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## **Supplementary Information**

**Written submission from  
Lake Ontario Waterkeeper  
and Ottawa Riverkeeper**

## **Renseignements supplémentaires**

**Mémoire de  
Lake Ontario Waterkeeper et  
Sentinelle Outaouais**

**Regulatory Oversight Report for  
Canadian Nuclear Laboratories  
(CNL) sites: 2018**

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**Rapport de surveillance réglementaire  
des sites des Laboratoires Nucléaires  
Canadiens (LNC) : 2018**

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Commission Meeting

Réunion de la Commission

November 7, 2019

Le 7 novembre 2019

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Amendments have been made to these submissions to reflect additional information that has been received by Ottawa Riverkeeper and Lake Ontario Waterkeeper since October 7.

In addition to some typographical corrections, the following changes were made to these previously submitted main report:

- 1) Recommendation #20 no longer requires that CNL confirm whether a DFO permit has been issued for any Chalk River facilities. This recommendation still requests that any assessments accompanying the permit application be provided. Now it also requests a timeline for CNSC staff consideration of the permit;
- 2) Recommendation #21 no longer requires that CNL confirm whether there are any ECAs for the Chalk River site. This recommendation still requests any assessments that were undertaken to determine whether one was necessary;
- 3) Discussions of issues concerning DFO permits and ECAs on page 20 have been updated to reflect the fact that Ottawa Riverkeeper is no longer waiting for confirmation of whether there are any DFO permits or ECAs for the Chalk River site. However, formal access to information requests are still ongoing to provide more background information on both DFO and ECA assessments, and CNL has still been asked to provide this information as well; and
- 4) Discussions of the Port Hope Harbour wall collapse on page 26 have been amended to reflect additional disclosures received since October 7. The discussion also includes a new undertaking by LOW to provide further analysis concerning the event in the LOW submission during its Processing ROR intervention (due Nov 12).

Appendix A to the main submissions have also been updated to include references to disclosures received since October 7.

Please note Appendices B, C, and D are unchanged.





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# **Updated Submissions of Lake Ontario Waterkeeper and Ottawa Riverkeeper**

**Re: 2018 CNSC Staff Regulatory Oversight Report Meeting  
concerning Canadian Nuclear Laboratories Sites**

Notice of Public Meeting: Ref 2019-M24

October 30, 2019

Submitted to:

Participant Funding Program Administrators [cnsccpsn@canada.ca](mailto:cnsccpsn@canada.ca) and the CNSC Secretariat  
[cnsccinterventions.ccsn@canada.ca](mailto:cnsccinterventions.ccsn@canada.ca)

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Appendix B: Expert Report of Dr. Markelova

Appendix C: CV of Pippa Feinstein, JD, LL.M

Appendix D: CV of Dr. Ekaterina Markelova

## Executive Summary

Ottawa Riverkeeper (ORK) is a charity that seeks to inspire action and collaboration in order to achieve a healthy Ottawa River in which every person can safely swim, drink, and fish. We work to encourage responsible decision making, to hold polluters accountable, and to recommend alternative practices and policies to safeguard our local waterways. We are also first responders on the river to investigate spills and harmful pollution that may impact aquatic life and public health.

Lake Ontario Waterkeeper (LOW) is a Canadian charity working for a day when every person in our watershed can safely touch the water, when the water is pure enough to drink, and when the lake is clean and wild enough that you could toss in a line anywhere and pull out a fish. Our work connects and empowers people in order to stop pollution, protect human health, and restore habitat. Our programs bring together law, science, culture, digital media and public education to achieve our goals, and we regularly assist in environmental decision-making processes as members of stakeholder advisory committees and through legal interventions.

ORK and LOW are collaborating jointly on this intervention and have retained two external experts to assist in the preparation of these submissions:

1. **Pippa Feinstein, JD, LLM** as case manager, legal counsel, and expert on public information-sharing policies and practices; and
2. **Dr. Ekaterina Markelova**, an expert on environmental modelling and biogeochemistry who provided the qualitative assessment of environmental contamination at the Chalk River complex with regard to the natural water bodies (wetlands, surface and groundwater).

These submissions begin by addressing certain concerns relating to intervention procedures and make several recommendations for immediate and longer-term solutions.

These submissions are also drafted to provide Commissioners with:

- 1) An evaluation of deficits in public information disclosure by CNL at Chalk River;
- 2) An overview of some potential environmental concerns from ORK's perspective concerning CRL impacts to local waterways and the need for more specific disclosures related to these identified concerns;
- 3) Associated recommendations for improvement at Chalk River; and
- 4) Recommendations concerning potential improvements to emergency/incident public alerts in Port Hope.

Finally, this intervention has been drafted to provide members of the public with:

- 5) A better understanding of how existing and still functioning facilities at the site operate;
- 6) A better understanding of the extent to which operating and retired facilities and current waste sites are contained; and
- 7) A better understanding of an event last year in which the west wall of the Port Hope Harbour collapsed, including the event's potential impacts to water quality in the area and the efficacy of subsequent mitigation measures.

## About the intervenors

Ottawa Riverkeeper (ORK) is a charity that seeks to inspire action and collaboration in order to achieve a healthy Ottawa River in which every person can safely swim, drink, and fish. We work to encourage responsible decision making, to hold polluters accountable, and to recommend alternative practices and policies to safeguard our local waterways. We are also first responders on the river to investigate spills and harmful pollution that may impact aquatic life and public health.

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## Current intervention opportunity

ORK and LOW have examined two sites and projects administered by Canadian Nuclear Laboratories (CNL): the Chalk River Laboratories (CRL) complex, and the Port Hope Area Initiative (PHAI).

### Chalk River Laboratories

ORK was granted funding to examine the Chalk River site with a particular focus on its information sharing mechanisms and its impact to local ground and surface water.

The organization is a member of Chalk Nuclear Laboratories' (CNL) Environmental Stewardship Council (ESC). The ESC was started by Atomic Energy Canada Limited – Chalk River in 2006 in response to a recommendation of the Canadian Nuclear Safety Commission (CNSC). Through participation in the ESC, ORK has developed considerable knowledge of operations at CRL and the wastes that have accumulated at the site over its lifetime. This experience has highlighted the importance and urgency of dealing with all wastes at this site in a responsible and safe manner.

ORK submitted an intervention in last year's licence renewal process, however it did not retain experts at that time. The main objective for this current intervention is to better understand the Chalk River site – and in turn, assist members of the public to do the same. Unfortunately, due to several interrelated factors, including the complexity and age of the site and its facilities, there is a considerable lack of transparency concerning its exact make up and specific impacts on surrounding surface and groundwater.

More specifically, this intervention seeks to provide Commissioners with:

- 1) An evaluation of deficits in public information disclosure by CNL;



- 2) An overview of some potential environmental concerns from ORK's perspective concerning CRL impacts to local waterways and the need for more specific disclosures related to these identified concerns; and
- 3) Associated recommendations for improvement.

It has also been drafted to provide members of the public with:

- 4) A better understanding of how existing and still functioning facilities at the site operate; and
- 5) A better understanding of the extent to which operating and retired facilities and current waste sites are contained.

### **Port Hope Area Initiative**

LOW was granted funding to examine an unplanned release event resulting from the collapse of the West Harbour Wall of Port Hope Harbour in October 2018.

LOW has been involved with decision-making processes for the PHAI for over a decade. The organization has also enjoyed long-standing relationships with many Port Hope residents since its founding in 2001. The organization intervened in 2009 during the Environmental Assessment (EA) for the PHAI, in 2012 during its licence hearing which ultimately granted a 10-year licence for remediation work, and again in October and November 2016 during a Commission meeting to review the PHAI.

This intervention seeks to provide members of the public with:

- 1) A better understanding the event, its potential impacts to water quality in the area, and the efficacy of subsequent mitigation measures;

It has also been drafted to provide Commissioners and CNSC staff with:

- 2) recommendations concerning the improvement of emergency/incident public alerts and subsequent messaging related to this and any other unplanned events.

However, before discussing these issues, certain concerns relating to intervention procedures must be briefly outlined.

### **Concerns with current Commission Meeting intervention processes**

The Waterkeeper and Riverkeeper organizations have long expressed concerns with significant shortcomings involved with CNSC intervention proceedings, whether they be Commission meetings or hearings. These concerns should not surprise Commissioners or CNSC staff as they have been repeatedly expressed by both LOW and ORK in almost all past Commission hearings and meetings. Similar concerns have also been expressed by other public interest organizations and environmental non-government organizations who regularly intervene in meetings and hearings.

Ultimately, intervening in CNSC meetings and hearings is an unnecessarily fraught process that can at times disrespect the time and expertise of members of the public and public interest organizations who are deeply concerned about nuclear industrial operations and their regulation. Procedural deficits in the intervention regime compromise the CNSC's regulatory transparency and strain the relationship between the regulator and civil society. Immediate concerns apply to timelines for public interventions, and associated challenges with access to information (especially environmental data). However, there is an urgent need to more formally review CNSC intervention procedures in consultation with public stakeholders.

## **Timelines**

Just under three months were provided as notice for funding applications, with the notice published on February 25, and funding applications due May 17, 2019. Once applications were submitted, it took another three months to render a funding decision, which was received by ORK and LOW on August 9, 2019. This left only two months for LOW and ORK to: secure third-party expert consultants; revise the scope of study to reflect actual funding amounts offered; obtain information from CNSC staff, CNL, and other government agencies responsible for overseeing the subjects of study; not to mention understanding, synthesizing, analysing information received, and drafting legal arguments and scientific/technical findings. Further, the CNSC staff Commission Member Document (CMD) that forms the basis for the current intervention opportunity was only made available on September 5, effectively providing a month for its review.

At least three months should be afforded by the CNSC to intervenors for their reviews. This period would span from the date on which organizations are notified of the actual granted funding amounts until the date on which written submissions are due. The release of CNSC staff CMDs should be made as soon as possible to the funding announcement date to further assist intervenors in preparing their written submissions.

In this current intervention opportunity, the CNSC staff CMD was completed August 16, and released September 6, 2019. Had the report been completed only two weeks earlier, and released immediately, it would have doubled the time over which it would have been available to intervenors. Making such amendments to CNSC staff CMD release times should not be considered too onerous to be applied by the Commission

*Recommendation 1: that the CNSC ensure intervenors have at least three months to prepare written interventions for future public meetings. This time period would span from date on which organizations are notified of the actual granted funding amounts until the date on which written submissions are due.*

*Recommendation 2: that CNSC Staff ensure their CMD is available at least two months in advance of due dates for written interventions.*

## **Access to information**

Current timelines often mean that interventions focus mainly on obtaining information, and often have to be drafted without having received sufficient responses to requests. Further, there is also insufficient time left for actual synthesis and analysis of information received.

