

**Comments by J.A.L. Robertson on**  
**“The Precautionary Approach to Risk Appraisal”**  
**by Andy Stirling, University of Sussex, U.K.**

[Page numbers refer to the Adobe Acrobat Reader version on the NWMO website]

Andy Stirling’s paper gets an “A” for its treatment of the precautionary principle, but an “F” for its superficial application to nuclear wastes, particularly in the current Canadian context. Following an introductory section, much of the paper is devoted to a good comprehensive review of what “The Precautionary Approach” means to its proponents. Readers are not informed that much of it is not new but represents current good practice. Indeed, there is some similarity to the ten principles that I proposed in my paper “Nuclear energy - an ethical choice”, also on the NWMO website (in Section 2) but written in much simpler language. Despite the author’s assertion, “Though (The Precautionary Approach is) subject to a variety of different definitions and interpretations,” (p.3) he fails to state his own definition of the term: he lists all the good things that it claims to do, but not what it is. Another important omission from Stirling’s treatment of the precautionary principle is recognition that logically it should apply equally to the status quo and any new proposal: sometimes there are as many unknowns and uncertainties about the effects of existing technologies as there are about their alternatives.

The main part of the paper is divided into two sections: “Risk, Science and Precaution” and eight “Key Elements of the Precautionary Approach”, according to the author’s understanding of it. The first of these consists of essays couched in general terms and raising more questions than they answer. Where Stirling applies a Key Element to nuclear wastes the treatment is superficial and sometimes misleading.

However, nowhere in the paper is the reader informed that virtually all the topics in these sections have been addressed in AECL’s Environmental Impact Statement, submissions to the Blair Seaborn (BS) Panel that reviewed it, the BS Panel’s Report, and a critique of that report (“Malice in Blunderland?”, Canadian Nuclear Society Bulletin, 19, 2 & 3, available at [www.magma.ca/~jalrober/Blunder.htm](http://www.magma.ca/~jalrober/Blunder.htm)). After ten years of a panel that was supposed to resolve these questions, the NWMO is apparently expected to start again from scratch. References to nuclear wastes in the discussion of these features are misleading for this reason.

The final section consists of 18 questions that should be considered in an assessment of the management of nuclear wastes. The wording of the questions is such that they could apply to any technology but some of the wording again includes gratuitous and unsubstantiated comments on nuclear wastes.

With the precautionary principle the devil is not in the detail but in the application. When applied to nuclear wastes, there are implicit assumptions in Stirling’s paper demonstrating an ignorance of the existing situation, particularly in Canada. The paper should have avoided superficial comments, without discussion, of the applicability of the principle to nuclear wastes.

These opinions are substantiated in the following detailed comments.

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- 3 The paper provides a good summary of the problems faced in decision-making. It would make an agenda for lengthy academic debate on the subject but, given that no such debate occurred during the Panel's eight years, it is unlikely to be of practical use during the NWMO's three year term. The author fails to point out that protection of health and the environment depends on a healthy economy: this is not a case of either/or.
- 7 The author states: "The notion that there can be a single 'science-based' prescription in the regulatory appraisal of risk is not only naïve and misleading, it is a fundamental contradiction in terms." While this is true it is totally misleading for readers in its implication that this represents the current regulatory situation in Canada. What he terms the "science-based" risk assessment is necessary but not sufficient. The staff of the Canadian Nuclear Safety Commission (CNSC) assembles this information, along with complementary information on health and environmental effects, economics, etc., for its recommendations to the Commissioners. They have the responsibility to consider all these, plus government policies and public attitudes in reaching their decisions.
- 8 The graph is used to suggest that there is a large disagreement on the subject, i.e., the rhetorical technique of "The scientists disagree so we cannot believe any of their conclusions". Before drawing this conclusion one needs to determine if they are all comparable, e.g., some may be for operation only while others are for the whole life-cycle, and the quality of each input has to be assessed.
- 9 The examples given under each quarter of Box 2 seem to be based on subjective judgements. For instance, for some diseases there is ambiguity, ignorance and uncertainty, and I would have put "greenhouse scenarios" under "ignorance". For any technology, some aspects can probably be found to fit in each quarter. Given these problems of subjectivity and generalization it is difficult to see what practical use can be made of this categorization. It should be emphasized that uncertainty, etc., applies to the status quo as well as to new proposals.
- 11 The author fails to recognize that professionals have an ethical obligation to inform the regulator, any other decision-makers and the public of what he terms the "science-based" risk. Indeed, some professionals would be legally liable if they ignored this risk. However, as explained under p.7, this assessment is complemented by other considerations. The author is presenting a false dichotomy.
- 12/13 Be more humble about science. Stirling admits that: "Scientific and technical evidence and analysis remain absolutely essential" but he recommends shifting attention from risks to hazards. We know that the public has a greater horror of one aircraft crash that kills a hundred people than a hundred traffic accidents that each kills one person. Would concentrating public funds on the former at the expense of the latter represent responsible policy making? He criticizes claims of too great precision and the use of probabilistic models. However, this is irrelevant to the Canadian proposal for deep underground disposal. Atomic Energy of Canada's (AECL) Environmental Impact Statement (EIS) assessed the risk of its proposal by application of the SYVAC analysis, the essence of which is a recognition of the uncertainty in all the input data. Readers should be made aware that a 1976 U.K. Royal Commission on Environmental Pollution concluded that: "It is difficult to think of any other form of pollution that has had its effects on man so well examined as has ionizing radiation ...." If anything, this is probably more true today. It is important when comparing nuclear energy and its resulting wastes with other energy sources.
- 13/14 Burden of persuasion. The author claims that: "Under a more precautionary approach to radioactive waste management, this issue might productively be subject to wider and more deliberate discussion than is typically the case at present." He is apparently unaware

