

Modernizing Canada's Radioactive Waste Policy

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I have attended all four Roundtable events for this consultation process and am now submitting this input as one 'integrated' response covering the topics in the four background papers and a related range of considerations.

Consultation Outcome

The 'policy modernization' challenge framed in this circumscribed four-part way, and the narrow consultation process conducted, cannot produce the kind of broad democratic consensus and policy outcome that the Canadian public needs and deserves.

Part 1: Policy for the unthinkable and the unknown

The consultation task as framed, purports to normalize 'radioactive waste' in rational 'management' terms, while ignoring the fundamental realities.

- Radioactive waste has deadly existential implications, but the consultation does not invite the fundamental questions of: "Why do we have this dangerous nuclear waste in the first place?" and, "If we do have to now deal with this awful legacy of the past 50 years, what possible 'public good' could justify continuing to add more to it, to be 'managed'?" and
- Our human knowledge has barely 'scratched the surface' regarding the 211+ new radioactive elements produced in the nuclear fission process, which did not exist until 1940. Little is understood about how each one impacts human health and the soil, water and air comprising the environment for all living entities, including how these materials transmute over the thousands and up to millions of years that some remain radioactive!

Hidden in plain sight

Even for those aware of this 'consultation' process, no-where in any of the simplistic short background 'papers', is there any mention of the current context in which the Government of Canada is promoting a new generation of nuclear, misleadingly called "Small Modular Reactors". These SMRs will not only perpetuate the production of additional nuclear waste, but will add the challenge of new forms of waste and sprinkle it around the country by promoting the use of SMRs for 'remote' areas. Creating a public impression that nuclear waste is under control with a 'modernized policy', may even be a pre-requisite for public acceptance of these 'Generation 4' nuclear additions.

What the Public Knows,..... or Not

I am aware that even my limited level of knowledge on the topic of nuclear fission and nuclear waste is currently well beyond that of the general public, in spite of their genuine interest in understanding the limited media coverage. Many would be shocked, as I am, at the limits of human knowledge about, and limited provisions for, 'managing' nuclear waste in Canada and around the world.

My understanding has been gained over the last year from reading some of the scientific papers produced by experts in various aspects of nuclear reactors and radioactive waste and by attending a number of webinars from the UK, USA and Canada featuring expert presentations. Other webinars and articles focussed on a number of local nuclear waste issues in Canada at Chalk River, Ignace, the Bruce Peninsula, and Port Hope have been particularly informative as the presenters include members of local

What the Public Knows,..... or Not (cont'd)

groups with a range of expertise in the science and practices surrounding nuclear waste as well as institutional and process concerns. Many of them have become jaded and physically and emotionally worn-out by years of contributing researched and articulated positions to processes like this one, without their concerns being addressed in the decisions made.

'Unknowns' Revealed

This learning experience has revealed many 'unknowns' about spent nuclear fuel or decommissioning forms of radioactive waste. Absent any commitment to research, they will remain unknowable.

- The human and environmental health impacts of the various radioactive and chemical pollutants generated by reactors and released intentionally as well as unintentionally into the surrounding air, soil and water, are remarkably under researched for a process that is already known to have some specific short and long-term deadly impacts. What is 'known' less formally – from anecdotal reporting and constrained reporting on the Chernobyl accident area and also emerging from physician and citizen scientist reporting in uranium mining areas in Canada and from Fukushima or Three Mile Island, is dismissed by industry and government as 'not meeting rigorous scientific standards'. At the same time, the government fails to initiate and fund the studies that could meet those standards!

Studies that are done at the initiative of individual scientists are not funded at the level needed to go beyond initial findings. One such is the US study of Strontium 90 found in baby teeth collected for another purpose and showing significant increases of that radioactive element in children born during the period when nuclear power reactors are operational in the area, and increasing more as those reactors age.

To show a real commitment to health monitoring, for example, would require that Health Canada mandate comprehensive and consistent data on health conditions - cancers, endocrine disruptions, birth defects etc., across all provinces and territories. In this way studies, especially long term ones, can be undertaken, using comparative findings for areas with and without reactors and controlled for baseline data on naturally occurring background radiation. The status quo wreaks of "don't wanna know, 'don't ask, don't tell'!

