Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Saskatchewan Research Council SLOWPOKE-2 Reactor Facility Licence Amendment

Commission Hearing
September 26, 2019
CMD 19-H100.A

e-Doc 5981129 (PPTX)
e-Doc 5998309 (PDF)

nuclearsafety.gc.ca

Canada

CNSC Staff's Presentation

- Review of licence amendment application
- Summarize CNSC staff's assessment on:
  - SRC's safety performance since licence renewal in 2013
  - Current site status
- Overview of interventions
- Provide CNSC staff's conclusion and recommendation

SRC's Request for a Licence Amendment

- December 14, 2018 – Application for an amendment of SRC's existing licence to authorize decommissioning
- Detailed decommissioning plan (DDP) reviewed and accepted by CNSC Staff
- Defueling is covered under the current operating licence
- All reactor components to be removed
- Water to be purified and disposed
- Concrete pool to be decontaminated and filled with concrete
- End state objective is unrestricted use

Operating/Decommissioning Activities

	Operating	Decommissioning
Operate reactor	✓	✗
Maintenance	✓	✓
Defueling (including disassembly of reactor components)	✓	✓
Refueling	✓	✗
Transport of spent fuel (under D.O. licence)	✓	✓
Disposal of reactor/pool water	✗	✓
Transport of radioactive waste	✓	✓
Dismantling of reactor	✗	✓

CNSC Assessment of SRC's Performance

- CNSC staff have assessed SRC's programs - Satisfactory rating in all Safety and Control Areas
- Documents in support of the application are complete and provide assurance that the decommissioning project will be executed safely
- Contractor for decommissioning is qualified

Status of the Reactor

- The reactor was defueled on August 15, 2019
- CNSC staff inspected the defueling operation
- IAEA staff witnessed defueling and applied seal to transport package, ensuring material is safeguarded
- Fuel was transported to USDOE Savannah River Site on September 7 – 9 under Canada – U.S. Agreement on minimization of HEU inventories
- Preparation work underway for decommissioning, pending licensing decision

Next steps

Should the Commission grant this licence amendment:

- SRC to proceed with decommissioning work
- CNSC staff to inspect the facility
- SRC to submit End-State Decommissioning Report (ESDR)
- Authorization to abandon – Current submission includes all relevant information
  - Decision to abandon is conditional to an acceptable ESDR

CNSC will verify the End-State

Interventions

- Participant Funding awarded:
  - Nuclear Waste Watch - $10,796
  - Northwatch - $1,918
- 7 interventions received
- Details of interventions provided in Annex

Interventions – Key Concerns

- Discharging reactor water to the municipal sewer system
- Waste in municipal landfill
- Abandoning the concrete pool
- Transport of radioactive waste
- No plan for long-term management of low-level radioactive waste

CNSC Staff Recommendation

CNSC staff recommend that the Commission amend the SRC SLOWPOKE-2 Licence to authorize decommissioning activities

Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Thank You!

e-Doc 5981129 (PPTX)
e-Doc 5998309 (PDF)

nuclearsafety.gc.ca

Canada

ANNEX – DISPOSITION OF INTERVENORS' COMMENTS

National Council of Women of Canada, CMD 19-H100.2

Comment/Recommendation	CNSC Staff Disposition
The planned in-situ burial and abandonment of the SRC concrete-filled reactor pool, "with no institutional control required", given that in 2018 CNSC allowed the UoASlowpoke reactor to be filled with concrete and abandoned although portions of the reactor were still radioactive	The licensee must conduct a final survey of the reactor pool to ensure it meets the criteria for unconditional release listed in the *Nuclear Substances and Radiation Devices Regulations*. The pool can be filled with concrete only after CNSC staff have verified that the pool meets the release criteria. If the results are above clearance levels, the licensee would be required to revise their plans and submit an updated safety case to the CNSC for approval.
Acceptance that "cores from the reactor pool floor have met clearance levels" when these will not include measurements of long-lived , hard to measure, radioactive substances such as tritium, carbon- 14 and calcium-41	Activity Concentration Limits for Unconditional Clearance Levels are found in Schedule 2 of SOR/2000-207. This table includes Carbon 14 with an activity concentration of 1 Bq/g and Tritium with an activity concentration of 100 Bq/g. Calcium-41 is not listed, however falls under the clause: (b) in respect of a radioactive nuclear substance that is not set out in column 1, (i) is 1 Bq/g, if the atomic number of the substance is equal to or less than 81. The ten nuclides listed are the significant ones with respect to release limits. Tritium, carbon-14, chlorine-36, and calcium-41, were assessed via calculation methods. From the calculations, their concentrations were found to be very small compared to the unconditional release limit (0.2% of the unconditional release limit for Ca-41).
Chemical and radiological dangers to workers from beryllium oxide dust as the reactor is decommissioned. For example, decommissioning of both the University of Dalhousie and the University of Toronto reported there were events where decommissioning staff received excessive doses of radiation during the removal of beryllium reflectors.	The dose effects at Dalhousie were due to a procedure taking longer than expected and consequently the workers were exposed to the radioactive field for longer, not due to the beryllium reflectors alone. The dose incurred by workers never exceeded regulatory limits or administrative control levels. Exposure to beryllium and beryllium oxide is avoided through the use of engineering and management controls of the work processes. Lessons learned were applied and beryllium shim removal tool was improved. The was no event with the UofA decommissioning. CNSC staff inspected the beryllium reflector removal at SRC. The operation was done without incident.

