

***Nuclear Waste Governance in Canada
A Brief Submitted to the ENVI Committee***

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Summary

Every process generates wastes. The question is, what do we do about those wastes?

Consider our own wastes. If we chose to store it, we have this idea that we will find a use for it sometime in the future. Think of what is in that closet, basement, attic, or garage. Some of us even pay to have a storage locker.

If we decide to dispose of it, then there is no future use for it, and it can be abandoned.

Note the link between “disposal” and “abandon”. When “disposal” is related to wastes that present a hazard to the health and safety of future generations, and/or to the environment, the term “abandon” changes the framing of what “disposal” really means. This is why municipalities have hazardous waste programs, to separate these hazards from what is appropriate for disposal in a municipal waste landfill once the facilities is filled and can be abandoned..

Consider the history of the nuclear industry in Canada.

Canada has been generating nuclear wastes since the 1940's. Those wastes were a result of Canada's contribution to the nuclear weapons industry, that is, the Manhattan Project. Virtually all of it is currently located on the Chalk River site.

Then came the development of “Atoms for Peace”. The results of that initiative were nuclear power reactors and medical isotopes. Most of the early research for these initiatives occurred at Chalk River, and the wastes from that research are also located there.

Since the development of weapons was the original reason for the nuclear industry, “maintaining secrecy” was the only consideration when it came to interactions with the public. While the reason for maintaining that secrecy has changed to protecting “intellectual property”, it continues to this day.

However, we have now reached a new milestone with the nuclear industry. Canada's CANDU reactors have reached the end of their design life. While that life can be temporarily extended through expensive refurbishment projects, renewal cannot continue forever. Soon all those reactors will be decommissioned generating a massive nuclear waste problem that can no longer be ignored.

This leads directly to the topic under consideration by this Committee, “Nuclear Waste Governance in Canada”. Since the current governance was developed to address past industry practices, it is no longer appropriate to address this pending waste problem.

As discussed in the brief, there are at least two issues that Canada's Nuclear Waste Governance has to address.

- Since waste disposal decisions will have impacts to future generations, possibly forever, Public Engagement cannot be left to the proponents and the regulator alone. Examples of alternatives public engagement activities are evaluated.
- Both the Proponents and Regulator must directly address real meaning of disposal, “abandonment”, in any application or regulatory approval. This topic is also discussed.

To address these issues, I respectfully provide two recommendations to the Committee for their consideration.

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1 Introduction

Canada has been generating nuclear wastes since the 1940's. Those wastes were a result of Canada's contribution to the nuclear weapons industry, that is, the Manhattan Project. Virtually all of it is currently located on the Chalk River site.

Then came the development of "Atoms for Peace". The results of that initiative were nuclear power reactors and medical isotopes. Most of the early research for these initiatives occurred at Chalk River, and the wastes from that research are also located there.

However, we have now reached a new milestone with the nuclear industry. Canada's nuclear power reactors have reached the end of their design life. While that life can be temporarily extended through expensive refurbishment projects, this cannot continue forever. Soon all those reactors will be decommissioned generating a massive nuclear waste problem that can no longer be ignored.

Since the development of weapons was the original reason for the nuclear industry, "maintaining secrecy" was the only consideration when it came to interactions with the public. While the reason for maintaining that secrecy has changed to protecting "intellectual property", it continues to this day.

This focus on secrecy has led to the use by Canada's nuclear industry of the Decide-Announce-Defend (DAD) strategy for public engagement, that appears to be supported by the nuclear regulator. This strategy leads to a significant trust issue with both the licensees and the regulator. Section 2 below, the issues with the DAD approach are discussed. Included is a discussion of several alternatives to the DAD approach, including a discussion of international experience with stakeholder involvement.

What is somewhat more disturbing is that since 2016, when CNL submitted its project description for their mound disposal facility [1], the CNSC has revised their guidance documents to remove any reference to abandonment, which is the real meaning of disposal. This issue is discussed in Section 3 below.

In Section 4 below, I provide two recommendations for the Committee to consider, that address the Public Engagement and Abandonment issues discussed in this brief.