- The 'safe dosage' for radiation levels still relies on studies of the victims of the nuclear bombing of Japan - a standard based on a male, age 30, weighing 130 pounds. This does not in anyway relate to long term exposure to low level radiation coming from an operational reactor over time with its potential differential impacts by age and gender.
- Since CANDU reactors are all situated along large water bodies to draw on the water as the cooling technology, there need to be thorough long term detailed monitoring studies in the adjacent area regarding the impact of reactor operation and radwaste handling on: the water temperature; the presence of radioactive elements in the water; and the health and numbers of marine life..
Similarly, given the wind-blown distribution of some elements emanating from reactors in gaseous form or from the waste, there need to be studies of the presence of these elements in the surrounding soil and their possible effects on microbial activity with potential for absorption up the food chain. This kind of thorough and comprehensive research appears to be lacking anywhere in the world.

Conclusion:

Much more research is needed by the 'nuclear nations' community into the human health and environmental impacts of nuclear power and its radioactive wastes, before extending or expanding the power industry in any form. Canada, as a provider of uranium for reactor fuel internationally and a nation of nuclear power users, must take a significant role in carrying out and funding this research.

Risk-Taking in Light of Unknowns

Another whole category of 'unknowns' in which the industry is operating, relates to the questionable bases for determining the risks of accidents or uncontrolled releases of radioactive material, whether in reactor operation or management of the radioactive wastes or in decommissioning the reactors.

Risks of Plans for a Deep Geologic Repository (DGR)

The NRCan paper on Waste Disposal revealed that the decision for a DGR has already been taken, as it is included as part of "Adaptive Phased Management" under the Nuclear Fuel Waste Act! The oft-touted "international consensus" that this is the best option, turns out to be not an exhaustively-researched option among many. Rather, it was a 1950's conclusion by US nuclear scientists, who -not knowing what to do with it – assumed that the best idea would be to just bury it deep in the earth.

Now this faulty 'consensus' is being reinforced by reference to the facilities in Sweden and Finland that are the furthest along implementing that DGR trajectory and are considered 'state of the art'. Then we learn in a webinar that citizen scientists in Sweden are challenging the effectiveness of the approach – similar to the one proposed for Canada – with radioactive wastes stored in canisters and packed around with bentonite clay. Already, the copper canisters in the Swedish repository are significantly corroded. This approach is basically experimenting with all the unknowns -but at least the waste is still accessible for monitoring and discovery of the state of the waste and the containers. Given the several million years it will take for the waste to decay, why would we be planning to 'bury and abandon' after a few hundred years, without having materials that provably cannot corrode. We have no provable way to ensure that gases potentially produced in decay will not seep up to the surface and or into ground water. The German underground waste burial experiment which is now leaking radioactive waste into ground water is surely a cautionary tale!????

Conclusion:

The plans to use a 'deep geologic repository' in which to 'bury and abandon' radioactive waste, with only a limited time to monitor before releasing the polluter from obligations to manage the waste, must be forbidden. Instead, there must be legislation to require 'rolling stewardship' i.e., keeping the waste accessible for direct monitoring and repackaging as needed should the containment or isolation provisions start to fail, until a method of reversing the radioactivity can be developed, no matter how far into the future.

Risks of 'Disposal stabilized in Situ'

The same range of unknowns applies to the concept of 'disposal stabilized in situ'. This approach has, however, been acknowledged as a possible option in Canada, where remote location and other conditions make radioactive waste removal 'not practical'. In fact, Small Modular Reactors are being proposed precisely for such 'remote areas'.

Conclusion:

No remote location should be licenced for reactors of any size, unless the 'practical' plan for full radioactive waste management – through to decommissioning – is adequate for approval right from the time of application for a site licence.

Risks of Extending the Operational Life of Reactors.

