September 20, 2017

Office of the Auditor General of Canada
Commissioner of the Environment and Sustainable Development
Attention: Petitions
240 Sparks Street
Ottawa, ON K1A 0G6

Via e-mail: petitions@oag-bvg.gc.ca

Policies and strategies for managing non-fuel radioactive wastes

This petition is being submitted to the Office of the Auditor General of Canada in accordance with section 22 of the *Auditor General Act* by the Concerned Citizens of Renfrew County and Area and the Canadian Environmental Law Association (see Appendix 1 for details on petitioners). Our petition addresses gaps in Canada's current policies and strategies for managing non-fuel radioactive wastes. There is an urgent need to close these gaps in order to prevent pollution, protect the health of Canadians, protect ecosystems, meet international obligations, and respect nature and the needs of future generations.

Introduction

A proposal by a multinational consortium to create a giant mound of radioactive wastes beside the Ottawa River at Chalk River Ontario has alarmed citizens living downstream in Quebec and Ontario. The proposal, known as the "Near Surface Disposal Facility" (NSDF), is on a fast track to approval by the Canadian Nuclear Safety Commission (CNSC) despite the fact that it flouts international safety standards developed by the International Atomic Energy Agency (IAEA), of which Canada is a member state.

According to retired experts from Atomic Energy of Canada Limited, the NSDF employs inadequate technology, is problematically located and would be hazardous for more than 100,000 years. The Town of Deep River, birthplace of the nuclear industry in Canada, joined the chorus of opposition to the proposal in a submission to CNSC on August 16, 2017. Two recent articles in the Globe and Mail highlighted these concerns[1].

In attempting to understand how the badly flawed NSDF proposal came to be on a fast track to approval, the petitioners have identified gaps in the governance of non-fuel radioactive wastes in Canada. By describing these gaps and proposing remedies, we hope to jump-start improved management of non-fuel radioactive waste in Canada.

A companion to the current petition, *Petition 405-Canadian Nuclear Legacy Liabilities*, submitted by our groups in June 2017, describes problems caused by privatization of operations at Canada's federally-owned nuclear facilities, including radioactive waste management, in 2015. We submit that the attempt by the previous government to reduce costs associated with cleaning-up Canada's federally-owned radioactive wastes, in the absence of relevant federal policies and strategies that prioritize safety, led to

[1] Concerns of retired scientists were highlighted in Globe a Mail article on June 27, 2017 entitled *Scientists decry plan for Ontario nuclear-waste site*. The town of Deep River's concerns were highlighted in a Globe and Mail article on August 23, 2017 entitled *Ontario town slams proposal for nuclear-waste facility, citing safety concerns*.

the irresponsible and unsafe NSDF proposal. By addressing the policy and strategy vacuum, Canada can ensure that radioactive wastes are managed responsibly and avoid being faced with unsafe and irresponsible nuclear waste disposal proposals in the future.

Background

The use of radioactive materials such as uranium to produce energy and nuclear weapons creates large quantities of radioactive wastes that are highly toxic to all living things. Many of these wastes remain highly toxic and hazardous for hundreds of thousands of years, thus they present a serious problem to society, in terms of keeping them out of the biosphere for periods of time that are orders of magnitude greater than recorded history.

Canada was one of the first countries to become involved in the "nuclear age", supplying uranium and plutonium for nuclear weapons beginning in the 1940's. Later Canada became involved in developing nuclear reactors for power generation and producing medical isotopes. Thus Canada has been accumulating radioactive wastes for more than six decades.

There are many different types of radioactive waste in Canada including uranium mine tailings, refining wastes, nuclear fuel rod fabrication wastes, reactor operations wastes, and decommissioning wastes. It is important to note here that naturally-occurring radioactive materials, such as uranium and radium, are fairly uniform and thus relatively straightforward to manage, in contrast to the human-made "witches brew" of radioactive materials that result from splitting uranium atoms (fission) in a nuclear reactor. This petition concerns the latter type, "post-fission" wastes, which are complex and difficult to manage.

During nuclear fission, nuclear fuel rods become very highly radioactive. The fission process creates hundreds of highly toxic and very long-lived radionuclides that do not exist naturally. When the fuel can no longer safely sustain a nuclear chain reaction the "spent fuel" rods are removed from the reactor at which point they become "nuclear fuel waste". Nuclear fuel waste is highly toxic, must be stored in cooling pools for decades while its heat dissipates, and will be hazardous for longer than 100,000 years. In 2002, the *Nuclear Fuel Waste Act* came into force in Canada to address this type of radioactive waste.

During operation of nuclear reactors, many other non-fuel radioactive wastes are generated including irradiated reactor parts, building walls, cooling liquids, etc. These wastes share with spent fuel the quality of containing a witch's brew of highly toxic, human-made radionuclides. Some of these are relatively short-lived and give off strong penetrating gamma radiation from which workers must be shielded to avoid getting a fatal dose. Others are extremely long-lived alpha emitters; these can be handled without shielding but are highly toxic if inhaled or ingested. Extraction of plutonium, a long-lived alpha emitter, for nuclear weapons; and extraction of medical isotopes (both of which involve dissolving spent fuel in solvents such as nitric acid) have added to stockpiles of highly contaminated, post-irradiation wastes. These wastes are non-uniform and difficult to manage; they include solids, liquids and gases. There are large quantities of this type of radioactive waste at Chalk River, and as this petition will illustrate, there are no federal policies or strategies for managing them safely.

The federal government owns most of Canada's non-fuel, non-tailings radioactive wastes, the total quantity of which was estimated at close to 600,000 cubic meters in 2015 (8).

Canada has international obligations to manage its radioactive wastes safely

Canada became a member state of the International Atomic Energy Agency (IAEA)[1] on July 29, 1957 (1). Canada is also a party to the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management* (2). Article 32 of the *Joint Convention* requires Canada to submit regular national reports describing its national radioactive waste management policy, radioactive waste management practices, and criteria used to define and categorize radioactive waste along with inventory of radioactive waste and a list of nuclear facilities in the process of being decommissioned.

IAEA document *Predisposal Management of Radioactive Waste* (3) provides details on a Member State's responsibilities regarding an effective national policy and strategy for radioactive waste management. It states:

- the government shall ensure that a national policy and a strategy for radioactive waste management are established,
- the policy has to set out the preferred options for radioactive waste management,
- the strategy has to outline arrangements for ensuring the implementation of the national policy.

IAEA Guide, *Policies and strategies for Radioactive Waste Management* (4) states:

- strategies are needed to define how and when the identified goals and requirements will be achieved and **enhance public confidence in relation to the subject of spent fuel and radioactive waste management** (emphasis added),
- the objective of radioactive waste management is to protect human health and the environment now and in the future without imposing undue burdens on future generations,
- a national classification scheme for radioactive waste is one of the prerequisites for strategy development.