National Council of Women of Canada, CMD 19-H100.2

Comment/Recommendation	CNSC Disposition
The collective radiation dose for this application is higher than that allowed for the [U of A] SLOWPOKE reactor [2.7 mSV estimated vs 0.26 mSv for U of A as a final result]	The 2.7 mSv is an estimated collective for the work to be performed. The SLOWPOLE reactors are not run in an identical manner, so the radiological consequences are also not identical. The initial estimated collective dose of 2.7 mSv is reasonable and lower than the 3.6 mSv initial estimated dose for the University of Alberta. Both values are well below the allowable dose limit and protective of workers.
The plans for unconditional release into municipal landfills of "as much waste as possible", and the "processing" of radioactive waste from the reactor pool and release into the municipal sewage system, given the difficulties municipalities are having with their waste management, including sewage systems	Water is released to the sewage system after it is treated and only if it meets the release limits listed in appendix R of REGDOC-1.6.1 Licence Application Guide: Nuclear Substances and Radiation Devices and requirements of City of Saskatoon. The release limits for each radionuclide are calculated so that the annual effective dose to the most critical receptor is 10 µSv. There are no harmful effects to health or the environment at this level.
it is essential that no part of the core be abandoned, and that its radioactive waste not be placed in municipal landfills or released into the municipal sewage system. Rather, using good stewardship, it should be safely stored and retrievable - well away from waterways, sensitive natural systems and populated areas - and be under human control.	All radioactive waste will be transported to a licensed radioactive waste management facility. Waste sent to landfill must meet the Unconditional Release Levels listed in the *Nuclear Substances and Radiation Devices Regulations*. Limits for releases to the municipal landfill and to the municipal sewer system are derived using IAEA methodology and are designed to be protective of workers and the environment.

Elaine Hughes, CMD 19-H100.3

Comment/Recommendation	CNSC Staff Disposition
To be fair to those who will be most affected by the decision to carry out this process, the hearing planned for September 26, 2019 on the decommissioning of the Slowpoke-2 reactor on the University of Saskatchewan campus should be held in Saskatchewan, specifically, in Saskatoon	To be addressed by Secretariat.
Transporting the high level waste from the site to South Carolina and the intermediate level waste to Chalk River - on public highways, near lakes, rivers and other sources of precious drinking water, through towns and villages, past schools, swimming pools and playgrounds, past hospitals, homes and work places – is risky. Should an accident, and subsequent spill of this lethal material occur, the effects would be long-lasting (hundreds of thousands of years for some of the elements in the waste) and devastating.	Only low-level and intermediate level wastes are transported to Chalk River. Nuclear substances are safely and routinely transported throughout the world every day in accordance with strict international regulations. There have never been any serious injuries, fatalities or environmental consequences from radioactivity associated with these materials being transported or involved in a transport accident. Safety in transport relies heavily on the design of the transport package. Packages designed for the transport of high-risk radioactive material must be certified by the CNSC. These packages undergo rigorous testing to demonstrate that there would be no release of the radioactive contents even under accident conditions, for example if the package were to be dropped, punctured, set on fire, or immersed in water.
Acting as if radioactive water can be 'treated' to be safe enough to be released into the municipal sewage system and dumped into the Saskatchewan River is irresponsible	Water can become radioactive because it contains dissolved minerals which are radioactive. The ion-exchange process removes the contaminants and achieves the water quality that meets the criteria for unconditional release. Water is released to the sewage system after it is treated and only if it meets the release limits listed in appendix R of REGDOC-1.6.1 Licence Application Guide: Nuclear Substances and Radiation Devices. The release limits for each radionuclide are calculated so that the annual effective dose to the most critical receptor is 10 µSv.

