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Royal Roads University

**NWMO Assessment Framework**  
November 29th, 2004, 10am –12noon PST  
Moderated by Dr. Ann Dale

This e-dialogue involved young Canadians from youth and academic organizations, organized into four e-round tables, later joined by some audience members. The e-round tables were co-moderated by Jamie Doyle, Senior Project Manager, Jacques Whitford, Environment Ltd; Lenore Newman, Post-Doctoral Scholar, RRU Canada Research Chair in Sustainable Community Development; Doug Seeley, Professor, Science, Technology and Environment Division, and Nancy Averill, Director of Research, Public Policy Forum. The e-panelists applied the Assessment Framework developed by the Nuclear Waste Management Organization to the three storage options now under consideration--storage at reactor sites; centralized storage and deep geological storage to determine its robustness for decision-making and to identify any gaps.

**Group #3 -- Applying the NWMO Assessment Framework, Determining the Gaps**

**Dialogue**

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**Ann Dale**

Thank you for participating in this dialogue. We appreciate your time and commitment to engaging in one of the critical public policy issues affecting Canadians today.

I look forward to a dynamic discussion in which we can explore questions, share ideas, solutions, and visions of new sustainable futures. We have an opportunity to influence the sustainable management of nuclear waste by applying the proposed framework of values and strategic objectives to the three disposal options.

The two questions we will be addressing are:

1. Is the assessment framework comprehensive and balanced? Are there gaps, and if so, what do we need to add?
2. Are there specific elements that you feel must be built into an implementation plan? What are your thoughts on what a phased approach must include?

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**Jamie Doyle**

Good morning, afternoon. My name is Jamie Doyle and I will be co-moderating this session. I graduated from RRU in 2002 with a MSc in Environment and Management and have over 25 years experience in nuclear and energy related industries. I work for Jacques Whitford, a consulting firm in Ottawa and have participated in international discussions on nuclear waste management. Please tell us your backgrounds.

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**Yuill Herbert**

My name is Yuill Herbert. I studied environmental philosophy at Mount Allison University on the east coast but am currently living in a small town in BC, Salmon Arm. I have worked as an activist on a wide variety of environmental and social issues.

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**Jodi Mucha**

Good morning, my name is Jodi Mucha. I have an BSc in Environmental Science and an MA in Environment and Management. My experience is primarily in the social side of sustainable development. I look forward to this e-dialogue.

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**Anna van der Kamp**

Hello my name is Anna van der Kamp. I am an environmental consultant with The Delphi Group in Ottawa with an educational background in geography. I have worked mostly on climate change, air quality and community economic development in the past. However I also have an interest in citizen engagement processes on environmental issues.

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**Jamie Doyle**

Hi again; the first question is: Is the assessment framework comprehensive and balanced? Are there gaps, and if so, what do we need?

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**Jodi Mucha**

Jamie, at first glance it appears that the assessment framework (10 areas listed: citizen values, ethical principles, fairness, public health and safety, worker health and safety, community well-being, security, env. integrity, economic viability,

adaptability) seems to cover a wide range of values.

Many of the listed issues however, sound somewhat vague.

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### **Yuill Herbert**

I think that the assessment framework is comprehensive- whether it is balanced or not is another question that has to do more with the way in which it is applied to the issue at hand. A decision that incorporated each of these principles or factors with integrity would be a good decision. As an optimist, I believe that this wide-ranging decision-making is the intent of most public policy, however, the devil is in the details. At the end, maybe two or three fight for dominance and usually, rightly or wrongly, the economic factor leads.

So my question is what process will meaningfully incorporate this range of principles?

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### **Anna van der Kamp**

I had the same reaction. My impression is that the framework is certainly comprehensive however it is difficult to say if it is balanced. Are each of the eight specific objectives given an equal billing in terms of importance? Or would some take precedence over others. I am thinking for example of economic viability vs. environmental integrity.

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### **Jamie Doyle**

I agree with both of you in that the list is very comprehensive. Do you think it is too broad however? Does the breadth of values "dilute"the decision? Further to my last comment; which objectives are most important to you and why?

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### **Yuill Herbert**

To Jamie's question, I think that having such a comprehensive list will complicate the decision-making process considerably and require a high degree of creativity. Reflecting this broad range of perspectives on this issue is the only way to go. I would say that we don't know how to deal with nuclear waste in any meaningful sort of way because of the time scale.

We have the social, knowledge, scientific framework to deal with problems on a twenty year, forty year and maybe hundred year scale (some long term engineering projects) but something that has consequences for thousands of

years blows our minds- it is not operating on our scale. We have no ethical context for such a decision. The process will have to be complicated and unusual.