The guide also provides details on available options for different waste classes, including very low level waste (landfill disposal), low level waste (near surface disposal), intermediate level waste (intermediate depth disposal), and high level waste (deep geologic disposal).

Canada released a radioactive waste policy framework in 1996

Canada has a *Radioactive Waste Policy Framework* (5). Natural Resources Canada (NRCan) describes the framework as three "principles governing… disposal of radioactive waste". The *Framework* has not been updated since 1996; the principles read as follows:

- The federal government will ensure that radioactive waste disposal is carried out in a safe, environmentally sound, comprehensive, cost-effective and integrated manner.
- The federal government has the responsibility to develop policy, to regulate, and to oversee producers and owners to ensure that they comply with legal requirements and meet their funding and operational responsibilities in accordance with approved waste disposal plans.
- The waste producers and owners are responsible, in accordance with the principle of "polluter pays", for the funding, organization, management and operation of disposal and other facilities

[1] The IAEA was initiated in 1957 to "accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world"

required for their wastes. This recognizes that arrangements may be different for nuclear fuel waste, low-level radioactive waste and uranium mine and mill tailings (5).

This half-page document with three bullet points has been referred to as Canada's radioactive waste management policy in meetings of the *Joint Convention*. It has also been referred to as Canada's policy on radioactive waste classification, which is ostensibly implied in the last sentence of the third bullet point, i.e. there are three classes of radioactive waste in Canada 1) nuclear fuel waste, 2) low-level radioactive waste, and 3) uranium mine and mill tailings. This "policy" on classification of radioactive waste classification deviates strikingly from IAEA guidance[1]. For details on serious problems with Canada's radioactive waste classification system see Appendix 2.

Two May 2017 requests[2] for a full text of all the policies encompassed by the *Radioactive Waste Policy Framework*, to Natural Resources Canada (NRCan) and CNSC, did not yield any additional documents that could be considered a government policy or strategy as per IAEA guidance. Appendix 2 provides a detailed analysis of the documents listed by NRCan as policies encompassed by the *Framework*.

Canada's policy framework is deficient when measured against IAEA guidance

A policy framework is not a policy, but rather is, according to Wikipedia, "a logical structure that is established to organize policy documentation into groupings and categories that make it easier to find and understand the contents of various policy documents".

Documents referenced by NRCan, in response to the ATIP request, do not contain information recommended by IAEA. These documents contain no strategies, and no timeframes. They contain no goals or requirements for safe handling of radioactive wastes. They do not define how and when the goals and requirements will be achieved. They do not set out preferred options for radioactive waste management. They include non-standard, inconsistent and incomplete waste classifications. The policy framework includes the phrase "in accordance with approved waste disposal plans", implying that such plans exist, but we were unable to find any.

CNSC's three "regulatory guidance" documents use extremely weak language, suggesting that the Commission will "consider the extent to which licence applicants adhere to principles". In any case, these documents cannot be considered government policy, given the CNSC's "arms-length governance structure" that "ensures that it remains independent from government"[3].

Most fundamentally, the purpose of the *Nuclear Safety and Control Act* makes no reference to radioactive waste management. The word "waste" appears nowhere in the *Act*.

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[1] IAEA's classification system includes six classes of radioactive waste, one of which is low-level radioactive waste, but IAEA's definition of low level radioactive waste is very different from Canada's (6). Canada has been asked why its classification system differs from that recommended by the IAEA at meetings of the Parties to the *Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management* (7). Canada was also asked why there was no mention of long-lived alpha radiation in the classification system.

[2] ATIP requests to NRCan (Request number A2017-00007) and CNSC (Request number A-2017-00001) from CCRCA

[3] CNSC 2017. *The CNSC as a unique regulator*. Canadian Nuclear Safety Commission. Date modified: 2017-03.17.

Given that very large quantities of radioactive wastes are the responsibility of the federal government itself, these national policy and strategy gaps are deeply troubling.

Lack of a strategy for non-fuel radioactive waste noted by the Province of Quebec

In 2005, Quebec's Bureau d'audiences publiques sur l'environnement released a report on a proposal from Hydro-Québec to build a facility for storing radioactive wastes from the Gentilly-2 nuclear reactor, including waste arising from Hydro-Québec's planned refurbishment of the reactor (20). The report acknowledged that the reactor had generated a large quantity of non-fuel radioactive wastes, but no long-term strategy for dealing with such wastes had yet been determined in Canada. The report recommended that prior to making a decision on reactor refurbishment, Hydro-Québec should propose a long-term plan for managing its reactor wastes that would be realistic and socially acceptable.

Suggested remedies

The Government of Canada should develop publicly acceptable policies and strategies for managing non-fuel radioactive wastes 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 that is publicly acceptable and consistent with IAEA guidance (4). Review of the policies and strategies in countries such as Sweden and Finland, highlighted briefly in Appendix 3, could usefully inform these efforts.

Questions:

1. As a party to the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management,* Canada has committed "to ensure that during all stages of spent fuel and radioactive waste management there are effective defenses against potential hazards so that individuals, society and the environment are protected from harmful effects of ionizing radiation, now and in the future, in such a way that the needs and aspirations of the present generation are met without compromising the ability of future generations to meet their needs and aspirations."[1]

   Will the Ministers of Health, Natural Resources, and Environment jointly commit, as a matter of urgency, to ensuring this objective is addressed through the development of socially-acceptable policies and strategies based on international best practices and IAEA guidance for non-fuel radioactive wastes in Canada? Will the Ministers please outline a process and outline a timeline for accomplishing this?

2. **Will the Ministers of Natural Resources, Health and Environment commit, as a matter of utmost importance, to consult with Indigenous peoples and the public during the development of policies and strategies for long-term management of Canada's non-fuel radioactive wastes; will the ministers please** outline how the Government of Canada will consult Indigenous peoples and the public and provide a target date for initiating consultations?

3. **Given the serious deficiencies in Canada's radioactive waste classification, outlined in Appendix 2 of this petition and noted by peer reviewers at meetings of the Parties to the Joint Convention, will the Minister of Natural Resources commit,** as a matter of urgency, to developing a publicly acceptable

[1] IAEA 1997. *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*. International Atomic Energy Agency Information Circular 546. 24 December 1997.

national classification system for radioactive wastes, consistent with IAEA guidance, as a prerequisite for the development of national policies and strategies for the management of non-fuel radioactive waste; will the Minister please also outline the steps involved and provide a timeframe for completion?

