

**Date:** Feb 19, 2018

**From:** Northwatch

**To:** Lucia Abellan, Environmental Assessment Officer  
Canadian Nuclear Safety Commission

**By email:** cnscc.ea-ee.ccsn@canada.ca

**Subject line:** Northwatch Submission on CNL's Draft EIS for proposed Nuclear Power Demonstration Closure Project

**CEAA Reference number:** 80121

**Comments:**

CEAA Reference No. 80121

Please find attached Northwatch's submission and information requests, further to our review of Canadian Nuclear Laboratories proposed decommissioning project for the Nuclear Power Demonstration facility at Rolphton.

Thank you for your consideration.

Brennain Lloyd  
Northwatch Project Coordinator

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Northwatch  
[www.northwatch.org](http://www.northwatch.org)

Canadian Nuclear Laboratories  
Proposed In Situ Decommissioning of  
the Nuclear Power Demonstration  
Project at Rolphton, Ontario

# Northwatch Comments

CNL's Draft Environmental  
Impact Statement 2017

CEAA Reference No. 80121

February 2018

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Comments prepared and provided by Northwatch

13 February 2018

Box 282, North Bay, Ontario, P1B 8H2

[www.northwatch.org](http://www.northwatch.org) E:[northwatch@northwatch.org](mailto:northwatch@northwatch.org) T: 705 497 0373

## 1. Introduction

Canadian Nuclear Laboratories (CNL) is proposing to decommission the Nuclear Power Demonstration project (now being referred to as the “Nuclear Power Demonstration Waste Facility”), a former nuclear generating station that was owned by Atomic Energy of Canada Limited (AECL) and operated by Ontario Power Generation (OPG) (operating at the time as Ontario Hydro) from 1962 until 1987. The facility is located in Renfrew County, Ontario, on the south bank of the Ottawa River, approximately 225 kilometres northwest of Ottawa.

The reactor was built by Canadian General Electric (now GE Canada), in partnership with Atomic Energy of Canada Limited (AECL) and consisted of a single 22 MWe pressurized heavy water reactor (PHWR) unit. The primary role of NPD was as a prototype for CANDU engineering and it served as a test bed for new fuels, materials, components, and instruments and a training and simulation center for CANDU operations staff.<sup>1</sup>

As summarized on the introductory page of the on-line document registry for the federal environmental assessment of the project, CNL is proposing an “in situ (leaving in place) decommissioning approach”. The project would be comprised of the following proposed activities:

- assembly and operation of a grout batch mixing plan
- grouting of below-grade (underground) structures
- removal of above-grade structures for use as backfill
- installation of concrete cap and engineered barrier over the grouted area
- final site restoration
- long-term care and maintenance activities

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<sup>1</sup> [https://en.wikipedia.org/wiki/Nuclear\\_Power\\_Demonstration](https://en.wikipedia.org/wiki/Nuclear_Power_Demonstration), corroborated by several historical reports as found at <https://www.cns-snc.ca/media/history/npd/npd.html> et al

Some temporary infrastructure – such as mobile offices and washrooms, as well as an increase to the electrical services – would also be required in order to carry out the decommissioning activities. Water-holding tanks and fuel storage may also be required on site to support the proposed project. Additional groundwater monitoring wells would be installed, as required, to monitor the performance of the in situ decommissioned facility.<sup>2</sup>

### Northwatch's Interest

Northwatch is a public interest organization concerned with environmental protection and social development in northeastern Ontario. Founded in 1988 to provide a representative regional voice in environmental decision-making and to address regional concerns with respect to energy, waste, mining and forestry related activities and initiatives, Northwatch has a long term and consistent interest in the nuclear chain, and its serial effects and potential effects with respect to northeastern Ontario, including issues related to uranium mining, refining, nuclear power generation, and various nuclear waste management initiatives and proposals as they may relate or have the potential to affect the lands, waters and/or people of northern Ontario.

The Nuclear Power Demonstration project in Rolph Township is outside of Northwatch's geographic area, which is comprised of the six federal districts of northeastern Ontario (specifically, the project is 55 km east of the boundary between the District of Nipissing and the County of Renfrew). Northwatch's direct interest is in the potential for decisions related to CNL's three concurrent environmental assessments for large-scale radioactive waste projects to be precedent-setting. CNSC decisions on many of the issues associated with Canadian Nuclear Laboratories proposed entombment project may have implications for northern Ontario in the event that practices, policies and / or regulatory decision-making with respect to the management of radioactive wastes become precedent-setting or normative in Canada.

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<sup>2</sup> Canadian Environmental Assessment Registry for the Nuclear Power Demonstration Project, as posted at <http://www.ceaa-acee.gc.ca/050/details-eng.cfm?evaluation=80121>

## 2. Project Development Over the EA Phases

The project is being evaluated under the Canadian Environmental Assessment Act (CEAA) 2012. Notice of the commencement of the environmental assessment was issued in May 2016, and later the same month a notice of a 30 day comment period on a project description for Canadian Nuclear Laboratories (CNL) proposed “in situ decommissioning” of the NPD Project at Rolphton, Ontario was posted in the public registry for the project’s environmental assessment process. Northwatch provided comments on June 24th 2016.

Northwatch found the Project Description to be insufficient or inadequate in a number of respects, in terms of both form, substance, and the degree to which statements were substantiated (or, more specifically, the unsubstantiated nature of many of the statements).

On November 15, 2017 a draft Environmental Impact Statement was posted on the public registry for comments. On November 28, 2017 notice was given that the deadline to submit written comments has been extended from January 29, 2018 to February 13, 2018. A final EIS and an environmental assessment report to be prepared by CNSC staff is currently expected to be released for public comment followed by a CNSC hearing in mid-to-late 2018.

In reviewing the Draft Environmental Impact Statement, we had expected these shortcomings identified in the review undertaken by Northwatch and others of the project description to be resolved; upon review of the Draft EIS we have concluded that to a large degree they have not been resolved.

Additional details will be provided in later sections, but in summary our conclusions on progress between the Project Description and the Draft EIS are as follows:

- Like the Project Description, the Draft EIS provides no clear and detailed statement of the Project’s purpose. Nor does it provide a clear statement on the basis for bringing forward approaches that are very similar for two different projects concurrently (NPD and WR#1 in Manitoba)
- Like the Project Description, the document is tedious in its over-generalization and failure to provide basic information in a straightforward fashion

- Like the Project Description there are numerous statements that the underground structures will be sealed by grouting, but the draft EIS lacks adequate descriptions of the grouting, the grouting material or the grouting methods
- Like the project description, the Draft EIS utilizes non-sequiturs and attempts to assign relationships to unrelated statements; this occurs in what are some of the most fundamental aspects of the decommissioning project
- Like the Project Description, the document provides inadequate information about the site, site conditions, past land uses, and related residual hazards

In two respects we noted general improvements from the Project Description to the Draft EIS, the first being that the draft EIS does provide a somewhat improved discussion of alternatives to the proposed approach, at least in terms of length, although the analysis is still incomplete. The second area of improvement from the Project Description to the Draft EIS is that in the latter document CNL consistently refers to grout as such, and has relented in its use of concrete as an interchangeable term; that said, there is so little information provided about the grout and its characteristics that it could well simply be standard residential or industrial grade concrete, and using the terms of concrete and grout interchangeably might not be inaccurate. In fact, in its limited discussion of the grout, the draft EIS refers to the grout as being “Portland Cement”, which is the most common concrete mix in use across industrial and residential users.

