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Royal Roads University

Decision-Making under Conditions of Risk and Uncertainty

February 10th, 1pm – 3pm PST

Moderated by Dr. Ann Dale

Participants

Ann Dale, Professor, Science, Technology & Environment Division, Royal Roads University

Christopher Henderson, CEO, [The Delphi Group](#), Canada's leading strategic consulting firm in the environment and clean energy sectors.

Jim MacNeill, recently Chairman of the World Bank's Independent Inspection Panel in Washington D.C.

Norman Rubin, Director, Nuclear Research and Senior policy Analyst, Energy Probe, Toronto, Ontario.

Dr. Andy Stirling, Senior Lecturer at SPRU (science & technology policy research), University of Sussex

Dialogue

Ann Dale

How do you make decisions for issues where the stakes are high, the science often uncertain, values are held dearly, there is a plurality of interests, and information often incomplete? Join our wise panel as we discuss what decision-making frameworks, tools and processes could enhance our decision-making in these dynamically interconnected, messy and wicked problems.

Panelists, could you like to briefly introduce yourselves?

Andrew Stirling

Hi there! It's good to have the chance to join in another of these e-dialogues – tho' it's getting a little late in the evening over here in the UK!

I wonder if anyone else is here yet?

Chris Henderson

I expect Ann asked me to be a panelist, to a provocateur: to prod our discussion to examine alternative decision-making processes and structures related to the management of nuclear waste.

My background and biases:

My company, The Delphi Group, advises industrial corporations and environment/clean energy technology companies realize environment and sustainability market opportunities. We are also very active in the sphere of public policy. That's what we do.

Delphi's business units include: Clean Energy, Climate Change, Health and Environment, and Corporate Sustainability.

I would describe Delphi as a social entrepreneur firm focused on environment and clean energy.

We're based principally in Ottawa, but operate across the country, in the US, and undertake projects in South America and China.

Our corporate line: is Complexity ... Creativity Change. That is: achieving sustainability is inherently complex, and change can only be engineering by being creative or innovative.

Norman Rubin

I'm here, Andy. And here's my intro:

I've been working for Energy Probe on nuclear issues since (gasp!) 1978, shortly after a 3-month review by the 3-person "Hare Commission" (1977) helped lock Canada onto a path toward unmonitored, irretrievable, deep geological disposal of these high-level radioactive wastes.

I've been fascinated by these issues -- risk, uncertainty, legitimacy of decision-making, etc. -- for a LONG time.

Chris Henderson

I think Norm's hit the issues on the head.

In managing environment risks for this millennia, we must base decision-making on scientific knowledge (and insight), but also expand the bounds of sciences (including social sciences) to inform the process. Current frameworks are inadequate to manage the challenges we face, and the importance of transparency and accountability is on the rise.

Jim MacNeill

Hi, I'm Jim MacNeill. As my posted bio implies, I have been active in public policy for a long time including, from time to time, nuclear issues. In my experience, they are the most controversial of all energy issues, among both the experts and the public. This was the case in the late '70s, after Three Mile Island, through the mid-80s when I was Director of Environment at OECD, relating to the Nuclear Energy Agency. In drafting Our Common Future for the Brundtland Commission, it caused us no end of grief, especially after Chernobyl. At our final meeting in Tokyo, it kept some of us going several nights, providing the stuff of drama, and was among the very last issues on which we found mutually acceptable language.

Andrew Stirling

I'm glad to hear other folks! To introduce myself: after starting out as a natural scientist, and a period working as an environmentalist, I guess I'm now a 'social scientist'. My work focuses on trying to find practical and 'robust' ways for society to respond to the deep uncertainties that can arise with science and technology.

I'm especially interested in helping to develop and test new ways to get the best out of expert analysis with 'stakeholder engagement' and 'public participation'. In the end, much of what passes for debates about 'risk' often boils down not just to questions of 'safety', but to a pressure for greater public accountability and choice in the general paths that are taken by our science and technology.

With the very high stakes, long time scales and important implications for the way we produce energy – radioactive waste management is an especially important area within which these issues play out.

Ann Dale

Welcome, panelists. Let's start off with how decisions are currently made for the management of nuclear waste? Norm and others?

Norman Rubin

In the preliminary discussions, Ann asked if I would post something about how decisions are currently made in the area of high-level nuclear waste ("spent fuel") and in the area of nuclear power, i.e., decisions about whether to make nuclear waste at the current pace, or faster or slower.

