



Record of Decision

DEC 20-H2

In the Matter of

Applicant BWXT Nuclear Energy Canada Inc.

Subject Application for the Renewal of the Fuel Facility
Licence for BWXT's Toronto and Peterborough
Facilities

Public Hearing
Date March 2 – 6, 2020

Record of
Decision Date December 18, 2020

RECORD OF DECISION – DEC 20-H2

Applicant: BWXT Nuclear Energy Canada Inc.

Address/Location: 1160 Monaghan Road
Peterborough, Ontario
K9J 7B5

Purpose: Application for the Renewal of the Fuel Facility Licence for BWXT’s Toronto and Peterborough Facilities

[Application received:](#) November 9, 2018

[Notice of public hearing:](#) June 3, 2019

[Notice of continuation of public hearing:](#) April 6, 2020

Dates of public hearing: March 2 – 6, 2020

Locations: Casa Do Alentejo Community Centre, 1130 Dupont Street,
Toronto, Ontario (March 2 – 3, 2020)

Regency Ballroom Holiday Inn Peterborough Waterfront, 150
George Street North, Peterborough, Ontario (March 4 – 6, 2020)

Members present: R. Velshi, Chair
T. Berube
S. Demeter
M. Lacroix
S. McKinnon

Secretary: M. Leblanc
Recording Secretaries: C. Moreau and M. Hornof
Senior General Counsel: L. Thiele

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See appendix A	
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Natural Resources Canada: J. Fairchild	
Ministry of Environment, Conversation and Parks: J. Caicado, C. Chisholm, J. Mugford and N. Orpana	
City of Peterborough: K. Hetherington	

Licence: Renewed as two facility-specific licences for BWXT's Toronto and Peterborough facilities

Commercial production of nuclear fuel pellets at BWXT's Peterborough facility:
Authorized

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1.0 INTRODUCTION

1. Pursuant to subsection 24(2) of the [Nuclear Safety and Control Act](#) (NSCA), BWXT Nuclear Energy Canada Inc. (BWXT) has applied to the Canadian Nuclear Safety Commission¹ (CNSC) for the 10-year renewal of the Nuclear Fuel Facility Operating Licence for its two Class IB facilities located in Toronto and Peterborough, Ontario. BWXT's current licence, FFOL-3620.01/2020, expires on December 31, 2020, and authorizes BWXT to operate both facilities. Subsection 24(4) of the [NSCA](#) provides the conditions under which the Commission may renew a licence following receipt of an application.
2. Prior to 2010, the Toronto and Peterborough facilities operated under separate Class IB licences. These licences were amalgamated under a single licence during the [2010 licence renewal hearing](#) when the previous licensee, GE Hitachi Nuclear Energy Canada Inc. (GE Hitachi), was the applicant. Following BWXT's acquisition of GE Hitachi, the Commission [transferred the licence to BWXT by decision](#) in December 2016.
3. Pursuant to paragraph 21(1)(b.1) of the NSCA, the Commission has established a [Participant Funding Program](#) (PFP) to facilitate the participation of Indigenous peoples, members of the public and stakeholders in Commission proceedings. In [June 2019](#), up to \$50,000 in funding to participate in the BWXT licence renewal process was made available through the CNSC's PFP. A Funding Review Committee, independent of the CNSC, recommended that up to \$37,001 in participant funding be provided to [four applicants](#). These applicants were required, by virtue of being awarded participant funding, to submit a written intervention and make an oral presentation at the public hearing respecting BWXT's application.
4. BWXT operates two fuel fabrication facilities and supplies fuel bundles for CANDU reactors. BWXT's Toronto facility has pelleting operations where it produces natural and depleted uranium dioxide (UO₂) pellets. The Peterborough facility uses the UO₂ pellets and in-house manufactured zircalloy tubes to assemble fuel bundles for nuclear power reactors. The Peterborough facility also carries out nuclear design and contaminated equipment repair services.
5. BWXT is authorized to commercially produce UO₂ fuel pellets at its Toronto facility. In its licence renewal application, BWXT requested the Commission's authorization to also conduct commercial fuel pelleting operations at the Peterborough facility. This licensed activity is currently not within BWXT's [licensing basis](#) for the Peterborough facility. BWXT indicated during the public hearing that it planned to move its pelleting operations to Peterborough.

¹ The *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.

Issues

6. At issue in this application is the renewal of BWXT's licence for both the Toronto and Peterborough facilities, as well as the authorization for BWXT to carry on the commercial production of UO₂ fuel pellets at its Peterborough facility.
7. In respect of BWXT's licence renewal application and the request for authorization to conduct UO₂ pelleting operations at its Peterborough facility, the Commission was first required to decide what environmental review process was required, respecting BWXT's application. Then the Commission had to determine, pursuant to subsection 24(4) of the NSCA, whether it was satisfied that:
 - a) BWXT is qualified to carry on the activity that the licence would authorize; and
 - b) in carrying on that activity, BWXT would make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

Public Hearing

8. In accordance with Rule 17 of the [Canadian Nuclear Safety Commission Rules of Procedure](#)² (the Rules), the Commission published a Notice of public hearing and participant funding on June 3, 2019 for this matter. Subsequently, four revised notices of public hearing were published between September 19, 2019 and February 10, 2020 on the [CNSC's public website](#).
9. Pursuant to Rule 19 of the Rules, the Commission invited interventions from persons who have an interest or expertise in this matter, or information that may be useful to the Commission in coming to a decision on BWXT's application. Persons were invited to intervene by way of written submission only or by way of written submission and oral presentation. The Commission received and accepted into the record 247 interventions.
10. Pursuant to subsection 40(5) of the NSCA, the Commission considered BWXT's licence renewal application during a [public hearing](#) held on March 2 – 3, 2020 in Toronto, Ontario and on March 4 – 6 in Peterborough, Ontario. The public hearing was conducted in accordance with the Rules. During the hearing, the Commission considered written submissions and heard oral presentations from BWXT ([CMD 20-H2.1](#), [CMD 20-H2.1A](#), [CMD 20-H2.1B](#)) and CNSC staff ([CMD 20-H2](#), [CMD 20-H2.A](#), [CMD 20-H2.B](#), [CMD 20-H2.C](#), [CMD 20-H2.D](#), [CMD 20-H2.E](#)). The Commission also considered oral and written submissions from 247 intervenors (see Appendix A for a list of interventions). The hearing was webcast live via the CNSC website and [video archives](#) are available on the CNSC's website.

² SOR/2000-211

Continuation of public hearing

11. During the public hearing in Toronto and Peterborough, the Commission considered the information provided by BWXT, CNSC staff and intervenors about beryllium emissions from BWXT's Peterborough facility. Specifically, in respect of the results from the CNSC's [Independent Environmental Monitoring Program](#) – which showed increasing beryllium concentrations in soil at properties adjacent to the Peterborough facility – the Commission decided to require additional information.
12. On this basis, the Commission issued a Notice of continuation of public hearing on [April 6, 2020](#), directing CNSC staff to carry out expedited soil resampling for beryllium from properties adjacent to BWXT's Peterborough facility, with a special focus on the property where the Prince of Wales Public School is located. CNSC staff were to carry out an analysis of the results with the aims of clarifying the risk that the seemingly increasing beryllium levels may present to the health and safety of the public and the environment, and potentially identifying the reasons for the increase and the source of the beryllium.
13. The Commission had originally requested that CNSC staff submit this additional information by August 31, 2020. However, because of the impacts of the COVID-19 pandemic on health and safety protocols, CNSC staff requested and were [granted an extension](#) until October 30, 2020. CNSC staff submitted [CMD 20-H2.D](#) to the Commission on October 28, 2020 which responded to the Commission's enquiries.

2.0 DECISION

14. Based on its consideration of the matter, as described in more detail in the following sections of this Record of Decision, the Commission concludes that BWXT is qualified to carry on the activities that will be authorized by licence. The Commission is satisfied that, in carrying on the licensed activities, BWXT will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed. Therefore,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Nuclear Fuel Facility Licence issued to BWXT Nuclear Energy Canada Inc. as two facility-specific licences. The Commission has determined that there should be separate licences for each of the Toronto and Peterborough facilities. The renewed facility-specific licences, FFL-3621.00/2030 for the Toronto facility and FFL-3620.00/2030 for the Peterborough facility, are valid from January 1, 2021 until December 31, 2030.

The Commission authorizes BWXT to carry on the commercial production of UO₂ fuel pellets at its Peterborough, Ontario facility, subject to the condition that BWXT submits a final commissioning report related to the commercial production of fuel pellets that is acceptable to the Commission. At any time in the licence period of the two licences, BWXT shall be authorized to commercially produce fuel pellets at only one of its facilities, and not both.

15. With respect to the authorization to BWXT to conduct commercial fuel pelleting operations in Peterborough, the decision is that of the majority of the Commission. Commission Member Dr. S. Demeter would not authorize BWXT to conduct commercial UO₂ fuel pelleting operations in Peterborough, Ontario and would hold that the pelleting operations should remain in Toronto, Ontario. The reasons for the dissenting view of Dr. S. Demeter are presented in Section 4.19 of this Record of Decision.
16. The Commission is satisfied that neither an environmental assessment (EA) under the [Canadian Environmental Assessment Act, 2012](#) (CEAA 2012) nor an impact assessment under the [Impact Assessment Act](#) (IAA) was required for the renewal of the licence and considers the environmental protection review that was conducted by CNSC staff to be acceptable and thorough.

Licence conditions for the Toronto facility

17. The Commission includes in the Toronto facility's licence the conditions as recommended by CNSC staff in CMD 20-H2, CMD 20-H2.A and CMD 20-H2.B, with the exception of the proposed facility-specific licence conditions 15.1 and 15.2.
18. Per the Commission's decision on the authorization to conduct pelleting operations at the Peterborough facility, BWXT shall cease pelleting operations at its Toronto facility prior to commencing pelleting operations in Peterborough. Therefore, the Commission includes in the licence for the Toronto facility licence condition 15.1 which shall read

“The commercial production of fuel pellets shall be conducted at either the Toronto facility or at the Peterborough facility, but not at both facilities.”

Licence conditions for the Peterborough facility

19. The Commission includes in the Peterborough facility's licence the conditions as recommended by CNSC staff in CMD 20-H2, CMD 20-H2.A and CMD 20-H2.B, with the exception of the proposed facility-specific licence condition 15.1 and 15.2. The Commission does not delegate the authority for the approval of BWXT's commissioning report related to production of fuel pellets at BWXT Peterborough facility.

20. The Commission includes facility-specific licence condition 15.1 in the renewed licence for BWXT's Peterborough facility which shall read:

“The licensee shall submit and implement an updated environmental monitoring program at the Peterborough facility prior to the commencement of production of fuel pellets as described in paragraph (i) (a) and (iii) of Part IV of this licence.”
21. The Commission includes facility-specific licence condition 15.2 in the renewed licence for the Peterborough facility which shall read:

“The licensee shall submit a final commissioning report related to production of fuel pellets as described in paragraph (i) (a), (iii) of Part IV of this licence that is acceptable to the Commission prior to commencement of commercial production of fuel pellets at the Peterborough facility.”
22. The Commission also includes in the licence for the Peterborough facility licence condition 15.3 which shall read:

“The commercial production of fuel pellets shall be conducted at either the Toronto facility or at the Peterborough facility, but not at both facilities.”

Other licensing direction and issues

23. The Commission directs that, at about the mid-point of the 10-year licence period and no later than 2026, BWXT shall present to the Commission comprehensive mid-term updates on its licensed activities for each of the Toronto and Peterborough facilities. These mid-term updates will take place during a public Commission proceeding in the vicinity of the communities that host BWXT's facilities. Indigenous peoples, members of the public and stakeholders will be able to intervene in these proceedings in the manner to be established by the Commission.
24. The Commission directs CNSC staff to conduct an information session in Peterborough, Ontario to explain the beryllium resampling results to the community and to answer any questions that the community may have. This session should be held as soon as possible, and no later than 6 months after the release of the Commission's decision in this matter.
25. With this decision, the Commission directs CNSC staff to report on the performance of BWXT in respect of its Toronto and Peterborough facilities as part of a sector-specific regulatory oversight report (ROR). CNSC staff shall present the ROR at public proceedings of the Commission, where Indigenous peoples, members of the public and stakeholders will be able to participate.
26. The Commission notes that CNSC staff can bring any matter to the Commission as applicable. The Commission directs CNSC staff to inform the Commission of any changes made to the Licence Conditions Handbook (LCH) as a component of the ROR.

3.0 ENVIRONMENTAL ASSESSMENT

3.1 Application of the *Canadian Environmental Assessment Act, 2012* and the *Impact Assessment Act*

27. The IAA came into force on August 28, 2019. Under the IAA and the [*Physical Activities Regulations*](#) made under it, impact assessments are to be conducted in respect of projects identified as having the greatest potential for adverse environmental effects in areas of federal jurisdiction. BWXT's application was submitted to the CNSC on November 9, 2018 prior to the coming into force of the IAA, and relates to the renewal of authorized activities. Licence renewal is not a project designated in the *Physical Activities Regulations* under the IAA.
28. At the time of the licence renewal application, CEAA 2012 and its regulations were the EA regime in place and specified the requirements for EAs for nuclear projects. The licence renewal of a facility is not included on the Designated Project list for an EA, as renewing a licence is not an activity identified in the [*Regulations Designating Physical Activities*](#).
29. The application submitted by BWXT included a request for authorization to carry on commercial production of UO₂ fuel pellets at its Peterborough facility. With this request BWXT
- would not change how its current pelleting operations are carried out and this authorization would only change the location of where BWXT would be authorized to conduct these operations.
 - has not requested an increase in production limits and possession limits.
 - has not requested to change the footprint of the Peterborough facility.

As such, the requested change is within the current licensed operating limits that govern the Peterborough facility's overall safety case.

30. Based on the information considered for this hearing, the Commission is satisfied that neither an EA under CEAA 2012 nor an impact assessment under the IAA was required in regard to this licence renewal or the authorization for BWXT to conduct its fuel pelleting operations at its Peterborough facility.

3.2 CNSC Environmental Protection Review

31. The Commission considered the completeness and adequacy of the environmental protection review under the NSCA and its regulations that CNSC staff conducted for this licence renewal. CNSC staff's primary findings included that:
- BWXT's environmental protection programs meet CNSC regulatory requirements and results from BWXT's and from other regional monitoring programs carried out by other levels of government confirmed that the environment and health of persons around the Toronto and Peterborough facilities remained protected.

- The potential risk from physical stressors and radiological and hazardous releases to the atmospheric, terrestrial, hydrogeological, aquatic and human environment are low to negligible.
32. BWXT's environmental risk assessment (ERA) – as further considered in section 4.9.4 of this Record of Decision – demonstrated that the proposed pelleting operations at the Peterborough facility would not require any changes to the physical footprint of the current facility. CNSC staff's assessment found that the ERA was conducted in accordance with applicable standards, [REGDOC-2.9.1, Environmental Protection: Environmental Protection Policies, Programs and Procedures](#) and CSA N288.6-12, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills*.³
 33. Although the ERA did show that the pelleting operations in Peterborough would increase both airborne and waterborne uranium releases to the surrounding environment, the releases are expected to remain low and below regulatory limits.
 34. CNSC staff conducted Independent Environmental Monitoring Program (IEMP) sampling in publicly-accessible areas near BWXT's Toronto facility in 2014, 2016, 2018, and 2019, and near BWXT's Peterborough facility in 2014, 2018, and 2019.
 35. CNSC staff's IEMP results in respect of beryllium levels in soil in the vicinity of the Peterborough facility showed an apparent increase between 2014 and 2019. Due to this apparent increase, the Commission requested that CNSC staff conduct expedited soil resampling in Peterborough, with a focus on the property of the Prince of Wales Public School. CNSC staff carried out this resampling on July 21 – 22, 2020. In CMD 20-H2.D, CNSC submitted its view that there was no discernable increase in beryllium levels near the Peterborough facility and that the concentration of beryllium in soil remained below [background levels for Ontario](#). Details on this issue are provided in section 4.9.3 of this Record of Decision.
 36. Based on the evidence considered in this matter, the Commission is satisfied that the IEMP results support CNSC staff's submissions that the public and the environment in the vicinity of both BWXT facilities are protected and that there are no health impacts as a result of ongoing activities. These results are also consistent with the results submitted by BWXT, demonstrating that the licensee's environmental programs protect the health of persons and the environment.
 37. Based on the information provided on the record for this hearing, the Commission is satisfied that the environmental protection review conducted by CNSC staff for the licence renewal of BWXT Toronto and Peterborough facilities was acceptable and thorough. The Commission notes that the NSCA provides a strong regulatory framework for environmental protection, and the health and safety of persons.

³ N288.6-12, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills*, CSA Group, 2012.

3.3 Conclusion on Environmental Assessment

38. The Commission concludes that a licence renewal is not
- a Designated Project in the *Regulations Designating Physical Activities* under CEAA 2012; or
 - a project designated in the *Physical Activities Regulations* under the IAA.

Therefore, the Commission concludes that an EA under CEAA 2012 or an impact assessment under the IAA is not required in respect of this licence renewal. The Commission also concludes that an EA or and impact assessment is not required in respect of BWXT's request to carry on the commercial production of fuel pellets in Peterborough.

39. Following its consideration of the information provided on the record for this hearing, the Commission concludes that the environmental protection review conducted under the NSCA and its regulations was appropriate for this licence renewal application.
40. The Commission concludes that the evidence shows that BWXT has made, and will continue to make, adequate provision for the protection of the environment throughout the renewed licence period.

4.0 ISSUES AND COMMISSION FINDINGS

41. BWXT submitted its [licence renewal application](#) on November 9, 2018. In its consideration of this matter, the Commission examined the completeness of the application and the adequacy of the information submitted by BWXT, as required by the NSCA, the [General Nuclear Safety and Control Regulations](#) (GNSCR) and other applicable regulations made under the NSCA.
42. In making its decision, the Commission considered a number of issues and submissions relating to BWXT's qualification to carry on the proposed licensed activities. The Commission considered, in this regard, the past performance of the licensee as a means to assess its qualification for prospective activities. The Commission also considered the adequacy of the proposed measures for protecting the environment, the health and safety of persons, national security and international obligations to which Canada has agreed.
43. To ensure that licensees in Canada meet all of their regulatory requirements and expectations, the CNSC has established [14 safety and control areas](#) (SCAs) which allow the CNSC to assess, evaluate, review and verify how well licensees are complying with these requirements. On this basis, the Commission examined CNSC staff's assessment of BWXT's past performance and how BWXT planned to maintain satisfactory performance in all 14 SCAs. The Commission also examined information in relation to several other matters of regulatory interest over the current licence period. The Commission's consideration of the SCAs and other matters of regulatory interest are provided below and form the basis of the Commission's assessment of whether BWXT satisfies the conditions set out in subsection 24(4) of the NSCA.

44. The licence conditions included in the renewed licences reflect the CNSC modernized and standardized licence conditions.

4.1 Management System

45. The management system SCA covers the framework that establishes the processes and programs required to ensure that BWXT's Toronto and Peterborough facilities achieve their safety objectives, continuously monitor their performance against these objectives, and foster a healthy safety culture. Per the [Class I Nuclear Facilities Regulations](#) (Class I Regulations) and the [GNSCR](#), BWXT submitted in its application information on its proposed management system for the activity to be licenced and on its organizational management structure.
46. Per its current licence condition 2.1, BWXT is required to implement and maintain a management system for its facilities. BWXT is also expected to meet the specifications of CSA N286-12, *Management system requirements for nuclear facilities*.⁴ CNSC staff rated BWXT's performance in this SCA as "satisfactory" and reported that BWXT was in compliance with regulatory requirements in respect of its management system.
47. BWXT submitted that it had implemented CSA N286-12 and that its management system applies to both the Toronto and Peterborough facilities. BWXT's management system describes BWXT's organizational structure, implementation of operational experience, record keeping practices and safety culture. BWXT will implement future versions of CSA N286 through revised business plans during the proposed licence period.
48. BWXT submitted information regarding management system self-assessments that BWXT had carried out during the current licence period. Although no significant issues were identified, findings identifying opportunities for improvement were reviewed by BWXT management and processed according to BWXT's established procedures.
49. BWXT identified the high-level responsibilities and authorities of the positions associated with its operations and detailed its organizational structure. The Commission noted that BWXT had a significant change in management structure at the senior executive level following BWXT's 2016 acquisition of GE Hitachi's nuclear operations. CNSC staff submitted that compliance verification activities throughout the current licence period showed that BWXT maintained a satisfactory organizational structure and detailed the individual responsibilities of positions which have oversight of licensed activities.

⁴ N286-12, *Management system requirements for nuclear facilities*, CSA Group, 2012 (R2017).

50. As part of its management system, BWXT is required to maintain design change control and vendor management programs. CNSC staff indicated that BWXT was in the process of improving its design change control and vendor management programs and that it will monitor the implementation of these improvements over the proposed renewed licence period.

4.1.1 Safety culture

51. BWXT's safety culture at its Toronto and Peterborough facilities met the specifications of [REGDOC-2.1.2, Safety Culture](#) throughout the current licence period. BWXT reported that it was committed to maintaining a strong safety culture and that it implemented a set of human error reduction tools including procedure use and adherence, having a questioning attitude and situational awareness. BWXT also reported that it assessed its safety culture through audits, self-assessments and corrective action program metrics.
52. CNSC staff participated in three onsite meetings at both BWXT facilities during the current licence period to discuss safety culture and CNSC regulatory framework improvements. CNSC staff noted BWXT's use of electronic billboards outside the production area to promote recent operating experience (OPEX) to improve safety awareness.
53. Intervenor Z. Ruiter raised concerns about BWXT's operations in the United States. In response, the BWXT representative stated that BWXT in Canada was a separate entity from its parent corporation and that it operated in Canada under a separate management structure and procedures than its US-based parent company. The Commission is satisfied on this point.
54. In light of information above, the Commission is satisfied that BWXT has maintained and will continue to maintain a strong safety culture in accordance with REGDOC-2.1.2 at its Toronto and Peterborough facilities during the proposed licence period.

4.1.2 Conclusion on Management System

55. On the basis of the information provided on the record for this hearing, the Commission concludes that BWXT has an appropriate management system that meets regulatory requirements at its Toronto and Peterborough facilities. The Commission concludes that the evidence considered for this hearing indicates that BWXT will continue to meet regulatory requirements and expectations under the renewed licences.
56. The Commission takes note of BWXT's stated commitment to improve its design change control and vendor management programs in the renewed licence period. The Commission will expect to hear from CNSC staff updates on these improvements via a ROR, or through other means, as appropriate.

57. The Commission includes licence condition 1.1 in respect of the management system SCA in both renewed licences, as recommended by CNSC staff in CMD 20-H2.

4.2 Human Performance Management

58. The human performance management SCA encompasses activities that enable effective human performance management. This is achieved through the development and implementation of processes that ensure that personnel at the BWXT Toronto and Peterborough facilities are sufficient in number in all relevant job areas, and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.
59. BWXT is required to meet the requirements set out in the [Class I Regulations](#) and the [GNSCR](#) in respect of its human performance management. Per its current licence condition 3.1, BWXT is required to implement and maintain a program for training. CNSC staff rated BWXT's performance in this SCA as "satisfactory."
60. Per the Class I Regulations, BWXT submitted in its application information regarding
- its human performance program
 - the improvements put in place during the current licence period to reduce human performance-related events and errors
 - the identification of qualifications and training requirements for each position
 - the training provided to employees including on-the-job, radiation protection and safety risk assessment training
 - the tracking of human performance indicators, such as near misses, as a measure of performance improvement
61. BWXT has implemented a program to maintain an alcohol- and drug-free workplace and the program sets clear expectations for supervisors and employees in regard to prevention, reporting, assessment and testing, rehabilitation, aftercare, and confidentiality.
62. Several intervenors raised concerns about human error-related events at BWXT's Toronto facility. The BWXT representative submitted that, in addition to its focus on worker training and qualification, BWXT had automated many of its processes to prevent human error accidents. The Commission is satisfied that the evidence shows BWXT has adequately addressed human error-related events in its human performance management programs.

4.2.1 Personnel Training

63. In accordance with its [licensing basis](#), BWXT is required to implement [REGDOC-2.2.2, Personnel Training](#). BWXT implemented a systematic approach to training-based (SAT-based) program in 2015 in accordance with REGDOC-2.2.2 and ensures that training managed internally by BWXT or by external contractors is SAT-based.
64. BWXT's managers and supervisors are trained to ensure that workers use the prescribed protective equipment and that all reasonable precautions are being taken to ensure the protection of workers. New BWXT employees are provided with radiation protection training prior to commencing work, with periodic retraining carried out for all employees.
65. CNSC staff submitted that compliance verification activities during the current licence period, including onsite inspections in 2014 and 2017, showed that BWXT's personnel training programs meet the specifications of REGDOC-2.2.2. During the proposed licence period, BWXT is expected to implement updated training documentation.
66. Asked for more information on its occupational health and safety training program, the BWXT representative explained that its workers start with classroom training, which is followed by on-the-floor training. New BWXT employees are required to demonstrate their ability to operate equipment prior to being allowed to do so by themselves.
67. As a follow up to the intervention from the CANDU Owners Group (COG), the BWXT representative provided information about BWXT's participation in the senior leadership and management courses that are offered through COG. BWXT's leaders are provided the opportunity to learn from other companies in the nuclear industry, develop relationships and better understand the technical challenges faced by the nuclear industry, nationally and internationally.
68. In light of the information above, the Commission is satisfied that BWXT has and will continue to have appropriate training programs in place at its Toronto and Peterborough facilities that meet the specifications of REGDOC-2.2.2. As indicated during this hearing, the Commission expects BWXT to implement updated training documentation during the renewed licence period.