2 Public Engagement

As discussed in Section 1 above, the approach to public engagement (that is, maintaining secrecy), while appropriate for the early days of the industry, is no longer suitable for making decisions regarding nuclear waste management in Canada. Recall that managing the nuclear wastes has ramifications for generations long into the future. Thus, it is critical that the public and indigenous groups be "engaged" in that decision making process, not just "consulted".

Section 2.1 below provides a definition of the DAD strategy, when this approach is appropriate to use, and suggests why its continued use by Canada's nuclear industry is no longer justified.

Section 2.2 below, provides some alternatives to the DAD strategy. Of particular note is the US DOE's use of Site-Specific Advisory Boards (SSABs). See Section 2.2.2.1 below.

2.1 The DAD Approach

2.1.1 What is "Decide-Announce-Defend"?

Decide-Announce-Defend is a process by which a proponent engages with all those interested and/or affected by a proposed undertaking. Essentially the proponent decides on the optimal solution to a problem for which the time associated with the decision process is limited, such as when the situation is an emergency.

[1] CNL, *Project Description: Near Surface Disposal Facility At Chalk River Laboratories*, 232-509200-ENA-001, Revision 0, March 2016.

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Alternatively, if the proposed solution has little impact or its consequences have limited scope, then an announcement is sufficient.

However, for larger projects, with large potential impacts and long-term timelines, and a large number of potentially impacted stakeholders, questions about a proponent's unilateral decision will inevitably arise. Once announced, and those inescapable queries arise, the proponent is left to defend their decision.

In the both the nuclear and non-nuclear fields, examples abound where this process has failed. (See also Section 2.2 below)

2.1.2 When to use "DAD"

In emergency situations, decisions are generated through a top-down hierarchy thus do not require stakeholder input. In general, a group of experts who base their decision on scientific or technical analysis occupies this top. For this reason, the DAD approach is not suited to situations:

- *"Where a wide range of technical, social, cultural and economic factors are influencing the current situation and the various possible alternatives to it*
- *Where successful implementation involves a lot of people*
- *Where these people are not in an obvious command structure, but can choose whether to cooperate" [2]*

As to whether the conditions for the choice of the DAD approach to waste disposal issues, consider the three reasons why this process is appropriate; it is an emergency situation, no stakeholder input is required, and the relevant expertise is at the top.

2.1.3 Is Nuclear Waste Disposal an Emergency?

If it is an emergency, such as the Fukushima and the Chornobyl incidents, the answer is yes. And that is exactly what happened. In both situations, decisions had to be made before all information was available. As a result, the hazards in wastes produced during those incidents are unlikely to reach acceptable levels for thousands of years.

2.2 Alternatives to "DAD"

To ensure the public are actively involved in decisions that have the potential to affect the long-term future of their communities, two examples are discussed below.

The first, "Arnstein's ladder of citizen participation", depicts the level of public engagement corresponding communication activities where the lowest level corresponds to announcing (little to no participation) to the public's control of the decision process at the top. (see Section 2.2.1 below).

The second is the formation of Site-Specific Advisory Boards (SSAB) at US DOE sites, as discussed in OECD-NEA bibliography [7] and the formation of SSAB's at the US DOE sites (see Section 2.2) This is an example of the top of the Arnstein's ladder, and points to the importance of early public engagement in the decision making process.

2.2.1 Arnstein's Ladder of Citizen Participation

In 1969, Sherry Arnstein, described a "ladder of citizen participation" that depicted levels of citizen involvement in the planning processes in the United States [3]. The ladder is shown in Figure 1.

Rungs 1 and 2, "Manipulation" and "Therapy" do not involve any public participation. Essentially, they describe the planned activities in terms of "we are the experts, and this is the best". These correspond to the "Decide" part of the DAD process.

[2] See link - <http://www.asset-scienceinsociety.eu/pages/decide-announce-defend-dad>

[3] Sherry R. Arnstein "A Ladder of Citizen Participation," *Journal of the American Planning Association*, Vol. 35, No. 4, July 1969, pp.216-224.