Here are some words:

1) How decisions are currently made in the area of high-level nuclear waste:

At present, decisions about the management of Canada's "spent fuel" wastes are made under the terms of Canada's Nuclear Fuel Waste Act of 2002. That Act directs the producers of nuclear waste to create the NWMO, to populate its Board of Directors, and to set aside funds for the NWMO and the ultimate disposition of the wastes, according to a set schedule. NWMO has 3 years to recommend a plan. At the end of the 3 years, the federal Cabinet -- apparently with no recourse to further public hearings or even to Parliament(!) -- will either accept that plan, or send it back for further work, or impose its own plan.

The Act is pretty devoid of any guarantees of future transparency or public participation in decision-making in this field. On the other hand, I believe that NWMO has been working pretty hard to be open and transparent, partly in response to public comments that consistently stress these values. It is also worth noting that the federal government has not historically been an "honest broker" in matters nuclear, but rather that it created the industry, still owns much of it (e.g., through AECL), and that it actively promotes nuclear expansion through a number of official mechanisms. So, decisions will apparently be made behind closed doors by the owner and creator of the polluting industry. That situation hasn't significantly changed since early 1987, when I complained about it to an all-party federal committee in <http://www.energyprobe.org/energyprobe/reports/nuclearWaste87.pdf> , The Mismanagement of Canada's Nuclear Waste Management Program.

2) How decisions are currently made in the area of nuclear power:

There has been virtually no "closing of the loop" between (1) acknowledging and addressing the difficulties of arriving at a "least bad" solution to the nuclear-waste problem, and (2) incorporating those difficulties into the decision to add to the problem -- i.e., to increase or decrease the number of nuclear reactors operating in Canada. The only shred of a linkage is that reactor operators are now (and only relatively recently) expected to pay money into a fund to take care of the wastes. Ironically, any discussion of the disposal of used coffee-grounds, eggshells, and newspapers begins with "Reduce, Reuse, Recycle", but discussions of the disposal of used nuclear fuel bundles are generally expressly FORBIDDEN to discuss these options. Many debate participants -- especially those who favor a reduction of the rate at which public funds are thrown at the nuclear option -- find this separation frustrating.

Furthermore, nuclear power plants (all of which are owned by provincial or federal Crown Corporations) often receive special subsidies and regulatory breaks that their private competitors (who use competing technologies, many of them more benign in my opinion) cannot receive. For example, the Ontario government is preparing to guarantee an above-market price to the Bruce Power consortium if it will agree to restart (and resume nuclear waste production) from two more reactors at "Bruce A". That price will apparently not be available to owners of windmills. . . More frustration.

Jim MacNeill

Thanks, Norm, while that is the way decisions are being made now, we should bear in mind at this opening stage that these decisions are not only long overdue, they are being taken (well, that's yet to be seen) at the wrong end of the decision cycle.

In my view, decisions on plans to manage nuclear wastes, including the decommissioning of the plants generating them, and the financing thereof, should have been part and parcel of the decision to proceed with the construction of nuclear facilities in Ontario (or any other jurisdiction). They weren't, of course. It simply wasn't a factor in the decision to proceed, neither in Canada nor elsewhere. While the then decision makers may plead innocence through ignorance, I find it hard to accept that the experts involved didn't know the burden they were laying on present and future generations.

While we're stuck with this history, what really bothers me is that we are repeating it. In Ontario, decisions have and are being taken to extend the life of existing reactors without corresponding decisions on plans for the management of the stream of waste they will generate and, (at least until recently?), decisions to ensure that current users finance those plans. Moreover, AECL and their supporters in government salivate about new generations of reactors (with extended sales to China's expanding program), with no corresponding plans for the management of waste, here or in the export markets.

Not any plan would do, of course. Continued storage in surface pools, the default option (a cop-out in my view) will impose continuing and rising costs on our children and grandchildren into the future. In my view, given the fact that the half-life of much of the waste exceeds by several orders the known history of civilization, with perhaps more social disorder in the future than in the past, the only way to ensure that our costs are not passed on to future generations is to adopt a plan that will put the stuff away safely and permanently without need for human surveillance. That points, I suppose, to some form of deep disposal in plutonic rock.

Andrew Stirling

A couple of key general features about the way that decisions tend to be made (or envisaged) about radioactive waste at the moment – not just in Canada – are:

1 that they tend to place a high weighting on the results of 'sound scientific' risk assessment

2 that - as Norm says - they tend to involve pressure to separate consideration of radioactive waste management strategies from consideration of the contending possible energy strategies which provide the essential context.