4. **Will the Minister of Natural Resources please explain what measures are in currently place to ensure radioactive wastes will remain isolated from the environment for the duration of their radioactive hazard and** outline any specific provisions for alpha emitting radionuclides that will not decay to a non-hazardous level of activity concentration during the time for which institutional controls can be relied upon? If there are currently no special provisions for alpha emitting radionuclides, will the Minister commit, as a matter of urgency, to develop such provisions as part of the development of policies and strategies for the management of non-fuel radioactive waste?

5. **Given that in Canada there is no federal direction to licensees regarding types of facilities that are appropriate for various classes of radioactive waste, what steps will the Minister of Natural Resources take to develop clear direction for licensees, based on IAEA guidance, and with input from the public and subject to duties to consult with Indigenous peoples, that outlines what types of facilities are acceptable for the management of various classes of radioactive waste in Canada?**

6. **Given that no distinction is made between disposal and storage of nuclear materials in Canada's acts, regulations, and policies, what steps will the Minister of Natural Resources take to correct this deficiency before allowing waste disposal projects to be considered?**

7. **Would the Minister of Natural Resources please explain why Canada has no legally binding regulations for radioactive waste management?** Does the Minister of Natural Resources consider a license condition that "the licensee shall implement and maintain a waste management program" as sufficient to ensure that licensees will manage radioactive waste safely? Does the Minister deem this sufficient to meet the objectives of the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*?

8. **Would the Minister of Natural Resources please explain how the requirement in the *Radioactive Waste Policy Framework* for producers of radioactive waste to have approved disposal plans is implemented in practice;** would the Minister of Natural Resources please cite where this requirement is found in policy, law and regulations, describe the approval process, and provide examples of these approved plans?

9. **Would the Minister of Natural Resources please explain how CNSC's "policy" to "consider the extent" to which waste owners adhere to "principles" can limit risks to health, safety and the environment from radioactive waste management?** What does "consider the extent" mean in a legal sense? Is it the Minister's position that CNSC licensees should be allowed to determine their own methodologies for radioactive waste management and does the Minister think it is reasonable to expect the public to trust that licensees will put the public's interest ahead of financial considerations in this regard?

References

1) IAEA 2016. *List of Member States (https://www.iaea.org/about/governance/list-of-member-states* International) Atomic Energy Agency, Vienna.
2) IAEA 1997. *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*. International Atomic Energy Agency Information Circular 546. 24 December 1997.
3) IAEA 2009. *Predisposal Management of Radioactive Waste*. General Safety Requirements. Safety Standards Series No. GSR Part 5. International Atomic Energy Agency Vienna, 2009. (see p. 9)
4) IAEA 2009. *Policies and Strategies for Radioactive Waste Management*. IAEA Nuclear Energy Series No. NW-G-1.1. International Atomic Energy Agency Vienna, 2009. (see p. 17) 5) Natural Resources Canada 1996. *Radioactive waste policy framework*.
6) IAEA 2009. *Classification of Radioactive Waste*. Safety Standards Series No. GSG-1. International Atomic Energy Agency, Vienna.
7) CNSC 2006. *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: Canada's Responses to Questions*. Canadian Nuclear Safety Commission.
8) CNL 2015. *Inventory of Radioactive Waste in Canada: 2013 Inventory Summary Report*. Canadian Nuclear Laboratories. Low Level Radioactive Waste Management Office.
9) CNSC 2016. *Glossary of CNSC Terminology*. REGGOC-3.6. Canadian Nuclear Safety Commission. December 2016.
10) The Nuclear Safety and Control Act, 1997
11) CNSC 2004. *Managing Radioactive Waste*. Regulatory Policy P-290. Canadian Nuclear Safety Commission. July 2004.
12) CNSC 2006. *Assessing the Long Term Safety of Radioactive Waste Management*. Regulatory Guide G–320. Canadian Nuclear Safety Commission. December 2006.
13) CNSC 2000. *Decommissioning Planning for Licensed* Activities. Regulatory Guide G-219. Canadian Nuclear Safety Commission. June 2000.
14) CNSC 2014. *Canadian National Report for the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Fifth Report, October 2014*. Canadian Nuclear Safety Commission.
15) IAEA 2011. *Disposal of Radioactive Waste*. Specific Safety Requirements No. SSR-5. International Atomic Energy Agency, Vienna.
16) OPG 2005. *Deep Geologic Repository for Low and Intermediate Level Radioactve Wastes – Project Description*. Ontario Power Generation Report Number 00216-REP-07722.07-00001.
17) CNSC 2017b. *Nuclear Substances*. Canadian Nuclear Safety Commission. Date modified: 2017-0731.
18) IAEA 2012. *The Safety Case and Safety Assessment for the Disposal of Radioactive Waste*. Specific Safety Guide No. SSG-23. International Atomic Energy Agency, Vienna.
19) IAEA 2014. *Near Surface Disposal Facilities for Radioactive Waste*. Specific Safety Guide No. SSG-29. International Atomic Energy Agency, Vienna.
20) Bureau d'audiences publiques sur l'environnement. 2005. *Projet de modification des installations de stockage des déchets radioactifs et réfection de Gentilly-2: Rapport d'enquête et d'audience publique*. Rapport 207, Mars 2005.

Appendix 1 – Information about petitioners

The Canadian Environmental Law Association (CELA)

CELA works to protect human health and our environment by seeking justice for those harmed by pollution and by working to change policies to prevent such problems in the first place. For almost 50 years, CELA has used legal tools to increase environmental protection and safeguard communities. CELA is an Ontario legal aid environmental law specialty clinic. CELA has worked on issues related to nuclear liabilities, legacy wastes, and nuclear safety over many years. This has included law reform such as the work on replacing the *Nuclear Liability Act*, and amendments to the *Canadian Environmental Assessment Act* in various iterations. Case work has included work at the Chalk River facility, the SRB facility in Pembroke, transportation of nuclear waste, and licensing hearings at the nuclear power plants at Darlington, Pickering, Bruce, Point Lepreau and Gentilly II among others. Current case work includes a number of nuclear waste environmental assessment files, including the proposed Deep Geologic Repository at Kincardine, the ongoing work of the Nuclear Waste Management Organization, the proposal for a Near Surface Disposal Facility at Chalk River, and proposals to abandon in place the former nuclear reactor facilities at Rolphton and Whiteshell.

