C/76-22
#2329

Conference on
Public Policy Issues In
Nuclear Waste Management

October 29, 1976

"IMPLEMENTATION: ACTION OR STALEMATE?"

Eugene B. Skolnikoff
Professor, Political Science, M.I.T.

I

The court opinion that required radioactive waste disposal to be considered in the licensing of reactors gave legal weight to the growing public concern about the management and control of this part of the nuclear fuel cycle.[1] It served to emphasize once again the growing difficulty of dealing with technological issues in our society, issues that raise central questions of decisionmaking, of management, and of regulation.

In fact, the ability to reach decisions about technically complex and necessarily risky issues, and to proceed with implementation of those decisions, is becoming one of the central concerns of governance in industrial societies. It is not too strong to state that fundamental values of our political system are at stake. Essential needs must be met. If decision processes to meet those needs become stalemated the pressures for more authoritarian modes of governance will grow. But, the preservation of open decision processes that do not lead to stalemate is a difficult task that is likely to get harder, not easier, in the future.

---

1. Aeschliman v. NRC, Nos. 73-1776 and 73-1867 (D.C. Circuit, July 21, 1976).

The management of radioactive waste is an excellent example of a complex and risk-laden issue. It relates to the basic requirement for energy, but also involves long-term questions of safety and control. It is closely tied to issues of national security, and raises emotional spectres of nuclear danger. Moreover, it also has the characteristics of issues that are the hardest to deal with: the level of uncertainty is high, the technology is esoteric and not easily accessible, the evaluations of risk are contentious -- even among experts -- and the opportunity for demagoguery on all sides of the question is therefore substantial. Moreover, significant economic and political interests are at stake, further exacerbating the problem of dealing with the issue successfully.

Other papers at this conference will be concerned in detail with analysis of alternative policies for radioactive waste management. It is not the purpose here to develop these alternatives independently. Rather, it is to point up what is necessary to reach decisions about those alternatives and to carry them out. Whatever the particular preferred choices may be, any policies considered for radioactive waste management will have to be concerned with several specific considerations that deserve to be singled out:

-- The longevity of some of the waste products will appear to create a requirement for unprecedented governmental control of the material. Whether this is in fact a serious technical difficulty is presumably in question and is related to other issues, but the perception of that requirement will undoubtedly have to be reckoned with.

-- The difficulty of handling radioactive waste is bound up with the decision about reprocessing and the development of breeder reactors. The reprocessing of spent fuel elements to recover plutonium and uranium may make the waste physically easier to dispose of, but that policy cannot be decided in isolation from the broader questions raised by the reprocessing issue.

-- Responsibility for nuclear waste management and regulation in the U.S. is divided among many agencies and institutions. ERDA has primary R & D responsibility, and NRC and EPA have the major regulatory responsibility at the Federal level, with the States also involved.

-- Management authority is divided between ERDA and private industry, with the DOD also playing a role. The International Atomic Energy Agency is involved at the international level, but so far plays only a facilitating role for analysis and consultations on waste management issues.

Any resolution of waste management issues will require attention to the capability of institutions to carry out management and regulatory tasks. Even a decision to halt nuclear power development in the U.S. would not avoid the problem since there is already considerable waste from existing power reactors and military

programs in temporary or questionable storage. And other countries will proceed with nuclear power, whatever the U.S. decides.

It is possible that a new institution for management of nuclear waste will be necessary in the U.S., either by expanding the responsibility of an existing agency, or by creating a new "authority" for that purpose. Institutional development on the international scene may also be necessary.

-- The concern over the length of time for which nuclear wastes continue to pose hazards has a reverse consideration. Should storage be carried out so that the waste is retrievable for better disposal as waste disposal technologies improve, or to allow the possibility of recovery of the stored energy by a future generation, in the case of unreprocessed fuel rod storage? The time scales involved in radioactive waste seem to lend an unusual caste to the choices involved, though in fact management of hazardous stable chemicals have some similar characteristics.

-- Radioactive waste storage must be concerned not only with the disposal of spent fuel and its byproducts, but also with contaminated plants and other facilities no longer operating. Thus, a major factor in the design and licensing process for power reactors will have to be the plans for dealing with the plant after its useful life, an issue likely to arouse considerable local controversy if

plants have to be left sealed for any substantial length of time.

In attempting to come to grips with these and related issues in the policy process, and to carry out the decisions reached, there are a number of observations about technology in the public arena that need to be kept in mind.