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Rung 3, “Informing” is the step in which the public relations group becomes involved in an attempt to gain public support. The public needs to know, and are provided an opportunity for questions. This corresponds to the “Announce” part of the DAD process.

Rung 4, “Consultation” is the next step. This has been approach to public engagement [4] used by both the nuclear industry and the regulator. It is essentially “window-dressing”.

Rung 5, “Placation” is the attempt to “co-opt” local decision makers (such as, municipalities, indigenous groups and community organizations) into supporting the planned activities. While these initiatives allow some citizens a chance to advise or comment on the planned activities, they do not represent true engagement. The proponent retains the right to judge the legitimacy or feasibility of the advice received. Regretfully, this is the approach the regulator uses in their licence hearings.

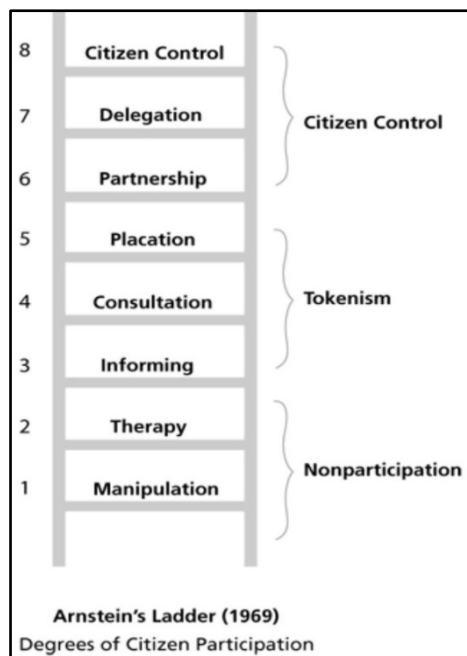
Rungs 4 and 5 correspond to the “Defend” part of the DAD process. Anyone who reads the Commission’s decisions as documented in their Record of Decision documents will recognize this “Defend” approach.

The upper three rungs begin the process of true citizen participation. Rung 6, “Partnership” means that the planning and decision-making processes are shared through joint committees in which both the proponent and the public have an equal say in the processes.

At the Rung 7 level, “Delegation”, the citizens have a clear majority of the seats on the joint committees, thus having the power to make decisions. That power would extend to ensuring accountability for the proposed undertaking.

The top rung, Rung 8, “Citizen Control”, is self-explanatory. The entire job of planning, decision-making, obtaining financing, et cetera, rests with the neighbourhood corporation.

I know of no nuclear projects in Canada that reach this rung.



**Figure 1 - Arnstein's Ladder of
Citizen Participation**

The “DAD” approach does not allow for “Partnership”, “Delegation” or “Citizen Control”, the top three rungs. As such, the residents in the communities in the vicinity of any of Canada’s proposed nuclear

[4] CNSC, *Public and Aboriginal engagement: Public Information and Disclosure*, REGDOC-3.2.1

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waste disposal facilities have been engaged at these rings. Since these facilities are likely to have long-term consequences, public participation in those decisions is essential.

Comparing the role of SSAB's with the rungs of the ladder suggests that these boards function at the Rung 6 (possibly the Rung 7) level. For example, consider this section of the quote from Section 2.2,

“... the board may provide advice and recommendations concerning the following EM site-specific issues: cleanup standards and environmental restoration; waste management and disposition; stabilization and disposition of non-stockpile nuclear materials; excess facilities; future land use and long-term stewardship; risk assessment and management; and cleanup science and technology activities.” [8]

The range of public concerns that are part of the “mandate” of a DOE SSAB appears to cover all issues with the future of the site. As discussed in the Rock Flats site case study, that SSAB hired a consultant. This suggests this board functioned at Rung 7. (For details, see the report on this case study included in Reference [6].)

2.2.2 International Experience on Stakeholder Input

As with all projects that have long-term horizons, the lack of crucial stakeholder input means that a DAD approach is unlikely to succeed. There are many publications in the nuclear industry pointing to this issue. For example, in 2003, the OECD-NEA held a workshop in Villigen, Switzerland on “*Stakeholder Participation in Radiological Decision Making*”. Two publications resulted from that meeting, the first addressed processes and implications [5] and the second described three case studies [6].

