverse environmental effects that may be caused by the DGR;
- (e) there is insufficient information available to the JRP to adequately describe, at an appropriate level of detail, the content requirements of an appropriate followup program for the DGR; and
- (f) there is insufficient information available to the JRP to adequately demonstrate that the DGR meets the sustainability purposes and precautionary requirements mandated under CEAA.

3. Accordingly, CELA concludes that on the basis of the hearing record, the JRP must file a report with the Minister of the Environment that recommends against the approval of the proposed DGR under CEAA. Despite OPG’s vague commitments regarding mitigation, monitoring and adaptive management, CELA submits that there is no reasonable basis, and no cogent and compelling evidence, upon which the JRP can conclude that the DGR is unlikely to cause significant adverse environmental effects over its extremely lengthy contaminating lifespan.

4. Similarly, CELA submits that OPG’s applications under the *Nuclear Safety and Control Act* (NSCA) for licences to site prepare and construct the DGR should not be granted. As a matter of law, the condition precedent for issuing these NSCA licences is the completion of an Environmental Assessment (EA) in full compliance with the requirements of CEAA, the EIS Guidelines, and the amended JRP Agreement. In short, this condition precedent has not been satisfied to date.

PART II - EA METHODOLOGY, PRECAUTION AND SUSTAINABILITY CONSIDERATIONS

5. CELA submits that the EA approach used by OPG (and erroneously accepted by the Canadian Nuclear Safety Commission (CNSC) and other federal authorities in this case) does not comply with applicable CEAA requirements, the EIS Guidelines, the amended JRP Agreement, and relevant international standards and best practices.¹ To the contrary, CELA submits that the EA documentation remains essentially incomplete and fundamentally flawed, despite the last-ditch efforts of OPG (and its supporters) to salvage the DGR during the final two weeks of the JRP hearings. In short, OPG has

¹ PMD 13-P1.80D, pages 4-21.

fundamentally failed to justify the alleged need to establish the proposed DGR, and has similarly failed to demonstrate that the Bruce site is the best location for the DGR, or that the DGR concept itself is the environmentally preferable alternative for managing L&ILRW.² Since there is no demonstrable need for this risk-laden facility at this location, it is contrary to the public interest to approve it under CEEA or the NSCA.

(a) OPG's Failure to Identify or Evaluate Alternative Sites

6. The identification and evaluation of alternatives is the cornerstone of sound EA decision-making. This is why the obligation to assess “alternatives to” and “alternative means” was firmly established by Parliament in CEEA, and was duly incorporated in the EIS Guidelines and amended JRP Agreement in this case. However, CELA submits that OPG’s alternatives analysis is woefully inadequate, particularly in relation to the alternative means of managing L&ILRW.

7. Siting is a fundamentally important factor in the geological disposal of long-lived radioactive waste. One critical deficiency in OPG’s EIS is that an actual comparative evaluation of alternative sites was not undertaken, despite the clear direction in Section 7.3 of the EIS Guidelines that OPG must consider “siting the DGR at a different location” as part of its “alternative means” analysis. Accordingly, the JRP – and the public at large – has no rational or empirical basis for concluding that the proposed Bruce location is the best (or environmentally preferable) option relative to other potential locations. CELA submits that siting is the paramount consideration in this case, given the high risks and potentially irreversible effects associated with nuclear waste management, and given the proposed DGR location in close proximity to Lake Huron – a natural resource of significant public interest in Canada and neighbouring jurisdictions.

8. By directing OPG to undertake an independent Alternative Means Risk Analysis (AMRA), the JRP took some initial steps to address unresolved siting issues. Specifically, the JRP stipulated that OPG’s analysis should include a conceptual DGR in granite bedrock, and that OPG should use extensive data and analyses available within the EA performed by Atomic Energy of Canada Limited (AECL) for the Environmental Assessment Panel for Nuclear Fuel Waste Management and Disposal Concept (known as the Seaborne Panel).

9. While CELA commends the JRP for requesting an AMRA, neither CELA nor the JRP can accept as adequate the conceptual consideration of a DGR in granite bedrock that has been filed in these proceedings. Many authorities hold that the most important issue with respect to siting is the long-term safety of the site in relation to the geosphere.³ As noted by CELA in its recent presentation to the JRP, international standards for siting geological disposal facilities recommend that in site selection, one or more candidate sites should be selected *after* the investigation of a large region, the rejection of unsuitable sites, and the rigorous screening and systematic comparison of the remaining sites. A selection should be made from several, possibly many, prospective sites identified at the start of a siting process on the basis of the geological setting and other factors.⁴ Clearly, a conceptual consideration of a hypothetical DGR in granite bedrock does not meet international standards.