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### **Anna van der Kamp**

I noted in response to Jamie's question regarding the "breadth of values" that in reference to the specific citizen's values and ethical principals, as opposed to the objectives, I think these are not too broad however many of them seem to be addressing values of process rather than outcome. So I would wonder if that needs to be addressed.

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### **Yuill Herbert**

There is something vaguely ironic (understatement) about applying these assessment principles to the issue of nuclear waste without first applying them to the source of the waste. In the same way that one would plug the holes in a leaky ship before going to sea, it seems like a sensible idea to analyze nuclear power in the context of community well-being, environmental integrity, economic viability, etc.

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### **Vivek Voora**

My name is Vivek Voora and I have a Chemical Engineering & Society background. I have an MSc from RRU in Environment and Management and have worked as a manufacturing engineer with 3M Canada and lab technician with Environment Canada. I'm looking forward to chatting with you!!!

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### **Anna van der Kamp**

[in reply to Jamie Doyle] For me environmental integrity, public and health safety and adaptability would be most important to me - probably in that order. By the way public and health safety implies to me security and worker health and safety.

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### **Jodi Mucha**

In regard to the Ethical Principles, I am curious as to how exactly they would determine which communities to locate the disposal. Would socio-economic considerations come into play? I would assume that lower income communities would be the target...

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**Vivek Voora**

I would agree with Yuill's comments. What I see as a major gap in the framework is the lack of discussion around the use of nuclear energy to meet our power requirements. Should we be phasing out nuclear power in Canada?

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**Jamie Doyle**

Interesting thoughts. A couple of corollary questions. Is the assessment framework too focused on "process" and not enough on "objectives". Also, are the timeframes really that different for nuclear waste? What are the half lives of heavy metals?

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**Jodi Mucha**

Jamie, I agree, the top objective on my list is Environmental Integrity- taking a holistic integrated viewpoint, with environmental considerations first we pretty much cover the rest. I also agree with Yuill in that it is pretty difficult to project what impacts may occur over 1,000 years.

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**Vivek Voora**

[in reply to Jodi Mucha] I would think that lower income communities may even welcome disposal sites if it led to job creation and financial remunerations.

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**Yuill Herbert**

To Jodi,

I was thinking about that issue earlier today. One of the arguments against the status quo (storage at nuclear reactors) is that the nuclear waste is near a concentration of population. To take the waste 'away' from population centres likely means that it will go to a rural area, say the north of Ontario. The logic is that less people will be impacted that in a rural area if there is a problem. Is that not saying implicitly that the life of a rural person is worth less than that of a city person simply because of where they live?

Similarly, because rural implies nature, it further emphasis's that nature once again is a dumping ground, instead of the vital life support system.

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**Jodi Mucha**

Vivek, this is the thing, lower income communities welcome this kind of thing, and overall everyone is happy about this as then WE don't have to deal with the impacts, in my opinion that is totally out of integrity (which is actually an impact). Just like shipping our garbage elsewhere

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**Jodi Mucha**

Yuill, Vivek, so now what? if we look back to the objectives, what exactly is the gap... how could we address something like this?

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**Jodi Mucha**

Anna, what do you think?

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**Anna van der Kamp**

Not sure which strand to reply to ...

What do I think about potential gaps? I can't see any specific gaps. I think, as I have said that the real question is about prioritizing the objectives and even the values.

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**Yuill Herbert**

Anna, instead of prioritizing, maybe balancing? This is a very tricky one.

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**Jamie Doyle**

Just a comment to keep things on track. The purpose of the NWMO dialogue is to get input regarding the selection of a management strategy. Are you suggesting that the location of the proposed management approach for nuclear wastes should be fundamental to the selection of the approach?

What are the key considerations for the overall management approach, particularly since we are deciding something that will have impacts for many many years.

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**Yuill Herbert**

Back to Jamie on time....

I think, but do not have much experience in this area that radioactive elements and heavy metals are in different categories. While there are various remediation techniques that can be applied to heavy metals (some of which are biological, for example using bacteria), the only remediation for nuclear waste is time and lots of it. The half life of Uranium 234 is 250,000 years, so in a million years it is down to 1/16th of its original mass... And a very small mass of radioactive material is considerably more hazardous than a similar mass of heavy metals. Is this analysis accurate?

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**Vivek Voora**

[in reply to Jodi Mucha] I think that conceptually there are no real gaps to the assessment framework but turning this into a process will be a real challenge. Meaning putting the ideals of the assessment framework into practice will be the real challenge. That is when we come to ethical issues such locating waste in low income communities.