In the case of this intervention, formal Access to Information requests were demanded by two agencies to respond to ORK information requests. Under the applicable federal and provincial access to information legislation, agencies have 30 days to initially respond to requests for information and then several weeks to refine and understand requests. It can ultimately take several weeks or months for agencies to actually provide requested records. In the current case, no records (requested pursuant to legislated Access to Information processes) have been provided to date to ORK, and limited information has been provided to LOW from provincial, federal, and municipal bodies. Further, it took three weeks (four emails, two phone calls, and a request for assistance to the CNSC Secretariat) to receive acknowledgement from CNL of our initial information requests and subsequent partial responses to these requests. Ultimately, much information required to provide the analysis we were funded to undertake in this intervention has still not been provided to date.<sup>1</sup>

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<sup>1</sup> See Appendix A to these submissions for a more detailed account of information requests made by LOW and ORK.

This not only a waste of Waterkeeper’s and Riverkeeper’s experts’ time and expertise. It also constitutes a waste of the Commission’s time and participant funding. These experts are already donating much of their time to supplement these intervention processes and contribute what they can to assist LOW and ORK in their important public interest work. More formalized information request procedures, spread over longer timeframes would better support intervenors and ensure experts could provide more value-added information.

*Recommendation 3: The CNSC should immediately initiate a comprehensive review of access to information or interrogatory processes for future Commission meetings and hearings in consultation with stakeholders.*

*Recommendation 4: In the meantime, the CNSC should immediately institute the following changes concerning access to information by intervenors for future Commission meetings:*

- a. When notifying organizations of their funding grants, Participant Funding Program officers should also provide contact information for designated individuals representing the industrial facilities that are subject to the meeting reviews. These representatives should be prepared to field questions and should be made aware of intervenors’ timeframes and deadlines; and*
- b. Some CNSC staff time, and industry/proponent staff time must be designated to provide intervenor-requested information and engage in follow-up information requests and/or site visits.*

## **ORK REVIEW: CHALK RIVER LABORATORIES**

### **Chalk River’s Ecological Context**

The Chalk River Laboratories (CRL) are located in several clusters in the municipality of Deep River. The largest facilities sit on banks of the Ottawa River, at the river’s deepest point.

Facilities are located in the Canadian shield, predominantly on eroded bedrock,<sup>2</sup> in a rift valley. Actually, it is through this valley that the Ottawa River flows. This effectively means that the Chalk River complex was sited not merely ‘adjacent to the Ottawa River’ but perhaps more accurately, deeply embedded within the river system. Several Chalk River facilities directly border the shores of the river and several lakes - the largest of which are Perch Lake and Sturgeon Lake. Many of the facilities are also surrounded by wetlands intimately connected to the ecology of the flowing river. As such, Dr. Markelova explains in her report, there are numerous pathways for contaminant migration from the site to the river, either by direct discharge into the river, or else via contaminated wetlands, bogs, streams, and lakes which ultimately flush out into the river. This also means that biota and fauna along contaminant pathways are at risk of long-term exposure.<sup>3</sup>

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<sup>2</sup> See: Wilf Ruland, “Initial Independent Review of Hydrological Issues Pertaining to the draft Environmental Impact Statement for the Proposed Near Surface Disposal Facility (NSDF) at the Chalk River Nuclear Site”, prepared for Ottawa Riverkeeper and the Algonquin Anishnabeg Nation Tribal Council, July 31 2017, online: <[https://www.ottawariverkeeper.ca/wp-content/uploads/2017/08/Ottawa-Riverkeeper-Submission-EIS-Review\\_AUG16.pdf](https://www.ottawariverkeeper.ca/wp-content/uploads/2017/08/Ottawa-Riverkeeper-Submission-EIS-Review_AUG16.pdf)>.

<sup>3</sup> Dr. Markelova Expert Report at p. 3, Appendix B to these submissions.



Source: Google Maps, retrieved September 10, 2019

The CRL facilities were built within the Boreal Forest Biozone, thus forestry is an important industry in the area. Much of the CRL property is forested with white, red, and jack pine; white and yellow birch; hemlock; white, red, and black spruce; beech; sugar and red maple; red oak; and poplar. The Canadian Forest Service established 30 research plantations around the Chalk River complex which are managed and monitored by the Petawawa Research Forest.<sup>4</sup>

The area hosts several hydroelectric generating facilities as well, which constitutes another ecological stressor on local waterways, in addition to expected municipal and agricultural runoff associated with local towns and farmland.

Wildlife species in the area include moose, deer, black bear, ruffed grouse, hare, beaver, mink, fisher, marten, otter, muskrat, fox, and raccoon. Numerous wetlands provide a suitable nesting habitat for waterfowl.<sup>5</sup>

Recreation and tourism is popular in the area. The Ottawa River is an important source of sport fishing. Fish found in local waters within and surrounding the CRL property includes pike, bass, walleye, muskie, and sturgeon.<sup>6</sup> Paddling and boating in the region is also popular amongst locals and visitors.

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<sup>4</sup> Written submission from Canadian Nuclear Laboratories in the matter of the Chalk River Laboratories Application for the renewal of the Nuclear Research and Test Establishment Operating Licence”, January 24-25, 2018, online: <[http://www.cnl.ca/site/media/Parent/CMD\(1\).PDF](http://www.cnl.ca/site/media/Parent/CMD(1).PDF)> [CMD 18-H2.1] at p. 4.

<sup>5</sup> *Ibid* at p. 4.

<sup>6</sup> *Ibid* at p. 5.

## Chalk River's Historical Context

Chalk River was established, and the first facilities there were built, during the Second World War. The nearby town of Deep River was built to house those working at the laboratories. During the war, Canadian and European physicists and engineers worked on nuclear weapon development for the Allied powers. When the war ended, many of the Canadian scientists stayed there and transitioned their work to focus on peaceful uses of the atom: namely designing and building the first CANDU nuclear energy generating reactors as well as research reactors to produce a variety of medical isotopes for the global market.

The licensing challenges posed by such a complex and dynamic site are immense, especially when understandings of nuclear substances and the environment have evolved so much over its 80-year lifespan. The capacity and attitudes of government regulators have also shifted significantly over this time. Chalk River predates the establishment of the *Nuclear Safety and Control Act* (and its predecessor the *Atomic Energy and Control Act*) and the CNSC (and its predecessor the Atomic Energy and Control Board). The historical legacies of the site are difficult to separate from current conditions as they continue to be felt, both in the surrounding ecology as well as well as governing licenses and permits.

## Review of Selected CRL Facilities and Associated Ecological Concerns

As of 2018, the Chalk River complex housed 12 Class I nuclear facilities in operation; several fuel manufacturing and processing facilities; hot cells; 13 waste management areas, four Class II nuclear facilities (including accelerators and irradiators), over 60 radioisotope laboratories; and various support facilities and offices.<sup>7</sup> A description of some of the larger facilities and associated ecological impacts of concern are as follows:

The **National Research Experimental (NRX) Reactor** was built just after the Second World War, and operated between 1947 and 1993. The NRX suffered a serious accident in 1952 when the reactor core suffered a melt-down, the first ever serious nuclear reactor accident in the world – requiring hundreds of Canadian and US technicians and military personnel to mitigate the damage over the course of a whole year. During that incident, a million gallons of water was pumped in (presumably from the Ottawa River or nearby lakes) to cool the reactor. This led to a significant amount of contaminated water penetrating the ground below the facility. Contaminated water was also pumped into adjacent ‘holding ponds’ which were not effectively lined, thus likely responsible for further groundwater contamination. Given the limited understanding of radioactive contamination in the environment at the time, and coupled with an absence of environmental legislation or regulations concerning this issue for many years, the severity of that incident’s full impacts remain unclear.<sup>8</sup> However, Waste Areas A and B in the Perch Lake Basin (discussed more below) are likely in their currently compromised state due to their being the primary receiving areas for NRX contaminants.

In addition to this historic accident, there has been a decades-long leak of Strontium (Sr-90) from the NRX fuel bays into the environment. The Sr-90 plume was first detected in 1959, and only in 2006 was the source of the contamination finally removed (i.e. the last fuel bay). While the source of this leak may have been stopped at that time, Sr-90 has a long half-life (almost 30 years), meaning that historic releases of the substance will persist in the environment for decades to come. Groundwater wells at the Chalk River complex have measured Sr-90 at levels five times higher than established benchmarks as recently as 2017.<sup>9</sup> Sr-90 contamination of soil around the NRX facility is also highly likely. However, soil contamination (as opposed to groundwater contamination) does not appear to have been assessed by CNL to date. This is a

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<sup>7</sup> *Ibid* at p. 3.

<sup>8</sup> Peter Jedicke, “The NRX Incident”, online: <<https://www.cns-snc.ca/media/history/nrx.html>>.

<sup>9</sup> Dr. Markelova Expert Report at p. 6.

concern as contaminated soil can ultimately end up in surrounding wetlands, lakes and rivers via stormwater runoff during precipitation events. Thus, while NRX facility is currently sitting in a storage state, the adequacy of its containment remains difficult to assess.

*Recommendation 5: that CNL and CNSC staff characterize Sr-90 contamination of the soil around the NRX facility and that that soil contaminant runoff be regularly monitored and taken into account in the CRL's stormwater management plan.*

The **National Research Universal (NRU) Reactor** was built and operated for almost 70 years. It generated medical radioisotopes as well as early fuels and materials for future CANDU reactors until this past year. In 1958, it also became the site of another significant reactor accident when a fuel rod caught fire while being removed from the core. This incident constituted the second largest nuclear accident in the world at that time, after the NRX incident (discussed above). The NRU accident required months of remediation efforts, and likely resulted in significant contamination below and around the site.

Operations at the NRU from that point continued with periodic difficulties until the CNSC shut it down in 2007 due to non-compliance with safety requirements contained in its licence. The Commission's decision to do so led the federal government to pass emergency legislation to allow the NRU to continue operations despite the CNSC's order (as it was a globally-significant source of medical isotopes). The government subsequently fired the Commission president over her decision to stop operations, which constituted an episode of unprecedented political interference with the federal agency.<sup>10</sup> In 2008 and 2009 the facility experienced a significant heavy water leak which demanded the closure of operations for a year in order to attempt to contain and repair the damage.

The NRU ceased its operations on March 31, 2018 and was permanently shut down. By late May 2018, the reactor was defueled and all rod bays had been moved into wet storage. In September of 2018, all heavy water was drained from the reactor vessel and temporarily stored awaiting further processing and storing in metal drums. As such, the majority of the reactor and its parts are currently sitting in a storage state. It will be decommissioned starting in 2028.

Dr. Markelova has noted there is a tritium plume in groundwater at the Chalk River complex originating from the NRU reactor. Much of this plume may be attributable to ongoing leaks from the spent fuel rod bays stored at the facility. The highest measured concentration of tritium in a nearby groundwater monitoring well was 109kBq/L, though the dose acceptance criteria is 17400 kBq/L. However, as tritium cannot be removed from groundwater and treated, the only available course of action is for it to be diluted over the next several decades. As the tritium plume in groundwater below the Chalk River complex remains one of the key environmental concerns for CRL, the proper management and containment of NRU's tritium plume will be crucial.

