Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 22-H7.129

File / dossier : 6.01.07
Date: 2022-04-11
Edocs: 6771726

Oral presentation

Written submission from the Ottawa River Institute

Exposé oral

Mémoire de l'Ottawa River Institute

In the Matter of the

À l'égard des

Canadian Nuclear Laboratories (CNL)

Laboratoires Nucléaires Canadiens (LNC)

Application from the CNL to amend its Chalk River Laboratories site licence to authorize the construction of a near surface disposal facility

Demande des LNC visant à modifier le permis du site des Laboratoires de Chalk River pour autoriser la construction d'une installation de gestion des déchets près de la surface

Commission Public Hearing
Part 2

Audience publique de la Commission
Partie 2

May and June 2022

Mai et juin 2022

Canada

Ottawa River Institute submission for the NSDF licensing hearing

April 11, 2022

The Ottawa River Institute (ORI) is an incorporated, charitable organization based in the Ottawa Valley. ORI's mission is to foster sustainable communities and ecological integrity in the Ottawa River watershed.

Chalk River Laboratories has been one the largest employers in the upper Ottawa Valley for many decades. People from around the world come to work there. It is a major economic driver in the County of Renfrew. Worker health and safety have not been addressed in detail in CNL's Safety Case or the CNSC staff CMD. We present a number of questions about worker health and safety in Appendix A to this submission.

We are concerned about the $16 billion federal legacy nuclear waste liability, much of it located at the Chalk River Laboratories. The nuclear waste liability is the largest federal environmental cleanup liability in Canada. It exceeds the sum total of 2000 other environmental cleanup liabilities across the country. The environmental cleanup challenge at Chalk River was described in detail in a 2011 Ottawa Citizen article "Chalk River's Toxic Legacy" by investigative reporter Ian MacLeod.

We very much support the cleanup of the Chalk River Laboratories site.

We do not support the proposed NSDF for the following reasons:

- **It is not appropriate to dispose of radioactive wastes that will remain hazardous for 100,000 years or longer on the surface of the ground.** http://concernedcitizens.net/2022/04/11/iaea-says-chalk-river-wastes-are-not-suitable-for-disposal-in-an-above-ground-mound-or-in-ground-trenches/
- **An above ground facility for the legacy radioactive wastes at Chalk River would not comply with international safety standards** http://concernedcitizens.net/2020/11/24/several-ex-aecl-scientists-have-pointed-out-that-all-three-of-cnls-proposed-nuclear-waste-projects-fail-to-meet-the-international-atomic-energy-agency-safety-standards-for-radioactive-waste-faciliti/
- **It would not keep radioactive wastes out of our air and drinking water** http://concernedcitizens.net/2021/02/23/how-would-the-near-surface-disposal-facility-leak-let-us-count-some-of-the-ways/
- **It would contaminate the Ottawa River, sacred treasure to the Algonquin People and source of drinking water for millions of Canadians** http://concernedcitizens.net/2021/03/21/six-reasons-to-stop-the-ottawa-river-radioactive-waste-dump/

- **It would degrade and disintegrate within 300 years, while the wastes would remain hazardous and radioactive for 100,000 years.** http://concernedcitizens.net/2020/11/04/the-proponents-own-study-shows-that-the-chalk-river-mound-will-disintegrate/

Instead, we believe Canada can and should build state-of-the-art, world-class facilities that will keep radioactive wastes out of the biosphere for as long as they remain radioactive and hazardous. Other countries are ahead of Canada on this. By way of example, here are two illustrations of what the Finnish people are doing with their radioactive wastes.