10. By not requiring an actual investigation of alternative sites, the JRP has not remedied OPG’s insufficient attention to the critically important location issue in the EIS process. If this fundamental inadequacy remains unaddressed, the JRP risks giving the public the impression that it considers OPG’s previous investments in the Bruce location (or the ‘willing host’ criterion or municipal monetary agreements) as a valid (or sole) basis for selecting the Bruce site for the DGR. Furthermore, any acceptance of a conceptual evaluation of other site types suggests that it is reasonable to propose a DGR for long-lived radioactive waste near a vital natural resource – without an actual investigation of alternative locations.

11. Accordingly, CELA submits that the JRP should recommend the rejection of the DGR project based, in part, on OPG’s wholly inadequate investigation of alternative sites. In the event that OPG remains interested in pursuing the DGR, then, at a minimum, any future EA work must require OPG to conduct an actual investigation of at least one other site – away from a Great Lake or other natural resources of significant public interest.

² *Ibid.*, pages 6-7. See also PMD 13-P1.119.

³ See International Atomic Energy Agency (IAEA). (2011). Geological Disposal Facilities for Radioactive Waste: Specific Safety Guide. IAEA, Vienna.

⁴ *Ibid.* See also PMD 14-P1-1A; PMD 14-P1-16A; and Transcript (Sept. 15, 2014) pages 245-258, 263, 265-66. See also Dr. Peter Duinker’s critique of OPG’s cumulative effects analysis and OPG’s assessment of the significance of the DGR’s environmental effects: PMD 13-P1.175; Transcript (Oct. 4, 2013), pages 52-59, 71-72, 78-80, 84-85.

(b) The Independent Experts Group: Assessing the Relative Risk of a Hypothetical DGR Site

12. The Independent Experts Group (IEG) conducted a “relative risk assessment” of four “alternative means” (i.e. two surface facilities and two DGRs) using a “novel” methodology that was apparently “developed” by IEG members during their closed-door deliberations (in which no meeting minutes were taken).⁵ However, there is no evidence before the JRP demonstrating that the IEG’s newly developed methodology is well-established in peer-reviewed literature, reflects best practices of EA practitioners, or is consistent with the requirements of CEAA. In addition, the IEG determined that it could not go beyond these four options, and could not compare the DGR to other locational options away from a Great Lake.⁶

13. Moreover, the IEG readily conceded that it faced a “conundrum” when comparing the two DGRs since one location (i.e., Bruce site) was real and subject to allegedly “rigorous” investigation, while the other DGR was a pure hypothetical involving a number of assumptions.⁷ CELA submits that this information imbalance resulted in an “apples and oranges” comparison that has no air of reality and should be given little or no weight by the JRP, particularly since the relevant Information Request (IR) had expressly directed the IEG’s attention to extensive AECL data pertaining to a specific granite site. In addition, CELA submits that the IEG’s numerous – and highly questionable – assumptions (i.e., that the granitic bedrock would be “similar” to the limestone formation at the Bruce site; that the closed DGR would be sealed with no opportunity for intrusion; that the DGRs would be constructed to the same depths; that the DGR shaft seals would perform as predicted, etc.) have the unfortunate effect of skewing or predetermining the outcome of the relative risk assessment.⁸

14. CELA further submits that the IEG’s findings are essentially qualitative assertions based on professional judgment and implicit assertions of IEG expertise, rather than robust quantitative analysis premised upon empirical evidence.⁹ While the IEG exercise may have been a well-intentioned initiative, it did not ultimately produce results which are traceable, replicable or persuasive. Indeed, the IEG acknowledged that other persons could use the same methodology but reach different conclusions about relative risks.¹⁰ Thus, the IEG report does little or nothing to dispel the lingering uncertainty – or fill in the sizeable information gaps – that still plague the OPG proposal and the underlying EA documentation. The IEG itself admitted there was still “a lot of uncertainty” in its relative risk assessment, and that it was “challenging” to apply the precautionary principle in the IEG exercise.¹¹

(c) OPG’s Failure to Assess the DGR in a Careful and Precautionary Manner

15. The precautionary approach is well-entrenched within CEAA, and it is one of the guiding principles governing the content and conduct of the EIS in this case. In particular, Section 2.5 of the EIS Guidelines stipulates that OPG must consider the precautionary principle in the design of the DGR project. In various IRs (e.g., IR 03-44, IR 03-92, IR 06-275, IR 06-278, etc.), the JRP asked OPG to explain how the precautionary principle was considered in the design of the project. CELA’s review of OPG’s responses reveals that the proponent purported to apply the precautionary principle mainly by using “conservative” estimates when there was a potential for uncertainty surrounding, for example, predicted environmental effects.

16. However, CELA submits that there remain two critical inadequacies with respect to how OPG considered the precautionary principle. The first relates to OPG’s comparative evaluation of alternative means. The second pertains to how OPG acknowledged and addressed various types of uncertainties throughout the EIS.

17. With respect to the first inadequacy, OPG failed to provide an evaluation of the alternative means in light of risk avoidance, adaptive management capacity and preparation for surprise, as required by the EIS Guidelines. In a previous submission to the JRP, CELA highlighted this significant omission, and our concerns were forwarded to OPG by the JRP in IR 06-278. However, similar to the way in which OPG considered sustainability (see below), OPG’s response to IR 06-278 reveals that a transparent comparative evaluation of the alternative means relative to these criteria was not undertaken. Rather, as OPG claims in its response, these concepts were addressed in an implicit way in Section 3.4 of the EIS.