1. There is no such thing as a riskless technology.

This is obvious, but the subtle characteristics of risk associated with particular technologies often make acceptance of risk difficult in practice in the political process. The risks associated with technologies already in place are often ignored when new technologies with evident risks are being considered; the patent risks of a new technology are not easily weighed against the much less certain risks of foregoing the technology; the risks of a new technology are easily seen and may arouse emotional reactions because of their nature rather than their scale (particularly relevant to nuclear technologies); the new risks may threaten different segments of society than do those of existing technologies; the risks of new technologies have different characteristics (e.g., individually assumed vs. socially imposed) than those that are already part of everyday life.

Obviously, we are dealing here with comparisons of risks and of benefits associated with those risks. But this is not a wholly quantitative comparison, even if all the information about the technologies and their effects were available. Risk comparisons are partly quantitative, dealing with apparent matters of fact, but are also bound up with emotional, economic, political and personal aspects that are necessarily subjective.

2. Agreement by experts on the risks associated with use of specific technologies is not to be expected, even for those aspects that are apparently amenable to quantitative assessment.

It is obvious that if overall risk assessment is subjective, it must involve matters of value as well as fact so that one would not expect agreement a priori. But, why is agreement even on the quantitative or factual aspects not usually or easily achievable?

The problem is simply that policy choices involving new technology are concerned with future actions and thus necessarily involve uncertainty. That means that assessments involve extrapolations of present information (which itself may be imprecise or in dispute), and therefore depend on judgment, analytical competence and imagination. All of those not only vary from individual to individual, but are also affected by an individual's attitude or stake in the issue and in its broader implications.

The range of disagreement to be expected is not predetermined, it will vary with how much is known, how big a step from the present is being proposed, whether there is agreement on what the issue actually is, and how much testing, experimentation and study is possible. A rough consensus among most of the experts is possible if a great deal is known about the technology, the issues are reasonably clear and agreed, the number of relevant professions small, and the non-technical stakes are not too large (compare the fluoridation controversy, for example, with debates over nuclear safety). Of course, on new complex issues, those conditions are rarely satisfied.

In general, the more significant the technological step under discussion, which usually correlates with the importance of the issue in

social terms, the less likely there is to be agreement by the "experts" on the definition of the issues and on the technical aspects. Uncertainty can be reduced through research, but it rarely can be removed entirely in advance since in large part that could only be done by actually introducing the technology and observing its effects. Even that is not sufficient where scale or long-term consequences are the basis of important disagreements.

Unfortunately, it is also unlikely that disagreements among experts will be sharp and amenable to clear exposition. There are likely to be variations in the competence of "experts," and the relationship of any important technological issue to broader concerns usually guarantees that different groups will see the questions in different terms.

3. No one who has become a party to a public policy debate can remain completely disinterested, so that bias or point of view necessarily color risk assessments.

There is a corollary to the preceding point in that the existence of inextricable value aspects of most issues implies that completely disinterested analyses by experts, or for that matter by any parties to an issue, are not possible. Obviously, this is a matter of degree, and is affected by the extent of an individual's involvement and the signficance of an issue. But, scientists as well as politicians are not immune; scientists too, are likely to be influenced in their professional judgment by their policy preferences. In fact, it is not uncommon to observe scientists and others use their expertise in an advocacy role, consciously or unconsciously using information selectively. This does not mean there are no important

and useful benefits to be realized by going as far as possible to reach agreement on the technical aspects of an issue; quite the contrary, but the limits must be recognized.

Note that the inevitable existence of bias applies to all parties of interest. Public interest groups are also strongly affected by their goals and their environment as are industry or government representatives. George Wald's implication that nuclear power skeptics are more likely to be right because they have "nothing to gain" should not be accorded weight (for that reason) in evaluating arguments regarding the risks of nuclear power.[2] Conflict of interest is pervasive, insidious, and also subtle.

The problem, of course, is not to rule out all analysts as ineligible, but to determine how to proceed recognizing that on important issues most people are interested parties.

4. The participation of the lay public in technological decisionmaking does not guarantee sensible decisions, nor that there is understanding of the issues involved.

Public participation in decisions about technology can have many justifications. The most pragmatic are the public's increasing wariness about the effects of new technology,[3] and the growing need to allow participation by interested parties in order to reach decisions that are, in fact, acceptable.