Then in 2015, the OECD-NEA published another document that addressed the same topic, a bibliography entitled “*Stakeholder Involvement in Radioactive Waste Management Decision Making: Annotated Bibliography-Forum on Stakeholder Confidence (FSC)*”. This report includes a listing (with notes) of various international reports including several from the US, UK and Canada [7].

2.2.2.1 US DOE Site-Specific Advisory Boards

As to the clean up of nuclear weapon sites in the US, the US DOE recognized the importance of stakeholder input such that it mandated the formation of site-specific advisory boards (SSAB). One of the case studies in the OECD-NEA case study publication [6] describes the role of the Rocky Flats Site-Specific Advisory Board in the settlement of a dispute over the setting of soil action levels at the US DOE Rocky Flats site in Colorado. This report summarizes the role of the Board in the successful resolution of that dispute.

What about the other DOE sites? The following is the SSAB mission statement copied from the DOE website:

“The EM Site-Specific Advisory Board (EM SSAB) was created to involve stakeholders more directly in EM cleanup decisions. When stakeholders share their opinions by becoming involved in cleanup discussions, federal decision-making and cleanup activities are improved. Public input helps agencies to make decisions that are cost effective, community specific and environmentally sound, which leads to faster, safer cleanups.

In accordance with its charter, the EM SSAB exists to provide the EM senior management with information, advice and recommendations concerning issues affecting the EM program at various sites. Specifically, at the request of the Assistant Secretary or the site managers, the board may provide advice and recommendations concerning the following EM site-specific issues: cleanup

[5] OECD-NEA, *Stakeholder Participation in Radiological Decision Making: Processes and Implications - Third Villigen Workshop*, Villigen, Switzerland, 21-23 October 2003, NEA No. 5298, 2004 (Link - <https://www.oecd-nea.org/rp/pubs/2004/5298-stakeholder-villigen-3.pdf>)

[6] OECD-NEA, *Stakeholder Participation in Radiological Decision Making: Processes and Implications, Case Studies for the Third Villigen Workshop*, Villigen, Switzerland 21–23 October 2003, NEA No. 5410, 2004. (Link - <https://www.oecd-nea.org/rp/pubs/2004/5410-stakeholder.pdf>)

[7] OECD-NEA, *Stakeholder Involvement in Radioactive Waste Management Decision Making*, NEA/RWM/R(2015)4, Sep 2015. (Link - <http://www.oecd-nea.org/rwm/docs/2015/rwm-r2015-4.pdf>)

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standards and environmental restoration; waste management and disposition; stabilization and disposition of non-stockpile nuclear materials; excess facilities; future land use and long-term stewardship; risk assessment and management; and cleanup science and technology activities.

The EM SSAB's activities are governed by the Federal Advisory Committee Act (FACA), which was enacted to ensure that the general public has access to advisory board deliberations and recommendations. While only one FACA-chartered EM SSAB exists, eight local boards have been organized under its umbrella charter. They include the Hanford Advisory Board, Idaho Cleanup Project Citizens Advisory Board, Northern New Mexico Citizens' Advisory Board, Nevada SSAB, Oak Ridge SSAB, Savannah River Site Citizens Advisory Board, and Portsmouth SSAB and Paducah Citizens Advisory Board." [8]

While these boards and their governing legislation do not apply to clean up activities in Canada, surely this process represents best practice. As such, it provides the benchmark by which to evaluate whether Canada's nuclear industry public engagement activities are adequate.

The CNSC recognizes the importance of stakeholder input in their regulatory documentation [4]. However, that document does not address the top three rungs of the Arnstein Ladder depicted in Figure 1.

The result of ignoring their concerns when deciding on an option that has significant consequences to the future of local communities has been unnecessary antagonism, and has been detrimental to the public's trust of the nuclear industry, and especially the regulator.

3 Disposal Means Abandonment

3.1 Four Fundamental Definitions

3.1.1 Disposal

With respect to *Nuclear Waste Governance*, we need to understand some terminology related to radioactive waste disposal, such as "What is meant by disposal?"