### 3. Review of Draft Environmental Impact Statement

#### 3.1 Focus of Northwatch Review

Consistent with Northwatch's primary interest in the project and as an outcome of collaboration with other public interest groups participating in this review (including the Canadian Environmental Law Association, Nuclear Waste Watch, the Old Fort William Cottagers Association, Ottawa Riverkeeper, the Concerned Citizens of Renfrew County and Area, and others) Northwatch intends to focus our review in two key areas:

- CNL's presentation and technical evidence with respect to their proposed decommissioning standard, including an evaluation of CNL's end-state objectives for the decommissioning project and the ability for the proposed in-situ approach of the NPD Decommissioning Project to achieve those objectives, and
- CNL's intended use of grout and reliance on it as a barrier in the entombment of the Nuclear Power Demonstration project, including an evaluation of evidence CNL provides with respect to the effectiveness of their proposed grout formulation and application in containing and isolating nuclear wastes from the environment.

Northwatch's review of the draft Environmental Impact Statement is just that – a review. Northwatch's intent at this point in the environmental assessment process is to evaluate the draft EIS for the adequacy, quality and comprehensiveness of the information provided, and to provide the tribunal with that evaluation to assist in the tribunal determining next steps in the review process. It is not Northwatch's intent at this point in the process to identify a preference for one option or alternative over another or to place before the tribunal an argument with respect to the merits of the project (or lack thereof).

General comments of the draft Environmental Impact Statement are also provided in Section 3.4 of this submission.



### 3.2 CNL's Proposed Decommissioning Standard

Northwatch examined the draft EIS in order to evaluate CNL's presentation and technical evidence with respect to their proposed decommissioning standard, including an evaluation of CNL's end-state objectives for the decommissioning project and the ability for the proposed in-situ approach of the NPD decommissioning project to achieve those objectives

The draft EIS failed to provide the information that would be required to undertake this evaluation.

In the draft EIS, there is only one reference to the project end state results or objectives, and that reference lacks content or any substantive statement with respect to the intended or aspired to end state:

*By selecting a strategy of in situ decommissioning, the project end state results in a disposal facility for the waste inventory at the NPD site. In that regard, all of the existing waste inventory at NPDWF, or generated as a result of the decommissioning activities, will remain within the grouted facility.<sup>3</sup>*

This failure to include a substantive discussion of the end state which the project is intended to achieve is doubly curious, because not only does it fail to meet the information requirements of the EA process, but it is a sizeable information gap which a review of the references listed in the draft EIS would indicated could have been readily filled with a subject report listed as follows:

*Seto, P. 2015. Interim End State Report: Nuclear Power Demonstration (NPD) Waste Facility.64-508350-IES-001. Prepared for CNL. October.*

The statements or sections in the draft EIS which reference this report on end states for the NPD site are not related – at least not directly – to end state or decommissioning objectives. In each case of this end state report being referenced, the draft EIS section is describing current physical conditions of the site; none are statements or descriptions related to end state objectives or decommissioning standards to be employed.

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<sup>3</sup> Section 4.3, Waste Strategy

Beyond stating that the purpose of the project is “to safely carry out the decommissioning of the NPDWF”, the draft EIS provides no indication of the actual objectives of the decommissioning work. Subsequently, there are no measures against which project outcomes can be evaluated to determine project success.

The draft EIS states that “In-situ decommissioning of NPDWF meets one of the CNL integrated waste strategy objectives by providing a disposition route for the NPD reactor, components and systems” but does not provide the suite of waste strategy objectives, nor identify the decommissioning objectives and then discuss the means by which the waste strategy objectives and decommissioning objectives are mutually supportive or are in need of resolution.<sup>4</sup>

The draft EIS does provide a brief outline of the CNL Radiation Protection Program and its very general objectives (i.e. to limit the doses to less than the regulatory limits, and to levels as low as reasonably achievable, and to prevent detrimental non-stochastic (deterministic) health effects caused in employees and members of the public by CNLs use of radiation. Again, the draft EIS does not discuss the means by which the Radiation Protection Program objectives and CNL’s decommissioning objectives are mutually supportive or are in need of resolution.<sup>5</sup>

The draft EIS also provides a brief outline of the CNL Environmental Protection Program, but like the previous two examples the draft EIS does not discuss the means by which the Environmental Protection Program objectives and CNL’s decommissioning objectives are mutually supportive or are in need of resolution.<sup>6</sup>

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<sup>4</sup> Section 4.1 Purpose of Project, page 4-1

<sup>5</sup> Section 10.2 CNL Management Programs, page 10-3

<sup>6</sup> Section 10, Mitigation Measures, page 10-3, 10-4

### 3.3 Grout in CNL's Proposed In-Situ Approach to Decommissioning

The CNL proposal for “in situ decommissioning” of the Nuclear Power Demonstration project facility is fundamentally about filling it with cement, or “grout”, as the draft EIS refers to it.

While the word “grout” appears numerous times, the draft EIS provides very little actual information about the “grout” and its qualities and functions and provides no information about its formula. Interestingly, the closest the draft EIS comes to providing information about the formula is in the definitions section:

*Grout: a mixture of Portland Cement and water that produces a pourable, concrete-like, mixture.*<sup>7</sup>

Like their intended use / application of the “grout”, the proponent’s definition varies from those in standard use, such as:

*Definition of grout: thin mortar used for filling spaces (such as the joints in masonry); also : any of various other materials (such as a mixture of cement and water or chemicals that solidify) used for a similar purpose. (Merriam-Webster)*<sup>8</sup>

*Definition of grout: verb / to put a thin line of mortar in the spaces between tiles; noun / mortar used for grouting (Cambridge English Dictionary)*<sup>9</sup>

The utilization of grout in efforts to remediate radioactive waste storage systems has been in use for several decades in some limited circumstances, but even in these earlier applications and in associated technical papers in the public domain dating to that period, the discussion has generally included a description of the formula that goes well beyond CNL’s “cement and water”.<sup>10</sup> Well-known problems with the use of concrete in encapsulating radioactive

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<sup>7</sup> Pg 1-4, Glossary

<sup>8</sup> <https://www.merriam-webster.com/dictionary/grout>

<sup>9</sup> <https://dictionary.cambridge.org/dictionary/english/grout>

<sup>10</sup> For example, see “In-Situ Grouting of the Low-Level Radioactive Waste Disposal Silos at ORNL’s Solid Waste Storage Area Six”, Environmental Sciences Division Publication No. 4026, Oak Ridge National Laboratory, 1993, as found at <https://www.osti.gov/servlets/purl/10170328> or An Overview of In Situ Waste Treatment Technologies, S. Walker, R. A. Hyde, R. B. Piper, M. W. Roy, Idaho National Engineering Laboratory, presented at the Spectrum '92 Conference, Boise, Idaho (August 1992).

wastes include that, due to the porosity of the material, concrete allows access for water and leaching of radionuclides, and the release of undesirable gases, such as radon. In more recent decades, reliance and research has shifted from the earlier reliance on cement-based formulations to other alternatives, such as microfine cements, polymers, and other materials or other additives.<sup>11</sup>

The draft EIS as submitted by CNL is deficient on three important counts:

- The document provided no substantive description of the grout, and provides no details on the formulation of the grout or what is contained in the mix CNL proposes to apply at the NPD, other than the very generic statement that it will be made up of Portland cement and water
- The document provides no evidence of how CNL selected the particular formulation to be employed in this decommissioning project, or how the intended formulation was selected above alternatives, including alternative formulations such as those using polymers, polyesters, clays, epoxies or other materials<sup>12</sup>
- The document provides no analysis of the inherent challenges in using Portland cement for this purpose, or the means by which these challenges will be addressed or shortcomings resolved.

