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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 #2 -- 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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**Doug Seeley**

Hi folks, this is Doug Seeley, moderator of Group 2 of this e-Dialogue.

Since all of us are not familiar with each other, lets introduce ourselves to each other.

I am a core Professor at Royal Roads in the Science, Technology and the Environment division, and have graduate students in waste management. I am a whole systems modeler, with an active company applying this approach in the Australian transportation, logistics & manufacturing sector.

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**David Measday**

Hi, my name is David Measday, and I teach nuclear physics at the University of British Columbia in Vancouver, B.C. I have been particularly interested in the applications of nuclear physics, including reactors, but also medical and industrial applications. My research on nuclear physics has been at TRIUMF, a large national facility on our south campus.

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**Levi Waldron**

My name is Levi Waldron. I just graduated from a collaborative Ph.D. in Wood Science and Environmental Studies at the University of Toronto, studying the leaching of wood preservatives from pressure-treated wood. I did my undergrad in physics at UBC, and thus remember David Measday, although I never took a class from you!

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**Doug Seeley**

People are a little slow logging in now. But lets get started anyway.

Have you all read the assessment framework? One of the first issues is the completeness or thoroughness of the proposed framework, independent of the specific disposal method being examined. Any thoughts?

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**Levi Waldron**

If I remember correctly, the "framework" was the list of criteria and values to be considered in the decision-making process?

That list seemed comprehensive to me, although I was unsure how the different values expressed in that framework would all be accounted for, especially if they conflict.

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### **David Measday**

I believe the present process is excellent, maybe even a little bit of overkill. We normally do not demand such national debate over a technical matter. There are plenty of other hazardous aspects to industrial life, which are left to local authorities; for example in BC there are gold mining ponds full of cyanide, yet these are left in the wilderness. I think there are many other more dangerous things than nuclear waste, although that does NOT mean that we can be casual about it.

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### **Doug Seeley**

One of the problems that I see with accounting for the various criteria is how all of the financial issues, or the social issues can show up in the same decision-making process. When it comes to the dollars, the inability to put future costs on various impacts and the tendency of corporate interests to regard various impacts as merely externalities, poses a challenge. Any thoughts?

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### **Levi Waldron**

I agree that there are other more dangerous things than nuclear waste, which we are cavalier about. However, it still occupies a special position of concern in the minds of most Canadians, and that concern and stress can't be overlooked, even if it doesn't make perfect technical sense to those of us with physics backgrounds in particular (I spent 2 summers working at TRIUMF, so I'm also pretty familiar with radiation). What I'm saying is that I wouldn't minimize or reduce those concerns. Technical question: what is the half-life of the spent fuel bundles?

I'll get on Doug's next question now...

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### **David Measday**

Again, I do not see the nuclear industry as any different from many other activities. I thoroughly agree that industry often leaves problems as "externalities", and the ultimate weapon is to go bankrupt, which leaves the local or national authorities to clean up. Because the nuclear industry is justifiably well controlled, there is far less risk here.

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**David Measday**

The fuel bundles have a complex mixture of radioactive nuclides; so there is no single half-life, but many. The decay is rapid for a few years or decades, but it is the long-lived nuclides, such as plutonium isotopes, which are the long-term concern. The number I remember from the previous dialogue was that fuel bundles reach ore activity after 300 years. It gets complicated if you process the fuel first, which may become popular if they try to burn weapons grade plutonium, to get rid of the stuff.

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**Doug Seeley**

Ok, folks what about the framework? Can you see any gaps? Or is it at all possible to bring the various factors together into any practical decision-making process?

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**Levi Waldron**

The difference in cost of the main disposal options seemed "close enough" (~17-25 billion, with the most expensive being the present choice of on-site disposal, and all of these being just estimates) that the main cost differences would be whether the money is all spent in the near future (deep geological disposal) or over three centuries (on-site and centralized disposal). I would think it would be very hard to predict the actual costs of a process that will last 300 years!