Figure 1

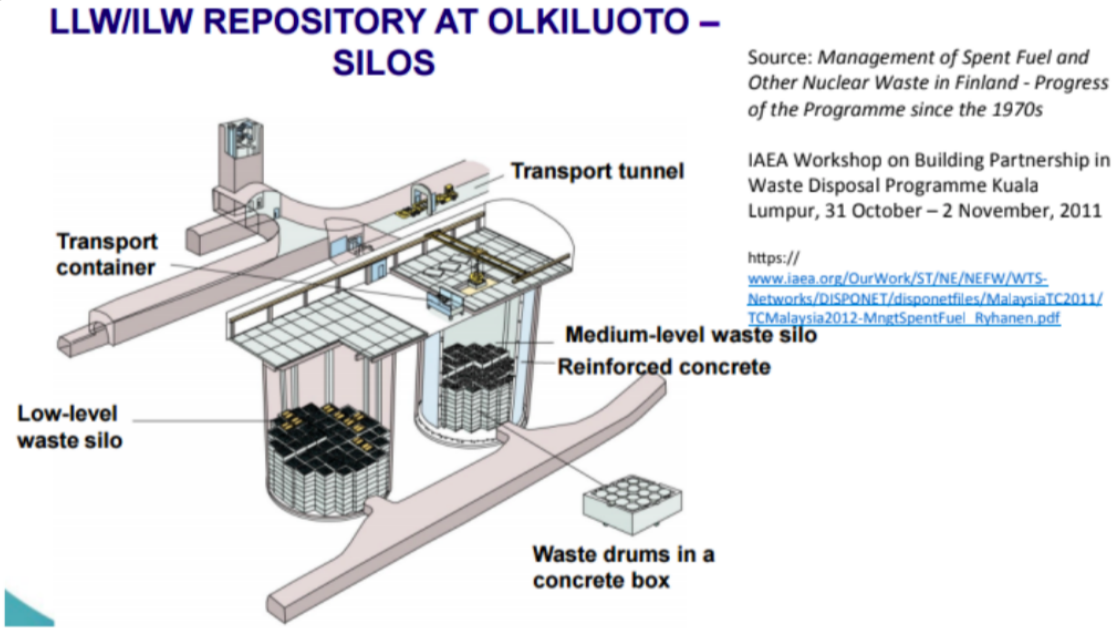

Figure 1 above shows below ground silos for low level and intermediate level waste. These are made out of reinforced concrete.

Figure 2 above shows a tunnel used to emplace wastes in the silos.

We believe that necessary clean-up work and proper long-term management of waste can provide well-paying jobs for years to come. We want those jobs to be as safe as possible so workers and their families can enjoy good health and a good quality of life.

In conclusion, we do not believe that a credible case has been made that the NSDF should be licensed. We believe it is clear that there would be many adverse environmental and health impacts that cannot be mitigated. We urge you to uphold your responsibility to protect Canadians and the environment and refuse to approve the requested license amendment.

Appendix A: Worker health and safety

Our concerns and questions on worker health and safety arise from reading a document entitled *Near Surface Disposal Facility Safety Analysis Report* (October 2020). This document (not publicly available at this time) describes various jobs that would be created by the NSDF project and health and safety issues related to these jobs.

The *Safety Analysis Report* says that “ground gamma” would be by far the highest annual radiation exposure pathway for workers at the mound (6.36 mSv/year), many times higher than inhalation of alpha and beta particles (0.01 mSv/year). Questions:

- How did the models used to calculate worker radiation doses come to that conclusion?
- Why is there such a minimal risk from inhalation?

Ground gamma should increase over the 50-year operating period as more waste with more radiation goes into the mound.

- Is 6.36 mSv/year the average for the 50-year period?
- How high would the “ground gamma” dose be at the end of the fifty-year operating period?

When waste is being put in the mound, the job with the highest radiological consequence to workers, “macro encapsulation of drummed waste,” has a dose estimate of 10.4 mSv/year.

- What is macro encapsulation?
- Would workers do this task at the mound or someplace else?
- What are the contents of the waste drums that create this dose?

The job with the second highest radiological consequences, 7.0 mSv/year, is packaged waste placement. Jobs would include one mechanical service attendant, one technician, one driver, two radiation protection staff, one millwright, and one hoisting engineer.

- Could these jobs (e.g., mechanical service attendant, millwright, hoisting engineer be described in more detail?

