Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 20-H4.12

File / dossier : 6.01.07
Date: 2020-10-26
Edocs: 6393709

Written submission from the Saugeen Ojibway Nation

Mémoire de la Nation Ojibway de Saugeen

In the Matter of the

À l'égard de

Canadian Nuclear Laboratories, Douglas Point Waste Facility

Les Laboratoires Nucléaires Canadiens, installation de gestion des déchets de Douglas Point

---

Application to amend the waste facility decommissioning licence for the Douglas Point Waste Facility

Demande de modification du permis de déclassement de l'installation de gestion des déchets de Douglas Point

Commission Public Hearing

Audience publique de la Commission

November 25-26, 2020

25 et 26 novembre 2020

Canada

This page was intentionally left blank

Cette page a été intentionnellement laissée en blanc

Written Submissions of the Saugeen Ojibway Nation –
Application from Canadian Nuclear Laboratories to Amend the Decommissioning license for the Douglas Point Waste Facility to Phase 3 Decommissioning.

Commission Public Hearing: November 25-26 2020

Introduction

The purpose of this document is to provide a written submission on behalf of the Saugeen Ojibway Nation (SON) to the Canadian Nuclear Safety Commission (the Commission) as part of the Commission hearings for Canadian Nuclear Laboratories' (CNL) application to amend the current Decommissioning license for the Douglas Point Waste Facility (DPWF) to a Phase 3 Decommissioning license to dismantle and demolish remaining DPWF facilities. CNL currently manages the DPWF on behalf of Atomic Energy of Canada Limited (AECL).

The Saugeen Ojibway Nation (SON) is comprised of the Anishinaabe People of the Chippewas of Nawash Unceded First Nation and Chippewas of Saugeen First Nation. SON's Territory (or Anishinaabekiing) encompasses much of the Saugeen (Bruce) Peninsula, extending down south of Goderich and east of Collingwood. The waters that comprise the Territory are the waters surrounding these lands and include the lakebed of Lake Huron from the shore to the international boundary with the United States and the lakebed of Georgian Bay to halfway across the Bay. The SON Communities occupy large, unceded communal lands (reserves) bordering Lake Huron and Georgian Bay (Territory Map: Attachment 1). SON also has an exclusive hunting reserve in the northern part of the Saugeen Peninsula. In SON's Territory, SON members have proven and asserted Aboriginal and treaty rights, including a court-proven commercial fishing rights (*R v Jones Nadjiwon 1993*) and active commercial fishery, an active land and lakebed title claim. Saugeen Ojibway Nation asserts its rights, jurisdiction, and governance across the Territory.

SON's ancestors have used and occupied the Anishinaabekiing since time immemorial and its People continue to do so today. SON's Territory consists of everything integral to life—the lands, rivers, lake, winds, grass, people, animals, and fish. The Anishinaabekiing has sustained the SON people physically and spiritually for countless generations and must continue to do so far into the future.

The DPWF is located in the SON Territory, within Treaty $45^{1/2}$, on the shore of Lake Huron within both historical and contemporary areas of significance for the SON People, including areas of historical settlements, ceremonial and burial or sacred sites, areas of historical and contemporary commercial and subsistence fishing, and areas of historical and contemporary harvesting. The lands and waters that DPWF is now part of, are areas of importance and meaning for SON. These are the lands and waters where our Ancestors lived and non-human relatives lived since time beyond memory, and where our People continue to uphold their sacred responsibilities, relationships and connections to who we are as Anishinaabe.

The DPWF was the first nuclear operation constructed in SON Territory, beginning operation in 1968 and ceased operation in 1984, and began the nuclear industrialization of SON Territory. SON was not consulted or involved in the decisions made during this time to bring nuclear power generation to the Territory, nor any consequent decisions about nuclear power generation in SON Territory. As the Douglas Point Nuclear Generating Station (DPNGS) ceased operations, the Bruce Nuclear Generating Station (BNGS) was built on the shore of Lake Huron (adjacent to DPNGS) to continue nuclear power generation in the region. BNGS is now the largest nuclear operating facility in the world. SON has continued to be inundated and faced with difficult decisions related to the nuclear industry in our Territory. This is not something that SON chose, but rather something that was forced upon us, that we now must work to reconcile in respect of our People, our Ancestors, the Environment of our Territory, our non-human relatives, and future generations.

Background

CNL provided notification to the CNSC in February 2019 of their intention to begin the licensing and approvals process with the Commission to authorize an amendment to CNL's Decommissioning licence to proceed to Phase 3 Decommissioning (dismantling and demolition) of all remaining facilities within the DPWF.

CNL and SON began a consultation and engagement process regarding the decommissioning license amendment for the DPWF in late 2019. On March 9 2020, SON Environment Office (EO) staff met with CNL staff (Margot Thompson and Ian Bainbridge) at the CNL DPWF site. CNL provided a presentation overview regarding the DPWF decommissioning license (overview, timeline, approach), and an overview of CNL's approach to and experiences in consultation and engagement with Indigenous Communities. Due to COVID-19 related closures and restrictions, further engagement on this file was paused until August 2020. SON EO and our external subject matter experts, Jarmo Jalava (Terrestrial Ecologist), Chesapeake Nuclear Services (Nuclear Safety and Radiological Experts), and Dr. William Fitzgerald (Archaeologist) undertook to review and evaluate the available information and completed in-person site-visits at DPWF. On August 25, 2020, SON EO staff, Jarmo Jalava, and Dr. Fitzgerald completed a site field visit with CNL staff at the DPWF. The site visit included a tour of the DPWF administration, operations, and waste storage facilities, as well as the entire physical environment within the DPWF boundary. On September 17 2020, CNL, SON and Chesapeake Nuclear Services completed a technical call to discuss and address questions and concerns regarding radiological, safety, and industry standards related to decommissioning activities and to identify additional information needs regarding these aspects of decommissioning.

SON EO and its technical experts completed a review of the decommissioning license application and associated documents based on materials provided by CNL and a site visit to DPWF. SON's review included an evaluation for potential environmental, radiological/safety, and archaeological impacts of the decommissioning activities, identification of solutions or mitigations where impacts were identified but could not be avoided, and recommendations for on-going engagement between SON and CNL throughout the decommissioning process.

Technical Comments and Recommendations

SON staff and subject matter experts completed a review and analysis of available technical documentation (as provided by CNL) as well as a site-visit at DPWF. Attachments 2 and 3 provide full reporting on the technical documents reviewed, observations during the site visit, identification of issues or concerns and relevant recommendations.

Archaeology and Cultural Heritage Considerations

The purpose of the archaeological/cultural heritage review is to ensure that the historical and ancestral context of SONs occupation of its Territory through time is accurately represented and that places of cultural and spiritual significance to SON are protected from any disturbance or destruction.

Dr. Fitzgerald reviewed the available written materials provided by CNL and participated in a site visit at DPWF with CNL staff on August 25 2020. During the site visit, Dr. Fitzgerald made note of one (1) feature ("Lime Kiln") directly adjacent to the CNL administration facility (trailer) within the DPWF site. Dr. Fitzgerald noted that this feature has cultural significance to SON and that any disturbance or disruption of this area must be avoided during all decommissioning activities. CNL staff acknowledged their awareness of the feature, and indicated that CNL would not be disturbing the location in any way during decommissioning activities. Dr. Fitzgerald noted that he had in previous years completed a detailed archaeological assessment across the

broader Ontario Power Generation (OPG) and Bruce Power (BP) site, including the DPWF vicinity, and that based on the area identified for decommissioning activities, there were no additional archaeological or cultural heritage concerns.

Ecological Considerations

The purpose of the ecological review is to ensure that the lands, waters, wildlife and Aboriginal and treaty rights of the SON are protected from any potential negative impacts of the proposed DPWF decommissioning and associated activities. Additionally, given that the site is being decommissioned, the proposed decommissioning and long-term planning for the site provides an opportunity for ecological rehabilitation/restoration to benefit species of cultural importance to SON, as well as species at risk and local biodiversity generally. This review provides an opportunity to understand the potential for SON's engagement in ecological rehabilitation or restoration planning at the site.

Jarmo Jalava reviewed the available written materials provided by CNL and participated in a site visit at DPWF with CNL staff on August 25 2020. Based on the technical review and site visit, Jalava concluded that there would be no significant impacts to the ecological features, flora or fauna, within the DPWF resulting from decommissioning activities.

> The Douglas Point – Baie du Doré area is situated within the Huron Fringe physiographic region, an important, widely-recognised corridor and staging area for migratory, breeding and wintering bird species. Natural cover is relatively well-connected on the Saugeen Peninsula to the north, with more fragmented forest, wetland and cultural grasslands more prevalent from the community of Saugeen Shores southward. Protected areas in this southern section include MacGregor Point and Inverhuron provincial parks, various conservation areas, and municipal 4 zoning that limits shoreline development to some degree. As a result, a relatively "green" natural corridor extends down the shoreline from the Peninsula to Huron County.
>
> In this context, it is widely recognised that the Bruce Power – Douglas Point area provides extensive remnant habitat for significant populations of reptile, bird and plant species at risk, as well as many species of cultural importance to SON. The site provides opportunities to maintain and enhance regional habitat connectivity. It is important to recognise that the condition, extent and configuration of these terrestrial ecosystems in the area has a direct influence on water quality of the rivers and streams that flow into Lake Huron, which is of fundamental importance to the health of fish populations, which are of paramount cultural and commercial importance to SON.
>
> Based on the background information as well as observations during the August 2020 site visit, the DPWF is a totally human-modified and disturbed site, with very little natural vegetation. The extant ecological community consists largely of adventive non-native plant species ("weedy plants") and planted cultivars (lawn and border shrubs and trees). The predominant land cover consists of the retired nuclear facility buildings and adjacent asphalt roadways and parking areas. Immediately adjacent to (but outside) the facility on the northwest near the Lake Huron shoreline, there is a small concrete tank/reservoir associated with the water intake pump house. Some native aquatic and terrestrial vegetation has colonised portions of this reservoir.