In addition to the above noted issues related to the use of cement as “grout”, the draft EIS acknowledges that in the course of grouting the below grade structure and demolition there will be a displacing of volatile radionuclides in underground air (and from surface contamination) to the surface environment. While this impact on the biosphere is acknowledged, it is not addressed, nor is sufficient detail provided.

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<sup>11</sup> See, for example, “Polymer Encapsulation of Nuclear Waste: Alternatives to Grout”, UKAEA, as found at [http://www.rsc.org/images/AndrewGreen\\_tcm18-156622.pdf](http://www.rsc.org/images/AndrewGreen_tcm18-156622.pdf)

<sup>12</sup> For clarity: the Northwatch comment is that these alternative materials appear to have not been considered, including as alternative means of carrying out this project. Northwatch has not concluded that these alternative materials would serve as effective barriers in this application, particularly considering the scale and time periods.

The CNL draft EIS states that the purpose of the project is to “safely carry out the decommissioning of the NPDWF”<sup>13</sup>. A reasonable expectation would be that “safe decommissioning” could be equated with the effective isolation of the radio-active hazards in the NPD. Based the information provided in the draft EIS, the grouting-based approach selected by CNL is incapable of achieving that.

For example:

- Following project execution, groundwater that comes into contact with the grout may contain low levels of soluble contaminants that can potentially affect aquatic life<sup>14</sup>
- The draft EIS ambiguously states that “for most of the assessed period, only a small percentage of the initial total radioactivity is released from the NPDWF as soluble contaminants”
- Predictions in the post closure safety assessment is that the grout will gradually degrade as the cement constituents are slowly leached out upon contact with groundwater.<sup>15</sup>
- grouting the below grade structure has the potential to affect ambient radioactivity, through the release of volatile radionuclides in air displaced from the facility and from surface contamination<sup>16</sup>

Given that the filling of the NPD reactor structure with “grout” is the primary activity of CNL’s proposed decommissioning approach and given that the ability of the grout to serve as a barrier between the resident radionuclides and the receiving environment will be the fundamental test of whether the CNL decommissioning approach is successful or not, the above-noted omissions and deficiencies must be judged to be fatal to the CNL application.

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<sup>13</sup> Section 4.1

<sup>14</sup> Sections 2.7.3 and 2.7.4 and 2.7.5 and 2.7.8

<sup>15</sup> Page 4-13

<sup>16</sup> 2.7.7 Ambient Radioactivity

### 3.4 Additional Comments

As a general observation, we found the draft environmental impact statement submitted by Canadian Nuclear Laboratories and posted to the environmental assessment registry in November 2017 to be of poor quality and inadequate to the task of describing and providing an evidentiary basis and technical defence of the CNL proposal.

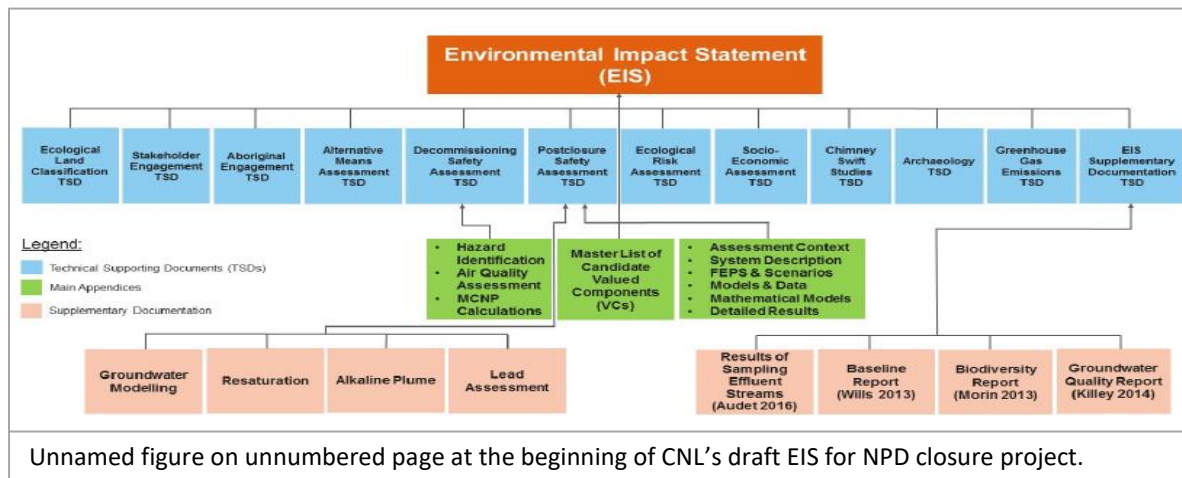
The following comments provide examples of the deficiencies Northwatch identified in our review of the draft environmental impact statement. Three general observations can be made:

- The document is not identified as the draft environmental impact statement; the administrative protocol, the public registry and other sources accurately identify it as a draft document, but the document itself does not
- The document does not identify its authors or provide their credentials or areas of expertise (the consulting firm Arcadis is identified, but no information is provided about the report authors or the expertise of the unidentified author or the consulting group more generally; in visiting the Arcadis web site, exploration to three links deep unveiled no information about the firm's expertise or experience in nuclear waste management or nuclear decommissioning projects)
- Descriptions throughout the draft EIS are overly generalized and lack the specificity and technical basis to be useful in understanding or evaluating the project design and implementation

#### Absence of Supporting Documents

Another significant failing of the Draft EIS is the absence of Technical Support Documents being made publicly available as companions to the Draft EIS. There are numerous technical documents referenced throughout the draft EIS document which were not provided and are not publicly available, but by reference are reasonably expected to provide relevant technical information in support of the EIS. Particularly when reviewing the final Environmental Impact Statement – should the process proceed to that phase – these documents will be necessary to many public intervenors and technical experts who are assisting them.

Document groups include the Draft EIS, Technical Support Documents, Main Appendices and Supplementary Documentation, as per CNL identification.