Elaine Hughes, CMD 19-H100.3

Comment/Recommendation	CNSC Staff Disposition
It is equally unconscionable to dump radioactive waste into the City of Saskatoon's landfill	Release limits to the municipal landfill are derived using IAEA methodology and are designed to be protective of workers and the environment. Also, see response above.
As to burying the reactor on site in concrete where it cannot be monitored, our experience with Chernobyl has shown us that concrete will disintegrate in fewer than 25 years. Some of our brightest and best students attend this University (approximately 25,000 young people). Is even the remotest risk worth it?	The licensee must conduct a final survey of the reactor pool to ensure it meets the criteria for unconditional release listed in the *Nuclear Substances and Radiation Devices Regulations*. CNSC staff will verify the results of the survey conducted by the licensee through an inspection. The pool can be filled with concrete only after CNSC staff have verified that the pool meets the release criteria. If the results are above clearance levels, the licensee would be required to revise their plans and submit an updated safety case to the CNSC for approval. Should the licensee request a release from licensing through an exemption, the decision would reside with the Commission.

Linda Murphy, CMD 19-H100.4

Comment/Recommendation	CNSC Disposition
Radioactive materials are potentially going to be released into the sewage system in Saskatoon and some into the landfill	Water is released to the sewage system only after it is treated and only if it meets the release limits listed in REGDOC-1.6.1 and requirements of City of Saskatoon. Waste sent to landfill must meet the release limits listed in appendix R of REGDOC-1.6.1 Licence Application Guide: Nuclear Substances and Radiation Devices. There are no harmful effects to health or the environment this level.
The suggestion of entombing waste in more concrete and leaving it "in situ“ is of concern. Isn't concrete porous so over time are we not going to have leakage of more radioactivity?	The use of grout for the SRC decommissioning project is for conventional purposes (i.e., to fill a hole), not for disposing contaminants in place. It is expected that there will be no nuclear substances or residual radiological risks in an amount that would require a CNSC licence. Levels of contamination do not pose a safety risk now or if the concrete deteriorates. The pool will be filled with concrete if it meets the criteria for unconditional release listed in the *Nuclear Substances and Radiation Devices Regulations*. the licensee must conduct a final survey of the reactor pool to ensure it meets the criteria for unconditional release listed in the *Nuclear Substances and Radiation Devices Regulations*. CNSC staff will review the results of the survey conducted by the licensee. The pool can be filled with concrete only after CNSC staff have verified that the pool meets the release criteria. If the results are above clearance levels, the licensee would be required to revise their plans and submit an updated safety case to the CNSC for approval. Should the licensee request a release from licensing through an exemption, the decision would reside with the Commission.
As for shipping [radioactive] waste from Saskatoon to Chalk River, isn't that hazardous? The problem as I see it is that the experts still have no sound way of storing radioactive waste.	For transport safety, see other responses above and below.

Concerned Citizens of Renfrew County, CMD 19-H100.5

Comment/Recommendation	CNSC Staff Disposition
A large proportion of the SRC reactor decommissioning waste is destined for storage [including beryllium reflector], and possible eventual disposal, at the Chalk River Laboratories (CRL), located in the Ottawa Valley	The low and intermediate level radioactive waste from decommissioning of SRC's SLOWPOKE will go to licensed waste management facility at Chalk River Laboratories. Chalk River Laboratories has a licence to possess, manage and store the waste low and intermediate radioactive waste, including the decommissioning waste from the SRC facility.
Incomplete decommissioning of the SRC SLOWPOKE-2 could set a poor precedent for other reactors awaiting decommissioning, such as the shutdown NRX and NRU reactors at CRL	The decommissioning plan for the SRC SLOWPOKE-2 reactor covers the complete decommissioning of the reactor. Other SLOWPOKE reactors in Canada have also been decommissioned completely and successfully in accordance with the Nuclear Safety and Control Act, its associated regulations, the licence, and international standards. Each licensee is responsible to propose a decommissioning plan for their facility to the CNSC who will then assess it from a safety perspective against all applicable regulatory requirements.
Shipping spent fuel to South Carolina, USA, and other radioactive waste to Chalk River hardly constitutes "Final Disposition". It merely transfers radioactive waste from Saskatoon to other locations, which may not (at least in the case of CRL) have an approved plan and capacity for long-term management of reactor decommissioning wastes.	The spent HEU fuel is sent back to its country of origin as part of a broad international effort to consolidate HEU inventories in fewer locations around the world. The USDOE Savannah River Site is equipped to reprocess the fuel for use in nuclear power plants. Low and intermediate level waste authorized under the CNL licensing basis. CRL has a licence to possess, manage and store the waste.