I don't see the predicted cost differences as so large that they should be the main deciding factor.

Sorry I'm writing so slowly, it's taking me time to think out my answers. More coming... I do see some gaps in the framework.

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**Guest**

Good afternoon, everyone. Please accept my apologies for being late. I am a recently retired technical supervisor of Point Lepreau Nuclear Generating Station, and would like to participate in your discussion .

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**Levi Waldron**

The main gap I saw in the decision-making process as presented to me is that it

didn't clearly identify who the stakeholders were: who is benefiting the most from the nuclear energy, and who would be accepting the risks of each disposal option. And, who will make the final decisions, how public input is being sought, who is providing the public input, and how this public input will be incorporated. I see fairness and justice as paramount concerns in making this decision.

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### **Doug Seeley**

Welcome supervisor from Point Lepreau... What is your name?

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### **Roger G. Steed**

I should have given my name, but I assumed the computer would show it! I am Roger Steed, recently retired from Point Lepreau GS, and having been involved with the storage of spent fuel I am most interested in this whole question

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### **David Measday**

I agree that you cannot possibly estimate accurately costs over a 300-year period. However you can try, and that is better than most industrial activities which do not try. Logging has ruined the forests in BC, but no one tries to add that cost properly to the bill. Similarly with mining and mining wastes. At least the nuclear industry is being forced to try. I think we should force others to include long-term costs too.

The most dramatic being carbon-burning industries, which happily increase the CO2 content of the atmosphere, with almost certain devastating impacts on the environment.

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### **Levi Waldron**

Agreed, both about the uncertainty in long-term estimates and the complete shirking of this responsibility in other industries.

The point I'm making is that given the great uncertainties in these cost estimates, the overall cost should just be seen as "comparable," with the main difference being the time period over which these costs are incurred. Thus it seems to me the main considerations should be just the technical feasibility and duration of responsibility, and the social concerns.

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**Doug Seeley**

Great comment David...

Any ideas how we can bring these long-term costs into the decision-making process, it seems that both governments and corporate interests are averse to this?

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**David Measday**

As it is so slow, may I add another comment? TRIUMF was recently required to estimate the cost of closing down, and going to a "green field". At first I felt this was unreasonable, but now I feel it was a good idea. The only unpleasant thing was that the NRC would not commit to the costs, because government estimates and especially commitments go only year-to-year!! I feel everyone should have to estimate the clean up.

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**Roger G. Steed**

Having read the Nuclear Waste Management Organization's "understanding the Choices" and "Assessing the Options", I believe that the NWMO has undertaken a very thorough and balanced assessment of how to proceed with spent fuel storage. I completely agree with the deep geological storage, as long as the spent fuel can be safely retrieved in the future, to extract unused uranium and plutonium, so that they can be used as future energy sources.

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**Levi Waldron**

Perhaps one way to bring these costs into the decision-making process would be to require by law the nuclear power owners/operators to set up a trust fund capable of dealing with the long-term costs, regardless of the option chosen. My concern with the on-site storage and central storage options is that the money will "dry up" sometime in the distant future, but that these options will be favoured in the short term because their present costs are not as high.

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**David Measday**

I am not against deep geological "disposal", eventually, but I agree that for now, and maybe a few decades, we need storage. There are still many undecided questions about reprocessing, and changing circumstances can change the situation. As I said earlier, the burning of weapons grade plutonium changes

technical problems, and so you need time to think it through. Ultimately however disposal is necessary, and every country has agreed that deep geological disposal is the way to go. The actual geological stratum varies from country to country, but the philosophy is the same.

To bring up a couple of points from previous dialogues: - I think that an international body should study disposal. I feel the IAEA has a lot of prestige now, and should calm many nervous folks. Secondly there was the matter of using titanium as a container instead of copper. This is a corrosion problem, and I am not an expert. However I believe that any disposal method must assume that several containers will corrode, and the containment must still hold in general.