The following Technical Support Documents appear to be specific to this EIS and are cited in the report but are not provided:

- Aboriginal Engagement TSD
- Alternative Means Assessment TSD
- Archeology TSD
- Chimney Swift TSD
- Decommissioning Safety Assessment (DecomSA) TSD
- Ecological Land Classification (ELC) Technical Supporting Document (TSD)).
- Ecological Risk Assessment (EcoRA) TSD
- Ecological Risk Assessment TSD
- EIS Supplementary Information TSD
- Greenhouse Gas Emmissions TSD
- Postclosure Safety Assessment (PostSA) TSD
- Socio-Economic and Socio-economic Assessment TSD.
- Stakeholder Engagement TSD

Examples of additional referenced documents which should be available for the review include:

Aikens, A.E. 2017. Detailed Decommissioning Plan Nuclear Power Demonstration Waste Facility. 64-508310-DDP-001 Revision 0. Prepared for CNL. August.

Athauda-Arachchige, H. 2015. Safety Analysis Report for the Nuclear Power Demonstration Waste Management Facility. 64-03610-SAR-001. Prepared for CNL. February.

Audet, M. 2016. Results of Sampling Effluent Streams from CNL's Prototype Reactor Decommissioning Sites. 3640-509000-021-000. March.

Calder, N. 2017. Groundwater Modelling at the Site of the Proposed Decommissioned Rolphton Nuclear Power Demonstration (NPD) Reactor. Prepared for CNL. August.

Calder, N. and R. Walsh. 2016. CRL Gas Generation and Transport Model. Prepared for CNL. March.

Canadian Nuclear Laboratories (CNL). 2017a. Environmental Protection Program Description Document. 900-509200-PDD-001 Rev 1, 2017 February.

Canadian Nuclear Laboratories (CNL). 2016a. NPD Airborne and Waterborne Releases (2009 to 2015). 64-509200-016-000-0003 Rev.0.

Canadian Nuclear Laboratories (CNL). 2016b. Characterization Plan for Nuclear and Conventional Hazards of the Nuclear Power Demonstration Waste Facility (NPD). NPD Decommissioning. CNL Report 64-509410-PLA-001. Rev.0. Prepared by Oak Ridge Associated Universities. July.

Canadian Nuclear Laboratories (CNL). 2016c. Evaluation of NPD Air Effluent Stack and Modifications Required for Facility. NPD Decommissioning. CNL Report 64-508340-002. Rev.0. Prepared by WorleyParsons Canada Services Ltd. July.

Chouhan, S. L. and N. Scheier. 2011. Derived Release Limits for AECL's Nuclear Power Demonstration (NPD) Site, Rolphton. 64-96000-NSN-002\_DRL. September.

Davison, C., Gascoyne, M., Sikorsky, E., and Tomsons, R. 1995. Geology, Geophysics and Hydrogeology of Boreholes RH1, RH2 and RH3 drilled at the Chalk River Laboratories Property near Deep River, Ontario. Siting Task Force Tech. Bib. No. 358.

DeWaele, C. 2016. Nuclear Power Demonstration Effluent Monitoring Plan. 64-509200-PLA-001. Prepared for CNL. April.

DeWaele, C. 2013a. Management and Monitoring of Emissions. CW-509200-PRO-001. Prepared for AECL. May.

DeWaele, C. 2013b. Environmental Monitoring Programs. CW-509200-PRO-002. Prepared for AECL. June.

Dolinar, G. 2017. "Plan for Managing PCBs at NPD During Facility Decommissioning (NPD Closure Project)" 64-CNEC-17-0001-L. Letter from G. Dolinar (CNL) to ECCC. 18 May.

Dolinar, G. and Vickerd, M. 2017. Species at Risk Act Request for a Permit. 64-509200-018-000. April.

Dunfield, T. J. and D. Glennie. 2012. NPD WMF - Fire Hazard Analysis. 64-508720-FHA-001. August.

Gillespie, A. 2017. Waste Management Plan for the Nuclear Power Demonstration (NPD) Closure Project. 64-508600-WMP-001. Prepared for CNL. August.

Ingram, J.L. 2017. Emergency Procedure – NPD Building Emergency Procedure. 64-508739-EP-001 Revision 3. Prepared for CNL. January.

International Atomic Energy Agency (IAEA). 2014a. Near Surface Disposal Facilities for Radioactive

Killey, D. 2014. Current Groundwater Quality at NPD. 64-509247-REPT-001. Prepared for CNL. November.

Killey, D. and Bredlaw, M. 2017. Environmental Monitoring at NPD – 2016. 64-509240-055-000. April.

King, D.A. 2017. Historical Site Assessment Report for the Nuclear Power Demonstration Waste Management Facility Rolphton, Ontario. 64-509410-ASD-001. Rev.1. Prepared by ORAU for CNL. April.



Lambert, K. 2016a. Summary of CNL's Greenhouse Gas Reporting Requirements for the 2015 CY. ENVP-509200-021-000-0304. CNL Memo. 17 March.

Lambert, K. 2016b. Summary of CNL's NPRI Reporting for the 2015 CY. ENVP-509200-021-000-0305. CNL Memo. 29 March.

Laraia, M. 2014. Entombment: A Viable Decommissioning Strategy for Research Reactors? International Nuclear Safety Journal. 3(4): 1-10. November.

Lee, D. 2014. Radioactivity in the Bed of the Ottawa River near the Nuclear Power Demonstration Generating Station. 64-509243-REPT-001. Prepared for CNL. September.

Leeson, P. K. 2016. Meteorological Condition for the Environmental Impact Study for the Near Surface Disposal Facility. 148-509200-021-000. Prepared for CNL. April.

Liu, F. 2011. Quality Assurance Plan: Facilities Decommissioning Quality Assurance Plan. 3600-514200-QAO-001. Prepared for AECL. October.

MacLarentech Inc. 1990. Rolphton NPD Waste Management Facility Site Characterisation and Facility Evaluation. Project No. 703725. Prepared for CNL. February.

McCrack, G.D.F. 2016. Geologic Waste Management Facility Descriptive Geosphere Site Model Report: Phase 1. 361101-10260-REPT-005. Prepared for CNL. March.

McVeigh (2017). Characterization Report for the NPDWF Primary Heat Transport and Moderator Systems. CNL Report 64-509410-002May.

Morin, A. and J. Carr. 2015. NPD Biodiversity Report. 64-509200-REPT-002. Prepared for CNL. November.

Murrant, M. 2016. Results of Bat Surveys at NPD. 64-509200-021-000-0016. CNL Memo. June.

Neville, K. 2015. 2014 Annual Compliance Report for Prototype Waste Facilities (Douglas Point, Gentilly-1 & Nuclear Power Demonstration). 3640-00521-REPT-001. Prepared for CNL. May.

New Millennium Nuclear Technologies International, Inc. (NMNTI). 2017. Final Report for the Characterization of NPD Reactor Using Tru-Pro®- Technology. 64-509410-REPT-004. May.

Paterson Group Inc. 2012. Groundwater Sampling and Testing, NPD Waste Management Facility, AECL Candu Site, Rolphton, Ontario. Prepared for CNL by M.S. D'Arcy, 22 August.

Primeau, K. 2016. 2015 Annual Compliance Report for Prototype Waste Facilities (Douglas Point, Gentilly- 1 & Nuclear Power Demonstration). 3640-00521-REPT-002. Prepared for CNL. May.