Concerned Citizens of Renfrew County, CMD 19-H100.5

Comment/Recommendation	CNSC Staff Disposition
While CRL has Canada's only licenced commercial radioactive waste storage facility, the individual structures where commercial wastes are presently stored cannot contain and isolate longer-lived reactor wastes for the duration of their radioactive hazard. These wastes include a large variety of fission and activation products produced when uranium-235 atoms split and emit neutrons.	CNL has a licence to possess, manage and store the waste low and intermediate radioactive waste safely and in accordance with its licensing basis, including the decommissioning waste from the SRC facility.
The DDP lacks information on the types of radiation emitted by the SRC SLOWPOKE-2 decommissioning wastes, the half-lives of the radionuclides in the wastes, their potential mobility in the environment, and their uptake by humans. Hence, no consideration is given to their long term management	Half-lives, mobility and toxicity of isotopes contained in waste are well known and documented. The *Radioactive Waste Management Plan* provides the details of waste classification, characterization and management for the main waste components. The DDP states: Radioactive wastes will be characterized as they are packaged. Characterization include monitoring for fixed and removable contamination with bulk radiochemical analysis for significant radionuclides. The analyses (Bq/kg) will be combined with the masses of the materials to generate an estimate of the radionuclide inventories in each shipping container. A listing of the inventory of each container will be maintained and it will accompany the shipment when the wastes are transported from the SRCSF.

Concerned Citizens of Renfrew County, CMD 19-H100.5

Comment/Recommendation	CNSC Disposition
There is no assurance that the Government of Canada (which owns CRL) and Canadian taxpayers will not bear the costs of managing these wastes for an indefinite time into the future.	Natural Resources Canada's Policy Framework for Radioactive Waste specifies that waste owners are responsible, in accordance with the "polluter pays" principle, for the funding, organization, management and operation of the facilities required to safely manage their wastes over the short and long terms. Licensees are obligated to adhere to the terms and conditions of a licence, such as references to standards, decommissioning planning and financial guarantee requirements. The financial guarantees ensure the costs of decommissioning, including management of the waste, are covered by the licensees. SRC pays a fee to CNL for the transfer of the waste, which includes its long term management.
The Commission should consider deferred decommissioning in the absence of long-term waste management strategies	The CNSC's mandate is to regulate nuclear activities, in order to protect the health, safety and security of Canadians and the environment, and to implement Canada's international commitments on the peaceful use of nuclear energy. The CNSC does not prescribe the decommissioning strategy. The licensee is responsible for selecting the strategy and CNSC staff assess the proposed strategy to ensure it meets regulatory requirements for safety.

Concerned Citizens of Renfrew County, CMD 19-H100.5

Comment/Recommendation	CNSC Staff Disposition
The end-state report should show clearly that any remaining radionuclides, in total, do not exceed the "Unconditional Clearance Levels" found in Schedule 2 of the *Nuclear Substances and Radiation Devices Regulations*. If the intent is to abandon still-radioactive waste in place, this would create a "facility for the long-term disposal of nuclear waste" and would trigger a separate licencing process and a review under the Impact Assessment Act	SRC's end-state report is expected to include the final radiological status of any remaining equipment, structures or areas, and identify any requirements for further monitoring. The licensee must conduct a final survey of the reactor pool to ensure it meets the criteria for unconditional release listed in the *Nuclear Substances and Radiation Devices Regulations*. The pool can be filled with concrete only after CNSC staff have verified that the pool meets the release criteria. If the results are above clearance levels, the licensee would be required to revise their plans and submit an updated safety case to the CNSC for approval. Should the licensee request a release from licensing through an exemption, the decision would reside with the Commission.
Demonstrating that the requirements of Schedule 2 of the *Nuclear Substances and Radiation Devices Regulations* are met is extremely challenging, owing to the wide variety of nuclear substances created during reactor operation. Indeed, it appears that these requirements have been ignored in issuance of past licences to abandon SLOWPOKE reactors, and that these requirements will likely again be ignored in the case of the SRC SLOWPOKE-2	Concrete samples are taken in the most exposed portions of the pool concrete and analyzed by an independent laboratory, and the isotope concentrations are compared to Schedule 2 of the NSRD regs. Radionuclides of known significance are listed in the analyses.