In the course of the Round Table presentations, we heard passionately-expressed concerns from a nuclear industry consultant warning of the dangers of extending the licensed operation of several reactors in Ontario, to 40 years instead of their original 30 year life span. The embrittling of the fuel tubes risks having the tube split and leak fissionable fuel thereby triggering a melt down similar to the Fukushima one. As a basis for one license extension, CNSC dismissed as faulty, a test result on the fuel cells that showed an unlikely result, but did not require new accurate testing. This appears to place industry profits over human safety, given the potential daily cost for reactor shut down. If a 30 year operating span was originally based on science and good modelling, then on what 'known' basis is an extension acceptable? This represents 10 more years of producing radioactive waste to be managed. How will this increased embrittling impact the radwaste from the decommissioning phase?

Risks during Decommissioning

To date, no CANDU reactor has been decommissioned and disassembled. Another participant in the last Roundtable, retired from the nuclear industry with expertise in measurement and dosage of radioactivity, warned of the extreme levels of radioactivity in and around the reactors which are now slated for decommissioning. The exposure for workers involved in the decommissioning would be well beyond safe. This flags a concern that the current plans and the Centre of Excellence for Decommissioning are being undertaken with a lack of knowledge re the radioactivity level challenge to be faced at this stage of waste-handling.

Probability Analysis Misapplication to Risk Assessment

All of this guesstimating around the unknowns of nuclear waste and nuclear operation appears to be underpinned by a false use of 'probability analysis' in risk assessment'.

If the inputs to a risk analysis are not based on known long term behaviours of the earth around a DGR or the containers inside, or in fact the long- term decay characteristics of the various elements in the waste, the assessment is inherently faulty.

Worse still, is the likelihood of dismissing low probability risks, if their implications - should they happen - are disastrous – especially if disastrous for a large population in the vicinity and for a very long time into history – both of which apply to accidents with either nuclear reactors or their wastes.

Lastly, separate risk assessments for individual process breakdowns are not meaningful. As MV Ramana warned in the 2021 webinar on the anniversary of the Fukushima Daichi accident, when any process involves a number of critical interdependent elements, there will be failures leading to system failure. The handling and storing and transporting of nuclear wastes of a variety of elements that also transmute over time, combined with dependence on the behaviours of the earth's geologic make up and atmosphere above, do seem to qualify as such a string of interdependence.

Conclusion:

The best approach is to acknowledge and plan for, and stay prepared to respond to, whatever comes from these 'unknowns'. Bring the nuclear power industry to a close to stop adding to the opportunities for chance accidents to apply.

Liability/Insurability Risk

Perhaps the most telling measure of dealing with these risks of 'unknowns', is that in spite of nuclear industry claims that the Canadian nuclear power industry is "extremely safe" – bolstered by the lack of serious accidents in the short 40 year history to date with CANDUs – the insurance industry is not willing to insure the true full value of a nuclear accident at acceptable rates. The government has accordingly capped the insurance requirement at one billion dollars. Looking at the costs of Fukushima - even ten years later - shows that this is a small 'drop in the bucket' and that in some fashion the government will pick up the cost of some of the wider and long-term impact on the populace. As this is unlikely to result in full compensation, the remaining risk falls on the population in the area surrounding the reactor or the deep geologic or other facility.

Conclusion:

Capping the insurance requirement for operation of reactors or management of wastes, cannot be the final step for government responsibility for a waste that lasts into perpetuity. (See Part 3, Roles of Government for further actions required.)

Part 2: General Principles Can Mislead Radioactive Waste Management Policy

Principles Lack Hierarchy

The IAEA 'Principles for radioactive Waste Management' and the NRCan discussion papers both give the requisite 'lip-service' to the "protection of human health and the environment". When this is stated as one of a number of other principles in the list, that invites compromises, trade-offs or limited the commitment to this principle. The primacy of protection for human health and the environmental needs to be clearly set above all other values, *no matter what!*

An example of how this primary value can be obscured unless set above, is that another principle enunciated by the IAEA, is that there not be an 'undue burden on future generations'. As this is typically interpreted as a burden of financial cost, in this case cost of maintaining ongoing monitoring and readapting over the years as the decaying properties of the waste and the need for adaptive actions emerge, this can be used to practically prescribe, 'burial and abandonment' of the waste in a Deep Geologic Repository. . In fact, we have already created a 'burden' for the future – a genie that will not go back into the bottle. The shape of that burden will emerge in one form or another over the hundreds of thousands of years its radioactivity exists while it decays, whether or not it is placed in a DGR. The 'burden' can even be increased if it is ignored until it emerges in a way that is not easy to address once it is inaccessible for remediation.