4.2.2 Conclusion on Human Performance Management

69. Based on its consideration of the information presented on the record for this hearing, the Commission concludes that BWXT has implemented appropriate human performance management programs that meet regulatory requirements at its Toronto and Peterborough facilities. The Commission concludes that the evidence for this hearing shows that BWXT will continue to meet regulatory requirements and expectations under the renewed licences.

70. The Commission includes licence condition 2.1 in respect of the human performance management SCA in both renewed licences, as recommended by CNSC staff in CMD 20-H2.

4.3 Operating Performance

71. The operating performance SCA covers an overall review of how BWXT conducts its licensed activities and the activities that enable its effective performance. Per the [Class I Regulations](#), BWXT submitted information in respect of measures, policies, methods and procedures for operating its facilities.
72. BWXT's current licence includes five licence conditions in respect of this SCA. The licence includes conditions requiring BWXT to
- implement and maintain an operating program and provide direction for safely operating its facilities to reflect the safety analysis.
 - ensure that BWXT's workers handle radioactive nuclear substances in accordance with written procedures and maintain records in accordance with the NSCA and its regulations, specifically the [Nuclear Substances and Radiation Devices Regulations](#) (NSRDR).

CNSC staff rated BWXT's performance in the operating performance SCA as "satisfactory."

73. BWXT submitted that it monitors operating performance at its facilities with key performance indicators, such as non-conformance trending data and whether program goals are being met. To assess conformance to internal and external requirements, BWXT also conducts annual internal audits.
74. CNSC compliance verification activities showed that BWXT's Toronto and Peterborough facilities were operated safely during the current licence period and that BWXT maintained an effective operating program for both facilities in accordance with regulatory requirements. BWXT meets the requirements of the NSRDR in respect of records to be kept and retained for nuclear substances.
75. In the intervention from J. D'Orsay, the aging of BWXT's operations was raised. The BWXT representative acknowledged that some processes, such as pellet grinding, had not changed for decades because they had remained an adequate method to carry out that activity. However, BWXT assured the Commission that, when possible, modern technologies are explored and operations are revised or updated. The Commission is satisfied that BWXT applies modern technology in its operations as practicable.

4.3.1 Procedures and Quality Assurance

76. In accordance with the Class I Regulations, BWXT maintained a comprehensive suite of procedures across all of its programs at both the Toronto and Peterborough facilities. BWXT updated its facility-specific procedures to support ongoing process improvements and no procedural changes were made to operating procedures that could have the potential to affect the safe operation of either facility. BWXT also maintained a quality assurance program that met requirements during the current licence period. BWXT submitted that it would continue to meet requirements in respect of these programs during the proposed licence period.
77. On the issue raised by intervenor A. Tilman respecting BWXT's quality assurance processes for its Toronto pelleting operations, the BWXT representative explained that BWXT's quality assurance processes meets the specifications of CSA Z299.1, *Quality Assurance Program - Category 1*.⁵ BWXT's low fuel bundle defect rate provides a good indicator of the success of its quality assurance processes. The BWXT representative added that the same quality assurance processes would be used at the Peterborough facility, should the Commission authorize BWXT to produce fuel pellets at that site. The Commission is satisfied that BWXT has appropriate quality assurance processes in place for pelleting at the Toronto facility.
78. On the basis of its review of the information submitted for this hearing, the Commission is satisfied that BWXT will continue to ensure that appropriate operating performance-related procedures and quality assurance programs are in place at BWXT's Toronto and Peterborough facilities to ensure the health and safety of persons and the protection of the environment in the renewed licence period.
79. The Commission notes that BWXT has not yet carried out a complete assessment on how the pelleting operations would be moved to the Peterborough facility and whether significant changes to the quality assurance process would be needed. Further information on the Commission's expectations and directions in this regard are provided in section 4.19 of this Record of Decision. Facility-specific licence conditions 15.1, 15.2 and 15.3 provide for the conditions under which BWXT would be authorized to commence the commercial production of fuel pellets at its Peterborough facility.

4.3.2 Reporting Requirements

80. Pursuant to the GNSCR, BWXT is required to report certain unplanned events to the CNSC. Further, per its current licence condition 3.2, BWXT is required to comply with [REGDOC-3.1.2, Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills](#). BWXT complied with reporting requirements in respect of unplanned situations or events at its Toronto and Peterborough facilities during the current licence period, noting that corrective and

⁵ Z299.1, *Quality Assurance Program - Category 1*, CSA group, 2016.

preventive actions had been implemented to address all events. BWXT also submitted annual compliance reports to CNSC staff in regard to operating performance. BWXT submitted that it would continue to meet reporting requirements per the GNSCR and its licence conditions during the proposed licence period.

81. CNSC staff reported that BWXT met its licensing requirements in respect of the reporting of unplanned events, including an event involving a beryllium occupational exposure limit exceedances reported at BWXT's Peterborough facility in August 2017 by BWXT.⁶ In response to this event, BWXT submitted an event report that included the root causes and the corrective actions taken to prevent a recurrence. An unplanned reactive CNSC inspection confirmed that BWXT responded appropriately to the [CNSC request under subsection 12\(2\) of the GNSCR](#) to review its operations with the aim to minimize beryllium air concentrations in the affected work areas.
82. BWXT maintains an OPEX program which reviews and documents events, incidents and near misses. The BWXT representative provided information on its participation in COG, the sharing of OPEX with national and international COG members, and the incorporation of OPEX and industry best practices in its operations and procedures.
83. Intervenor J. McNeill noted a discrepancy between the number of reported events at BWXT's facilities in the licensee's CMD 20-H2.1 and CNSC staff's CMD 20-H2. The BWXT representative explained that, although BWXT had reported 21 events to the CNSC over the current licence period, its CMD provided a summary of the six events that BWXT considered to be the most significant. Upon the Commission recommendation that future CMDs include more consistent reporting of events, CNSC staff acknowledged the importance of the ways by which information is reported.
84. On the issue of the number of reported events at BWXT's Peterborough facility during the current licence period, CNSC staff explained that the reported events at both the Peterborough and Toronto facilities did not constitute a significant failure or a major loss of control of BWXT's operations. BWXT has implemented an appropriate program to ensure the mitigation of similar events in the future and CNSC staff actively tracked BWXT's corrective actions to their completion in respect of these events. The Commission is satisfied with the information provided on this issue.
85. Intervenor J. Dufresne expressed concerns about beryllium contamination having been found in BWXT's Peterborough facility. The BWXT representative acknowledged the possibility of beryllium contamination settling and accumulating on surfaces, despite the airborne beryllium concentration being one tenth of the limit in the B2 beryllium work area. For this reason, BWXT has resumed routine cleaning in the B2 work area. CNSC staff verified the absence of beryllium surface contamination by conducting swipe tests during CNSC inspections at BWXT's Peterborough facility. The Commission is satisfied that the evidence shows that BWXT is adequately managing airborne and surface beryllium contamination at its Peterborough facility.

⁶ CMD 17-M53, Event Initial Report (EIR), *BWXT Nuclear Energy Canada Inc. – Peterborough, Beryllium Occupational Exposure Level Exceedance for two workers*, October 2017.

86. Based on the information provided, the Commission is satisfied that BWXT met all reporting parameters for reporting unplanned situations or events at its Toronto and Peterborough facilities and complied with REGDOC-3.1.2, Volume I. The Commission is also satisfied that BWXT will continue to meet regulatory and licence requirements in this regard during the renewed licence period.

4.3.3 Conclusion on Operating Performance

87. Having examined the information submitted for this hearing, the Commission is satisfied that BWXT's Toronto and Peterborough facilities were operated and will continue to be operated safely during the proposed licence period. The Commission is also satisfied that the evidence shows that BWXT will continue to meet its reporting requirements in the renewed licence period.
88. The Commission concludes that the operating performance at BWXT's Toronto and Peterborough facilities during the current licence period provides a positive indication of BWXT's ability to carry out the activities under the renewed licences.
89. The Commission includes licence conditions 3.1 and 3.2 in respect of the operating performance SCA in both renewed licences, as recommended by CNSC staff in CMD 20-H2.

4.4 Safety Analysis

90. Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of the licensed activity or the operation of a facility, and considers the effectiveness of preventive measures and strategies in reducing the effects of such hazards. Safety analysis supports the overall safety case for BWXT's facilities. Per the [GNSCR](#) and [Class I Regulations](#), BWXT submitted information about the safety analyses conducted in its application.
91. In respect of this SCA and per its current licence condition 5.1, BWXT is required to implement and maintain a safety analysis program. BWXT's safety analysis reports (SAR) identify facility hazards and systems, structures and components relied upon for safety to control or mitigate these hazards. Throughout the current licence period, CNSC staff assessed that BWXT's Toronto and Peterborough facilities were operated safely and within licence limits, with BWXT's performance in this SCA rated as "satisfactory."
92. BWXT updated the SARs for both the Toronto and Peterborough facilities in 2019. BWXT is also required to maintain a fire hazards analysis (FHA) for each of its facilities. BWXT's FHAs were updated in 2018 for the Toronto facility and in 2019 for the Peterborough facility, and meet the requirements of the:

- National Fire Protection Association NFPA 801, [*Fire Protection for Facilities Handling Radioactive Materials*](#)
 - [*National Building Code of Canada*](#) (NBCC)
 - [*National Fire Code of Canada*](#) (NFCC)
93. BWXT's updated SARs adequately assess the hazards associated with its licensed activities and demonstrate an adequate level of protection over a broad range of operating conditions. CNSC staff submitted that the SARs included events such as earthquake risk analysis, assessment for aircraft impacts, flooding risk analysis and transport-related events. During the proposed licence period, BWXT would be required to update its SARs every five years or as operational requirements changed.
94. Many intervenors raised concerns about the hazards associated to the BWXT facilities and hazard frequency calculations. The BWXT representative explained that BWXT used a generic methodology that is widely accepted in the nuclear industry, as well as statistical information from relevant industrial operational experience. CNSC staff noted that, due to inherent uncertainty in risk calculations, surveillance and monitoring were used to verify the adequacy of safety margins. The Commission is satisfied on this point.
95. On the issue raised by intervenors about the apparent vagueness of terminology such as "unreasonable risk" and "safety," CNSC staff explained that, as a regulator, the CNSC considered unreasonable risk to be an exposure to the public, worker or environment that causes an impact to health and safety. A licensee's loss of control of the operations of its facility – which may not have an immediate impact but has the potential to have one – is also considered to be an unreasonable risk. Safety analyses consider information and assessments that had been carried out relative to risk and are a more judgment-based concept. Although, the Commission understands the concerns raised by intervenors on the apparent vagueness of such terminology, the Commission notes that the CNSC's mandate per article 9(a)(i) of the NSCA includes the "*prevention of unreasonable risk...to the health and safety of persons...*" The term "risk," in the context of the CNSC's mandate, is also defined in [REGDOC-3.6, Glossary of CNSC Terminology](#). The Commission is satisfied with CNSC staff's interpretation of the terminology discussed during this hearing.
96. J. Logan's intervention raised concerns about BWXT's "what-if analyses," which are part of BWXT's hazard identification and assessment processes. The BWXT representative explained that BWXT used two qualitative review methods for its preliminary hazards assessments, including the what-if analysis and the hazard inoperability study, with these making up part of BWXT's safety cases. BWXT does not assess hazards in isolation and contracts out to a third-party consultant to assist BWXT with both its qualitative and the downstream quantitative hazard assessments. Based on the information submitted, the Commission is satisfied with the methods by which BWXT carries out its hazards assessments.

97. REGDOC-2.4.4, *Safety Analysis for Class IB facilities*⁷ is under development and, when it is published, CNSC staff will include this REGDOC as part of the compliance verification criteria for BWXT during the proposed licence period. The Commission agrees that REGDOC-2.4.4 should be included in BWXT's licensing basis as soon as possible following its publication.

4.4.1 Safety Analysis – BWXT Toronto Facility

98. On the issue of 'worst case scenario' type accidents at the Toronto facility, CNSC staff explained that the SAR for the Toronto facility showed that a large fire would be a worst case event, with a probability of occurrence having been assessed as once in every 5,000 years. CNSC staff added that its assessment showed that workers, the public and the environment would remain protected should such an event occur. The BWXT representative noted that BWXT has a fully developed emergency response plan which includes the involvement of the Toronto Fire Department.
99. Further on accident scenarios, CNSC staff explained that train derailment scenarios and the resulting worst case scenario of a collapse of the Toronto facility had been considered in BWXT's SAR. The Deputy Fire Chief of Operations for Toronto Fire Services confirmed that it had the resources necessary to deal with such an accident. The Commission is satisfied that BWXT has adequately considered worst case scenario type accidents for its Toronto facility. Additional information on emergency management is provided in section 4.10.
100. D. Fernandes and J. Tuer raised the issue of UO₂ powder storage of at the Toronto facility and the potential for dispersal and contamination in the event of an accident. The BWXT representative explained that BWXT has approved spill response protocols in place should such an event occur, with these protocols including isolation, cleaning and the surveying of the spill area. Additionally, although BWXT is licensed to store 700 tonnes of UO₂ at the facility, it typically stores only 10% to 20% of that limit. The Commission is satisfied that BWXT's safety analysis has adequately considered UO₂ dispersal and contamination at the Toronto facility.

Hydrogen tank at the BWXT Toronto facility

101. BWXT's pelleting process requires the use of hydrogen gas to sinter the pellets in a high temperature furnace under a hydrogen atmosphere. BWXT stores liquid hydrogen on-site at the Toronto facility. Should pelleting be authorized at the Peterborough facility, BWXT would have to install a hydrogen tank at that facility. This subsection considers the Commission's review of safety analysis in respect of the hydrogen storage tank currently located at the BWXT Toronto facility.

⁷ CNSC Regulatory Document REGDOC-2.4.4, *Safety Analysis for Class IB Facilities*, under development.

102. Multiple intervenors in Toronto including P. Medeiros, R. Mound, the Rockcliffe-Smythe Community Association, J. D’Orsay and the Ontario Clean Air Alliance (OCAA) expressed concerns regarding the potential for a large explosion should the hydrogen storage tank be compromised. The BWXT representative explained that the hydrogen storage tank was considered in the SAR for the Toronto facility, noting that the risk for severe accidents involving the hydrogen tank had been assessed as having a probability of less than one in 10,000 years. Additional information on this issue submitted at the hearing includes
- The SAR considering the hydrogen tank was prepared by a third party and showed that there was no risk of an event causing structural damage – onsite or offsite – uranium releases or injuries to persons.
 - The hydrogen tank is a vacuum insulated double-walled tank with two pressure-relief valves and pressure-relief disks, has a design pressure of 150 psi and contains low-pressure liquid hydrogen.
 - In the case of an explosion of the hydrogen tank, a pressure wave could cause a broken window and, in the case of a fire, there is potential for some onsite and offsite heat exposure.
 - Toronto Fire Services is equipped to deal with pressurized gas fires.
 - The hydrogen tank is stored in an open area with no confinement, and with bollards providing visual and mechanical protection to the tank.
 - The hydrogen tank is maintained in accordance with all relevant codes, including [NFPA 55, Compressed Gases and Cryogenic Fluids Code](#).
 - The hydrogen tank is routinely inspected by the [Technical Standards and Safety Authority](#) (TSSA).
103. The OCAA raised the issue of an event involving the Toronto hydrogen tank in 1999. The BWXT representative explained that, in 1999, the Toronto facility had gaseous hydrogen storage tanks, which stored compressed hydrogen at 2,600 psi. BWXT, however, now stores liquefied hydrogen, rather than gaseous hydrogen, at a much lower pressure of 150 psi. During the 1999 event, a safety pressure relief device on one of the gaseous hydrogen tanks released, with friction igniting the hydrogen gas. This safety device worked as intended, releasing the hydrogen gas to a safe area, but homes in the immediate area were evacuated as a precaution. BWXT started using liquefied hydrogen in 2000 due to the inherent higher safety of a low-pressure storage system. The Commission is satisfied with the information provided on this issue and that, since BWXT stores liquefied rather than gaseous hydrogen, this is not a credible event in respect of BWXT’s current facility.

Assessment of Safety Analysis – BWXT Toronto Facility

104. Based on the information submitted for this hearing, the Commission is satisfied that BWXT’s SAR for the Toronto facility adequately identifies and assesses hazards associated with that facility, including the storage of UO₂ and the on-site hydrogen storage tank. The Commission is satisfied that BWXT has effective preventive measures and strategies in place to reduce the effects of such hazards.

4.4.2 Safety Analysis – BWXT Peterborough Facility

105. Concerns about the presence of hazardous materials at the Peterborough facility – other than uranium and beryllium – were raised by Dr. Buddle. The BWXT representative explained that additional hazardous materials used or stored at BWXT’s facilities include compressed gases for welding, flammable liquids, acids, and zirconium, noting that zirconium was only flammable metal when present in the form of a fine dust. Based on its consideration of the information provided for this hearing, the Commission is satisfied that BWXT has considered all hazardous materials present at its facilities in the SARs.
106. On the issue raised by Dr. Ragheb of whether the SAR for the Peterborough facility reflected the requested pelleting operations, the BWXT representative explained that the Peterborough facility SAR reflects the operations that are currently in place and that the SAR would have to be updated to include the pelleting. However, BWXT is of the view that the SAR for Toronto pelleting operations is representative of what would be included in an updated SAR for the Peterborough facility, should the pelleting operations be authorized at that facility.
107. To address the issue of the need for an updated SAR should pelleting be authorized in Peterborough, CNSC staff proposed in CMD 20-H2 the inclusion of the facility-specific licence condition 15.2 in BWXT’s licence. This licence condition would require BWXT to submit a final commissioning report prior to commencing the production of fuel pellets at the Peterborough facility. The Commission has addressed the facility-specific licence condition 15.2 in more detail in section 4.19.

Assessment of Safety Analysis – BWXT Peterborough Facility

108. Based on the information submitted for this hearing, the Commission is satisfied that BWXT’s SAR for the Peterborough facility adequately identifies and assesses hazards associated with that facility. The Commission is satisfied that BWXT has effective preventive measures and strategies in place to reduce the effects of the identified hazards.
109. The current SAR for the Peterborough facility does not include the proposed fuel pelleting operations. BWXT will have to submit to the CNSC an updated SAR to include the risks and hazards associated with that licensed activity prior to commencing the commercial production of fuel pellets in Peterborough.

4.4.3 Conclusion on Safety Analysis

110. On the basis of the information presented, the Commission concludes that the systematic evaluation of the potential hazards and the preparedness for reducing the effects of such hazards is adequate for the operation of the facility and the activities under the renewed licences.

111. The Commission finds that BWXT's safety analysis program for BWXT's Toronto and Peterborough facilities meets the requirements of the NBCC, NFCC and NFPA 801. The Commission is of the view that the evidence shows that BWXT has adequate preventive measures and strategies in place at BWXT's Toronto and Peterborough facilities to ensure the protection of workers, members of the public and the environment, and that the facilities meet safety requirements.
112. The Commission understands that an updated SAR reflecting the commercial production of fuel pellets will be included as part of the final commissioning report that shall be submitted to the Commission prior to the commencement of that activity.
113. The Commission includes licence conditions 3.1 and 3.2 in respect of the safety analysis SCA in both renewed licences, as recommended by CNSC staff in CMD 20-H2.

4.5 Physical Design

114. The physical design SCA includes the activities to design the systems, structures and components (SSC) to meet and maintain the [design basis](#) of the facility. The design basis is the range of conditions, according to established criteria, that the facility must withstand without exceeding authorized limits for the planned operation of safety systems. Per the [Class I Regulations](#), BWXT submitted in its application information about the physical design of its facility. CNSC staff rated BWXT's performance in this SCA as "satisfactory."
115. Per its current licence condition 6.1, BWXT is required to implement and maintain a design program for its Toronto and Peterborough facilities. In respect of this SCA, BWXT has to meet the design and construction provisions of the [NFCC](#), the [NBCC](#) and CSA N393-13, *Fire protection for facilities that process, handle, or store nuclear substances*.⁸ During the current licence period, BWXT carried out all modifications to its facilities in accordance with its licence condition, LCH, and applicable codes and standards.
116. BWXT has a change control program and change management process which
 - provide the framework to maintain and control the physical configuration of all structures, systems and components (SCCs); and
 - apply to all design, operation, decommissioning and maintenance activities at BWXT's Toronto and Peterborough facilities.

CNSC staff submitted that compliance verification activities showed that BWXT met licensing requirements in this regard.

⁸ N393-13, *Fire Protection for facilities that process, handle, or store nuclear substances*, CSA Group, 2013 (reaffirmed in 2018).

117. K. Sato raised safety concerns related to the age of BWXT's facilities. CNSC staff explained that BWXT was required to meet current codes and standards, including the NBCC, NFCC and CSA N393, and that the age of the facilities did not exempt BWXT from meeting these requirements. Additionally, during the current licence period, CNSC staff conducted inspections to ensure that any upgrades to BWXT's building were done in accordance with the most current codes and standards. The Commission was satisfied with this information.
118. Prior to the implementation of any proposed modification with the potential to impact protection from fire, BWXT is required to submit the proposed modification for third-party review through code compliance reviews. CNSC compliance verification showed that BWXT carried out code compliance reviews as required throughout the current licence period.
119. Per its licence condition 4.6, BWXT is required to implement and maintain a pressure boundary program which is comprised of processes and procedures, and associated controls that are required to ensure compliance with CSA B51-14, *Boiler pressure vessel and pressure piping code*.⁹ Throughout the current licence period, BWXT has maintained pressure boundary systems at the Toronto and Peterborough facilities that meet the specifications of CSA B51-14.
120. BWXT is also required to have in place a formal agreement with an authorized inspection agency in respect of registered pressure-retaining vessels, systems or components, in accordance with its current licence condition 4.7. Throughout the current licence period, BWXT has maintained an agreement with the TSSA, an authorized third-party inspection agency, for the review and certification of its pressure retaining components against the specifications of CSA B51-14. BWXT submitted that it will continue to maintain this agreement with the TSSA throughout the proposed licence period.
121. In order to support the proposed pelleting operations at the Peterborough facility, BWXT would be required to modify specific aspects of its facility, equipment and SCCs, and implement all safety and control measures relevant to that licensed activity before beginning that activity.
122. J. Keil raised the issue of construction at the Peterborough facility which was thought to be related to the proposed pelleting operations. The BWXT representative responded that BWXT was conducting a leak repair on the roof of its main building and that BWXT was not adding a third storey to the facility. The Commission is satisfied that the evidence shows that BWXT is not proceeding with an unauthorized construction project for the proposed pelleting operations or otherwise.
123. On the concern raised by P. Harris about the location of the stacks at BWXT's Peterborough facility, the Commission enquired whether relocating the stacks was a possibility. The BWXT representative reported that the stacks were located directly

⁹ B51-09, *Boiler, pressure vessel and pressure piping code*, CSA Group, 2009.

above the operations area. BWXT had previously considered relocating the stacks and would continue to look at the feasibility of relocation. Should pelleting operations be authorized in Peterborough, BWXT would also consider wind dispersion models in determining the location of any additional stacks. The Commission was satisfied with the information provided on this issue.

124. Based on the evidence considered for this hearing, the Commission concludes that BWXT continues to implement and maintain effective design and pressure boundary programs at its Toronto and Peterborough facilities and that the design of both facilities is adequate for the operation period included in the proposed licence. The Commission is satisfied that BWXT has maintained and will continue to maintain a physical design program at both the Toronto and Peterborough facilities that meet the provisions of the [NFCC](#), the [NBCC](#) and CSA N393.
125. The Commission includes licence conditions 5.1 and 5.2 in respect of the physical design SCA in both renewed licences, as recommended by CNSC staff in CMD 20-H2.
126. To ensure adequate oversight of the changes that would be required at BWXT's Peterborough facility should the Commission authorize BWXT's request to conduct pelleting at that facility, CNSC staff recommended the inclusion of a facility-specific licence condition 15.2 in BWXT's renewed licence. This licence condition would require BWXT to "... *submit a commissioning report related to the production of fuel pellets as described in paragraph (iv) of Part IV of this licence that is acceptable to the Commission, or a person authorized by the Commission.*"
127. As further detailed in section 4.19, the Commission does not delegate its authority in respect of such a licence condition. Prior to BWXT commencing fuel pellet production in Peterborough, the final commissioning report shall be accepted by the Commission.