Concerned Citizens of Renfrew County, CMD 19-H100.5

Comment/Recommendation	CNSC Staff Disposition
The DDP says concrete samples will be analyzed for "radionuclides that are primary contributors to the clearance index." It provides the following list: europium-152, scandium-46, cesium-134, cobalt-60, europium- 154, manganese-54, zinc-65, potassium-40 and iron-59. Missing from this list are tritium, carbon-14, chlorine-36, and calcium-41. These lighter radioisotopes are among those that pose the greatest health hazard to humans if ingested. Most are very long-lived and difficult to measure. For example, irradiated concrete contains calcium-41, a bone seeker, with a half-life of approximately 100,000 years. Accurate measurement of calcium-41 is very challenging. Is it therefore acceptable to ignore this radioactive substance?	The ten nuclides listed are the significant ones with respect to release limits. Tritium, carbon-14, chlorine-36, and calcium-41, were assessed via calculation methods. From the calculations, their concentrations were found to be very small compared to the unconditional release limit (0.2% of the unconditional release limit for Ca-41). Activity Concentration Limits for Unconditional Clearance Levels are found in Schedule 2 of SOR/2000-207. This table includes Carbon 14 with an activity concentration of 1 Bq/g and Tritium (listed as Hydrogen-3) with an activity concentration of 100 Bq/g. Calcium-41 is not listed, however falls under the clause: (b) in respect of a radioactive nuclear substance that is not set out in column 1, (i) is 1 Bq/g, if the atomic number of the substance is equal to or less than 81. They are not being ignored, but instead a matrix is used to determine the amount of all relevant isotopes from those measured.
The pool floor [for U of A] had a maximum end value of 0.54 µSv/h, that is slightly above the clearance level of 0.5 µSv/h. However, the reactor pool was filled with cellular concrete and capped with reinforced concrete, thereby providing adequate shielding and preventing access to the pool floor. Effectively this created a permanent, unlicensed, facility for the long-term disposal of nuclear waste. This could be considered a form of reactor entombment, which is considered by the International Atomic Energy Agency to be unacceptable for planned reactor decommissioning.	SRC's Gamma Dose Rate Summary showed a maximum of 0.54 µSv/h and an average of 0.14 µSv/h for the pool surfaces. The End State Report for UofA shows that reactor pool and all other areas had dose rates well below the 0.5 µSv/h. The 0.54 µSv/h value is regarding the preliminary survey of the reactor pool (area PWW10). The radioactive source was removed and the final survey results show that the location of interest met the unconditional release criteria. These levels are similar to background, naturally occurring radiation fields and are therefore negligible.

Northwatch, CMD19-H100.6

Comment/Recommendation	CNSC Staff Disposition
General: Inconsistencies, contradictory information and lack of details in some areas	CNSC staff conducted a sufficiency check of the application and noted that it was complete. Furthermore, CNSC staff conducted a technical assessment of the DDP and the decommissioning waste management plan, and concluded that it met regulatory requirements.
Transportation: The application identifies Chalk River Laboratory as the destination for low and intermediate level wastes, meaning the transportation routes will transverse northern Ontario, directly affecting our region and members.	Low level and intermediate waste are routinely transported to Chalk River, safely and in accordance with regulations.
Transportation: the intention to transport high level radioactive waste to the U.S. may be contributing to a series of precedents that could cause harm to northern Ontario in the future by establishing precedents for the cross border transfer of radioactive wastes, including from the U.S. into Canada.	Repatriation of the fuel is done in accordance with the Canada-US agreement on minimization of HEU inventories and Global Threat Reduction Initiative. Waste packages are required to meet the *Packaging and Transport of Nuclear Substances Regulations*, 2015. (SOR/2015-145). Radioactive material has been transported safely nationally and internationally by road, rail, water and air without incident. It is a highly regulated activity that must meet the stringent requirements of both Transport Canada and CNSC before being approved.
Decision-making: CNSC decisions on many of the issues associated with Saskatchewan Research Council / Candu Energy's proposed decommissioning approach project have potential implications for northern Ontario in the event that practices, policies and / or regulatory decision-making with respect to the management of radioactive wastes become precedent-setting or normative in Canada.	The policies and practices followed for SRC are governed by regulations. These were also applied to past decommissioning projects. There is no precedent set by this project.

Northwatch, CMD19-H100.6

Comment/Recommendation	CNSC Staff Disposition
In general, the suite of documents (supporting the application) inadequately describe the hazards associated with the radioactive wastes that will be generated through decommissioning.	Sufficiency check indicated the application is complete.
Request: SRC or their contractor SNC-Lavalin be required to fill all information gaps [e.g. inadequately described hazards associated with the radioactive wastes that will be generated through decommissioning] prior to the hold point requested in the next sub-section	Sufficiency check indicated the application is complete. All hazards are identified in the supporting document of the application. A list of all radionuclides and expected quantities that will be present in facility are listed in the Radiation Physics Assessment Report 147-03320-ASD-004 Rev 1. Additional information becomes available in the End-State Report once decommissioning is done.
Request: Create a hold point through licence conditions which require a public review of the radiological survey results of the reactor pool floor and wall, and a decision by a multi-member panel of the Commission to determine whether the clearance conditions have been met and the reactor pool can be filled.	The criteria for unconditional release of materials and abandonment are stated in the regulations. Abandonment of the facility will be subject to a decision by the Commission.
Request: Require an augmented sampling of the reactor pool floor and walls to provide adequate information to support a determination as to whether clearance levels have been met.	The samples are taken in the most exposed areas of the pool. There is no benefit in taking samples in areas that are less exposed to neutron flux.