⁵ Transcript (Sept. 11, 2014), pages 11, 63, 258-259. See also Transcript (Sept. 18, 2014), page 8.

⁶ *Ibid.*, pages 218, 223-224.

⁷ *Ibid.*, pages 12, 60.

⁸ PMD 14-P1-16, page 5. See also Transcript (Sept. 17, 2014), pages 24-29.

⁹ Transcript (Sept. 11, 2014), page 26.

¹⁰ *Ibid.*, pages 27, 236.

¹¹ *Ibid.*, pages 155, 165.

18. In light of the requirements imposed by CEAA and the EIS Guidelines, OPG was obliged to demonstrate how the DGR project emerged as the preferred option in light of a comparative evaluation of the options relative to the concepts of risk avoidance, adaptive management capacity and preparation for surprise. In our previous submission to the JRP, CELA explained how this task should have been undertaken.¹² In asking for an AMRA, the JRP gave OPG a clear (and second) opportunity to re-evaluate the options in light of these criteria. OPG's analysis, however, reduced these considerations to a simple table. Moreover, the information was clearly added to the table well after the risk assessment had already been completed. Indeed, the table does not illustrate how these criteria were applied throughout the AMRA in a proactive or systematic manner.

19. Risk avoidance, adaptive management capacity, and preparation for surprise are critical concepts to consider in selecting the best option for managing long-lived radioactive waste. A transparent evaluation of the alternative means relative to these criteria should have been properly prepared by OPG to help the JRP and the public to understand whether – and to what extent - the proponent addressed: (i) the reality of scientific uncertainty and incomplete knowledge; (ii) the adequacy (or inadequacy) of OPG's claims that the preferred option(s) will not lead to serious or irreversible environmental damage; and (iii) whether or not the proponent has erred on the side of caution when choosing among the options.

20. The second critical inadequacy pertains to the obligation to err on the side of caution when selecting among options. The CEAA requirements for precaution have profound implications for how OPG should have addressed various uncertainties. In particular, OPG must admit to and fully describe the uncertainties (scientific, technological, environmental, etc.) surrounding each option in the comparative evaluation. In addition, OPG must consider for each option the irreversible environmental effects associated with a range of accidents, malfunctions and malevolent acts, as well as the uncertainties surrounding how each option would perform in the face of such events. However, throughout the EIS and the JRP hearing, OPG has minimized, discounted or otherwise overlooked these effects and uncertainties when, as a matter of sound EA planning, they should have had serious implications for the selection of the preferred option(s).

21. CELA therefore submits that the JRP should recommend the rejection of the DGR project based, in part, on the above-noted inadequacies in relation to precaution and uncertainty. In the event that OPG remains interested in pursuing the DGR, then, at a minimum, any future EA work must require OPG to:

- (a) undertake a comparative evaluation of the alternative means (as per the AMRA and the EIS) relative to the concepts of risk avoidance, adaptive management capacity and preparation for surprise;
- (b) explicitly incorporate in the comparative evaluation a concern for all of the uncertainties (scientific, technological, environmental, etc.) associated with each alternative; and
- (c) explicitly incorporate in the comparative evaluation an admission of the irreversible environmental effects associated with a range of real-life accidents, malfunctions and malevolent acts, as well as the uncertainties surrounding how each option would perform in the face of such events.

22. In summary, given the numerous outstanding technical and scientific issues raised by hearing participants, CELA submits that approving the DGR would be unjustified, premature, and contrary to the precautionary principle entrenched within CEAA. In particular, CELA submits that it would be the antithesis of the precautionary principle to ignore the substantive deficiencies in OPG's safety case in the EIS, or to approve the DGR despite the fundamental uncertainties about the efficacy of the design/operation, monitoring, mitigation and adaptive management proposed by OPG. Accordingly, if the precautionary principle is to be taken seriously and properly applied in this case, then the JRP must recommend rejection of the DGR under CEAA.

(d) OPG's Failure to Properly Consider the DGR's Alleged Contribution to Sustainability

23. Section 2.4 of the EIS Guidelines requires OPG to consider the extent to which the DGR contributes to sustainable

¹² See PMD 13-P1.80: Gaudreau, K., Markvart, T., & Gibson, R.B. (2013). Final Comments to the Joint Review Panel for the Deep Geologic Repository for Low and Intermediate Level Radioactive Waste Project – Environmental Impact Statement and Licence to Prepare Site and Construct Application. See also Transcript (Oct. 3, 2013), pages 152-171; and PMD 13-P1.80D, pages 20-21.

development. In its presentations to the JRP, CELA explained the basic steps that OPG should have undertaken to fulfill this key requirement,¹³ and provided some helpful references for guidance.^{14,15}

24. The JRP correctly raised questions about OPG's consideration of sustainability in certain IRs, notably IR 03-44, IR 06-273, and IR 12-513. CELA recognizes that OPG's evaluation of the DGR project attempted to address some (but not all) concerns related to sustainability. For example, as OPG's response to IR 03-44 explains, biodiversity and capacity of renewable resources were considered in various sections of the EIS. Similarly, OPG's comparison of alternative means incorporated some effects relevant to sustainability. In Undertaking No. 72, OPG describes how sustainability concepts relate to the definition of Valued Ecosystem Components (VECs).