General Principle versus Real World Context

The principle of 'Minimizing', i.e., "Keeping waste to the minimum practical" is seductively 'common sense' sounding. In NRCan's outline on "Waste Minimization", this is interpreted as: "The waste hierarchy states that prevention, reduction (minimization), re-using and recycling, should be favoured before disposal. Disposal is the only appropriate strategy if all other options have been exhausted."

This is now being used by the new SMR proponents who intend to reuse CANDU fuel by extracting plutonium. Their political rhetoric calling this 'recycling' of radwaste and their misleading promise to thereby reduce the volume of nuclear waste, are being used to justify development to extract plutonium from spent CANDU fuel by 'pyro-processing' technology. The dangers of doing so have been highlighted, by nuclear experts based on experience in the USA:

- The new type of liquified waste stream is a dangerous complex mix of elements for which there is no cost-effective management approach at this time.
- The form of plutonium extracted is deemed by the US nuclear weapon laboratories to be attractive for use in nuclear weapons and hence a security risk.
- Less than 1 percent of the original waste is extracted – so the claim of reducing the waste is bogus!

The fact that this has been experimented with in the USA for over 25 years, costing billions of dollars and declared a failure as a waste reduction strategy, is being ignored and promoted publicly as 'recycling'!!!! The seriousness of the proliferation threat has been highlighted the week of May 24th in an 'Open Letter to PM Trudeau" from 9 senior nuclear scientists in the USA.

Conclusion:

The government of Canada must legislate an absolute ban on the 'reprocessing' or 'recycling' of nuclear waste for the extraction of plutonium.

Part 3: Roles of Government, Industry and Civil Society in Radioactive Waste Management

The current roles played by various ‘stakeholders’ in the governing and management of radioactive waste in Canada, undermine the prime principle of “protection of human health and the environment.” These roles seem to have grown out of a view that nuclear waste is a matter too complex and scientific for either: informed standard-setting and regulation by government departments/agencies; or, engaged public input to decisions on radwaste management.

This has led the government to abrogate decision-making and environmental evaluation, leaving it primarily to the control and preferences of the ‘experts’ leading or recycled from, the nuclear industry itself. The nuclear industry’s main focus is on profit, in part by controlling costs – including radwaste management costs. This focus has become an increasingly desperate one for the very survival of a declining nuclear industry, as nuclear loses the competition with cheaper renewable power. To entrust a radwaste management strategy and decisions to the nuclear industry in this context, is to invite compromise of the prime protection principles.

Government Role

The role of government in both the policy and the strategy for dealing with radioactive waste is: as a proponent of the ‘public good’ with ‘protection of human health and the environment’ as the inviolable primary marker. This ‘marker’ should be fully delineated through the democratically expressed will of the people. That in turn assumes public access to related information and expertise in understanding it, and inclusive processes whereby a broad demographic can learn, discuss and come to conclusions on the best ways forward regarding radioactive waste, *to meet their expectations for safety.*

Government owes no special allegiance to any narrower interests such as the nuclear industry, including for industry survival.

Government does have responsibility to meet Canada’s international obligations on safety and weapons proliferation related to both nuclear power production and the related radwaste.

Operationalizing Government’s Role

1. When faced with the nuclear industry lobby, (which is currently promoting ‘small modular nuclear reactors’ for which the specific waste handling is unknown and, currently proposing ‘reprocessing’ of existing radioactive nuclear waste to ‘recycle’ the plutonium fuel is proposed) government’s role involves doing thorough ‘due diligence’ and at minimum inviting a range of other non-industry expert perspectives regarding both: - expanding generation of additional radioactive waste into the future, and the viability and implications of managing the new forms of radioactive waste.