The job with the third highest radiological consequences, 6.37 mSv/year, would be the two heavy equipment operators who would spend eight hours a day, four days a week, for eight months, moving and grading the mound. The estimated dose is essentially the same as the “ground gamma” dose. The assumption seems to be that inhalation doses associated with these jobs would be minimal.

The job with the fourth highest radiological consequences, 6.09 mSv/year, is “grouting of packaged waste.” A millwright, a contamination monitor, a hoisting engineer, two radiation protection staff, a mechanical service attendant, a civil engineer, a technician and two carpenters would spend 50%f of two days per month during an eight-month season at the packaged waste containment area.

- What types of packages would be grouted?
- What would the grouting process involve?
- What kind of grout would be used?

- Why would carpenters be involved in grouting of packaged waste?

The *Safety Analysis Report* also describes worker doses associated with operations of the Waste Water Treatment Plant. These doses are estimated to be lower than doses for workers on the mound.

Table 14-9 the *Safety Analysis Report* shows a number of possible accidents at the mound - Dropped load, Unintended contents, Vehicle collision, Damage to structure, Misdirected flow, and Internal fire.

Table 14-10 shows the most severe accident to be “Dropped load” The dropped load event results in a waste package being dropped onto another waste package, resulting in two waste packages being damaged, the loss of containment and the spread of contamination, with radiological consequences to the worker. Some packages would need to be moved by mechanical means, such as a mobile crane.

- What types of waste packages would need to be moved with a crane?
- What packages require shielding?
- What would be in them?
- How often would a loss of shielding accident be expected to occur?

The “benchmarking” for these jobs on the mound is the Hanford Environmental Restoration Disposal Facility (ERDF). Table 5-3 In the NSDF *Safety Case* (p. 282) briefly describes the Hanford ERDF. It is located in a part of the state of Washington with an arid climate (16 cm annual precipitation), in a flat area, 12 km from the Columbia River. It is much larger than the proposed NSDF, with 16.8 million cubic meters of hazardous and mixed waste from environmental remediation and decommissioning.

Figure 3. Hanford Environmental Restoration Disposal Facility

Being in an arid climate, the Hanford ERDF does not require a waste water treatment plant that releases leachate from the mound to the environment, unlike the proposed

NSDF. However, the Safety Case says that the ERDF experiences dust control challenges. Water trucks and fixatives are in continuous use at the site.

In 2016, the U.S. Department of Energy described plans for "disposing additional waste on top of the current landfill," by "increasing the top of the waste grade by 20 feet." (https://www.energy.gov/management/articles/hanford-disposal-facility-expands-vertically-make-room-more-waste). It says that "ERDF began operations in 1996 and was expanded horizontally to accommodate waste as Hanford cleanup progressed. The first eight disposal cells were built in pairs with each cell being 500 feet wide, 1,000 feet long, and 70 feet deep."

This prompts the following questions:

- Is the Hanford ERDF an in-ground facility or an engineered containment mound?
- Does the Hanford ERDF contain packaged wastes and shielded wastes requiring handling by mechanical means, similar to those planned for the NSDF?
- Owing to lack of protection of having wastes in the ground, would workers be exposed to more radiation from the NSDF mound than from an in-ground facility such as the Hanford ERDF?
- How much would worker dose estimates differ between an in-ground facility and a mound?
- Is the Hanford ERDF the right facility for benchmarking the NSDF?
- Noting that the Hanford ERDF has been progressively expanded over time, but the NSDF site would not allow expansion, are there worker health and safety benefits of locating a facility at a site that allows expansion?
- What worker hazards are associated with a mound located in colder, wetter climate than the one at the Hanford ERDF?

The Ottawa River Institute feels that consideration should be given to worker health and safety and long-term employment aspects of different disposal facility types. We could not find this issue discussed in the alternative means section of the environmental assessment report for the NSDF.

1. We recommend research on alternative sites that could accommodate an in-ground facility and expansion over time, prior to any decision on approval of the NSDF project.
2. We ask that this research compare long-term employment and worker health and safety aspects of a mound facility versus an in-ground facility.