Concerned Citizens of Renfrew County and Area (CCRCA)

CCRCA, a volunteer-based citizens' group, formed in 1978 in response to a 15-year federal-provincial, $700 million study of the feasibility of disposing of high level nuclear waste in plutonic rock. For more than 20 years, CCRCA has intervened at all licensing hearings on Chalk River Laboratories (CRL) held by the Canadian Nuclear Safety Commission (and prior to the year 2000, by the Atomic Energy Control Board). Our interventions have highlighted pollution issues such as the plumes from the leaking fuel bays and waste management areas and major safety concerns such as the high level liquid wastes in the "Fissile Solution Storage Tank". We have expressed support for new CRL facilities that have reduced pollution levels (such as the Liquid Waste Treatment Centre) and that have placed radioactive wastes in more secure, monitored above-ground storage. We have consistently called for greater transparency and openness in monitoring and reporting on the state of the CRL environment. We believe that our efforts have raised public awareness about risks associated with Canada's nuclear waste liabilities, and have helped persuade government decision-makers to allocate significant resources to clean-up projects such as the Nuclear Legacy Liabilities Program.

Appendix 2 – Detailed Analysis of Federal Policies, Acts and Regulations Concerning Non-Fuel Radioactive Waste Management

Natural Resources Canada (NRCan) describes Canada's *Radioactive Waste Policy Framework*[1] as three "principles governing… disposal of radioactive waste". These are:

- The federal government has the responsibility to develop policy, to regulate, and to oversee producers and owners to ensure that they comply with legal requirements and meet their funding and operational responsibilities in accordance with approved waste disposal plans.
- The federal government will ensure that radioactive waste disposal is carried out in a safe, environmentally sound, comprehensive, cost-effective and integrated manner.
- The waste producers and owners are responsible, in accordance with the principle of "polluter pays", for the funding, organization, management and operation of disposal and other facilities required for their wastes. This recognizes that arrangements may be different for nuclear fuel waste, low-level radioactive waste and uranium mine and mill tailings.

NRCan adds, "Radioactive waste is currently managed in a safe and environmentally responsible manner by storing the waste under the requirements of the Canadian Nuclear Safety Commission (CNSC), Canada's independent nuclear regulator."[2]

Making a distinction between storage and disposal of radioactive waste is of crucial importance. The *Nuclear Safety and Control Act* contains both terms but defines neither. A CNSC *Glossary*[3] provides the following definitions for "reference and information" only:

> storage - with respect to nuclear substances and radiation devices, possession for storage only.
> disposal - the placement of radioactive waste without the intention of retrieval.

CNSC has granted many storage licences but has never granted a licence for radioactive waste disposal. CNSC licensing of any disposal project would be precedent-setting. Prior to a decision on this matter, a thorough consultation process is needed - with input from Indigenous peoples and the public - as to whether there are any acceptable technologies available for the long time frames required, and whether current approaches should include an element of retrievability or reversibility.

Three proposals for permanent disposal of the Government of Canada's own radioactive waste are undergoing environmental assessments under the *Canadian Environmental Assessment Act, 2012*: the Nuclear Power Demonstration Closure Project, the Near Surface Disposal Facility Project and the In Situ Decommissioning of the Whiteshell Reactor #1. Also, an environmental assessment of the Deep Geologic Repository Project for Low and Intermediate Level Radioactive Waste generated by Ontario Power Generation (OPG) that began in 2005 is ongoing. OPG uses varying terminology to describe this project, including "long-term" or "permanent" storage, but its project description says "Disposal in the

[1] NRCan 1996. *Radioactive waste policy framework*. Natural Resources Canada.
[2] NRCan 2016. *Radioactive Waste*. Natural Resources Canada. January 13, 2016.
[3] CNSC 2016. *Glossary of CNSC Terminology*. REGGOC-3.6. Canadian Nuclear Safety Commission. December 2016.

sedimentary bedrock beneath the Bruce site was selected following extensive technical and community reviews of alternative long-term waste management technologies."[1]

The federal government owns most of Canada's non-fuel, non-tailings radioactive wastes

The Government of Canada is responsible for the vast majority of the inventory of low- and intermediate-level wastes in Canada, other than uranium mine and mill tailings. Using data from the *Inventory of Radioactive Waste in Canada*,[2] as of the end of 2014, Canada had 670,492 cubic meters of low and intermediate level radioactive waste generated from power reactors, fuel fabrication, nuclear research and development, and radioisotope production and use; including both operations and decommissioning. Of this total, the Government of Canada (Atomic Energy of Canada Limited, or AECL) was responsible for 82% (549,310 cubic meters), most of it (525,066 cubic meters) having arisen from nuclear research and development, largely at the Chalk River Laboratories.

In 2014 Canada also had 1,721,924 cubic meters of "historic" waste generated by refining and processing of uranium and radium. AECL was responsible for 98% (1,683,924 cubic meters) of this "historic" waste, which is largely found at Port Hope, Ontario. Thus, in 2014 the Government of Canada was responsible for 95% of Canada's low and intermediate level radioactive waste: over 2.2 million cubic meters of a total of nearly 2.4 million cubic meters. Over half of this waste can be attributed to "Cold War" activities[3], namely production of material for nuclear weapons including uranium refining at Port Hope and plutonium production and extraction at Chalk River[4].

The federal government also "owned" the lion's share (58%) of the 34,950 cubic meters of intermediate level waste reported in the 2014 *Inventory*.

Canada has international obligations to manage its radioactive waste safely

Canada became a member state of the International Atomic Energy Agency (IAEA) on July 29, 1957.[5] Canada is also a party to the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*.[6] Article 32 of the *Joint Convention* requires Canada to submit regular national reports describing its national radioactive waste management policy, radioactive waste management practices, and criteria used to define and categorize radioactive waste. Article 32 also requires that Canada provide:

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[1] OPG 2005. *Deep Geologic Repository for Low and Intermediate Level Radioactive Wastes – Project Description*. Ontario Power Generation Report Number 00216-REP-07722.07-00001.

[2] CNL 2015. *Inventory of Radioactive Waste in Canada: 2013 Inventory Summary Report*. Canadian Nuclear Laboratories. Low Level Radioactive Waste Management Office.

[3] NRCan 2011. *Evaluation of the Nuclear Legacy Liabilities Program (NLLP) of the Energy Sector, Natural Resources Canada*. Natural Resources Canada Reports 2011 (see section on *"Radioactive Waste and Legacy Liabilities."*)

[4] CNSC 2012. *Canada's historical role in developing nuclear weapons*. Canadian Nuclear Safety Commission. May 28, 2012.

[5] IAEA 2016. *List of Member States*. International Atomic Energy Agency, Vienna.

[6] IAEA 1997. *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*. International Atomic Energy Agency Information Circular 546. 24 December 1997.

- a list of its radioactive waste management facilities (including location, main purpose and essential features);
- an inventory of radioactive waste (including volume or mass, activity and specific radionuclides) whether in storage, disposal or resulting from "past practices"; and
- a list of nuclear facilities in the process of being decommissioned and their status.

The IAEA provide extensive guidance to Member States in its "Safety Standards" series. Requirement 10 of the IAEA's *Governmental, Legal and Regulatory Framework for Safety*[1] *says* "safe management and disposal of radioactive waste shall constitute essential elements of governmental policy and the corresponding strategy over the lifetime of facilities and the duration of activities".