*Recommendation 6: CNL and CNSC staff should conduct further investigations and release additional publicly accessible information concerning the migration of the tritium plume originating in the groundwater below the NRU facility.*

*Recommendation 7: CNL and CNSC staff should conduct further investigation and release additional publicly accessible information concerning airborne emissions of tritium from the NRU facility, and their migration to the Ottawa River via contaminated soil carried by stormwater.*

a) *this review should inform the development of CNL's stormwater management plan.*

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<sup>10</sup> Voices-Voix, "Linda Keen", online: <<http://voices-voix.ca/en/facts/profile/linda-keen>>.

In addition to tritium releases from the NRU, organics, heavy metals, and chlorinated organic compounds have also been released over time. With the shutdown of the facility, releases will be significantly curbed if not ceased completely and some substances may cease to give cause for concern such as total residual chlorine. However, other substances such as PCBs and mercury will likely persist in the environment for a long time if not made the subject of considerable and specific remediation efforts.<sup>11</sup>

*Recommendation 9: CNL and CNSC staff should conduct further investigation and release additional publicly accessible information concerning the quantity and concentration of PCBs and mercury released by NRU facility into the surrounding environment (especially groundwater and soil).*

The NRU was also the major source of radioactive emissions to the air at the Chalk River complex. In fact, emissions of tritium to the atmosphere have been higher than those to groundwater directly. Once released into the air, emitted contaminants eventually fall to the ground where they contaminate soil and further contaminate already compromised groundwater quality which can migrate to the Ottawa River as stormwater runoff during precipitation events and snow melts. These NRU releases to the air do not only contain tritium, but also noble gasses including Ar-41.<sup>12</sup> The stormwater management plan for CRL is currently being amended, and it is impossible to predict its contents and how effectively it will account for stormwater containment and treatment to mitigate this runoff.

*Recommendation 9: CNL and CNSC staff should ensure airborne emissions of tritium and noble gases from the NRU to surrounding soil is addressed in the new stormwater management plan for CRL.*

*Recommendation 10: CNL should ensure timely public disclosure of the new stormwater management plan as soon as it is finalized.*

Finally, Dr. Markelova makes an important note of the direction of wind at the CRL which is responsible for much of the NRU's airborne emissions being carried upstream from the CRL.<sup>13</sup> As such, it is crucial to re-evaluate the baseline conditions that are often taken from the upstream values in the estimation of contaminant levels from Chalk River emissions downstream of the complex. In other words, CNL must ensure that upstream contamination is considered when measuring any upstream conditions so that this contamination can be substituted from any measurements of upstream conditions used to constitute baseline values against which Chalk River emissions limits are compared.

*Recommendation 11: CNL and CNSC staff must demonstrate that upstream contamination is being taken into account in the calculation of upstream (i.e. baseline) conditions against which the impacts of Chalk River facilities are measured.*

The **Molybdenum-99 Production Facility (MPF)** began producing the important medical radioisotope Mo-99 in 1984. It ceased to operate in October 2016, and CNL kept it in a standby state for two years ready to be returned to operation should it be required over that time. With the more recent cessation in NRU operations, CNSC staff have confirmed that the MPF will also now be permanently retired (as it was dependent solely on the NRU reactor for its production process). Waterborne releases of contaminants from the facility are treated at the CRL's Waste Treatment Centre, and airborne emissions of Ar-41 and I-131 (which exhibit more elevated levels of contaminant release than waterborne pathways) are being mitigated by absorption filters on certain tile holes. With the cessation of the facilities' operations, it remains to be seen how effective existing treatment and mitigation activities will be.<sup>14</sup>

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<sup>11</sup> Dr. Markelova Expert Report at p. 5.

<sup>12</sup> *Ibid.*

<sup>13</sup> *Ibid.*

<sup>14</sup> *Ibid* at p. 6.

Additional facilities at the Chalk River Site include:

- **ZEEP Reactor**, which was the first reactor built at the site during the war as a precursor to the NRX reactor. The ZEEP produced plutonium to fuel nuclear weapons and research until it was decommissioned in 1973 and dismantled in 1997;
- **Pool Test Reactor (PTR)** which operated between 1957 and 1990 when it was shut down and defueled. It had been responsible for measuring the reactivity effects of materials at the site;
- **Zero Energy Deuterium (ZED-2)** research reactor was the successor to the ZEEP, and has operated at the site since 1960 mainly for research concerning reactor and fuel design;
- The NRU also contained a **Canadian Neutron Beam Centre**;
- **SLOWPOKE reactors** were built at the site before being transferred for use at the University of Toronto in the early 1970s;
- **Tandem Accelerator Superconducting Cyclotron (TASCC)** was the world's first accelerator, and operated at the site between 1986 and 1996 when it began to be decommissioned;
- Two **Multipurpose Applied Physics Lattice Experiment (MAPLE)** reactors were built in the early 2000s at the site, however, due to a series of design and construction flaws, never functioned as intended and their project was terminated in 2008. They were meant to produce medical isotopes, fueled by enriched uranium;
- The **Combined Electrolysis Catalytic Exchange Upgrading/Detritionation (CECEUD)** which processed heavy water until its operations ceased a few years ago. It is currently being relocated, though that process is ongoing;
- A **Health Physics Neutron Generator** which houses a Texas Nuclear Neutron Generator (150 IH) linear accelerator that was recently shut down and is currently pending decommissioning and removal;
- **The Pool Test Reactor** which is in the process of being decommissioned;
- A **Plutonium Tower** and **Plutonium Recovery Reactor** the first of which has been decommissioned, the latter is currently being decommissioned;
- A **Heavy Water Upgrading Plant** which was decommissioned, which involved retrieving and demolishing Under Ground Heavy Water Storage tanks; and a
- **Cosmic Ray Inspection and Passive Tomography (CRIPT)** unit.

With these units, and other waste storage and treatment facilities, there are approximately 100 major buildings and an additional 60 smaller structures at Chalk River.

As discussed above, the legacy waste challenges at the Chalk River sites are considerable. Part of the plan to address this issue is **the proposed Near Surface Disposal Facility (NSDF)**: a new waste site for permanent low-level waste storage. The proposal was the subject of an Environmental Impact Statement (EIS).<sup>15</sup> ORK has reviewed the EIS document for its assessment of risks to the Ottawa River with several technical experts, and is waiting to continue its review of the site, once the regulatory review process is resumed – however, it remains unclear when this will be exactly.<sup>16</sup>

The facility was at one point proposed to hold high and intermediate-level radioactive waste. However, due to strong concerns expressed by ORK and several other organizations and Indigenous nations, the proposal to store high- and intermediate-level waste at the facility has since been withdrawn.<sup>17</sup> Should the NSDF

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<sup>15</sup> See: Canadian Nuclear Laboratories, “The Environmental Impact Statement (EIS) for the Near Surface Disposal Facility (NSDF)”, online: <<https://www.cnl.ca/en/home/environmental-stewardship/nsdf/eis.aspx>>.

<sup>16</sup> *Supra* note 2.

<sup>17</sup> Ottawa Riverkeeper, “CNL backs down from proposal to include intermediate-level radioactive waste”, October 27, 2017, online: <<https://www.ottawariverkeeper.ca/breaking-news-cnl-backs-down-from-proposal-to-include-intermediate-level-radioactive-waste/>>.



ultimately be approved, it will be added to the existing Chalk River Laboratories' licence, rather than being issued a separate licence.<sup>18</sup>

The NSDF project is mostly meant to store and contain legacy waste at the Chalk River site (though low-level waste from other locations in Ontario may be housed there as well). Approximately 70% of the waste at Chalk River, generated over the last 80 years, would be stored in the NSDF and would constitute a tremendous volume of waste requiring storage. And still, while the NSDF is being relied on by the CNL to address much of its legacy waste challenges, the truth is that the exact nature and extent of legacy wastes at Chalk River remains unclear. Even Natural Resources Canada has noted that legacy waste issues at Chalk River are poorly documented and generally misunderstood.<sup>19</sup>

There are 13 waste sites at the Chalk River complex, five of which are in operation and eight of which are legacy sites no longer in use. Some of these sites and their ecological footprints are discussed in greater detail below.

For decades, Chalk River's contaminated water was directed via the area's sandy soil to the Perch Lake Basin which is a depressed area in the underlying bedrock. Over this time, highly radioactive waste was also buried there beginning with the 1952 accident at the NRX reactor, but continuing throughout the 1960s and 1970s when highly radioactive liquid waste was brought to the area and stored in unlined trenches from fuel repurposing experiments conducted at the site. The Perch Lake Basin was also used to store contaminated but reusable equipment from around the CRL site over this time. As the Basin was one of the earliest waste repositories for the site, it constitutes one of the most severely contaminated sites at Chalk River. This whole site is referred to as **Waste Management Area A** and waterborne contaminants ultimately flow from it into the Maskinonge Lake Basin and Ottawa River via Perch creek. The area boasts a considerable Sr-90 plume as well as gross beta and chloride contamination. While 3m of cover material was put over the site a number of years ago, and a permeable reactive barrier was installed across the plume in 2013, the extent of their efficacy remains to be seen.

**Waste Management Area B** spans 14 hectares and contains a decade's worth of buried waste with only a cap of sandy fill, and no lining below. Due to its size and contents, it poses a greater ecological risk than Waste Management Area A. Apparently, this site has two reactor vessels buried in it from the NRU and NRX reactors from early 1970s, and it still receives waste from elsewhere at the CRL site. Waste Management Area B has at least two significant contaminant plumes: one comprised of tritium, the other of Sr-90. Their migration has been studied and characterized, and upgraded groundwater treatment facilities at the site are minimizing releases of Sr-90 from the area. Tritium contamination, however, cannot be treated and mitigation can only attempt to control the substance's dilution into the environment. Since the installation of the groundwater treatment facilities, there has been at least one extended outage event which appears to have further aggravated Sr-90 releases to the environment – an outage event that merits more investigation and publicly available information. Further, trichloroethane, 1,1-dichloroethane, trichloroethylene (TCE), 1,1-dichloroethylene and tetrachloroethylene (PCE), and 1,1,1-TCA and chloroform compounds have been measured at Waste Management Area B in concentrations and volumes that may constitute cause for concern, as the adequacy of treatment to date is unknown.<sup>20</sup>

Waste Management Area B also holds irradiated uranium and thorium from over 50 years of nuclear reactor fuel and related substances (e.g. hot cell waste, experimental fuel bundles, unusable radioisotopes, active exhaust system filters, fission products from medical isotope production). They are kept in 750 tiled

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<sup>18</sup> For CNSC staff response to Riverkeeper information request, see Appendix A to these submissions.