- that this has been discussed to the point of exhaustion during the eight years of the BS Panel. If not, what more does he believe could be done?
- 14/15 Monitor. The reader is not told of existing environmental monitoring around Canadian nuclear sites and of epidemiological studies to monitor the worker's health. Questions of whether to monitor the proposed repository, and to what extent, have been discussed but not decided pending approval of both the concept and the site.
- 16/17 Compare pros and cons of policy options. Since this is one of the ten principles that I proposed in my paper I obviously agree, *provided that the options include the status quo*. The author fails to recognize that there no such thing as "an acceptable risk". For each individual what is acceptable is determined by a balance between their perceived risk and their perceived benefit. His implicit assumption that the nuclear wastes, if in deep geological disposal, would present a significant risk over specially long times is at least controversial: the similar assumption that the disposal would be irreversible is simply untrue.
- 17/18 Interdisciplinary appraisal. Stirling claims: "The implications for assumptions over containment in radioactive waste management are obvious. Confidence that such issues have been given due attention can only be increased by involving a full range of relevant technical disciplines." It is difficult to imagine a broader and deeper interdisciplinary appraisal of a technology than that for nuclear energy in general and Canadian nuclear wastes in particular. Under the Canadian Environmental Assessment Act any proposal for a nuclear waste repository would require an environmental assessment by a panel. For this, "environmental effects" include just about everything, including health, social, economic, physical, cultural and aboriginal factors
- 18/19 Independent regulatory. According to the author: "Steps towards this kind of framework have in the past been taken in the radioactive waste management field<sup>69</sup>. Typically, however, the appraisal process fails to fulfil the potential of these kinds of techniques, leaving plenty of opportunities for improvement." In Canada the nuclear regulator, CNSC, is independent. For the nuclear wastes, AECL's Technical Advisory Committee, composed of independent scientists and engineers, the BS Panel's Scientific Review Group, similarly composed, and many submissions to the BS Panel ensured a diverse assessment.
- 19-21 Provide full participation. This is yet another "motherhood" statement that is not unique to the "Precautionary Approach", but has been part of current practice for years. What the author fails to acknowledge is that participation can be encouraged but cannot be forced. Experience with several nuclear inquiries in Canada, ignored by Stirling, has demonstrated that the general public, as opposed to special interest groups, are not interested in participating until they believe that their own neighbourhood is affected. Such participation as there is is usually dominated by vociferous opponents, so that a superficial survey gives a misleading impression of "public opinion". The BS Report rejected the proposed concept on the grounds that it did not have "broad public support". Since the BS Panel had not done any polling it presumably based this opinion on the roughly 500 submissions that it received, out of more than 30 million Canadians. My review of the submissions (see [www.magma.ca/~jalrober/Blunder.htm](http://www.magma.ca/~jalrober/Blunder.htm)) found that about half showed no evidence of having read even the summary of the proposal; and all of them had formed their opinions before the BS Report revealed that its SRG had found the proposal adequately safe. Stirling poses many questions but there is no mention that these have been discussed in the EIS and eight years of the BS Panel. His sentence: "In the case of radioactive waste, for instance, colloquial institutional and behavioural insights concerning the wisdom of 'brushing problems under the carpet' may hold substantive implications for decisions between retrievable and non-retrievable management options.",

- if it means anything, implies improper behaviour. If he has any evidence of this he should have provided it.
- 21/22 Address options early. This, like most of the other Elements has been part of accepted practice since long before the “Precautionary Approach” was coined. In Canada, options for the management of nuclear fuel wastes were addressed in the 1977 “Hare Report”, and they had been examined within AECL for years before that. Lumped in with this Element is the desirability of resilience, flexibility, adaptability and robustness in any proposal. However, Stirling fails to acknowledge the problem of each generation wanting to second-guess its predecessors. Society cannot afford to carry several options on each technology: at some stage informed judgments must be made and we have to move on.
- 23 This final section provides 18 questions for academic debate before establishing an assessment. They appear to be applicable to any technology. In the section’s preamble there are two references to proposals for conducting an assessment, but not to my review of over 30 “Nuclear energy inquiries: national and international”, Report AECL-10768, (1993), or my published critique of the BS Panel’s process and proposals for future improvements (see [www.magma.ca/~jalrober/Blunder.htm](http://www.magma.ca/~jalrober/Blunder.htm) and [www.magma.ca/~jalrober/Chapter16.htm](http://www.magma.ca/~jalrober/Chapter16.htm)), both of which are relevant.
- 23 The wording of some of the questions indicate the author’s prejudice, without justification, that the current situation is unsatisfactory. “5. By what means might the strategic balance be made *more deliberate and explicit*.” “6. How should *enhanced* levels of field research and monitoring be funded.” “13. How can policy and decision making procedures be adapted ... to make them *more receptive* to more plural forms of technical advice?”(stress added).

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