25. However, CELA submits that while OPG may have addressed certain sustainability matters, the proponent's overall evaluation of the DGR in light of sustainability considerations is inadequate in at least three key ways. First, OPG considered sustainability primarily as an afterthought. Indeed, the proponent tended to explain how the assessment addressed sustainability only when prompted by the JRP in various IRs – that is, well after the analyses were done. For example, OPG's elucidation of how sustainability informed the definition of VECs reveals that sustainability criteria were not explicitly used as an overarching framework to guide the investigation. Rather, the VECs were defined and then, later, when prompted by the JRP, OPG explained how the VECs implicitly address sustainability considerations. This retrospective approach is insufficient because it relegates sustainability to a tacit "back seat" role as opposed to an explicitly proactive one. Moreover, it obfuscates the process by which sustainability was incorporated in the design of the project.

26. Second, OPG's analysis of alternative means is incomplete in that the generic evaluation criteria that OPG used did not cover all areas of sustainability considerations. Moreover, the criteria were not specified to ensure that all context-specific sustainability issues were covered. For example, in the alternative means evaluation, OPG's consideration of economic concerns did not address issues related to intergenerational equity, especially with respect to the long-term economic costs of the DGR. Consequently, there are critical (and outstanding) gaps in the hearing record regarding the extent to which the proposed DGR project will (or, more likely, will not) contribute to sustainability. In short, sustainability requires careful consideration of the ethical and intergenerational implications of the proposed DGR. The operational phase of the DGR may be measured in mere decades, but it will leave an incredibly toxic legacy (and an unknown socio-economic burden) to countless future generations (over a number of millennia) who are not here to speak about their willingness (or unwillingness) to accept long-term DGR costs, risks or impacts.¹⁶ CELA submits that the DGR should be considered and rejected for that reason alone.

27. Finally, the scope of OPG's evaluation is too narrow in that it did not apply sustainability criteria to evaluate and compare the options, considering all aspects and stages of the work. For example, the analysis of alternative means did not extend to the matters addressed in Section 7 (Effects Prediction, Mitigation Measures and Significance of Residual Effects), Section 8 (Malfunctions, Accidents and Malevolent Acts), and Section 9 (Long-Term Safety of the DGR) of the EIS. In addition, OPG did not demonstrate how sustainability criteria led the analysis of "alternatives to" the project, which was undertaken before the EIS Guidelines were finalized. In requesting the AMRA, the JRP provided OPG a renewed opportunity to re-evaluate the options in light of sustainability considerations. OPG's analysis, however, reduced sustainability considerations to a simplistic table, and the information was clearly added to the table well after the risk assessment had been completed. Indeed, the table does not illustrate how sustainability criteria were applied throughout the AMRA in a proactive and systematic manner.

28. CELA submits that the "contribution to sustainability" test is of considerable importance under CEAA, particularly in this case because it obliges OPG and the JRP to ensure that the proposed DGR will safeguard and enhance the integrity of vital life support systems over millennia. CELA's presentations to the JRP have amply demonstrated how OPG should have addressed sustainability essentials in a meaningful way in this EA process. However, OPG's assertions about the extent to which the DGR project will contribute to sustainability rest on an evaluation that is too opaque, narrow and retrospective

¹³ *Ibid.* See also CELA Answer to Undertaking 73 (Sept. 18, 2014).

¹⁴ See Gibson, R.B. (2000). Favouring the higher test: Contribution to sustainability as the central criterion for reviews and decisions under the *Canadian Environmental Assessment Act*. *Journal of Environmental Law and Practice*, 10(1), 39-54.

¹⁵ See Gibson, R.B., Hassan, S., Holtz, S., Tansey, J., & Whitelaw, G. (2005). *Sustainability Assessment: Criteria and Processes*. Sterling, VA: Earthscan.