Northwatch, CMD19-H100.6

Comment/Recommendation	CNSC Staff Disposition
Request: [On spent fuel transportation] That the Commission require SRC to meet the information requirements related to transportation risk prior to giving further consideration to the SRC application	Transportation has been demonstrated to be safe and is governed by Regulations.
Request: In its Decision the Commission clarify and confirm that decommissioning activities such as removal and shipping of reactor fuel waste are to be undertaken only under a decommissioning licence, not under a reactor operating licence	Removal and transportation of spent fuel are normal activities associated with operating reactors, and are authorized under SRC's operating licence.
Request: That in its Decision the Commission clarify and confirm that a separate licence for the transport of the spent fuel will be subject to a separate licence will be the subject of a public notice, opportunity to comment, and a public hearing including oral submissions, and that the Commission will conduct the hearing.	The transport of the spent fuel was conducted safely and in accordance with the regulations.
Request: That in considering the application for a transportation licence, the Commission ensure that there is a public hearing with notice and opportunity for interested parties along transportation routes to contribute, including and particularly First Responders.	The transport of the spent fuel was conducted safely and in accordance with the regulations

Northwatch, CMD19-H100.6

Comment/Recommendation	CNSC Staff Disposition
Request: That future proceedings related to the decommissioning and abandonment of SLOWPOKE-2 reactors be conducted as public hearings, with adequate notice and the opportunity for both written and oral submissions by interested parties	To be addressed by Secretariat.
Request: That the Commission ensure that the City of Saskatoon has had a full opportunity to provide meaningful input in advance of the Commission coming to a conclusion on the licence application. The Commission should consider delaying its decision in order to achieve this	SRC has provided supporting evidence that the City of Saskatoon has been consulted on the project. Water is released to the sewage system only after it is treated and only if it meets the release limits listed in REGDOC-1.6.1 and requirements of City of Saskatoon. Waste sent to landfill must meet the release limits listed in appendix R of REGDOC-1.6.1 Licence Application Guide: Nuclear Substances and Radiation Devices. There are no harmful effects to health or the environment this level.
Request: That in its Decision the Commission clarify and confirm that decommissioning activities such as removal and shipping of reactor fuel waste are to be undertaken only under a decommissioning licence, not under an reactor operating licence.	As stated in CSA N294 and Appendix C of REGDOC 3.5.1, activities undertaken during decommissioning that also occur during operations, such as the removal of fuel from the reactor can be conducted under a licence that authorizes either operation or decommissioning. Defueling and shipping of spent fuel are part of normal reactor operation in general. SLOWPOKES are specific in that the fuel core can last up to 30 years.

North American Young Generation in Nuclear, CMD 19-H100.7

Comment/Recommendation	CNSC Staff Disposition
I would encourage other universities and companies to look at the impressive history of the SLOWPOKE and other nuclear research reactors and to consider the services these reactors could provide. I am sad to hear that the SLOWPOKE-2 will be closing but I have confidence that SRC and SNC Lavalin can successfully decommission this facility. I encourage the CNSC to accept SRC's application to amend their Non-Power Reactor Operating Licence for the Safe LOW POwer Kritical Experiment (SLOWPOKE-2) reactor and associated facilities and authorize SRC to decommission the facility.	CNSC staff acknowledge the comment

Canadian Environmental Law Association (CELA), on behalf of Nuclear Waste Watch and Inter-Church Uranium Committee Educational Cooperative, CMD 19-H100.8

Comment/Recommendation	CNSC Staff Disposition
Recommendation 1: In order to facilitate public participation, all Commission Member Documents (CMDs) and accompanying references should be made available on the CNSC's website at least 60 days in advance of intervention deadlines and remain on the website for future public use	To be addressed by Secretariat.
Recommendation 2: Based on our review of applicable requirements governing decommissioning in Canada, we request that the CNSC: 1. Develop a principled overall policy framework underpinning a robust, clear, and enforceable regulatory regime for the decommissioning of nuclear facilities as well as the waste that arises from nuclear and decommissioning activities; 2. Stipulate the required evidentiary basis for a licensee's preferred decommissioning strategy and provide rationally based, clear, and enforceable conditions for its implementation. 3. Include enforceable conditions and detailed requirements for compliance within the approval for decommissioning activities. 4. Utilize the international best practices and standards as a guide to assess decommissioning planning and develop a comprehensive decommissioning policy and regulatory framework	1. Natural Resources Canada, the Government of Canada responsible for developing policy, has developed the Policy Framework for Radioactive Waste which establishes roles and responsibilities with respect to all radioactive waste including waste arising from decommissioning. 2. In their decommissioning plan, the applicant must provide the rationale for their preferred decommissioning strategy, as outlined in G-219 and CSA N294. 3. Upon issuance of a licence authorizing decommissioning, the decommissioning plan becomes part of the licensing basis and is used to as part of the compliance verification criteria. 4. IAEA standards are used extensively in the development of CNSC Regulatory Documents and CSA standards. In addition, CNSC staff participate in multiple international fora to stay abreast of best practices and latest developments in the area of decommissioning.