But, this objective of greater public participation often founders on lack of responsible attention by the public, or is reflected in plans

---

2. George Wald, NYT, February 29, 1976, p. E-15.
3. LaPorte and Mettay, "Technology Observed: Attitudes of a Wary Public," Science, Vol. 188, April 11, 1975, pp. 121-127.

for unrealistic citizen feedback schemes,[4] or involves groups who do not necessarily reflect the views of those they claim to represent. Time, attention, interest, and competence to understand the details are often lacking; and factors such as manner of presentation, personality of the protagonists, skepticism of authority, and often widely varying personal objectives (such as employment vs. environment) condition the quality of public participation, especially when -- as is almost always the case -- public exposure time is extremely limited.

Inevitably, therefore, the public, or rather the different publics, must have available formal or informal means to be "represented." If elected representatives are not sufficient representation, and increasingly they are not, other means and institutions are necessary. And the representation must be such that it provides, and is seen as providing, effective participation in the decision process.

5. Access to relevant information and analysis is a necessary though not sufficient, condition for effective participation of interested parties (or their representatives).

When dealing with high technology issues, there is often a natural monopoly of relevant information and competence on the part of government or industry with the greatest stake in proceeding with the technology. At the same time there are usually few individuals outside the immediate protagonists who can digest technical information, reduce it to policy terms, ask the relevant questions, understand the alternatives and participate meaningfully in policy discussions. The public debates over

---

4. Leonard et al., "Minerva: A Participatory Technology System," BAS, November 1971, pp. 4-12.

weapons systems in recent years were only made possible because former government and industry employees with both experience and knowledge elected to enter the lists.[5]

The need for information and analysis to be more widely available may be just as difficult to meet in unclassified civilian technology areas, even without security problems; it is essential that it be met. It will require conscious measures to make information available, and to build a cadre of analysts able to use the information.

It is counterproductive for the protagonists of a technology to assume they are better off if the public at large is ignorant about a technology, leaving decisions to knowledgeable experts. Today's skepticism about the effects of technology coupled with technological ignorance leaves society prey to demogoguery. The absence of trusted responsible analysts enhances the power of irresponsible analysts, just as the absence of trusted, responsible protagonists of technological systems enhances the power of special interest groups in industry and government.

Disagreement among experts who have been given access to information certainly complicates the problem of reaching decisions, but it is even more dangerous to allow opposition based on fear and ignorance by withholding information. The challenge is to build a process based on information and knowledge so as to be able to reach acceptable policies, even if they are not necessarily optimum from any single point of view.

That injunction leads directly to the final proposition which in many ways is a prerequisite for reaching effective agreement on complex, risky, but needed technological action.

---

5. Anne Cahn, Eggheads and Warheads, Scientists and the ABM, (Cambridge, C.I.S., M.I.T., 1975)

6. The willingness of a society to accept a technological decision that is not fully understood and that carries the risk of unfavorable consequences along with its benefits, even when there has been adequate opportunity for debate and participation, depends fundamentally on the existence of trust and confidence in the essential fairness of the society.

No efforts at public participation, discussion, dissemination of information or other measures with regard to a complex technology carrying possible risk, will be of much use in achieving willing acceptance unless there is a substantial degree of trust in the system. In the not too distant past, decisions by experts with little public discussion were relatively easily accepted. Early decisions about nuclear power, many technical military and foreign policy choices, and others in complex technological areas were made with little public debate. The experts had legitimacy; they were trusted to represent all interests on subjects not accessible to the public at large, and it was assumed the issues could be treated largely as technical questions.

But that trust was later seen to be misplaced; some decisions turned out to be representative only of specific interests, others turned out to be made on too narrow a base of knowledge or analysis, and some had serious adverse consequences. As a result, we are in a new era in which the testimony of experts, especially those in government or industry, is often devalued, challenged, suspect. Yet, that, too, must not be allowed to last, for immobility is also a decision and may also have serious consequences.

There must be a middle ground in which there is sufficient openness to explore issues adequately, and sufficient trust to reach closure on a debate and accept a decision even when that implies injury to some

parties at interest, or more general risk to the society. That can only happen if the process of decision is, and is seen to be, fair, which also means that it represents everyone, or at least those most affected by the decision.

Willingness to share information, to open issues for discussion, to bring in the public early and honestly will contribute to rebuilding that trust and confidence. But it must be recognized that this is a broader issue that relates to the society as a whole, not just to technological questions. In that sense, the ability to involve the public successfully in decisions on and implementation of policies for nuclear waste management is dependent on deep-seated developments in the general political climate in the U.S. There is only a limited influence that the manner of dealing with this particular issue can have on that larger question of trust in the system.