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**Jodi Mucha**

Does anyone have suggestions on how to balance the objectives?

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**Jamie Doyle**

This is a key question Jodi. How to balance competing objectives. What do you think?

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**Yuill Herbert**

If you could somehow select representatives of each of these values, sit them down around a table (round) and tell them that they can't leave (food and water provided) until they hash it out.

The tricky part is identifying the representatives who will represent society with integrity on behalf of the value in a dynamic yet compromising manner. This, I think, is where this approach struggles.

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**Jodi Mucha**

Yuill, I was thinking that we need a representative team... the objectives that we are talking about were put together by the Assessment Team. I don't know who is on that team though.

So, maybe they have done a good job at weeding out and coming up with what they've currently got.

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**Vivek Voora**

[in reply to Jodi Mucha] By virtue of being interlinked the objectives are somewhat already balanced.

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**Jamie Doyle**

Any thoughts on how to resolve issues where one value conflicts with another value. For example, fairness with environmental integrity.

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**Vivek Voora**

I hope I am not detracting from the conversation at hand. How would Nature handle nuclear waste? Shouldn't we design our approach based on it.

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**Anna van der Kamp**

I am not sure how the objectives can be balanced. At least not equally. I would think that, if we agree that environmental integrity takes precedence over economic viability then that is an imbalance and a prioritization.

One way to determine what weight should be given to each objective would be to ask Canadians to put their own value level on them. That would be a democratic way. Another would be to look at them in the framework of environmental harm/benefit as the starting point - much like the Natural Step or some of the other planning frameworks do.

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**Vivek Voora**

[in reply to Jami Doyle] Hmmm... for your specific example I believe that fairness requires proper representation for all potential entities that can be impacted. This



would have to include a voice for the environment and hence one would hope that environmental integrity would be safeguarded. The problem is how to do you represent something that has no voice and is so complex.

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### **Jamie Doyle**

Here is another consideration. Are the disposal IMPLEMENTATION considerations comprehensive, realistic and workable? What is your advice to the NWMO?

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### **Vivek Voora**

[in reply to Anna van der Kamp] *One way to determine what weight should be given to each objective would be to ask Canadians to put their own value level on them. That would be a democratic way. Another would be to look at them in the framework of environmental harm/benefit as the starting point - much like the Natural Step or some of the other planning frameworks do.*

I like your suggestion Anna. I believe that assigning a value level should be preceded by an information session. The problem is to ensure that the information presented is comprehensive, representative and unbiased.

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### **Yuill Herbert**

Anna, you are right. There is no way that a decision can balance all of those values or principles equally, but the process could give equal weight by balancing the voice of each.

For example, I think of Land Use Planning in BC in which numerous economic assessments were completed but ecological assessments are few and far between. Society has a certain type of expertise relating to a certain type of economics and this tends to overwhelm many decision-making processes.

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### **Vivek Voora**

[in reply to Jamie Doyle] I believe that a balanced approach to our waste disposal options (meaning that all three should be pursued simultaneously) would be sensible. It may be more expensive but it would add to the objective of adaptability.

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**Yuill Herbert**

I am struggling with the idea of considering the strengths and weaknesses of three disposal options without knowing the future of the nuclear industry in Canada. For example, it may be that storing the waste at one location is acceptable if there is a set volume of waste, implying a limited number of transport trips (the reactors will be shut down). But, this decision may change if the waste is continuing to accumulate and thus continuous transport is necessary. I argue then that the cart is being put before the horse. Decisions about nuclear waste storage cannot be made until decisions are made about Canada's nuclear industry.

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**Jamie Doyle**

Very interesting thought Yuill. What do the rest of our panel think on this point?

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**Vivek Voora**

I think Yuill is hitting the nail right on the head. The future of the Nuclear industry is key to figuring out how best to deal with the waste. It would be nice to see Canada move away from Nuclear Energy. I am definitely biased towards a nuclear free country (perhaps I should move to New Zealand).

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**Anna van der Kamp**

I am certainly in agreement with Yuill about the future of the nuclear industry and its impacts on disposal decisions.

However given the current questions being asked by the NWMO it is still possible to look at the options for storage on their own basis.

I am by no means a nuclear waste disposal expert but my gut reaction to the underground storage option was very negative. Lack of access to the materials, uncertainty about sub surface stability and many other worries spring to mind. Also I have concerns about a decentralized system of storage where Canada's limited resources and capacity for safe management would need to be spread out amongst the facilities. It would also entail an extensive process for community engagement and welfare with so many communities involved and the potential for damage to affect a much larger number of people and ecosystems. I think that storage in one location might be the best option. Although as was mentioned before this means that one community and bio region are left with all the potential risk.