CELA, on behalf of Nuclear Waste Watch and Inter-Church Uranium Committee Educational Cooperative, CMD 19-H100.8

Comment/Recommendation	CNSC Staff Disposition
Recommendation 3: The CNSC should utilize the best practices of IAEA standards as a guide to assess decommissioning planning and develop a comprehensive decommissioning policy and regulatory framework.	IAEA standards are used extensively in the development of CNSC Regulatory Documents and CSA standards.
Recommendation 4: The CNSC should cease reliance on CSA standards for any matters relevant to nuclear licensing, and instead conduct all standard setting and guidance within the CNSC's processes.	The CNSC participates actively in developing these standards. They are an important tool in ensuring the safety of nuclear facilities and operations.
Recommendation 5: The CNSC should develop publicly acceptable policies and strategies for managing radioactive wastes and the decommissioning of nuclear facilities that reflect international best practices and have been developed in consultation with Indigenous peoples and the Canadian public. This should include, as a prerequisite, the development of a national classification scheme for radioactive waste, decommissioning strategies, and decommissioning execution that are scientifically sound and publicly acceptable.	IAEA standards are used extensively in the development of CNSC Regulatory Documents and CSA standards. The waste classification scheme currently found in both REGDOC 2.11 and CSA N292.0 is aligned with the IAEA classification. Draft regulatory documents are released for public comment on the CNSC's consultation page.
Recommendation 6: The CNSC should clarify the scenarios in which in situ confinement will be considered an appropriate decommissioning strategy. Current international standards indicate that, short of an emergency scenario, this strategy should be limited to nuclear facilities that only contain short-lived or limited concentrations of long-lived radionuclides. The CNSC should provide clear definitions for what constitutes an "emergency scenario", "short-lived radionuclides", "limited concentrations" and "long-lived radionuclides" or any other criterion used to determine the viability of in situ confinement as a decommissioning strategy for nuclear facilities.	The new revision for CSA N294 as well as the new REGDOC 2.11.2 provides further clarification with respect to the use of in-situ decommissioning. It should be noted that, in-situ decommissioning is where a facility, or portions of the facility, is placed in a safe and secure condition in which some or all of the radioactive contaminants are disposed of in place. The use of grout for the SRC decommissioning project is for conventional purposes (i.e. fill a hole), not for disposing contaminants in place.

CELA, on behalf of Nuclear Waste Watch and Inter-Church Uranium Committee Educational Cooperative, CMD 19-H100.8

Comment/Recommendation	CNSC Staff Disposition
Recommendation 7: The CNSC should require that a detailed decommissioning plan is submitted for approval within two to five years of permanent shutdown	The DDP is an evolution of the PDP that specifies the work package structure. The DDP forms the licensing basis for the Decommissioning Licence application and is typically submitted one year prior to permanent shutdown, as outlined in Appendix C of REGDOC 3.5.1.
Recommendation 8: Approval for termination of decommissioning activities should not be granted unless: 1. The CNSC verifies that the licensee has demonstrated that the end state criteria as specified in the final decommissioning plan and any additional regulatory requirements have been met; 2. The end state criteria reflect the best available science and highest level of safety feasible for Canadians and the environment; 3. The public has been consulted before authorization for decommissioning is terminated, and the site of the nuclear facility is released from regulatory control.	Under the CNSC's non-prescriptive approach, the applicant determines the decommissioning end state which is included in the DDP and forms part of the licensing basis for the licence. CNSC staff will verify that the end-state criteria and the objectives of the decommissioning strategy are met by conducting an inspection.
Recommendation 9: In the context of this licensing hearing, CNSC should review the feasibility of the licensee's contingency plan and its efficacy.	CNSC regulates the activity as per the NSCA and all applicable regulations
Recommendation 10: In light of the potential for human error, CNSC must ensure the licensee's application includes sufficient precautions to protect the health and safety of workers and the public, including worst-case exposure scenarios and ongoing consultation with all relevant stakeholders.	CNSC has assessed that the licensee will make all provisions for the protection of the health of people and the environment.

CELA, on behalf of Nuclear Waste Watch and Inter-Church Uranium Committee Educational Cooperative, CMD 19-H100.8