¹⁶ Transcript (Sept. 12, 2014), pages 115, 135.

to provide the JRP and the public any confidence that the proposed DGR is the best and most sustainable option. In CELA's view, the JRP and the public must be fully satisfied that the DGR project on the Bruce site emerged as the preferred alternative out of a proactive, comprehensive, and consistent application of sustainability criteria in a comparative evaluation of the options. Simply put, this has not occurred to date. Moreover, the CNSC has confirmed that it lacks sustainability criteria, and therefore did not closely scrutinize the sustainability aspects of OPG's EA documentation.¹⁷

29. Accordingly, CELA submits that the JRP should recommend the rejection of the DGR project based, in part, on the above-noted inadequacies regarding sustainability considerations. In the event that OPG remains interested in pursuing the DGR, then, at a minimum, any future EA work must require OPG to:

- (a) re-evaluate the alternatives in light of a proactive and consistent application of a comprehensive set of sustainability criteria that combine the generic requirements for progress towards sustainability, with particular attention to the key considerations surrounding selection among options for best management of L&ILRW; and
- (b) ensure that this comparative evaluation satisfactorily addresses all relevant aspects of the options, all phases of nuclear waste management, and malfunctions, accidents and malevolent acts, as per the EIS Guidelines.

(e) The “Bounding Approach”: Blinkered Assessment of the DGR’s Environmental Effects

30. Throughout the JRP proceedings, OPG and CNSC repeatedly relied upon “bounded” scenarios for the purposes of identifying and evaluating potential environmental effects. In the recent *Greenpeace* case,¹⁸ the Federal Court held that using a bounding approach is not objectionable *per se*, provided that the resulting EA documentation properly assesses environmental effects in accordance with CEAA requirements. In CELA's view, this important proviso has not been satisfied in the DGR case.

31. For example, in relation to human health exposure, the CNSC considered the four scenarios proposed by OPG to be “bounding” and sufficient for dose calculations from disruptive scenarios. However, it was acknowledged by CNSC at the JRP hearings that the dosages described in CMD 14-P1 – 2 (page 44) were in error, and that disruptive scenario doses are not 100,000 times less than the dose limit as claimed, but actually hover around prescribed dose limits.¹⁹ Upon further questioning from the JRP Chair, the CNSC conceded that certain disruption scenarios yielded human exposures considerably in excess of 1 mSv per year.²⁰

32. In addition, these dose estimates – and the DGR's “safety case” itself – is undermined by continuing uncertainty about the accuracy of the waste characterization undertaken to date. While OPG and CNSC staff argue that the bounded scenarios and the alleged “over-estimate” of doses and pathways are sufficient to address the acknowledged uncertainty,²¹ CELA urges the JRP to reject this unsubstantiated and unpersuasive argument. The precondition for a robust assessment of environmental effects (and their significance) includes a comprehensive and accurate inventory of all waste types to be received at the DGR. However, such an inventory has not been completed to date, and CELA agrees with and adopts Dr. Greening's well-founded criticisms of the serious errors and omissions in the limited testing/estimates of L&ILRW presented by OPG in these proceedings.²² Promises by OPG to conduct further waste inventory verification and/or additional characterization work in the post-EA period (and outside the careful scrutiny of the JRP and hearing participants) are unacceptable and fall considerably short of fulfilling applicable CEAA requirements, particularly in relation to cumulative effects analysis, and assessing the significance of environmental effects of accidents and malfunctions.

¹⁷ Transcript (Oct. 3, 2013), pages 180-184. Despite lacking such criteria, the CNSC did not ask any other federal authority to assess the sustainability aspects of the proposed DGR. Environment Canada similarly stated that it did not “specifically use” the sustainability criteria in the EIS as guiding principles for reviewing the EA documentation: Transcript (Sept. 17, 2014), pages 210-211.

¹⁸ *Greenpeace Canada et al. v. Attorney General of Canada et al.*, 2014 FC 463. Long before the EIS was even started (let alone completed), OPG had already decided *a priori* that the proposed DGR would produce no adverse effects: Transcript (Sept. 16, 2013), pages 88-93.

¹⁹ Transcript (Sept. 10, 2014), page 35.

²⁰ *Ibid.*, pages 111-113.

²¹ *Ibid.*, pages 10, 12, 27, 55.

²² *Ibid.*, pages 115-138, 141-143, and 153; PMD 14.P1.10A. See also PMD 14-P1.22.

33. CELA also derives no comfort from the waste acceptance criteria being proposed for the DGR. Surprisingly, OPG’s “preliminary” waste acceptance criteria document²³ was not tendered as evidence until at the very end of the JRP hearing, although it has been in existence for over four years. More alarmingly, a close perusal of its perfunctory requirements (i.e., containers should not be leaking and lids should fit) reveals a number of inadequate safeguards in relation to container design or other measures to prevent or reduce doses to workers or other persons (especially in relation to low likelihood, high consequence incidents such as explosions or malevolent acts). Again, vague promises by OPG or the CNSC to revisit these matters in the post-EA period (i.e., during the operating licence application under the NSCA) should be soundly rejected by the JRP.

(f) Decommissioning Waste at the DGR: Classic Project-Splitting or “Bait and Switch”?

34. CELA submits that the JRP hearing was marred (if not undermined) by considerable uncertainty about whether – or to what extent – the DGR (if approved and constructed) would eventually be expanded to accommodate large volumes of L&ILRW arising from the decommissioning of Ontario’s aging nuclear fleet.