Both these key features can be problematic.

Ann Dale

Norm, you talk about principles of openness and transparency, I think of the maxim, Primum non nocere (First of all do no harm), are there other principles to guide decision-making under this context, Andy, what about this precautionary principle you have written about?

Andrew Stirling

In order to understand this, we first need to be clear about the limits of conventional risk assessment. Under the right conditions, this is a very powerful tool. But – even in its own terms – risk assessment does not apply to conditions of ‘uncertainty’ (where it is difficult to arrive at firm probabilities for the different things that might happen) or ‘ambiguity’ (where we are unclear or disagree over how to define, prioritise or interpret the different things that might happen).

Most of all, risk assessment does not apply to ‘ignorance’, where “we don’t know what we don’t know”. In other words, where we face the prospect of surprise. Yet time and again, it is ignorance that has proven to be the most important part of our experience with new technologies. The effect of CFCs on the ozone hole; or the emergence of the new cattle disease BSE; or the recognition of hormone disrupting effects in some chemicals are all examples of cases of this kind of ‘surprise’.

Precaution is about how we can respond to ‘uncertainty’, ‘ambiguity’ and ‘ignorance’, as well as to risk. There are a whole bunch of practical strategies, that tend to get forgotten where we assume that risk assessment is the only show in town. In my experience, this is something that tends to be especially true in radioactive waste management.

Norman Rubin

Ann, I love Andy's presentation of the precautionary principle, and I personally favor storage over irreversible, unmonitored disposal for many decades largely because of that principle. But I am personally willing to be overruled by the Canadian public if my views are out of sync with Canadian values as a whole. I don't believe they are, but I do personally think that legitimate and participatory decision-making must ultimately trump even the precautionary principle, if and when they conflict. (Note in Andy's presentation that legit and participatory decision-making is very much part of his view of the precautionary principle, so there's almost no conflict by definition.)

Chris Henderson

In reference to Norm's and Andy's comments regarding precaution and decision making.

I believe there are clear distinctions and interrelationships between the: base for decision-making; decision-making processes; and, the actual making of a decision.

Jim MacNeill

Ann, like Norm, I thought that Andy's paper on the precautionary principle was excellent. I think this principle should be mandatory in dealing with any technology whose effects on society and the environment are largely unknown or uncertain, and especially where those effects may be irreversible and extend to future generations. That includes decisions to construct or expand nuclear facilities.

Unfortunately, in my experience the precautionary principle is seldom invoked in these cases.

I was with the Board of Ontario Hydro for 4 years and I certainly didn't see it in management presentations. On the contrary, at that time their presentations were marked by a high degree of confidence concerning the estimated costs and economy of proceeding with proposals to deal with shutdowns, whether as part of a planned maintenance schedule or in response to a surprise. There were plenty of surprises in those days, as Norm will recall, but they never shattered the wall of confidence surrounding the management (or the unions, whose jobs were at stake.)

The same, I suspect, is now true of proposals to extend the life of existing reactors. And, in due course, if Manley's advise is accepted, of proposals to build a new generation of reactors.

Andrew Stirling

Norm is quite right that a precautionary approach is inherently about involving those who stand to be affected - and also the general public - in order to be as rigorous as possible about all the knowledge to bring to bear on the problem, and the assumptions that are used.

But there are some other features of precaution as well:

- we should be more humble about the confidence that we can place in mathematical models – 'science should be on tap, not on top'.
- we should take account of 'edge of the envelope' scenarios, rather than averaging these out using probabilities.
- we should be sure to involve specialists from a wide range of different disciplines – including social scientists.
- we should ask questions about how people and organisations will behave in practice – rather than how they're supposed to behave.
- we should - as Norm says - put more weight on things like flexibility, reversibility and

diversity in our technology strategies – so that we can learn well from our mistakes.
- we should be more deliberate about who has the burden of proof – those who wish to proceed with a technology or those who are concerned about it.

These are all things that - like the role for public engagement - tend to get left out in conventional risk assessment.

Norman Rubin

Andy, that list of yours -- closely related to your background paper for NWMO -- is part of what I so strongly agree with.

Ann Dale

It seems to me, dear colleagues, that the two are not mutually exclusive, that in terms of integrated decision-making, the precautionary principle and participatory decision-making are mutually complementary.

Ann Dale

Chris, can you explain in more detail what you mean? Thanks.