<sup>19</sup> Ian McLeod, "Chalk River's toxic legacy", *Ottawa Citizen*, December 29, 2011, online: <<https://ottawacitizen.com/news/chalk-rivers-toxic-legacy/wcm/12a1f5e3-9b71-4448-9414-1e4416fbacf>>.

<sup>20</sup> Dr. Markelova Expert Report at p. 9.

concrete cylindrical holes, each 4.9m deep. The CNSC has expressed concerns in the past about the structural integrity of these holes, as 100 of them hold 175 highly radioactive old prototype fuel rods encased in aluminium – the structural integrity of which is threatened as they are submerged in water. Another 600 rods are also submerged but since they are encased with zircaloy and stainless steel, the concern is not as urgent. All of these fuel rods are awaiting relocation to a new above-ground facility which is required to help ensure their containment.<sup>21</sup>

*Recommendation 12: that CNL and CNSC staff provide more publicly-accessible information concerning the recent failure of Waste Management Area B's Sr-90 groundwater treatment facility in order to assist further public review.*

*Recommendation 13: that CNL and CNSC staff provide more publicly-accessible information concerning the monitoring and management of tritium dilution in groundwater around Waste Management Area B to assist further public review.*

The South Swamp at the CRL site is the recipient of much of the contamination at Waste Management Areas A and B. As such, the swamp exhibits high levels of Sr-90, Ba, Cl, Li, Sr, Cu, Fe, PCBs, phenolics, TCE, TCFM, CI, and solvent extractables. Further, there are numerous non-radiological contaminants which have been measured in water and sediments at Spring B Forest and the West Swamp. The main source of contamination of those wetland areas is contaminated groundwater discharges from Waste Management Area B which include chlorinated solvents, Hg, lithium (Li), uranium (U), phenolics, arsenic (As), Cl, Fe, Ni, (lead) Pb, strontium (Sr), zinc (Zn), barium (Ba), Al, Cu, solvent extractable (oil and grease), TCFM, V, TCE and chloroform.<sup>22</sup> The contamination of these wetlands and swamps may pose a threat to the flora growing in those spaces. It may also adversely impact the wellbeing of wildlife, should those locations provide habitat for fauna.

There are four species of turtle listed as species at risk under the *Species at Risk Act* that have been identified at the Chalk River complex.<sup>23</sup> There is not currently sufficient publicly available information concerning which parts of the complex are currently constituting habitat for these species. As such, the extent of their exposure to contaminants in the site's wetlands are unknown. While exact locations of at risk species is not always publicly disclosed for their own safety, more information concerning their potential exposure to contaminants at the site as well as any existing efforts to mitigate exposure should be publicly disclosed.

*Recommendation 14: that CNL and CNSC staff publicly disclose more information concerning the interaction of flora and fauna exposed to contaminants in swamp and wetland areas (including South, West, East, and Duke Swamps) in the Perch Lake and Masinonge Lake basins, with special mention included of interactions between contaminants and the four at risk species of turtle that have been identified at the Chalk River complex.*

In addition to the two waste management areas discussed above, there are a variety of **Liquid Dispersal Areas (LDAs)** and a **historical laundry pit** as well as six additional **Waste Management Areas (C, D, H, F, G, and J)** and three **Acid, Chemical, and Solvent (ACS) Pits** at the Chalk River complex which release numerous contaminants into the environment. The LDAs contain cobalt (Co-60) and cesium (Cs-137), which are sources of gamma radiation that require unique and specific measures to ensure against their spread of radiation through the surface and near-surface environment. The LDAs are also possibly responsible for elevated levels of Al, cadmium (Cd), Cu, Fe, PCBs, TCE, TCFM, V, Ni, tetrachloroethylene (PCE), Sr, Al, Ba, Hg, Pb, and U in the East Swamp, as well as elevated concentrations of phosphorous (P)

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<sup>21</sup> *Supra* note 19.

<sup>22</sup> Dr. Markelova Expert Report at p. 9.

<sup>23</sup> *Supra* note 4 at p. 91.

and PO<sub>4</sub>, which along with bioavailable organics may cause an increased rate of eutrophication of local water bodies.<sup>24</sup> The ACS Pits are not the subject of any specific recovery efforts. Instead, they are awaiting approval of the proposed NSDF which would receive their waste.<sup>25</sup>

There is a **Thorium Pit** which contains liquid waste from an on-site Nitrate Plant including natural thorium, thorium nitrate, ammonium nitrate, Ce-144, Cs-137, Sr-90 and U-233. Its Sr-90 plume appears to be contaminating Duke Swamp. Gross beta radiation as well as Al, As, Cd, Cl, Fe, Li, Ni, Pb, Sr, TCFM and V have also all been detected along the length of the plume from the Pit to the Duke Swamp. While there is a 'Wall and Curtain' passive water treatment system that mitigates the runoff from the Plant to the Pit, there is currently no specific recovery plan for the pit to address the identified plume, though contaminated soils are being monitored.<sup>26</sup>

*Recommendation 15: that CNL and CNSC staff develop and publicly release a site-specific recovery plan for the Thorium Pit, as well as remediation activities to address resulting contamination of Duke Swamp. Should such a plan not be deemed necessary, reasons outlining such a decision should be made publicly available.*

Waste areas and facilities at the Chalk River complex also include the following:

- A **Dilute Effluent Disposal System** which was recently shut down permanently;
- As was a **Waste Water Evaporator** which was shut down in 2012 and is currently being decommissioned;
- Construction of the **Bulk Material Landfill** was completed in 2018 after its capacity was doubled to store dewatered sludge produced by the on-site Sewage Treatment Plant;<sup>27</sup>
- Low-level waste is also stored in an above-ground **Modular Above-Ground Storage (MAGS)**;
- two **Shielded Modular Above-Ground Storage (SMAGS)** bunkers, both of which have some form of leachate collection systems. Some of the waste in these last two facilities has been shipped for treatment or permanent storage in the US; and
- **Grey Crescent**, a collection of mostly historic landfills at the CRL complex which contain a variety of radiological and non-radiological contaminants. Uranium has been detected in soil in the area at extremely high concentrations: up to 430,000 µg/g, which is about a thousand times higher than the Canadian Soil Quality Guideline of 300 µg/g for industrial sites. Other contaminants include Al, Ba, Cl, Cu, Li, Zn, and Sr.<sup>28</sup>

*Recommendation 16: that CNL and CNSC staff prepare and publicly release a better characterization of contaminants in and around Grey Crescent so that their interaction with the local ecology can be better understood.*

Despite the fact that most of the Chalk River facilities are either awaiting decommissioning or in decline, there is a 10-year **Chalk River Revitalization** project which began in 2016, expected to end in 2026. It aims to renovate essential site infrastructure, decommission aging infrastructure, and build new facilities. The project will cost approximately 1.2 billion in federal funds. The NSDF is a part of this plan.

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<sup>24</sup> Dr. Markelova Expert Report at p. 11.

<sup>25</sup> *Ibid* at p. 9.

<sup>26</sup> *Ibid* at pp. 12-13.

<sup>27</sup> *Supra* note 4 at p.10.

<sup>28</sup> Dr. Markelova Expert Report at p. 7.

Finally, a **Small Modular Reactor (SMR)** is a currently proposed for the Chalk River site.<sup>29</sup> No SMRs have yet been built in Canada, and the approval process for this technology is still in early development with public consultations underway as of July 2019 via the Canadian Environmental Assessment Agency’s website.<sup>30</sup> If the unit is ultimately approved, it will hold its own licence separately from the larger Chalk River complex in which it will be located.<sup>31</sup>

As the discussions above illustrate, Chalk River is a complex site that poses several significant challenges in terms of oversight. Over its 80-year history, the character and activities at this site have continuously developed and changed. Nuclear regulation has similarly developed considerably over this time as well. Even over the course of the last 10-year licence term, Chalk River has been shown to exist in a constant state of flux with the retirement and decommissioning or several large facilities, as well as the construction of new ones. The current 10-year licence is guaranteed to govern a similarly dynamic period for the site. The challenges inherent in regulating such a complex site help to inform the discussion on licences and permits below.

## Chalk River Regulation: Licences and Permits

### Public access to the Chalk River Laboratories licence

The CNSC online licence database on its website is very limited, frustrating regulator transparency. Copies of actual licences are not available online, and must rather be specially requested from the Commission. Further, licences on the database are arranged according to type of licence and licence-holder, but the locations and names of the facilities to which the licenses apply are not included anywhere in the database. This makes it virtually impossible to match up licences listed on the database with specific CNSC-regulated facilities. Further, CNSC staff have explained that only Class II licences are included in the database. This means no Class I licenses or any other licence types are searchable online. In the context of this current intervention, it is impossible to say with any certainty whether the Chalk River Licence is included in this online database – a concerning prospect as it governs the largest nuclear complex in the country. This is a cause for concern as greater licence disclosure would be in the public interest.

Ontario’s Environmental Compliance Approval (ECA) database may serve as an example of a better platform for public regulatory licence/permit disclosure as it includes copies of licences, their addresses, the companies to which the ECAs have been provided to, as well as the facilities’ locations on an online interactive GIS map. While there are significant gaps in the ECA database as well, it would still serve as a helpful starting point for future improvements to the CNSC equivalent.

*Recommendation 17: that the CNSC licence database on its website include all CNSC-granted licences in Canada, regardless of their Class.*

*Recommendation 18: that the CNSC licence database on its website include the addresses and facility names associated with all catalogued licences.*

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<sup>29</sup> Canadian Nuclear Safety Commission, “Micro Modular Reactor Project”, online: <[http://www.nuclearsafety.gc.ca/eng/resources/environmental-assessments/ongoing/ontario/EA\\_80182.cfm](http://www.nuclearsafety.gc.ca/eng/resources/environmental-assessments/ongoing/ontario/EA_80182.cfm)>; and Canadian Nuclear Laboratories, “Small Modular Reactor Technology: What’s New”, online: <<https://www.cnl.ca/en/home/facilities-and-expertise/smr/default.aspx>>.

<sup>30</sup> CNSC Staff CMD, “Annual Program Report, Canadian Nuclear Laboratories Regulatory Oversight Report for Canadian Nuclear Laboratories Sites: 2018”, August 16, 2019, at p. 44.

<sup>31</sup> CNSC staff response to Riverkeeper information request, see Appendix A to these submissions.

*Recommendation 19: that actual copies of all licences be posted to the CNSC licence database on its website so that they can be made permanently available to the public on a continuous basis that does not require CNSC staff intervention.*

The current Chalk River licence does not specify the individual pieces of infrastructure to which it applies, nor do CNL or the CNSC provide a permanently available online map of the site and its buildings, waste areas, or environmental management infrastructure. This further impedes public transparency by denying a reliable and comprehensive description of the Chalk River complex.