35. The prospect of doubling the size of the DGR decades from now in order to receive approximately 200,000 additional tonnes of decommissioning waste was not mentioned in the EIS or Technical Support Documents (TSDs) first filed by OPG and made available for stakeholder, municipal and agency review. It therefore follows that the design/operation implications of expanding the DGR to receive decommissioning waste – or its potential environmental impacts due to higher metals content and attendant post-closure gas generation risks – were not properly identified or evaluated in OPG’s initial EA documentation. Similarly, the potential receipt of decommissioning waste at the DGR was not initially disclosed to interested persons or local communities, including municipal councils that immediately professed support for the project as originally proposed.

36. However, as the JRP hearing progressed in 2013, CELA, other intervenors and the JRP learned that eventual DGR expansion is, in fact, OPG’s long-term vision for dealing with decommissioning waste, although OPG has apparently not yet made a “business decision” to proceed with DGR expansion. Nevertheless, in the 2014 hearings, OPG representatives opined that an expanded DGR could safely accommodate decommissioning waste (which has also not been carefully quantified or adequately characterized to date²⁴). At the same time, OPG hastened to add that the current application before the JRP did not extend to decommissioning waste, and CNSC further indicated that such an expansion would trigger future licencing requirements under the NSCA.²⁵ OPG claimed that this licencing process would be subject to EA,²⁶ but this claim is erroneous (if not misleading) and should be rejected by the JRP because no further EA under CEAA will be triggered by doubling the DGR capacity in order to receive decommissioning waste, as discussed below.

37. CELA notes that the NSCA is a regulatory statute rather than an EA statute, and the NSCA does not require licence applicants to address the key EA considerations that are mandatory under CEAA in this case (i.e. need/purpose, alternatives to, alternative means, cumulative effects, sustainability, precautionary principle, etc.). In short, from both a substantive and procedural perspective, the NSCA licencing process is not EA, nor is it an acceptable substitute for a CEAA-compliant EA.

38. On the record, the CNSC has confirmed that the potential doubling of DGR capacity below-ground will not trigger another EA under CEAA in the future, although the CNSC concedes that changing the ratio of low- and intermediate-level waste (i.e., by introducing larger volumes of decommissioning waste) would impact the amount of radionuclides and change OPG’s current safety case.²⁷ Therefore, the current EA process is likely the only EA that will ever occur under CEAA in relation to the DGR, even if it is expanded in the future to receive decommissioning waste (or perhaps “new build” L&ILRW waste if new reactors are added to the Darlington power plant). CELA submits that this is precisely why the potential environmental effects (and the design/operation implications) of disposing decommissioning waste at the DGR should have been rigorously assessed by OPG throughout the EIS, rather than be superficially addressed under the guise of OPG’s cumulative effects analysis.

²³ OPG, Preliminary Waste Acceptance Criteria (July 16, 2010).

²⁴ Transcript (Sept. 15, 2014), pages 185-186.

²⁵ Transcript (Sept. 15, 2014), page 306; CEARIS Document #1609: CNSC Staff Position on CELA’s Request for Ruling.

²⁶ Transcript (Sept. 15, 2014), page 306. See also Transcript (Sept.17, 2013), page 72.

²⁷ Transcript (Sept. 17, 2014), pages 90-93; Transcript (Sept.18, 2014), pages 276-278.

39. It further appears that OPG envisions the receipt of decommissioning wastes at the DGR around 2044. However, it is equally conceivable that decommissioning wastes may be created much sooner than OPG’s scenario, particularly if the Pickering power plant undergoes accelerated (rather than dilatory) decommissioning.²⁸

40. More importantly, CELA submits that OPG’s approach constitutes “project-splitting”; viz., breaking down, segmenting or piecemealing a project into smaller components, different temporal phases or series of functionally related or connected actions, and thereby failing to undertake a careful and rigorous examination of the overall environmental effects of the project in its entirety. Project-splitting was disallowed under CEAA by the Supreme Court of Canada in the leading *MiningWatch* case,²⁹ and should not be countenanced by the JRP in this case. CELA has carefully considered the JRP’s Ruling No. 2 (October 11, 2013) regarding decommissioning waste, but we respectfully maintain that OPG’s approach constitutes inappropriate project-splitting, and that the current hearing record (including OPG’s cumulative effects assessment) has not properly addressed the environmental impacts of doubling the DGR in order to receive decommissioning waste.

41. CELA’s concerns are exacerbated by OPG’s questionable (if not wholly inadequate) characterization of the L&ILRW to be received in the short- and long-term at the DGR. Moreover, OPG suggests that under the current DGR application, up to 80% of the incoming waste stream (by package volume) will comprise of low-level materials (i.e. wipes, mops, buckets, etc.).³⁰ If this is accurate, then CELA submits that it makes no environmental or socio-economic sense to construct a risk-laden, multi-billion dollar underground facility near Lake Huron just to house discarded housecleaning gear (which will lose most radioactivity after “only” 300 years³¹ and could be stored and monitored in enhanced above-ground facilities, as has been done for decades). In short, the currently proposed DGR is a “solution” in search of a problem.