Long term future use of the site (i.e., post-2070) has not been determined, but commercial/industrial uses are being considered. Any ecological objectives for the site would largely depend on the future land uses and how much area is available for habitat creation, rehabilitation and restoration.

Without an end-state site concept, a compatible ecological rehabilitation cannot be articulated in detail. Recommendations are therefore made below to identify opportunities that would contribute to SON's interests in the maintenance and enhancement of regional and local ecological health and biodiversity generally, and of the overall Bruce nuclear facility site specifically.

The Douglas Point Waste Facility is situated immediately adjacent to the Lake Huron shoreline. Keeping coastal areas natural or restoring them to a natural or quasi-natural state has multiple benefits including (but not limited to): maintaining and improving water quality; reducing erosion; providing a buffer between anthropogenic infrastructure and dynamic lake and shoreline processes; and providing numerous high-value biodiversity and ecological benefits. Biodiversity and ecological benefits of ecological restoration at the site would include maintaining and enhancing a natural corridor for the movement and foraging of birds, mammals, herpetofauna and insects, especially those with limited dispersal abilities. Many native species are at risk of local extinction in fragmented natural landscapes when their environmental conditions shift as a result of climate change. Preliminary recommendations include:

Recommendations:

1. Keep SON apprised on a regular consultation schedule as decommissioning progresses and collaborate with SON as appropriate.

2. Any site disturbance creates conditions that could contribute to colonisation by invasive alien plant species. Appropriate protocols should be applied to minimise and prevent the spread of invasive species during decommissioning. Some invasive plant species (e.g., knapweed) were observed at the site during the August 25, 2020, site visit.

3. The decommissioning of the Douglas Point facility provides an opportunity to re-establish some ecological functions and ecosystem services lost during development of the site. Strategic landscaping and habitat creation in collaboration with SON, Bruce Power, OPG and other relevant parties, could expand and enhance migratory bird, pollinator, reptile and mammal habitat, as well as a linkage to the Baie du Doré natural area over the long term.

4. Increasing natural habitat connectivity immediately to the south of the Douglas Point facility is probably not feasible due to the existing Bruce Power facilities.

5. Habitat creation and restoration opportunities include forest/woodland, shrub thickets, pond(s) and marshes, coastal meadow marsh and pollinator meadows. Microhabitats beneficial to biological diversity may be created through pit and mound landscaping and other techniques to increase topographic variability of the site. If appropriately resourced, SON may be able to provide expertise to plan, and human resources to undertake, such initiatives.

6. Only native plants species appropriate to site conditions should be used in any site restoration or rehabilitation. SON can assist in developing site-appropriate planting lists, which may include species of cultural importance.

7. Continue to explore opportunities for collaboration with SON regarding long term site planning and specific rehabilitation and ecological restoration activities.

Nuclear and Radiological Safety Considerations

The purpose of the nuclear and radiological safety review is to ensure that the highest standards are adhered to in all decommissioning plans and that risk or potential impacts resulting from radiological release during decommissioning, management and storage of nuclear waste, or other unforeseen incidents are adequately considered and appropriately planned for.

Chesapeake Nuclear Services reviewed available written material as provided by CNL and participated in a teleconference on September 17 2020 to further discuss written materials and request additional information and documentation. Additional information was provided by CNL for inclusion in the review and evaluation of the decommissioning plan, as requested. Detailed review and assessment are provided as Attachment 3.

Chesapeake Nuclear Services did not identify any significant concerns regarding the Decommissioning plans in terms of regulatory and industry standards, radiological hazards or safety, worker safety, or impacts to SON rights or the environment of the Territory.

Since its shutdown in 1984, the Douglas Point Nuclear Generating Station (DPNGS) has been maintained in a safe shutdown state, known as the "storage with surveillance plan" with the fuel having been removed and the reactor drained. Following shutdown, selected decontamination was performed to reduce contamination levels where most systems have been deactivated to safe storage conditions. Stored radioactive waste inventory has been reduced with the shipment of miscellaneous liquids and demineralizer resin to CNL for processing and storage, pending final disposition. Otherwise, essential facilities are being maintained to support the continued surveillance activities needed for ensuring continued safe conditions; and the most systems and components, including radioactive and nonradioactive, remain in-place. No significant efforts have been devoted to the decommissioning of the plant and site environs.

The time that elapses from shutdown in 1984 to present day has allowed for much of the (short-lived) radioactive material to decay, reducing the overall radioactivity of the materials and components. This so-called "decay in-place" reduction results in lower dose rates (and worker exposure) when at a future time dismantling and decommissioning activities are performed. While significant from reducing worker radiation exposures and reduction in (short half-life) radioactive waste activities, it does little in reducing the longer-lived, intermediate level radioactive waste; ultimate disposal in a deep geological repository will still be required.

This delay can be desirable from the perspective of the responsible entity (Canadian Nuclear Laboratories), since it defers costs, and to some extent may also reduce overall decommissioning impact due to reduced radiation levels, not taking into consideration inflation and increases in labour and other associated costs, including that required for the continued maintenance activities. However, the continued delay in final decommissioning, and returning the site to its natural condition (i.e., radioactive materials and waste removed, facilities demolished) can be viewed as a continuing undesirable legacy from a community perspective.

As part of the next step in the decommission process, Canadian Nuclear Laboratories (CNL) submitted two documents to Canadian Nuclear Safety Commission (CNSC) in support of an application to proceed with Phase 3 Decommissioning for the dismantling and demolition of all remaining facilities of the DPWF. Two key documents, as reviewed herein, are the Storage with Surveillance Plan (SWSP) and the Detailed Decommissioning Plan (DDP), Volume 1: Program Overview. The Plan addresses five (5) so-called Planning Envelopes (A thru E, see Table 6-1 of the DDP), each of which covers, in a somewhat increasing radiological hazard, various facilities and aspects for decommissioning stages. However, it is important to recognize that this Plan essentially only focuses on Envelopes A, B and C, which cover the non-nuclear facilities (Envelope A), the lower-level contaminated facilities (Envelope B), and a clear-out, but not demolition, of the Reactor Building (Envelope C). Projected timelines extend out to 2070 for final site closeout. Envelope A is from 2021 – 2025; Envelope B is from 2022 – 2025; and Envelope C is

2024 – 2030. Envelope D (Spent Fuel Canister Area) and Envelope E (Reactor Building Decommissioning) are not anticipated to occur until after 2030 with final site closure somewhere around 2070. The primary underlying reason for the deferral of Envelopes D and E is perceived to be the absence of a final disposal option for the waste, which contains much of the intermediate level waste requiring disposal in a deep geological repository. The low-level waste is perceived to have easier and available processing and storage options. And, much of what is being addressed is to be treated as "clean" (no-radioactive) or decontaminated to a level where it can be handled/dispositioned as "clean." In summary, the planned near-term decommissioning activities only address those facilities and systems that are considered non-radioactive or mostly lower radiological hazards.

Key Observations and Recommendations:

1. Details of the Plan.
   CNL should make available the key implementation level programs, procedures, and reports that provide the details and results of the decommissioning efforts. To this end, the additional documents, as provided by CNL in response to SON's recent requests, are examples of positive actions in this direction. To ensure awareness of important details of the Plan, as developed and implemented during the decommissioning efforts, SON will need to remain actively engaged.

2. Approach to Decommissioning.
   With no final disposal option currently available for the radioactive waste, SON should continue to have input into the decision process for planned treatment and interim storage.

3. Managing Radioactive Waste.
   SON needs assurance that the specific methods being used
   during the building and system demolition will ensure that potentially radioactive contamination materials are identified and controlled. Detailed methods and controls will be put in-place for CLEARANCE of materials for reuse or disposal as non-radioactive. SON needs a clear understanding of these details to ensure radioactive waste is controlled and not released to its Territory.

4. Disposal of Radioactive waste.
   SON should have a voice in the planned processing, interim storage and final disposal on all waste from the decommissioning.

5. Site Closure.
   SON should continue its engagement with CNL, reviewing the criteria that will be used for terminating the license and the application of the MARSSIM approach for verifying a site acceptable for unconditional release.

In summary, the issues, as discussed above, identify that many details need to be developed and key decisions need to be made for the successful decommissioning of DPWF. These emphasize the importance of SON's continued engagement. While CNL's dialogue, supporting SON's awareness, has started, a well-defined process remains to be formalized. As has been recognized in recent activities, SON's engagement into the decision-making process is paramount to the final acceptance for the site. This engagement will need to be a formal, continual process throughout the decommissioning effort and should ensure not only awareness but also direct voice in decision.

Conclusions

Overall, through SON's engagement with CNL, we did not find that any significant negative impact would occur to SON's Aboriginal and treaty rights, or the Environment of the Territory as a result of the issuance of the Phase 3 Decommissioning license to CNL for the DPWF. Based on the archaeological review, we can be assured that no ancestral (archaeological or cultural) sites would be disturbed or impacted. Based on the ecological review, we can be assured that potential for ecological impacts are very low and contained within the site footprint and any unforeseen interactions with wildlife (e.g., breeding birds) will be avoided, or appropriately mitigated where avoidance is not possible. Based on the nuclear and radiological safety review, we can be assured that CNL has prepared a decommissioning plan for DPWF with consideration of the potential risks, and has developed appropriate plans for decommissioning activities that will not result in radiological or safety hazards on site (to workers or others) or beyond the site.