Chris Henderson

What I mean Ann, is that when we look at nuclear waste management, we need to look at:

- What we base decisions on
 - What the decision making process is, and
 - What actual decisions are and how they're managed.
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Ann Dale

Chris, it seems to me that you are raising some critical points, especially for expanded decision-making contexts and participatory processes. Who gets to frame the issue? Who has authority? Who are considered experts? Who gets to make the decisions?

Okay, I think we can all probably agree on the need for expanded decision-making contexts? But before that, would we also agree that decision-making in such contexts must be integrated, that is, reconcile ecological, social and economic imperatives? Jim, any thoughts?

Norman Rubin

Ann, your point "that decision-making in such contexts must be integrated, that is, reconcile ecological, social and economic imperatives" is vital, and in danger of being lost. I think the point is also closely related to the oft-expressed desire for "accountability" and "responsibility" in decision-making. (These are oft expressed by the PUBLIC, rather than the decision-makers!)

But few have suggested how that responsibility could be ensured. One possible approach is rights-based: Those who create and transport and dispose of radioactive waste (or do any other hazardous or toxic activity) should be held legally and totally responsible for any abridgement of the rights of those who are affected, now and in the future. On the flip side, innocent neighbours should have unabridged rights to be free from nuisance, trespass, toxic pollution, etc. That would mean (for instance) that Canada's Nuclear Liability Act should be either repealed or massively rewritten, and similarly many of the CNSC's regulations governing radioactive pollution exposures. Those regulations now legally permit estimated cancer risks from off-site radioactive pollution that are many times higher than regulatory maxima for non-radioactive "chemical" pollution -- as if the public had demanded more radiogenic cancer risk, versus chemical cancer risks(!).

Of course, assuring "accountability" and "responsibility" in decision-making about wastes whose main impacts are likely to be thousands of years in the future is vexing and challenging at best, and hopeless at worst. I've often mused (only a bit facetiously) that the best thing that could happen in the discussion about nuclear waste would be if the curses of future generations could be made effective and retroactive. Then, if somebody 100,000 years from now said "May the @\$#%^&*(SOB who put these poisons here rot in hell!" we'd see somebody disappear in flames in 2005! Unfortunately, I have no shortcut to implement this recommendation, so we have to settle for second-best. . .

Jim MacNeill

I'm afraid I don't type fast enough to keep up with the flow of discussion.

But coming back to Ann's question, I of course agree that decision-making should reconcile ecological, social and economic imperatives?

I think there has been some positive change in that direction, at least at the rhetorical level, but we still have a long way to go.

The need to deal with the flow of waste and ultimate decommissioning is now recognized. Whether we will (or can) take the needed decisions is yet to be seen. Uncertainties and risk are now recognized.

However, in my experience, the nuclear establishment usually deals with uncertainties and risk within the context of trying to demonstrate the opposite; confidence and safety. I suspect this is an inevitable reflection of their professional training – not to mention their own self-interest in ensuring vigorous expansion of nuclear facilities. Certainly in Ontario Hydro, management and unions had a strong predisposition to privilege nuclear options. Board members often shared this predisposition --- or felt they were ill-equipped to challenge it.

As for economics, well, the costs of nuclear power have not historically been included the costs of research and development.

Nor have the costs of disposing of HLNW or the ultimate decommissioning of the nuclear facilities.

Nor have the costs of liability insurance for societal risks. Even now, this is capped with the major costs being assumed by energy users or the taxpayers of Canada. Yet these risks are deemed to be acceptable.

In addition, nuclear power attracts enormous direct subsidies.

Yet, it is still deemed to be an “economic” source of power.

Perhaps Norm can explain it.

Norman Rubin

Jim, the main thing that prompted me to give up a cushy job teaching at U of T so I could become an underpaid activist, was the growing realization that nuclear power was expanding NOT because it was a good investment, but despite the fact that real (non-government) investors had rejected it as too bad an investment -- too risky, with too big a downside and too pathetic an upside. That, in my view, still distinguishes this "environmental" debate from the ordinary ones where a quick and profitable and dirty (or scary. . .) option competes with a more expensive but cleaner or safer option. (I was already making donations to organizations who try to influence those environmental tradeoffs, and I still do.)

Norman Rubin

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Jim MacNeill

Good for you, Norm. And I agree with your comments on what should be done with the Nuclear Liability Act, although I see no prospect of it.