Schruder, K. 2017. NPD Closure Project Organization. 64-514100-ORG-001. Prepared for CNL. May.

Seto, P. 2015. Interim End State Report: Nuclear Power Demonstration (NPD) Waste Facility. 64-508350-IES-001. Prepared for CNL. October.

Smith, W.M. 1988. Calculated Radioactive Inventory of NPD. 64-01631-021. April.

Stewart, A. 2014. Licence Conditions Handbook for Prototype Waste Facilities (DP, Gentilly-1, & NPD). No. 3640-508760-HBK-001. Rev. 0. August.

Titterton, S. 2016. Environmental Assessment (and/or Environmental Effects Review): Project Description – NPD Closure Project. 64-509200-ENA-003. Prepared for CNL. March.

Titterton, S. 2011. Management of Cultural Resources. ENVP-509213-PRO-001. November.

Walker, J. 2016. Licensing Plan. Licensing and Environmental Assessment for NPD – NPD Closure Project. Prepared for CNL by Arcadis Canada Inc. May.

Wills, A. 2013. Nuclear Power Demonstration Site: A Description of the Environmental Baseline for Decommissioning. 64-509200-ENA-001. Prepared for CNL. February.

## Description of Location

It may seem a small point, but Northwatch suggests that errors in the details in the Draft EIS may tell the tale for CNL’s environmental assessment abilities more generally. For example, in the opening page of both the executive summary<sup>17</sup> and the Project Description<sup>18</sup> of the draft Environmental Impact Statement, the unidentified report authors erroneously identify the project as being located in Rolphton Township, rather than Rolph Township. For those unfamiliar with the project or the area it is perhaps an understandable error, confusing the nearby community of Rolphton with the similar name of Rolph Township, but Northwatch would assert that those proposing to undertake a project of this long term and considerable significance should be very familiar with both the project and the area, and should be very attentive to all details.



Further, Section 3.1 titled “Location of the Project” describes the project site as being in a “remote”. In the same section, the report goes on to identify the site as having area residents living only 1 km away, and acknowledge the hamlet of Rapides-des-Joachims is only 3 km with a year round population of 170 (no estimate is provided of a season residents or short term visitors in this major recreational centre) and an additional 7,000 residents living downstream within approximately 20 km on the Ontario side of the river (no population numbers are provided for Quebec residents in this section).<sup>19</sup>

On what basis and for what purpose does CNL describe this site as “remote”? While we would agree with CNL’s very general statement that the area has a “relatively low population density”,

### 1.1 Definition of REMOTE

- 1: separated by an interval or space greater than usual
- 2: far removed in space, time, or relation :
- 3: OUT-OF-THE-WAY, SECLUDED a remote cabin in the hills

Source: <https://www.merriam-webster.com/dictionary/remote>

<sup>17</sup> Draft EIS, Page 2-1

<sup>18</sup> Draft EIS, Section 3.1 Location of the Project

<sup>19</sup> Draft EIS, Section 3.1 Location of the Project

this is the case relative to urban centres, but does not by default make this site “remote”. Our experiences and observations in northern Ontario is that the term “remote” is on occasion used by proponents who wish to suggest that the consequence of harm will be less serious if there are fewer people in the area to be affected by adverse outcomes. In our assessment, the NPD site does not match any of the accepted definitions of “remote” and the selection of “remote” as a descriptor in this instance is both dismissive and erroneous.

### Project Purpose

The draft EIS variously describes the purpose of the project in Sections 2.1, 2.2.1, 3.2 and 4.1 as being to “safely decommission the NPDWF, ensuring a reduction of Canadian legacy long-term liabilities and eliminating interim waste storage, while reducing worker risk and transport/waste handling risk”<sup>20</sup>, to “safely carry out the decommissioning of the NPDWF using the in-situ decommissioning approach to isolate the contaminated systems and components inside the below-grade structure”<sup>21</sup>, to “safely carry out the decommissioning of the NPDWF”<sup>22</sup>.

While the various statements do not directly conflict, neither do they fully coincide. Perhaps more importantly, the various purpose statements:

- Conflate purpose and method
- Fail to meet the requirements of the Operational Policy in that it does not provide “the rationale or reasons for which the designated project would be carried”<sup>23</sup>, particularly not in the context of the purposes of CEAA 2012; rather, the various statements are statements of intent rather than of purpose; singly and in combination they stated what the proponent intends to do, rather than why they intend to undertake the project
- Fail to meet the purposes of CEAA 2012, which identifies the first purpose of environmental assessment as being to “to protect the components of the environment that

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<sup>20</sup> 2.1 Introduction

<sup>21</sup> 2.2.1 Purpose

<sup>22</sup> 3.2 and 4.1 Purpose of Project

<sup>23</sup> Operational Policy Statement: Addressing “Purpose of” and “Alternative Means” under the *Canadian Environmental Assessment Act, 2012*

are within the legislative authority of Parliament from significant adverse environmental effects caused by a designated project” in that it does not it does not speak to the protection of those “components”, including the Ottawa River, endangered species, human health, and the rights of Indigenous peoples

### Radioactive Waste Inventory and Characterization

Northwatch notes with interest that CNL described various radioactive wastes on the NPD sites as wastes that would generated by the project, rather than as wastes that had been generated through NPD operations and would managed through the project.<sup>24</sup>

Concerns with the CNL address if radioactive waste issues in the draft EIS include the following:

- the radionuclide inventory of the reactor was estimated using mathematical models, rather than actual measurements; while CNL indicates that they have “also taken samples of reactor components to verify the estimated inventory” that statement was extremely vague and CNL provides no clear indication of which numbers are based on measures versus which are based on models
- CNL indicates that “Contamination in other areas of the NPDWF has been estimated based on previous measurements. These data have been combined with estimates of the amount of material that is contaminated in each room to derive an inventory for the main system, components or stored waste” but provides insufficient detail or information about the basis for estimates included in the draft EIS
- In some sections of the draft EIS CNL makes precise statements about total residual radioactivity (eg by 2018) but is unclear on whether these definitive statements are based on measurements or on modelling<sup>25</sup>

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<sup>24</sup> 2.2.3 Wastes and Emissions

<sup>25</sup> Draft EIS, page 3-10

### NPD Ownership

The draft EIS erroneously states that Ontario Hydro then turned over ownership of the facility to Atomic Energy of Canada Limited (AECL) in September 1988.<sup>26</sup> As the CNSC will be well aware, the facility was never owned by OPG; rather, since construction, it was owned by AECL and operated by Ontario Hydro (now OPG).<sup>27</sup> As with the errors in describing the location, this error may not be significant from a technical perspective, but does signal a sloppiness that is of increasing concern as the EIS moves from the general information to the more substantive descriptions and as the project potentially moves from application to operation.

### Radiological Liquid Waste Tank

Section 3.1.1 includes a statement that three underground storage tanks - used for diesel, heating furnace oil, and radiological liquid waste - were located on the NPD site, but have since been removed and the surrounding soil remediated<sup>28</sup> and an almost identical statement is included at the conclusion of Section 3.3.1<sup>29</sup> but no additional information is included. In particular, the draft EIS does not characterize the radiological liquid waste or describe the method or extent (and end state) or the remediation effort. This information is necessary to understanding site conditions, and should be included in the EIS.