Engagement with CNL on the decommissioning of the DPWF is the first time that SON has ever formally engaged with CNL regarding the DPWF. With no end-site concept developed, it will be imperative to develop a long-term and formal relationship with CNL in order to ensure that SON continues to be meaningfully involved in the planning and implementation of the end-site concept. SON views this as an opportunity to begin an on-going dialogue and a formal long-term relationship with CNL to ensure our involvement in decisions and planning regarding DPWF, but also to enhance our collective discussion and decision making regarding nuclear operations, nuclear decommissioning and nuclear waste management in SON Territory (and across Canada).

We will look to advance this formalized relationship with CNL by developing a Memorandum of Understanding in the near future, and look forward to continued dialogue with CNL and CNSC staff regarding DPWF and other nuclear issues in SON Territory and across Canada, long into the future.

Attachment 1


Traditional Territories of the Saugeen Ojibway Nations
Geewaedinoong
Ae-pungishimook
Waubunoong
Zhauwunoong
CANADA
U.S.A
Georgian Bay
Lake Huron
Chippewas of Nawash Unceded First Nation
Chief'sPoint
Chippewas of Saugeen First Nation
Meaford
Collingwood
Sydenham River
Saugeen River
Nottawasaga River
Maitland River
Arthur
Goderich
FOR ILLUSTRATIVE PURPOSES ONLY
Aboriginal Title claim area
Treaty 45 1/2 (1836) area
The islands around the Peninsula were subject to various treaties but many small islands on the Lake Huron side were returned to the First Nations in 1980
Treaty 67 (1851) area
Treaty 72 (1854) area
Treaty 82 (1857) area
Treaty 93 (1861) area
First Nations' lands 2004

Attachment 2

Douglas Point Waste Facility Decommissioning

Technical Memo: Terrestrial Ecology Considerations

Prepared for:

Saugeen Ojibway Nation Environment Office

Prepared by:

Jarmo Jalava

Consulting Ecologist

519-949-0402

jvjalava@gmail.com

To: Kathleen Ryan and **Michael Chegahno, Saugeen Ojibway Nation Environment Office**

Date: September 7, 2020

Re: Douglas Point Waste Facility Decommissioning background info and site visit

Relevant sections of the following documents were reviewed to prepare this technical memo:

- Application for Licence Amendment to Proceed with Phase 3 Decommissioning at Douglas Point Waste Facility, July 18, 2019
- 2018 Annual Compliance Monitoring Report for Douglas Point and Gentilly 1 Waste Facilities
- Douglas Point Waste Facility Detailed Decommissioning Plan Volume 1 – Program Overview [22-00960-DDP-001] Revision 0, 2019 July & Revision 1, 2019 December.
- Environmental Risk Assessment for Douglas Point [22-07000-ASD-001] Revision 0, 2019 March.
- Environmental Effects Review - Environmental Review for Douglas Point Waste Facility - Phase 3 Decommissioning, Douglas Point Waste Facility [22-03710-ENA-001] Revision 2, February 2020

- Douglas Point Waste Facility Storage with Surveillance Plan [22-00960-SWS-001] Revision 2, 2015/03/02

Information gathering also involved an August 25, 2020, site tour of the Douglas Point facility, led by Canadian Nuclear Labs (CNL) staff, Ian Bainbridge and Margot Thompson, with SON EO staff Kathleen Ryan and Michael Chegahno also in attendance. SON Archaeology Advisor, Dr. William Fitzgerald was present for initial discussions but did not participate in the actual walk through the facilities.

This memo is intended to support the Environment Office's work to ensure that across the Traditional Territory of the Saugeen Ojibway Nation ("SON"), the lands, waters, wildlife and Aboriginal and treaty rights of the SON are protected from any potential negative impacts of the proposed DPWF decommissioning and associated activities. As well, given that the site is being decommissioned, the proposed decommissioning and long-term planning for the site uses provide an opportunity for ecological rehabilitation/restoration to benefit species of cultural importance to SON, as well as species at risk and local biodiversity generally.

Background:
Canadian Nuclear Labs, which currently operates the DPWF on behalf of Atomic Energy of Canada Limited, has submitted an application to the Canadian Nuclear Safety Commission (CNSC) for an amendment of the Douglas Point Waste Facility (DPWF) Decommissioning Licence, WFDL-W4-332.02/2034 [1] to proceed with Phase 3 Decommissioning involving dismantling and demolition of all remaining facilities of the DPWF. More detailed background on the history of the facility, its operation and decommissioning plans, and the requirement for the amendment application is provided in "Douglas Point Waste Facility Detailed Decommissioning Plan Volume 1 – Program Overview [22-00960-DDP-001] Revision 1, 2019 December" and the "Application for Licence Amendment to Proceed with Phase 3 Decommissioning at Douglas Point Waste Facility, July 18, 2019".

The proposed decommissioning schedule, according to the Detailed Decommissioning Plan (version of December 2019), involves a six planning-envelope (PE) process, with PE-A, PE-B and PE-C to be completed by 2030, and overall project completion by 2070. Non-nuclear buildings and structures are to be dismantled, demolished, disposed of, and those areas of the site restored, by 2025 as part of PE-A. PE-B involves the dismantling, demolition, disposal, and site restoration of the purification building, service building, and resin storage tanks and vault, to be completed between 2022 and 2025. PE-C involves the reactor building clear-out, associated dismantling, removal and disposal of materials by 2030. Each phase includes a final survey, close-out documentation and end-state report.

Interim end-state objectives for each Planning Envelope include:

- Drain, de-energize and remove all subsurface structures to a minimum depth of one metre below grade;

- Perform a radiation survey of the excavated area (i.e. building footprint and the adjacent area) and surrounding soil (i.e. within 1 metre of building perimeter);
- If contamination is found in the soil, remove the affected soil;
- Seal all holes, voids and channels below the 1-m depth from grade with grout;
- Backfill and grade the area with new gravel and topsoil, and landscape the area…

The "final end state" and long-term land use objectives have not been articulated in detail, and are said to depend on the long-term land use objectives for the site. Industrial/commercial use, compatible with Bruce Power uses, is being contemplated as the proposed end-state land use. The cleanup criteria are therefore based on the following radiological, chemical and physical objectives:

- Remove all radiologically contaminated structures or clean them to free release level. If contamination has entered the geosphere and it is impractical to completely decontaminate, CNL will use a clean-up criteria that meet a dose constraint no more than 300 μSv in a year as recommended in the ICRP Publication 82, Protection of the public in situations of prolonged radiation exposure [6-19], see Section 6.8.3 for details;
- With regard to chemical contaminants, Ontario Contaminated Sites clean up criteria for brownfields specific to Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition under Part XV.1 of the Environmental Protection Act [6-20] will be used; and
- All aboveground structures and underground structures including foundations to a depth of 1 m below grade will be removed, backfilled and graded with gravel and topsoil, and landscaped (with sod or seeded) to meet physical end-state goals for the site.
- Upon completion of the Phase 3 decommissioning and achieving the final end-state (i.e. site suitable for other industrial or commercial use, consistent with OPG's anticipated end-state land use for "other OPG use" [6-21]), CNL will apply for a Licence to Abandon. AECL will then attempt to transfer the DP site including its title to OPG which has the first right to enter into a land transfer deal, or to a third-party.

Ecological Context:

The Douglas Point – Baie du Doré area is situated within the Huron Fringe physiographic region, an important, widely-recognised corridor and staging area for migratory, breeding and wintering bird species. Natural cover is relatively well-connected on the Saugeen Peninsula to the north, with more fragmented forest, wetland and cultural grasslands more prevalent from the community of Saugeen Shores southward. Protected areas in this southern section include MacGregor Point and Inverhuron provincial parks, various conservation areas, and municipal

zoning that limits shoreline development to some degree. As a result, a relatively "green" natural corridor extends down the shoreline from the Peninsula to Huron County.

In this context, it is widely recognised that the Bruce Power – Douglas Point area provides extensive remnant habitat for significant populations of reptile, bird and plant species at risk, as well as many species of cultural importance to SON. The site provides opportunities to maintain and enhance regional habitat connectivity. It is important to recognise that the condition, extent and configuration of these terrestrial ecosystems in the area has a direct influence on water quality of the rivers and streams that flow into Lake Huron, which is of fundamental importance to the health of fish populations, which are of paramount cultural and commercial importance to SON.

Based on the background information as well as observations during the August 2020 site visit, the DPWF is a totally human-modified and disturbed site, with very little natural vegetation. The extant ecological community consists largely of adventive non-native plant species ("weedy plants") and planted cultivars (lawn and border shrubs and trees). The predominant land cover consists of the retired nuclear facility buildings and adjacent asphalt roadways and parking areas. Immediately adjacent to (but outside) the facility on the northwest near the Lake Huron shoreline, there is a small concrete tank/reservoir associated with the water intake pumphouse. Some native aquatic and terrestrial vegetation has colonised portions of this reservoir.

Long term future use of the site (i.e., post-2070) has not been determined, but commercial/industrial uses are being considered. Any ecological objectives for the site would largely depend on the future land uses and how much area is available for habitat creation, rehabilitation and restoration.

Recommendations:
Without an end-state site concept, a compatible ecological rehabilitation cannot be articulated in detail. Recommendations are therefore made below to identify opportunities that would contribute to SON's interests in the maintenance and enhancement of regional and local ecological health and biodiversity generally, and of the overall Bruce nuclear facility site specifically.