You mention the time frame of 100000 years. I found it interesting to learn that the USEPA decided to regulate the safety of humans around Yucca for 10,000 years and that the National Academy of Sciences decided that that wasn't enough: any safety standard for Yucca should extend to 100,000 years since the waste to be stored there will reach its peak radiation level only after that time. In my view, since no one can imagine what form humans and other species will take in 10,000 let alone 100,000 years, I find this a bit of a stretch, but it does emphasize the need to put the stuff away safely and permanently without need for human surveillance.

Norman Rubin

But there isn't necessarily a need to do that today, or even within the next 30 or 50 or even 100 years, Jim.

The good news here is that the new version of the CNSC's regulatory doc on rad-waste disposal -- replacing the one (R-104) that arbitrarily stopped analyzing risks at 10,000 years -- says that analysis must continue until the predicted impacts have reached their peak. It's so obvious, yet (1) it took a few decades to get it, and (2) the difficulty of

getting it right, and getting confidence that we have, is still enormous.

Andrew Stirling

Chris and Ann's points on the need for integration are very important. And Jim's points on the particular context provided by the institutions associated with nuclear power is very much part of this. The ways different costs are included and excluded and passed on to others is a crucial factor in deciding who to trust to make future decisions.

But there are also some tricky challenges posed by accountability. Just because 'the public' are involved in some way, does not necessarily mean that you automatically get more accountability. In fact, by burying decisions deep in some process of engagement, it can sometimes be even less clear how a decision was arrived at than in traditional expert-based analysis.

This is not at all a reason to hold back on public engagement, but gives us a reason to be cautious about precisely how to do it and what to expect from it.

Norman Rubin

Andy, if democracy were easy to get right, we wouldn't still be debating how to do that! And the closer the decisions get to the impossibly complex and conflicted, the less satisfactory our institutions are bound to be.

Chris Henderson

I think Norm has raised a very interesting principle to broaden the decision making framework for nuclear wastes, through the concept of 'rights'.

Related, alternative or complementary approaches might include:

- The Liability Approach: A broadening, legal or non-legal liability approach. That is, defining accountability for wastes management and there consequences such that there is recourse.
- The Stewardship Approach: While certain parties may have decision making powers regarding nuclear wastes, they would have defined obligation to consider a set of defined societal interests.
- The Organic Approach: The cultivation of a process that is: inclusive, on-going, and which integrates scientific knowledge (on a broad science basis), and which emphasis's consensus.

This also links to Andy most recent point.

Ann Dale

Jim and others have introduced the issue of time? And yet, don't these participatory approaches take a lot of time--to build trust, to understand each others' language?

Norman Rubin

Yes, Ann, and that's one of my favourite reasons to recommend a go-slow approach. I also believe that regulatory protection of Canadians (and others, including non-humans) from radioactive pollution is likely to continue increasing in stringency, so today's "acceptable" repository may well be found to impose Unacceptable risks on future humans (and others) in just a few decades. Again, if the setting of these standards were done with some transparency and public participation (or even done in Canada!!) this process might move more quickly.

Jim MacNeill

In a way, I am glad to hear it. But if we keep it in pools for the next 3-100 years, how do we avoid passing a lot of the costs on to our grandkids and later generations?

We all agree that that costs should not be passed on to future generations is now accepted, but as you know experience to date suggests that it is very difficult to get decision-makers to apply it, especially those at the political level. Rationality may say "pay now," but political reality usually says "pay later," or at least wait until after the next election or, better, until a new government takes over. It's a part of the political DNA.

Moreover, the rationale for deciding later to pay now is often reinforced by those who highlight the uncertainties and risks associated with any option. How often have I heard politicians say: look, we're not scientists and we can't really justify placing this burden on our energy users or taxpayers until they have at least reduced if not eliminated these risks and uncertainties!

I must add that demands for ever more comprehensive assessments, taking ever more interests into account, plays directly into this political propensity for procrastination. I've seen it often -- and not only in Canada but other countries. I doubt that is going to change in 30-100 years.

Ann Dale

Chris, this organic process, how would that work when political elections are held every four years, how would you sustain such a process, and ensure its political neutrality?

Chris Henderson

Ann, simply put, does this type of societal decision making need to be made principally within a political context?

If you put aside the question of whether we should develop any new nuclear capacity, we still need to manage the wastes that are there now.

Transferring the decision making process away from a 'political' context, means one can devise process' that are more enduring.

One good example, is how the Superfund legislation in the US created the accountability chain for waste management and allowed an affected entity of today to pursue remedies to earlier owners of property. Once the legislation was enacted, it moved out of the legislative process and into the realm of liability.