II

Implications for Implementation

What are the implications of these propositions? Our goal is to be able to reach decisions about a technically complex and necessarily risky issue -- radioactive waste management -- and to be able to implement those decisions. Let me briefly recapitulate the propositions:

-- a riskless technology is not possible;

-- agreement by the "experts" on the risks is not to be expected;

-- no party to a public policy issue is completely disinterested;

-- public participation does not automatically mean understanding and acceptance;

-- access to information and analysis is essential for participation; and

-- trust and confidence in the political system at large is a necessary prerequisite for reaching and carrying out decisions about controversial technology involving substantial risk.

To what policies and measures, when combined with the specific issues involved in waste management, do these propositions point?

It is obvious that there are no panaceas. In part this is so because, as noted, the ability to deal with this issue is dependent on broader questions of attitude in the society at large. In part it is because the technical issues of nuclear waste management cannot be separated in the policy process from the issues associated with nuclear power, such as the need for reprocessing and breeder reactors, or from the licensing of reactors themselves, now mandated by court decision. Nor can they be totally separated from larger social issues such as energy policy, nuclear proliferation, economic growth, inflation, and Middle East politics. And in part it is because there are no short cuts nor assured outcomes of an open policy process.

The major thrust of the arguments is simply that the policy process must be, and be seen to be, open and fair. That will not guarantee that closure can be reached on decisions and that those decisions can be implemented, but it is increasingly a necessary aspect of the decision process.

There are a series of approaches and policies that are relevant to the goal; I will attempt to spell out a few of the more important in brief compass.

1. Open Policy Discussions Starting at Early Stages

This is an obvious, if general, injunction which, however, is not easy to carry out. It has little meaning unless other steps are followed to make information and expertise available outside government and the involved industry (suggested below). And there is necessarily great difficulty in defining where confidentiality and secrecy are legitimate. All deliberations in government cannot be open: that results either in immobility or the development of different forms of internal communication (telephone calls instead of memos, few formal documents, etc.). Industry also has legitimate need for protection of proprietary information and of development of corporate plans.

But, self-conscious efforts can be made to create opportunities for meaningful public discussion of policy options before decisions are reached. As noted, it is important as well that these efforts be seen to be honest in that they are genuinely held before agencies have decided on their policy choices.

Policies for management of nuclear waste will now necessarily be aired in the hearings required in the licensing process for power reactors,

and in the development of environmental impact statements. In fact, it seems likely that waste management will become a major factor in reactor licensing debates. It would be a mistake to think of these hearings as the first step in obtaining public inputs in the decision process. Rather, through means mentioned below, there should be ample opportunity prior to hearings to elaborate options, encourage independent analysis, and engage in public discussion.

2. Involvement of Other Institutions

The development of analyses and options should be carried out not only inside the government and with industry that is directly involved, but also with other institutions, such as universities and technical analysis firms. This can serve the multiple objectives of making information and analysis more generally available; of providing more options, from a variety of perspectives, for consideration in policy deliberations; and of contributing to consensus-building among institutions perceived by the public to have less of a stake in particular policy outcomes and thus in some sense serving as their representatives.

Inevitably, if the government sponsors such analyses, it will mean supporting studies carried out by groups that may ultimately turn out to be critics of the policies chosen. If the studies are in fact sponsored before decisions are made there may be enough reflection of them in the decisions to minimize opposition. In any case, one can hope that competent studies will serve to make disagreements clearer and more easily debated.

Since disagreements and varying assessments are unavoidable, any steps that sharpen the real issues under dispute are likely to reduce confusion and make choices easier.

The need for widespread involvement means that on important issues it would be wise to commission studies by more than one outside institution. There is nothing wrong, and much to be gained, by seeking analyses on the same issues from multiple sources.

Government support for analytical studies also carries some dangers. Over time, it may influence the attitudes of those who become dependent on continuing funding and thus become a way of co-opting potential critics. Providing for diversity of sources of funds from government can help to alleviate that danger; better yet are analyses wholly supported from private resources.

3. Outside Reviews of Major Policy Analyses

When a government agency commissions a major study it intends to use as a basis for policy decisions, it should also fund outside reviews of that study to develop comments and highlight issues.