The Douglas Point Waste Facility is situated immediately adjacent to the Lake Huron shoreline. Keeping coastal areas natural or restoring them to a natural or quasi-natural state has multiple benefits including (but not limited to): maintaining and improving water quality; reducing erosion; providing a buffer between anthropogenic infrastructure and dynamic lake and shoreline processes; and providing numerous high-value biodiversity and ecological benefits. Biodiversity and ecological benefits of ecological restoration at the site would include maintaining and enhancing a natural corridor for the movement and foraging of birds, mammals, herpetofauna and insects, especially those with limited dispersal abilities. Many

native species are at risk of local extinction in fragmented natural landscapes when their environmental conditions shift as a result of climate change.

Preliminary recommendations include:

1. Keep SON apprised on a regular consultation schedule as decommissioning progresses and collaborate with SON as appropriate.
2. Any site disturbance provides creates conditions that could contribute to colonisation by invasive alien plant species. Appropriate protocols should be applied to minimise and prevent the spread of invasive species during decommissioning. Some invasive plant species (e.g., knapweed) were observed at the site during the August 25, 2020, site visit.
3. The decommissioning of the Douglas Point facility provides an opportunity to re-establish some ecological functions and ecosystem services lost during development of the site. Strategic landscaping and habitat creation in collaboration with SON, Bruce Power, OPG and other relevant parties, could expand and enhance migratory bird, pollinator, reptile and mammal habitat, as well as a linkage to the Baie du Doré natural area over the long term.
4. Increasing natural habitat connectivity immediately to the south of the Douglas Point facility is probably not feasible due to the existing Bruce Power facilities.
5. Habitat creation and restoration opportunities include forest/woodland, shrub thickets, pond(s) and marshes, coastal meadow marsh and pollinator meadows. Microhabitats beneficial to biological diversity may be created through pit and mound landscaping and other techniques to increase topographic variability of the site. If appropriately resourced, SON may be able to provide expertise to plan, and human resources to undertake, such initiatives.
6. Only native plants species appropriate to site conditions should be used in any site restoration or rehabilitation. SON can assist in developing site-appropriate planting lists, which may include species of cultural importance.
7. Continue to explore opportunities for collaboration with SON regarding long term site planning and specific rehabilitation and ecological restoration activities.

Specific Comments Relating to Reviewed Documents:

1. Application for Licence Amendment to Proceed with Phase 3 Decommissioning at Douglas Point Waste Facility, July 18, 2019

   No additional specific comments.

2. 2018 Annual Compliance Monitoring Report for Douglas Point and Gentilly 1 Waste Facilities

   No additional specific comments.

3. Douglas Point Waste Facility Detailed Decommissioning Plan Volume 1 – Program Overview [22-00960-DDP-001] Revision 0, 2019 July & Revision 1, 2019 December.

   8-4, p. 143, second bullet: Why are only "Aquatic species as defined in subsection 2(1) of the Species at Risk Act [8-27]" included here? Should terrestrial species at risk not also be included?

4. Environmental Risk Assessment for Douglas Point [22-07000-ASD-001] Revision 0, 2019 March.

   p. 2-9, "conservative areas (Brucedale and Saugeen Bluffs)" should be corrected to read "conservation areas (Brucedale, Saugeen Bluffs and Stoney Island)". This section should also note that various private conservation organisations and land trusts have protected a number of land parcels in close proximity to the site, and that this is because of the widely-recognised ecological significance of the area.

   p. 2-14 to 2-15, "Two tree species with special conservation status" should be corrected to "Two plant species with special conservation status" since dwarf lake iris is not a tree.

   p. 2-15, second paragraph, "S3" means 21-100 occurrences in the province, not 5-20 occurrences.

   p. 2-15, 2.3.5, The statement "Most of the wildlife habitat on the BP site occurs around the periphery of the site, in Inverhuron Provincial Park, in the Baié du Doré Wetland Complex, and in the conifer forest communities near or along the perimeter fence" is confusing. If "the site" being referred to is the Douglas Point facility to be decommissioned, then the statement is correct, but it could be interpreted as the Bruce Power – OPG – Hydro One site, which provides important habitat for a great variety of significant species, including numerous federally and provincially designated species at risk, as well as species of cultural importance to SON.

In addition to the comments in the report, other significant natural communities at the Bruce Power / OPG site include older forest stands and open sandy habitats; also, Pitcher's Thistle, a designated species at risk, occurs on the globally significant Inverhuron dune ecosystem. Great Lakes coastal meadow marshes occur at various locations along the Lake Huron shore, and are considered a globally significant community and are host to a number of rare, uncommon and endemic flora.

p. 2-16, second paragraph, To the best of my knowledge, the report of eastern foxsnake occurring at the site is unconfirmed and likely incorrect.

p. 2-16, section 2.3.5.2. The section on birds has many inaccuracies and generally understates the significance of the BP site in terms of importance to breeding, migratory and wintering avifauna. For example species at risk such as Bald Eagle (Special Concern) and Barn Swallow (Threatened) have been confirmed as breeding on site, and others, such as Red-headed Woodpecker (Endangered) and Least Bittern (Threatened) are probable or possible breeders. The totals relating to breeding bird species can be significantly updated with more recent data collected as part of ongoing biological monitoring activities by Bruce Power and OPG.

p. 4-6, section 4.2. Short-eared owl would not be suitable as a reference organism (ecological receptor) for the site, since this species is very rare in southern Bruce County and extremely unlikely to be encountered at the site with any regularity.

5. Environmental Effects Review - Environmental Review for Douglas Point Waste Facility - Phase 3 Decommissioning, Douglas Point Waste Facility [22-03710-ENA-001] Revision 2, February 2020

   No additional specific comments.

6. Douglas Point Waste Facility Storage with Surveillance Plan [22-00960-SWS-001] Revision 2, 2015/03/02

   No additional specific comments.

Attachment 3

REVIEW OF THE DOUGLAS POINT DECOMMISSIONING PLANS FOR THE SAUGEEN OJIBWAY NATION ENVIRONMENT OFFICE

J. Stewart Bland, CHP
Chesapeake Nuclear Services, Inc.
September 2020

1 Overview

Since its shutdown in 1984, the Douglas Point Nuclear Generating Station (DPNGS) has been maintained in a safe shutdown state, known as the "storage with surveillance plan" with the fuel having been removed and the reactor drained. Following shutdown, selected decontamination was performed to reduce contamination levels where most systems have been deactivated to safe storage conditions. Stored radioactive waste inventory has been reduced with the shipment of miscellaneous liquids and demineralizer resin to CNL for processing and storage, pending final disposition. Otherwise, essential facilities are being maintained to support the continued surveillance activities needed for ensuring continued safe conditions; and the most systems and components, including radioactive and non-radioactive, remain in-place. No significant efforts have been devoted to the decommissioning of the plant and site environs.

The time that elapses from shutdown in 1984 to present day has allowed for much of the (short-lived) radioactive material to decay, reducing the overall radioactivity of the materials and components. This so-called "decay in-place" reduction results in lower dose rates (and worker exposure) when at a future time dismantling and decommissioning activities are performed. While significant from reducing worker radiation exposures and reduction in (short half-life) radioactive waste activities, it does little in reducing the longer-lived, intermediate level radioactive waste; ultimate disposal in a deep geological repository will still be required.

This delay can be desirable from the perspective of the responsible entity (Canadian Nuclear Laboratories), since it defers costs, and to some extent may also reduce overall decommissioning impact due to reduced radiation levels, not taking into consideration inflation and increases in labour and other associated costs, including that required for the continued maintenance activities. However, the continued delay in final decommissioning, and returning the site to its natural condition (i.e., radioactive materials and waste removed, facilities demolished) can be viewed as a continuing undesirable legacy from a community perspective.

As part of the next step in the decommission process, Canadian Nuclear Laboratories (CNL) submitted two documents to Canadian Nuclear Safety Commission (CNSC) in support of an application to proceed with Phase 3 Decommissioning for the dismantling and demolition of all remaining facilities of the DPWF. Two key documents, as reviewed herein, are the *Storage with Surveillance Plan* (SWSP) and the *Detailed Decommissioning Plan* (DDP), *Volume 1: Program Overview.* The *Plan* addresses five (5) so-called Planning Envelopes (A thru E, see Table 6-1 of the DDP), each of which covers, in a somewhat increasing radiological hazard, various facilities and aspects for decommissioning stages. However, it is important to recognize that this *Plan* essentially only focuses on Envelopes A, B and C, which cover the non-nuclear facilities (Envelope A), the lower-level contaminated facilities (Envelope B), and a clear-out, but not demolition, of the Reactor Building (Envelope C). Projected timelines extend out to 2070 for final site closeout. Envelope A is from 2021 – 2025; Envelope B is from 2022 – 2025; and Envelope C is

2024 – 2030. Envelope D (Spent Fuel Canister Area) and Envelope E (Reactor Building Decommissioning) are not anticipate occurring until after 2030 with final site closure somewhere around 2070. The primary underlying reason for the deferral of Envelopes D and E is perceived to be the absence of a final disposal options for the waste, which contains much of the intermediate level waste requiring disposal in a deep geological repository. The low-level waste is perceived to have easier and available processing and storage options. And, much of what is being addressed is to be treated as "clean" (no-radioactive) or decontaminated to a level where it can be handled/dispositioned as "clean." In summary, the planned near-term decommissioning activities only address those facilities and systems that are considered non-radioactive or mostly lower radiological hazards.

2 Key Observations

Reviews were performed of the *Storage with Surveillance Plan* (SWSP) and the *Detailed Decommissioning Plan* (DDP), *Volume 1: Program Overview*, for the purpose of evaluating the radiological impacts associated with the continued maintenance and the planned entry into Phase 3 of decommissioning for the Douglas Point Nuclear Generating Station (DPNGS).

