INSIGHTS FROM THE PANEL REVIEW PROCESS

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Abstract

The environmental review process for nuclear waste management and disposal was unusual in that the Panel was asked to examine a **concept** rather than a specific project at a specific site. The Panel was charged with commenting on the safety and acceptability of the AECL concept, examining criteria for determining the safety and acceptability of **any** concept for managing nuclear fuel waste, and examining **future steps** which should be taken. In short, it was asked to provide policy advice to governments.

The Panel concluded that safety is a key part, but only one part, of acceptability, and that safety must be viewed from both a technical and a social perspective. It judged that safety of the AECL concept had been adequately demonstrated from a technical perspective, but not from a social perspective. It also concluded that the AECL concept does not have the required level of public acceptability to be adopted as Canada's approach for managing nuclear fuel wastes.

The paper examines in some detail the various aspects of the public concerns surrounding the nuclear cycle in general, and the safety of the proposals put forward by AECL for nuclear fuel waste management in particular. It notes the differences between those who look at safety from a technical perspective, and those who look at safety from a social perspective. And it lists the concerns related to acceptability in addition to the key factor of safety.

After outlining the Panel's recommendations to governments on future steps to be taken, the paper discusses the extent to which the recommendations respond to the public's concerns. It stresses the importance of Aboriginal participation; of the creation of a new agency to deal with the full range of activities, technical and social, related to long-term management; of the public and decision-makers having more than one viable option to choose from; and of the essentiality of an inter-active process of public participation at all stages of decision-making.

Finally, the paper makes some general observations on the concept review process. A significant part of the mandate of the Panel dealt with social and ethical policy questions, and in that sense it had similarities with a commission of inquiry. The limitations of the Panel's terms of reference, and the request to review a concept with no specific site, were a source of difficulty and frustration for many members of the public. The work of the Panel helped further the debate on what Canada should so with its nuclear fuel wastes. But it is necessary to move forward with the public debate on a wider front and to complete the process of public consultation begun by the Panel so that decisions can be made in a timely fashion and implementation begun in the near future.

The Terms of Reference and the Nature of the Review

The eight-member environmental assessment panel established to look into the long-term management of nuclear fuel waste in Canada and a disposal concept was no ordinary panel. It was asked to review a **concept** rather than a specific project at a specific site. The concept for geological disposal was the proposal of Atomic Energy of Canada Limited, but neither AECL nor any other body was identified as the implementing agency for the proposal. The concept put forward was for the disposal of the wastes in a multi-barrier system 500-1000 meters below the surface in the rock of the Canadian Shield.

The Panel was asked to comment on the safety and the acceptability of the concept, and to make recommendations to governments to assist them in reaching decisions on the acceptability of the concept. It was also asked to examine the **criteria** which should be used for determining the safety and acceptability of **any** concept for managing nuclear fuel wastes. Finally, it was asked to examine the **future steps** which should be taken in the long-term management of nuclear fuel wastes in Canada.

In short, the Panel was asked to provide policy advice to governments.

The energy policies of Canada and the provinces, as well as the place of nuclear energy in these policies, were **not** part of the Panel's mandate.

Steps in the Review

The Panel conducted its review in Saskatchewan, Manitoba, Ontario, Quebec and New Brunswick. In 1990, it held scoping sessions to develop guidelines for AECL's environmental impact statement and consulted the public on the draft guidelines before making them final in March,1992. After receipt of the environmental impact statement and its nine supporting primary reference documents in the autumn of 1994, there was a nine-month period for public review of this documentation. A total of 13 weeks of public hearings was held in 16 communities beginning in March,1996 and ending in March,1997.

Phase I of the hearings focussed on a range of broad societal issues related to managing nuclear fuel wastes. It included two innovations: speakers knowledgeable in such subjects as hazardous waste management, transportation, risk and safety, and the ethical dimension, but not necessarily in nuclear matters, were invited to make presentations on the various societal issues; and round-table discussions, in smaller and larger groups, were held on the subject of the day. The first innovation was a real success, as it helped the Panel and participants to focus on the essentials of the subject. The second was less successful. It did little to overcome the polarities which seem to be a feature of many nuclear discussions.

In a more traditional format, Phase II of the hearings focussed on the safety of the AECL concept from a technical viewpoint. Phase III, the community hearings, focussed on the public's opinions of the safety and acceptability of the concept.

In the course of all three phases, the Panel heard from a total of 531 registered speakers and received 536 written submissions.

Panel Conclusions

At the end of this process, taking into account what it had heard from participants in the hearings and its own analysis, the Panel came to four major conclusions:

First, there must be broad public support to ensure the acceptability of **any** concept for managing nuclear fuel wastes.

Second, safety is a key part, but only one part, of acceptability. Safety must be viewed from two complementary perspectives: technical and social.