Norman Rubin

BTW, Jim, I believe your reference to the USEPA should be to the USNRC, the Nuclear Regulatory Commission, though I may be wrong.

Jim MacNeill

You may be right. My source was the Economist, not a journal noted for reporting on science.

Andrew Stirling

I agree with Chris that Norm's emphasis of liability is very important. However, here as elsewhere, 'the devil is in the detail'.

It's not just a matter of ensuring that this liability is absolute (rather than strict or fault based - which provide many huge exemptions in a field as complex as radioactive waste). It's also a matter of ensuring that the legal rules do not conceal organisational boundaries to the practical capacity for compensation (around the arrangement of

insurance, channeling of compensation and company ownership).

And on Norm's other point, about democracy not being easy, this is certainly true. But the challenge for the precautionary appraisal of radioactive waste management has some more specific implications than this. We have to be careful that we do not find 'participatory' approaches used as a way to artificially reduce the diversity of values and interests out there in society and justify premature closure on particular 'consensus' courses of action and obscuring the potential merits of alternative strategies.

In the end, participatory process are not immune to being 'closed down' in unhelpful ways. By ensuring that they come up with plural recommendations we learn much more about the way in which science and values interact and provide for more effective accountability in the actual decision making. This is especially true in an area like radioactive waste management, where the enormous infrastructure costs and long lead times make us very prone to getting 'locked in'.

Norman Rubin

Andy, the fear (and reality) of institutional "lock-in" is another great reason to go slow on deep disposal. I believe that today's relatively open-minded assessment by NWMO would not have been possible if AECL's Whiteshell Nuclear Labs juggernaut were still proceeding full speed (and full staff) towards deep disposal. They were largely derailed by the surprising rebuff the AECL concept got from the Seaborn EA panel, so now we can spend some time (<3 years!) looking at alternatives.

Andrew Stirling

Jim makes a good point about procrastination. This is especially a challenge where we face a manifest impact from something we don't fully understand and the effect of delay is to exacerbate the problem.

But in an area like radioactive waste management, I think the issues are more ambivalent. By being cautious about headlong commitments (as Norm describes the current position in Canada) and maintaining our options and flexibility, we can maximise the extent to which we learn from experience and the accumulation of relevant knowledge.

We also avoid providing a spurious pretext for claims that the problem has been 'solved'.

Jim MacNeill

Norm, Andy, if we are talking about less than 3 years (or less than 30), fine, that's still more or less within the generation of present users. We can certainly wait that long

before making a final decision. My fear is that, given the way politicians work, we may delay any decision except keeping it in pools almost indefinitely.

Chris, would that we could take it out of the political context. But what do you see that might force the governments of Canada/Ontario to agree to do that?

Andrew Stirling

I see the attractions of Chris argument for more 'long-sighted' processes of appraisal and decision making, leading to more durable decisions and commitments.

But I am rather concerned about the idea - and even more the aspiration - that this can (or should) get us 'away from politics'. The fact of there existing divergent ways to frame a problem and prioritise different values and assumptions will always be with us - no matter how 'enduring' the process.

Whilst we may hope to mitigate the adverse effects of short party-political horizons, the idea that politics itself can be set aside is misguided and potentially dangerous. It is through claims that politics has been excluded that we risk becoming blind to the constant presence of alternatives and making ourselves vulnerable to the covert exercise of particular interests.

Norman Rubin

In defense of Chris's "non-political" suggestion, I've seen a number of procedures work pretty well that were established by politicians but operated outside the realm of question period, media scrums, and partisan and electoral politics. Arguably the Superfund was one, and one that Chris mentioned. At least at its best, the Ontario Energy Board has been another. Some EA panels have been pretty good, too. I'm not sure these are "apolitical", but they have presented arenas for sober discussions that were separated from the next election.

Ann Dale

Norm, Andy, Jim and Chris, is this a form of adaptive management, that is learning by doing? If this is combined with practices such as precautionary appraisal, and enlarged decision-making contexts perhaps led by a 'one-off' organization such as NWMO with a long-term mandate?

Chris Henderson

Ann,

Yes, I think it is a form of adaptive management. But, I think as Andy mentioned the devil is the details of the management framework of the other elements that would need to be integrated into the process as you mentioned (i.e. precautionary appraisal, enlarged decision-making mandate and long term orientation).

It would be critical to be clear on principles and decision-making frameworks to avoid being in a situation of reactionary management versus adaptive management.