42. In CELA’s view, this is why the JRP should find or infer that OPG’s underlying (or unstated) rationale for the DGR is the long-term disposal of decommissioning waste (and perhaps to establish a precedent for underground disposal of high-level waste at an as-yet unspecified location). Accordingly, CELA submits that no approval should be considered for the DGR until such time as the proponent is more forthcoming about its true DGR intentions and, more importantly, prepares proper EA documentation regarding the direct, indirect and cumulative environmental effects of disposing all types of L&ILRW, including decommissioning waste at an expanded DGR. Moreover, CELA submits that OPG has not adequately justified its threshold decision to receive both low- and intermediate-level waste streams at the DGR. In short, OPG has not proven that accepting these waste streams at the same underground facility is environmentally superior or necessary.

PART III - HYDROGEOLOGICAL ASSESSMENT, GEOTECHNICAL ISSUES AND DGR DESIGN

43. Aside from CELA’s concern that more than one DGR site should be closely evaluated by OPG for comparative purposes, the hydrogeological and other geotechnical evidence presented to the JRP suggests that there are still unresolved concerns, significant uncertainties, and sizeable data gaps regarding the proposed Bruce location for the DGR.

(a) Groundwater, Surface Water and Geotechnical Considerations

44. The independent hydrogeologist retained by CELA concluded that while the Bruce site may be “potentially suitable”, there are a number of key issues which have not been addressed adequately or at all by OPG,³² including:

- (a) hydraulic overpressures in the sandstone formation (and possibly in the pre-Cambrian basement) immediately beneath the proposed host formation, which could drive contaminants upward to surface;
- (b) the nature, number and location of existing deep boreholes for oil/gas exploration which could serve as potential pathways for DGR contaminants to move upward to surface;

²⁸ Transcript (Oct. 3, 2013), pages 243-244; Transcript (Sept. 16, 2014), pages 300-303.

²⁹ *MiningWatch Canada v. Canada*, 2010 SCC 2.

³⁰ PMD 14-P1.1B, Figure 6; Transcript (Sept.18, 2014), page 141.

³¹ Transcript (Sept.17, 2013), pages 24-28, 42.

³² PMD 13-P1.80: Ruland Report (Aug. 10, 2013), pages 6-23; Transcript (Sept. 30, 2013), pages 238-259, 261-262. See also Transcript (Sept. 15, 2014), pages 188-203.

- (c) the long-term permeability of the Salina formation, particularly if DGR excavations disturb bedrock and facilitate groundwater movement within and between formations relied upon by OPG as geological barriers;
- (d) modelling and mapping the potential movement of the existing tritium plume from the Western Waste Management Facility due to DGR excavation activities (and consequential worker exposures);
- (e) targets for tritium, gross beta and carbon-14 in OPG's surface water monitoring program;
- (f) details for groundwater monitoring wells in the shallow horizons along the main shaft and ventilation shaft, particularly in the post-closure period;
- (g) details for the testing of, and discharge limits for, contaminated water collected in the stormwater management pond;
- (h) the inadequate and "arbitrary" proposal by OPG to conduct post-closure DGR monitoring for only 300 years; and
- (i) the development of appropriate contingency plans if the DGR does not perform as planned, or if monitoring detects adverse environmental effects which are new, unanticipated or greater than predicted in the EIS.

45. Without adequate information in the hearing record about these and related matters, CELA submits that the JRP and the public have insufficient reassurance about the viability of the DGR at the Bruce site. While OPG indicated that some of these matters (i.e. groundwater monitoring) could be addressed in future licencing applications under the NSCA, CELA submits that it was incumbent upon OPG to address these matters, at a sufficient level of detail, in the current EA process, as required by CEAA, the EIS Guidelines and the amended JRP Agreement. OPG's failure or refusal to do so should not be accepted or endorsed by the JRP.

46. CELA's hydrogeological expert also raised various concerns about the OPG proposal to construct, use and ultimately backfill/seal two very deep tunnels (i.e., main shaft and ventilation shaft) at the DGR facility.³³ Interestingly, the now-discredited Waste Isolation Pilot Project (WIPP) in New Mexico (see below) was also designed with several shafts. From an environmental, public health and workplace safety perspective, CELA submits that OPG's dual shaft proposal represents the long-term "Achilles heel" of the DGR proposal.