Third, from a technical perspective, safety of the AECL concept has been on balance adequately demonstrated for a conceptual stage of development, but from a social perspective, it has not.

Fourth, as it now stands, the AECL concept for deep geological disposal has not been demonstrated to have broad public support. The concept in its current form does not have the required level of acceptability to be adopted as Canada's approach for managing nuclear fuel wastes.

Public Concerns

In order to understand better these admittedly rather broad and general conclusions, we must look at the public concerns which led the Panel to conclude that there is not the necessary level of broad support to proceed to siting and the implementation of deep rock disposal of Canada's nuclear fuel wastes at this time.

The first, which is applicable to all phases of the nuclear cycle, is what is referred to as the "dread factor", a deeply entrenched fear and mistrust of nuclear technology. It stems from the mysteriousness (for most people) of nuclear fission; from the imperceptibility, mobility and longevity of the radiation hazard; from the association with nuclear weapons and past disasters; and from anxiety over worst-case scenarios, regardless of their low likelihood. Experts may challenge the correctness or the relevance of these fears, but they remain in the public mind nonetheless.

The more specific concerns related to nuclear fuel waste can perhaps better be understood by looking at the work of Professor Peter Sandman of Rutgers University on the subject of risk, hazard and outrage. In a very interesting analysis, he maintains that the public's understanding of risk is a combination of two things: hazard (which equals probability times consequence) and

a number of components of what he calls "outrage". Sandman lists 12 principal and 8 secondary components of "outrage" and indicates how the public employs them in its thinking to decide whether a proposal is "safe" or "risky". To take but three examples, people will be less concerned about a risk which they believe they are accepting voluntarily than about one they feel is being imposed on them; about one where the risks are borne proportionate to the benefits, rather than disproportionately; and about one where those in charge are responsive to their concerns rather than oblivious or apparently uncaring. Sandman's work is well worth reading for a better understanding of public attitudes about nuclear questions.

If the public's understanding of risk in general, and the "dread factor", are a first order of public concern, a second set of concerns relates specifically to the safety of the proposals put forward in the AECL concept for deep rock disposal, proposals which are similar to those envisaged in many other countries.

Here it is perhaps necessary to discuss what the Panel meant by "safety from a technical perspective" and "safety from a social perspective". Those who looked at the safety of deep rock disposal from a technical perspective stressed that this was a concept review where the level of knowledge and understanding for approval of a generic concept were different from the more stringent "burden-of-proof" requirements which would be part of a licensing procedure for an actual project. That many presentations to the Panel included detailed and important technical criticisms was regarded as part of a normal peer review process, a means of getting to greater technical certainty, and in no way inconsistent with expressing support for moving to the next step, siting. Those with a technical perspective feel comfortable with the notion of probabilities and are re-assured when the probability of an undesirable event is very low. They also tend to feel comfortable with modelling as a means of predicting long-term events which cannot be measured by experience.

Those who looked at the safety of the AECL proposal from a social perspective, on the other hand, tended to think that if reputable scientists had found significant shortcomings in the concept, this meant that the concept itself was fatally flawed and must be rejected. Such people are less convinced by probabilities as a means of judging safety than they are by the negative, long-term and perhaps irreversible consequences which could flow from an undesirable event, however remote its likelihood might be. They tend to be very sceptical of the applicability of modelling as a device for predicting events thousands of years into the future. And they tend to have greater confidence in human institutions for the management of risky situations than in a technical solution relying on passive safety.

This difference in perspectives on safety must be kept in mind as one looks at public concerns about the AECL concept. These concerns include:

- Lack of confidence in the state of scientific knowledge about the concept, and particularly in modelling to predict very long-term events and effects.

- Uneasiness about a system which does not envisage indefinite monitoring of what is happening in the disposal vault and in the geosphere, and is moreover not designed for easy retrieval of the wastes should anything go wrong.

- The failure to look at a sufficiently wide range of "worst-case scenarios" and their consequences.

- The lack of precedent anywhere in the world to demonstrate that this is indeed a safe and acceptable method for the long-term management of the wastes.

A third set of public concerns relates to important elements of the **acceptability** of the proposal in addition to the key factor of safety, whether safety is viewed from a technical or a social perspective. These concerns include:

- The need for public confidence in the implementing organization and in the regulator of the industry.

- The absence of information about **options** for dealing with the long-term management of the wastes, and therefore the absence of effective choice.

- The means for the public to be adequately and impartially informed about the facts and the issues.

- The means by which the public, both nationally and locally, can participate in decision-making.

The Panel considered that these elements of acceptability, over and above the key factor of safety, were critical to obtaining broad public support and therefore required much greater attention than has so for been the case in Canada.

Where Do We Go From Here?