The SWSP provides a general overview of the current conditions. It describes the status of key facilities and those systems that have been deactivated or are being maintained. It includes discussions of surveillance activities (type and frequency) that are performed for continued verification of safe, stable conditions. An overview of radiological conditions for the facilities is provided; radioactive effluent monitoring and environmental surveillance activities summarized. Reference is made to the annual report for *Douglas Point Waste Management Facility Annual Compliance Report (Year)* for the documented releases maintained to very low levels and small fraction of limits.

The DDP, Vol. 1, presents a broad scope overview of the planned decommissioning activities with the focus being on Phase 3 with the purpose of removal of equipment and components, buildings and structures including foundation and footings, and the return of the land for reuse consistent with its location adjacent to the Bruce Site. Excluded from this initial Phase 3 planning is the Reactor Building and Spent Fuel Canister Area, primarily because there is currently inadequate waste processing and disposal capacity for the intermediate level radioactive waste. Additional volumes to the DDP will be developed as the plan progresses, covering more details on the decommissioning of different groupings of facilities and components. The non-nuclear facilities decommissioning will be conducted first followed by nuclear facilities (i.e., those that contain radioactive materials and components).

1. Details of the Plan. As a general observation, the Plan provides a good overview, including commitments to safety and environmental compliance programs with reference to key CNL implementing programs and procedures. The DPP, Vol. 1, identifies programs that are in-place or to be developed that will ensure safety, focused on workers, and regulatory compliance. Extensive reference is made to other documents that supposedly include more details for these programs; however, these referenced documents are publicly available. This approach of summarizing programs and approaches is not uncommon, even for regulatory submittals and approvals, as it provides a good general overview as well as commitment to certain standards and requirements. From a regulatory posture, on-site inspections may be used to evaluate performance and determine compliance. CNL should make available the key implementation level programs, procedures, and reports that provide the details and results of the decommissioning efforts. To this end, the additional documents, as provided by CNL in response to SON's recent requests, are examples of positive actions in this direction. To ensure

awareness of important details of the Plan, as developed and implemented during the decommissioning efforts, SON will need to remain actively engaged.

2. Approach to decommissioning. The submittal is focused on the demolition and decommissioning of the non-nuclear and low-level waste facilities. CNL is wanting to continue to defer certain decommissioning activities – those activities that involve the higher radioactive systems and components and that will result in intermediate level and potentially high-level waste. The primary reason appears to be primarily due to the fact that no suitable disposal option currently exists; processing and storage options are also more limited. There is merit to decommissioning the non-radioactive facilities first so as to gain experience as well as limiting the potential for cross-contamination. With no final disposal option currently available for the radioactive waste, SON should continue to have input into the decision process for planned treatment and interim storage.

3. Demolition activities, occupational risks/hazards associated with the decommissioning. There are no significant differences in the planned activities than what is involved with most other demolition activities for a major facility/complex. These activities will involve noise, traffic, and worker exposure to potentially hazardous pollutants, including radiation for nuclear facilities. Since there are no dynamic, driving forces, like the thermodynamics for an operating nuclear plant, radioactive effluents from the D&D operations can be readily controlled through well-established processes and procedures. Even for potential accidents, any resulting airborne radioactivity will be retained within a localized area with little to no transport of radioactive contamination to the offsite environment. Worker safety is the primary issue. Therefore, the primary concern for D&D activities lies in the controls for identifying and controlling the radioactive material content of the D&D waste. This issue is further discussed below.

4. Managing radioactive waste. There is reference to characterization, as needed for identifying and defining the radioactive content for the facilities, systems, and surrounding environment. However, there is little substantive details included on criteria or controls for this important aspect of radioactive control. There is also reference to clearance of materials, where disposal as non-radioactive or leaving in-place would be allowed. It is envisioned that much of the waste from decommissioning with be clean or decontaminated and, thereby, suitable for unconditional release as clean. Commitments are included to compliance with regulations and standards for identifying and controlling the radioactive component of waste resulting from the decommissioning. This is an important operational aspect, as the inadequate identification and control of radioactive waste could lead to public exposures and spread of contamination outside the bounds of the site. Additional documentation is needed on the adequacy of the sampling and surveys that have been used for classifying facilities, systems and components as clean versus potentially contaminated. SON needs assurance that the specific methods being used during the building and system demolition will ensure that potentially radioactive contamination materials are identified and controlled. Detailed methods and controls will be put in-place for CLEARANCE of materials for reuse or disposal as non-radioactive. SON needs a clear understanding of these details to ensure radioactive waste is controlled and not released to its Territory.

5. Disposal of Radioactive Waste. As discussed above, absent an acceptable low and intermediate waste disposal site, there is no clear direction on where the decommissioning LLW and ILW will be sent – for processing, storage or disposal. Radioactive waste (ILW and LLW) will be shipped

to an appropriate off-site waste management facility for processing/storage/disposal. The off-site waste management facilities will be designated in each DDP and Decommissioning Work Plans. SON should have a voice in the planned processing, interim storage and final disposal on all waste from the decommissioning.

6. Site Closure: Prior to release of buildings, facilities, areas, and ultimately the site as a whole, radiation surveys are performed of the intended "as left" condition. These are referred to as to Final Status Surveys (FSS). While generally stating that FSS will be performed, there are no criteria presented to judge the adequacy of the planned approach. Final FSS and site release is far into the future, but each stage needs to be done correctly to support the next, meaning that the identification and control of radioactive materials during the demolition process are important in supporting the future release of the site. Poorly planned characterization surveys, as may be used for guiding the demolition process increases risks and chances of unidentified residual contamination, i.e., not a clean site suitable for unconditional release. This is one of the bigger items for decommissioning for ensuring complete decommissioning and a final site condition free of radioactive contamination and acceptable for release. The DDP give reference to Derived Concentration Guideline Levels (radionuclide specific criteria for any residual contamination) and the MARSSIM process (a detailed approach to evaluating residual radioactive contamination from decommissioning as developed by NRC, EPA, DOE). Details have not been developed for this Planning phase.

   As stated in Section 6.8, upon completion of the Phase 3 decommissioning and achieving the final end-state (i.e. site suitable for other industrial or commercial use), CNL will apply for a Licence to Abandon. It is stated that AECL will then attempt to transfer the DP site, including its title, to OPG, which has the first right to enter into a land transfer deal, or to a third-party. It is apparent that the planned termination is as an industrial site. Reference to use of a 300 µSv in a year acceptable dose criterion for future receptors on the site points to the possibility of areas remaining with identifiable levels of radioactive contamination. While a perspective needs to be maintained, recognizing the natural radioactive environment, the aspect requires careful consideration. SON should continue its engagement with CNL, reviewing the criteria that will be used for terminating the license and the application of the MARSSIM approach for verifying a site acceptable for unconditional release.

In summary, the issues, as discussed above, identify that many details need to be developed and key decisions need to be made for a the successful decommissioning of DPNSG. These emphasize the importance of SON's continued engagement. While CNL's dialogue, supporting SON's awareness, has started, a well-defined community engagement process remains to be formalized. As has been recognized in recent activities, SON's engagement into the decision-making process is paramount to the final acceptance for the site. This engagement will need to be a formal, continual process throughout the decommissioning effort and should ensure not only awareness but also direct voice in decision.

3 Supporting Review Items: Detailed Decommissioning Plan, Volume 1: Program Overview

As stated in the DDP, Vol. 1, Section 1.4: "Program Overview DDP Volume 1, provides a clear picture of the overall site end-sate condition (interim and final), and the inter-relationships between various existing facilities (nuclear and non-nuclear) and support programs as the site is being decommissioned. It also describes individual facilities and their decommissioning approach, schedules, costs and funding, proposed monitoring and surveillance (SWS) throughout the decommissioning phase and at interim

end-states of the site and proposed final end-state for the site. This overview document also covers other important topics in general terms such as program management, hazards, environmental assessments, waste management plans, radiation protection, emergency response plans, and quality assurance."

3.1 Availability of Supporting Documents

Within the DDP, many relevant documents are referenced, supporting general positions and conditions as stated within the Plan. As a general finding, many of these references are not available; it is not possible to fully understand and evaluate the validity of the Plan without access to these documents.

As a few examples:

- Section 2.2 states that for a building or structure to be deemed a Non-nuclear Area, it shall not contain any materials or areas with surface contamination greater than the maximum values identified for unrestricted use defined in Table 2 of CNL Radiation Protection Program Requirements Document. (Ref: *Radiation Protection,* 900-508740-PRD-001, Revision 3, 2018 June.) The values for the referenced maximum surface contamination levels are not stated; it is not possible to evaluate if the proposed application is reasonable and acceptable for the control of radioactive materials.
- In Section 3.3, it states that based on survey results, the building areas are assigned a Radiological Safety Zone (RSZ) rating in accordance with Radiological Areas and Zones procedure. (Ref: Radiological Areas and Zones, 900-508740-MCP-027, Rev. 1, 2018 December.) It further states that the Facility zoning survey and the corresponding RSZ ratings are provided in the zoning plan document. (Ref.: Radiological Safety Zone Plan for Douglas Point Waste Facility, 22-03426-ZP-001, Revision 2, 2019 July.) Again, this, as well as most other referenced bases documents or implementation procedures, are unavailable.
- Section 4.1.3 states that the following DPWF-specific procedures and processes have been implemented at the DP site and are followed through to ensure and validate compliance with CNL Environmental Protection program requirements:
    - Douglas Point Waste Facility Effluent Monitoring Plan [4-34]; and
    - Douglas Point Waste Facility Effluent and Operational Control Sampling [4-35].