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<sup>26</sup> Section 3.1.1. 11

<sup>27</sup> <https://canteach.candu.org/Content%20Library/19930101.pdf>

<sup>28</sup> 3.1.1 Description of Site and Vicinity+

<sup>29</sup> 3.3.1 Structures at the NPD Site

## 4. Conclusions

Northwatch's conclusion of the review of CNL's draft EIS for the NPD project are similar if not identical to conclusions on the review of CNL's draft EIS for the Whiteshell Reactor decommissioning project. Although the projects differ somewhat and different consultants were retained by CNL for each project – which presumably explains the slight variations between the two project presentations – the fundamental failures are common to the two projects, as outlined below.

As outlined in this submission and in the submissions of many other intervenors and review participants, the proponent and their consultants have failed to produce a credible environmental impact statement and set of supporting documents; what CNL has submitted as a draft environmental impact statement simply does not provide the basis for proceeding in the environmental assessment process.

There are several potential causes for this failure; we offer three:

- The proponent is seeking to avoid the scrutiny that would come from a rigorous assessment process by simply starving the process of necessary information
- The project is not sufficiently developed to provide an adequate description with sufficient supporting information
- The project is simply not viable, and evidence in its support cannot be presented due to the fundamental flaws with the project concept and design

The way forward for this project is not clear. Yes, the EIS needs to be revised and to a large degree redone, and several supporting documents need to be provided or developed and then provided. Clearly, there is a large investment of effort required of CNL before they will be in a position to complete a revised EIS; what is unclear is whether CNL has the commitment and the capacity to meet these challenges.

As the responsible authority, the Canadian Nuclear Safety Commission must ensure that the review is rigorous, that the social and technical scientific findings presented by CNL in support of any eventual project are sound, and that public and indigenous engagement and scientific

investigation are not sacrifice to meet the Canadian Nuclear Energy Alliance / Canadian Nuclear Laboratories business needs.

In the immediate, we make three requests of the Canadian Nuclear Safety Commission:

- Require CNL to respond to information gaps and deficiencies and questions raised by public intervenors and review participants before the review proceeds
- Require CNL to resubmit a revised draft EIS after the above step has been completed, and make it subject to a public review and review by the federal departments in a manner similar to the review closing February 2018
- Review the protocol between CNSC and CNL in an open and transparent manner, engaging the public and indigenous peoples in a process that leads to a revision of the protocol, including and particularly the timeline, to improve the review process and better accommodate the level of public and indigenous interest and better reflect lessons learned in this process to date

In particular, Northwatch requests that the a full suite of technical support documents be made publicly available in advance of the public review period for the revised draft EIS (examples provided above) and that the information requests forwarded by Northwatch receive a response from CNL in a timely fashion.

Northwatch looks forward to continued engagement in this review process and additional opportunities to provide input into the review of this project.

Canadian Nuclear Laboratories Proposed In Situ  
Decommissioning of the Nuclear Power  
Demonstration Project at Rolphton, Ontario

# Northwatch Information Requests

CNL's Draft Environmental Impact  
Statement 2017

CEAA Reference No. 80121

February 2018

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Information Requests prepared and provided by Northwatch

13 February 2018

Box 282, North Bay, Ontario, P1B 8H2

[www.northwatch.org](http://www.northwatch.org) E:[northwatch@northwatch.org](mailto:northwatch@northwatch.org) T: 705 497 0373

## Northwatch Information Requests Following Review of Draft Environmental Impact Statement Environmental Impact Statement for the Proposed “In Situ” Decommissioning of WR-1 at the Whiteshell Laboratories, Pinawa, Manitoba

IR#	EIS Page	EIS Section	Description / EIS Excerpt	Discussion	IR
1	3-4	<b>3.1.1</b>	The EIS identifies that a tank for radiological liquid waste was located on the NPD site, but has since been removed and the surrounding soil remediated (King 2016).	This is the single reference to this tank. Insufficient information is provided about its location, hazard and remediation	Provide a detailed description of the radiological liquid waste tank, details of its removal, and a detailed description of the residual site conditions. An exact location should be included, and soil monitoring results.
2	3-8	3.2	In numerous locations, including this example, the draft EIS makes statements with respect to the predicted or estimated radioactivity, as in section 3.2 and the statement “The total residual radioactivity by 2018 will have decayed to $4.7 \times 10^{13}$ Bq and is dominated by long-lived beta and gamma radionuclides.”	The draft EIS acknowledges that some of the statements of levels of radioactivity are measured and some are estimated, but in many instances does not indicate whether the level being communicated is measured or estimated.	Clearly state in each instance where a level of radioactivity is communicated whether that level is a result of measurement or of estimation, and the methods used for that measure or estimation.
3	4-5	4.2	The draft EIS states that “this approach involves removal of the reactor system and components. The preliminary assumptions are that the feeders, pressure tubes, calandria tubes, calandria and associated bioshielding will all be removed, and the fuel handling room will be decommissioned.”	The draft EIS is ambiguous on what radioactive components will remain in situ.	Clearly state what of the reactor system and components will be left in situ, the basis for making these decisions, and the final disposition of all removed components. This discussion should include a detailed characterization of the associated radiological hazard of all components, including structures.
4	4-5	4.2	The draft EIS states that “a few drums of waste from the spent fuel bay cleanup would likely also be removed.”	This is the only reference found to these “few drums”; more details information is required	Provide a detailed description of the “few drums” referenced in section 4.2, including a detailed characterization of

IR#	EIS Page	EIS Section	Description / EIS Excerpt	Discussion	IR
					the associated radiological hazard, the volumes, current and proposed system / state of containment
5	4-12 to 4-15	4.3.1	The draft EIS describes the project as being to fill “All below-grade areas” with grout. This activity is described or referenced in numerous locations, including Sections 4.	No actual description of the grout is provided, or of its qualities, abilities to serve as a barrier or contribute to containment, or related challenges.	Provide a detailed description of the grout to be used, including its formulation, the alternative formulations that were considered, alternative barriers that were considered, and the reasons for selecting grout as the preferred media and the selected formulation.
6	4-12 to 4-15 9-6	4.3.1 9.1.1.1	The draft EIS describes the project as being to fill “All below-grade areas” with grout. This activity is described or referenced in numerous locations, including Sections 4.	Predictions in the post closure safety assessment is that the grout will gradually degrade as the cement constituents are slowly leached out upon contact with groundwater. This is not sufficiently addressed in the draft EIS.	Provide a detailed description of the interactions between the grout/concrete and water over time, including in the long term. Include estimates of radiological releases and the basis for those estimates.
7	4-12 to 4-15	4.3.1	The draft EIS describes the project as being to fill “All below-grade areas” with grout. This activity is described or referenced in numerous locations, including Sections 4.	Components to be left in the below-grade areas will include metal. There are known interactions between metal and concrete over time that are not outlined in the draft EIS.	Provide a detailed description of the interactions between the grout/concrete and metal over time, including in the long term. Include estimates of radiological releases and/or other hazards and the basis for those estimates.
8		4.4.1.1	The draft EIS states that “the radiological inventory comprises the radionuclides that would remain in NPDWF as part of the in-situ decommissioning strategy. These will primarily be associated with the reactor system (pressure tubes, calandria, and associated structures), as well as contamination within the heat transfer system, equipment for spent fuel storage and handling, facility structure and historic drummed waste.”	The radiological inventory that would be left in the below-grade areas is not sufficiently detailed in the draft EIs.	Provide a detailed radiological inventory for all components that would be left in the below-grade areas, including levels of radioactivity over time. The inventory should include per component and total levels, and indicated if the provided

