

Public fears of nuclear accidents raise difficult problems for democratic institutions. Who can judge the risk? Who can fashion an energy policy?

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Institutional responses to Three Mile Island

Three Mile Island presented American society and the world with dramatic proof that nuclear reactors can fail catastrophically. That no one died is largely irrelevant to this realization. What counts is that millions of us, including many experts, were able for the first time to see clearly the anatomy of a major nuclear nightmare. In the 10 days after March 28 the part-in-a-million probabilities of the AEC's Reactor Safety Study were largely forgotten, along with the reassurances that have echoed in our ears for the last 10 years.

The institutional response is gathering force: the President has mandated a special commission; Congress has rejected a broad moratorium on nuclear power plant operation but is considering a narrower moratorium linked to emergency preparedness; the Nuclear Regulatory Commission alone has some 130 projects related to the accident; and the nuclear industry is confronted by the inconceivable suddenly becoming conceivable.

In the aftermath of Three Mile Island, a key question is: how may institutions best respond to the experience and to the new reality it has wrought? We start with a number of givens, many of which remain unaltered by the accident itself.

• Speaking broadly, the public perceives danger substantially greater than that suggested by most expert assessments, and the extent of departure is unusually great as compared with other technologies and other risks. This does not mean that there is not a substantial minor-

ity of expert opinion which sides with the public; nor that there is not a large fraction of the public which agrees with the bulk of expert opinion.

• The sources of this hypercritical public response lie partly in the nature of the risks (particularly their catastrophic and involuntary character), partly in the social history of nuclear power (particularly its origin in weapons of destruction), and partly in the inadequacy of past risk management (particularly with regard to radioactive wastes).

• The rancorous debate that divides experts is a special source for public concern and quite likely amplifies public anxiety and fear.

• A number of other social issues adds to the health risks, thereby enlarging public concern. Prominent among these are the dissociations of risks and benefits over generations and regions and the possible threats to democratic institutions.

• An organized opposition, anchored in the environmental movement, is at war with nuclear power as a technology, with battlegrounds shifting according to available targets of opportunity.

• Institutions charged with the management of nuclear safety suffer from a substantial lack of credibility and public trust.

We structure our analysis in terms of three major questions:

1. Is nuclear power compatible with democratic institutions?

2. Should institutions take account of the large difference in public and expert risk assessment? If so, how is this best done?

3. Is a societal consensus on nuclear power possible? If not, what are the institutional implications?

After considering each of these questions, we propose one possible pathway out of the current impasse on nuclear energy.

Is nuclear power compatible with democratic institutions? In August 1979, the American Civil Liberties Union circulated a letter which it described as [perhaps] "the most critical alert ACLU has issued in your lifetime." This extraordinary action reflects the ACLU's perception of the threat that nuclear energy poses to democratic processes and civil liberties. The letter cites a number of issues:

• The suppression of information concerning the exposure of servicemen to the fallout from testing of nuclear weapons;

• The restraint on publication in *The Progressive* of information concerning building a nuclear bomb;

• A lack of due process in the licensing of nuclear power plants;

• The surveillance by a number of law enforcement agencies of political opponents to nuclear energy;

• The threats posed by the evolving security system for nuclear materials; and

• Screening procedures for nuclear employment which threaten to discriminate against "controversial" persons.

To this list can be added other issues that have arisen in the past: the centralization of decision-making involved with a complex technology few understand; the "priesthood"

role that could develop for specialized managers and guardians of safety. Running through these issues is a common fear—that there is a fundamental incompatibility of this technology, so complex in design and so closely linked with nuclear weapons, with democratic institutions.

Several points need to be made. First, it should be recognized that statements such as that of the ACLU characteristically merge weapons indiscriminately with electricity production and other uses of nuclear energy. As a result, problems related primarily to the growth of modern weapons systems and militarism are attributed to this particular form of energy production. Second, it is important to emphasize that the problems appear to be shared with and are often dwarfed by other technologies espoused by society. Indeed, communications technology has undoubtedly done much more to centralize institutions than nuclear power will ever accomplish; electronics and computer technology appear to pose much graver threats of surveillance and privacy invasion; the control of biological and nuclear weapons constitutes a far greater need for extensive security arrangements. Third, we are not aware of a convincing analysis which demonstrates that the various unhappy side-effects are an *intrinsic* product of meeting nuclear power needs. Thus, the U.S. Public Health Service and Forest Service have created a high degree of professionalism and *esprit de corps* without a closed, quasi-military sub-society. It is our

view, in short, that while we do recognize a number of points of tension with democratic institutions, we do not see nuclear energy as *intrinsically* more incompatible with democratic institutions than a number of other technologies or societal functions.

Having said this, it is still significant that the ACLU list presents an impressive *prima facie* case of past wrongdoings and infringements on democratic processes, and that a wide variety of environmental, religious, and civil liberties groups share the ACLU concerns.