It was the Panel's view that a number of additional steps were required to develop an approach for managing Canada's nuclear fuel wastes in a way that could achieve broad public support.

The Panel therefore recommended to governments the following steps:

1. Issue a policy statement on managing nuclear fuel wastes so that Canadians will be clear on the government's long-term approach to the question in all its complexity.

2. Initiate a process to involve Aboriginal people.

3. Create a special agency to manage nuclear fuel waste.

4. Conduct a public review of AECB regulatory documents using a more effective consultation process.

5. Develop a comprehensive public participation plan.

6. Develop an ethical and social assessment framework within which the nuclear fuel waste question can be examined.

7. Develop and compare options for managing nuclear fuel wastes.

From the major conclusions and recommendations of the Panel report, certain things follow:

- Until the foregoing steps have been completed, the search for a specific site or sites should not proceed.

- Should the AECL concept be chosen as the most acceptable option after all the recommended steps have been undertaken, then governments should direct the new nuclear fuel waste management agency, together with Natural Resources Canada and AECB, to review all the social and technical shortcomings in the AECL concept. These shortcomings were identified by the Panel's own group of scientific advisors and by other review participants. These agencies should then establish their priority and develop a plan to address them.

Do These Recommendations Respond to Public Concerns?

Some of the public concerns are of course very difficult to address. There is always likely to be a significant and articulate sector of the population who will not be comfortable with any system for dealing with nuclear fuel wastes . It is nevertheless the Panel's view that certain steps have to be taken if there is to be any hope of gaining broad public acceptance of any long-term management proposal, and these are listed as the recommendations in the report.

Of special significance in this country, there must be a participation process designed with and for our Aboriginal population, many of whom inhabit the areas most frequently suggested as suitable physically for a disposal facility. The process must respect Aboriginal traditions of consultation and decision-making, but must at the same time recognize that there are other legitimate interested parties whose views and concerns must also be addressed.

An agency at arm's length from the utilities and from AECL should be established to manage and co-ordinate the full range of activities, technical and social, related to long-term management. Trust in the agency, as well as in the regulator, is essential to gaining public support. Both AECL and Ontario Hydro carry "baggage" from the past which, rightly or wrongly, seems to limit the confidence and trust which many people have in them. The creation of a new agency would enable the public to identify and hold accountable the institution responsible for future initiatives and would constitute one of the conditions for a "fresh start". It should be fully funded from a segregated fund to which producers and owners of the wastes would contribute. The board of directors should be representative of key stakeholders. The agency should have a strong advisory council and be subject to appropriate oversight mechanisms.

The risks, costs and benefits of a few viable options for managing the wastes in the long term must be developed and compared by the agency so that the public and the decision-makers can make an informed choice as to the preferable option. These options include a version of the AECL disposal proposal, modified to take into account certain shortcomings identified in the course of the Panel's hearings; indefinite storage at the reactor sites, with whatever modifications are required to the existing on-site temporary storage; and a central storage facility, above or below ground, with provision for indefinite monitoring and planned retrievability. A choice of only one management option, the one presented by AECL, is not a choice. What happens, for example, if the one proposal on the table is rejected?

There must be provision for engaging the public in an educational process around the facts and the issues involved, making explicit the social and ethical assessment framework within which decisions will be made. This framework will be subject to periodic adjustment to reflect changing social values. One of the first challenges of the new agency will be to propose and seek public views on a method of interactive education which will provide the information needed in order to make an informed choice. It must include a feed-back mechanism from the public and an agreed plan which sets forth the means by which, and the points at which, the public will be involved in decision-making.

[For a fuller elaboration of the public consultation question, see "La participation et la consultation publique sur des questions où les opinions sont polarisées – Réflexions au sujet de l'examen public sur le concept de gestion et de stockage de déchets de combustible nucléaire au Canada", a paper by Guy Riverin (Panel manager) and Louise Roy (Panel member) presented to the 3rd international colloquium of francophone specialists in impact evaluation, Montreal, May 27, 1998.]

All of the above will be required if there is to be a hope of gaining the required broad measure of public support from Canadians at large for the long-term management of nuclear fuel wastes. How will it be possible to gauge whether that degree of support exists? There is no simple or unique way of gauging it, but consideration should be given among others to full use of our Parliamentary processes, including perhaps hearings and a report by a special joint committee of the House and Senate, and then full Parliamentary debate prior to governmental decision.

It is the view of the Panel that the public acceptance of a concept for waste management, respecting the steps outlined above, should take about two years. Thereafter, the search for a region suitable for the management concept chosen, then for localities which would meet the technical and social requirements, and finally finding a host community which will willingly accept a facility in full knowledge of what it is doing – all this would likely take about twenty years.

It is also the Panel's view that, if these steps are followed in good faith, they will go a considerable way to meeting many of the concerns raised in the course of its hearings.