The brevity to which key programs and procedures, as relied upon for supporting the D&D and regulatory compliance, runs throughout the whole DDP. The scope and specific conditions/criteria for the programs and procedures are not detailed and are not readily available.

3.2 Waste Management – During Decommissioning

Section 3.2.7, Inactive Drainage System, makes reference to two collection and disposal systems, one which includes the roof and floor drains from the Service Building, a designated radioactive building. The second system consists of the roof drains from the Reactor Building and drainage from the sumps surrounding the foundations of the Reactor Building and the Service Building with the sump pumps directing the drainage to the outfall. As stated in Section 2.2.2.1, the Active Liquid Handling System (ALHS) ceased to be functional following the reactor shutdown. The Hold-up Tank and Dispersal Tanks are empty, while the Evaporator Feed Tank continues collecting condensate from the Service Building basement. Any collected liquid waste will be pumped out and shipped off-site for processing.

Section 4.1.8, Transportation of Dangerous Goods, addresses the applicability of Canadian Nuclear Laboratories Transportation of Dangerous Goods (TDG) program as providing an operational framework for the safe transport of dangerous goods by conforming to all applicable laws and regulations. It states, that the TDG program applies to off-site shipping of dangerous goods by all modes of transport, and to anyone who performs an activity associated with the transport of such materials. All off-site transport of dangerous goods, including radioactive materials/waste at the DPWF site, follows the TDG program requirements, which provide compliance with the Douglas Point Waste Facility Licence Conditions Handbook and the Waste Facility Decommissioning Licence.

Section 4.1.9, Waste Management, states that the Canadian Nuclear Laboratories Waste Management (WM) program [4-72] applies to all operations and activities that result in the generation, transportation, treatment, storage and/or disposal of wastes (i.e. the lifecycle of waste), generated by CNL or received by CNL from an external organization. It further states that all waste generated during the life cycle of the facility including the D&D phase will be monitored, segregated, packaged or contained, shipped for processing/storage or disposal. For D&D waste, a separate Waste Management Plan (WMP) will be prepared as part of the project-specific DDP covered under a particular Planning Envelope (see Section 7 for details). The WMP will ensure that:

- All waste material will be adequately characterized, in order to meet CNL WM program requirements including waste acceptance criteria for clean/likely clean waste and solid radioactive waste.
- Waste materials are properly packaged for transportation and storage, or disposal.

Any contaminated waste above the normal background level, will be volume reduced to the extent possible and packaged in low specific activity containers for shipment to a suitable waste management facility which is approved for receiving such waste.

Section 5.1.6 discussed the Prototype Reactor Decommissioning Facilities Effluent Monitoring Program, indicating that it conforms with CSA Standard N288.5, Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills at each PRD site. The Effluent Verification Monitoring Program at the DPWF consists of:

- An annual check against the National Pollutant Release Inventory (NPRI) reporting requirements;
- An annual check against the Greenhouse Gas Emissions reporting requirements;
- Monitoring and reporting any losses of halocarbon refrigerants and fire suppressants over 10 kg, in compliance with the Federal Halocarbon Regulations;
- Airborne release monitoring through tritium and gross particulate (i.e. gross alpha and gross beta) monitoring of the ventilation stack emissions; and,
- Waterborne release monitoring through tritium, gross alpha, and gross beta monitoring of the Reactor Building and Service Building external sumps.

A description and justification for the parameters monitored, frequency of monitoring, and potential contaminant sources is provided in the referenced DPWF Effluent Monitoring Plan (not available).

Section 5.1.6.1 goes on to state that airborne and liquid emissions to the environment are monitored at the point of discharge:

> "These radioactive exhaust effluents are sampled, analysed and/or monitored as per the Environmental Protection Program requirements [5-40] for tritium and beta/gamma particulates

to ensure they are below the applicable release limit. The Derived Release Limits (DRLs) for both airborne and liquid effluents from the DPWF are provided in [5-41]. Over the last three years the effluent releases have remained consistently below 0.01% of the limit.

The groundwater collected in the Reactor Building and the Service Building external sumps is considered potentially radioactive, and is monitored for tritium, beta/gamma-emitting radionuclides before it is released to Lake Huron. The concentrations of Tritium, Carbon-14, and gross beta/gamma activities in the groundwater that is being released to Lake Huron remain at extremely low levels of their respective DRL (i.e. less than 0.01% of their individual DRLs, with gross beta/gamma release compared to the most restrictive radionuclide Cs-134). The radioactive liquid releases are reported in the Douglas Point Waste Facility Annual Compliance Report [5-25]."

Section 5.2, Hazards during Decommissioning Phase, identifies the future hazards anticipated during Phase 3 decommissioning activities, including:

- Radiological hazards; and
- Non-radiological hazards (chemical, industrial, biological and environmental hazards).

It states that during execution of the decontamination and dismantling activities, appropriate actions will be taken to prevent, control and/or mitigate the potential risks anticipated from these hazards. These actions will be documented in the DDPs and associated work packages.

It further addresses approach for reducing future hazards, where prior to the commencement of demolition activities:

- "All stored radiological and hazardous materials will be removed from each building/structure;
- Structures, systems and components will be decontaminated to the extent feasible to remove both loose and fixed radiological and/or hazardous contaminations; and
- All service supplies such as air, water and electricity will be disconnected."

Section 5.2.5, Environmental hazards, identifies some limited controls for the demolition processes with a position that there will be no impact on the public:

> "In cases where the potential for significant airborne contamination exists, the dismantling/demolition activities will be performed within a confinement such as a Temporary Ventilated Enclosure to minimize the releases to the environment. Since the DPWF is several kilometres away from the nearest public access, the release of residual contaminations to the external environment due to decommissioning activities and due to abnormal weather conditions such as high wind and heavy rains will not have any significant impact to the public. Administrative control measures as noted above will also be put in place to mitigate the risks associated with the dust, airborne contamination and noise. Furthermore, the implementation of the effluent monitoring will make sure that the air and water quality remain acceptable and meet the regulatory requirements."

3.3 Decommissioning Approach / Site Characterization

As identified in Section 6, the 35-year period since DPP shutdown radioactive decay has significantly reduced the radiological hazards.

> "At present, after a deferment period of 35 years, the radioactivity levels from short-lived radionuclides at DPWF have reduced to such an extent that most of the nuclear buildings can be

> decommissioned safely without exposing the workers to any significant occupational doses. However, decommissioning of the Reactor Building (calandria, dome and the containment) and the Spent Fuel Canister Area (see Table 10-1) will be delayed until proper disposal/storage facilities are available for intermediate- and high-level wastes, and is not expected during the current licence period which expires in 2034."

As this indicates, CNL is wanting to continue to defer certain decommissioning activities – those that will result in higher radioactive waste (intermediate level and potentially high-level waste) due primarily to the fact that no suitable disposal option currently exists.

Section 6.3, Scope of Decommissioning, provides an overview of the decommissioning plan for the DPWF and all its associated SSCs. As stated:

> "For the purpose of decommissioning planning and prioritization of work, buildings and structures at DPWF are divided into five Planning Envelopes (PE). For each planning envelope, a separate volume of DDP will be prepared. The estimated effort required for planning Phase 3 decommissioning varies for each planning envelope and is commensurate with the complexity of the facility to be decommissioned, contamination, type and quantity of radioactive materials present and the availability of past operating history. Table 6-1 lists the planning envelopes and associated DDP Volumes and Figure 6-1 shows the planning envelopes marked on the DPWF site layout."

Volume 2 (pending development and submittal) will address the non-nuclear facility decommissioning, including the Turbine Building, Administrative Building and ancillary facilities. Volume 3 will address the nuclear facilities, including the Purification Building, Service Building, Weld test Shop, and Resin Storage Tanks and Vaults. As identified, the decommissioning of the Reactor Building and the Spent Fuel Canister Area are not included in this planning with deferral most likely until a disposal solution is available for the Intermediate Level (radioactive) Waste (ILW).

Section 6.4, Characterization, presents an overview of plans intended for assessing hazards and development of the detailed decommissioning plans. As stated:

> "As a part of the Detailed Decommissioning Planning, characterization will be performed for each planning envelope in accordance with CNL procedure [6-6] and any other guidelines available at the time when the decommissioning work will be performed. The characterization includes planning and conducting the hazard assessment and evaluation and documenting the results. The characterization report will document the most current radiological, chemical and industrial conditions that will be encountered during Phase 3 decommissioning activities. The characterization results will assist in the preparation of the DDP(s) and the associated DWPs.
>
> If for some operational and/ or technical reasons a system/equipment/structure cannot be fully characterized prior to the commencement of the decommissioning work, that information shall be documented in the relevant DDP Volume. If extensive, invasive procedures are required and a comprehensive characterization study cannot be completed prior to the demolition phase, then an initial assessment (i.e. a scoping survey) should be conducted prior to the building demolition phase without compromising the safety of the workers or integrity of the system/structure. The scoping survey results will be considered while preparing the Work Control Package (WCP). A comprehensive characterization study will be completed at the time of dismantling and/or demolition phase and affected sections of the WCP will be revised accordingly, if needed."

Section 6.6 states that Contractors will be used for execution of the decommissioning work; CNL committed to oversight or conduct of the final clearance surveys.