IR#	EIS Page	EIS Section	Description / EIS Excerpt	Discussion	IR
					levels are the result of measures, estimates, or some combination thereof.
9	4-19	4.4	The draft EIS states: “By selecting a strategy of in situ decommissioning, the project end state results in a disposal facility for the waste inventory at the NPD site”	While indicating that there selected strategy will result in an altered end state (compared to the null option), but does not indicated what the intended end state will be, or what the decommissioning objective is.	Provide a clear and detailed statement that identifies the intended end state for the NPD property and the decommissioning objectives and how they will be met. These statements and objectives should reference Canadian and international standards and guidance, and should reflect current and future site conditions at the NPD property. Particular attention should be paid to any potential impacts, or mitigation of impacts, on the Ottawa River.
10	5-6	5.2.1.2	The draft EIS states that institutional controls are expected to remain in place for a period of 100 years is assumed (PostSA TSD), and further states that “100 years is a conservative assumption for cessation of institutional controls”	A period of 100 years for institutional controls is stated, and claimed to be conservative, but no basis for the selection of 100 years is provided. A period of 300 years is more common in Canadian proposals for long term waste disposition projects.	Provide a basis for the selection of 100 years for institutional controls from a safety perspective, and a description of how the period of 100 years was selected over alternative lengths, including but not limited to consideration of a period of 300 years.
11	8-35	8.3.2.1	The draft EIS indicates that groundwater modelling has been undertaken at the NPD site and draws conclusions on groundwater flows based on the referenced report.	A groundwater modelling report is referenced but not provided. It is not clear if actual groundwater monitoring results are not compared to the modelling report as verification.	Provide a copy of the referenced groundwater modelling report, a full suite of groundwater monitoring reports / results, and a discussion of how the groundwater modelling report

IR#	EIS Page	EIS Section	Description / EIS Excerpt	Discussion	IR
					and the monitoring results indicate in relation to each other.
12	8-37	8.3.3.	Table 8.3-1. “WAS Annual Radioactive Release” provides data for 1997 to 2015 for several parameters.	Table 8.3-1. “WAS Annual Radioactive Release” is missing data in several categories for several years.	Replace the table with one fully populated with data, or provide a detailed explanation as to why data is missing.
13	8-67	8.5.3	Table 8.5-1. presents Concentrations of Tritium (HTO) in Surface Soil near NPD (in Bq/L) for the years 1988 to 2015,	Table 8.5-1 presents a set of data presented, but there is no discussion of significance, what CNL learns from that data. For example, text should discuss the significance of the concentrations relative to sampling site; any rationale for spikes (eg NPD-NE in 2012), and other observations.	Provide a discussion of the significance of the data, including an explanation of any anomalies.
14	8-77		The draft EIS indicates that groundwater seepage into the facility is directed to the lowest point at the WAS and that this sump is periodically pumped to the Ottawa River after the water has been sampled and analysed.	The draft EIS indicates that groundwater seepage in the vicinity of and through the below-grade area is collected and then periodically pumped to the Ottawa River. No sampling results are provided.	Provide a record of sampling results for the WAS, including volume and parameters. By providing a full data set, the sampling frequency will also become known.
15	Throughout	Throughout	The draft EIS is not accompanied by a sufficient level of detail or technical supporting documents.	There are numerous technical documents referenced throughout the draft EIS document which were not provided and are not publicly available, but by reference are reasonably expected to provide relevant technical information in support of the EIS.	Provide the list of documents included in Section 3.4 of the Northwatch submission. See Appendix A to this set of information requests.

## Appendix 1

The following Technical Support Documents appear to be specific to this EIS and are cited in the report but are not provided:

- Aboriginal Engagement TSD
- Alternative Means Assessment TSD
- Archaeology TSD
- Chimney Swift TSD
- Decommissioning Safety Assessment (DecomSA) TSD
- Ecological Land Classification (ELC) Technical Supporting Document (TSD)).
- Ecological Risk Assessment (EcoRA) TSD
- Ecological Risk Assessment TSD
- EIS Supplementary Information TSD
- Greenhouse Gas Emissions TSD
- Postclosure Safety Assessment (PostSA) TSD
- Socio-Economic and Socio-economic Assessment TSD.
- Stakeholder Engagement TSD

Examples of additional referenced documents which should be available for the review include:

- Aikens, A.E. 2017. Detailed Decommissioning Plan Nuclear Power Demonstration Waste Facility. 64-508310-DDP-001 Revision 0. Prepared for CNL. August.
- Athauda-Arachchige, H. 2015. Safety Analysis Report for the Nuclear Power Demonstration Waste Management Facility. 64-03610-SAR-001. Prepared for CNL. February.
- Audet, M. 2016. Results of Sampling Effluent Streams from CNL's Prototype Reactor Decommissioning Sites. 3640-509000-021-000. March.
- Calder, N. 2017. Groundwater Modelling at the Site of the Proposed Decommissioned Rolphton Nuclear Power Demonstration (NPD) Reactor. Prepared for CNL. August.
- Calder, N. and R. Walsh. 2016. CRL Gas Generation and Transport Model. Prepared for CNL. March.
- Canadian Nuclear Laboratories (CNL). 2017a. Environmental Protection Program Description Document. 900-509200-PDD-001 Rev 1, 2017 February.
- Canadian Nuclear Laboratories (CNL). 2016a. NPD Airborne and Waterborne Releases (2009 to 2015). 64-509200-016-000-0003 Rev.0.
- Canadian Nuclear Laboratories (CNL). 2016b. Characterization Plan for Nuclear and Conventional Hazards of the Nuclear Power Demonstration Waste Facility (NPD). NPD Decommissioning. CNL Report 64-509410-PLA-001. Rev.0. Prepared by Oak Ridge Associated Universities. July.
- Canadian Nuclear Laboratories (CNL). 2016c. Evaluation of NPD Air Effluent Stack and Modifications Required for Facility. NPD Decommissioning. CNL Report 64-508340-002. Rev.0. Prepared by WorleyParsons Canada Services Ltd. July.

Chouhan, S. L. and N. Scheier. 2011. Derived Release Limits for AECL's Nuclear Power Demonstration (NPD) Site, Rolphton. 64-96000-NSN-002\_DRL. September.

Davison, C., Gascoyne, M., Sikorsky, E., and Tomsons, R. 1995. Geology, Geophysics and Hydrogeology of Boreholes RH1, RH2 and RH3 drilled at the Chalk River Laboratories Property near Deep River, Ontario. Siting Task Force Tech. Bib. No. 358.