To quote the CNSC definition, disposal means:

"The placement of radioactive waste without the intention of retrieval." [9]

With no intention to retrieve, the proposed disposal facility should reduce the liabilities associated with Canada's nuclear waste to zero. Of course, that ultimate goal can only be reached once the waste repository presents no risk to human and non-human biota and the facility can be abandoned. Otherwise, the proposed facility will be a costly burden to future generations in perpetuity. See also Section 3.1.2 below.

3.1.2 Institutional Control

There is another issue associated with radioactive wastes. While the radioactivity in the wastes decay away to a level that presents no risk to human or non-human biota, access to their location must be controlled. This time is known as the Institutional Control (IC) period.

The CNSC defines IC as:

"The control of residual risks at a site after it has been decommissioned. Institutional controls can include active measures (those requiring activities on the site such as water treatment, monitoring, surveillance and maintenance) and passive measures (those not requiring activities on the site, such as land use restrictions or markers)". [9]

[8] See link - <https://www.energy.gov/em/services/communication-engagement/em-site-specific-advisory-board-em-ssab>

[9] CNSC, *Glossary of CNSC Terminology*, REGDOC-3.6, April 2021.

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While IC can include both active and passive measures, someone has to be responsible for ensuring those measures are in place throughout this period. Those measures will involve expenditures for both personnel and materials, in other words, “liabilities”.

Once the residual hazards at the site present no risk to persons or the environment, the need for IC is removed, the wastes can be abandoned. Thus, the liabilities associated with maintaining the IC become zero..

3.1.3 Abandon

As stated in the definition of “disposal”, Section 3.1.1 above, with no intent to retrieve, the wastes will eventually be abandoned. Thus, we need a definition of this term. The CNSC defines “abandon” as:

“Remove from regulatory control.” [9]

This raises another issue. What are the criteria that can be used to determine whether a facility can be removed “... from regulatory control”?

3.1.4 Clearance Levels

Those criteria are “clearance levels’ which the CNSC defines as:

“With respect to radioactivity levels, the maximum permissible concentrations of radioactivity in or on materials, equipment and sites to be released from regulatory control (for example, becquerels per gram or per square centimetre, near-contact dose rates). Clearance levels may be expressed as conditional or unconditional, depending on whether the specific pathways of release, or destinations for reuse, recycling and/or disposal are specified.” [9]

Where does one find those “clearance levels”? They are defined in Schedule 2 of the *Nuclear Substances and Radiation Devices Regulations*, SOR/2000 207. [10]

3.2 NSCA Has No Provision for a Disposal Licence

If the wastes are placed in a disposal facility “...without the intention of retrieval.” (Section 3.1.1 above), then logically those wastes will eventually be abandoned (Section 3.1.3 above).

In the Nuclear Safety and Control Act (NSCA) [11], there are five licences specifically identified that cover the full life-cycle of a nuclear facility. To quote from Section 26 of the Act:

“26 Subject to the regulations, no person shall, except in accordance with a licence...

(e) prepare a site for, construct, operate, modify, decommission or abandon a nuclear facility...”

Since the Act contains no provision for a “disposal licence”, we are left with the licence to abandon as the last CNSC licence that covers the whole life-cycle of a nuclear facility.

3.2.1 Removal of “Abandonment” from the CNSC’s Guidance Documents

As shown in Table 1, sometime after CNL initiated the licencing process to amend the Chalk River licence in 2016 [1], the CNSC chose to replace and revise their guidance documentation that were applicable to at the time CNL introduced their disposal project. The regulator’s subsequent revisions essentially eliminated any reference to abandonment.

The results of a search of the term “abandon” in the each of the CNSC’s guidance documents is provide in the third column of Table 1, As one can see, this term twice in P-290 and 11 times in G-320, whereas it occurs twice in only one of the updated REGDOC 2.11.1, Vol II (mines and mills).

By superseding P-290 and G-320 (which did address “abandonment”) with these revised REGDOCs, the CNSC no longer provides the licensee any guidance for abandonment.