Comment/Recommendation	CNSC Staff Disposition
Recommendation 11: Should there be an apparent lack of public involvement or interest in a licensing matter, the CNSC should inquire with the licensee, the extent to which they have been proactive in advancing public engagement and information sharing.	CNSC has confirmed that the licensee has reached out to inform the public of the project.
Recommendation 12: CNSC staff should produce lessons-learned reports for the benefit of future decommissioning projects and make these reports publicly available.	Lessons learned are included as part of the licensee's Decommissioning End-State Report. The lessons learned requirement is specified in CSA N294 Decommissioning of nuclear facilities. OPEX and lessons learned are also included in the proposed REGDOC 2.11.2 (decommissioning) and the new revision of CSA N294.
Recommendation 13: In light of the lessons learned by U of T and the IAEA, we request the Commission to review each in turn, and consider their relevancy to this application to decommission the SRC's SLOWPOKE-2 reactor	In reviewing applications for decommissioning, CNSC staff use science-based knowledge and practices, including relevant lessons learned. CNSC staff participate in multiple national and international fora to stay abreast of best practices, latest developments and operational experience in the area of decommissioning.
Recommendation 14: In the context of this licensing hearing, we request that the CNSC ensure the reliability and effectiveness of all systems, equipment and components affecting the safety of the reactor.	CNSC staff have reviewed the decommissioning plan in detail and have assessed it to be safe for the workers, the public and the environment

CELA, on behalf of Nuclear Waste Watch and Inter-Church Uranium Committee Educational Cooperative, CMD 19-H100.8

Comment/Recommendation	CNSC Staff Disposition
Recommendation 15: The CNSC should apply the precautionary principle in the context of decommissioning by prioritizing environmental protection, and human health and safety.	CNSC staff have reviewed the decommissioning plan and decommissioning waste management plan in detail. Staff conclude that the decommissioning project will be carried out in a manner that is safe for the workers, the public and the environment.
Recommendation 16: The CNSC should prepare and make publicly available comprehensive lessons learned reports following each decommissioning project, and incorporate those lessons when reviewing future decommissioning licence applications.	Lessons learned are included as part of the licensee's Decommissioning End-State Report. The lessons learned requirement is specified in CSA N294 Decommissioning of nuclear facilities. OPEX and lessons learned are also included in the proposed REGDOC 2.11.2 (decommissioning) and the new revision of CSA N294.
Recommendation 17: The CNSC staff's CMD should include greater detail and provide a comprehensive review and assessment of a proponent's licencing application and supporting documentation.	The CMD discusses the important aspects to be considered by the Commission to make a licensing decision
Recommendation 18: The CNSC should require a draft LCH specific to decommissioning as part of SRC's licencing application and ensure that it reflects the CNSC's most up-to-date guidance documents	CNSC staff plan to update SRC's LCH to reflect the decommissioning documents submitted as part of this application.

CELA, on behalf of Nuclear Waste Watch and Inter-Church Uranium Committee Educational Cooperative, CMD 19-H100.8

Comment/Recommendation	CNSC Staff Disposition
Recommendation 19: The SRC's decommissioning licence should not be granted by the CNSC unless SRC's financial guarantee is sufficient to cover the total estimated cost of proposed decommissioning work	CNSC staff have reviewed SRC's FG and conclude that it meets the regulatory requirements. SRC's Letter of Commitment provides sufficient funds to cover the cost of the decommissioning work.
Recommendation 20: The CNSC should require that the decommissioning of SRC's SLOWPOKE-2 reactor involve the total dismantlement and clean-up of the reactor pool structure.	Under the CNSC's non-prescriptive approach, the applicant proposes the decommissioning strategy and the CNSC will then review and assess from a safety perspective, in accordance with applicable regulatory requirements.
Recommendation 21: The CNSC should perform an independent analysis of core samples from the reactor pool as part of its inspection.	SRC uses the services of a laboratory accredited by the Standards Council of Canada.
Recommendation 22: None of the radioactively contaminated waste generated from the decommissioning of SRC's SLOWPOKE-2 reactor should be subject to clearance levels and approved for general release or recycling. Rather, such waste must be retained under regulatory control in appropriate radioactive waste management facilities.	The release limits for each radionuclide are calculated so that the annual effective dose to the most critical receptor is 10 µSv. Clearance levels ensure that only waste that is proven safe to the environment is released from regulatory control. The Clearance levels used in Canada are aligned with international recommendations.

CELA, on behalf of Nuclear Waste Watch and Inter-Church Uranium Committee Educational Cooperative, CMD 19-H100.8

Comment/Recommendation	CNSC Staff Disposition
Recommendation 23: The CNSC should not permit the release of approximately 28,380 liters of treated radioactive water into the public sewer system without a careful assessment of the cumulative or additive effects of the release.	The treated water will only be released after it meets the release limits, found in REGDOC-1.6.1, which are protective of the environment. Cumulative effects have been accounted for.
Recommendation 24: The CNSC should require on-going monitoring post-decommissioning and abandonment of a nuclear facility.	SRC's final end-state report will include the final radiological status of any remaining equipment, structures or areas; and identify any requirements for further monitoring. As outlined in their DDP, the licensee must conduct a final survey of the reactor pool to ensure it meets the criteria for unconditional release listed in the *Nuclear Substances and Radiation Devices Regulations*. CNSC staff will review the results of the report. If the results are above clearance levels, the licensee would be required to revise their plans and submit an updated safety case to the CNSC for a licensing decision.