As well as external non-industry specialists, it should involve input and research by Departments relating to the different implications of nuclear power and its waste products. This would include Departments of Health, Environment, Global Affairs, Transportation, Innovation and Industry, Natural Resources and Energy.

2. The role of government is ***not*** to uncritically, and without public consultation, facilitate the nuclear industry wishes by specifically exempting these ‘smaller’ (up to 300 MWe) radwaste-creating reactors from federal environmental assessment when they are situated on existing traditional reactor sites, while at the same time acknowledging that these are new, untried technologies using ‘enriched’ nuclear fuels.

No nuclear reactor, of any size, for any location, should be exempt from federal environmental assessment - including the addition of duplicates, which can still complicate the challenges of accident or waste handling.

3. The role of government includes exposing things like the possible expansion of nuclear power and its concomitant expansion of radioactive waste, to public examination and democratic debate:
 - by transparently including it in an election platform. I note the lack of mention of same, with respect to the SMRS and their waste reprocessing in the Liberal party platform for the 2019 election, although they were already being discussed and planned for in numerous meetings of government with the nuclear industry lobby;
 - by providing draft Impact Assessment legislation, such as that exempting SMRs from Impact Assessments , for a well advertised period of public comment.
4. Government has a role in developing effective public consultation models – such as citizen assemblies – for ensuring adequate public input on such critical issues as radwaste policy. These need to include a broad demographic selection of citizens, who can come together over a reasonable period to learn the science of the health and environment issues posed by radwaste. They need to operate in a transparent way, open to public observation and with discussions and presentations well recorded.
5. Government needs to provide adequate funding so that citizen assemblies considering particular proposed technologies related to radwaste, or activist groups in communities dealing with proposed or actual radioactive waste facilities, can afford to call upon the independent expertise they feel is needed to advise on the scientific and social/health aspects of the nuclear operation or radwaste issue at hand.
6. *Government should take on the role of establishing what type and level of radwaste management is put in place and standards and regulations for enforcement as well as criteria for the siting of waste storage – whether centralized or decentralized ‘rolling stewardship’ or another option. This will require a separate “**Nuclear Safety Regulator.**”*

The Regulator would draw on experts in all the related fields of physical and human sciences, from government departments or from academic, civil society, or other non-nuclear-industry backgrounds, to co-operatively evaluate and communicate regarding the challenges of radwaste management, and to transparently inform and consult with the public. Given the role of the Department of Natural Resources Canada in promoting the nuclear industry, this body, must not report through NRCAN, but - like the replacement for the CNSC per item 8 -, needs to report directly to Parliament.

Government Roles Item ^ Nuclear Safety regulator (Cont'd)

Further, we must eliminate the current practice of the industry's Nuclear Waste Management Organization being responsible for siting nuclear waste disposal sites and bribing small communities to acquiesce using local township councils and town councils for approvals.

Those Councils were originally created for decisions regarding gravelling or paving roads and building waste water treatment facilities, etc. using proven technologies. These intended matters do not involve the level of complexity of radioactive waste and the elected councils have neither the range of expertise required nor access to the funding to afford independently informed expert advice.

Even worse, dangling offers of nuclear industry money in front of such local Councils - often small, somewhat remote municipalities with very limited financial means or tax base, is really morally obscene!!!

The current practice of NWMO selecting and 'testing' possible deep geological waste disposal sites, and selling the positive side without transparent explication of the unknowns and risks, is even more faulty in that they focus on what they see as 'adjacent' communities for 'approval' or social licence, whereas the potential for environmental impacts from accidents or leaks of radioactive waste will affect a wider area that may have no input to approvals. One example is the focus on getting approval from the tiny town of Ignace to site a DGR nearby, whereas, any radioactive leaks into ground water would contaminate the two water sheds running toward the west, away from Ignace! One of those watersheds has already experienced the existential threat of Minamata disease which ravaged the nervous system in the indigenous community of Grassy Narrows where the fish were contaminated with the mercury in the effluent of a paper mill upstream.

This is a job for government (see Item 6 above, re Nuclear Regulator) to consider disposal siting or rejection, by including a wide geographic area for consideration – and especially with input from a new "Water Protection Agency" that the government is now completing consultation on.