47. For example, the extensive blasting required to excavate the shaft tunnels will inevitably create damage zones in the bedrock which will be exceedingly difficult (if not impossible) to completely seal, and there is no operational experience (or scientific evidence) confirming that the seals will remain intact and fully effective for the millenia-long contaminating lifespan of the DGR. In addition, the vertical permeabilities in the backfilled shafts will be much higher than the surrounding host formations, and CELA draws no comfort from OPG's unsubstantiated claims that it can "minimize" blast-induced damage during DGR excavation activities. Indeed, it appears that OPG plans to partially remove only "highly damaged" rock, and OPG will not attempt to seal or remove the remaining damaged rock.³⁴

(b) Relevance of the WIPP Experience

48. During the first phase of the JRP hearing, the WIPP was repeatedly extolled by OPG and CNSC staff as the model for the DGR.³⁵ However, after two unrelated and significant accidents occurred at the WIPP in February 2014 (which caused on- and off-site radiological releases), OPG and the CNSC attempted to distinguish the WIPP from the DGR on the basis of an inadequate safety culture and other factors at the WIPP.³⁶ CELA urges the JRP to reject this unconvincing distinction, particularly since OPG and CNSC, when previously praising the WIPP (and following the site visit to the WIPP), did not notice or mention safety culture issues prior to these accidents.

³³ Transcript (Sept. 17, 2014), pages 106-107; Transcript (Sept. 30, 2013), pages 251-253. See also Transcript (Sept. 18, 2014), pages 201-206.

³⁴ Transcript (Sept. 18, 2014), pages 246-247.

³⁵ See, for example, EIS (Vol. 1), page 3-10; Transcript (Oct. 3, 2013), pages 174-177, 231-232; Transcript (Sept. 17, 2014), pages 14-17.

³⁶ Transcript (Sept. 9, 2014), pages 40, 46, 67-68); Transcript (Sept.15, 2014), pages 181-182, 358-361.

49. In light of the now-closed WIPP,³⁷ CELA submits that the JRP should give no weight or credence to OPG's claim that there is "proven technology" for DGR-type facilities. If anything, the extremely limited DGR track record to date³⁸ indicates that such facilities are costly, risky, and prone to accidents, malfunctions or other problems which have exposed workers and the environment to various radionuclides. In this regard, the JRP should reject OPG's and CNSC's steadfast insistence that no DGR design changes are needed in light of the lessons learned from the WIPP.³⁹

50. For the same reason, neither CELA nor the JRP can accept OPG's or CNSC's view that there is no scenario that would require an off-site emergency plan for the DGR.⁴⁰ Instead, at least according to the CNSC, emergency planning would be left with Bruce Power and off-site authorities regarding the operating nuclear power plant, rather than with OPG, the Western Waste Management Facility or the proposed DGR. In light of the WIPP experience, this cavalier approach to emergency planning in the DGR context should not be endorsed by the JRP.

PART IV - CONCLUSIONS AND RELIEF REQUESTED

51. For the foregoing technical, scientific, legal and policy reasons, CELA submits that OPG has failed to demonstrate that the DGR can be constructed, operated and decommissioned without causing significant adverse environmental effects, and has further failed to demonstrate that such effects can be justified in the circumstances.

52. By any objective standard, the EA documentation tendered to date by OPG (and its supporters) can only be regarded by the JRP as fundamentally incomplete in light of the numerous gaps, deficiencies and omissions identified by various public/agency reviewers throughout the JRP proceedings. In short, the hearing record generated to date does not provide the JRP or federal decision-makers with the evidentiary basis required to reach informed, transparent and justifiable conclusions under CEAA about the likelihood, significance or mitigability of the DGR's environmental effects. Therefore, OPG needs to be sent back to the drawing board to develop a new, safe and sustainable project for managing L&ILRW at the best location possible, and to rigorously assess the project in an open and transparent manner that is CEAA-compliant.

53. At the same time, CELA cautions the JRP against recommending a conditional approval containing provisions which would allow OPG to remedy or "backfill" its inadequate EA documentation after the completion of the JRP hearing. Given the years which have elapsed since the EA process was first commenced, CELA submits that OPG has had ample opportunity (i.e., through the EIS, TSDs, technical briefing sessions, IR responses, supplementary documentation and two rounds of public hearings) to prove its safety case for the DGR, but OPG has failed to fulfill this evidentiary burden. Thus, the JRP should refrain from recommending approval conditions requiring OPG to conduct yet more field investigations, data collection, information-gathering or analytical work at the Bruce site after the EA process has concluded, or during subsequent licencing processes to be conducted by the CNSC under the NSCA. In CELA's view, deferring or delegating EA-mandated work to future non-EA processes is contrary to the requirements prescribed by CEAA, the EIS Guidelines and the amended JRP Agreement.

54. Accordingly, CELA respectfully requests that the JRP recommend that the DGR should not be approved under CEAA, and the site preparation and construction licences should not be issued under the NSCA, on the basis of the current hearing record.

All of which is respectfully submitted on this 9th day of October, 2014.

original signed by
per
Theresa A. McClenaghan, Executive Director

original signed by
Richard D. Lindgren, Counsel

original signed by
per
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original signed by
per
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³⁷ *Ibid.*, pages 230-239.

³⁸ PMD 13-P1.169A; Transcript (Oct. 3, 2013), pages 179-180; Transcript (Sept. 9, 2014), pages 222-236.

³⁹ Transcript (Sept. 9, 2014), pages 48, 74, 246-247.

⁴⁰ *Ibid.*, pages 216-217, 255-258.