Requirement 2 of in the IAEA document *Predisposal Management of Radioactive Waste*[2] provides additional details on a Member State's responsibilities regarding an effective national policy and strategy for radioactive waste management. It says:

> To ensure the effective management and control of radioactive waste, the government shall ensure that a national policy and a strategy for radioactive waste management are established. The policy and strategy shall be appropriate for the nature and the amount of the radioactive waste in the State, shall indicate the regulatory control required, and shall consider relevant societal factors. The policy and strategy shall be compatible with the fundamental safety principles and with international instruments, conventions and codes that have been ratified by the State. The **national policy and strategy shall form the basis for decision making** with respect to the management of radioactive waste (emphasis added).
>
> The national policy on radioactive waste management **has to set out the preferred options** for radioactive waste management (emphasis added).
>
> The national strategy for radioactive waste management **has to outline arrangements for ensuring the implementation of the national policy**. It has to provide for the coordination of responsibilities. It has to be compatible with other related strategies such as strategies for nuclear safety and for radiation protection (emphasis added).

Further details are provided in an IAEA *Guide*, *Policies and strategies for Radioactive Waste Management*.[3] The *Guide* says that the national policy should "indicate the State's intention to inform the public about proposed plans for radioactive waste management, and to consult concerned parties and members of the public to aid in making related decisions." It also states that "The national policy should identify the main sources of radioactive waste in the country, including the decommissioning of facilities" and should:

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[1] IAEA 2016. *Governmental, Legal and Regulatory Framework for Safety*. Safety Standards Series No. GSR Part 1 (Rev. 1). International Atomic Energy Agency Vienna, 2016.
[2] IAEA 2009. *Predisposal Management of Radioactive Waste*. General Safety Requirements. Safety Standards Series No. GSR Part 5. International Atomic Energy Agency Vienna, 2009. (see p. 9)
[3] IAEA 2009. *Policies and Strategies for Radioactive Waste Management*. IAEA Nuclear Energy Series No. NW-G1.1. International Atomic Energy Agency Vienna, 2009. (see p. 17)

- Identify the intended national arrangements for the management of the main types of radioactive waste;
- identify the end points of the management process;
- Recognize that some radioactive waste may be potentially hazardous for long into the future and, therefore, require long term safety measures.

The IAEA *Guide*[12] also provides extensive guidance on development of a national strategy for radioactive waste. It identifies a "national classification scheme for radioactive waste" as one of the "prerequisites for strategy development". It provides details on available options for different waste classes, including very low level waste (landfill disposal), low level waste (near surface disposal), intermediate level waste (intermediate depth disposal), and high level waste (deep geologic disposal).

Lack of a standard radioactive waste classification puts Canadians at risk

"Radioactive waste shall be characterized and classified in accordance with requirements established or approved by the regulatory body," says the IAEA "to ensure that proper and adequate provision is made for the safety implications associated with the management and disposal of the waste." The IAEA warns that inadequate waste classification "can lead to less than optimal levels of safety."[3]

The IAEA emphasizes that waste with long-lived radionuclides must be placed in geological facilities, because a "disposal facility at or near the surface makes it susceptible to processes and events that will degrade its containment and isolation capacity over much shorter periods of time".[4] Determining acceptability of a geological repository option requires a government-led consultation with indigenous peoples and the public, with full consideration of Issues such as retrievability and reversibility.

Canada's nuclear regulatory body - the Canadian Nuclear Safety Commission (CNSC) – has not established requirements for radioactive waste classification, or options for different waste classes.

Canadian Nuclear Laboratories (CNL) intends to put both low and intermediate level waste in an above ground "Near Surface Disposal Facility" (NSDF) at Chalk River.[5] What does this mean? The IAEA says:

> Intermediate level waste (ILW): Waste that, because of its content, particularly of long lived radionuclides, requires a greater degree of containment and isolation than that provided by near surface disposal. However, ILW needs no provision, or only limited provision, for heat dissipation during its storage and disposal. ILW may contain long lived radionuclides, in particular, alpha emitting radionuclides that will not decay to a level of activity concentration acceptable for near surface disposal during the time for which institutional controls can be

[1] IAEA 2009. *Policies and Strategies for Radioactive Waste Management*. IAEA Nuclear Energy Series NW-G-1.1 International Atomic Energy Agency Vienna, 2009. (see pp. 19 and 23)
[3] IAEA 2009. *Classification of Radioactive Waste*. Safety Standards Series No. GSG-1. International Atomic Energy Agency, Vienna. (see p. 1)
[4] IAEA 2014. *Near Surface Disposal Facilities for Radioactive Waste*. Specific Safety Guide No. SSG-29. International Atomic Energy Agency, Vienna. (see p. 18)
[5] CNL 2017. *Near Surface Disposal Facility Environmental Impact Statement. Executive Summary*. Canadian Nuclear Laboratories Report No. 1547525. March 17, 2017. (see p. ES-1)

relied upon. Therefore, waste in this class requires disposal at greater depths, of the order of tens of metres to a few hundred metres.[1]

ILW, as defined by the IAEA, means radioactive waste that contains long-lived radionuclides; in particular, alpha-emitting radionuclides such as plutonium. The IAEA says this waste must go underground. But CNL intends to dispose of large amounts of plutonium and other long-lived, alpha-emitting radionuclides in the NSDF, an above-ground landfill. How could this possibly be allowed?

Canada's nuclear regulator uses a non-legally binding definition of ILW that makes no reference to longlived and alpha-emitting radionuclides, or to the need to place these long-lived wastes at depths of tens to hundreds of metres. Furthermore, CNSC's definition of low level waste (LLW)[2] omits a key phrase in the IAEA's definition: namely, the IAEA's reference to LLW as requiring containment "for periods of up to a few hundred years."[3] Even if "only" LLW (as defined by CNSC) were put in the proposed NSDF, this would still create unacceptable risks.

Canada's failure to adopt a standard radioactive waste classification is dangerous for workers, for the community around radioactive waste management facilities, and for the millions of Canadians whose water could be contaminated if disposal facilities are improperly designed and sited. It could allow wastes that will remain hazardous for over a hundred thousand years to go into facilities designed to contain those wastes for only a few hundred years.