In Section 6.7.4, Interim End-State, an interim end state approach is described, where the intent is to ensure a site/facility condition, following the demolition, that is acceptable pending final surveys and release of the facility/site. As stated, interim end-state objectives for each Planning Envelope (A to E) include:

- Drain, de-energize and remove all subsurface structures to a minimum depth of one metre below grade;
- Perform a radiation survey of the excavated area (i.e. building footprint and the adjacent area) and surrounding soil (i.e. within 1 metre of building perimeter);
- If contamination is found in the soil, remove the affected soil;
- Seal all holes, voids and channels below the 1-m depth from grade with grout;
- Backfill and grade the area with new gravel and topsoil, and landscape the area; and
- Update the DPWF Interim End-State Report.

Section 6.8.1, Final End-State Objectives for the DPWF, presents the land clearance criteria to which the Douglas Point site will be prepared for its (final) end-state depend on the long-term land use objectives for the site. It indicates that industrial/commercial use is being contemplated as the proposed end-state land use. As an anticipated industrial site, the cleanup criteria will be based on the following radiological, chemical and physical objectives.

- In terms of radiological activity, the intent is to remove all contaminated structures or clean them to free release level [6-18]. However, if contamination has entered the geosphere and it is impractical to completely decontaminate, CNL will use a clean-up criteria that meet a dose constraint no more than 300 μSv in a year as recommended in the ICRP Publication 82, *Protection of the public in situations of prolonged radiation exposure* [6-19], see Section 6.8.3 for details;
- With respect to chemical contaminants, Ontario Contaminated Sites clean up criteria for brownfields specific to *Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition* under Part XV.1 of the Environmental Protection Act [6-20] will be used; and
- Regarding the end-state physical state of the site, all aboveground structures and underground structures including foundations to a depth of 1 m below grade will be removed, backfilled and graded with gravel and topsoil, and landscaped (with sod or seeded).

As stated: “Upon completion of the Phase 3 decommissioning and achieving the final end-state (i.e. site suitable for other industrial or commercial use, consistent with OPG’s anticipated end-state land use for “other OPG use” [6-21]), CNL will apply for a Licence to Abandon. AECL will then attempt to transfer the DP site including its title to OPG which has the first right to enter into a land transfer deal, or to a third-party.”

It also states that any contaminated underground structures that are accessible but left in-situ (i.e., buried structures and services below the 1-m depth from the grade) will have been decontaminated to levels ALARA and grouted in cement matrix. A good philosophical approach but without any criteria for judging acceptability.

And as emphasized again here, spent fuel is essentially out-of-scope for this planning process:

> "The removal and relocation of the spent fuel from the DPWF for long term management will not take place until a suitable disposal facility for HLW and irradiated fuel becomes available in Canada. Until such time, the spent fuel may continue to remain on-site at the DPWF canister area. If the DPWF undergoes complete decommissioning before a suitable spent fuel disposal facility is available, one of the options will be to transfer the spent fuel to a similar facility at the Chalk River Laboratories for interim storage."

Section 6.8.3, Final Status Survey, addresses the types of radiation surveys that will be made for demonstrating acceptable radiological conditions, supporting a release of the site. As stated:

> "Final Status Survey (FSS) will be conducted when the DPWF has been completely decommissioned and the DP site is ready to be released from regulatory control, but not at the conclusion of decommissioning activities of each Planning Envelope. However, a radiation survey (i.e. surface scan) of the footprint area of the buildings and the surrounding soil (minimum 1 m from the building perimeter) will be performed for each Planning Envelope following the completion of its decommissioning activities. The survey ensures that the radiation fields are at the background level and there are no 'hot spots' in the impacted area. Any contaminated soil above background level will be removed to suitable containers for interim storage and managed appropriately as per CNL procedure [6-22].
>
> "At the completion of Phase 3 decommissioning of the DP site (i.e. decommissioning of all five Planning Envelopes completed), FSS will be performed to ensure the protection of future receptors on the property. If contamination has entered the geosphere and it is impractical to completely decontaminate the impacted area, CNL will follow the ICRP recommended clean-up criteria that limit dose no more than 300 μSv in a year to future receptors on the site and in the vicinity. Compliance with the dose constraint (i.e. dose objective of 300 μSv/year) will be demonstrated through site-appropriate intake pathway modelling for the critical population group. The model determines the derived concentration guideline levels (DCGLs) for various radioisotopes that are contributing to the residual radioactivity on site. The FSS sampling and analyses results will compare against the respective DCGLs and demonstrate compliance (or lack thereof) with respect to the selected site clearance criteria. If the FSS fails to pass the release criteria, additional remediation measures may become necessary. Following a successful FSS outcome, CNL will request to the CNSC a 'Licence to Abandon' and subsequently engage with OPG to facilitate the return of the site to it or to a third-party."

ISSUE with 300 μSv in a year to future receptors on the site and in the vicinity.

Section 6.8.4, Institutional Controls, addresses the fact that the Douglas Point site is located within the Bruce Power complex (8 operating CANDU reactors), and as such, the final release of the site will depend ultimately on the plans for these reactors and their future decommissioning.

As stated:

> "CNL intends to return the DP site to a Class 3 impacted area per MARSSIM classification [6-23] meeting the end-state objectives identified in Section 6.8.1. The residual radioactivity, if any, will be at a small fraction of the site clearance criteria derived based on regulatory limit in terms of dose or risk, and causes no adverse impact to the health and safety of the future receptors on the site or those living in the surrounding communities, or to the protection of the environment. As such, the site will not require any active measures in terms of institutional controls. However,

> the land use may be restricted to industrial/commercial use because the DP site is embedded within the Bruce site which is destined for other OPG uses [6-21].
>
> "Since the final decommissioning and site remediation are decades away into the future and if the currently proposed end-state objectives change in the future, they will be reflected in a future DDP or in a revision of this document. Also, the results of FSS that ought to be conducted to demonstrate compliance with site clearance criteria prior to seeking site release from regulatory control will aid in determining whether or not CNL should put in place any institutional controls unlike proposed, including active measures (e.g., groundwater monitoring) for a specified period of time."

Items of concern relate to the overall approach to identification and control of radioactive waste during decommissioning, including:

- Facility and component characterization,
- methods and criteria for identifying any controlling radioactively contaminated materials, structures, components,
- use of decontamination and clearance for releasing materials as clean, and
- adequacy of clearance and final status surveys.

It is also not clear what the site endpoint is. As stated, "Following a successful FSS outcome, CNL will request to the CNSC a 'Licence to Abandon' and subsequently engage with OPG to facilitate the return of the site to it or to a third-party." Reference to use of a 300 μSv in a year acceptable dose criterion for future receptors on the site and in the vicinity points to the possibility of areas remaining with identifiable levels of radioactive contamination. While a perspective needs to be maintained, recognizing the natural radioactive environment, the aspect requires careful consideration.

3.4 Decommissioning Waste

As stated in Section 1.4, Decommissioning Plan Strategy:

> "The facilities/buildings at the DPWF site are classified as nuclear and non-nuclear (see Section2.2 for details). The non-nuclear facilities/ buildings include Administration Building, Turbine Building, Steam Bridge and the Ancillary Facilities which comprise the former Carpenter's Shop, Water Treatment Area, Garage, Storage Area, and the Diesel Room. The nuclear facilities include Purification Building, Service Building (including Ventilation Stack, Fuel Bays, and Active Liquid Handling System), Weld Test Shop, Resin Storage Tanks and Vault, Spent Fuel Canister Area, and Reactor Building.

Section 7.2, Inventory of Stored Wastes, discussed the stored wastes at DPWF, which is categorized into the following five waste streams:

- High Level Radioactive Waste (HLW)
- Intermediate Level Radioactive Waste (ILW)
- Low Level Radioactive Waste (LLW)
- Hazardous Waste
- Mixed Waste

High level waste, in the form of 22,256 spent fuel bundles, are on site, stored in dry storage facility i.e., Spent Fuel Canister Area.

As identified, there is approximately 6 m^3 of accumulated solid ILW at DPWF, located in the fuel transfer tunnel in the Service Building. The solid ILW consists of booster flow tubes, ram extensions and active pool debris.

There is also a total of 100 m^3 of solid LLW is stored at three locations: the Service Building, Reactor Building, and the Purification Building. The Service Building stores about 10 m^3 of solid LLW, which is mostly sixteen drums of contaminated soil collected from property cleanup in 2001, two B-25 waste containers containing PPE&C, and one partially-filled B-25 container of metal waste. There is approximately, 20 m^3 (94 drums) of LLW legacy water which was recovered from resin tanks (7914-TK-1 and 7914-TK-2) during the Resin Retrieval Project. The solid LLW in the Reactor Building (70 m^3) and the Purification Building (20 m^3) consists of metal, wood, lead bricks, and concrete.

Section 7.3, Inventory of Decommissioning Wastes, provides an overview of the waste that is expected to be generated from the decommissioning activities. The waste has been grouped into the following three categories:

- Potentially Clearable Waste (i.e. clean waste or likely clean waste);
- Radioactive Waste (ILW, LLW); and
- Hazardous Waste (e.g. Asbestos Containing Materials, Lead, PCBs, Mercury, Silica, etc.).

Table 7-1 (copied below) provides a high level summary of the waste streams along with their quantities for each planning envelope. In summary:

- 38259 m^3 Concrete Waste (99.1% potentially clearable and 0.9% radioactive which is 33.0% LLW and 67.0% ILW).
- 2129 m^3 Masonry Waste (100% potentially clearable)
- 3234 m^3 Miscellaneous Construction Waste (89.5% potentially clearable and 10.5% hazardous waste)
- 26762 m^3 Excavated Materials (100 % potentially clearable)
- 5621 metric ton Structural Steel and Miscellaneous Metals (96.9 % potentially clearable and 3.1% radioactive which is 100% ILW)
- 4796 metric ton Rebar (99.6% potentially clearable and 0.4 % radioactive which is 100% ILW)
- 3045 metric ton Mechanical & Electrical Waste (79.4 % potentially clearable, 1.0% hazardous waste, and 19.6% radioactive which is 85.4% LLW and 14.6% ILW).