7. Government needs to estimate and fairly assess the nuclear industry for the cost of radioactive waste management (polluter pay) – regularly updating to ensure costs can be met - and retain the funds for disbursement at the time of actually building the infrastructure required to undertake the next stage of 'phased management'.

8. *Government needs to legislate the creation of a truly ‘arms length’ agency to replace the current CNSC, for licencing reactor siting, site prep, operation, storage/management of radwaste, and decommissioning, as well as for then monitoring and approving phased rad waste management steps and releasing the industry funding that has been set aside to carry out the planned management.*

*The agency – possibly named the “ **Nuclear Power Licencing Commission**” must report directly to parliament and be able to adequately brief related parliamentary committees, providing an independent comprehensive science-based analysis, untainted by industry priorities.*

The Agency must recruit primarily from outside the industry, and draw on the expertise of a wide range of fields from engineering, to nuclear physics, to health science, to decision-modelling, to social sciences of economics and human behaviour. At present the CNSC is hobbled from providing any clear independent perspective, by the revolving door recruitment of nuclear expertise from the nuclear power industry – almost exclusively.

A critique of the ‘industry-co-opted’ role now being played by the CNSC was well expressed by the long-experienced and well informed and articulate citizens contributing to the Round Tables, as the issue came up repeatedly and with specific experiences and examples.

A critique of the CNSC’s bias is included in a United Church of Canada submission to the 2014 Deep Geologic Repository Joint Review Panel co-authored by Dr Mary Lou Harley (Phd Chemistry). She is a veteran of some forty years of scientific analysis and input for the United Church of Canada on the nuclear industry and its waste management. She points out multiple ways in which CNSC’s evaluations of the industry’s proposals fail: in assumptions made, in faulty use of probability analysis, in failure to apply the precautionary principle’, etc. The submission is available at <https://www.ceaa.gc.ca/050/documents/p17520/99668E.PDF>.

9. *Government has a further role in establishing and charging for uninsured liability for accidents in the nuclear industry – including accidents or unintended health and safety outcomes from the management of Radioactive waste.*

At present, based on the nuclear industry plea that they cannot competitively absorb the insurance industry assessments for full liability coverage, the government has established a cap pf \$1Billion liability coverage requirement. This inevitably relies on the taxpayer to absorb multiple Billions in costs should there be an accident in reactor operation or radwaste handling that could have a widespread impact on the land and water adjacent to the accident site.

Government needs to estimate the gap in coverage and charge a reasonable fee to the companies to maintain a fund in lieu of commercial insurance, which will protect the public purse in the event of accidents. Any company that cannot afford to pay it should be invited to wind up their operations as part of a not-viable industry.

10. Depending on the government's 'ability to pay' at the time, some of the costs may well be born by the residents of the area and certainly it is unlikely there will be coverage for the mental health impacts from dislocation. Even the physical endocrine and other impacts will emerge gradually and causation will be hard to prove. (Fukushima's 20 year impact on children is just now emerging from studies.). *This limitation of insured liability should be well publicized at the time of any reactor licencing or relicencing approvals!*

Roles of Independent 'Arms-Length' Regulators

*As set out in Items 6 and 8 in the 'Government Role' above, two new independent agencies are needed: A **Nuclear Regulator** to define standards, regulations and criteria for siting disposal, and a "**Nuclear Power Licencing Commission** which is truly arms-length from government, and from the nuclear industry, for licencing and enforcing all stages of nuclear power production and radwaste management, in keeping with established government standards and regulations, as set out by the Nuclear Regulator.*

The experience of informed members of the public over 20 years in making presentations to CNSC hearings, the history of CNSC recruiting its leadership and staff through a nuclear industry revolving door, and the CNSC's current role in facilitating rather than critically evaluating development of a 'small modular reactor' industry, all leave the agency's reputation so tainted that public trust in it cannot be recovered. It needs to be replaced by a new agency as described.