4.6 Fitness for Service

128. The fitness for service SCA covers activities that are performed to ensure that SSCs at BWXT's Toronto and Peterborough facilities continue to effectively fulfill their intended purpose. Per the [Class I Regulations](#), BWXT included in its application information regarding the proposed measures, policies, methods and procedures for operating and maintaining its facilities.
129. BWXT's current licence includes two conditions in respect of this SCA:
 - licence condition 7.1 requires that BWXT implement and maintain a program for maintenance
 - licence condition 7.2 requires BWXT to implement and maintain a program for periodic inspection and testing

130. CNSC staff submitted that BWXT's governing documents for the conduct of maintenance and on-site compliance verification activities showed that BWXT's maintenance program meets licensing requirements. CNSC staff rated the BWXT's performance in this SCA as "satisfactory."
131. CNSC staff submitted that BWXT's maintenance program meets the specifications of CSA N286-12 in respect of having processes in place for SSC preventive maintenance, aging management, periodic inspection and testing requirements. Since 2014, BWXT uses a web-based maintenance management program for work order and asset management. In 2016, BWXT implemented a Critical to Safety (CTS) systems and equipment program. BWXT added that the CTS program includes equipment that directly ensures the safety of workers, protection of the environment, or regulatory compliance.
132. The intervention from L. E. George expressed concerns about the fitness for service and aging management of BWXT's Peterborough facility. In response, the BWXT representative stated that BWXT's facilities were inspected annually by a third-party against the NBCC and the NFCC. Additionally, during its acquisition of the Toronto and Peterborough facilities in 2016, BWXT's insurer inspected the facilities and found them to be in good condition. The Commission is satisfied with the information provided on this topic.
133. Based on the information provided on the record for this hearing, the Commission is satisfied with BWXT's programs for the inspection and life-cycle management of key safety systems at BWXT's Toronto and Peterborough facilities. The Commission concludes that the equipment, as installed at BWXT's Toronto and Peterborough facilities, is fit for service and that BWXT has appropriate programs in place to ensure that the equipment remains fit for service throughout the renewed licence period.
134. The Commission is also satisfied that BWXT has adequately considered, and will continue to consider, aging management in respect of its facilities and that they remain fit for service during the renewed licence period.
135. The Commission includes licence condition 6.1 in respect of the fitness for service SCA in both renewed licences, as recommended by CNSC staff in CMD 20-H2.

4.7 Radiation Protection

136. BWXT's radiation protection program must meet the requirements set out in the [*Radiation Protection Regulations*](#) (RPR). The Commission considered BWXT's radiation protection program and how BWXT ensured that both radiation doses to persons and contamination were monitored, controlled and kept as low as reasonably achievable (ALARA), with social and economic factors taken into consideration at both the Toronto and Peterborough facilities.

137. Per BWXT's current licence conditions 8.1 and 8.2, BWXT is required to implement and maintain a radiation protection program, and notify the Commission within 24 hours of becoming aware that an [action level](#) has been exceeded, with a written report submitted within 21 days of becoming aware of the matter. CNSC staff rated BWXT's performance in this SCA as "satisfactory."
138. BWXT's radiation protection program has been assessed as meeting the requirements of the RPR. Continuous improvement of the program is facilitated through an ALARA Committee, which consists of both unionized and management employees. BWXT also carries out improvements to its program following self-assessments and audits; reported safety concerns; near miss and incident investigations; and CNSC inspections. During the current licence period, BWXT updated radiation protection work instructions and developed a non-[nuclear energy worker](#) (NEW) dose control program.

4.7.1 Application of ALARA

139. BWXT submitted that, in respect of applying ALARA, its radiation protection program meets the requirements of the RPR and the specifications of [G-129, Keeping Radiation Exposures and Doses As Low As Reasonably Achievable](#). BWXT's ALARA Committee meets quarterly and sets annual ALARA goals focused on reducing worker dose and surface contamination. The ALARA Committee also reviews radiation monitoring data with an aim of identifying any trends.
140. CNSC staff submitted that compliance verification activities during the current licence period showed that BWXT has implemented radiation protection measures to keep radiation exposures and doses to persons ALARA, taking into account social and economic factors. BWXT established its radiation protection action levels in accordance with the [G-228, Developing and Using Action Levels](#) and implements a combination of action levels, staff training and dose management tools – such as work planning and management oversight – to ensure that radiation doses to workers are controlled and kept ALARA.
141. Based on the information considered for this hearing, the Commission is satisfied that BWXT adequately applies the ALARA concept to its activities at the Toronto and Peterborough. The Commission is also satisfied that BWXT will continue to adequately implement G-219 and G-228 in the renewed licence period.

4.7.2 Radiological Hazard and Worker Dose Control

142. Per the RPR, BWXT is required to control occupational exposures to radiation and to report on radiation doses received by workers. During the current licence period, no regulatory dose limit exceedances were recorded for any BWXT workers.¹⁰ All BWXT workers involved in the processing and handling of UO₂ are designated as NEWs. BWXT submitted that the highest individual maximum effective dose for BWXT's Toronto and Peterborough facilities NEWs during the last 10 years were below regulatory limits, at 11.8 mSv and 9.2 mSv for the Toronto and Peterborough facilities, respectively, suggesting that BWXT's radiation protection program was effective in controlling worker doses.
143. BWXT submitted information about worker dose control measures in place at BWXT's Toronto and Peterborough facilities, such as using shielding or moving items to alternative storage locations, when necessary. BWXT submitted that UO₂ particles which may enter the body by inhalation, ingestion or absorption represent the primary internal radiation hazard at both its Toronto and Peterborough facilities. BWXT carries out air monitoring at various work stations in both of its facilities and monitors for surface contamination in the manufacturing areas of each facility to reduce the amount of loose radioactive contamination which could be a source of internal exposure for workers.
144. All NEWs involved in BWXT's fuel manufacturing activities are assigned a thermoluminescent dosimeter and BWXT workers use extremity dosimeters to measure and monitor radiation doses to their extremities. BWXT uses a CNSC-licensed dosimetry service provider for external dosimetry. Employees who may be exposed to radioactive dust also undergo bioassay to measure uranium in urine and to assess whether inhalation of airborne UO₂ has occurred. Internal doses are calculated using the measured uranium in air concentrations with the worker's occupancy time and a dose conversion factor.
145. BWXT does not directly monitor non-NEWs, such as administrative personnel and contractors, whose work does not require a NEW designation. BWXT estimates doses for non-NEWs based on facility radiological conditions and occupancy factors which ensures that radiation doses were controlled below the regulatory dose limit for the public (1 mSv/year) for a non-NEW.
146. CNSC compliance verification activities during the current licence period showed that BWXT had effectively implemented its radiation protection program at its Toronto and Peterborough facilities to ensure that doses received by all workers – NEWs and non-NEWs – remained below regulatory limits.

¹⁰ The effective dose limits for a NEW is set at is set at 50 mSv in any one year and 100 mSv in five consecutive years, and for pregnant NEWs the dose limit is 4 mSv from the time the pregnancy is declared to the end of the term. The dose limits for non-NEWs, including members of the public, is set at 1 mSv per year.

147. Regarding the issue of BWXT's internal control systems for the use of dosimeters raised by J. Carter, the BWXT representative explained that workers are required to wear dosimeters appropriately on their body while working and to store them in a specified location at the end of their work day. Dosimetry results are reviewed and compared against internal control and action levels to identify any unusual readings. Any internal control level exceedances would be investigated to determine the cause, and corrective measures would be applied, if required.
148. Dr. J. Deutsch and J. D'Orsay raised concerns regarding the presence of radon in UO₂. CNSC staff explained the U-238 decay chain and stated that the amount of radon produced, and therefore the associated dose from radon, would be low. CNSC staff added that all uranium progeny, including radium and polonium, were removed and concentrated in the tailings at the milling stage and, as such, there was no radon exposure risk at BWXT facilities. The Commission is satisfied on this point.
149. The Commission enquired about BWXT's nuclear service activities and its handling procedures for contaminated equipment. The BWXT representative responded that equipment serviced by BWXT was cleaned prior to it being sent to BWXT, but there was always the possibility that the equipment was contaminated above [unconditional clearance levels](#) or that the existence of lower-level contamination was known upon shipment. The BWXT representative added that the dose rate for the workers handling the equipment was very low. The Commission is satisfied that BWXT has adequate processes in place to control radiological hazards and protect its workers during nuclear servicing activities.
150. The intervention from A. Tilman enquired about the possibility for additional automation in BWXT's manufacturing process in order to reduce worker exposure. The BWXT representative provided information about automation that is currently in place in BWXT's fuel bundle manufacturing operation in Peterborough, noting that the automation ensured a high-volume of production while limiting radiation dose to workers and increasing industrial safety. BWXT is continually exploring ways by which it can further automate its processes with the aim of improving radiation protection, as well ergonomics and industrial safety. The Commission is satisfied on this point but encourages BWXT to continue to explore ways by which worker doses can be reduced and safety can be increased in its operations.
151. Based on the information provided for this hearing, the Commission is satisfied that BWXT is adequately monitoring and controlling doses to workers at BWXT's Toronto and Peterborough facilities and that BWXT has improvement processes in place to ensure worker radiation protection.

4.7.3 Control of Dose to the Public

152. BWXT maintains programs to prevent uncontrolled releases of radioactive materials to the public from the BWXT's Toronto and Peterborough facilities. BWXT established its [derived release limits](#) (DRL) for uranium emissions to the environment for both the Toronto and Peterborough facilities in accordance the public dose limit of 1 mSv per year, per the RPR.¹¹
153. CNSC compliance verification activities throughout the current licence period showed that BWXT had adequately controlled radiological hazards to the public near both the Toronto and Peterborough facilities. During the current licence period, the maximum annual effective dose based on all radioactive releases during the last five years from the Toronto facility was 0.0175 mSv per year in 2017. The effective annual dose from the Peterborough facility during the last five years remained below detectable limits.
154. BWXT has implemented CSA N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*.¹² DRLs are reviewed by CNSC staff to ensure that they are adequate for the facility in question, meet applicable standards and are protective of the public.
155. Several intervenors, including individuals and groups, expressed concerns about internal UO₂ dose calculations. CNSC staff explained that the calculated public dose included both external and internal radiation sources and was calculated for all age groups – infants, children and adults – as though an individual were standing at the facility fence line for 24 hours a day and 365 days a year. CNSC staff added that the internal dose took into account the amount of UO₂ taken into the body, the amount deposited in the respiratory tract and the amount deposited in all tissues and organs until age 70 for infants and for 50 years after the intake for adults. The Commission noted that, based on these calculations, doses to public would be significantly below regulatory limits and is satisfied that this methodology adequately assesses the dose to the public in the vicinity of BWXT's facilities.
156. In their interventions, D. Fernandes, J. Wilkes and the Citizens Against Radioactive Neighbourhoods (CARN) raised concerns related to risks in inhaling one particle of uranium. CNSC staff explained that the dose over a long period of time from one particle of uranium in the lungs would be very small – less than 0.001 µSv – and that an associated cancer risk was considered as negligible. CNSC staff also referenced [studies of workers exposed to uranium](#) which showed very weak associations between uranium exposure and lung cancer.

¹¹ The regulatory dose limit for a member of the public is 1 mSv (1,000 µSv) per year and the natural background dose is estimated between 2 mSv – 5 mSv (2,000 µSv – 5,000 µSv) per year.

¹² N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, CSA Group, 2014.

157. Further on the risk of uranium, CNSC staff explained that environmental studies considering populations living near uranium processing facilities, as well as studies on the effects of uranium in drinking water, included children and that Canadians are exposed to naturally-occurring uranium daily. The inhalation dose from background radiation in Canada is on average 0.9 mSv per year in Canada and Ontario's drinking water contains on average 0.1 µg to 5 µg per litre of uranium.
158. The OCAA and Canadian Association of Physicians for the Environment (CAPE) raised concerns about public dose calculations and radiation risks. CNSC staff provided an explanation about types of radiation and stated that the prescribed public dose limit per the RPR was derived from the recommendations of various international bodies, including United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the International Commission on Radiological Protection (ICRP), and based on thousands of literature reviews by hundreds of international experts.
159. The Commission considered the absorbed dose calculations using microdosimetry, as presented in the intervention from CARN, and asked how these dose calculations compared to effective dose calculations using tissue weighting factors. CNSC staff explained that the concept of effective dose had been developed and recommended by the [International Atomic Energy Agency](#) (IAEA) since the late 1970s and that, previous to that, organs had distinct dose limits. CNSC staff added that the concept of effective dose is implemented worldwide and that dose limit as a risk to humans is expressed in terms of the effective dose.
160. Addressing cancer rates near BWXT's facilities raised by intervenors in both Toronto and Peterborough, CNSC staff stated that studies showed that people living near nuclear facilities were as healthy as the rest of the general population and that no health effects were expected from the very low doses measured during environmental monitoring.
161. The Commission asked about whether any studies demonstrated that underlying health issue could increase susceptibility to radiation exposure. CNSC staff responded that there was no evidence that it was aware of showing that there would be such an increased susceptibility to radiological hazards. The Toronto Public Health representative responded that they were likewise not aware of any such increased susceptibility to radiation. The Commission is satisfied with the information provided on this issue.
162. J. McNeill raised a concern that the World Health Organization (WHO) and the IAEA had made an agreement to not study the human health impacts of radiation. CNSC staff stated that a 2001 update on the [WHO website](#) clarified this issue, noting that such a concern was unfounded and that UNSCEAR has carried out numerous studies on the health impacts of radiation on people. The Commission notes that [CNSC staff submitted a memo](#) on this topic in the context of an undertaking and is satisfied with the information provided on this topic.

Assessment of Control of Dose to the Public

163. Based on the evidence assessed for this hearing, the Commission is satisfied that BWXT has adequately identified and controlled radiological hazards at BWXT's Toronto and Peterborough facilities, and will continue to do so in the renewed licence period. The Commission is satisfied that the evidence shows that BWXT's operations have not had an adverse impact on the rates of cancers in Toronto or Peterborough.
164. The Commission is satisfied that calculating effective dose using tissue weighting factors is an internationally-accepted and adequate methodology for the protection of human health and safety. The Commission is also satisfied that the public dose limit of 1 mSv/year, per the RPR, is protective of the public and notes that BWXT's emissions from both facilities are significantly below this limit.
165. The Commission is satisfied that the evidence shows that BWXT has adequately controlled doses to the public. The Commission is satisfied that BWXT has appropriate measures in place to continue to adequately control radiological doses to the public and to meet the requirements of the RPR at both facilities in the proposed licence period.

4.7.4 Conclusion on Radiation Protection

166. The Commission concludes that, based on the evidence provided on the record for this hearing, BWXT has appropriate mitigation measures and safety programs in place to control radiation hazards. The evidence shows that BWXT provides for, and will continue to provide for, the adequate protection of the health and safety of persons and the environment throughout the renewed licence period.
167. The Commission concludes that BWXT's radiation protection programs at the Toronto and Peterborough facilities meet the requirements of the RPR.
168. The Commission includes licence condition 7.1 in respect of radiation protection in both renewed licences, as recommended by staff in CMD 20-H2.

4.8 Conventional Health and Safety

169. Per its current licence condition 9.1, BWXT is required to implement and maintain a program for occupational health and safety for its facilities. The conventional health and safety SCA covers the management of conventional (non-radiological) workplace safety hazards at BWXT's Toronto and Peterborough facilities. Per the [Class I Regulations](#) BWXT submitted in its application information about its proposed worker health and safety policies and procedures.

170. As a federally-regulated site, BWXT's conventional health and safety program is required to comply with the [Canada Labour Code](#) (CLC) and the [Canada Occupational Health and Safety Regulations](#), including all occupational exposure limits for chemical compounds listed under these regulations. CNSC staff rated BWXT's performance in this SCA as "satisfactory."
171. BWXT has implemented a Health and Safety Policy Committee, a Workplace Safety Committee, an ALARA Committee, a Beryllium Safety Committee (Peterborough facility only) and an Ergonomics Committee at its facilities. These committees aim to prevent accidents and occupational illness by promoting health and safety awareness and the review of BWXT's activities to ensure safe operations at its facilities.
172. [Employment and Social Development Canada](#) (ESDC) is mandated with overseeing and enforcing compliance with the CLC and its regulations. ESDC conducted a routine inspection at BWXT's Toronto facility in 2018 and several minor non-compliances were identified. BWXT has since closed all non-compliances. CNSC staff reported that it verified BWXT health and safety practices during compliance inspections and that CNSC staff was satisfied that BWXT's programs met all applicable statutory and regulatory requirements.
173. In regard to lost time injuries (LTI), BWXT submitted that the last LTI recorded at the Toronto facility was in 2014 and that no LTIs had been reported at the Peterborough facility during the current licence period. Following two recordable injuries associated with the workstation where pelleting trays were manually lifted in 2018, BWXT carried out changes to its engineering controls and automation in respect of pelleting operations at the Toronto facility.
174. BWXT reported that a risk assessment related to machine safety had been completed in 2011 by a third party at its Toronto and Peterborough facilities. The output of the risk assessment was used to upgrade the guarding of the machines and that over 125 machines were upgraded or replaced to reduce the risks posed to operators.
175. Intervenors W. Fischer, J. Logan and D. Rudka raised concerns regarding the effectiveness of BWXT's conventional health and safety program. The BWXT representative described the committees that it had in place at its facilities, noting that any health and safety issues were analyzed and trended. CNSC staff informed the Commission that its compliance verification activities assessed all aspects of BWXT's conventional health and safety program and that it met requirements. CNSC staff works collaboratively with other government departments to ensure that BWXT has all required permits in place.
176. In relation to J. Rogers' intervention, the Commission asked about whether BWXT currently had any health and safety related grievances from unionized employees. The BWXT representative reported that it was not aware of any current grievances regarding health and safety issues and added that BWXT employees can raise concerns in different ways, including anonymously, with all concerns raised logged and tracked until completion. CNSC staff noted that BWXT employees can also raise concerns confidentially with CNSC staff inspectors.

177. In relation to D. Rudka's intervention about the actions that would be taken by BWXT in the event of a worker injury, the BWXT representative stated that workers were required to report all injuries and that BWXT's emergency response team would respond depending on the severity of the injury. BWXT's emergency response team consists of people trained in first aid and the team's first step in any response is to determine whether it is safe to intervene. BWXT reports all such incidents to the CNSC and other regulatory agencies, as required.
178. On the issue of legacy contamination raised by T. Gilbert, J. Dufresne and several other intervenors in Peterborough, the BWXT representative explained that GE Hitachi, as the owner of the facility, performs annual asbestos surveys and inspects the condition of asbestos-containing materials to ensure that they remained in safe condition. During those surveys, other potential hazards within the building, such as lead and mercury, were also inspected to ensure that those were controlled and at safe levels. For contaminants in soil, such as PCBs, the BWXT representative stated that those do not present a hazard to workers since the facilities are mostly paved.
179. In respect of the licensed activities involving beryllium at the Peterborough facility, BWXT has implemented CSA Z94.4-18, *Selection, use and care of respirators*.¹³ Beryllium represents a significant inhalation hazard and this standard sets out requirements for the selection, use and care of respirators and for the administration of an effective respiratory protection program.
180. To ensure the safety of workers who work with beryllium at the Peterborough facility, BWXT monitors air through area and personal air monitors in the beryllium work area. When work involving beryllium is expected to result in airborne beryllium levels higher than the occupational exposure level, work is performed under a work permit system. CNSC staff's compliance verification activities have shown that BWXT has adequate procedures in place to protect worker safety during work involving beryllium.
181. On the issue of beryllium hazards as raised by D. Rudka, the BWXT representative stated that BWXT has a medical monitoring program in place for all beryllium workers. This program includes beryllium lymphocyte proliferation testing and pulmonary function tests. BWXT's beryllium workers are monitored annually or triennially, depending on their work area, and no workers are currently showing signs of beryllium sensitivity. All workers who are permitted to enter the beryllium room have been appropriately trained in respect of this hazard, have consented to conducting this work activity and use the appropriate personal protective equipment. The BWXT representative noted that no issues had been raised by workers concerning beryllium. The Commission is satisfied with the information provided on this issue.
182. The Commission concludes that the evidence on the record for this hearing shows that BWXT's conventional health and safety program at the Toronto and Peterborough facilities satisfies statutory and regulatory requirements.

¹³ Z94.4-18, *Selection, use and care of respirators*, CSA Group, 2018.

183. The Commission concludes that the health and safety of workers, including the risk posed by beryllium to workers, was adequately protected during the current licence period. The Commission is also satisfied that BWXT has appropriate programs in place to continue adequately protecting workers at its Toronto and Peterborough facilities during the renewed licence period.
184. The Commission includes licence condition 8.1 in respect of conventional health and safety in both renewed licences, as recommended by staff in CMD 20-H2.

4.9 Environmental Protection

185. In accordance with its licence conditions 10.1 and 10.2, BWXT's environmental protection programs at its Toronto and Peterborough facilities are intended to identify, control and monitor all releases of radioactive and hazardous substances, and aim to minimize the effects on the environment which may result from the licensed activities. These programs include effluent and emissions control, environmental monitoring and estimated doses to the public.
186. Pursuant to the [Class I Regulations](#), BWXT submitted in its licensing application information about its proposed environmental protection programs. The [GNSCR](#) requires that every licensee take all reasonable precautions to protect the environment and the health and safety of persons. As noted in section 4.7 of this Record of Decision, the [RPR](#) prescribe a 1 mSv per year radiation dose limit for the general public. CNSC staff rated BWXT's performance in this SCA as "fully satisfactory" in 2015 and "satisfactory" from 2016 to 2019.
187. BWXT's environmental protection was designed and is implemented in accordance with [REGDOC-2.9.1, Environmental Protection: Environmental Protection Policies, Programs and Procedures](#). CNSC staff stated that BWXT would implement any changes in their environmental protection programs associated with the updated [REGDOC-2.9.1: Environmental Protection: Environmental Principles, Assessments and Protection Measures, Version 1.1](#), in the proposed licence period.

4.9.1 Effluent and Emissions Control (Releases)

188. In accordance with its licence condition 10.3, BWXT is required to control and monitor the releases of hazardous substances. In accordance with its licence condition 10.4, BWXT is required to notify the Commission within 24 hours of becoming aware that an action level for an environmental release has been exceeded.
189. The release of hazardous substances is regulated by the CNSC, the [Ontario Ministry of Environment, Conservation and Parks](#) (MECP), and [Environment and Climate Change Canada](#) (ECCC). BWXT's effluent and emissions control programs meet, and will have to meet in the proposed licence period, the specifications of

- CSA N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*
 - CSA N288.4-10, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills*¹⁴
 - CSA N288.5-11, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills*¹⁵
 - CSA N288.6-12, *Environmental risk assessment at Class I nuclear facilities and Uranium Mines and Mills*¹⁶
 - CSA N288.8-17, *Establishing and implementing action levels for releases to the environment from nuclear facilities*¹⁷
190. BWXT submitted information about radiological emissions from its Toronto and Peterborough facilities, including airborne emissions and liquid releases, noting that they were below environmental action levels and regulatory limits. CNSC staff indicated that BWXT would update its environmental action levels in accordance with CSA N288.8-17 in 2020.
191. BWXT informed the Commission about its effluent and emissions monitoring procedures, and indicated that uranium and beryllium in effluent originated from cleaning and washing protective clothing, walls, floors and equipment. BWXT added that wastewater was treated, analyzed and verified to be below the Internal Control Level, a level significantly below regulatory levels, before being released.
192. In respect of release limits, BWXT submitted to the Commission detailed information regarding its effluent monitoring results and noted that the levels of radiation and radioactive contaminants in the environment outside the BWXT's Toronto and Peterborough facilities remained low throughout the licence period. Releases of radioactive and hazardous substances from BWXT's Toronto and Peterborough facilities also remained below licence limits and action levels. CNSC staff submitted that, throughout the current licence period, compliance verification activities showed that BWXT met licensing requirements in respect of effluent and emissions control.
193. BWXT had established exposure-based release limits (EBRL) as part of this licence renewal process at identified release points at the Toronto and Peterborough facilities. The EBRLs are based on uranium and beryllium discharges to water and air. The EBRLs for effluent released to water were calculated by deriving release limits based on the

¹⁴ N288.4-10, *Environmental monitoring programs at class I nuclear facilities and uranium mines and mills*, CSA Group, 2010 (Reaffirmed 2015).

¹⁵ N288.5-11, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills*, CSA Group, 2011 (Reaffirmed 2016).

¹⁶ N288.6-12, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills*, CSA Group, 2012 (Reaffirmed 2017).

¹⁷ N288.8-17, *Establishing and implementing action levels for releases to the environment from nuclear facilities*, CSA Group, 2017.

- Canadian Council of Ministers of the Environment (CCME) [Canadian Water Quality Guidelines for the Protection of Aquatic Life](#) (Protection of Aquatic Life Guidelines)
- annual flows released by the Toronto and Peterborough municipal wastewater treatment plants
- average annual treated water that is discharged from the Toronto and Peterborough facilities

Should the Commission authorize BWXT's request to conduct pelleting operations in Peterborough, BWXT has also established EBRLs for effluent from the Peterborough facility in respect of this activity.