The Government of Canada has no policies and strategies for managing non-fuel radioactive wastes

Canada's *Radioactive Waste Policy Framework* consists of three "principles governing… disposal of radioactive waste." In May 2017 Natural Resources Canada provided the following links in response to a request for "a full text of all the policies" encompassed by the *Framework:*

- Canada's 1996 Radioactive Waste Policy Framework
- The Nuclear Safety and Control Act, 1997
- The Nuclear Fuel Waste Act, 2002
- The Nuclear Liability and Compensation Act, 2015
- CNSC Regulatory Policy P-290 – Managing Radioactive Waste
- CNSC Regulatory Guide G-320 – Assessing the Long Term Safety of Radioactive Waste Management
- CNSC Regulatory Guide G-219 – Decommissioning Planning for Licenced Activities
- CNSC Regulatory Document RD/GD-370 – Management of Uranium Mine Waste Rock and Mill Tailings
- The Canadian National Report for the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Fifth Report, October 2014

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[1] IAEA 2009. *Classification of Radioactive Waste*. Safety Standards Series No. GSG-1. International Atomic Energy Agency, Vienna. (see p. 6)

[2] CNSC 2016. *Glossary of CNSC Terminology*. REGGOC-3.6. Canadian Nuclear Safety Commission. December 2016. (see pp. 56 and 65)

[3] IAEA 2009. *Classification of Radioactive Waste*. Safety Standards Series No. GSG-1. International Atomic Energy Agency, Vienna. (see p. 5)

- Canada's Inventory Summary Report, 2013

While CNSC has prepared "regulatory guidance" for its licence holders, the Government of Canada has no national policy for radioactive waste, and hence no strategy for implementing that policy. In addition to the gap in national radioactive waste policies and strategies, the Government of Canada has:

- adopted no standard national radioactive waste classification;
- identified no options for radioactive waste management other than for fuel wastes;
- given no policy consideration to "relevant social factors" (despite embarking on permanent disposal of its own radioactive wastes); and
- made no provision for coordination of responsibilities among its various bodies, including Atomic Energy of Canada Limited, NRCan and other federal departments, and CNSC.

Given that Canada is among the IAEA Member States with the largest quantities of radioactive waste, this national policy and strategy gap is troubling. Much of this waste arose from "past practices" (as per Article 12 of the *Joint Convention*[1]) of the Government of Canada itself: production of materials for nuclear weapons at Chalk River and Port Hope. In the words of the IAEA, much of this waste will be "hazardous for long into the future."[2][3]

As IAEA Director General Yukiya Amano states in his foreword to the *Governmental, Legal and Regulatory Framework for Safety*:

> "Standards are only effective if they are properly applied in practice… Regulating safety is a national responsibility, and many States have decided to adopt the IAEA's standards for use in their national regulations. For parties to the various international safety conventions, IAEA standards provide a consistent, reliable means of ensuring the effective fulfilment of obligations under the conventions."[4]

This petition is not the first time that the national policy and strategy gap for radioactive waste management has been brought to the attention of the Government of Canada.

Petition # 173 to the Commissioner of the Environment and Sustainable Development, submitted on June 21, 2006, addressed *Federal Oversight of the Nuclear Industry in Canada*.

In the section entitled "Background – Non-fuel radioactive wastes", the petitioner stated "Greenpeace Canada is concerned that the federal government and its regulator, the Canadian Nuclear Safety

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[1] IAEA 1997. *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*. International Atomic Energy Agency Information Circular 546. 24 December 1997.
[2] IAEA 2009. *Policies and Strategies for Radioactive Waste Management*. IAEA Nuclear Energy Series No. NW-G-
[3] .1. International Atomic Energy Agency Vienna, 2009. (see p. 17)
[4] IAEA 2016. *Governmental, Legal and Regulatory Framework for Safety*. Safety Standards Series No. GSR Part 1 (Rev. 1). International Atomic Energy Agency Vienna, 2016.

Commission, have failed to establish a transparent and socially acceptable framework for managing long-lived, non-fuel radioactive wastes in Canada."[1]

The petitioner then asked:

> "The federal government has developed policies for low-level radioactive wastes and legislation for used nuclear fuel waste. What policies or regulations has the federal government established for long-lived, non-fuel wastes?"

The Minister of Natural Resources Canada replied,

> "The Government's 1996 Radioactive Waste Policy Framework covers all radioactive waste generated from the nuclear fuel cycle, including long-lived, non-fuel waste… As for long-lived, non-fuel waste—which may refer to uranium tailings, historic wastes, or other contaminated material emanating from the nuclear fuel cycle—one solution is not possible for all the waste, given the variety and volume of waste types and the considerable distances separating their management location. Natural Resources Canada is satisfied that the Policy Framework provides the necessary policy direction to waste owners concerning their responsibilities and recognizing that these materials are also regulated by the Canadian Nuclear Safety Commission."

We note that much of the "variety and volume of waste types" in Canada is found in the federal government's own wastes. Also, citing "considerable distances" as a barrier to policy development seems disingenuous, given that these "considerable distances" occur between the government's own facilities in Ontario (Chalk River and Douglas Point), Manitoba (Whiteshell) and Quebec (Gentilly-1). And not least - although not addressed directly in the petitioner's question – this response does not acknowledge the federal government's responsibility for managing its own radioactive wastes.

The federal government prepared a waste strategy, never consulted on it, and abandoned it.

In 2005 the federal government initiated the Nuclear Legacy Liabilities Program (NLLP), thereby taking some responsibility for "funding, organization, management and operation of disposal and other facilities" for its own wastes (in the words of the *Radioactive Waste Policy Framework*). Furthermore,

> In April 2006, the federal government approved a long-term 70-year strategy to deal with nuclear legacy liabilities and a five-year plan to initiate the strategy, as well as authorizing the Minister of Natural Resources to consult the public on the further development of the long-term strategy.[2]

The consultation with the public never took place. In fall 2015, the federal government terminated the

[1] Stensil, S.-P. 2006. *Federal Oversight of the Nuclear Industry in Canada*. Environmental Petition No. 173. Office of the Auditor General of Canada. June 16, 2006.

[2] NRCan 2011. *Evaluation of the Nuclear Legacy Liabilities Program (NLLP) of the Energy Sector, Natural Resources Canada*. Natural Resources Canada Reports 2011 (see section on *"Radioactive Waste and Legacy Liabilities."*)

NLLP, privatized AECL, and handed responsibility for its wastes to the Canadian Nuclear Laboratories (CNL), a taxpayer-funded multinational consortium of private companies that now operates the Chalk River Laboratories.

CNL then abandoned the 70-year strategy. A Natural Resources Canada official told us that the *Comprehensive Preliminary Decommissioning Plan*[1] for the Chalk River Laboratories, which is not publicly available, essentially describes the 70-year strategy. This *Plan* includes phased design and construction of separate disposal facilities for very low level waste, low level waste, and intermediate level waste.

CNL now proposes to dump all of these federal government non-fuel wastes into a million-cubic-meter, above-ground, landfill-type "Near Surface Disposal Facility" (NSDF), a so-called "engineered containment mound", with construction starting in 2018.