*Recommendation 20: that CNL permanently post on its website a map of the Chalk River complex with labels indicating all facilities (operational and in storage), waste areas, groundwater monitoring locations, and stormwater infrastructure.*

### Chalk River Laboratories licence and licence control handbook

At the moment, Chalk River Laboratories (all waste areas and 170+ structures) are subject to a single and very generalized ‘blanket licence’. The licence does not name any specific facilities. Rather, it provides CNL with extremely broad authority to:

- (a) prepare a site for, construct, operate, modify, decommission or abandon a nuclear facility;
- (b) possess, transfer, use or abandon a nuclear substance, prescribed equipment or prescribed information;
- (c) produce, refine, convert, process, package, manage, store or dispose of a nuclear substance; and
- (d) produce or service prescribed equipment.

The licence requires CNL to have some kind of environmental management program that includes reference to selected action levels for emissions. It also includes brief mention of the requirement that CNL have a waste management plan that includes decommissioning activities. For such a complex site, its licence is extremely broad.

The lack of specificity in the current license is concerning as it effectively provides CNL with a considerable amount of discretion in the management of its facilities. It further inhibits CNSC and CNL transparency as the legal reach of the licence is ill-defined for the public. ORK alluded to this issue in its submission in last year’s licence renewal proceeding when it advocated for the licence to include more specific information concerning the management of legacy wastes at the site.<sup>32</sup> At that time, ORK also raised concerns with the licence’s 10-year term, which it argued was too long and would effectively exclude the public from important conversations concerning potentially significant developments planned for the site over the next decade.<sup>33</sup> One such development would be the NSDF, which if approved would be included as a potential amendment to the existing licence rather than subject to a new and separate licence. If the currently proposed SMR is approved at Chalk River, it would receive its own separate licence – making it the only facility at the site that would be subject to a facility-specific licence.

The Canadian Environmental Law Association (CELA) and Northwatch also expressed several concerns with the licence at last year’s licence renewal hearings. Of significance to this current intervention are their arguments concerning the 2018 changes to the Licence Conditions Handbook (LCH) in which 56 licence conditions from the previous version of the LCH were deleted, many of which had contained important particulars about licence conditions for specific sites or aspects of operations. Unfortunately, the proposed

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<sup>32</sup> Ottawa Riverkeeper, “Submission from Ottawa Riverkeeper/Garde-Riviere des Outaouais Intervening in the Operating Licence Renewal Hearing for Chalk River Nuclear Laboratories (CNL) Ref. 2018-H-01”, December 11, 2017, online: <[https://www.ottawariverkeeper.ca/wp-content/uploads/2018/01/ORK-Submission\\_CNL-Licence-Renewal-2018.pdf](https://www.ottawariverkeeper.ca/wp-content/uploads/2018/01/ORK-Submission_CNL-Licence-Renewal-2018.pdf)>.

<sup>33</sup> *Ibid.*

Licence Conditions Handbook appears to have been adopted by the Commissioners, despite concerns and recommendations for improvement by ORK, CELA, Northwatch, and others.

It is worth noting that CELA and Northwatch also noted that the majority of CNSC-drafted compliance verification criteria were replaced by criteria developed by the Canadian Standards Association (CSA), a less transparent non-government (i.e. more industry-focused) body. The CSA verification criteria were less rigorous, and not generally subject to public comments processes concerning their contents.<sup>34</sup> This issue of compliance verification is a significant one in Canada as the federal Commissioner of the Environment and Sustainable Development already issued a report in 2016 in which it expressed concerns with several identified shortcomings in CNSC's compliance inspections.<sup>35</sup>

In her review, Dr. Markelova has also identified a potentially worrying bias in the LCH. While the Chalk River Basin is the focus of action levels and derived release limits specified in the document, the other two basins are almost entirely neglected – only one control area in the Maskinonge Lake Basin is included in the LCH and none in the Perch Lake Basin.<sup>36</sup> As such, it appears as though the Perch Lake Basin and Maskinonge Lake Basin are not being regulated as closely as the Ottawa River Basin, despite the fact that these other two basins exhibit especially high levels of radiological and non-radiological contamination – and despite the fact that both basins ultimately feed into the Ottawa River.

*Recommendation 21: that Commissioners and CNSC staff include additional LCH Action Levels and Derived Release Limits for the Perch Lake Basin and Maskinonge Lake Basin in addition to those specified the LCH for facilities in the Chalk River Basin.*

*Recommendation 22: as a starting point, that Commissioners and CNSC staff include Action Levels and Derived Release Limits in CNL's LCH for the following substances in the Perch Lake and Maskinonge Lake Basins:*

- a) *waterborne releases of Sr-90, Cs-137, Cl, and Co-60, tritium, phosphate, mercury, Ba, V, uranium, and Pb solvents, chloroform, toxic elements and heavy metals; and*
- b) *airborne emissions of Ar-41*

Further, the contaminants identified in the last Environmental Risk Assessments (ERA) for the Chalk River complex are considerably more comprehensive than contaminants included in the site's LCH. As these contaminants of concern have already been identified by CNL and are already periodically monitored, it should not be considered unduly demanding for them to be included as parameters in the LCH itself.

*Recommendation 23: that Commissioners and CNSC staff amend the current LCH to include Action Levels and Derived Release Levels for all contaminants of concern identified in the 2019 ERA for CRL.*

*Recommendation 24: In particular, that additional ground water and effluent streams and outfalls monitored in the 2019 ERA be included in the LCH.*

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<sup>34</sup> Canadian Environmental Law Association, submissions to the Canadian Nuclear Safety Commission, December 11, 2017, online: <[https://www.cela.ca/sites/default/files/1164-CELASubmissionsCanadianNuclearSafetyCommission\\_0.pdf](https://www.cela.ca/sites/default/files/1164-CELASubmissionsCanadianNuclearSafetyCommission_0.pdf)> and Northwatch, "Comment on application from Canadian Nuclear Laboratories (CNL) for the Renewal of its Nuclear Research and Test Establishment Operating Licence for Chalk River Laboratories", December 11, 2017, online: <<https://www.cela.ca/sites/cela.ca/files/1157-CommentsOnApplicationFromCNL.pdf>>.

<sup>35</sup> 2016 Fall Reports of the Commissioner of the Environment and Sustainable Development, "Report 1 – Inspection of Nuclear Power Plants – Canadian Nuclear Safety Commission", online: <[http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_201610\\_01\\_e\\_41671.html](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201610_01_e_41671.html)>.

<sup>36</sup> Dr. Markelova Expert Report at pp. 16 – 17.

Finally, upon reviewing existing controls in the LCH, it is unclear whether contaminant parameters have been calculated and defined with ecological, as well as human-dose, considerations taken into account. After reviewing all references made to Action Levels and Derived Release Limits in CNSC staff submissions at last year's licence renewal hearing, CNSC staff's CMD in the current meeting process, and the current LCH for DRL itself, it appears as though only a one-year cumulative dose to humans was considered when setting existing release limits.

*Recommendation 25: that CNSC staff confirm and explain whether LCH controls were established keeping in mind exposure to varied ecological components in addition to human exposure.*

#### Fisheries Act permits for Chalk River Laboratories

As several reactors have been in operation at the Chalk River complex for decades, fish impingement and entrainment by reactor once-through cooling water systems has been identified as an environmentally adverse impact of the site's operations. However, publicly accessible documents do not seem to indicate which facilities exactly have been responsible for this ecological impact, making it difficult to conceptualize and assess.

Impingement monitoring of lake sturgeon is conducted annually,<sup>37</sup> though there does not appear to be any publicly available data concerning monitoring results. The Great Lakes and Upper St. Lawrence population of lake sturgeon is considered to be endangered under Ontario's *Species at Risk Act* and is the subject of a specific recovery strategy.<sup>38</sup>

*Recommendation 26: that CNL make its monitoring results concerning the impingement of lake sturgeon publicly available.*

Impingement monitoring of other species of fish was conducted in 2011, 2012, 2014, and to a lesser extent in 2015 and 2016. Entrainment monitoring appears to have only been conducted for a single year (June 2016 – June 2017), which is insufficient to understand longer-term trends.

*Recommendation 27: that CNL make its monitoring results from other monitoring programs concerning both impingement and entrainment of fish publicly available.*

*Recommendation 28: that if any entrainment is continuing at the site, CNL should conduct additional monitoring to better understand longer-term trends in the entrainment of fish.*

The *Fisheries Act* specifies in section 35(1) that:

No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.<sup>39</sup>

Such activity is strictly prohibited by the Act and any contravention of this provision can result in fines of up to \$100,000 or \$500,000 and/or a prison sentence of up to one or two years.<sup>40</sup> Further, the Act specifies that for any contravention lasting longer than a single day, each subsequent day on which the offence

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<sup>37</sup> *Supra* note 4 at p. 86.

<sup>38</sup> Committee on the Status of Species at Risk in Ontario, "Ontario Species at Risk Evaluation Report for Lake Sturgeon (*Acipenser fulvescens*)", November 2017, online: <[http://cossaroagency.ca/wp-content/uploads/2018/06/Accessible\\_COSSARO\\_Evaluation\\_LakeSturgeon\\_FINAL\\_20FEB2018\\_SP.pdf](http://cossaroagency.ca/wp-content/uploads/2018/06/Accessible_COSSARO_Evaluation_LakeSturgeon_FINAL_20FEB2018_SP.pdf)>.

<sup>39</sup> *Fisheries Act*, RSC 1985, c F-14, at s 35.

<sup>40</sup> *Ibid* at s 78.

continues constitutes a separate offence.<sup>41</sup> Of course, this section does not apply to facilities that receive a special permit by the DFO to undertake activities that would result in serious harm to fish. When such permits are granted, they generally contain provisions for the mitigation or offsetting of harm caused by the licensed activity.

When these submissions were first provided to the Commission on October 7, it was unclear whether CNL has been granted a permit by the federal Department of Fisheries and Oceans (DFO). DFO policy had prevented the ministry from posting its licenses online, or providing them to the public upon request via informal mechanisms. Thus, they had to be requested of the DFO via a formal federal Access to Information (ATIP) request, which ORK since filed. A request was also made of CNL for a copy of any permits issued for CRL under the *Fisheries Act*. On October 23, after two additional follow-up emails from Ms. Feinstein, CNL explained that they have applied to the CNSC for a *Fisheries Act* permit for the Chalk River site. Copies of this application (with CNL's self-assessment of the site), and any CNSC review of it have not yet been provided, nor has information concerning when the application was filed, when it may be considered by the CNSC, and why the site has not yet had such a permit.

*Recommendation 29: that CNL provide a copy of its permit application to Riverkeeper with the self-assessment used to inform it. If no permit is ultimately granted, CNL should still provide the assessment conducted to support any decision not to issue a permit. And that CNSC staff provide a timeline for their consideration of CNL's current permit application.*

#### Environmental Compliance Approvals

From a search of the Ontario Ministry of Environment Conservation, and Parks (MECP) online database of environmental approvals, it did not appear as though any ECAs have been issued for Chalk River. This was tentatively confirmed with the local MECP office for CRL, but more information is being provided to Riverkeeper via a provincial Freedom of Information (FOIP) request to the ministry. This query had also been submitted to CNL. As of October 23, CNL confirmed they did not have any ECAs for the Chalk River site, nor had any been sought.