194. Regarding emissions to air, BWXT harmonized its release limits with the provincial air quality standards under [Ontario Regulation 419/05: Air Pollution – Local Air Quality](#). To do this, BWXT calculated EBRLs by deriving release limits that apply to the stack, which are based on meeting the applicable air quality standards at the point of impingement. Should its pelleting request for the Peterborough facility be authorized by the Commission, BWXT would determine EBRLs based on actual stack details and location.
195. CNSC staff noted that the upcoming REGDOC-2.9.2, *Controlling Releases to the Environment*¹⁸ would be published in the proposed licence period and that BWXT would be expected to update its EBRLs to meet the specifications of that REGDOC.
196. Lake Ontario Waterkeeper expressed concern about BWXT's release limits for uranium. CNSC staff explained that BWXT's current release limit for uranium was based on a dose constraint to a member of the public of 50 µSv/year. CNSC staff further explained that, since the EBRL calculations are based on the CCME Protection of Aquatic Life Guidelines, the release limits are based on the effects on the biota and the environment to reflect not only the radiological impact, but also the total biological impact of uranium. As such, the release limits are developed by working backwards from the guidelines to determine the release limit as a concentration.
197. Asked to explain the precautionary principle and how it was used in setting release limits, CNSC staff noted that the precautionary principle was set in Canadian environmental law via the [Canadian Environmental Protection Act, 1999](#) and that the principle stated that, should an important or significant effect be predicted, one should not use scientific uncertainty to avoid mitigating that effect. CNSC staff also stated that the CNSC expected licensees to implement the precautionary principle in respect of their operations and should also implement the principle of using the “best available technology economically achievable” (BATEA) to prevent releases to the environment releases.

¹⁸ CNSC Regulatory Document REGDOC-2.9.2, *Controlling Releases to the Environment*, under development.

198. K. Sato raised concerns about the reporting of action level exceedances. Noting that action levels are set much lower than release limits, CNSC staff explained that, per their licence conditions, licensees were required to report to the CNSC any action level exceedances. CNSC staff reviews a licensee's investigation report containing information about the remediation measures taken to prevent reoccurrence. The implementation of the remediation measures is then verified during compliance inspections.
199. The Commission asked BWXT to explain the difference in action levels between BWXT's Toronto and Peterborough facilities. The BWXT representative explained that action levels were process-specific and that some action levels were different because of the difference in operations between the two facilities. The Commission is satisfied on the points made in respect of action levels.
200. In its intervention, the Committee for Future Generations raised the issue about the potential for contaminants in BWXT's wastewater releases. CNSC staff explained that BWXT adds a flocculent to the wastewater to ensure the settling of heavy particles, such as uranium, so that only clean water is released. Test results show that precipitated solids are not considered a risk in respect of BWXT's wastewater.

BWXT Toronto Facility

201. The BWXT Toronto facility performs continuous in-stack sampling for uranium and carries out boundary air monitoring as a secondary measure. BWXT submitted that an independent laboratory analyzes and verifies the in-stack samples, and that the results are compared to previous results, as well as relevant internal control and action levels. BWXT also carries out uranium soil sampling at multiple locations on and near the facility.
202. E. Underwood and M. Stiles raised concerns about BWXT's dispersion models and the potential for contaminant deposition in vegetable gardens near the Toronto facility. The BWXT representative explained that BWXT's air and soil monitoring results around its Toronto facility were consistent with the stack emission measurements. CNSC staff explained that IEMP results demonstrated a lack of uranium accumulation around BWXT's Toronto facility and that uranium in soil concentrations were consistent with MECP background levels for uranium.
203. Dr. Ragheb and J. D'Orsay raised the issues of flooding and surface water management. In response, the BWXT representative explained that, in 2018, BWXT had experienced heavy rainfall and flooding. Despite the facility losing power, BWXT was able to treat, sample and release the water into the municipal sewer system since the contaminated water was contained entirely within the facility's sump. Since the usual processes were followed, BWXT did not need to carry out any off-site groundwater monitoring. The Commission was satisfied with the information provided on this topic.

BWXT Peterborough Facility

204. The Peterborough facility performs continuous in-stack uranium and beryllium sampling. An independent laboratory analyzes and verifies the in-stack samples on a weekly basis. The results are compared to previous results and relevant action levels, with corrective actions generated, as appropriate.
205. The BWXT Peterborough facility has a beryllium safety program governed by the [CLC, Part II](#) and the [Canada Occupational Health and Safety Regulations](#). BWXT added that the permitted concentration of beryllium release was determined by the [Ontario Environmental Protection Act](#) and [O. Reg. 419/05, Air Pollution – Local Air Quality Regulation](#).
206. CNSC staff reported that, should BWXT be authorized to carry out pelleting in Peterborough, uranium emission levels at the Peterborough facility were expected to increase to a level similar to those around the Toronto facility. CNSC staff added that this increase in the uranium emissions was not expected to have an adverse effect on the health and safety of people or the environment. CNSC staff's assessments also show that the proposed pelleting operations would not pose any additional risk of groundwater contamination.
207. Asked by the Commission about whether BWXT had other means to monitor the Peterborough stack emissions, the BWXT representative explained that, in case of an event, BWXT could remove the stack filter and send it for immediate analysis. The BWXT representative added that in the event of suspected beryllium contamination, BWXT could set up workplace air monitoring within the facility.
208. L. Bates and J. Dufresne expressed concerns about the management of storm water, floods and spills at the Peterborough facility. The BWXT representative explained that BWXT had a raised berm around the uranium pellet handling area to prevent any surface water uranium contamination, noting that the berm was designed to manage well over the 100-year storm criteria of 100 millimetres of rain in 24 hours. The BWXT representative also explained that legacy infrastructure in Peterborough – for which GE Hitachi retains overall responsibility as property owner – is not considered a credible pathway for contaminants to enter the environment. The Commission is satisfied that BWXT has adequate measures in place at the Peterborough facility to manage storm water.
209. The intervention from E. Straka raised the issue of a contaminated groundwater plume originating from BWXT's Peterborough facility. The MECP representative explained that a groundwater plume of trichloroethylene originating from GE Hitachi's past activities was present at that site and that this plume was being appropriately managed by GE Hitachi. The Commission is satisfied that this trichloroethylene groundwater plume is not a result of BWXT's CNSC-licensed activities and that it is being appropriately managed.

210. A. Hamilton and Lake Ontario Waterkeeper raised the issue of downstream monitoring for uranium and of the potential contamination of waterbodies in the vicinity of the Peterborough facility. CNSC staff reported that the estimated concentration in effluent for BWXT's Peterborough facility was
- 0.0002 mg/L compared to a screening criteria of 0.02 mg/L for uranium; and
 - 0.0004 µg/L compared to a screening criteria of 4 µg/L for beryllium.

The Commission notes that the concentration in effluent for uranium and beryllium is 2 and 4 orders of magnitude below the screening criteria, respectively.

211. The CNSC's IEMP showed that the uranium concentration in the Ontonabee River was 0.34 µg/L. CNSC staff noted that the Province of Ontario and the Ontonabee Region Conservation Authority were also monitoring the watercourses in the vicinity of the Peterborough facility, and that their results showed 3.63 µg/L for uranium with a limit of 15 µg/L recommended in the CCME Guideline for the Protection of Aquatic Life. CNSC staff stated that these concentrations have been shown to be protective of human health and the environment, and also show that BWXT's Peterborough operation has not had a measurable impact on the health of nearby waterbodies. The Commission is satisfied that monitoring shows that uranium in waterbodies in the vicinity of the Peterborough facility is at safe levels.

212. Many intervenors in Peterborough, including individuals and groups, and most notably CARN, expressed concerns about beryllium emissions from BWXT's Peterborough facility. The BWXT representative provided the following information on this topic:
- The Peterborough facility has three separate stacks that service the beryllium work area and the stacks are continuously monitored.
 - Beryllium stack monitoring results would indicate if a filter had been incorrectly installed or if it was not working.
 - Following the 2017 beryllium event, BWXT implemented strict and formal means for purchasing critical-to-safety components and ensuring that these are deployed correctly.
 - Solid and liquid wastes contaminated with beryllium are packed into containers and transferred to an approved hazardous waste contractor.
 - Although fugitive emissions are not monitored at the facility, workplace air is monitored in both the beryllium and uranium work areas and these measurement results are very low.

Assessment of Effluent and Emissions Control (Releases)

213. On the basis of the information provided for this hearing, the Commission is satisfied that BWXT has and will continue to have adequate programs in place for the control of effluent and emissions at its Toronto and Peterborough facilities to protect the environment and meet regulatory requirements.

214. The Commission anticipates that BWXT will implement CSA N288.8-17 during the renewed licence period. Although no longer a standalone licence condition under the proposed licence, the Commission notes that proposed licence condition 9.1 includes the notification of the Commission within 7 days when the licensee becomes aware that an action level has been reached.
215. The Commission also expects BWXT to implement REGDOC-2.9.2 and revise its EBRLs, if necessary, as soon as practicable following this REGDOC's approval and publication.

4.9.2 Environmental Management System

216. BWXT's EMS serves as a management tool to integrate all of BWXT's environmental protection measures in a documented, managed and auditable process. BWXT maintains an EMS that describes and manages the activities associated with BWXT's protection of the environment. BWXT has adequately implemented the specifications of [REGDOC-2.9.1, Version 1.1](#) in respect of its EMS.
217. BWXT has established and incorporated technology-based performance targets for uranium and beryllium discharges to water to demonstrate continuous improvement and pollution prevention. The targets were established by assessing the treatment systems and control measures in place to control releases of nuclear and hazardous substances to the environment.
218. In regard to the sustainability of BWXT's operations as raised by D. Jordan, the BWXT representative explained that, for BWXT, sustainability meant that it could operate without a long-term impact on the environment and that BWXT demonstrated its commitment to sustainability through the absence of a build up of contaminants in its host communities. CNSC staff stated that the CNSC's regulatory framework requires licensees to continually optimize and improve their processes to reduce environmental releases and to consider the BATEA principle in their operations. The CNSC can require licensees to use adaptive measures should their operations be considered to be below modern standards.

Assessment of *Environmental Management System*

219. Based on the evidence heard during this hearing, the Commission is satisfied that BWXT has maintained, and will continue to maintain, an adequate EMS throughout the renewed licence period. The Commission is satisfied that the evidence shows that BWXT will continue to adequately implement REGDOC-2.9.1, Version 1.1 in respect of its EMS.

4.9.3 Environmental Monitoring

220. Per its current licence condition 10.3, BWXT is required to monitor releases of hazardous substances resulting from its operations. BWXT's environmental monitoring programs meet the specifications of CSA N288.4-10, with these programs showing that emissions of nuclear and hazardous substances at both the Toronto and Peterborough facilities are properly controlled.
221. BWXT's gamma monitoring program shows that the annual public dose attributable to BWXT's facilities remained below the prescribed public dose limit of 1 mSv/year and ALARA. The CNSC's compliance verification activities showed that BWXT's environmental monitoring programs meet licensing requirements.
222. Several intervenors, including C. Kalevar, OCAA, L. Griffin and CAPE, raised the issue of BWXT's self-reporting of environmental monitoring results. Addressing these concerns, CNSC staff stated the following:
- CNSC staff verifies all environmental monitoring programs against the same recognized standards.
 - BWXT's monitoring program results are verified through the use of an external laboratory and periodic third-party review of stack emissions. Stack emissions are monitored daily at the Toronto facility and weekly at the Peterborough facility.
 - The CNSC's compliance verification activities review the adequacy of monitoring programs, including the maintenance and calibration of BWXT's monitoring equipment.
 - Stack emissions inform the modelling which identifies whether there is a need for ambient air monitoring and the concentrations of hazardous substances in soil. CNSC staff stated that, should there be a disagreement between modelling and monitoring results, it would require the licensee to investigate the cause(s) for this.
 - Soil monitoring is required around the Toronto facility to confirm that uranium emissions remain low. However, due to the low uranium emissions at the Peterborough facility, soil monitoring is not justified.
 - CNSC staff verifies BWXT's monitoring results through the IEMP.

BWXT Toronto Facility

223. Soil sampling is conducted annually at the BWXT Toronto facility. Surface soil is sampled from 49 locations in accordance with a documented sampling plan developed by a third-party consultant. Soil samples are analyzed by an independent laboratory and the average uranium-in-soil concentrations near its Toronto facility were well below the CCME [*Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*](#) (Soil Quality Guidelines). Any indication of increased uranium levels would be investigated by BWXT. CNSC staff submitted that BWXT's soil sampling near the Toronto facility has shown that the facility's operations do not contribute to the accumulation of uranium in surrounding soil.

224. R. Mound, C. Muir and P. Medeiros expressed concerns about the validity of emission monitoring results at the Toronto facility. The BWXT representative responded that stack emissions and five monitors at the facility's boundary were monitored by BWXT 24 hours a day, with stack filters analyzed daily by a third-party laboratory. CNSC staff validate the monitoring data during its compliance verification activities. The Commission is satisfied with the information provided on this point.
225. The Commission enquired about an elevated uranium sampling result at the Toronto facility boundary in 2016. The BWXT representative explained that, during this incident, one of the five boundary monitors of the Toronto facility failed to measure for the prescribed monitoring period. Upon verification of the other four boundary monitors, BWXT did not find any indication of any other unusual results and there had been no odd operational events that could explain the 2016 result. It was also noted that boundary monitoring was a secondary monitoring measure, with stack monitoring the primary method by which BWXT monitored emissions. The Commission is satisfied with the information provided on this issue and that the elevated uranium sampling result did not represent a loss of control of BWXT's operations.
226. U. Medeiros raised the issue of air quality monitoring during the transfer of UO_2 into the Toronto facility. The BWXT representative reported that the UO_2 was received in non-dispersible form inside drums that were offloaded one at a time out of a transport trailer. The UO_2 offloading operation as well as the transport of fuel pellets has no potential for dust generation, and it is the case as well with pellets being transported out of the plant. The Commission is satisfied on this point.

BWXT Peterborough Facility

227. The annual average atmospheric emissions of uranium discharged from the Peterborough facility during the current licence period was $0.001 \mu\text{g}/\text{m}^3$ which is below the MECP annual [Ambient Air Quality Criteria](#) (AAQC) of $0.03 \mu\text{g}/\text{m}^3$ at the point of release. As such, BWXT is not required to carry out soil sampling at its Peterborough facility.
228. E. Underwood raised the concern that the Peterborough facility only has a single environmental monitoring point. CNSC staff explained that the entire Peterborough facility is under negative pressure and that all of the air in that facility goes through the stacks. As such, stack monitoring results are considered to be representative of the air quality exiting the entire facility and CNSC staff is satisfied that the Peterborough facility is meeting the MECP AAQC.
229. In considering the intervention from CAPE, the Commission asked about the monitoring frequency for the different measurements to ensure an appropriate representation of BWXT's emissions. CNSC staff indicated that it was sufficient to continuously monitor stack emissions because contaminant concentrations beyond the

stack would be negligible if the stack emissions remained controlled. CNSC staff added that the objective of soil monitoring was to detect accumulation over the long term and that the sampling frequency was structured in such a way to be able to detect long-term trends. The beryllium emissions from the Peterborough facility are on the order of 15 mg/year, which would cause 15 kg of soil to increase by 1 mg of beryllium.

230. Many intervenors in Peterborough, including individuals, CARN, CAPE, Peterborough Public Health, expressed concerns about environmental monitoring in Peterborough should BWXT's pelleting operations be authorized. The following information was provided on this topic during the hearing:
- Should the pelleting request be authorized, BWXT's updated environmental monitoring program would be similar to that at the Toronto facility and would include boundary ambient air monitoring and soil sampling for uranium, as described in a Consolidated Environmental Risk Assessment Report.
 - In CMD 20-H2, CNSC staff recommended the inclusion of facility-specific licence condition 15.1 requiring BWXT provide the CNSC with a Facility Modification plan that details how BWXT will update its environmental monitoring program at the Peterborough facility.
 - BWXT's updated environmental monitoring program would be assessed against the specifications of CSA N288.4-10 and the updated program would require ambient air monitoring.
 - Given the current absence of soil monitoring in Peterborough, BWXT is expected to conduct a baseline soil survey based on CSA N288.4-10 and N288.6-12 prior to commencing pelleting operations in Peterborough, should this activity be authorized.
 - Since the perimeter of the Peterborough facility is larger than that of the Toronto facility, the number of soil sampling points would likely be higher than the 49 points in Toronto. The BWXT representative submitted that the determination of the number and location of sampling points would be done by a third-party expert with the involvement of the public including the community liaison committee and Peterborough Public Health.

The Commission is satisfied that BWXT will be required to update its environmental monitoring program at its Peterborough facility prior to commencing fuel pelleting operations at that site. The Commission is satisfied with CNSC's staff's proposed regulatory oversight in this regard.

Independent Environmental Monitoring Program (IEMP)

231. The CNSC has implemented its [IEMP](#) to verify that the public and the environment around licensed nuclear facilities are safe. It is separate from, but complementary to, the CNSC's ongoing compliance verification program. The IEMP involves taking samples from public areas around the facilities, and measuring and analyzing the

amount of radiological (nuclear) and hazardous substances in those samples. CNSC staff collect the samples and send them to the CNSC's independent laboratory for testing and analysis.

232. CNSC staff carried out sampling through the IEMP in respect of BWXT's Toronto facility in 2016 and in respect of both BWXT facilities in 2014, 2018 and 2019. During these sampling campaigns, air, water and soil samples were collected in publicly accessible areas near the facilities and were analyzed for uranium and beryllium. IEMP results were consistent with BWXT's environmental monitoring results for both facilities, demonstrating that BWXT's environmental protection program protected the health of persons and the environment and that there were no expected health impacts resulting from BWXT operations.
233. The Commission notes that the 2019 IEMP results were released to the public on January 22, 2020 and that many intervenors expressed a concern about the short period of time that the public had to review these results prior to this hearing. CNSC staff reported that the 2018 IEMP results were considered in CNSC staff's assessment of BWXT's licence renewal application. Although the 2019 IEMP results became available after the submission of CMD 20-H2, they were published for transparency reasons prior to this licence renewal hearing. The Commission is of the view that the publishing of IEMP results by CNSC staff should be timelier, especially prior to a hearing, to ensure that the public has sufficient time to consider them.
234. The Commission asked CNSC staff to explain the reason why IEMP samples were collected at the same time of the year for a facility. CNSC staff responded that there could be variability in sampling results due to weather conditions such as rain, frost and snow melts. Soil conditions also had to be considered to ensure that the ground was not overly muddy, frozen or wet. The Commission encourages CNSC staff to continue sampling at specific sites at approximately the same time of year to ensure reproducibility of results.
235. Noting the concerns raised about the adequacy of air sampling at the Toronto facility, CNSC staff stated that IEMP sampling was done in publicly accessible areas around the Toronto facility, taking buildings and wind direction into consideration. The Commission suggested that, since some residents live closer to the Toronto facility than the IEMP sampling points, CNSC staff should consider setting sampling points closer to that facility.
236. In considering B. Blaney's intervention, the Commission asked whether BWXT was informed in advance about the IEMP sampling. CNSC staff responded that all IEMP sampling is performed on a planned schedule. Licensees are notified about when sampling is to take place but host communities are not given prior notification of upcoming IEMP sampling. To enhance transparency and trust, the Commission requests CNSC staff to provide host communities prior notice about its sampling schedules.

237. The Commission considered J. Cosgrove's intervention and asked for information regarding a question related to a two-kilometer buffer zone for environmental monitoring around BWXT's Peterborough facility. CNSC staff explained that there was no buffer zone around BWXT's Peterborough facility but that the IEMP sampling was performed in a two-kilometer radius around the facility. The Commission was satisfied with the information provided on this topic.
238. In its intervention, Peterborough Public Health submitted that additional IEMP sampling should be carried out in Peterborough to help restore public confidence and trust. CNSC staff agreed that additional monitoring was needed in Peterborough and that CNSC staff will engage with the Indigenous communities, members of the public and local authorities to increase the community's trust in the monitoring and sampling processes.

IEMP results for beryllium in soil concentration in Peterborough

239. Environmentally available concentrations of beryllium can be derived through partial or full digestion of soil samples. Beryllium concentrations derived through full digestion include beryllium contained in siliceous and zircon matrices, and therefore result in higher beryllium concentrations than those derived through partial digestion. Of importance is that the beryllium concentration in siliceous and zircon matrices is not considered bioavailable and, therefore, federal and provincial soil quality standards and guidelines for beryllium are based on the partial digestion of soil samples. The CCME [Soil Quality Guidelines](#) provides for beryllium levels that are protective of the environment (4.0 mg/kg) and human health (75 mg/kg). In its [provincial standard](#), the MECP cites the upper limit of natural background for beryllium in Ontario as 2.5 mg/kg.
240. During the current licence period, the IEMP results for the concentration of beryllium in soil in the vicinity of the Peterborough facility increased from 0.7 – 1.1 mg beryllium / kg soil in 2014, to 1.08 – 1.34 mg/kg in 2018 and 1.10 – 2.34 mg/kg in 2019. These concentrations were derived through the full digestion of soil samples that, as noted above, results in higher beryllium concentrations.
241. In considering several interventions, including that of Dr. J. Aherne, the Commission expressed the concern about the comparison of IEMP beryllium results obtained by different sampling protocols and of comparing these results to standards using a different methodology for the derivation of concentration. CNSC staff explained that additional sampling in Peterborough would help verify if the variances in beryllium concentration reflected improvements in the CNSC's sampling protocols, analytical methodologies or an increase in beryllium concentration in soil.

242. The majority of intervenors in Peterborough interpreted the IEMP data as showing that there was a trend showing an increasing beryllium concentration in soil near the BWXT Peterborough facility. Especially concerning to intervenors was that, in 2019, the beryllium concentration on the property of the Prince of Wales Public School (sampling point GP05-S-L5) was the highest of all the points sampled at 2.34 ± 0.47 mg/kg. On this issue, the following information was provided:

- The CNSC's sampling procedures have changed and improved since 2014 resulting in higher uncertainty in earlier results.
- All IEMP beryllium concentration results were within the provincial background level of 2.5 mg/kg and were analyzed using the total digestion method.
- The MECP's review of IEMP results for beryllium concentration in soil at the Prince of Wales Public School indicated that the results were reflective of BWXT's low emissions since the beryllium concentration remained at background levels after 50 years of operations. The MECP's review considered BWXT's emissions and the predominant wind direction near the facility.
- The MECP was of the view that the variability in the IEMP results could be explained by CNSC staff's changes in the sampling and analytical methodology, as well as the natural variability of soil.

243. Individuals and groups, including CARN, P. Harris and S. Daniels, raised the issue of beryllium accumulation in soil in Peterborough. CNSC staff explained that

- accumulation of contaminants can occur when contaminants are deposited by air;
- fossil fuel emissions are also contributors to beryllium in the environment;
- soil properties such as pH, oxidation-reduction potential and soil porosity affect the potential for contaminant leaching;
- soils containing clay are most likely to retain contaminants as compared to soil composed of silt or sand;
- when deposited on hard surfaces, contaminants are transported by rain water; the advantage of soil samples is that contaminants are confined to the first five centimetres of soil; and
- beryllium soil concentration at a particular location could be the result of airborne deposition, but was ultimately determined by many factors such as the distance from the emission source; wind frequency and direction; local topography; the presence of vegetative cover; removal process due to the chemistry and soil types; particle size and solubility; and soil disturbance.

Beryllium Resampling in Peterborough in July 2020

244. At the close of the oral component of the hearing on March 6, 2020, the Commission deliberated on the matter of the licence renewal, including the issue of the beryllium in soil concentration in Peterborough. The Commission was not satisfied with the

information it had received on the record regarding the apparent trend of increasing beryllium concentration in soil near the BWXT Peterborough facility. Per the [Notice of Continuation of Public Hearing](#) published on April 6, 2020, the Commission directed CNSC staff to carry out expedited soil resampling for beryllium of properties adjacent to BWXT's Peterborough facility, with a special focus on the property where the Prince of Wales Public School is located. The Commission also directed CNSC staff to carry out an analysis of the results with the aims of clarifying the risk that the seemingly increasing beryllium levels may present to the health and safety of the public and the environment, and potentially identifying the reasons for the increase and the source of the beryllium. The original deadline for the submission of this information to the Commission was August 31, 2020.

245. On July 29, due to the ongoing COVID-19 pandemic and the need for heightened health and safety protocols, CNSC staff requested a two-month extension to complete the resampling and analyses. The CNSC President, as a panel of the Commission on procedural matters, approved this request setting the deadline for CNSC staff's submission as October 30, 2020. CNSC staff submitted [CMD 20-H2.D](#) to the Commission on October 28, 2020.
246. In CMD 20-H2.D, CNSC staff provided the following information in respect of the beryllium resampling near the BWXT Peterborough facility:
- Expedited soil resampling for beryllium in Peterborough was carried out on July 21-22, 2020. The resampling took into considerations all COVID-19 health and safety protocols, as well as restrictions.
 - All concentrations of beryllium in soil derived by partial digestion were in the range of Ontario's natural background for beryllium of up to 2.5 mg/kg and below the most restrictive CCME Soil Quality Guideline of 4.0 mg/kg.
 - The maximum concentration of beryllium derived by partial digestion of soil, 0.64 ± 0.13 mg/kg, was found in a residential park. This concentration is one sixth of Ontario's natural background.
 - The concentration of beryllium in soil derived by total digestion of samples at the Prince of Wales Public School ranged from 1.45 ± 0.26 to 1.95 ± 0.35 mg/kg with an average of 1.69 mg/kg. This is lower than the 2019 result of 2.34 ± 0.47 mg/kg measured in 2019.
 - CNSC staff's review of beryllium concentrations measured in 2014 to 2020 are not statistically different and cannot be used to support any conclusions on the increase of beryllium in soil in Peterborough in the vicinity of the BWXT facility.
 - CNSC staff committed to include Indigenous communities, the public and municipal officials in future IEMP activities to help address the concerns that were raised during the hearing and to foster public trust in the IEMP and the CNSC's regulatory activities.