Norman Rubin

Ann, the problem with giving NWMO a long-term mandate is that NWMO is basically the waste-producers-owners-polluters, so it raises the question of who's going to regulate or control them so they protect the rest of us adequately. But there have been many suggestions of a one-off agency to do the job -- including the recommendation of the Seaborn EA panel. According to a leaked fed'l Cabinet document, that recommendation (to set up a federal waste-management agency) was rejected because it could create a residual federal liability to take care of the wastes in case their owners (the utilities, mostly) failed to do so.

So again, far from ENSURING responsibility in this field, the federal government has so far been motivated primarily by AVOIDING responsibility! (What is wrong with this picture?!?!?)

Jim MacNeill

Plus ca change. They continue to want nuclear power and they continue to want to avoid the liabilities. If the cost of these liabilities were built in to the price of nuclear power (along with other hidden costs) the reaction of consumers would be interesting to witness.

I agree with Norm on the problem with giving NWMO a long-term mandate.

Jim MacNeill

Further to my question to Chris, I do agree with Andy that taking the decision out of the political context is not a good idea, even if it were possible, which, in my view, it isn't.

Andy claims that in taking it out of the political context "we riskmaking ourselves vulnerable to the covert exercise of particular interests."

In my experience Andy, "the covert exercise of particular interests" is alive and well and living in all democracies. The trick is to make them overt and this is where greater

transparency could help.

Andrew Stirling

Absolutely, Jim.

Ann Dale

Andy, any words of wisdom about how to maintain flexibility and options? Others, and then there are two very interesting questions from the audience that I would like to pose?

Andrew Stirling

Not sure about 'wisdom', but one obvious but often neglected feature is simply to make flexibility part of the appraisal. Where we allow ourselves to become too confident in our models and assessments (including our 'participatory consensus') on the PROBLEM, we can sideline some key features of the potential SOLUTIONS themselves.

So, a premium might be placed on a number of different qualities:

- options that preserve a capacity to follow other options
- options that can be more readily withdrawn if they go awry
- mixtures of options that allow us to learn
- options that may not be 'optimal', but which are robust under 'extreme' outcomes

In a way these are the flip side to the dangers of 'procrastination' raised by Jim. I think they are also features of an 'adaptive management' approach of the kind Chris has been pointing to.

Ann Dale

Norm, the whole issue of governance is another e-dialogue, and I agree with you that is often spurious when our decision-making systems seem to separate rights from responsibilities, the two are inseparable in my mind. Which again gets us back to integrated decision-making and reconciliation, two powerful concepts I believe.

Norman Rubin

Ann, I see the attractiveness of "adaptive management" being inseparable from the issue of trustworthiness of the agent who's doing the adaptive management. It reminds

me of the debate we all had during the Seaborn EA hearing about the desirability of "flexibility" on behalf of the waste-disposer (presumably AECL at that time). AECL was arguing that being unfettered by firm or absolute or "drop-dead" performance standards would enhance their ability to react to surprises and make everybody safe and happy. The rest of us saw AECL flexibility a bit differently. Ditto with adaptive management. . .

Ann Dale

Thank you, colleagues, and I hate to end this rich discussion, but I would like to pose two questions from our audience and I warn you, they ain't easy!

"With respect to participatory processes, who are the public? How do we ensure all those affected including the sometimes silent majority have their voices heard when many are too busy to participate? How far should the participatory process take us?"

"Where should the balance lie between participatory processes and government responsibility for decision-making?"

Andrew Stirling

These are key questions with no quick-fix response. And they are related.

I think part of the answer to both is the same. Rather than aiming at a single prescriptive recommendation, the participatory process might instead 'map' out the way that the available evidence and analysis depends on - and is subject to - the different values and assumptions associated with different groups and interests in society.

Where this is the case, we lessen the pressure to drive towards the unachievable ideal of 'perfect representativeness' and at the same time make clear the role of essential (conventional) democratic accountability in justifying the final decision.

Beyond this, of course, there does need to be particular effort and care in including a full range of 'stakeholders' - and not just the 'usual suspects' or the most vocal.

Norman Rubin

I don't really feel that present structures of governance hold governments responsible for anything past Public Issue #2 or #3, and I sincerely hope that nuclear waste never rises that high in public consciousness -- because it will probably take a disaster to make that happen!