It should be possible to minimize the various potential tensions between nuclear power and democratic institutions, but history does little to inspire confidence. It is an open question whether the institutions responsible for managing nuclear power are so historically flawed that they are incapable of exorcising the forces that threaten to perpetuate the past.

Post-Three-Mile-Island responses carry a danger. In our zeal to "fix" nuclear energy, we may make choices in the name of safety that exacerbate rather than reduce the tensions between nuclear energy and democratic institutions. If the fixing leads to greater dominance by experts, closure of the decision process, quasi-military professionalism, and injudicious security precautions, then the ACLU's fears will be justified. The net result, whatever the safety gains, will be to link nuclear power production and nuclear weapons, enlarge the contrast with "soft" energy paths, and deepen

public distrust of nuclear technology.

Should institutions take account of the large departure in public and expert assessment? If so, how is this best done? It is essential to recognize at the outset that institutions already take such differences into account, for nuclear power and for other types of technological risks. A guideline for safety measures in nuclear plants has been the \$1,000-per-rem, or \$1- to \$10-million-per-life expenditure, a sum far in excess of similar expenditures in non-nuclear energy systems. Similarly, the fact that we have a Delaney Amendment and a war on cancer, but not on heart disease, reflects the public dread of cancer. It is also unlikely that adversarial groups would continue to allocate such a disproportionate amount of their resources to the nuclear issue if this departure did not exist. Society, in short, is more demanding with respect to certain types of risks than others, a situation not restricted to nuclear matters. Since institutions depend upon public support, they respond to these social realities.

Gearing safety policy to public assessment of risk, however, has its discomfort. Should public officials knowingly expend enormous public funds to realize only small increments of safety? Should regulations be based upon public fears rather than the best available scientific understanding of risk? Will even enormous expenditures do anything to allay public concerns, given that these concerns are anchored in the

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catastrophic potential of the technology?

The problem is well exemplified by a pending decision on waste acceptance criteria for the low-level and trans-uranic wastes to be delivered to the proposed WIPP (Waste Isolation Pilot Plant). Current analyses suggest that, despite a very substantial multi-million dollar expenditure and increased worker exposure, processing and compacting the waste will gain little, if any, additional safety. Yet it is unclear that unprocessed waste will gain public acceptance in New Mexico, and the failure to do so may well endanger development of the repository and a waste management program already in jeopardy.

On the other hand, the state-of-the-art of risk assessment, as the Lewis Report clearly shows, should restrain the hubris of scientists. How confident can we be of the expert assessment? Involved are not only the projection of fatalities at distant points in time using unvalidated or partially validated computer models, but questions of what risks to estimate, how to insure completeness, how to anticipate changes in technological and social contexts, and how to assess the meaning of the numbers generated.

There are at least two routes open to institutional response. The first entails acceptance of the double standard for nuclear energy. If this energy source is to have a future, it will require safety investment on a scale that many experts will continue to see as inappropriate, even irrational. Investing endlessly to make what is already safe even safer is indeed irrational. But since the double standard finds its wellspring in the catastrophic nature of nuclear power, since such catastrophes (and perhaps even the near catastrophes) do carry extraordinary prices for society, and since the probabilities of

catastrophes are poorly understood, substantial investments in catastrophe prevention may not be irrational. What is needed is a safety program that discriminates carefully among risk reduction goals.

Second, there will have to be a significant investment in process. The departure between public and expert assessment inflicts special burdens on the activities by which institutions air and make decisions on risks. Then there is the legacy of managerial expediency and lack of candor—a bill is now due for institutional credibility. Nuclear programs must go well beyond observing to the letter the mandated legal steps and requirements. Extraordinary efforts are needed to help the public to think out the difficult value issues permeating nuclear power decisions, to come to terms with risk and equity considerations, to assure itself of the honesty and openness of the safety guardians. There is, in short, a double standard for process as well as safety.

Is a societal consensus on nuclear power possible? If not, what are the institutional implications? The past five years have witnessed an impressive parade of various national efforts to win a consensus on nuclear power, and new ventures are planned:

- An extensive use of citizen study groups, involving some 10,000 in all, in an educational campaign in Sweden in 1974;

- Special parliamentary inquiries, such as the Windscale Inquiry in England, and the Fox Inquiry in Australia;

- The *bürgerdialog* program of information dissemination by the West German Ministry of Science and Technology since 1975;

- National referenda in Austria and Switzerland and one planned for Sweden in 1980;

- The Danish Experiment with "dialectical" information on energy issues generally;

- State referenda in the United States, with extensive dissemination of information by contending forces; and

- Mediation efforts, such as those used by the Keystone Group or the Swedish KBS -1 and -2 reviews, designed to separate areas of contention and areas of agreement.