247. On November 13, 2020, the Commission continued its deliberations on the licensing matter after receipt of the additional information, via videoconference. The following paragraphs reflect the Commission's consideration of the information provided by CNSC staff in respect of the Commission's direction in the April 6, 2020 Notice of Continuation of Hearing.
248. Following its submission of CMD 20-H2.D, several typographical errors and several calculation errors – as detailed in Appendix A of that CMD – were identified. Therefore, CNSC staff submitted to the Commission [CMD 2-H2.E](#) on December 7, 2020, which provides the following:
- Clarification of the units used in the equations A.1 and A.2.
 - Correction of the typographical errors in respect of equations A.3 and A.4.
 - Revision of the calculations in respect of equation A.3 and the estimated concentration of airborne beryllium from BWXT's stacks in Peterborough.
 - The revision of the calculated mass of airborne beryllium in equation A.4 as it is a function of the concentration of airborne beryllium.

Based on CNSC staff's revised calculations, the hypothetical concentration in air and mass of airborne beryllium changes from 1.28 $\mu\text{g}/\text{m}^3$ to 0.65 $\mu\text{g}/\text{m}^3$ and 133 g to 67.34 g, respectively.

249. The Commission is satisfied that
- CMD 20-H2.D responded to the Commission's requests for additional information per the Notice of Continuation of Hearing.
 - The revised calculations CMD 20-H2.E do not change CNSC staff's findings in respect of the protection of the health and safety of people and the environment in the vicinity of BWJXT's Peterborough facility. The revised calculations show that the hypothetical beryllium emissions from the Peterborough facility are half of those reported in CMD 20-H2.D.
 - Soil quality in the vicinity of BWXT's Peterborough facility has not been negatively impacted through emissions from BWXT's operations.
 - The data show that there is no risk to the environment and human health at the Prince of Wales Public School and on other properties adjacent to BWXT's Peterborough facility.
 - The data show that all concentrations of beryllium in soil near the BWXT Peterborough facility are in the range of natural background in Ontario (2.5 mg/kg) and below the CCME Soil Quality Guidelines (4.0 mg/kg).
250. The Commission is satisfied that the resampling data show that there has not been a statistically significant increase in the concentration of beryllium in soil near the Peterborough facility. Nevertheless, and although the Commission agrees with CNSC staff's finding in respect of the total digestion results on page 15 of CMD 2-H2.D that "*...the measured concentrations of beryllium are not statistically different and, therefore, these data cannot be used to support any conclusions on potential trends of beryllium levels in soil,*" the Commission notes that the analysis carried out by CNSC staff was not a trend analysis.

251. Further on trend analysis, the Commission considered the following in its decision making on this issue:
- A statistically significant trend can be present with no statistical variance in analysis.
 - Since the measured concentrations of beryllium in soil are within Ontario natural background levels, assessing a meaningful trend is challenging.
 - Since CNSC staff used the total digestion method to assess beryllium soil concentration from 2014 to 2019, assessing a trend and comparing this to current standards would not be meaningful.
252. Since partial digestion of soil better reflects the bioavailability of beryllium, with limits and standards based on this analysis, the Commission expects CNSC staff to derive all future beryllium in soil concentrations through the partial digestion rather than total digestion of samples.
253. The Commission appreciated the detailed data, including error bars, that were provided in CMD 20-H2.D. The Commission directs CNSC staff to provide the following information in all future CMDs:
- error bars on charts and graphs;
 - an explanation on sampling and analytical techniques, especially if any changes to these take place; and
 - sources of any equations used for calculations and analyses.

Assessment of *Environmental Monitoring*

254. Based on the information provided, the Commission is satisfied that BWXT has maintained, and will continue to maintain, adequate environmental monitoring at BWXT's Toronto and Peterborough facilities. The Commission understands that BWXT's environmental monitoring program will continue to meet CSA N288-4.10 during the renewed licence period and expects that BWXT will implement updated standards into its program as they are developed.
255. Based on the information submitted by CNSC staff, the Commission is satisfied that that environmental monitoring both within and outside the perimeter of the BWXT's Toronto and Peterborough facilities sites shows that BWXT has and will continue to make adequate provision for the protection of the environment, workers and the public.
256. The Commission is satisfied that the IEMP shows that there is no unreasonable risk to the environment or human health from BWXT's operations in both Toronto and Peterborough.

257. The Commission directs CNSC staff to hold, as soon as practicable, an information session with the Indigenous communities, members of the public and stakeholders in the vicinity of the Peterborough facility in order to share and explain the beryllium resampling results obtained through the IEMP.
258. The Commission directs CNSC staff to carry out an IEMP campaign near the BWXT Peterborough facility in 2021. Recognizing the importance of trust building and communication with host communities, the Commission directs CNSC staff to engage Indigenous communities, members of the public and stakeholders including, Dr. J. Aherne, CARN and municipal officials, in future Peterborough IEMP sampling campaigns. The Commission also directs CNSC staff to engage with stakeholders near the Toronto facility in respect of IEMP sampling.
259. The Commission expects BWXT to continue to build trust and relationships with its host communities in the renewed licence period. BWXT is encouraged to engage with Indigenous communities, members of the public and stakeholders in respect of its sampling activities near the Toronto and Peterborough facilities.
260. The Commission is satisfied that BWXT's stack monitoring result shows that the emissions releases from its facilities are low and do not pose a risk to the health and safety of the environment or persons. Nevertheless, the Commission directs BWXT to carry out annual soil sampling for uranium and beryllium near its Peterborough facility to confirm that its operations are not contributing to increases of either contaminant in soil.

4.9.4 Environmental Risk Assessment

261. BWXT carried out environmental risk assessments (ERA) for its Toronto and Peterborough facilities in compliance with CSA N288.6-12. The ERAs showed that meaningful human health or ecological effects attributable to BWXT's operations in Toronto and Peterborough were unlikely and that BWXT currently had acceptable environmental programs in place to ensure the protection of the public and the environment.
262. In 2018, BWXT completed a revised ERA for the Peterborough facility to identify any potential health and ecological risks associated with its request to conduct pelleting at that facility. The revised ERA was considered bounding in nature based on the Toronto facility's pelleting operating experience and performance. This revised ERA showed that, should pelleting operations be authorized in Peterborough, emissions of radiological and non-radiological substances would be very low and that the maximum estimated annual effective dose from the facility would remain below the public annual dose limit of 1 mSv/y.
263. CNSC staff reported that its review of the 2018 Peterborough facility ERA found that the risks attributable to emissions of radiological and non-radiological substances from BWXT's operations in Peterborough, including the addition of pelleting operations, were predicted to be very low and that no adverse effects to human health and non-human biota were expected.

264. CNSC staff submitted that the ERA for both facilities assessed BWXT's management of rain water and flooding. Off-site contamination, even in the event that BWXT would not be able to contain all the rain water, was not expected at either the Toronto or Peterborough facilities. However, should BWXT have off-site rainwater releases, BWXT would be required to report this to the CNSC and to sample the locations of outflow to verify that the environment and human health remained adequately protected.
265. ERAs consider uncertainties associated with climate change by evaluating the conservatism measures that are included in environmental modelling. CNSC staff explained that licensees update ERAs and conservatism measures in response to the results of the safety analyses – which assess external events and hazards – and are updated every five years. Licensees also consider lessons learned and OPEX from abnormal events in their ERAs.
266. The Justice, Peace and Integrity of Creation Office of the Sisters of St. Vincent de Paul raised additional concerns in respect of climate change and dispersion modelling. The BWXT representative reported that dispersion modelling for uranium is performed for both facilities and, for beryllium, it is performed for the Peterborough facility. This is a requirement of BWXT's MECP environmental compliance approval and BWXT uses an MECP-prescribed meteorological data set for the modelling. The meteorological data considers historical data, is based on averages over time and includes wind speed, wind direction and atmospheric stability. The Commission is satisfied that BWXT has adequately considered climate change and dispersion modelling in its ERAs.
267. Based on the information submitted by CNSC staff, the Commission is satisfied that that the ERAs show that BWXT has and will continue to have adequate environmental programs in place for the protection of the environment, workers and the public in the renewed licence period.

4.9.5 Protection of the Public

268. BWXT is required to demonstrate that the health and safety of the public is protected from exposures to radiological and hazardous substances released from its Toronto and Peterborough facilities. BWXT's effluent and monitoring programs are used to confirm that releases from its facilities will not adversely effect public health.
269. Based on the evidence considered in sections 4.7 and 4.9.3 of this Record of Decision, the Commission is satisfied that radiation monitoring results verified that the dose to the public resulting from operations at BWXT's Toronto and Peterborough facilities was below the annual dose limit of 1 mSv per year for any member of the public. The Commission is also satisfied that monitoring has shown that BWXT has controlled the release of non-radiological contaminants throughout the current licence period and that releases from both facilities did not adversely impact the quality of the local environment.

270. Several intervenors in Toronto, including P. Medeiros, C. Kalevar and A. Tilman, raised concerns about the potential for a higher incidence of cancers in the Davenport neighbourhood near the BWXT facility. CNSC staff stated that the environmental protection reviews that it conducted had not found any significant differences in cancer rates within the Davenport area as compared to other areas in Toronto.
271. Further on this topic, the Toronto Public Health representative reported that several health status indicators were monitored across all neighbourhoods in Toronto and that the cancer incidence rates in the Davenport area were similar to the rest of Toronto, and lower than the rest of Ontario. Lung cancer rates and other respiratory diseases, hospitalizations and mortality were lower in areas near BWXT Toronto facility than in the rest of Toronto. The Toronto Public Health representative stated that the referenced data is available on the [Toronto Public Health website](#), and statistics related to early childhood development, fertility and reproductive outcomes is also available on the same site.
272. U. Medeiros and P. Medeiros raised concerns about non-radiological health effects from uranium exposure. CNSC staff explained that no health effects other than kidney damage had been consistently found in humans after inhaling or ingesting significant quantities of uranium, significantly higher than those found in the vicinity of the BWXT facilities. Based on the information provided on this issue, the Commission is satisfied that there is no evidentiary basis before it on which to conclude that the uranium emissions from the Toronto BWXT facility are contributing to adverse health effects in members of the public living near the facility.
273. Several intervenors, including CARN, raised concerns about increased rates of cancers and other illness near BWXT's Peterborough facility. The Peterborough Public Health representative reported that Peterborough had rates of cancers typical for Ontario, with the exception of elevated lung cancer rates. The lung cancer rates have been related to higher smoking rates in Peterborough than the average smoking rates in Ontario.
274. J. Cosgrove's intervention raised a concern about the safety of Peterborough's drinking water and requested additional information in this regard. CNSC staff reported that the drinking water in Peterborough came from the Ontonabee River, and that the MECP had three surface water monitoring stations in Peterborough and inspected the Peterborough drinking water facility. BWXT's ERA found that there was no evidence or indication that groundwater was a pathway for BWXT's contaminants to enter drinking water and that storm and sewer water contributions in this regard were far below CCME guidelines protective of human health and aquatic species. The Commission is satisfied that the evidence shows that BWXT's operations in Peterborough are not adversely impacting drinking water in that city.
275. As noted in section 4.9.3 of this Record of Decision, the Commission expressed its concerns regarding an apparent increasing beryllium concentration in soil at properties adjacent to the Peterborough facility and directed CNSC staff to carry out expedited soil resampling for beryllium with a special focus on the property where the Prince of Wales Elementary School is located.

276. Based on the information considered by the Commission on the record for this hearing, the Commission is satisfied that the beryllium resampling results in Peterborough demonstrate that the public remains protected. The Commission is satisfied that the children and staff at the Prince of Wales Elementary School remain adequately protected.
277. The Commission is satisfied that BWXT's programs to mitigate risk to members of the public from its operations at the Toronto and Peterborough facilities are adequate.

4.9.6 Conclusion on Environmental Protection

278. Based on the assessment of the application and the information provided on the record at the hearing, the Commission is satisfied that, given the mitigation measures and safety programs that are in place to control hazards, BWXT will provide adequate protection to the health and safety of persons and the environment throughout the renewed licence period for both its Toronto and Peterborough facilities.
279. The Commission is satisfied that BWXT meets the requirements of the GNSCR and the RPR in respect of protecting the environment and the health and safety of persons.
280. The Commission is satisfied that the BWXT environmental protection programs adequately meet the specifications of REGDOC-2.9.1 and that BWXT will implement REGDOC-2.9.1, Version 1.1 in the renewed licence period.

4.10 Emergency Management and Fire Protection

281. The emergency management and fire protection SCA covers the measures for preparedness and response capabilities implemented by BWXT in the event of emergencies and non-routine conditions at the Toronto and Peterborough facilities. This includes nuclear emergency management, conventional emergency response, and fire protection. BWXT's emergency management and fire protection program is required to meet the requirements set out in the [Class I Regulations](#).
282. Per its current licence conditions 11.1 and 11.2, BWXT is required to maintain and implement emergency management programs for on and off-site events, as well as a fire protection program for the facilities. CNSC staff rated BWXT's performance in this SCA as "satisfactory."
283. CNSC staff's compliance verification activities during the current licence period showed that BWXT's emergency management program meets the specifications of [REGDOC-2.10.1, Nuclear Emergency Preparedness and Response, Version 2](#).

4.10.1 Emergency Management

284. BWXT submitted that both the Toronto and Peterborough facilities had emergency response plans in place that describe the actions to be taken to minimize health and environmental hazards which may result from fires, explosions, release of hazardous materials, or other emergencies.
285. BWXT reported that all employees were trained and had refreshers on emergency response through drills which included fire prevention measures, emergency situation responses, emergency evacuation routes and responsibilities. New employee orientation includes awareness training and emergency responders are provided with the level of training necessary to allow them to perform their designated functions.
286. BWXT conducts a full-scale exercise at each facility every three years, adding that the offsite emergency response organizations necessary to mitigate the consequences of the exercise scenarios were invited to participate in these exercises. BWXT also added that the primary responders for the facilities, Peterborough Fire Services and Toronto Fire Services, visited both facilities for familiarization tours annually.
287. BWXT submitted that it addressed areas for improvement identified by CNSC staff following an emergency response exercise inspection in October 2016. The Toronto emergency response program was revised to address CNSC staff comments and further implement the REGDOC-2.10.1, Version 2. This included the establishment of a designated Emergency Operations Centre in Toronto, which is equipped with the tools and technology required to respond to an emergency event. BWXT is revising the emergency program for BWXT's Peterborough facility to implement similar improvements to those implemented at the Toronto facility.
288. Several intervenors, including the OCAA, raised concerns about the potential for a nuclear emergency at the BWXT Toronto facility. CNSC staff submitted that BWXT processes ceramic-grade natural and depleted UO₂, which is an industrial operation. BWXT's operations do not include nuclear reactions or the processing of enriched uranium and, for this reason, there is no possibility of criticality events at the facility.
289. Further on nuclear emergencies, the BWXT representative explained that, even if there was an event with the potential for the release of uranium from the Toronto facility, there were no credible accident scenarios that would trigger the criteria for public sheltering or public evacuation according to the Ontario [*Provincial Nuclear Emergency Response Plan*](#). The Commission is satisfied that an emergency requiring sheltering or evacuation is not a credible event in respect of BWXT's operations.
290. In respect of evacuation requirements, the BWXT representative stated that some events involving the hydrogen tank in Toronto could necessitate an evacuation. The BWXT representative further added that the evacuation response would be similar to that of an industrial safety hazard at any industrial facility and that the Toronto Fire Services would implement its protocols to initiate a community response.

291. J. Gibb raised a concern about the potential for dust explosions at BWXT's Toronto facility. The Deputy Fire Chief of Operations for Toronto Fire Services responded that Toronto Fire Services personnel were trained to respond to dust explosions and that such an event was included in the emergency response plan for the BWXT Toronto facility.
292. In relation to N. Lato's concern regarding emergency risk management at BWXT's Peterborough facility, the Commission asked for information on how Peterborough Fire Service had engaged with BWXT on this issue. The Fire Chief of the Peterborough Fire Services responded that the Peterborough Fire Services met annually with BWXT to review plant operations, discuss emergency plans and response procedures, noting that firefighters did site tours annually and that firefighters participated in training exercises related to the facility.
293. Based on the information provided on the record for this hearing, the Commission is satisfied with BWXT's programs to manage emergencies at BWXT's Toronto and Peterborough facilities and that BWXT will continue to maintain these programs in the renewed licence period. The Commission is satisfied that a nuclear emergency is not a credible emergency scenario in respect of BWXT's operations.

4.10.2 Fire Protection

294. Per its licence condition 11.2, BWXT is required to maintain a fire protection program for both its Toronto and Peterborough facilities. BWXT's fire program was developed in accordance with CSA N393-13. BWXT's program also meets the requirements of the [NBCC](#), the [NFCC](#) and [NFPA 801](#).
295. BWXT submitted that its fire protection systems are inspected and tested in accordance with the NFCC and an established schedule, with an annual third-party review and internal self-assessments conducted at each facility. BWXT updated its fire hazard analysis in 2018 for its Toronto facility and in 2019 for its Peterborough facility.
296. CNSC staff submitted that its compliance verification activities showed that BWXT's fire protection program met applicable requirements and noted that, although BWXT meets the CNSC's performance objectives in respect of CSA N393-13, BWXT will fully implement CSA N393-13 in the proposed licence period. CNSC staff will verify this implementation through its regulatory oversight activities.
297. On the concern raised by J. Gibb and A. Blomme about whether UO₂ could spontaneously ignite, the BWXT representative explained that the UO₂ used by BWXT is not flammable because it is not in metallic form. The BWXT representative also stated that there were no restrictions regarding the use of water for firefighting purposes at the Toronto facility.

298. In respect of the fire training provided to its staff, the BWXT representative explained that each member of BWXT's emergency response team is trained in their roles and responsibilities during an emergency response. BWXT also works closely and participates in exercises with Toronto Fire Services to practice the emergency response plan. The Deputy Fire Chief of Operations for Toronto Fire Services stated that Toronto Fire Services and BWXT jointly prepared the Toronto facility's emergency response plan, with standard operating procedures reviewed annually.
299. C. Muir's intervention raised the issue of worst case scenario in the event of a fire. The BWXT representative reported that most of the assessed credible accident scenarios would produce a release of UO₂ for approximately one hour, while a more severe accident scenario would release sustained concentrations of uranium for two hours. Modelling has shown that uranium concentrations would decrease rapidly with distance from the fire, with the maximum uranium concentration being approximately 6 – 7 mg/m³ at the fence line. The BWXT representative further added that, on this basis, an estimated dose of 3 mSv was calculated for this scenario for an individual standing at the fence line for the 2 hours, with a memo submitted to the Commission in this regard in the context of [CMD 20-H2.1B](#).
300. CNSC staff stated that BWXT's SAR included a worst case catastrophic fire scenario and that BWXT compared its modelled uranium releases against the appropriate internationally-recognized [Emergency Response Planning Guidelines](#). The Commission is satisfied that BWXT has adequately assessed catastrophic fire events and has adequate measures in place in respect of such an event.
301. The Commission is satisfied that, based on the evidence submitted for this hearing, BWXT has adequate measures in place to protect the health and safety of persons and the environment in the event of a catastrophic fire at its facilities.
302. Based on the information provided, the Commission is satisfied that BWXT has provided evidence that it has an adequate fire protection program in place at its Toronto and Peterborough facilities that meets regulatory requirements.
303. The Commission anticipates that BWXT will fully implement CSA N393-13 in the renewed licence period.

4.10.3 Conclusion on Emergency Management and Fire Protection

304. Based on the evidence provided on the record for this hearing, the Commission concludes that BWXT has implemented and will continue to implement emergency management programs and the fire protection measures at both the Toronto and Peterborough facilities that are adequate to protect the health and safety of persons and the environment. The Commission is satisfied that the evidence shows that BWXT's emergency management and fire protection programs meet the requirements of the Class I Regulations, the NFCC and the NBCC.

305. The Commission anticipates that BWXT will revise its emergency management program at the Peterborough facility as detailed during this hearing and expects updates on this initiative via the applicable ROR or other means, as appropriate.
306. The Commission includes licence conditions 10.1 and 10.2 in both renewed licences in respect of the emergency management and fire protection SCA, as recommended by CNSC staff in CMD 20-H2.

4.11 Waste Management

307. The waste management SCA covers internal waste-related programs that form part of the facility's operations up to the point where the waste is removed from the facility to a separate waste management facility. Per the [GNSCR](#), BWXT submitted in its application information related to the management of radioactive or hazardous waste resulting from its licensed activities. Per the [Class I Regulations](#), BWXT submitted in its application the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances.
308. Per its current licence condition 12.1, BWXT is required to implement and maintain a program for waste management for its facilities. CNSC staff assessed BWXT's performance in this SCA, including waste minimization, segregation, characterization and storage programs, as "satisfactory."
309. BWXT's waste management program ensures the continued availability of waste storage capacity for waste generated and stored temporarily at BWXT's Toronto and Peterborough facilities. BWXT's program meets the specifications of
- CSA N292.0-14, *General principles for the management of radioactive waste and irradiated fuel*¹⁹
 - CSA N292.3-14, *Management of low- and intermediate-level radioactive waste*²⁰

CNSC staff submitted that all waste generated by BWXT was consolidated at BWXT's Toronto facility, after which it was characterized in accordance with CSA N292.3-14 and shipped to a licensed waste management facility.

310. CNSC staff evaluates BWXT's compliance in the waste management SCA through oversight activities. During inspections conducted in 2013 and 2017, CNSC staff issued enforcement actions related to waste segregation and labelling. BWXT submitted a corrective action plan which was assessed by CNSC staff as satisfactorily addressing all findings, and all enforcement actions have been closed.

¹⁹ N292.0-14, *General principles for the management of radioactive waste and irradiated fuel*, CSA Group, 2014.

²⁰ N292.3-14, *Management of low- and intermediate-level radioactive waste*, CSA Group, 2014.

311. The intervention from R. Mound raised the issue of uranium waste management at the Toronto facility. In response, the BWXT representative explained that a high proportion of the UO₂ was retained in the process or recycled, with only approximately 0.01% of the UO₂ lost in waste streams. Normal operations producing UO₂ pellets and fuel bundles, as well as waste arising from regular maintenance activities on the building structure and machinery, are the two primary sources of UO₂ solid waste. The BWXT representative also explained that contaminated metallic wastes and contaminated soft compactible wastes generated by BWXT were sent to a waste vendor for processing and sent back for storage in Canada.
312. On the issue of legacy waste at BWXT Peterborough facility, CNSC staff confirmed that it had no oversight on the GE Hitachi section of the facility and only regulated the BWXT nuclear facility. The Commission is satisfied on this point and recognizes that the management of that legacy waste is the responsibility of GE Hitachi, not BWXT.

4.11.1 Conclusion on Waste Management

313. Based on the information provided for this hearing, the Commission concludes that BWXT has and will continue to have in the renewed licence period, an appropriate program in place to manage the waste generated at its Toronto and Peterborough facilities.
314. The Commission includes licence condition 11.1 in respect of the waste management SCA in both renewed licences, as recommended by CNSC staff in CMD 20-H2.

4.12 Security

315. The security SCA covers the programs required to implement and support the security requirements set out in the [GNSCR](#) and Part 2 of the [Nuclear Security Regulations](#) (NSR). Per the GNSCR and the [Class I Regulations](#), BWXT submitted in its application information about BWXT's proposed measures to control access to its sites where the licensed activities will be carried out and its proposed measures to prevent acts of sabotage or attempted sabotage at those facilities.
316. In addition to the requirements provided for by the NSR, Part 2, BWXT is required to implement and maintain a program for nuclear security at its facilities per its current licence condition 13.1. CNSC staff rated BWXT's performance in this SCA as "satisfactory."
317. BWXT's security measures include access control to the facility, a Security Clearance program, the presence of security guards, security barriers and intrusion detection systems. BWXT also informed the Commission about security improvements completed since 2016, such as upgrades to the physical security system with the addition of a security guard that is present at all times and a physical guard house at the vehicle entrance of the Toronto facility.

318. CNSC staff submitted that BWXT maintained a security program in accordance with the NSR, Part 2 and the specifications of [REGDOC-2.12.3, Security of Nuclear Substances: Sealed Sources](#). CNSC staff further submitted that, through an on-site security inspection, technical assessments of BWXT's security plan, monitoring of licensee activities and the verification of compliance reports, CNSC staff had determined that BWXT had a satisfactory security program in place.
319. On the potential impacts of a terrorist attack on BWXT's facilities, the BWXT representative reported that its facilities had a perimeter fence with controlled access and security guards on site 24 hours a day. The BWXT representative added that BWXT had camera systems in place and monitored all on-site personnel and vehicle traffic.

4.12.1 Conclusion on Security

320. Based on the information provided on the record for this hearing, the Commission is satisfied that BWXT's performance with respect to maintaining security at its facilities is, and will continue to be, acceptable. The Commission is satisfied that BWXT's security program meets the requirements of the NSR, Part 2.
321. The Commission concludes that BWXT has made adequate provision for the physical security at its facilities and is of the opinion that BWXT will continue to make adequate provision for security during the renewed licence period.
322. The Commission includes licence condition 12.1 in both renewed licences, as proposed by CNSC staff in CMD 20-H2.