Given that Canada has never developed its own radioactive waste classification - much less one aimed at permanent disposal - CNL appears poised to take advantage of this void. It is advancing waste criteria, with no public consultation, that would maximize the "potential range" of waste to be put in the NSDF.

CNSC's acts and regulations do not ensure that radioactive waste is safely managed

As noted earlier, the *Nuclear Safety and Control Act* provides no definitions of "storage" and "disposal". The *Act* enables the CNSC to grant licenses for these activities but makes no distinction between them.

It is unclear if the purpose of the *Act*, which refers to limiting risks to health, safety and the environment "associated with the development, production and use of nuclear energy and the production, possession and use of nuclear substances" even encompasses waste management. None of the CNSC's 15 regulations is specific to waste management. When CNSC refers to its regulatory activities it usually omits waste management, as in the following:

> The Canadian Nuclear Safety Commission (CNSC) regulates all aspects of nuclear energy, ensuring that strict rules are followed for possession, use, packaging, transport, storage, and import and export of nuclear substances in order to protect the health, safety and security of Canadians and the environment.[2]

In an effort to modernize its regulations, in March 2013 CNSC prepared a *Regulatory Framework Plan 2015-2021*.[3] This modernization initiative may have been partly motivated by a recognition that CNSC's regulations do not address waste management. This *Plan* referred to "Possible Waste Regulations" in "Step 1", which was preparation of Discussion Paper DIS-14-02, *Modernizing the CNSC's Regulations*.[4] The Discussion Paper makes the following reference to waste management:

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[1] AECL 2014. *Comprehensive Preliminary Decommissioning Plan.* CPDP-508300-PDP-001 Revision 2. Atomic Energy of Canada Limited, Chalk River, Ontario. March 2014.

[2] CNSC 2017b. *Nuclear Substances*. Canadian Nuclear Safety Commission. Date modified: 2017-07-31.

[3] CNSC 2013. *Regulatory Framework Plan 2015-2021*. Canadian Nuclear Safety Commission. March 2013.

[4] CNSC 2014. *Modernizing the CNSC's Regulations*. Discussion Paper DIS-14-02. Canadian Nuclear Safety Commission. November 17, 2014.

> CNSC licensees must comply with the requirements set out in the NSCA and its regulations as well as the requirements established in their licences. Over the last decade, several standard licensing conditions - aligned with the CNSC's safety and control areas - evolved for major facilities. For example, two standard conditions state that "the licensee shall implement and maintain a waste management program" and that "the licensee shall implement and maintain a radiation protection program."
>
> Is the relationship between CNSC regulations and the obligations set forth in licences clear and straightforward? Would it be clearer to prescribe some standard licence conditions in regulations rather than in licences? If so, which ones?[1]

CNSC's "*What We Heard Report - DIS-14-02*"[2] lists eight "areas of potential regulatory amendments" that CNSC now considers "important for further consideration and discussion with stakeholders." One of these is to "Modernize application requirements for certain facility types: Updated application requirements may be needed for certain facility types, such as accelerators and waste facilities."

In May 2016, CNSC released Discussion Paper DIS-16-03, *Radioactive Waste Management and Decommissioning*[3], with an aim to seek "early feedback from stakeholders on the opportunities presented to improve the CNSC's regulatory framework for radioactive waste management and decommissioning." In this Paper, CNSC proposes "to clarify waste management program requirements in regulations and regulatory documents."

Feedback from an industry stakeholder[4] said:

> In general, Industry views the current Act and Regulations as adequate for most waste management activities and decommissioning, with the exception of the long-term aspects associated with some facilities. Industry does believe that creating a separate Regulation for long-term waste management facilities would be useful.

Feedback from a non-industry stakeholder[5] criticizes many aspects of the Discussion Paper and concludes by calling for

> a robust framework for radioactive waste management and decommissioning which is protective of human health and the environment, engages the public in its development and implementation, and is developed and delivered in a manner that is transparent and accountable.

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[1] CNSC 2014. *Modernizing the CNSC's Regulations*. Discussion Paper DIS-14-02. Canadian Nuclear Safety Commission. November 17, 2014. (see "Questions for Discussion")

[2] CNSC 2016. *What We Heard Report - DIS-14-02*. Canadian Nuclear Safety Commission. April 5, 2016. (see Theme 5: Proposed regulatory amendments)

[3] CNSC 2016. *Radioactive Waste Management and Decommissioning*. Discussion Paper DIS-16-03. Canadian Nuclear Safety Commission. May 2016.

[4] CNL 2016. *Canadian Nuclear Laboratories Comments on Draft Discussion Paper DIS-16-03 Radioactive Waste Management and Decommissioning.*

[5] Northwatch 2016. *Northwatch Comments on Canadian Nuclear Safety Commission DIS-16-03, Radioactive Waste Management and Decommissioning*. September 12, 2016.

A "What We Heard" response to these and other comments has not yet appeared. The void with regard to radioactive waste management regulations remains. CNSC licensees remain free "to implement and maintain a waste management program" of their choosing.

If CNSC does intend to address this void, our strongly-held view is that a process of policy development with engagement of indigenous groups and the public is required, with full consideration of Issues such as retrievability and reversibility. Consultations should be led by responsible federal departments and not simply delegated to CNSC.

CNSC fails to provide robust guidance on licensees' radioactive waste management obligations

CNSC regulatory policy, P-290, *Managing Radioactive Waste*, makes no distinction between storage and disposal. Furthermore, this regulatory policy imposes no requirements on radioactive waste generators and owners. It says only that "When making regulatory decisions concerning the management of radioactive waste, it is the policy of the Canadian Nuclear Safety Commission to **consider the extent to which** the owners of the waste have adhered to the following principles."[1] (emphasis added)

CNSC's "policy" to "consider the extent" to which waste owners adhere to "principles" is extremely weak, as are the principles themselves. Only one provides semi-quantitative guidance on acceptable impacts from radioactive waste management, without distinguishing between storage and disposal:

> d) The predicted impacts on the health and safety of persons and the environment from the management of radioactive waste are no greater than the impacts that are permissible in Canada at the time of the regulatory decision.