Some General Observations on the Concept Review Process

The membership of the Panel reflected, as was intended, the wide divergence of views within the public on the nuclear question. This did not make it easy to reach consensus. The difference in backgrounds and approach shows up most clearly, perhaps, in the question of what is "safety". In the end it was agreed by all Panel members that safety had to be looked at from both a technical and a social perspective. The differences in these perspectives coloured views on the "safety" of the AECL concept. The two points of view, described in an earlier section on public concerns have been presented as such in the Panel's report.

A significant part of the mandate of the Panel dealt with social and ethical policy questions and in that sense had similarities with a commission of inquiry. The "degree to which we should relieve future generations of the burden of looking after the wastes" raises ethical considerations, both inter-generational and inter-spatial. It can be argued that the generation which has created the wastes and benefited from them has the responsibility to deal with them in a way which imposes no burden on the next generation. But it can also be argued that present action denies future generations the opportunity of making their own decisions about the wastes, and possibly making them on the basis of firmer knowledge than we have now. The "criteria by which safety and acceptability should be evaluated" leads into the difficult areas of risk and uncertainty, risk perception and risk acceptability. To "review the general criteria for site selection and advise on a future site selection process" raises the whole question of how to consult, with whom, who shares in the decision-making, and what information is needed to make shared decision-making meaningful. It was difficult to get the public to understand, with respect to this part of the mandate, that there was no proponent, and that the Panel was honestly looking for their opinions and advice in order to make useful recommendations to governments on these very broad questions.

The limitation in the Panel's terms of reference was a source of frustration to many members of a public who considered it was not fair and reasonable to ask their opinions on nuclear fuel waste in isolation from the rest of the nuclear cycle and from the role of nuclear in the energy policy of Canada and the provinces. Why should they give their views on possible solutions to the waste problem but be precluded from commenting on the origins of the problem, the nuclear generation of electricity? The task of the Panel in working within this limitation was made more difficult by the fact that the federal government had not followed through on its earlier undertaking to have a parallel review on electrical energy generation and the environment, including the role of nuclear energy in the mix. Such a review would have set this Panel's work in a broader context.

Review of a concept with no specific site, no firm physical proposal adapted to that site, and no designated proponent to carry out the work made life difficult for the Panel and for many members of the public. It was hard to get one's teeth into exactly what was being proposed for acceptance. Choosing communities for the Panel to visit and to conduct consultations raised suspicions that governments, or the Panel, had an actual site in mind but would not declare it.

There was also a suspicion that governments were trying to get approval in principle for what to do with the wastes so that, with this major concern "solved", they could brush aside as unwarranted any objection raised by specific communities to hosting a long-term management facility.

The difficulty of establishing whether a proposal was "safe" without having access to the specifics of site and design led some participants to urge that the next immediate step must be the search for a site which would be both technically and socially acceptable for a facility. While recognizing that at some stage site and design had to be known before safety and acceptability could be judged concretely and with confidence, the Panel was convinced that to start the site search now, as the next step, would generate resistance, hostility and confrontation. A series of important intermediate steps, as indicated above, would have to precede the search for a site if the latter was to have any chance of success.

Some critics of the Panel's recommendations on future steps – especially those recommendations urging a comprehensive public participation plan and comparison of options for managing nuclear fuel wastes – have asked whether the Panel's nine years of existence did not provide consultation enough, and whether the recommendations were non tantamount to continuing consultations indefinitely.

Within the limits imposed by environmental assessment panel procedures, the work of this Panel did help to further the debate. But despite valiant efforts by staff in particular to engage the interest of a wider public, the Panel tended to hear primarily from those already engaged in the nuclear debate, their views in large part already formed, their positions polarized.

What is needed now is to move forward with the public debate on a wider front and to complete the process of public consultation begun by the Panel. Hence the importance attached to a major task of the proposed Nuclear Fuel Waste Management Agency which will become the proponent for <u>some</u> system (not yet decided) of long-term management. That task is an interactive educational process that will engage the broad Canadian public in the debate. Despite the polarization witnessed during the Panel's hearings (a polarization that to some extent reflects differing value systems), public dialogue can "re-establish a climate of confidence between the opposing forces and make possible the harmonization of the technical and scientific factors with the social values to demonstrate the safety of technologies." But "safety and acceptability will be determined [only] within the framework of a comparison of available technologies." [Both quotations from Riverin and Roy, cited above]

The Panel is convinced that this dialogue could, if properly prepared, be brought to reasonable closure in a couple of years. It also considers that the decision on a long-term management strategy ought to be taken shortly thereafter by governments so that Canada can then get on with its implementation. It rejects the suggestion that this decision can be, or need be, postponed indefinitely in the hopes that "something better" may turn up.