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**Vivek Voora**

If I were to lean towards one option for waste disposal I would go with the storage at reactor sites option. It eliminates the need for transportation and the spent fuel is not placed out of sight. I believe that this would encourage us to look at alternative means to generate power.

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**Jodi Mucha**

I agree with Anna, the thought of having the waste underground and inaccessible scares me. We don't have enough knowledge to inject something like this into the earth and hope that all will be okay.

It makes the most sense to store At-Reactors. As is mentioned sites already have nuclear expertise in case of emergency, and communities are already familiar. Yes, it would require constant management, but rather than seeing this as a disadvantage, it is essential to have continual monitoring for the health and safety of the environment and community overall.

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**Jamie Doyle**

Are there options not being considered and that should be considered?

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**Anna van der Kamp**

Yuill, I like your point about keeping the waste at reactor sites in the various communities. It might inspire a "Not in my backyard" reaction in many people across Canada instead of being quietly sequestered in one location. Hadn't thought of that.

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**Yuill Herbert**

To continue Vivek's point on out of sight. This is a major issue that is not addressed in NWMO's work because the deep well puts the waste out of sight and there out of mind. Like a garbage dump. If on the other hand, garbage were strewn alongside the highway, humans would be confronted with a more accurate cost of society every day and the impetus to reduce waste production would be much higher. That is not to say that nuclear waste on the side of the road is a good idea. But society must remember the true cost of its energy- if not there will only be an altruistic few who worry for all the rest, making change or adaptation difficult.

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**Jodi Mucha**

I also agree that nuclear energy should be phased out and the focus in Canada should be on alternative energy.

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**Yuill Herbert**

Degree of reversibility is an important consideration for me. because we don't know what the future holds, I think the best approach is one that is being applied in the green building industry- use screws instead of nails so that the building can be taken apart and reused in a different type of building. Because we don't know how technology is going to change, for example, it is important for us to leave as many options open for the future as possible.

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**Jamie Doyle**

Here is another thought. Do opposing technologies, such as solar, receive as much open debate and consideration as the nuclear option has seen? Are we rushing to condemn a technology without subjecting other options to the same scrutiny?

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**Vivek Voora**

It would be interesting to see if we were able to somehow "spread the impacts" so to speak and set up nuclear waste storage sites in all the municipalities that depend on nuclear energy as their power source. I think this would definitely spell the decline of the Nuclear Industry in Canada.

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**Jodi Mucha**

I am surprised there hasn't yet been some innovation in by-product synergy regarding nuclear waste... that makes sense to me.

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**Vivek Voora**

I think we should turn to nature to see how nuclear energy is harnessed or assimilated to identify potential synergy's.

This may be urban legend but I was told that spent uranium from nuclear waste was used in tank shells during the Iraqi war (an example of recycling gone bad).

There issue of security with nuclear waste is one that makes me nervous.

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**Jamie Doyle**

I believe that our time is coming to an end. Do you have any parting comments? Please post, the input you have provided has been very thought provoking and of great value. Thank you all very much.

I would love to continue this discussion off line as there were several issues not fully pursued. Feel free in contacting me at [jdoyle@jacqueswhitford.com](mailto:jdoyle@jacqueswhitford.com)

Bye for now. Jamie

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**Yuill Herbert**

But there are some pretty clear reasons why nuclear energy has seen this level of scrutiny. Hiroshima, Three Mile Island, Chernobyl, Chalk River (Canada), Chelyabunsk, etc. There are problems with manufacturing the silicon wafers for solar panels but nowhere near on the same scale. Dams have seen a high level of scrutiny also because of their ecological impacts. Wind energy has visual impacts, some manufacturing costs and can (but usually doesn't) impact bird migration.

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**Jodi Mucha**

Thanks Jamie, Vivek, Anna, Yuill...  
take care!

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**Yuill Herbert**

It was definitely interesting. All the best and take care out there, Yuill

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**Anna van der Kamp**

Enjoyed the discussion. Thanks to the moderators.

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**Vivek Voora**

[in reply to Jamie Doyle]

*Do opposing technologies, such as solar, receive as much open debate and*

*consideration as the nuclear option has seen? Are we rushing to condemn a technology without subjecting other options to the same scrutiny?*

Jamie that 's a good point! I think all technologies have inherent problems associated with them. This is what makes us human. When comparing nuclear to solar... not sure which technology would represent more of a threat. The problem with nuclear is that it is a waste that is so tough to handle.

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**Vivek Voora**

Thank you everyone for the great discussion.