Compare this statement to the following statement in IAEA Safety Standard SSR-5:

> A well-designed, well-located and properly developed disposal facility for radioactive waste will provide a high level of assurance that radiological impacts in the period after closure will be low, both in absolute terms and in comparison with the impacts expected from any other options for radioactive waste management that are available at present.[2]

The title of CNSC Regulatory Guide G–320, *Assessing the Long Term Safety of Radioactive Waste Management*, suggests that CNSC is concerned only with assessing, and not regulating, waste management. The document says:

> An applicant for a CNSC licence should provide reasonable assurance that the proposed plans for the long term management of radioactive waste that will arise from the licensed activities are consistent with all applicable requirements. It is up to the applicant to determine an appropriate methodology for achieving the long term safety of radioactive waste based on their

[1] CNSC 2004. *Managing Radioactive Waste*. Regulatory Policy P-290. Canadian Nuclear Safety Commission. July 2004. (see p. 2)

[2] IAEA 2011. *Disposal of Radioactive Waste*. Specific Safety Requirements No. SSR-5. International Atomic Energy Agency, Vienna. (see p. 49)

> specific circumstances; however, applicants are encouraged to consult with CNSC staff throughout the pre-licensing period on the acceptability of their chosen methodology.[1]

As CNSC has no "applicable requirements" for long term management of radioactive waste, the task of providing "reasonable assurance" that management plans meet requirements is greatly simplified.

In conclusion, the so-called "principle" in the *Radioactive Waste Policy Framework* that the federal government will ensure that waste owners "comply with legal requirements and meet their funding and operational responsibilities in accordance with approved waste disposal plans" is simply an empty promise. There are no legal requirements, no responsibilities, no plans and no approval mechanisms for radioactive waste disposal. CNSC, an "independent" agency widely criticized as subject to regulatory capture, has simply delegated the determination of an "appropriate methodology" to its licensees.

This policy, regulatory and strategy void for non-fuel radioactive waste management creates serious risks to health, safety and the environment. The Government of Canada could fill this void through consultations with indigenous peoples and the public using guidance prepared by the International Atomic Energy Agency.[2][3][4][5][6] It should do so before giving any further consideration to disposal facilities, either for its own radioactive wastes or for non-federal wastes.

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[1] CNSC 2006. *Assessing the Long Term Safety of Radioactive Waste Management.* Regulatory Guide G–320. Canadian Nuclear Safety Commission. December 2006. (see p. 8)

[2] IAEA 2009. *Policies and Strategies for Radioactive Waste Management*. IAEA Nuclear Energy Series No. NW-G1.1. International Atomic Energy Agency Vienna, 2009.

[3] IAEA 2009. *Predisposal Management of Radioactive Waste*. General Safety Requirements. Safety Standards Series No. GSR Part 5. International Atomic Energy Agency Vienna, 2009.

[4] IAEA 2011. *Disposal of Radioactive Waste*. Specific Safety Requirements No. SSR-5. International Atomic Energy Agency, Vienna.

[5] IAEA 2012. *The Safety Case and Safety Assessment for the Disposal of Radioactive Waste.* Specific Safety Guide No. SSG-23. International Atomic Energy Agency, Vienna.

[6] IAEA 2014. *Near Surface Disposal Facilities for Radioactive Waste*. Specific Safety Guide No. SSG-29. International Atomic Energy Agency, Vienna.

Appendix 3 - Non-fuel radioactive waste management in Sweden and Finland

A Swedish document, *Radioactive Waste Management And Decommissioning In Sweden (*https://www.oecd-nea.org/rwm/profiles/Sweden_report_web.pdf) indicates that Sweden's policy is to dispose of long-lived non-fuel waste in the same deep geological repositories as spent fuel.

A recent email exchange between a member of one of our groups and Kai Hämäläinen, Section Head, Nuclear Waste Facilities, Radiation and Nuclear Safety Authority, STUK in Helsinki, Finland yielded some useful information about policies and strategies for radioactive waste disposal in Finland:

July 21, 2017
Dear Lynn Jones,

Thank you for your question.

Nuclear waste disposal in Finland is regulated by Nuclear Energy Act (NEA) and Nuclear Energy Decree (NED). Both of these are available in STUKLEX:
https://www.stuklex.fi/en/ls/19870990 (NEA)
https://www.stuklex.fi/en/ls/19880161 (NED)

Both NEA and NED discuss on permanent disposal in Finland but the waste disposal depth is not specified.

Next level of regulation is STUK regulation on the Safety of Disposal of Nuclear Waste, which is more technical on its nature. https://www.stuklex.fi/en/maarays/stuk-y-4-2016

It is mainly written for waste disposal in bedrock because it is the predominant solution for nuclear waste disposal in Finland at the moment but it also gives the possibility for disposal of very low level waste in near surface disposal facility.

Finnish report on the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management gives more detailed description of the radioactive waste management in Finland. Report is available here:
https://www.julkari.fi/bitstream/handle/10024/125632/stukb180.pdf?sequence=1

IAEA guidance on disposal of radioactive waste (SSR-5, http://wwwpub.iaea.org/MTCD/publications/PDF/Pub1449_web.pdf) and near surface disposal facilities for radioactive waste (SSG-29, http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1637_web.pdf) state that near surface disposal facilities are suitable for very level and low level radioactive waste.

I hope this answers your question.

Best regards,

Kai Hämäläinen

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---------- Original Message ----------
From: Lynn Jones <hendrickson.jones@gmail.com>
Date: Tue, 18 Jul 2017 16:51:37 -0400
Subject: Question about radioactive waste management in Finland
To: <info@stuk.fi>

Dear Sir or Madam:

I would be very grateful if you could answer a question for me. I am representing a group from Canada called Concerned Citizens of Renfrew County and Area. We are opposing the construction of a giant above-ground mound beside the Ottawa River for one million cubic metres of low and intermediate level radioactive waste.

We know this is not a responsible way to deal with these wastes and that IAEA guidelines say that above ground mounds are only suitable for very low level radioactive waste.

We have learned from our internet research that Finland is a world leader in responsible management of radioactive waste and we are trying to figure out what sort of changes are needed in Canada so we too, can have good policies and strategies for dealing with radioactive wastes in a responsible manner.

I have been searching and reading a lot of documents but have not yet been able to find anywhere in Finnish law or policy and regulatory documents where it specifies that low and intermediate wastes shall be disposed of below ground in geological repositories.

Could you possibly direct me to any documents where this is explicitly stated?
Thank you very much for your assistance.
Best wishes,
Lynn Jones
Concerned Citizens of Renfrew County and Area https://sites.google.com/site/concernedcitizensrca/

Contact information

Names of petitioners:

Ole Hendrickson and Theresa McClenaghan

Contact information for petitioners:

Ole Hendrickson
[redacted]
Telephone number: (613) 234-0578
Email address: ole@nrtco.net

Theresa McClenaghan
Canadian Environmental Law Association
55 University Avenue, Suite 1500,
Toronto, Ontario M5J 2H7
Telephone number: (416) 960-2284 or 1 (844) 755-1420
Email address: theresa@cela.ca

Names of the groups:

Concerned Citizens of Renfrew County and Area

Canadian Environmental Law Association

We hereby submit this petition to the Auditor General of Canada under section 22 of the Auditor General Act.

Date: September 20, 2017