4.13 Safeguards and Non-Proliferation

323. Pursuant to the [Treaty on the Non-Proliferation of Nuclear Weapons](#) (NPT), Canada has entered into a Comprehensive Safeguards Agreement and an Additional Protocol (safeguards agreements) with the IAEA. The safeguards and non-proliferation SCA covers the programs and activities required for the implementation of the obligations arising from the Canada / IAEA safeguards agreements, as well as all other measures arising from the NPT and bilateral nuclear cooperation agreements.
324. The objective of these agreements is for the IAEA to provide credible assurance on an annual basis to Canada and to the international community that all declared nuclear material is in peaceful, non-explosive uses and that there are no undeclared nuclear material or activities in this country. Per the [Class I Regulations](#), BWXT submitted in its application information on BWXT's proposed measures to facilitate Canada's compliance with any applicable safeguards agreement.

325. The [GNSCR](#) requires the licensee to take all necessary measures to facilitate Canada's compliance with any applicable safeguards agreement, and defines reporting requirements for safeguards events. As such, BWXT's current licence conditions 14.1 and 14.2 require BWXT to implement and maintain a safeguards program; undertake all measures required to ensure safeguards implementation at its facilities; and not make changes that may affect safeguards implementation without prior approval. CNSC staff rated BWXT's performance in this SCA as "satisfactory."

326. Specific areas reviewed by CNSC staff during compliance verification activities include:

- nuclear material accountancy and control
- access and assistance to the IAEA
- operational and design information
- safeguards equipment, containment and surveillance
- import and export

CNSC staff submitted that, per requirements, BWXT had provided quarterly and annual updates to CNSC staff, provided the IAEA with adequate access and assistance, and submitted all Inventory Change Documents reports and Obligate Material Inventory Summaries reports.

327. BWXT's Nuclear Materials and Safeguards Management program is designed to meet the specifications of [REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy*](#) and applies to all nuclear material and safeguards management activities performed at BWXT facilities. BWXT further provided details on how it had implemented Nuclear Materials Accountancy Reporting (NMAR) at BWXT's Toronto and Peterborough facilities and how it submitted reports through NMAR to ensure accurate and efficient nuclear materials reporting and security verification.

328. The Commission enquired about the frequency of IAEA inspections at BWXT's facilities and whether the inspections had found any discrepancies in BWXT's nuclear material inventories. The BWXT representative stated that the IAEA performed an annual physical inspection of BWXT's inventory as well as periodic random short notice inspections. CNSC staff commented that some discrepancies related to accounting errors were found at times.

329. A. Vicente raised concerns about BWXT's operations producing weapons-grade material. The BWXT representative responded that BWXT does not produce weapons-grade nuclear material at its Canadian facilities and that it is only licensed to process natural and depleted uranium. The BWXT representative added that the depleted uranium pellets were only used by their client to test their reactor core and provided the example of reactor testing in respect of restart after refurbishment activities. The Commission is satisfied that the evidence shows that BWXT does not produce or does not support the production of weapons-grade materials at either of its facilities.

4.13.1 Conclusion on Safeguards and Non-Proliferation

330. Based on the evidence provided for this hearing, the Commission is satisfied that BWXT has provided for, and will continue to implement adequate measures in the areas of safeguards and non-proliferation at BWXT's Toronto and Peterborough facilities that are necessary for maintaining national security and measures necessary for implementing international agreements to which Canada has agreed.
331. The Commission includes licence condition 13.1 in respect of the safeguards and non-proliferation SCA in both renewed licences.

4.14 Packaging and Transport

332. The packaging and transport SCA covers the safe packaging and transport of nuclear substances and radiation devices to and from the licensed facilities. The licensee must meet the requirements of the [Packaging and Transport of Nuclear Substances Regulations, 2015](#) (PTNSR 2015) and Transport Canada's [Transportation of Dangerous Goods Regulations](#) (TDG Regulations) for all shipments. Per the [Class I Regulations](#), BWXT submitted in its application information on the proposed procedures for transporting nuclear substances and hazardous substances.
333. BWXT's current licence condition 15.1 requires BWXT to implement and maintain a packaging and transport program. CNSC staff submitted that CNSC inspections had shown that BWXT's packaging and transport program was effectively implemented and that the transport of nuclear substances between the two licensed facilities was regularly performed in a safe manner and met regulatory requirements. CNSC staff also noted that CNSC inspectors verified that BWXT's personnel involved in transport held valid training certificates. CNSC staff rated BWXT's performance in this SCA as "satisfactory."
334. BWXT transports UO₂ between its two licensed facilities and transports its waste to a licensed waste management facility. Per CNSC requirements, BWXT must maintain records of all transport activities that CNSC inspectors verify for accuracy purposes during on-site inspections. CNSC staff submitted that it has a memorandum of understanding with [Transport Canada](#) to provide oversight for the transportation of dangerous goods in Canada as a whole, and particularly Class 7 dangerous goods (radioactive material per the TDG Regulations).
335. BWXT reported that, during the current licence period, there were four reportable events related to the packaging and transport SCA, all of which had no effect on the health and safety of workers, the public or the environment. These included an event in January 2014 involving a damaged drum containing sludge and one in March 2019 related to a minor traffic accident. CNSC staff submitted that two other events were related to the mislabelling of transport packages. BWXT conducted an investigation to determine the root cause of the events and implemented preventive measures.

336. In relation to the interventions from A. Blomme and S. MacKay, the Commission asked for details about emergency plan deployment in case of a UO₂ transport accident. The BWXT representative explained that BWXT has an [Emergency Response Assistance Plan](#) (ERAP) in place that meets the requirements of the TDG Regulations and has protocols to be followed in the event of an accident involving the transport of UO₂.
337. Further on this issue, the BWXT representative reported that BWXT transports uranium in three different forms – powder, pellets and fuel – and that all types of accidents were considered within the scope of its ERAP. In the event of a significant accident, BWXT would recover the any spilled uranium and would provide technical assistance to first responders. BWXT has not yet had a uranium spill occur during transport but, should it happen, a third-party contractor would be engaged to also directly support the recovery of any spilled material. The Commission is satisfied that the evidence shows that BWXT has adequate plans in place in the event of an accident resulting in a UO₂ spill.
338. On Z. Topan’s concern with potential transport accidents during extreme weather, the BWXT representative stated that BWXT’s ERAP considers different accident scenarios in all weather conditions.
339. U. Medeiros raised safety concerns about how BWXT transported uranium to and fuel pellets from the Toronto facility. The BWXT representative explained that uranium is transported to the Toronto facility via transport truck in sealed drums. Fuel pellets are packaged in wrapped and sealed trays prior to being transported to the Peterborough facility via transport truck.
340. Further on this topic, CNSC staff explained that safety during transport was risk based, with increased requirements for material considered to be of a higher risk. CNSC staff added that the UO₂ powder transported by BWXT is a lower-risk material and that the radiological risk posed by UO₂ powder was extremely low when transported effectively in drums.
341. S. Mancini raised the issue of whether BWXT monitored the inside of transport trucks for uranium contamination. The BWXT representative explained that BWXT surveys the inside of trailers periodically to ensure that the contamination levels remain at acceptable levels. Transport drums have to satisfy requirements for cleanliness when packaged, when they were entering a facility and also during transport activities. The Commission is satisfied on this point.
342. S. MacKay’s intervention raised the issue of transport truck maintenance. The BWXT representative explained that BWXT owns three transport trailers and maintains them through its preventative maintenance program. The transport trucks and the drivers are supplied by a dedicated company and BWXT has not had any issues with transport truck or trailer maintenance. The Commission is satisfied that BWXT’s preventive maintenance program is adequate to ensure the safety of its transport trailers.

343. In the context of Ms. J. Tuer's intervention, the Commission enquired about whether BWXT stored UO₂ powder in the transport packages. The BWXT representative explained that UO₂ drums are used both to transport and store the UO₂, noting that they are fire resistant with very few ejecting their lids when exposed to fire.
344. In relation to the intervention from S. Mancini, the Commission asked whether truck drivers are designated as NEWs. The BWXT representative responded that the truck drivers are not designated NEWs because shipments are loaded and offloaded by BWXT employees. The BWXT representative also stated that the truck drivers do not handle any uranium products; their dose would not exceed the regulatory dose limit for a member of the public; and the dose rate in the cab of the truck is very low. The Commission is satisfied that transport drivers are protected from radiation hazards while transporting UO₂.
345. In considering the intervention from the Committee for Future Generations regarding uranium transportation routes, the BWXT representative explained that BWXT did not publicly publish its transportation routes as BWXT considered these as confidential information. Only the trucking company, Transport Canada and the CNSC are aware of BWXT's transportation routes.

4.14.1 Conclusion on Packaging and Transport

346. Based on the information presented on the record for this hearing, the Commission concludes that BWXT has, and will continue to, transport nuclear and hazardous substances in accordance with the PTNSR 2015. The Commission is satisfied that BWXT is meeting, and will continue to meet, regulatory requirements regarding packaging and transport.
347. The Commission includes licence condition 14.1 in respect of the packaging and transport SCA in both renewed licences.

4.15 Indigenous Engagement and Public Information

348. Indigenous engagement and maintaining a public information program are not part of an SCA but remain an important component of the CNSC regulatory framework. These components of the regulatory framework address issues such as the common law duty to consult with Indigenous peoples pursuant to section 35 of the [Constitution Act, 1982](#), the licensee's and CNSC staff's Indigenous engagement activities, and the requirement for licensees to have a Public Information and Disclosure Program (PIDP).

4.15.1 Participant Funding Program

349. The Commission assessed the information provided by CNSC staff regarding public engagement in the licensing process as enhanced by the CNSC's [Participant Funding Program](#) (PFP). CNSC staff submitted that, in June 2019, up to \$50,000 in funding to participate in this licensing process was made available to Indigenous peoples, members of the public and stakeholders to review BWXT's licence renewal application and associated documents, and to provide the Commission with value-added information through topic-specific interventions.
350. A Funding Review Committee, independent of the CNSC, recommended that four applicants be provided with up to \$37,001 in participant funding. These applicants were required, by virtue of being awarded participant funding, to submit a written intervention and make an oral presentation at the public hearing. As such, participant funding was awarded to the following recipients:
- Curve Lake First Nation
 - Canadian Nuclear Workers Council
 - Citizens Against Radioactive Neighbourhoods (CARN)
 - Lake Ontario Waterkeeper
351. Based on the information submitted for this hearing, the Commission is satisfied that Indigenous peoples, members of the public and stakeholders were properly notified of BWXT's application and were provided with sufficient information on how to participate in this licence renewal process.

4.15.2 Indigenous Engagement

352. The common law duty to consult with Indigenous peoples applies when the Crown contemplates action that may adversely affect established or potential Indigenous and/or treaty rights. The CNSC, as an agent of the Crown and as Canada's nuclear regulator, recognizes and understands the importance of building relationships and engaging with Canada's Indigenous peoples. The CNSC ensures that its licensing decisions under the NSCA uphold the honour of the Crown and considers Indigenous peoples' potential or established Indigenous and/or treaty rights pursuant to section 35 of the [Constitution Act, 1982](#). The Crown has discretion as to how it structures consultation, and must prioritize fairness. It is the CNSC's practice to use both the work by CNSC staff and the Commission hearing to advance reconciliation efforts and to fulfil the requirements of the duty to consult where it is engaged.
353. W. Fischer and C. Prinsen enquired about whether the Commission, as an agent of the Crown, had discharged its duty under section 35 of the *Constitution Act, 1982*. It is the view of the Commission that BWXT's ongoing operations and the addition of pelleting operations in Peterborough would not have a negative interaction with the environment and would not impede any existing or ongoing use of Indigenous peoples of their lands and territories for traditional practices as protected under the

Constitution. The Commission is of the view that the legal duty to consult was not engaged in this matter as this a licence renewal application.

354. The Commission notes that representatives from Curve Lake First Nation (Chief Emily Whetung), Hiawatha First Nation (Chief Laurie Carr) and Mississauga First Nations (Chief Reg Niganobe) presented together during Curve Lake First Nation's intervention representing the rights and interests of the Mississaugi and Williams Treaties communities and peoples.
355. The Commission notes that CNSC staff has been communicating on a quarterly basis with interested Indigenous communities of the Williams Treaties First Nations (WTFN) to ensure regular dialogue and build relationships.
356. CNSC staff submitted that it encouraged Indigenous communities' participation in this hearing process and provided information about the availability of participant funding to facilitate participation and details on how to participate. CNSC staff also submitted that it had sent letters of notification in March 2019 to the following identified First Nation and Métis groups who may have an interest in BWXT's licence renewal for the Toronto and Peterborough facilities:
 - WTFN consisting of Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, The Mississaugas of Scugog Island First Nation, Chippewas of Mnjikaming (Rama First Nation), Georgina Island First Nation and the Chippewas of Christian Island (Beausoleil First Nation)
 - Mississaugas of the Credit First Nation
 - Mohawks of the Bay of Quinte (MBQ)
 - Métis Nation of Ontario (MNO) Regions 6 and 8
357. [REGDOC-3.2.2, *Indigenous Engagement*](#) sets out requirements and guidance in respect of proposed projects that may raise the Crown's duty to consult. Even though BWXT's licence renewal application did not raise the formal requirements of REGDOC-3.2.2, CNSC staff encouraged BWXT to use the guidance set out in this REGDOC to help inform its engagement activities with Indigenous communities who have expressed an interest in BWXT's facilities and activities, including this licence renewal application.
358. BWXT informed the Commission that the Indigenous communities of interest near the Toronto and Peterborough BWXT facilities are:
 - Chippewas of Beausoleil First Nation
 - Chippewas of Georgina Island First Nation
 - Chippewas of Rama First Nation
 - Curve Lake First Nation
 - Hiawatha First Nation
 - Métis Nation of Ontario
 - Mississaugas of the New Credit First Nation
 - Mississaugas of Scugog Island First Nation

359. BWXT contacted each Indigenous community with introductory letters in April 2018 and December 2018 to inform them about its licence renewal application. BWXT also communicated with Indigenous communities throughout 2019, providing information about the licence renewal; information about meetings and community events; invitations for tours; and copies of newsletters and other documentation.
360. [BWXT's Indigenous Relations policy](#) was developed in 2017 and indicates that BWXT is committed to having positive relationships with Indigenous communities. BWXT is working to build and maintain positive, long-term relationships with local Indigenous groups or communities based on mutual understanding, respect, open and honest communication, and trust. BWXT aims to develop strategies in key areas including employment, economic development, education, training and community sponsorship that appropriately reflect the interests of Indigenous groups and to enhance employee understanding of Indigenous history and culture.
361. Curve Lake First Nation expressed concerns about BWXT's engagement efforts and its omission to inform them about BWXT's request for authorization to carry out its pelleting operations in Peterborough. The BWXT representative explained that BWXT sent a letter to Curve Lake and Hiawatha First Nations, among other communities of interest, detailing its licence renewal application and its ERA. BWXT followed up with email communications, offering to meet in person and to explain its technical information. The BWXT representative noted that due to the large amount of information contained within its licence renewal application, the request to conduct pelleting operations in Peterborough may have been overlooked.
362. Further on Curve Lake First Nation's concerns about BWXT's engagement efforts, the BWXT representative stated that BWXT also met with Curve Lake First Nation and Hiawatha First Nation on a separate licence application related to medical isotopes. BWXT's licence renewal application at issue in this hearing was not discussed at those meetings. The BWXT representative acknowledged the fact that BWXT engaging on two separate subjects at the same time may have caused confusion and that BWXT needed to improve its engagement process.
363. Curve Lake First Nation also expressed concerns about CNSC staff's engagement efforts. CNSC staff indicated that it reached out to communities having an interest in licensing activities early in the licence renewal process to ensure that Indigenous communities were able to make informed recommendations to the Commission. CNSC staff added that its initial letter to the Mississaugas Nations and the WTFN indicated that the application included the request to conduct pelleting operations at the Peterborough facility. The request to conduct pelleting operations at the Peterborough facility was also discussed during a meeting with the community representatives. CNSC staff emphasized that it looked forward to engaging with Curve Lake First Nation and Hiawatha First Nation in respect of environmental monitoring and sampling, and other areas of interest.

364. The Curve Lake First Nation representative explained that meaningful engagement would ensure that community members had the ability to fully understand the impacts of BWXT's licence renewal and proposed activities. It would also ensure that they can speak to the impacts that those activities may have on the environment and on cultural practices. The Curve Lake First Nation representative added that engagement should start the moment that an application to the Commission has the potential to proceed and that it should include training to help community members understand the information provided. The Curve Lake First Nation representative further added that engagement should also include other activities such as environmental stewardship and protection, and active participation in the IEMP.
365. CNSC staff reported that it collaborated with Indigenous communities with respect to the IEMP to incorporate Indigenous knowledge and values. CNSC staff explained that information on all IEMP sampling campaigns would be distributed to Indigenous communities and invited Indigenous communities to collaborate on developing a meaningful sampling process that would reflect their values and interests. CNSC staff added that Indigenous communities could also carry out their own sampling program with the help of CNSC's Participant Funding Program. The Commission expects CNSC staff to encourage the participation of Indigenous communities in the IEMP and to include Indigenous traditional knowledge in the IEMP, as applicable.

Assessment of Indigenous Engagement

366. The Commission notes that BWXT has committed to expanded engagement with Indigenous communities and to further addressing their concerns and developing a path forward. The Commission expects BWXT to engage with Indigenous peoples on its operations and the end-state of BWXT's Toronto and Peterborough facilities.
367. Based on the information provided for this hearing, the Commission is satisfied that Indigenous engagement activities carried out for the renewal of the licence were adequate. The Commission nonetheless encourages greater engagement by CNSC staff and BWXT with Indigenous peoples and to explore means to increase their ability to be part of and contribute to the regulatory process.

4.15.3 Public Information

368. The Commission assessed BWXT's public information and disclosure program (PIDP) for BWXT's Toronto and Peterborough facilities. A public information program is a regulatory requirement for licence applicants and licensed operators of Class I nuclear facilities. Paragraph 3(j) of the [Class I Regulations](#) requires that licence applications include

“the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed.”

369. BWXT's PIDP is also expected to meet the specifications of [REGDOC-3.2.1, Public Information and Disclosure](#). CNSC staff submitted that its review of BWXT's PIDP found that it met regulatory requirements and the specifications of REGDOC-3.2.1. CNSC staff has requested that BWXT refine and update its PIDP on a regular basis to meet the changing information needs of BWXT's target audiences.
370. On the issue of what types of communication would best meet the public's needs in the vicinity of the Toronto facility, J. Dzerowicz, MP of the Davenport riding in Toronto, stated the view that emergency planning information, relevant epidemiological studies and monitoring results should be readily available to the community. The BWXT representative committed to maximum transparency regarding that type of information and stated that BWXT would add information on these topics to its information sessions and on its website.
371. Further on the public availability of the emergency plan, the BWXT representative indicated that a summary document had been added to BWXT's website. BWXT will also explore what other information would be needed to address the community's concerns. The Commission expects BWXT to explore mechanisms by which more meaningful information can be provided to the public.
372. The Commission notes the commitment from BWXT to provide the documents requested by J. Gibbs, once those documents were redacted to remove confidential information such as employees' names.
373. Regarding CARN's concern related to being denied access to requested documents, the BWXT representative reported that some of the documents requested by CARN, such as BWXT's business plan, were considered proprietary. BWXT had recently published summaries on its website for some of the other requested documents.
374. On the concern raised by J. Keil on the availability of the emissions summary table prepared by BWXT for the MECP, the BWXT representative indicated that the emissions summary table was available on its website and was updated yearly. The BWXT representative added that uranium was on the emissions summary table. However, beryllium is not on this summary table as it was screened out as an insignificant source term, in accordance with MECP guidelines. The MECP representative indicated that it was an MECP requirement for BWXT to have the emissions summary table made available to the public. However, a formal information request would be required to get access to the full emissions summary dispersion modelling report.
375. BWXT addressed the question from A. Blomme on whether it had other means of judging the effectiveness of its outreach programs than the public satisfaction surveys. The BWXT representative indicated that BWXT had a variety of ways by which it communicated with its communities, such as a community liaison committee, barbecues, phone calls or emails. BWXT also sends newsletters to community members three times a year.

376. R. Mound raised the issue of perceived secrecy surrounding BWXT's operations. The BWXT representative stated that BWXT has open houses for members of the public and that BWXT offers tours at anytime, when requested. Members of the public are also invited to sign up for a tour during BWXT's annual barbecue.
377. In considering M. Smith's intervention on whether it could be possible for the licensee to more evenly spread out its communication efforts over the licence period rather of concentrating them just before a licence renewal, CNSC staff informed the Commission that it reviewed BWXT's PIDP on a yearly basis against REGDOC-3.2.1. CNSC staff reported that BWXT had regularly communicated with the public during its licence period even though it seemed concentrated over the last six months.
378. The Commission noted the opposition of several intervenors to the BWXT licence renewal application and asked whether BWXT had been aware of such opposition. The BWXT representative reported that BWXT had not heard any concerns from the public prior to its licence renewal application, which is also requesting the option to conduct pelleting operations in Peterborough.
379. CNSC staff informed the Commission that it will also explore how to better inform members of the public about CNSC-regulated activities. CNSC staff added that engaging with the community liaison committees to receive feedback on the information provided by CNSC staff would be an excellent mechanism to learn what should be improved.

BWXT Toronto Facility

380. In response to BWXT's public polling results showing low public awareness of BWXT Toronto facility's activities, the BWXT representative stated that BWXT could improve its use of communication tools such as social media and could use its community liaison committee more effectively.
381. Regarding J. McNeill's concern about the signage outside its Toronto building so to better inform the public about its activities, the BWXT representative stated that the current sign read BWXT Nuclear Energy Canada and committed to making signage more visible and clear that it is a uranium processing facility.
382. On P. Medeiros' concern about the zone around BWXT's Toronto facility within which BWXT distributed its information flyers, the BWXT representative reported that BWXT distributed its information flyers in an area of approximately 1,500 metres around its Toronto facility.
383. In relation to J. Tuer's intervention about member recruitment for BWXT's community liaison committee, the BWXT representative indicated that, every fall, BWXT advertised the committee and new member positions to 4,000 residents close to the Toronto facility. The BWXT representative added that the information was also on BWXT's website and on social media, and that BWXT deployed fence banners to notify people not otherwise receiving the information.

384. Further on BWXT's community liaison committee recruitment process, the Commission enquired about whether BWXT was also looking at members who were skeptical of BWXT's performance. The BWXT representative indicated that BWXT added interested intervenors to its mailing lists and that those individuals are invited to consider joining BWXT's community liaison committee.
385. The Commission considered S. Yoo's intervention and asked about a circulating petition requesting to end BWXT's licence renewal process for the Toronto facility. CNSC staff indicated that it was not aware of such a petition and the BWXT representative told the Commission that BWXT became aware of it when performing social media monitoring. The BWXT representative added that the petition was an indication that BWXT needed to better inform the community members of its activities and that it was committed to doing that.
386. On L. Kouchnir's intervention asking whether BWXT involved schools in its outreach to disseminate information, the BWXT representative told the Commission that BWXT did not disseminate information through schools, but added that two members of its Toronto community liaison committee were school representatives.

Other concerns related to the location of BWXT's Toronto facility

387. On the issue of ways to reduce the anxiety issues related to BWXT facilities' location, J. Dzerowicz indicated that the environmental monitoring results should be transparent, easily accessible to the community and in a language that is easily understandable. The intervenor added that BWXT should also actively reply to any misinformation and not allow it to proliferate as this could further public anxiety and fear.
388. The Commission enquired about whether BWXT received feedback from newly trained employees to determine the type of information that could help to alleviate some of the public anxiety about nuclear facilities. The BWXT representative explained that BWXT had mechanisms in place to receive feedback or concerns from employees, such as through union communications, and added that BWXT did not see any concerns from employees with regard to radiological or toxicological issues.
389. In considering the intervention from A. Currie and several other intervenors on whether potential home buyers should be informed of the presence of a nuclear facility in the area, the BWXT representative indicated that BWXT would be reaching out to real estate organizations to inform potential new residents about the Toronto facility's activities.

BWXT Peterborough Facility

390. With reference to K. Campbell's intervention regarding BWXT's communications approach, the BWXT representative reported that BWXT planned to improve its communication in Peterborough by implementing a community liaison committee constituted of individuals representing a variety of views. The BWXT representative added that BWXT encourages any intervenors to consider joining the committee and that members of the public would also be able to join the committee's meeting as observers and be allowed to comment and ask questions.
391. On the concern expressed by D. Berger and several other intervenors regarding the health and safety of the Peterborough Prince of Wales Public School teachers and students, the BWXT representative stated that BWXT informed the school principal and vice-principal, as well as the parent council, of business changes such as the licence renewal application. The BWXT representative added that BWXT took part in a meeting at the school with parent council leadership and set up a tour of its facility for parents interested in learning more about BWXT. The BWXT representative further added that the Prince of Wales Public School was also on BWXT's Newsletter distribution list.
392. S. MacKay's intervention stated that the CNSC had not consulted with the community prior to this proceeding. CNSC staff reported that, in preparation for the BWXT licence renewal hearing, CNSC staff came to the Peterborough community in late January 2020 for a Meet the Nuclear Regulator session and also conducted a webinar on BWXT's licence renewal application. CNSC staff also attended community liaison committee meetings in Toronto and would do so in Peterborough once a community liaison committee was set up. Additionally, CNSC staff participated in BWXT's barbecue events and other BWXT public outreach activities.