CNL asserts no such approvals for the Chalk River complex are required as the site is federally-regulated. However, federal jurisdiction of nuclear sites is not sufficient to exclude provincial environmental oversight of those same sites. For example, while radionuclides and other nuclear substances may fall primarily under federal jurisdiction, industrial emissions of non-radioactive substances are primarily a provincial regulatory concern. Multiple nuclear sites across Ontario including nuclear waste sites, reactor cooling systems, and processing facilities are governed both by CNSC licences as well as MECP ECAs.

*Recommendation 30: that CNL provide any assessments that may have been conducted for the Chalk River complex to support any decision not to seek an ECA.*

Ultimately, the lack of any ECAs or DFO permits for the Chalk River complex constitutes a significant concern, given the immense size and complexity of the Chalk River site and all its industrial facilities. While the CNSC is the primary regulator for the site's operations, this cannot be to the exclusion of all other applicable law.

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<sup>41</sup> *Ibid* at s 78.1.



## Public access to environmental information concerning Chalk River

The federal government has been developing an open data strategy for almost a decade. The most recent Plan on Open Government notes:

Openness and transparency are fundamental to ensuring Canadians' trust in their government and in democracy overall. Citizens expect their government to be open, transparent, and accountable... The Government of Canada's commitment to openness is intended to foster greater transparency and accountability, and to help create a more cost-effective, efficient, and responsive government for all Canadians.<sup>42</sup>

Several Commitments from this plan are especially relevant to the current intervention process, including Commitment 3 to expand and improve open data across the country. The commitment recognizes:

Open data has the potential to transform how government officials make decisions and how citizens interact with government... The Government of Canada is committed to ensuring that its data is open by default. Data must be discoverable, accessible, and reusable without restriction so as to enhance transparency, enable better services to Canadians, facilitate innovation, and inform public participation.

Commitment 6 requires all federal public servants to change how they design and deliver programs to support Canada's commitments to transparency and public engagement. It asserts "an openness mindset needs to be integrated into their day-to-day business activities". Further, Commitment 13 undertakes to increase the availability and usability of geospatial data, and Commitment 14 undertakes to make the science performed in support of Government of Canada programs and decision-making open and transparent to Canadians.

The CNSC recently amended its own internal regulatory document concerning public information and disclosure requirements for all regulated facilities. This policy (and its predecessor released in 2012) state the "primary goal of a public information and disclosure program... is to ensure that information related to health, safety and security of persons and the environment, and other issues associated with the lifecycle of the nuclear facilities are effectively communicated to the public."<sup>43</sup>

### **Proactive Disclosure by CNL**

The Chalk River licence requires CNL to have a public disclosure protocol, however the LCH fails to provide substantive guidance concerning required contents of CNL's protocol.<sup>44</sup> The Commission's REGDOC-3.2.1 *Public Information and Disclosure* similarly fails to include mandatory requirements for specific content in licensee information and disclosure protocols.

Currently, CNL has prepared and publicly released the following environmental information to its website:

- an environmental performance report for its facilities in June 2019;<sup>45</sup>
- an Annual Safety Report for its environmental monitoring programs in 2017;<sup>46</sup>

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<sup>42</sup> Government of Canada, Canada's New Plan on Open Government 2016-2018, online: <<https://open.canada.ca/en/content/canadas-new-plan-open-government-2016-2018>>.

<sup>43</sup> REGDOC-3.2.1 *Public Information and Disclosure*, s 2.1, online: <<http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc3-2-1/index.cfm>>. Note, this was the same in the previous *Public Information and Disclosure*, Regulatory Document 99.3, March 2012, s 2.1.

<sup>44</sup> Canadian Nuclear Safety Commission, Canadian Nuclear Laboratories' Licence Conditions Handbook, at p. 10.

<sup>45</sup> Online: <<https://www.cnl.ca/site/media/Parent/CRL-Performance-2019-June.pdf>>.

<sup>46</sup> Online: <[https://www.cnl.ca/site/media/Parent/CRL-509243-ASR-2017\(2\).pdf](https://www.cnl.ca/site/media/Parent/CRL-509243-ASR-2017(2).pdf)>.

- a one-page executive summary of its 2017 Annual Compliance Report for the NPD Waste Facility;<sup>47</sup>
- a summary of its 2017 environmental monitoring of the NPD Waste Facility;<sup>48</sup> and
- an Environmental Risk Assessment for Chalk River Laboratories from January 2019.<sup>49</sup>

Wherever possible, ORK advises against the publication of executive summaries of reports to the exclusion of the reports themselves. While broad assurances of the safety of facilities may be correct, if they are to be believed and understood, the information and data used to support such assertions must be made public.

*Recommendation 31: that CNL post all Environmental Monitoring Reports, Annual Safety Reviews, Environmental Risk Assessments, and Annual Compliance Reports from this point onward to its website.*

There are several other potential sources of information and data concerning nuclear facilities prepared independently from the CNSC. However, none of these sources has proven especially accessible or helpful during the current intervention opportunity:

- CNL reports to the National Pollutant Release Inventory (NPRI) for Chalk River Laboratories. Reports are for releases of lead and lead compounds, particulate matter, nitrogen oxides, and sulphur dioxide to air and water. However, all amounts are expressed as annual averages, preventing an understanding of seasonal trends or peak releases.<sup>50</sup>
- When the *Wastewater Systems Effluent Regulations (WSER)* came into effect in 2013, the CRL Sewage Treatment Plant was required to report to Environment and Climate Change Canada under the *Fisheries Act*. However, this data can only be obtained via a formal information request.
- The Ontario provincial Nuclear Reactor Surveillance Program does not appear to sample the Chalk River site.<sup>51</sup> A search of the Ontario provincial Drinking Water Surveillance Program does not include references to Chalk River or Deep River.<sup>52</sup>
- The Town of Deep River makes some of its water quality reports available online – including drinking water and sewage treatment. However, it remains unclear to what extent these reports reflect conditions at or nearer to the Chalk River sites.<sup>53</sup>
- The Canadian Radiological Monitoring Network shares online open-access data pages, however they are exceedingly difficult to navigate, especially as search functions do not clearly indicate specific facilities or geographic regions.<sup>54</sup>
- The Independent Environmental Monitoring Program (IEMP) for Chalk River includes air, water, sediment, soil, and vegetation monitoring data collected at several points around the Chalk River complex. However, data is averaged, and the locations of sampling points used for the IEMP have been a subject of concern in the past for several Waterkeeper experts, often because they are situated far from the polluting facilities and thus can effectively only measure highly diluted areas.<sup>55</sup>

<sup>47</sup> Online: <<https://www.cnl.ca/site/media/Parent/2017-Annual-Compliance-Report-NPD.pdf>>.

<sup>48</sup> Online: <[https://www.cnl.ca/site/media/Parent/2018-NPD\\_Environmenta-performance2.pdf](https://www.cnl.ca/site/media/Parent/2018-NPD_Environmenta-performance2.pdf)>.

<sup>49</sup> Online: <[https://www.cnl.ca/site/media/Parent/Env\\_Risk\\_Assessment\\_2019\\_Full\\_REV\\_0.pdf](https://www.cnl.ca/site/media/Parent/Env_Risk_Assessment_2019_Full_REV_0.pdf)>.

<sup>50</sup> For reports, see: <[https://pollution-waste.canada.ca/national-release-inventory/archives/index.cfm?do=facility\\_substance\\_summary&lang=en&opt\\_npri\\_id=0000003147&opt\\_report\\_year=2017](https://pollution-waste.canada.ca/national-release-inventory/archives/index.cfm?do=facility_substance_summary&lang=en&opt_npri_id=0000003147&opt_report_year=2017)>.

<sup>51</sup> For the database, see: <[https://www.labour.gov.on.ca/english/hs/pubs/rpms/report\\_water.php](https://www.labour.gov.on.ca/english/hs/pubs/rpms/report_water.php)>, see more generally: <<https://www.labour.gov.on.ca/english/hs/pubs/rpms/index.php>>.

<sup>52</sup> For the database, see: <[https://www.ontario.ca/data/drinking-water-surveillance-program?\\_ga=1.265290511.124848547.1486560529](https://www.ontario.ca/data/drinking-water-surveillance-program?_ga=1.265290511.124848547.1486560529)>.

<sup>53</sup> See: <<http://www.deepriver.ca/departments/public-works/drinking-water-system-annual-reports/>>.

<sup>54</sup> For the database, see: <[https://open.canada.ca/data/en/dataset?portal\\_type=dataset&q=Canadian+Radiological+Monitoring+Network](https://open.canada.ca/data/en/dataset?portal_type=dataset&q=Canadian+Radiological+Monitoring+Network)>.

<sup>55</sup> For monitoring results, see: <<http://nuclearsafety.gc.ca/eng/resources/maps-of-nuclear-facilities/iemp/ch-river.cfm>>.

- Past Environmental Assessments, licence decisions, and compliance reports for facilities at Chalk River are not consistently available online.

The shortcomings of these additional resources and databases highlight the need for CNSC staff and CNL to ensure they are publicly disclosing important information and data concerning environmental conditions and activities Chalk River.

### **Reportable Events**

In 2018, there were 35 reportable events at the CRL site. Eight of these related to NRU operations. Three involved action level exceedances and radioisotope releases, though CNSC staff assert no regulatory limits were exceeded.<sup>56</sup> CNL’s current LCH requires regulatory reporting for release events, however it does not contain detailed requirements concerning the contents of these reports. Instead, it provides CNL with considerable discretion to draft its own disclosure plan to determine the contents of these reports.<sup>57</sup> In CNL’s Public Information Protocol, the company commits to posting incident reports to its website on a quarterly basis. It does not specify which information must be included in these reports.<sup>58</sup>

*Recommendation 32: Each incident report reported by CNL should include at a minimum:*

- a) the incident date,*
- b) reporting date,*
- c) an exact description of the event including actual data of any measured releases, and*
- d) any applicable Action Levels and/or Derived Release Limits so that members of the public can understand the severity of the reported incidents.*

*Recommendation 33: Once posted, incident notices and reports should remain on the CNL website indefinitely and include subsequent event notices describing any follow-up remediation activity whenever it is undertaken.*

## **LOW REVIEW: PORT HOPE AREA INITIATIVE**

The intervention concerning the Port Hope Area Initiative has been scoped to follow up on an unplanned event last October, which Waterkeeper did not have the capacity at that time to examine in much detail.