The Role of the Nuclear Waste Management Organization (NWMO)

As described in Item 6 of the 'Government Role', above,

*The NWMO needs to be removed from categorizing waste and determining waste treatment according to its own 'cost-effective' criteria. As well it needs to be removed from the siting and establishment of a Deep Geologic Repository or other storage facilities. (See alternative **Nuclear regulator** per item 6 Government Roles')*

Its role should remain only as:

- Funder of radioactive waste treatment, based on the 'polluter-pay' principle
- Proposer of any radioactive waste technologies for evaluation by arms length agencies of government
- Contractor for implementing approved radwaste storage or treatment protocols.

The Role of Private Power Companies and their Industry Lobbying Organizations

The unfettered access of the nuclear power industry to lobby the federal governments of the time over at least the last decade, has led to decisions not open to public input that will affect:

- *the management of radioactive waste into the indefinite future,*
- *actual and potential cost to the public purse now and in future.*
- *potential existential impacts on public health and the environment as yet not known.*

This role must be ended!

The Role of Private Power Companies/Industry Lobbying Organizations (Cont'd)

Any lobbying by the nuclear industry must be published openly, at the time, to alert the public to industry-proposed changes to legislation or industry requests for funding or other subsidy (including 'venture capital' for start up technologies).

This will allow members of the public to:

- request 'equal time' to address government
- request funding to hire the required expertise to evaluate industry pitches and to provide public information bulletins addressing published industry claims disseminated with industry funding
- inquire of government what 'due diligence' and evaluation of industry requests has been done.

In this way, the public interest will not always be 'on the back foot', dealing with dubious decisions of particular short-term governments, regarding nuclear power as well as the related and inevitable radioactive waste management challenges.

The Role of the 'Settler' Public Regarding Radioactive Waste Management

The 'public' has a direct and fundamental interest in:

- the costs of electricity - as impacted in part by the cost of radioactive waste management, and
- the health and environmental impacts of the generation of power and the safety/adequacy of the waste storage which typically sit 'in their back yard'. Most reactors with waste silos are a few kilometres from large population centres and on the edge of the bodies of water -lakes and rivers. The waste is also 'in transit' on the roads between waste storage facilities and the reactor sites, travelling through more remote communities.

The public is comprised of people with a range of knowledge about radioactive waste and related policy and legislative ways of dealing with it. Most, however, are capable of evaluating their own level of acceptance of costs and safety in dealing with radioactive waste, if given the facts and the education to understand the basics and real-world impacts, including the fact that many things are 'unknowns' which should bring the 'precautionary principle' into play.

As described in items 4 and 5 under the 'Role of Government' above, the Public has right to know and an important role in becoming informed and participating in consultations and then informing each other. What is needed from government is a robust consultation model as described and the funding to obtain the expert advice they need!

IAEA Role in Canada's Radioactive Waste Management Provisions

It is important to keep in mind in any reference to the standards and statements from the IAEA, that it is the international face of the Nuclear Industry. As such, it can promote 'best practices' from the ongoing experimental experience of all forms of the industry within its purview.

It is not however, the representative of the best decisions about whether and how to operate nuclear power in any one jurisdiction, with any exclusive commitment to the health, safety and prosperity in the provision of electricity.

In fact, the role of the IAEA has probably been a protection for the nuclear power industry in implying that the world has an international safety policy and standards framework for the operation of nuclear power and this implies that there are ultimate safety provisions and that nuclear power can be safely operated.

As reflected in the discussion of 'Principles' in Part 2, the principles for management of radioactive waste management as set out by IAEA can lead to very faulty reasoning and decision-making in the current Canadian context.

That said, it has been helpful that the IAEA has at least highlighted the need for Canada to update its Radioactive Waste Management policy and to develop a Radwaste Strategy – where there has been none! Equally, as long as the limits of the IAEA role are understood, it can provide a reference for radwaste provisions that can act as a minimum standard, to be considered in the environmental context of the particular reactor's technology and waste form.

Role of Indigenous Communities

The role of indigenous communities is not for a settler like myself to spell out. Certainly, they require separate government to government, culturally sensitive consultations on all aspects of nuclear power production and radioactive waste treatment affecting the territories under their respective treaties.

The obligation of government for transparency and consultation as noted for the 'Settler Public' above, might well act as a minimum benchmark for indigenous communities.