Other concerns related to the location of BWXT's Peterborough facility

393. Many intervenors in Peterborough raised concerns related to the location of BWXT's Peterborough facility and zoning. CNSC staff reported that it reviewed any licence application that had the potential to have interactions with the environment, and would then perform an environmental protection review taking into account environmental characterization of the surrounding environment before recommending to the Commission whether a licence should be issued. CNSC staff also noted that zoning is a provincial power and that BWXT's lease agreement states that the operations are subject to the Ontario [*Planning Act*](#). The Commission is satisfied with the information provided on this topic.
394. The Commission asked about whether the addition of pelleting operations at BWXT's Peterborough facility could raise zoning considerations or restrictions. CNSC staff responded that there were no additional requirements from a zoning point of view in respect of the proposed pelleting operations. The Peterborough facility is licensed to process UO₂ and the pelleting operations are classified as the industrial processing of UO₂.

395. Still on the matter of zoning, the Commission enquired about the municipal zoning decision process. The City of Peterborough representative explained that, as each development was different, the City of Peterborough had to consider such decisions on a site-specific basis while considering provincial policies. The Commission is satisfied with the information provided in respect of zoning considerations for BWXT's facilities.
396. The Commission considered the concern raised by P. Harris regarding the location of the BWXT facility in Peterborough and enquired about the IAEA recommendation for siting such facilities away from populated areas. CNSC staff explained that the IAEA recommendation was for the construction of new facilities, as opposed to existing ones. CNSC staff added that the safety analysis accounted for the proximity of the population in terms of emissions and environmental risk.

Assessment of Public Information

397. During this hearing, the Commission heard from intervenors in both Toronto and Peterborough that BWXT's communication tools need improvement and that the public information measures described by BWXT for this hearing are inadequate.
398. In respect of the feedback heard on its public communication, the BWXT representative explained that BWXT had created a preliminary strategy to improve its public communication that included
- hiring of a local community relations specialist
 - increasing the number of community liaison committee members in Toronto
 - implementing a community liaison committee in Peterborough
 - posting additional information on BWXT's website, as requested by intervenors during this hearing
 - changing the sign in front of the facility to include the wording "uranium processing facility"
 - expanding BWXT's usage of social media to provide intervenors additional the information about its operations
 - increasing BWXT's involvement in community organizations and associations
 - reaching out to real estate organizations to inform potential new residents about BWXT's activities
 - improving public awareness regarding BWXT's emergency preparedness plan
399. Based on the information presented for this hearing, the Commission is satisfied that BWXT's PIDP meets the minimum expectations of REGDOC-3.2.1 and the Class I Regulations. The Commission is satisfied that BWXT has communicated and will continue to communicate to the public information about the health, safety and security of persons and the environment and other issues related to its Toronto and Peterborough facilities.

400. However, it is clear from the interventions heard and for this hearing that BWXT's public information efforts have not been sufficiently effective. The compliance verification criteria in respect of the expectations of REGDOC-3.2.1 may not be stringent enough to provide for a meaningful PIDP. On this basis, the Commission directs CNSC staff to review its compliance verification criteria in respect of PIDPs and the guidance that is provided in REGDOC-3.2.1. As the purpose of a PIDP is to ensure that the public receives the information it needs from licensees, there may be a need to review the regulatory document and consider anew how licensees' programs are verified for their effectiveness.
401. The Commission is satisfied with the approach proposed by BWXT to improve its public communications and looks forward to hearing more information on BWXT's progress in the context of a sector-specific ROR, or other means as appropriate. The Commission also notes CNSC staff's commitment to review how it can more meaningfully disseminate information to the public.

4.15.4 Conclusion on Indigenous Engagement and Public Information

402. The Commission acknowledges the current efforts and commitments made by BWXT in relation to Indigenous engagement and CNSC staff's efforts in this regard on behalf of the Commission that go beyond the context of the licence renewal proceeding. Based on the information presented on the record for this hearing, the Commission is satisfied that this licence renewal will not result in changes to BWXT's Toronto and Peterborough facilities operations that would cause adverse or new impacts to any potential or established Indigenous and/or treaty rights. The Commission is also of the opinion that the engagement activities taken for the review of the BWXT's Toronto and Peterborough facilities licence renewal application have been adequate.²¹
403. The Commission notes that BWXT has committed to meaningful dialogue with all Indigenous communities and is looking forward to meeting with them in person, better understanding their concerns in respect of BWXT's facilities and activities, and developing a plan and a path forward. Therefore, the Commission expects BWXT to engage accordingly with Indigenous groups on its operations and on the planned end-state of BWXT's Toronto and Peterborough facilities.
404. The Commission also notes the commitment from CNSC staff to continue strengthening the regulator's relationship with Indigenous communities and to involve them in future IEMP sampling.
405. The Commission is satisfied that, overall, BWXT's PIDP meets regulatory requirements and that the commitments made by BWXT will increase the effectiveness of its PIDP and engagement activities to better keep Indigenous peoples and the public informed of BWXT's Toronto and Peterborough facilities operations. The Commission acknowledges the many good practices already implemented by BWXT but emphasizes that BWXT needs to increase its efforts in establishing, maintaining and improving its dialogue with the neighbouring communities.

²¹ *Rio Tinto Alcan v. Carrier Sekani Tribal Council*, 2010 SCC 43[2010] 2 S.C.R. 650 at paras 45 and 49.

406. The Commission is satisfied that BWXT, through the PIDP and engagement activities, has, in accordance with regulatory and licensing requirements, communicated and will continue to communicate to the public information about the health, safety and security of persons and the environment and other issues related to BWXT's Toronto and Peterborough facilities.
407. However, the Commission clearly heard from the intervenors that BWXT's communication tools need improvement. The Commission notes that BWXT committed to improve its public communication strategy in Toronto and Peterborough, and directs CNSC staff to verify the implementation of the proposed improvements in conjunction of its own sufficiency review of REGDOC-3.2.1.
408. Indigenous peoples, members of the public and stakeholders in Toronto and Peterborough have some common interests and concerns in respect of BWXT's facilities. However, it is also clear to the Commission that, due to the distinct nature of BWXT's licensed activities at both facilities, there are many facility-specific interests and concerns. PIDPs must be tailored to the facilities' host communities and BWXT must tailor its information efforts to the needs of the communities.
409. The Commission includes licence condition G.4 requiring BWXT to implement and maintain a PIDP in both renewed licences.
410. The Commission directs CNSC staff to review its compliance verification criteria and the guidance that is provided in REGDOC-3.2.1. Should REGDOCG-3.2.1 be updated in the future, the Commission expects BWXT's PIDP to also be updated to meet any revised specifications.

4.16 Decommissioning Plans and Financial Guarantee

411. The Commission requires BWXT to have operational plans for the decommissioning and long-term management of waste produced during the lifespan of BWXT's Toronto and Peterborough facilities. In order to ensure that adequate resources are available for the safe and secure future decommissioning of BWXT's Toronto and Peterborough facilities, the Commission requires that an adequate financial guarantee for realization of the planned activities is put in place and maintained in a form acceptable to the Commission throughout the licence period.
412. Regarding decommissioning, BWXT must meet the requirements set out in the [GNSCR](#) and the [Class I Regulations](#), and also meet the specifications of [G-219, Decommissioning Planning for Licensed Activities](#) and CSA N294-09, *Decommissioning of facilities containing nuclear substances*.²² CNSC staff reported that BWXT was in compliance with licensing requirements in respect of the decommissioning and financial guarantee requirements.

²² N294-09, *Decommissioning of facilities containing nuclear substances*, CSA Group, 2009.

413. With respect to financial guarantees, BWXT is required by licence condition imposed by the Commission, pursuant to subsection 24(5) of the NSCA, to maintain an adequate guarantee in a form that is acceptable to the Commission. [G-206, *Financial Guarantees for the Decommissioning of Licensed Activities*](#), provides regulatory guidance on financial guarantees and financial instruments, and sets out the relevant considerations for adequacy.

4.16.1 Decommissioning Plan

414. BWXT submitted that it maintained a Preliminary Decommissioning Plan (PDP) in accordance with G-219 and CSA N294-09. BWXT further submitted that an updated PDP and associated decommissioning costs were provided to CNSC staff on October 16, 2019 and that the PDP would be reviewed and updated, if required, every five years.
415. CNSC staff reported that BWXT's PDP required BWXT to clean up the contaminants that it generated while using the site before returning the property back to GE Hitachi. Under its lease agreement, BWXT is not responsible to clean up all of the legacy contaminants resulting from past operations, only what is generated as a result of its activities, whether radiological waste or not. GE Hitachi is liable for the legacy waste.
416. The PDP requires BWXT to remove all of the uranium and beryllium generated by its operations. Cleaning activities include removing a layer of the concrete floors and removing drywall or any contaminated material.
417. In regard to P. Kienholz's concern regarding the public availability of BWXT's PDP, it is of note that BWXT's comprehensive PDP is not publicly available but a summary version is publicly available on its website.

4.16.2 Financial Guarantee

418. BWXT maintains a financial guarantee for the Toronto and Peterborough facilities in accordance with G-206. CNSC staff submitted that BWXT has an adequate financial guarantee in place for the facilities in respect of the proposed licence period.
419. CNSC staff reported that it verified the financial guarantee calculation data by looking at the decommissioning plan and the outlined activities to ensure that all activities are covered, including the value of escalation, the labour rates and the amount of contingency based on the uncertainty associated with different decommissioning activities. A 'decommissioning tomorrow' assumption is used, whereby the total amount of the funds required for decommissioning if BWXT was to stop its operations tomorrow is available. There is an escalation factor applied, to account for inflation over the five-year period and to ensure that the amount is sufficient for the next five years.

420. The Port Hope Community Health Concerns Committee, B. Blaney and D. Jordan raised concerns regarding the adequacy and accessibility of the financial guarantee, the choice of a surety bond as a financial instrument and the impact of a potential bankruptcy of the bond issuer. On these issues, the Commission is satisfied that
- the cost estimate process used by BWXT was adequate, including an activity-based estimate that resulted in differing amounts required for BWXT's Toronto and Peterborough facilities, as the activities required for their decommissioning would be different.
 - the financial guarantee is in place and is accessible to the CNSC in the event of bankruptcy where the licensee becomes financially insolvent and cannot do the decommissioning itself.
 - the financial guarantee can be only used for the decommissioning of the facilities.
 - a surety bond is an appropriate financial instrument for a financial guarantee.
 - even though the insurance company providing BWXT's bond is not, itself, insured by another party in case of bankruptcy, it is a federally-regulated financial institution under the oversight of the Office of the Superintendent of Financial Institutions with a Class A rating. BWXT is required to provide the financial rating of the bond issuer on an annual basis and could be requested to submit a new instrument from a different financial institution should the rating of the bond issuer change.
421. The Committee for Future Generations raised concerns regarding the PDP cost estimate. CNSC staff explained that BWXT's current financial guarantee amount decreased by approximately \$4 million from the previous estimate based on improved knowledge of the onsite contamination as well as a greater accuracy of the cost of the activities that BWXT would need to do.
422. CNSC staff reported that, if pelleting operations were to start at BWXT's Peterborough facility, BWXT would need to revise the decommissioning costs for the Peterborough facility.
423. In relation to Z. Topan's concern regarding the possibility of the financial guarantee being insufficient to cover the decommissioning costs, the BWXT representative responded that BWXT's decommissioning cost estimate included a 20% contingency and that BWXT is accountable for the cleanup, regardless of its cost.

4.16.3 Conclusion on Decommissioning Plans and Financial Guarantee

424. Based on the information considered at this hearing, the Commission concludes that the PDP and related financial guarantee for BWXT's Toronto and Peterborough facilities are acceptable and adequate for the purpose of the licence renewal application.

- 425. The Commission includes licence condition 11.2 in both renewed licences in respect of decommissioning plans, as recommended by CNSC staff in CMD 20-H2.
- 426. BWXT currently maintains an adequate financial guarantee for each facility. BWXT shall continue to maintain an adequate financial guarantee in respect of each facility and the Commission includes licence condition G.3 in both renewed licences in respect of financial guarantee requirements, as recommended by CNSC staff in CMD 20-H2.

4.17 Cost Recovery

- 427. The Commission examined BWXT's standing under the requirements of the [Cost Recovery Fees Regulations](#) (CRFR) respecting the Toronto and Peterborough facilities. Paragraph 24(2)(c) of the NSCA enables the Commission to consider licensing on receipt of a licence application that is accompanied by, among other things, the prescribed fee.
- 428. The evidence shows that BWXT is in compliance with the CRFR requirements, and has paid its licensing fees and cost recovery fees in full.
- 429. Based on the information submitted by BWXT and CNSC staff, the Commission is satisfied that BWXT has satisfied the requirements of the CRFR for the purpose of this licence renewal.

4.18 Insurance

- 430. CNSC staff submitted that BWXT's Toronto and Peterborough facilities were not designated nuclear installations under the [Nuclear Liability and Compensation Act](#) (NLCA) that came into force on January 1, 2017. The NLCA sets out a specialized scheme of third party liability and compensation in respect of nuclear incidents, where the operator of a designated nuclear installation is absolutely liable for damage, and is obliged to carry insurance from an approved insurer to cover that liability. CNSC staff explained that BWXT processes only natural and depleted uranium, which are excluded from the definition of nuclear material under the NLCA. The Commission notes therefore that BWXT is not subject to the NLCA. BWXT maintains industrial insurance as a commercial necessity.
- 431. Several intervenors raised concerns regarding BWXT's liability in case of an off-site contamination event. The BWXT representative reported that BWXT maintains liability insurance for off-site personal injuries or damage to property. The BWXT representative added that BWXT also maintained a financial capability to respond to that type of situation. CNSC staff indicated that it received a confirmation letter from BWXT stating that BWXT had liability insurance and that its liability insurance had been estimated by a third party to be adequate for the operations that BWXT currently conducts.

432. Given the level of concern respecting this issue, the Commission would encourage BWXT to post some information about its insurance coverage on its website. During the hearing, the BWXT representative committed to put liability insurance information on the BWXT website as well as the information provided in a related letter to CNSC staff.

4.19 BWXT's Request to Conduct Fuel Pelleting Operations in Peterborough

433. A key issue in this hearing is the request from BWXT that it be authorized, should it opt to do so, to transfer its pelleting operations from the Toronto facility to the Peterborough facility. Pelleting consists of the industrial production of natural and depleted uranium fuel pellets. Several intervenors are opposed to this potential transfer.
434. By majority, the Commission authorizes BWXT to transfer its pelleting operations from Toronto to Peterborough, subject to a number of conditions set out below. Dr. Demeter would deny the request that the licence authorize the possible transfer of the pelleting operations to Peterborough.
435. BWXT is requesting authorization for pelleting operations in Peterborough, before making the operational decision to transfer, to obtain assurance that this would be a possibility prior to analyzing the idea any further. Before proceeding further, BWXT would need to provide, for CNSC approval, information about the revised environmental monitoring program and safety analysis. The BWXT representative stated that no decision had been made to move operations at this moment but that changes in BWXT's marketplace might make it essential in the future, and that BWXT would do the required analyses and engineering if it decided to transfer the pelleting operations to Peterborough.
436. BWXT would use the existing Toronto process and would not seek any changes to its existing operating limits for possession and processing of uranium for the Peterborough facility. The BWXT representative added that the facility configuration would be somewhat different.
437. The BWXT representative reported that, if pelleting operations were to be transferred to Peterborough, BWXT expected the emissions resulting from pelleting operations to be similar to those at its Toronto facility. CNSC staff confirmed that emissions in Peterborough would be similar to Toronto, estimating the potential emissions from pelleting operations in Peterborough based on the technology used in terms of pollution and dust control and the characteristics of the technology used at BWXT's Toronto facility.
438. Responding to Dr. Ragheb's assertion that CNSC staff's evaluation of stack emissions was not based on a safety analysis for a specific plant, CNSC staff stated that it evaluates all aspects of facility emissions during normal operations, as well as the

impact to the public in terms of any accidents or events. CNSC staff added that BWXT had submitted an environmental risk assessment that analyzes the consolidated fuel pelleting operations, including the associated impact to the public.

439. On the planned configuration at the Peterborough facility for the requested pelleting operations, CNSC staff reported that it would perform a thorough assessment to make sure that the anticipated report, not yet submitted, would adequately incorporate all aspects of pelleting operations into the Peterborough site. CNSC staff noted that operational safety is assured by the equipment design and that the documentation to be submitted to the Commission would provide a complete safety analysis.
440. On whether BWXT's pelleting operations could process enriched fuel at the Peterborough facility, the BWXT representative clarified that the pellets made by BWXT for boiling water reactors were made of natural uranium. The BWXT representative added that BWXT does not process enriched uranium and has no intention to do so. In the hypothetical event such a request were made, CNSC staff reported that the first step would be to inform the community about the application and perform a technical assessment. The application would then be presented to the Commission for its consideration. On whether BWXT would need Commission authorization if it wanted to produce fuel for a non-CANDU reactor, CNSC staff indicated that any change to the licensing basis, including the type of material currently possessed, would require a licensing decision by the Commission.
441. If pelleting operations were to start in Peterborough, BWXT would also need to apply to the MECP for an amendment to its air emission limits to ensure that the MECP air standards would be met. The MECP representative added that BWXT would be required to perform stack monitoring and update emission dispersion modelling, after the beginning of operation, to demonstrate that BWXT met the MECP standards.
442. In relation to J. Scott's concern regarding the storage of hydrogen required for pelleting operations, the Fire Chief of the Peterborough Fire Services explained that the Peterborough Fire Services has a Hazardous Materials Technician Team trained and equipped to face any hazards, including a hydrogen explosion or a fire in a potential radiological environment. Emergency planning in respect of pelleting operations in Peterborough would involve the Peterborough Emergency Management Office and the Peterborough Fire Services.
443. All of the Commission members agree on the regulatory elements and the technical facts pertaining to the commercial production of fuel pellets. There is also agreement that, should the pelleting operations be transferred to Peterborough, the health and safety of persons and of the environment would remain adequately protected as emission levels would remain low. Dr. Demeter is of the view, however, that BWXT has not provided adequate justification for such an eventual transfer, and that the question is not whether pelleting is safe in Peterborough, but rather, at what location is it "safer" to pellet. Holding all else constant, the significant difference between BWXT's Toronto and Peterborough facilities is the presence of an elementary school

(i.e. Prince of Wales Public School), with an identifiable vulnerable population, immediately adjacent to BWXT's operations in Peterborough. Therefore, taking all things into consideration, is it safer to pellet in Toronto or Peterborough?

444. The Commission majority is satisfied that pelleting operations would be adequately safe at either the Toronto or the Peterborough facility, given that the public effective dose, the air UO₂ releases and the effluent UO₂ releases are and would remain well below regulatory and licence limits. The majority is of the view that BWXT is qualified, pursuant to subsection 24(4) of the NSCA, to operate pelleting operations in Peterborough.
445. Dr. Demeter has not opined on the qualification of BWXT to operate pelleting operations in Peterborough. Dr. Demeter is of the view that, if the safety case can be met for either site, the request to allow pelleting in BWXT's Peterborough location needs to be analyzed through the lenses of ALARA, justification, the precautionary principle and the relative risk of pelleting in Toronto versus Peterborough, as discussed in the paragraphs below.

ALARA

446. Dr. Demeter is of the view that the ALARA principle (As Low As Reasonably Achievable) needs to be considered for the "*selection of the best option under the prevailing circumstances*"²³ by taking into account the following, as set out in section 4.1.4 of the draft [REGDOC-2.7.1](#):

"The ALARA principle takes into account social and economic factors, and licensees have the overall responsibility of assessing and documenting the justification and rationale for how they will take these factors into account in the application of the ALARA principle in order to substantiate their decisions."

Dr. Demeter considered "social factors" such as equity and social trust to conclude that BWXT has not demonstrated that moving the pelleting operations to Peterborough would be acceptable. On equity, Dr. Demeter is of the view that the potential increase, should pelleting move to Peterborough, in estimated dose to the public from 0 to up to 0.0175 mSv/yr and the increase in environmental releases, based on the Toronto numbers, are not justified based on ALARA, especially the potential inequitable increased exposure to the vulnerable population given the proximity of the Prince of Wales Public School. On social trust, the proximity of the school and the concerns from local residents are also predominant factors for not allowing pelleting in Peterborough.

²³ Per section 4.1.3 of the draft [REGDOC-2.7.1: Radiation Protection](#).

447. The majority disagrees with Dr. Demeter's application of the ALARA principle in this manner. The majority is of the view that the very low levels of environmental releases and doses to the public would not have an impact on the health of persons and the environment, in accordance with subsection 24(4) of the NSCA. It is the licensee which has the responsibility to assess and document the rationale for its proposal, and the Commission is satisfied that BWXT will comply with the ALARA principle and aim at minimizing doses at either location. In addition, the majority is of the view that there is no reasonable basis on which to deny the request for flexibility to be built into the licence, which is conditional on further confirmation of these low levels via a final commissioning report and an updated safety analysis, should BWXT opt to transfer its pelleting operations.

Relative risk of conducting pelleting at one facility versus the other

448. The majority agrees with Dr. Demeter that the transfer of the pelleting operations would increase the environmental emissions of UO₂ in air and water and the resulting dose to the public in Peterborough. However, it is the view of the majority that these doses would be so negligible that they would have no health and safety impact to persons and the environment, including to the most vulnerable population such as the students at the Prince of Wales Public School. Releases would be a very small fraction of the regulatory limits.

Justification

449. BWXT has requested that flexibility be built in its licence in the eventuality that it decides, for business reasons, to consolidate operations in Peterborough. The majority is of the view that BWXT is entitled to determine how best to conduct its business, and that the Commission's role is to ensure it does so safely in accordance with the NSCA and related regulations.
450. Dr. Demeter, referring to the International Commission on Radiological Protection's system of radiation protection being framed by justification, optimisation and dose limits ([ICRP Publication 103, 2007](#)), is of the view that BWXT has not provided justification that would override the need to protect the more vulnerable population of Peterborough, and that it is therefore more justifiable to conduct pelleting in Toronto than in Peterborough.

Precautionary Principle

451. Dr. Demeter's opposition to pelleting in Peterborough is also grounded in the precautionary principle. That is, Dr. Demeter holds the view that, even if it would be difficult to argue that there is potential for "serious or irreversible damages" with moving the pelleting operations, adding radiation doses and UO₂ air and effluent emissions in a site which has an adjacent vulnerable population, is not acting in an abundance of precaution.

452. The majority is of the view that the precautionary principle is not being neglected in this matter as there would not be serious or irreversible damages. The pelleting operations, the plant design and the estimated doses and environmental releases are well characterized, and would be conducted in only one facility.

Decision on BWXT's request to conduct fuel pelleting operations in Peterborough

453. By majority decision in regard to pelleting operations, with Dr. Demeter dissenting, the Commission is satisfied that pursuant to subsection 24(4) of the NSCA
- BWXT is qualified to perform the licensed activity of fuel pelleting operations; and
 - will, in carrying out that activity, make adequate provision for the protection of the environment, the health and safety of person and the maintenance of national security and measures required to implement international obligations to which Canada has agreed

at either its Toronto or Peterborough facilities. The Commission authorizes the commercial production of fuel pellets to be conducted at BWXT's Peterborough facility, subject to BWXT submitting an acceptable final commissioning report, to be approved by the Commission.

454. The Commission has also decided that BWXT is authorized to carry on the commercial production of fuel pellets at only one of its facilities, with the result that BWXT would have to cease commercial production of fuel pellets at its Toronto facility before it could start at its Peterborough facility. This decision is reflected in the Toronto facility-specific licence condition 15.1 and the Peterborough facility-specific licence condition 15.3.
455. In order to minimize nuclear fuel supply issues, the Commission understands that there will be a transition period during which BWXT may conduct parallel activities at either facility during the transfer of pelleting operations from Toronto to Peterborough. However, as noted above in paragraph 453, the commercial production of fuel pellets in Peterborough shall only commence following Commission approval of the final commissioning report.

4.20 Licence Length and Conditions

456. The Commission considered BWXT's application in respect of a 10-year licence renewal for its Toronto and Peterborough fuel fabrication facilities.
457. CNSC staff submitted that its assessment of BWXT's past performance as a licensee and the programs it has in place in respect of its licensed activities demonstrate that that BWXT is qualified to carry on the licensed activities authorized by the licence. CNSC staff is also of the view that its assessment showed that BWXT will continue to

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

4.20.1 Licence Period

458. In its written and oral submissions for this hearing, CNSC staff recommended a 10-year licence period in respect of BWXT's licence renewal. The Commission also considered the submissions from several intervenors in both Toronto and Peterborough who recommended shorter licence periods. In its decision to renew BWXT's licence for a 10-year period, the Commission assessed these submissions as detailed below.
459. Some intervenors raised the issue of a licensee being subject to a lower level of regulatory oversight when licensed for a longer period of time. CNSC staff explained that the CNSC's regulatory oversight activities are risk-based and that the licence period is not a factor in determining the compliance verification activities needed to be carried out in respect of a licensee and its licensed activities. A longer licence period does not lead to a lower level of regulatory oversight and CNSC staff have flexibility in carrying out inspections beyond planned inspections, if necessary. The Commission also notes that RORs are a means by which the Commission is updated on a licensee's regulatory compliance throughout the licence period and that event initial reports update the Commission on licensee events that merit more timely reporting.