The commissioning of WASH 1400 (The Rasmussen Study of reactor safety) did not satisfy that criterion, and the positive contributions of that report may be reduced as a result. This study, dealing with an obviously complex and central issue, was opened for public review and criticism before being put in final form, but outside analysts were expected to find their own resources. Gradually, after final completion of the study, some questions have been emerging, now without adequate opportunity for discussion

and debate before the conclusions have been "accepted" as the basis for government policy. The result is to put into some question the credibility of the entire analysis, whether warranted or not, and to give a weapon to critics of nuclear energy that can go well beyond the actual deficiencies of the study.

4. Public Forums

Public forums, presumably such as this one, held frequently or on a continuing basis can provide occasions for airing of issues, for expressions of the views of various groups, and for feedback. Again, these will mean little unless there is adequate information, and resources available for analysis outside government or industry.

5. Continuing Regulation and Control

The nuclear waste management problem appears to require continuing political regulation and control to an unprecedented degree. The most dramatic aspect is the persistence of the hazards over time scales well beyond the lifespan of recorded society. That implies that the measures for dealing with waste must not necessarily be dependent on organized human intervention, but does not automatically mean the risks cannot be made acceptably small.

Clearly this aspect of the subject needs to be given special attention early in public studies and discussion. It appears to be a rather novel issue of public policy, though not in fact so different from problems of dealing with toxic chemicals, and certainly is easy to dramatize beyond its actual significance.

It may well be wise for this reason alone, if for no other, to create a new government body for the management of nuclear waste that has single-minded responsibility for the problem. That will serve to enhance the priority accorded to the issue over a longer time, and also help to separate promotional objectives for nuclear power from management objectives for handling the waste products.

Another aspect of the problem of regulation is more traditional, whether entrusted to existing agencies or shared with a new body. The history of regulation in the U.S. shows how easily the original basis of operation of a regulatory agency can gradually alter until it becomes the captive of the segment of society it was designed to oversee.

The reasons for this "capture" are to a considerable extent natural, for over time the only groups who sustain interest and knowledge in a subject are likely to be those with a specific stake in that subject. Others lose interest, have other concerns, and find the difficulty of maintaining continued competence in the subject too difficult. Thus they more easily accept (or don't even notice) the gradual narrowing of the decision process whether that happens naturally or by design. Until, of course, there is some crisis or catastrophe, when it may be too late.

This narrowing of the regulatory process is inappropriate for most technologies, and particularly so for nuclear technology and its waste management aspects. There are no sure ways of preventing this from happening, though assignment of management authority to a single agency may give the regulatory problem more continuing visibility and thus more attention.

Another, more ambitious course of action, is to develop institutions outside those directly concerned with management or regulation that have responsibility for analysis and challenge to government policies. Regulatory agencies are more likely to be independent regulators if interest and knowledge about a subject is more widespread. Some steps along these lines have been suggested earlier; other ideas of an institutional nature are offered below.

6. Congress

Congress increasingly provides a route for the expression of public concerns, for the dissemination of information and policy options. In addition, Congressional resources for independent analysis of technologically-related subjects are improving, through the creation of the Office of Technology Assessment (OTA), strengthening of the Congressional Research Service and the General Accounting Office, development of the new Congressional Budget Office, and the possible establishment of a policy studies organization for the Congress.

Congress thus is coming to have the competence to develop analyses of issues and proposed policies that can provide some of that counterweight to the dominant technological capability of Executive Agencies and of industry. In this role, it can serve as a route for expression of general interests, and as a means of maintaining technical competence outside government and industry in complex technological areas.

Conscious development of Congressional resources for this purpose could also be a route to stagnation if the result is increased Executive/

Congressional confrontation. If, however, the Executive Branch recognizes the role the Congress will play in questioning its policy recommendations on technologically-related issues and therefore reaches out earlier for more public involvement and debate, the results should be better and more timely agreement.

The studies carried out under Congressional auspices are more likely to reflect the views of interests outside the agencies or of directly-involved industry. Thus, if those interests have already been involved in policy discussions there is some greater likelihood of the development of the consensus needed for action.

These Congressional resources can also play a role in the regulatory process in the sense of being alert to problems that emerge once the technologies are in place. OTA specifically has such a responsibility, and could be a useful buffer against narrowing of the decision base with time.

7. Development of Institutions for Advocacy and for Objectivity

As society becomes increasingly committed to complex technology, the problem of competent criticism in an adversary political process becomes ever more difficult. The rationale for this paper can in fact be thought of as stemming from that growing problem.