This intervention seeks to provide members of the public with:

- 1) A better understanding the event, its potential impacts to water quality in the area, and the efficacy of subsequent mitigation measures;

It has also been drafted to provide Commissioners and CNSC staff with:

- 2) recommendations for the improvement of emergency/incident public alerts and subsequent messaging related to this and any other unplanned events.

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<sup>56</sup> *Supra* note 30 at pp. 36 – 37.

<sup>57</sup> Canadian Nuclear Safety Commission, Canadian Nuclear Laboratories’ Licence Conditions Handbook, at pp. 21-22.

<sup>58</sup> Canadian Nuclear Laboratories, “Public Information Program for Canadian Nuclear Laboratories (CNL)” at Section 2.6.6.2, online: <<https://www.cnl.ca/site/media/Parent/PIP-rev5.pdf>>.

## **Port Hope Harbour and the Port Hope Area Initiative**

The Port Hope Area Initiative (PHAI) is an internationally significant undertaking. It is the biggest radioactive waste clean-up project in Canadian history, and involves one of the largest nuclear waste holding facilities in North America.

The PHAI is comprised of two distinct projects: the Port Hope waste relocation project (“Port Hope Project”), and the Port Granby waste relocation project (“Port Granby Project”). Together, both projects seek to clean up a combined two-million cubic meters (m<sup>3</sup>) of low-level radioactive waste from various sites across Port Hope and Port Granby.

The Port Hope Project involves excavating 1,223,250 m<sup>3</sup> of historic radioactive waste from several sites around the town of Port Hope to a Long-term Waste Management Facility (PH LTWMF) just north of the community. The project was subject to an environmental assessment (EA) under the *Canadian Environmental Assessment Act, 1992* (CEAA, 1992) which was conducted from 2001 to 2007. In 2009, the CNSC granted a five-year Nuclear Waste Substance Licence to Atomic Energy Canada Limited (AECL) to implement the project. In 2012, AECL applied to have its licence extended for ten years. This was granted by the Canadian Nuclear Safety Commission (CNSC), making the current licence valid until December 31, 2022.

The Port Granby Project involves the removal of 450,000 m<sup>3</sup> of historic radioactive waste from the existing and poorly contained Port Granby waste management facility to a new above-ground waste management facility (the PG LTWMF) 700 meters north of the Lake Ontario shoreline. The Port Granby Project was also subject to a federal EA under CEAA, 1992 and the project was approved in 2009. After a public hearing in September 2010, the CNSC granted AECL a ten-year licence to implement this project.

Both Port Granby and Port Hope’s new LTWMFs have their own Waste Water Treatment Plants (WWTPs) to treat the sites’ stormwater and leachate before it is released into Lake Ontario.

AECL/CNL’s licences for both projects authorize it to:

- Develop and construct new long-term waste facilities;
- Remediate historic waste sites;
- Transport waste to its facilities; and
- Conduct long-term maintenance and monitoring of its waste sites.

LOW has been involved with decision-making processes for the PHAI for almost a decade. The organization has also enjoyed long-standing relationships with many Port Hope residents since its founding in 2001. Waterkeeper is very aware of the beauty of the Port Hope and Port Granby areas: their preserved historical town buildings and houses; their active aquatic communities along the lake’s shoreline, the Ganaraska River, and local creeks; their local beaches; and their stunning cycling and walking trails. The organization intervened in 2009 during the EA for the PHAI, and again in 2012 during its licence hearing which ultimately granted a 10-year licence for remediation work.

In October and November 2016, LOW intervened during a meeting to review the PHAI. At that time, Waterkeeper made a series of recommendations for improvements including remediation activities to address harbour water quality concerns while PHAI activities such as dredging and construction on other parts of the Harbour walls were being undertaken.<sup>59</sup> However, this does not appear to have been

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<sup>59</sup> Lake Ontario Waterkeeper, “Submissions of Lake Ontario Waterkeeper Re: Reviewing Canadian Nuclear Safety Commission (CNSC) staff’s status report on Canadian Nuclear Laboratories Limited’s (CNL) Port Hope Area Initiative (PHAI)” at p. 12.

implemented.

### **Port Hope Harbour incident last October**

On October 12 Waterkeeper saw a news story documenting the collapse of the west harbour wall in Port Hope Harbour.<sup>60</sup> The story noted that the collapse was not a surprise as it had been deteriorating for some time. It assured the public on behalf of the municipality that “there are no human or safety concerns related to this incident and that the area will continue to be monitored regularly”. The following three follow-up actions were also shared:

- A new silt curtain was sourced and scheduled for installation that week. The barrier was to be installed along the length of the west harbour wall, from the north to the south end, and was designed to prevent suspended materials from migrating into the rest of the harbour.
- End-to-end investigation of the sanitary sewer line was completed using a closed-circuit camera. Municipal staff determined that the pipe is clear and stable.
- The municipality’s regular water sampling schedule was enhanced and was being conducted by municipal staff daily. The Canadian Nuclear Safety Commission (CNSC) was also conducting water sampling to ensure water safety and compliance.<sup>61</sup>

A press release from the municipality of Port Hope had been published on October 9, 2019 with these same pieces of information.<sup>62</sup> As care and control of the west wall of the harbour is the primary responsibility of the municipality and not a CNSC licensee, the ability for LOW to make recommendations for improvements to incident reporting may be less applicable to the current intervention opportunity. However, since the CNSC has conducted water quality monitoring of the Harbour after the wall’s collapse, and the municipality of Port Hope has not yet posted any links to raw data concerning water quality monitoring around the date of the incident, the CNSC may be well positioned to fill some of this public communication gap.

*Recommendation 1: that CNSC staff make their sampling results of the Port Hope Harbour publicly accessible on the CNSC website.*

Currently, no steps appear to have been undertaken to remediate harbour water quality. This had been recommended by LOW in its 2016 intervention for the duration of harbour remediation activities. Thus, it is worth reiterating that previous recommendation, in the hope that it be reconsidered by the Commissioners at this time.

*Recommendation 2: that CNL and Cameco collaborate with the municipality of Port Hope to take positive steps towards remediating water quality in the Port Hope harbour to counteract activities and incidents that would further contaminate surface water in the harbour.*

*Recommendation 3: that CNSC staff, CNL, Cameco, and the municipality of Port Hope consider collaborating more on major incident communications to ensure the public knows in a timely way:*

- a) when the incident occurred;*
- b) measured environmental effects (including sharing available monitoring data); and*
- c) a description of any mitigation and/or remediation efforts undertaken to address incidents after they occur.*

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<sup>60</sup> Greg Davis, “Repairs underway following Port Hope harbour wall collapse”, *Global News*, October 12, 2018, online: <<https://globalnews.ca/news/4542149/repairs-underway-port-hope-harbour-wall-collapse/>>.

<sup>61</sup> *Ibid.*

<sup>62</sup> Municipality of Port Hope, “Media Release: Port Hope West Harbour Wall”, October 9, 2019, online: <<http://www.porthope.ca/news/media-release-port-hope-west-harbour-wall/>>.

LOW prepared information requests for CNL as part of this intervention to obtain additional information and data concerning the incidents and its environmental impact. The organization only obtained initial monitoring data disclosures from the Municipality on October 3<sup>rd</sup>. It received additional disclosures of Port Hope Harbour monitoring results from CNSC staff on October 18.<sup>63</sup>

LOW has also since requested additional information concerning the event from Cameco which operates the Port Hope Conversion Facility bordering the harbour's western wall, as an intervenor in a parallel Commission meeting process to consider the 2018 performance of nuclear processing facilities. The organization will continue to perform analysis of information received and present additional findings during the Commission Meeting to consider CNSC staff's Regulatory Oversight Report concerning nuclear processing facilities' operations over 2018.

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<sup>63</sup> See Appendix A for more detailed account of LOW's information requests.

## APPENDIX A: Information requests and responses

### CRL Information requests

Ms. Feinstein made a first round of information requests has been made on August 15<sup>th</sup> to the following parties:

#### For CNL and the CNSC:

- 1) “Can you confirm the current number of CNSC licences for facilities on the Chalk River sites?
  - a. Please provide copies of all existing licences.
- 2) Can you confirm the current number of CNSC licences currently being sought for the Chalk River sites and the names of these facilities?
- 3) Can you provide the groundwater management plan for the Chalk River site?
  - a. Can you also provide the last three years of groundwater monitoring program reports?
- 4) Can you provide the stormwater management plan for the Chalk River site?
  - a. Can you also provide the last three years of stormwater monitoring program reports?
- 5) Can you provide the last three years of CNSC Annual Compliance Reports for the Chalk River sites?

These requests concern copies of original documents, rather than summaries.”

#### For the MOECP:

- 1) “Can you confirm whether there are any Environmental Compliance Approvals (ECAs) for any facilities at the Chalk River sites?
  - a. If there are, can you please share them?
  - b. If there are, can you also please share the last three years of compliance reports for the/each ECA?”

#### For the DFO:

- 1) “Can you confirm whether there are any *Fisheries Act* approvals for any facilities at the Chalk River sites?
  - a. If there are, can you please share them?
  - b. If there are, can you also please share the last three years of compliance reports for the/each permit?”

On August 16<sup>th</sup>, Ms. Feinstein received responses for first two questions above from CNSC staff, and sent the following clarification questions on August 22<sup>nd</sup>:

#### Follow up to question #1

- a) Would it be possible for you to provide a copy of the licence conditions handbook? If it is too large to send electronically, mail is fine and can be left at the door of the address I provided in case I am not home.
- b) The licence you provided does not seem to contain a list of facilities to which it applies, so can CNSC staff confirm all facilities at the Chalk River sites are meant to be included in the 2018 licence provided?
- c) I was not able to find any reference to this 2018 licence on the CNSC's online licence database. Can CNSC staff verify whether the licence has been included in the lists provided by that database?

#### Follow up to question #2

- a) I understand the NSDF will also require a new licence at the Chalk River site (<https://www.cnsccsn.gc.ca/eng/reactors/research-reactors/nuclear-facilities/chalk-river/near-surface-disposal-facility-project.cfm>), thus at least two additional licences seem to be being pursued (the SMR and

NSDF). Can you confirm whether there are any additional licences being sought (by CNL or any other applicant) in addition to the SMR and NSDF?

Ms. Feinstein sent follow-up emails to CNL on August 22<sup>nd</sup>, called CNL on August 22<sup>nd</sup> and 26<sup>th</sup>. Ms. Feinstein also sent a follow-up email to CNSC staff on September 4 inquiring about responses to follow-up questions for staff, and requesting assistance with contacting CNL.

On September 4<sup>th</sup>, CNSC provided responses to follow-up questions (in red):

Follow up to question #1

a) Would it be possible for you to provide a copy of the licence conditions handbook? If it is too large to send electronically, mail is fine and can be left at the door of the address I provided in case I am not home. (The LCH was sent separately).

b) The licence you provided does not seem to contain a list of facilities to which it applies, so can CNSC staff confirm all facilities at the Chalk River sites are meant to be included in the 2018 licence provided? (Yes. All facilities on the CRL site are included and the list of Class I and Class II facilities are in the licence conditions handbook)

c) I was not able to find any reference to this 2018 licence on the CNSC's online licence database. Can CNSC staff verify whether the licence has been included in the lists provided by that database? (The "online licence database" on the website does not include Class I licences. None of the Class I facility licences are in this list.)