DeWaele, C. 2016. Nuclear Power Demonstration Effluent Monitoring Plan. 64-509200-PLA-001. Prepared for CNL. April.

DeWaele, C. 2013a. Management and Monitoring of Emissions. CW-509200-PRO-001. Prepared for AECL. May.

DeWaele, C. 2013b. Environmental Monitoring Programs. CW-509200-PRO-002. Prepared for AECL. June.

Dolinar, G. 2017. "Plan for Managing PCBs at NPD During Facility Decommissioning (NPD Closure Project)" 64-CNEC-17-0001-L. Letter from G. Dolinar (CNL) to ECCC. 18 May.

Dolinar, G. and Vickerd, M. 2017. Species at Risk Act Request for a Permit. 64-509200-018-000. April.

Dunfield, T. J. and D. Glennie. 2012. NPD WMF - Fire Hazard Analysis. 64-508720-FHA-001. August.

Gillespie, A. 2017. Waste Management Plan for the Nuclear Power Demonstration (NPD) Closure Project. 64-508600-WMP-001. Prepared for CNL. August.

Ingram, J.L. 2017. Emergency Procedure – NPD Building Emergency Procedure. 64-508739-EP-001 Revision 3. Prepared for CNL. January.

International Atomic Energy Agency (IAEA). 2014a. Near Surface Disposal Facilities for Radioactive

Killey, D. 2014. Current Groundwater Quality at NPD. 64-509247-REPT-001. Prepared for CNL. November.

Killey, D. and Bredlaw, M. 2017. Environmental Monitoring at NPD – 2016. 64-509240-055-000. April.

King, D.A. 2017. Historical Site Assessment Report for the Nuclear Power Demonstration Waste Management Facility Rolphton, Ontario. 64-509410-ASD-001. Rev.1. Prepared by ORAU for CNL. April.

Lambert, K. 2016a. Summary of CNL's Greenhouse Gas Reporting Requirements for the 2015 CY. ENVP-509200-021-000-0304. CNL Memo. 17 March.

Lambert, K. 2016b. Summary of CNL's NPRI Reporting for the 2015 CY. ENVP-509200-021-000-0305. CNL Memo. 29 March.

Laraia, M. 2014. Entombment: A Viable Decommissioning Strategy for Research Reactors? International Nuclear Safety Journal. 3(4): 1-10. November.

Lee, D. 2014. Radioactivity in the Bed of the Ottawa River near the Nuclear Power Demonstration Generating Station. 64-509243-REPT-001. Prepared for CNL. September.

Leeson, P. K. 2016. Meteorological Condition for the Environmental Impact Study for the Near Surface Disposal Facility. 148-509200-021-000. Prepared for CNL. April.

Liu, F. 2011. Quality Assurance Plan: Facilities Decommissioning Quality Assurance Plan. 3600-514200-QAO-001. Prepared for AECL. October.

MacLarentech Inc. 1990. Rolphton NPD Waste Management Facility Site Characterisation and Facility Evaluation. Project No. 703725. Prepared for CNL. February.

McCrank, G.D.F. 2016. Geologic Waste Management Facility Descriptive Geosphere Site Model Report: Phase 1. 361101-10260-REPT-005. Prepared for CNL. March.

McVeigh (2017). Characterization Report for the NPDWF Primary Heat Transport and Moderator Systems. CNL Report 64-509410-002May.

Morin, A. and J. Carr. 2015. NPD Biodiversity Report. 64-509200-REPT-002. Prepared for CNL. November.

Murrant, M. 2016. Results of Bat Surveys at NPD. 64-509200-021-000-0016. CNL Memo. June.

Neville, K. 2015. 2014 Annual Compliance Report for Prototype Waste Facilities (Douglas Point, Gentilly-1 & Nuclear Power Demonstration). 3640-00521-REPT-001. Prepared for CNL. May.

New Millennium Nuclear Technologies International, Inc. (NMNTI). 2017. Final Report for the Characterization of NPD Reactor Using Tru-Pro®- Technology. 64-509410-REPT-004. May.

Paterson Group Inc. 2012. Groundwater Sampling and Testing, NPD Waste Management Facility, AECL Candu Site, Rolphoton, Ontario. Prepared for CNL by M.S. D'Arcy, 22 August.

Primeau, K. 2016. 2015 Annual Compliance Report for Prototype Waste Facilities (Douglas Point, Gentilly- 1 & Nuclear Power Demonstration). 3640-00521-REPT-002. Prepared for CNL. May.

Schruder, K. 2017. NPD Closure Project Organization. 64-514100-ORG-001. Prepared for CNL. May.

Seto, P. 2015. Interim End State Report: Nuclear Power Demonstration (NPD) Waste Facility.64-508350-IES-001. Prepared for CNL. October.

Smith, W.M. 1988. Calculated Radioactive Inventory of NPD. 64-01631-021. April.

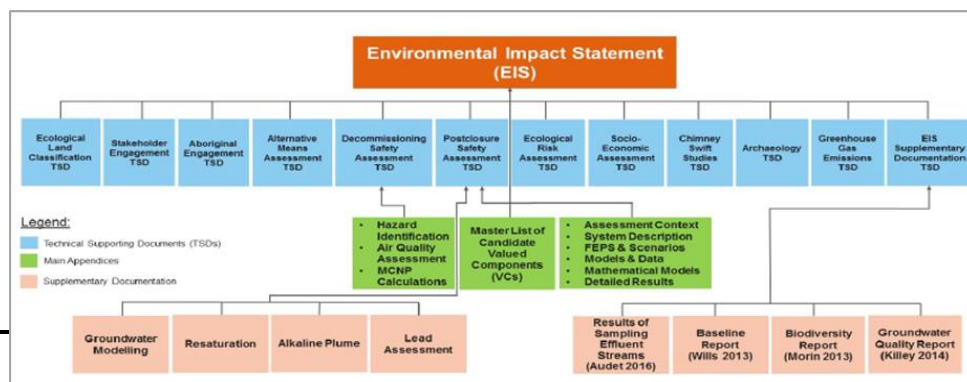
Stewart, A. 2014. Licence Conditions Handbook for Prototype Waste Facilities (DP, Gentilly-1, & NPD).No. 3640-508760-HBK-001. Rev. 0. August.

Titterington, S. 2016. Environmental Assessment (and/or Environmental Effects Review): Project Description – NPD Closure Project. 64-509200-ENA-003. Prepared for CNL. March.

Titterington, S. 2011. Management of Cultural Resources. ENVP-509213-PRO-001. November.

Walker, J. 2016. Licensing Plan. Licensing and Environmental Assessment for NPD – NPD Closure Project. Prepared for CNL by Arcadis Canada Inc. May.

Wills, A. 2013. Nuclear Power Demonstration Site: A Description of the Environmental Baseline for Decommissioning. 64-509200-ENA-001. Prepared for CNL. February.



The full suite of documents identified in CNL's unnumbered figure on the unnumbered page at the beginning of the draft EIS should be made available.