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### **Doug Seeley**

Anyone have any thoughts on what kind of body should be making these waste management decisions? Should all be done by experts like the NWMO or should there be representative citizen stakeholders as well, or should there even be an international role seeing how the waste lasts longer than civilizations?

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### **Roger G. Steed**

My feeling is that the NWMO should make the decision as to what kind of management technique should be used to store (not dispose of!!) the spent, or irradiated fuel, to use its formal name. They are examining all applicable questions most thoroughly, in my view.

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### **Doug Seeley**

Roger, how can we be assured that vested interests from its boards and advisory councils are not deflecting community interests away from current financial opportunities?

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### **David Measday**

About who should decide, may I expand my comment? I think an international organization, such as the IAEA, should set out "International" standards. However every country will need a national organization to confirm the local standard, and enforce the requirements. Unfortunately the USA and probably Russia too, will never submit to international control. This is wrong of them, but present day reality!

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**Levi Waldron**

Public input should be an essential part of the process, both to hopefully maximize the social acceptability of the chosen storage option and to improve public trust in the transparency and accountability of the process. I like the idea of using an international advisory panel like the IAEA because of their widespread credibility for general and technical advice and input. But the final decision would have to involve public input, especially in the vicinity of the disposal areas, which could be best taken into account by a Canadian group without vested interest in the storage costs. Perhaps the NWMO could fulfill this role if their financial interests were neutralized, for example by requiring a trust fund to be created independently of the option taken?

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**Doug Seeley**

Any more thoughts about how an appropriate trust fund can be set up? Would be by regulation or law, and how would it address the future costs?

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**Levi Waldron**

I'm not sure what the difference is between regulation and law. It would address the future costs by being big enough to cover the estimated costs of any of the disposal options, plus some extra to cover unforeseen circumstances.

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**Roger Steed**

Doug, I think if you look through the NWMO's publications and website you will be assured that community interests and desires are being sought out by the NWMO. I don't think it is just the nuclear industry stakeholders alone who will direct the NWMO's decision-making process.

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**Levi Waldron**

[quoted David Measday]

*About who should decide, may I expand my comment? I think an international organization, such as the IAEA, should set out "International" standards. However every country will need a national organization to confirm the local standard, and enforce the requirements. Unfortunately the USA and probably Russia too, will never submit to international control. This is wrong of them, but present day reality!*

I like this comment. Perhaps international standards set by the IAEA would define the details of the storage operations, but with Canada-specific considerations such as disposal location dealt with nationally.

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### **Doug Seeley**

OK folks, we will be closing this real-time dialogue in about 10 minutes.

Have you any final thoughts on what the NWMO should know about their proposed evaluation approach to possible methods? Do you wish to comment on this particular dialogue and its process?

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### **Doug Seeley**

Thanks Levi, David and Roger for your participation it has really been appreciated.

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### **David Measday**

I found this process interesting, but slow. Still, it is cheaper than a forum with everyone present. We missed out a lot of the points we were supposed to discuss, but I assume that the Microsoft glitch, took away concentration!

I feel the NWMO is doing a reasonable job, and trying to assess everything. I just wish we would do this to the automobile industry and the pharmaceutical industry!! At least Canada tried this type of idea concerning health care, and it worked. For the constitution it did not!

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### **Roger Stead**

Thank you, Doug. It was a pleasure to participate. I hope my comments were helpful.

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### **Levi Waldron**

I think that the values and points of consideration defined by the NWMO are good, but the proof rests in the details. Seriously seek out local input and don't traumatize some remote northern community by forcing an option on them that they don't understand or want.

[In reply to Doug Seeley] It seemed pretty slow and not very conversational,

perhaps just the nature of such a forum. I certainly hope that not all the public input will be sought through computers, and not all from other written formats either as it is not very inclusive. Clearly, this group of highly educated people with experience in the nuclear field is not representative of all the stakeholders. I know someone in the Ontario Ministry of Natural Resources who did first-nations consultations and talked of the need to get input from people who can't read or write.

Thanks for my opportunity to participate!