Follow up to question #2

a) I understand the NSDF will also require a new licence at the Chalk River site (<https://www.cnsccsn.gc.ca/eng/reactors/research-reactors/nuclear-facilities/chalk-river/near-surface-disposal-facility-project.cfm>), thus at least two additional licences seem to be being pursued (the SMR and NSDF). Can you confirm whether there are any additional licences being sought (by CNL or any other applicant) in addition to the SMR and NSDF? (We are not aware of anything else – the NSDF, if approved by the commission will be an amendment to the site licence for CRL, not a new separate licence. The SMR, if approved will be a separate licence)

On September 6<sup>th</sup>, ORK received the following documents from CNL:

- Effluent Monitoring Reports from 2016, 2017, and 2018;
- Annual Safety Reports from 2015, 2016, and 2017;
- Groundwater Monitoring Reports from 2016 and 2017; and
- Annual Compliance Reports from 2018.

On October 3<sup>rd</sup>, the following requests were submitted to CNL:

- 1) Has Chalk River has been granted any Environmental Compliance Approvals (ECAs) by the Provincial Ministry of Environment, Conservation, and Parks. If so, would you be able to share copies of it/them? and
- 2) Have any *Fisheries Act* permits for Chalk River issued by the federal Department of Fisheries and Oceans. If the site is also subject to such a permit, could you share a copy?

Confirmation of receipt of the requests were provided the same day, but no response has since been provided.

Follow-up emails were sent by ORK on October 18 and 23<sup>rd</sup>.

On October 23<sup>rd</sup>, the following responses were sent from CNL:

- 1) Chalk River Laboratories is a federally regulated organization and as such, does not have provincial Environmental Compliance Approvals from the Provincial Ministry.



- 2) Chalk River Laboratories has submitted a request, through the CNSC, for a Fisheries Act authorization under Section 35 (1). This request is currently under review. The results of the fish impingement and entrainment monitoring are included in our annual environmental monitoring reports and summarized in the site Environmental Risk Assessment. Fish impingement monitoring was conducted in 2001, 2004, 2012, 2014 and 2017 and is conducted annually (since 2012) for lake sturgeon. Based on this data, CNL estimated the production foregone for all fish species impinged from the NRU cooling system to be approximately 133 kg per year. Entrainment sampling was conducted in 2016 and 2017 and the estimated biomass entrained (expressed as age-1 equivalent) is approximately 17 kg per year. As of March 31 2018, the NRU reactor was shut down and flow rates were immediately reduced by 50%. Once the reactor was defueled (May/June 2018) the flow was further reduced to a flow to 25% of the previous flow. This reduction in flow will significantly reduce the number of impinged and entrained organisms into the NRU intake.

The total number of lake sturgeon impinged since 2012 was 6 individuals, one of which was alive and released. CNL will continue to monitor and report on any impinged lake sturgeon.

That same day, October 23, ORK sent the following follow-up questions:

- 1) Have any assessments been conducted to determine whether an ECA may be required for Chalk River? If so, can you provide copies of these assessments?
- 2) When did CNL submit its application for a *Fisheries Act* permit to the Commission? and can you provide a copy of the assessment of the site and its impact which usually accompanies such permit requests?

No response has yet been provided to either of these most recent queries.

### **PHAI Information requests**

Ms. Feinstein made the following information request to CNL on August 15<sup>th</sup>, 2019:

- 1) the identified cause for the wall collapse;
- 2) whether similar risk conditions exist for any remaining walls;
- 3) whether any water quality testing was conducted in the area after the collapse;
  - a. if so, a list of contaminants that were tested for and the results of water quality sampling;
- 4) a description of mitigation and remediation measures taken since the incident;
- 5) A copy of the incident report for the event that was sent to the CNSC; and
- 6) A copy of the incident report which was sent to the MECP.

On August 29<sup>th</sup>, CNL informed Ms. Feinstein that information should be obtained from the Municipality of Port Hope as it had control over the west harbour wall:

“It should be noted that Canadian Nuclear Laboratories (CNL) did not (and still does not) have care and control of the municipally owned west wall of the Port Hope Harbour during the collapse.

The deteriorating condition of the aging harbour walls and the potential for their collapse was known and taken into account during the planning phase for the harbour remediation, as part of the Port Hope Area Initiative (PHAI). Although it was determined that the collapse was not

related to PHAI work being undertaken on the Centre Pier and the east side of the harbour at the time, CNL worked closely with the Municipality and Cameco to provide technical assistance.

The Municipality of Port Hope issued a media release about the incident (attached) that provides information on the collapse and is the point of contact for information on any testing done at the time and any reports submitted.

CNL's rehabilitation of the remaining harbour walls began earlier this year to prepare the harbour for dredging. On the north and south side, (pipe) pilings were installed to protect the timber crib structure that is currently there. On the west wall, a section of which had collapsed prior to this event, a grout curtain is installed to prevent water seepage underneath the new combi wall when it is built. Installation of pilings on the Queen's Wharf also started this year, although completion of that work has been postponed as result of the high water levels experienced in the area. The shoring in that area will include drilling pipe piles against the existing wall along the wharf, which will continue once the waters recede to avoid underwater drilling.

As CNL continues work in the harbour in preparation for dredging, the safety of our workers, the public and the environment remain our priority."

forwarded the information request to the Municipality of Port Hope on September 4<sup>th</sup>. She was contacted September 5<sup>th</sup> with a promise to provide a response to questions by the 18<sup>th</sup>.

Ms. Feinstein was contacted September 17<sup>th</sup> by the municipality noting it could only provide responses by the 19<sup>th</sup> or 20<sup>th</sup>.

The following responses (in red) were provided September 19<sup>th</sup>, in addition to a copy of a previously prepared briefing report from Golder Associates reviewing the incident and its effects for Cameco Corporation (dated July 4, 2019 – the contents are too extensive to be attached to this Appendix):

- 1) The identified cause for the wall collapse;
  - a. the partial collapse of the west harbour wall concrete coping is believed to be a result of age, deterioration of sub grade cribbing, and erosion of soils surrounding the west wall. There has been incremental movement that has consistently been monitored since 2007 and the Municipality proactively installed a turbidity (otherwise known as silt) curtain in the spring of 2017 as a potential mitigation measure should the wall collapse as this area is within our drinking water intake protection zone. In advance of the west turning basin wall coping collapse in October 2018, Canadian Nuclear Laboratories (CNL) had also been operating a heavy duty turbidity curtain in the harbour approach channel in association with the Phase 1 wave attenuator placement and harbour remediation preparations. Subsequent to the partial west wall coping collapse in October 2018, the Municipality installed a second turbidity curtain across the full span of the turning basin west wall, with a north-south orientation. Moreover, Golder Associates was retained to design an engineered revetment to stabilize the wall. In consultation and cooperation with CNL and Cameco, the revetment was installed in December 2018.
- 2) Whether similar risk conditions exist for any remaining walls;
  - a. it has been known there is Harbour wall movement had been documented at various locations across the harbour, however, monitoring points along the mid portion of the west turning basin wall associated with the October 2018 coping failure had by far shown the greatest rates of displacement. A 2019 third party geotechnical assessment of the

remaining west turning basin wall coping identified a potential short term failure risk for the coping segment immediately north of the revetment zone. Remaining harbour wall segments are not at risk of failure in the short term. Cameco has provided and consented to the release of the enclosed Golder Associates Ltd. letter dated July 4, 2019.

- 3) Whether any water quality testing was conducted in the area after the collapse;
  - a. the Municipality undertook a daily sampling program after the collapse commencing on October 10th through October 25, 2017. Both the MECP and CNSC were satisfied with the performance of the turbidity (silt) curtain and mitigative measures installed by the Municipality and our Water Treatment Plant Manager / Overall Responsible Operator for protection of our drinking water system intake Zone. b) if so, a list of contaminants that were tested for and the results of water quality sampling; the Municipality continues weekly sampling with raw samples off our low lift header tap in the lab and treated sample from the treated sample tap in our lab. Basically before and after filtration that includes, but not limited to contaminants of potential concern for low level radioactive waste, specifically arsenic and uranium in both the raw water and treated water samples. Results of the sampling may be provided upon request, and the sampling is on-going as part of a regulatory compliance regime the Municipality is required to do. The sampling frequency was increased to daily immediately after the collapse to ensure water quality, both inside the harbour, immediate proximity to the west wall both in front of and behind the silt curtain, and at the wave attenuator both inside the attenuator and out in the lakeside. The Water Keepers are invited to consult directly with the regulators if there are any questions regarding test results and compliance measures.
- 4) A description of mitigation and remediation measures taken since the incident;
  - a. see Response to Q # 3. The Municipality continues to monitor water quality through its routine sampling regime. As with any other municipal construction activity where excavation work occurs the Construction Monitoring Program through CNL was engaged at the time of the west turning basin coping wall collapse to assess and manage LLRW contaminated soils excavated during the revetment construction period. CNL has care and control of the harbour and Centre Pier for remediation activities, EXCEPT for the west wall.
- 5) A copy of the incident report for the event that was sent to the CNSC;
  - a. the harbour west wall is owned by the Municipality of Port Hope and outside of a Federally CNSC licensed facility, and therefore under jurisdiction of the Ministry of Environment, Conservation and Parks. There is no incident report to be shared as the protocol for reporting is to Spills Action Ontario by telephone.
- 6) A copy of the incident report which was sent to the MECP;
  - a. see response to Question # 5 above.

Ms. Feinstein sent follow-up queries on September 25<sup>th</sup>:

- 1) You mention that the results of sampling could be made available upon request. Can I make that request to you or is another channel required? It would be helpful if we could see sampling results from between 9-10 months prior to the wall collapse up until the present.
- 2) You note primary contaminants of concern that were tested for were arsenic and uranium. Is this a comprehensive list? Were any other substances tested for?
- 3) I understand s.12 of OReg 675/98 requires written reports of all incidents reported to the Spills Action Centre, even if the report need only be made to the MECP officer over the phone. Would it be possible for you to share that report?

On October 3<sup>rd</sup>, the municipality sent sample results from the date of the collapse to October 24<sup>th</sup> as well as the results leading up to the collapse starting the previous August. A link to Port Hope's annual and summary reports was also provided.

On October 16, LOW requested the following information from CNSC staff:

- 1) Copies of the raw (i.e. disaggregated) results of all CNSC staff sampling conducted in and around the Port Hope Harbour to measure the potential impacts of the west wall's collapse last October?

This information was provided by CNSC staff on October 18, 2019.