The main and auxiliary equipment will be decontaminated and will be disposed as clean waste. Radioactive waste (ILW and LLW) will be shipped to an appropriate off-site waste management facility for processing/storage/disposal. The off-site waste management facilities will be designated in each DDP and Decommissioning Work Plans. Table 7-2 (copied below) provides a more detailed breakdown of the waste.

A check was made on the CNL waste estimates by examining the information included in the Natural Resources Canada, 2016 report, Inventory of Radioactive Waste in Canada. [1] Table 9 in this report, ILRW inventory from decommissioning – 2016, provides an estimate of 60 m^3 of ILW currently in storage at Douglas Point. Table 11 for projections, estimates 202 m^3 ILW for future decommissioning activities.

[1] Available: https://www.nrcan.gc.ca/our-natural-resources/energy-sources-distribution/nuclear-energy-and-uranium/radioactive-waste/7719

For LLW, Table 14 indicates that in 2016, there was 66 m^3 of contaminated soil in 2016. Table 15 showed an inventory of 32 m^3 of waste (misc) and 2 m^3 of soil (35 total). Table 16 shows 66 m^3 of ILW from the continued maintenance. Table 17 shows 6,500 m^3 of LLW for decommissioning. While the ILW waste volumes appear to be reasonably consistent, the LLW volumes in CNL's DDP appear to be significantly lower than the Natural Resources Canada referenced 2016 report.

The DDP states that metals such as lead, steel etc. that are decontaminated to levels below the clearance levels will be sent off site for recycling. Also to be disposed of as clean waste, following any necessary decontamination are the main and auxiliary equipment. Clearance levels for potentially clearable waste will be specified, such as in Decommissioning Work Plans, prior to initiation of decommissioning activities.

Radioactive waste (ILW and LLW) will be shipped to an appropriate off-site waste management facility for processing/storage/disposal. The off-site waste management facilities will be designated in each DDP and Decommissioning Work Plans.

Currently, there is not a clear direction on where the decommissioning LLW and ILW will be sent – for processing, storage or disposal. Clearly, a high-level waste disposal option is needed before the used fuel will be removed from the site (which per the timeline is projected out to 2070). The waste management/disposal approach also points to the concerns relates to the adequacy, oversight of decontaminating materials/waste with clearance as clean for unconditional release/disposal, i.e., clearance.

Table 7-1, Summary of DPWF Decommissioning Waste Estimates (copied from DDP)

Planning Envelope (PE)	PE-A					PE-B					PE-C					PE-E					Total Waste
Waste Stream	Potentially Clearable Waste	Hazardous Waste	Radioactive Waste		Total	Potentially Clearable Waste	Hazardous Waste	Radioactive Waste		Total	Potentially Clearable Waste	Hazardous Waste	Radioactive Waste		Total	Potentially Clearable Waste	Hazardous Waste	Radioactive Waste		Total	
			LLW	ILW				LLW	ILW				LLW	ILW				LLW	ILW		
Concrete (m^3)	10390	0	0	0	10390	3396	0	22	0	3418	0	0	0	0	0	24143	0	87	221	24451	38259
Masonry (m^3)	877	0	0	0	877	1000	0	0	0	1000	0	0	0	0	0	252	0	0	0	252	2129
Miscellaneous Construction Waste (m^3)	1074	340	0	0	1414	1436	0	0	0	1436	0	0	0	0	0	384	0	0	0	384	3234
Excavated Materials (m^3)	11110	0	0	0	11110	3862	0	0	0	3862	0	0	0	0	0	11790	0	0	0	11790	26762
Total (m^3)	23451	340	0	0	23791	9694	0	22	0	9716	0	0	0	0	0	36569	0	87	221	36877	70384
Structural Steel and Miscellaneous Metals (MT)	2122	0	0	0	2122	211	0	0	0	211	0	0	0	0	0	3113	0	0	175	3288	5621
Rebar (MT)	816	0	0	0	816	339	0	0	0	339	0	0	0	0	0	3622	0	0	19	3641	4796
Mechanical & Electrical (MT)	640	32	0	0	672	394	0	19	0	413	596	0	214	0	810	787	0	276	87	1150	3045
Total (MT)	3578	32	0	0	3610	944	0	19	0	963	596	0	214	0	810	7522	0	276	281	8079	13462

Table 7-2, Breakdown of DPWF Decommissioning Waste Estimates (copied from DDP)

Planning Envelope (PE)	PE-A				PE-B				PE-C	PE-E	Total Waste
Waste Stream	Administration Building	Ancillary Facilities (Non-Nuclear)	Steam Bridge	Turbine Building	Weld Test Shop	Purification Building	Service Building	Spent Resin Tanks and Vault	Rector Building Clear-Out	Reactor Building (Calandira, dome, and Containment	
Potentially Clearable Waste											
Concrete (m^3)	1115	1597	0	7678	83	44	3076	193	0	24143	37929
Masonry (m^3)	181	209	0	487	0	0	1000	0	0	252	2129
Miscellaneous Construction Waste (m^3)	225	36	183	630	360	53	1023	0	0	384	2894
Excavated Materials (m^3)	5105	506	0	5499	285	150	2976	451	0	11790	26762
Total (m^3)	**6626**	**2348**	**183**	**14294**	**728**	**247**	**8075**	**644**	**0**	**36569**	**69714**
Structural Steel and Miscellaneous Metals (MT)	56	83	67	1916	23	12	175	1	0	3113	5446
Rebar (MT)	54	110	0	652	7	4	308	20	0	3622	4777
Mechanical & Electrical (MT)	32	138	18	452	5	16	354	19	596	787	2417
Total (MT)	**142**	**331**	**85**	**3020**	**35**	**32**	**837**	**40**	**596**	**7522**	**12640**
Hazardous Waste											
Concrete (m^3)	0	0	0	0	0	0	0	0	0	0	0
Masonry (m^3)	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous Construction Waste (m^3)	32	0	0	308	0	0	0	0	0	0	340
Excavated Materials (m^3)	0	0	0	0	0	0	0	0	0	0	0
Total (m^3)	**32**	**0**	**0**	**308**	**0**	**0**	**0**	**0**	**0**	**0**	**340**
Structural Steel and Miscellaneous Metals (MT)	0	0	0	0	0	0	0	0	0	0	0
Rebar (MT)	0	0	0	0	0	0	0	0	0	0	0
Mechanical & Electrical (MT)	32	0	0	0	0	0	0	0	0	0	32
Total (MT)	**32**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**32**

Radioactive Waste	LLW	ILW	LLW	ILW	LLW	ILW	LLW	ILW	LLW	ILW	LLW	ILW	LLW	ILW	LLW	ILW	LLW	ILW	LLW	ILW	LLW	ILW
Concrete (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	87	221	109	221
Masonry (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous Construction Waste (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavated Materials (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (m^3)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0	**0**	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**0**	**0**	**87**	**221**	**109**	**221**
Structural Steel and Miscellaneous Metals (MT)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	175	0	175
Rebar (MT)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	19
Mechanical & Electrical (MT)	0	0	0	0	0	0	0	0	0	0	4	0	8	0	7	0	214	0	276	87	509	87
Total (MT)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0	**0**	0	**4**	**0**	**8**	**0**	**7**	**0**	**214**	**0**	**276**	**281**	**509**	**281**

Section 2.3, Significant Events:

During the operating life of Douglas Point, there were numerous events where there was loss of control over radioactive materials, including system leaks, spills, and uncontrolled releases. In 1969 and 1970, there were numerous events leading to releases of fission and activation products into the heat transfer system and inspection bay water. As identified in Section 2.3 of the DDP:

- In 1970, approximately 82 m^3 spent fuel bay water discharged directly into the plant effluent due to incorrect opening of a valve located in the bay water clean-up circuit. The bay water discharged carried a total of 4.8 Ci of Cs-137 and 1.9 Ci of Cs-134.

- Between 1972 and 1975, there were reports of twenty-two (22) D_2O spill/leakage in Heat Transport System with releases to F/M vaults. In 1982 thru 1984, there were reports of ten (10) D_2O spill/leakage events in the Heat Transport System, including one where approximately 5500 Kg of D2O was leaked into the Vault Recovery System.

- In 1977, a leak in Boiler #5 resulted in the escape of approximately 1000 kg of heavy water to the feedwater system. While attempting to refill the feedwater system, an operational error resulted in a flood of the turbine hall floor and control equipment room and wetting the Class II and III switchgear.

- A resin spill (due to the failure of a Victaulic coupling) at the heavy water collection area in the Service Building resulted in significant spread of contamination with general fields ranging from 10,000 to 20,000 cpm inside rubber areas and 1000 - 3000 cpm throughout the Service Building.

- In 1983, a rupture of a flexible hose while commissioning a decontamination loop for the HTS resulted in the spill of approximately 1200 kg of heavy water in the Purification Building resulting in elevated levels of radioactive contamination of the building access roadway and releases to the environment.

- In 1983, a leak from a heat exchanger resulted in the uncontrolled release of estimated 32000 kg heavy water into the service water, releasing 5760 Ci of tritium and 47.7 mCi of gross β, γ to the lake.

These past contaminating events serve as an indicator that there could be other contaminated areas/facilities that require careful evaluation during decommissioning. With fuel leaks, alpha-emitting radionuclide contamination may also require examination. This points to the importance of a well-established site characterization, clear criteria for detection/clearance, and comprehensive Final Status Surveys.