4.20.2 The Issue of One Versus Two Licences for BWXT's Facilities

460. An issue considered by the Commission for this hearing and raised by intervenors, the licensee and CNSC staff is whether having a single licence for BWXT's Toronto and Peterborough facilities provides for optimal facility-specific regulatory oversight. Since BWXT currently has a single licence for its facilities, the Commission considered the reasons in favour of renewing BWXT licence as a *single licence* versus *two facility-specific licences*. The reasons and considerations in the paragraphs below summarize the Commission members' views after considering all of the evidence on the record for this hearing.
461. The reasons and considerations in favour of renewing BWXT's licence as a *single licence* could include:
- potential lower regulatory burden: BWXT has common programs for both facilities
 - ease of regulatory oversight: this may allow CNSC staff more time to carry out inspections
 - separate financial guarantees for each facility are already in place
 - BWXT's complete process for the manufacturing of the fuel bundles requires the licensed activities conducted at both facilities (formation of pellets, sintering of pellets, fuel bundle assembly)

462. The reasons and considerations in favour of renewing BWXT's licence as *two facility-specific* licences could include:
- two licences better convey licence conditions specific to each facility and allow for separate licence periods, if needed in the future
 - the facilities are on sites that have distinct historical contexts and legacy wastes
 - the facilities have distinct challenges in respect of issues such as environmental monitoring, emergency management, protection of the public and public information
 - the facilities are located in distinct communities, with implications for Indigenous engagement and consultation
 - intervenors in Toronto and Peterborough demonstrated that their communities have distinct public information needs and concerns about BWXT's activities
 - intervenors in both Toronto and Peterborough requested facility-specific licence renewals
 - BWXT has separate financial guarantees in place for each facility
463. On the balance of the evidence considered for this hearing, the Commission has decided that a licence renewal in the form of two licences for BWXT's Toronto and Peterborough facilities will best meet the CNSC's regulatory needs and expectations, and the host communities' needs. The Commission is of the view that the benefits of renewing BWXT's licence as two licences greatly outweigh any regulatory burden that may be associated with such a change and that this licence structure will better allow for regulatory oversight in respect of issues that are unique to each of the Toronto and Peterborough communities.

4.20.3 Licence Conditions

464. Several intervenors requested that BWXT not be allowed to apply for licence renewal at the end of the 10-year renewed licence period. The Commission notes that the NSCA is permissive in that BWXT may apply for a licence renewal and that the Commission could not restrict such an application. However, should the Commission at any time during the renewed licence period, or upon the next application, be of the opinion that BWXT no longer meets the conditions in subsection 24(4) of the NSCA, BWXT's licence could be amended, suspended or revoked. A licensee must continue meeting all regulatory and licensing requirements throughout its licence period.

Toronto BWXT Facility

465. The Commission includes in the Toronto facility licence the conditions as recommended by CNSC staff in CMD 20-H2, CMD 20-H2.A and CMD 20-H2.B, with the exception of the proposed conditions 15.1 and 15.2.

466. In order to provide adequate regulatory oversight of changes that do not require a licence amendment or Commission approval, the Commission approves CNSC staff's recommendation in CMD 20-H2 that the Commission delegate authority for certain approval or consent, as contemplated in licence condition 3.2 in respect of reporting requirements, to the following CNSC staff:

- Director, Nuclear Processing Facilities Division
- Director General, Directorate of Nuclear Cycle and Facilities Regulation
- Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch

467. Per the Commission's decision on the authorization to conduct pelleting operations at the Peterborough facility, BWXT shall cease pelleting operations at its Toronto facility prior to commence pelleting operations in Peterborough. Therefore, the Commission includes in the licence for the Toronto facility licence condition 15.1 which shall read

“The commercial production of fuel pellets shall be conducted at either the Toronto facility or at the Peterborough facility, but not at both facilities.”

Peterborough BWXT facility

468. The Commission includes in the Peterborough facility licence the conditions as recommended by CNSC staff in CMD 20-H2, CMD 20-H2.A and CMD 20-H2.B with the exception of the proposed conditions 15.1 and 15.2.

469. In order to provide adequate regulatory oversight of changes that do not require a licence amendment or Commission approval, the Commission approved CNSC staff's recommendation in CMD 20-H2 that the Commission delegate authority for certain approval or consent, as contemplated in licence condition 3.2 in respect of reporting requirements, to the following CNSC staff:

- Director, Nuclear Processing Facilities Division
- Director General, Directorate of Nuclear Cycle and Facilities Regulation
- Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch

470. The Commission includes facility-specific licence condition 15.1 in the renewed licence for BWXT's Peterborough facility which shall read:

“The licensee shall submit and implement an updated environmental monitoring program at the Peterborough facility prior to the commencement of production of fuel pellets as described in paragraph (i) (a) and (iii) of Part IV of this licence.”

where Part IV defines the following in respect of licence conditions 15.1 and 15.2:

“This licence authorizes the licensee to:

- (i) operate and modify the Peterborough nuclear fuel facility located at 1160 Monaghan road, Peterborough, Ontario for the purpose of;
 - a. production of fuel pellets from natural and depleted uranium dioxide;
- (iii) modify the Peterborough facility and commission equipment for the purpose of the production of fuel pellets described in (i) (a).”

471. The Commission does not delegate the authority for the approval of BWXT’s final commissioning report related to the commercial production of fuel pellets at BWXT’s Peterborough facility, as recommended by CNSC staff in CMD 20-H2 (proposed licence condition 15.2). Rather, the Commission includes in the licence for the Peterborough facility licence condition 15.2 which shall read

“The licensee shall submit a final commissioning report related to production of fuel pellets as described in paragraph (i) (a), (iii) of Part IV of this licence that is acceptable to the Commission prior to commencement of commercial production of fuel pellets at the Peterborough facility.”

The Commission understands that an updated safety analysis report reflecting the commercial production of fuel pellets is included as part of the final commissioning report.

472. The Commission also includes in the licence for the Peterborough facility licence condition 15.3 which shall read

“The commercial production of fuel pellets shall be conducted at either the Toronto facility or at the Peterborough facility, but not at both facilities.”

5.0 CONCLUSION

473. The Commission has considered the licence renewal application submitted by BWXT. Based on its consideration of the information submitted, the Commission is satisfied that the application submitted by BWXT meets the requirements of the NSCA, the GNSCR and other applicable regulations made under the NSCA.
474. The Commission has also considered the information and submissions of the applicant, CNSC staff and all participants as set out in the materials available for reference on the record, as well as the oral and written interventions provided or made by the participants at the hearing.

475. The Commission is satisfied that BWXT meets the test set out in subsection 24(4) of the NSCA. That is, the Commission is of the opinion that BWXT is qualified to carry on the activities that will be authorized by licence and that it will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.
476. The Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Nuclear Fuel Facility Licence issued to BWXT Nuclear Energy Canada Inc. as two facility-specific licences. The Commission has determined that there should be separate licences for each of the Toronto and Peterborough facilities. The renewed facility-specific licences, FFL-3621.00/2030 for the Toronto facility and FFL-3620.00/2030 for the Peterborough facility, are valid from January 1, 2021 until December 31, 2030.
477. The Commission authorizes BWXT to carry on the commercial production of fuel pellets at its Peterborough, Ontario facility, subject to the condition that BWXT submits a final commissioning report related to the commercial production of fuel pellets that is acceptable to the Commission. At any time in the licence period of the two licences, BWXT shall be authorized to commercially produce fuel pellets at only one of its facilities, and not both.
478. With respect to the authorization to BWXT to conduct commercial fuel pelleting operations in Peterborough, the decision is that of the majority of the Commission. Commission Member Dr. S. Demeter would not authorize BWXT to conduct commercial fuel pelleting operations in Peterborough, Ontario and would hold that the pelleting operations should remain in Toronto, Ontario. The reasons for the dissenting view of Dr. S. Demeter are presented in Section 4.19 of this record of decision.
479. The Commission includes in the BWXT's Toronto and Peterborough licences the conditions as specified in section 4.20 of this record of decision.
480. The Commission directs that, at about the mid-point of the 10-year licence period and no later than 2026, BWXT shall present to the Commission a comprehensive mid-term updates on its licensed activities for each of the Toronto and Peterborough facilities. These mid-term updates will take place during a public Commission proceeding in the vicinity of the communities that hosts BWXT's facilities. Indigenous peoples, members of the public and stakeholders will be able to intervene in these proceedings in the manner to be established by the Commission.
481. The Commission is satisfied that neither an EA under the CEAA 2012 nor an impact assessment under the IAA was required for the renewal of the licence and considers the environmental protection review that was conducted by CNSC staff to be acceptable and thorough. The Commission is satisfied that BWXT has made, and will continue to make, adequate provision for the protection of the environment and the health of persons throughout the proposed licence period.

482. The Commission notes that CNSC staff can bring any licensing of compliance matter to the Commission that merits its attention. The Commission directs CNSC staff to inform the Commission on an annual basis of any changes made to the Licence Conditions Handbook (LCH).
483. With this decision, the Commission directs CNSC staff to report on the performance of BWXT and its Toronto and Peterborough facilities, as part of a sector-specific ROR. CNSC staff shall present this report at a public proceeding of the Commission, where Indigenous peoples, members of the public and stakeholders will be able to participate.
484. The Commission notes that BWXT is committed to expanding its engagement activities with all interested Indigenous communities and groups and expects BWXT to engage with Indigenous peoples on the operations and the end-states of BWXT's Toronto and Peterborough facilities. The Commission also requests that CNSC staff continues to engage with and develop relationships with Indigenous communities and groups around Toronto and Peterborough, and to report on progress in this regard in the context of the ROR or through other means.
485. The Commission expects BWXT to improve and expand its PIDP in the manner which BWXT detailed during this hearing. The Commission directs CNSC staff to verify these improvements during targeted compliance verification activities.
486. The Commission directs CNSC staff to review its compliance verification criteria in respect of PIDPs and the guidance that is provided in REGDOC-3.2.1 to ensure that it adequately meets the Commission's expectations and the needs of the public, as detailed during this hearing.

Velshi, Rumina

Digitally signed by Velshi, Rumina
DN: c=CA, o=GC, ou=CNSC-CCSN, cn="Velshi,
Rumina"
Reason: I am the author of this document
Location: your signing location here
Date: 2020-12-18 16:35:17
Foxit PhantomPDF Version: 9.7.1

December 18, 2020

Rumina Velshi
President,
Canadian Nuclear Safety Commission

Date

Appendix A – Intervenors

Intervenors – Oral Presentations	Document Number
CANDU Owners Group, represented by F. Dermarkar	CMD 20-H2.10
George Fogarasi	CMD 20-H2.13
Dan Rudka	CMD 20-H2.17
Hanna Conover-Arthurs	CMD 20-H2.23
Jenny Carter	CMD 20-H2.29
Melanie Buddle	CMD 20-H2.32
Safety Probe International, represented by H. Ragheb	CMD 20-H2.33 CMD 20-H2.33A
Organization of Canadian Nuclear, represented by R. Oberth	CMD 20-H2.36 CMD 20-H2.36A
Kate Haines	CMD 20-H2.40
Canadian Nuclear Workers’ Council, represented by B. Walker, T. Mocon, H. Blanchard and K. Billings	CMD 20-H2.42 CMD 20-H2.42A
Arthur Blomme	CMD 20-H2.45
Jim Dufresne	CMD 20-H2.51
David Fernandes	CMD 20-H2.55
Bill Templeman	CMD 20-H2.57
Lainey Bates	CMD 20-H2.58
Corinne Mintz	CMD 20-H2.61 CMD 20-H2.61A
Janine Carter	CMD 20-H2.65
Erica Martin	CMD 20-H2.66 CMD 20-H2.66A
Steve Daniels	CMD 20-H2.75 CMD 20-H2.75A CMD 20-H2.75B
Eleanor Underwood	CMD 20-H2.79 CMD 20-H2.79A
Kaia Martin	CMD 20-H2.80
James Deutsch	CMD 20-H2.81
Lara Griffin	CMD 20-H2.82
Angel Hamilton	CMD 20-H2.85
Julie Cosgrove	CMD 20-H2.87
North American Young Generation in Nuclear Durham Chapter, represented by D. Matachniouk, V. Sunassy and D. Awad	CMD 20-H2.92 CMD 20-H2.92A
Graham and Rachel Petty	CMD 20-H2.99
Curve Lake First Nation, represented by Chief Carr, Chief Whetung and Chief Niganobe	CMD 20-H2.101
Canadian Association of Physicians for the Environment, represented by C. Wakil	CMD 20-H2.104 CMD 20-H2.104A
Julia Tuer	CMD 20-H2.105 CMD 20-H2.105A

Intervenors – Oral Presentations	Document Number
Swim Drink Fish Canada / Lake Ontario Waterkeeper, represented by P. Feinstein	CMD 20-H2.108
Kathryn Campbell	CMD 20-H2.109 CMD 20-H2.109A
Sue MacKay	CMD 20-H2.116
Jennifer Logan	CMD 20-H2.117 CMD 20-H2.117A
Canadian Nuclear Association, represented by S. Coupland and A. Ethier	CMD 20-H2.118
Dana Jordan	CMD 20-H2.120 CMD 20-H2.120A
Peter Harris	CMD 20-H2.121 CMD 20-H2.121A
Justice, Peace and Integrity of Creation Office of the Sisters of St. Vincent de Paul, represented by J. Milloy	CMD 20-H2.122 CMD 20-H2.122A
Adrian Currie	CMD 20-H2.125
Rockliffe-Smythe Community Association, represented by M. Hawkins	CMD 20-H2.132
Philip Kienholz	CMD 20-H2.133 CMD 20-H2.133A CMD 20-H2.133B
Port Hope Community Health Concerns Committee, represented by F. More	CMD 20-H2.134 CMD 20-H2.134A
Ruth Bishop	CMD 20-H2.138 CMD 20-H2.138A CMD 20-H2.138B
Peterborough Public Health, represented by R. Salvaterra	CMD 20-H2.139
Margaret Smith	CMD 20-H2.142
Women in Nuclear Canada, represented by L. McBride	CMD 20-H2.143
Janice Keil	CMD 20-H2.144 CMD 20-H2.144A
Jacinta McDonnell	CMD 20-H2.146
Ontario Clean Air Alliance, represented by A. Bischoff	CMD 20-H2.154
Deirdre McGahern	CMD 20-H2.157
Jacquelin Millar	CMD 20-H2.159
James Wilkes	CMD 20-H2.160
Zach Ruiter	CMD 20-H2.166
Adam Prinsen, Laura Anderson, Wei Wei Han and Brenna Steels	CMD 20-H2.167 CMD 20-H2.167A CMD 20-H2.167B
Julie Dzerowicz, MP, Davenport	CMD 20-H2.168
Chris Muir	CMD 20-H2.169
Janet McNeill	CMD 20-H2.173 CMD 20-H2.173A
Jason Rogers	CMD 20-H2.175

Intervenors – Oral Presentations	Document Number
John D’Orsay	CMD 20-H2.176
James Tuer	CMD 20-H2.180
Indie Bennett	CMD 20-H2.181
Trista Gilbert	CMD 20-H2.184 CMD 20-H2.184A
Nick Lato	CMD 20-H2.187
Marit Stiles, MPP, Davenport	CMD 20-H2.191
John Gibb	CMD 20-H2.192
Laurie Pezzack	CMD 20-H2.200
Sarah Vandenberg, Sabrina Hale, Jennifer Ross and Jessica Arsenault	CMD 20-H2.201
Chaitanya Kalevar	CMD 20-H2.203
David Berger	CMD 20-H2.205 CMD 20-H2.205A
Priscilla Medeiros	CMD 20-H2.206
Wendy Fischer	CMD 20-H2.210
Christiaan Beyers	CMD 20-H2.211
Ursula Medeiros	CMD 20-H2.215
Committee for Future Generations, represented by K. Kimura	CMD 20-H2.216
Sarah Mancini	CMD 20-H2.219
Pete Woolidge	CMD 20-H2.220
Miles Johnston	CMD 20-H2.222
Zahir Topan	CMD 20-H2.223 CMD 20-H2.223A CMD 20-H2.223B
Kyle and Brad Blaney	CMD 20-H2.225
Anna Tilman	CMD 20-H2.237 CMD 20-H2.237A
Belinda Cole	CMD 20-H2.240
Rob Mound	CMD 20-H2.241
Kyoko Sato	CMD 20-H2.243
Julian Aherne	CMD 20-H2.244 CMD 20-H2.244A
Citizens Against Radioactive Neighbourhoods, represented by K. Blaise and G. Edwards	CMD 20-H2.245 CMD 20-H2.245A CMD 20-H2.245B
Jane Scott	CMD 20-H2.246
Catherine Prinsen	CMD 20-H2.247 CMD 20-H2.247A
Cameron Douglas	CMD 20-H2.249

Intervenors – Written Interventions	Document Number
Caroline Tennant	CMD 20-H2.2
Don and Heather Ross	CMD 20-H2.3
Barbara Russell	CMD 20-H2.4
Layne and Gail Lewis	CMD 20-H2.5
Devon Code	CMD 20-H2.6
Canadian Nuclear Isotope Council	CMD 20-H2.7
C. & T. Tool and Machine Inc.	CMD 20-H2.8
Laurie Westaway	CMD 20-H2.9
Nicolas Martin-Burtart	CMD 20-H2.11
Anne Elliott	CMD 20-H2.12
Jennifer Kazda	CMD 20-H2.14
Robert Paehlke	CMD 20-H2.15
Lisa Wood	CMD 20-H2.16
Karin DesChamp	CMD 20-H2.18
Emily Straka	CMD 20-H2.19
Bruce Power	CMD 20-H2.20
Adam Vicente	CMD 20-H2.21
Aimee Ng	CMD 20-H2.22
Helen Burnaby	CMD 20-H2.24
Miriam Davidson and Marlowe Bork	CMD 20-H2.25
Ashlynn Foster	CMD 20-H2.26
Murali Ganapathy	CMD 20-H2.27
Gordon and Claudea Usher	CMD 20-H2.28
Sheila Collett	CMD 20-H2.30
Gavin Winter	CMD 20-H2.31
Jennifer Guerin	CMD 20-H2.34
Ontario Power Generation	CMD 20-H2.35
Philip McMichael	CMD 20-H2.37
Adam Baker	CMD 20-H2.38
Ruth Pezzack	CMD 20-H2.39
Leslie McGrath	CMD 20-H2.41
Timothy Holland	CMD 20-H2.43
Anna Tennent-Riddell	CMD 20-H2.44
Cynthia Conner	CMD 20-H2.46
Kathy Dunne	CMD 20-H2.47
Jacqueline Wright	CMD 20-H2.48
Joshua Benjamin Marston	CMD 20-H2.49
Lara Elizabeth George	CMD 20-H2.50
Gwen Stevens	CMD 20-H2.52
Mary Garvey	CMD 20-H2.53
Sarah Thomson	CMD 20-H2.54
Corina McCoy	CMD 20-H2.56

Intervenors – Written Interventions	Document Number
Jonathan Campbell	CMD 20-H2.59
Anna Eidt	CMD 20-H2.60
Karen Hjort-Jensen	CMD 20-H2.62
Stanley Yoo	CMD 20-H2.63
Drew Ginter	CMD 20-H2.64
Janine Carter	CMD 20-H2.65
Birthe Jorgensen	CMD 20-H2.67
Andres D’Imperio	CMD 20-H2.68
Barton Feilders	CMD 20-H2.69
Ursula Pflug	CMD 20-H2.70
Olivia Kwan and Anthony Murray	CMD 20-H2.71
Beverly Peever	CMD 20-H2.72
Katrina Behr	CMD 20-H2.73
Jessica Rowland	CMD 20-H2.74
Mathew and Karlie Holtby	CMD 20-H2.76
Janet Harris	CMD 20-H2.77
Nika Morisano	CMD 20-H2.78
Stacy Smith Barriault	CMD 20-H2.83
Erin Parker	CMD 20-H2.84
Carolyn Ross	CMD 20-H2.86
Andrew Griffin	CMD 20-H2.88
Stu Morris	CMD 20-H2.90
Sharon Fitzgerald	CMD 20-H2.91
Erin Howley	CMD 20-H2.93
Ava Richardson and Zenryu Owatari	CMD 20-H2.94
Leanne Simpson	CMD 20-H2.95
Peter Prinsen	CMD 20-H2.96
Jonothan Fiddler	CMD 20-H2.97
Claire Symington	CMD 20-H2.98
John Climenhage	CMD 20-H2.100
Michael Phillips	CMD 20-H2.102
Cathy Manias-Fiddler	CMD 20-H2.103
Chris Risley	CMD 20-H2.106
Katherine Orgill and Bruce Scott	CMD 20-H2.107
Joanne O’Donoughue	CMD 20-H2.110
Matt Snell	CMD 20-H2.111
Adrienne Newman	CMD 20-H2.112
Charlotte Kennedy	CMD 20-H2.113
Jamie Chadwick	CMD 20-H2.114
Roy Brady	CMD 20-H2.115
Alejandra Gonzalez Jimenez, Amira Mittermaier and Felix Mittermaier	CMD 20-H2.119
Ralf Pohlak	CMD 20-H2.123
John Jared Irwin	CMD 20-H2.124

Intervenors – Written Interventions	Document Number
Susan Cooper	CMD 20-H2.126
Rosemary MacAdam	CMD 20-H2.127
Rebecca Reeves	CMD 20-H2.128
Danielle Tassie	CMD 20-H2.129
Miriam Lyall	CMD 20-H2.130
Timothy Wilson	CMD 20-H2.131
Stephanie Benn	CMD 20-H2.135
Ann Jaeger	CMD 20-H2.136
Dora Juhasz	CMD 20-H2.137
Ontario’s Nuclear Advantage (ONA)	CMD 20-H2.140
Robert Gibson	CMD 20-H2.141
Claudette Beaudoin	CMD 20-H2.145
Motion Canada	CMD 20-H2.147
Arndt Kruger	CMD 20-H2.148
John Marris	CMD 20-H2.149
Andrew Jobes and Sarah Crane	CMD 20-H2.150
Rosemary Frei	CMD 20-H2.151
Ken Brown	CMD 20-H2.152
Anna Petry	CMD 20-H2.153
Robert Steinman	CMD 20-H2.155
Sheila Nabigon-Howlett	CMD 20-H2.156
Rachel Wortis Beda	CMD 20-H2.158
Anna White	CMD 20-H2.161
Pete Hewett	CMD 20-H2.162
Kendra Couling	CMD 20-H2.163
Hiroshima-Nagasaki Day Coalition	CMD 20-H2.164
Doug Back	CMD 20-H2.165
Maggie Robertson	CMD 20-H2.170
Cathy Tafler	CMD 20-H2.171
Lisa Campbell	CMD 20-H2.172
Patricio Marinez	CMD 20-H2.174
John D’Orsay	CMD 20-H2.176
Angela Bird	CMD 20-H2.177
Bree and Aaron Walpole	CMD 20-H2.178
Colin Purcell	CMD 20-H2.179
Corry Prinsen	CMD 20-H2.182
Caroline (Cara) Peterman	CMD 20-H2.183
Steven do Vale	CMD 20-H2.185
Jonathan Minkarious	CMD 20-H2.186
Janice Rosen	CMD 20-H2.188
Markus Piro	CMD 20-H2.189
Jamie Flagg	CMD 20-H2.190
Sandra Lindgreen	CMD 20-H2.193

Intervenors – Written Interventions	Document Number
Barbara Chisholm	CMD 20-H2.194
Joyce Hall	CMD 20-H2.195
Marjorie Castro	CMD 20-H2.196
Trevor Middel and Stephanie Melles	CMD 20-H2.197
Tom Smarda	CMD 20-H2.198
Julian Aherne, Gary Burness, James Connoly, Peter Lafleur, Erica Nol, Mark Parnis and Rachel Wortis	CMD 20-H2.199
Thomas Miller	CMD 20-H2.202
George Campana	CMD 20-H2.204
Lana Kouchnir	CMD 20-H2.207
Megan Vincett	CMD 20-H2.208
Mary Elizabeth Konrad	CMD 20-H2.209
Juliette Barriault	CMD 20-H2.212
Everett Barriault	CMD 20-H2.213
Jennifer Bowe	CMD 20-H2.214
Gordon and Caroline Langill	CMD 20-H2.217
Bruce Harris	CMD 20-H2.218
Jillian Hansen	CMD 20-H2.221
Graeme Marrs	CMD 20-H2.224
Jennifer Kirkpatrick	CMD 20-H2.226
Linda Patterson	CMD 20-H2.227
Fred and Maggie Baker	CMD 20-H2.228
Rosanna Zerafa	CMD 20-H2.229
Katherine Fee	CMD 20-H2.230
Judy Dixon	CMD 20-H2.231
Annie Gelfand	CMD 20-H2.232
Susan Chiddix	CMD 20-H2.233
Craig Niziolek	CMD 20-H2.234
Laura Pauk	CMD 20-H2.235
Riki Kretschmar	CMD 20-H2.236
Christie Nash	CMD 20-H2.238
Judy Stewart	CMD 20-H2.239
Melinda Rees	CMD 20-H2.242
Catherine Prinsen, Beatrice Chan, James Wilkes, George Campana and 33 interested persons	CMD 20-H2.248