An interesting question, going well beyond what can be discussed in detail here, is whether and how the government in a representative democracy should see itself as responsible for the creation and maintenance of institutions designed to be analysts and critics of government policy and of the regulatory mechanisms established by government. Many institutions perform those functions now, especially universities and public interest

groups, but the resource base is often inadequate or sometimes raises conflict of interest questions.

Can (should) government agencies provide funds for institutional support of their critics? Can it be done in ways that avoid loss of independence over time? The NSF and NRC presumably would be more likely sources of continuing funds free from influence than would, say, ERDA or NASA. Would Congress accept such a mission, or should it provide funding directly as it does for OTA? There have been concrete proposals from some Congressmen and Federal judges for just such funding to outside groups by Executive and regulatory agencies.

In discussing the institutionalization of analysis and criticism of government policy, it must be clear that there is not always an obvious distinction between objectivity and advocacy. There is a tendency to deplore individuals, particularly scientists and engineers, who use analysis for advocacy purposes. Presumably, that is because it implies distortion of the analysis, or at the least selective use of information. As noted in the earlier propositions, however, there is inevitable pressure leading to bias, or something less than disinterestedness, as soon as a person becomes a party to a public policy issue.

However, that does not mean we are doomed always to discount everyone's views (with whom we don't agree) as hopelessly biased. Here the traditions and mores of the scientific community and of the universities become very important.

For what the society needs is <u>both</u> institutions for advocacy and for objectivity. The existing base of individuals competent to understand high technology issues and their implications is narrow. That implies

that groups involved in such an issue but not adequately represented in the government's decision process are likely to be underrepresented. Individuals or institutions able to work with the technology, and that have access to information, are needed in that avowedly advocacy role to represent those interests.

But then also needed are institutions outside of government able to provide a base of expertise not beholden to specific government policies or industrial interests that could analyze issues and provide a basis for resolving disagreements. Complete objectivity is not achievable, but over time a striving for disinterestedness and reliance on scientific norms could bring confidence in such institutions and help them provide a needed mediatory capability. Their authority would come from expertise and confidence built up over time, not from any formal grant of responsibility.

Whether such instituions should be sought among those that already exist, or new ones created, or both, deserves much attention and discussion. The "science court" is presumably one such proposal, but in my view is not a likely success, and may even be a diversion. Other ideas are possible or have been suggested and need development. My own guess is that existing institutions, in particular universities, the National Academy of Sciences, and research centers, already engaged in the task, are more likely candidates.

The judicial process in the U.S. is also becoming a major "institution" for the resolution of disputes related to technology. The ability of that process to deal adequately with technological issues is very much in question and needs urgent attention and, probably, invention. The development of institutions competent to deal with technologically-related policies and accepted as disinterested and reasonably objective, could have an important

role to play in the judicial process.

I am impelled in this discussion to point out the cost to the authority of science and technology of having scientists and engineers operating in both advocacy and adjudicatory roles. This is likely to be a real cost, but since we already see scientists and engineers in advocacy roles, to the discomfiture of some of their colleagues, there is little to do but accept it and focus on the development of needed institutions. Perhaps others would have different views on this from the perspective of the norms and values of the scientific community.

8. Bringing Industry Along

All too often in the U.S. today, attitudes toward business are polarized, with many seeing industry as dominated solely by improper motives, and others uncritically arguing for reduced regulation of industry.

In fact, a technological society requires change and technological innovation. The source of that innovation, which is largely in industry, can be adversely affected by a system that makes change too difficult, or removes the incentives for innovation. But imposition of restrictions with such effects can be prevented from happening only by reestablishing the trust, the reasonable confidence, that the policy process will reflect the concerns of all interested parties and not only those with narrow economic interests in the outcome.

Industry, then, must be very much a part of the measures for openness described above. Industrial motivations and objectives must be adequately, and fairly, represented in the process. That also implies a willingness by industry to recognize the need for full and informed parti-

cipation by other interested parties, including those who do not share the same objectives on particular issues.

III

Radioactive waste management represents the kind of technologically complex and risk-laden subject that cannot be isolated from the social issues in which it is embedded, and yet which must be dealt with just because of its relation to broader social issues. It is essentially a paradigm for the kinds of central questions with which the society must deal while preserving a democratic political process. And it is particularly relevant because the nature of the technology implies adequate measures over unprecedented spans of time.

The delicate balance between a regressive stalemate and authoritarian decisions about social policy must be achieved. In large measure whether we are able to do so or not will be determined by the ability to build a decision process with competent participation by those concerned and with willingness to accept the decisions that result.