[10] See Schedule 2 of the *Nuclear Substances and Radiation Devices Regulations*, SOR/2000 207

[11] Nuclear Safety and Control Act, S.C. 1997, c. 9

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Table 1: Document Publication Timing

Date Published	Title	Occurrence of the term "Abandon"
CNSC's Applicable Guidance, at the time CNL submitted its Project Description [1]		
2004-Jul	P-290, Managing Radioactive Waste [12]	2
2006-Dec	G-320, Assessing the Long term Safety of Radioactive Waste Management [13]	11
CNSC's Revised Guidance Documents		
2021-Mar	REGDOC-2.11, Framework for Radioactive Waste Management and Decommissioning in Canada, Version 2	0
2021-Jan	REGDOC-2.11.1, Waste Management, Volume I: Management of Radioactive Waste	0
2018-Nov	REGDOC-2.11.1, Waste Management, Volume II: Management of Uranium Mine Waste Rock and Mill Tailings	2
2021-Jan	REGDOC-2.11.1, Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste, Version 2	0

3.3 Is the Regulator Regulating?

The change in the CNSC's guidance documents to remove references to "abandonment" within a few years of a proponent's application for a nuclear waste disposal project is problematic. It provides evidence that confirms the suggestions made by several previous Committee witnesses, that the CNSC is a "captured regulator".

Alternatively, it suggests the regulator is uncertain how to address "abandonment", and how to release a landfill type mound facility containing one million cubic meters of radioactive waste from regulatory control.

Either way, since the licence to abandon is the last licence for a nuclear facility under Section 26(e) of NSCA (see Section 3.2 above), this reluctance to confront the waste abandonment issue for a disposal facility is unacceptable.

3.4 Waste Abandonment, a Gap in Canada's Nuclear Waste Governance

As discussed in Section 1 above, since Canada's CANDU power reactors are reaching the end of their design life, we have reached a significant milestone in the management of nuclear waste, The next phase is to decommission all reactors, thus creating a massive nuclear waste problem.

As the number of Canadian power reactors being decommissioned rise, the nuclear waste issue becomes more critical. Thus, the regulator has to address waste abandonment issue now, not years into the future.

The removal of "abandonment" from their guidance documents (see Section 3.2.1 above) does not bode well for the future of Nuclear Waste Governance in Canada. Where does a licensee find the required guidance to support a licence to abandon?

NOTE: If there is one history lesson to take away from Canada's nuclear industry, it is that those proponents of small reactors as the future of Canada's nuclear industry cannot leave to the future the problem of managing these wastes. Further, the costs associated with managing the wastes must be set aside NOW. It is not up to future generations to clean-up after these small reactors reach the end of their

[12] CNSC, *Managing Radioactive Waste, Regulatory Policy*. P-290, 2004.

[13] CNSC, *Assessing the Long Term Safety of Radioactive Waste Management*, G-320, 2006.

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design life, thus the need for the supporting infrastructure (such as, fuel fabrication facilities) is no longer required and are decommissioned.

4 Recommendations for Consideration

4.1 Public Engagement

Respectfully, I suggest that the Committee consider that a subcommittee be formed to consider implementing legislation to ensure public and indigenous group engagement activities associated with nuclear waste disposal address "Citizen Control" level of *Arnstein's Ladder of Citizen Participation* as depicted in Figure 1. Funding for this level of engagement should be the responsibility of the proponent.

A successful example for this initiative is discussed in Section 2.2.2.1 above.

4.2 Abandonment

As discussed above, neither the nuclear industry nor the regulator appears willing to address the radioactive waste abandonment issue. Therefore, I respectfully suggest that the Committee consider the formation of an entity independent of the regulator, and the industry, reporting directly to Parliament, with the mandate to address all aspects of Canada's nuclear waste management with the exception of CANDU fuels.

NOTE: The mandate of Nuclear Waste Management Organization covers only waste CANDU fuels. It does not address the experimental fuels that are currently stored on the Chalk River site. Further, given the current the small reactor fuels, and the fact that they require low-enriched uranium, they are not suitable for disposal in the current NWMO repository.