That said, there are many devils in the details of participatory processes, as most others have already said. (That's why I have to design the process! <G>)

Ann Dale

Andy, and Jim may relate to this, when we were building the National Round Table on the Environment and the Economy, we learned that you cannot have 'all' stakeholders at the table, but rather a representative body. This must be very carefully and deliberately designed, for we are not good at diversity, and without functional diversity, you are right, it is just the usual suspects and we stay mired in decision-making grid-lock.

Andrew Stirling

Good point, which speaks also to Chris' most recent challenge.

I think we may be in danger of using the term 'political' in different ways and so talking past each other.

For my part, the concern was not that we should keep to the short time horizons and narrow interests of mainstream politics. The ideas that Norm and Chris have mentioned may certainly have a lot to teach about extending the depth and scope of appraisal and decision making.

But I do think we should avoid seeing this as a way to remove politics in the wider sense of divergent values and interests.

Jim MacNeill

These are good questions to which I have no easy answers.

As to the first, given what I believe and what I have already said, I would be hard pressed to argue that the kind of process with political involvement is working now. Yet, I seem to recall (correct me if I am wrong) that Seaborn said that AECL felt they had demonstrated that deep disposal in plutonic rock is adequate, at least for a conceptual stage of development, but that the public wouldn't accept it. If so, by sticking to the status quo, could politicians be said to be reflecting public sentiment?

As for the second, we are talking about managing nuclear wastes for millennia, perhaps 100 millennia. Not only has no political arrangement lasted that long, no society has. It's longer than recorded history. Which is my point. Eventually, and I hope within this generation so we pay for it, we have to find a way to put the stuff away safely and permanently without need for human surveillance.

Ann Dale

At the risk of being tedious, politicians are not separate, and are a critical stakeholder at the table?

Norman Rubin

Ann, I think the media are also a critical stakeholder at the table, along with politicians. But the sad fact remains that the combo of media and politicians have done a miserable job of informing Canadians (and Americans. . .) about issues like rad-wastes, which everybody seems to think are important, yet they never have a "news hook" and they seldom are discussed in Question Period. Meanwhile, the issues that are discussed in Question Period are usually discussed at the intellectual level of. . . Question Period, n'est-ce pas?

If I knew how to solve that problem, I'd REALLY have something!

Ann Dale

I cannot agree with Norm more about the need for literacy, it is not just the role of educators, but politicians, media, and strategic partnerships between the research community and other sectors of society, which is one of the purposes of these e-dialogues. A fully informed and literate citizenry is key to the issues we have been discussing today, any last thoughts, dear colleagues, and I thank you for taking the time to share your ideas and wisdom with us today.

Norman Rubin

Further re: politicians as stakeholders: Nobody's talking about disenfranchising politicians completely -- just relatively! A handful of officials now exert nearly total control over the radwaste-disposal program, and that control has to be spread out. (Politicians as politicians may NOT be a stakeholder, since I don't think the hazards of radwaste discriminate between politicians and their next-door neighbours.)

Andrew Stirling

While we've got politicians and the media on the rack, I'd like to chip in another pathology that both tend to share to an extent greater than many other groups (despite the honourable exceptions!).

This is, that - for different reasons - both tend to treat the business of assessment as a matter of coming up with the 'right' answer.

The more uncertainty that is acknowledged, the more that many politicians feel exposed to having to take responsibility themselves. They are typically willing to exercise considerable pressure to avoid this...

And likewise, the media can often interpret the acknowledgement of uncertainty as a weakness. They want the 'bottom line' story of hero's and villains, not the ambiguity of 'on the one hand, on the other'.

When playing to the vanities of expert authority this can be a pretty seductive mix...

I think that in the radwaste debate as elsewhere, both politicians and the media could help us all by taking a much more mature view of uncertainty.

Chris Henderson

Ann, thanks for the opportunity to participate. Tough subject, facilitating discussion.

Jim MacNeill

Ann, thank you for inviting me. And thanks to Chris, Norm and Andy for a fascinating discussion.

Norman Rubin

As difficult as the choice among waste-management alternatives obviously is, the toughest choice and perhaps the most important one -- and one that even the unusually clever Assessment Team blew, in my opinion -- is the timing of the moves from active management toward passive disposal. It seems either trivial or unimportant, but the difference between shooting for disposal in 30 years and waiting for 75, in my view, will probably make the difference between folly and wisdom. But it's hard to start a direct discussion of that issue. (I could go on. . .)

Andrew Stirling

Likewise, thanks to everyone for a very interesting evening - sorry afternoon...

Norman Rubin

Thanks to you folks, and to the audience, too. And good luck to us all!

Ann Dale

Une mille fois merci, and good night.