Although outcomes of the various efforts are diverse, they share a common failure to win a consensus as well as an increased politicization of the nuclear issue. Nor is it clear that the profusion of information has eliminated confusion, reduced concerns over risks, or clarified the major issues of debate.

If by consensus we refer to a diminution in activist opposition and to very substantial majority support by the public, even without Three Mile Island, such consensus probably would not have been possible over, say, the next five years. The accident has certainly "softened" public support of nuclear energy, and "hardened" the opposition. It has also, of course, conferred increased legitimacy on nuclear opposition. Nuclear power will continue to be one of society's worrybeads. Errors will receive mass media amplifications; delay and conflict will characterize decision processes; new nuclear battlegrounds will appear. We foresee over the short term no events that will quiet vocal opposition and eradicate the deep public distrust of nuclear power.

We do foresee the possibility that future accidents or acts of terrorism might well exacerbate the present societal conflict. Whatever our response to the Three Mile Island accident, there will, of course, be such events. They could well occur not in the domestic but the international environment, where nations may

have much greater difficulty assembling an expert technical team 100-strong and where the movement from failure to catastrophic results may be more difficult to interdict. It is instructive to remember that some 219 nuclear power plants exist outside the United States. Although such events are beyond U.S. control, they nonetheless reverberate strongly on the domestic scene, just as Three Mile Island has had major repercussions elsewhere.

Beyond impasse. Having stated what we see as the bleak realities facing nuclear energy today, we turn our attention to possible routes out of the current impasse.

First, the continuing energy crisis may well produce a *de facto* resolution. Higher prices, long gasoline lines, and energy shortfalls may heighten the public valuation of benefits while, simultaneously, people confront the prices of other energy technologies: strip mining, the catastrophic potential of liquefied natural

gas, the carbon dioxide problem from coal burning, the enormous financial drain involved in synthetic fuel development. In such a context, a relatively low profile for nuclear energy could well contribute to a public reassessment of its role.

A second pathway involves active institutional intervention. Increasingly, the Vietnam analogy is being used for the nuclear power conflict. Alvin Weinberg, for example, warns that nuclear energy is being "Vietnamized," by which he means polarized. Actually, it has been Vietnamized in this sense for some time. We first employed this analogy several years ago in pointing out that a major reactor accident could well do for the nuclear conflict what the Tet offensive did for the Vietnam debate—cast doubt on the long-standing convictions of the expert proponents, introduce substantial doubt among public supporters and redouble the efforts of the opposition.

But Vietnam did end, and in that

ending we may seek lessons for the current impasse on nuclear energy. The decision by the Administration to terminate the American role in the war, to withdraw in stages our military forces and to provide extensive postwar support (unfulfilled) succeeded in producing a workable societal consensus, if not unanimity. It succeeded for three reasons: it removed the open-ended nature of the conflict; it limited the scale of operation; and it made substantial concessions aimed at de-escalating social conflict to realize short-term goals.

Drawing upon these guidelines, we offer a two-part strategy for an historical compromise on nuclear energy—one aimed at policy, the other at process. For policy, we see four elements:

- *Recognizing nuclear power as a transitional energy source.* This will limit the role of nuclear energy to the period required to develop and deploy long-term renewable energy sources. It rules out both fuel recycle and deployment of the breeder reactor.

- *Limiting the total size of the commitment.* No nuclear power plants beyond those currently on order or under construction will be built. The open-ended total scale of the nuclear enterprise is a key ingredient in the nuclear debate and is not resolved by limiting the number of sites (as opposed to plants). Taken together with the first point, this obviates the plutonium economy anxiety.

- *Pruning the existing commitment.* There is wide variability in the performance of nuclear plants, as indicated by capacity factors, safety inspections, and worker exposure. The siting of other plants (for example, Zion, Indian Point) near densely populated areas amplifies the catastrophic risk potential. A searching

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safety re-examination should be conducted of all reactors. Those not qualifying and not amenable to rectification should be closed permanently; others should be closed pending completion of necessary changes.

• *Solving the radioactive waste problem.* The current concern with reactor accidents should not obscure the depth of public concern over waste transport and disposal. The problems here are primarily institutional, but they are amenable to resolution if effective congressional and executive branch leadership is forthcoming.

This policy compromise will satisfy neither nuclear proponents nor opponents. In the case of Vietnam, many "hard core" supporters were left more frustrated and embittered as a result of the course taken to end the war. As with Vietnam, however, a nuclear compromise offers a chance for a workable consensus to de-escalate the current conflict sufficiently to permit the completion of a 150-gigawatt (electric) nuclear program.

The second component of the

strategy recognizes that current institutions and processes are deeply flawed, constituting in themselves a significant part of the conflict. To a great extent the nuclear controversy has raged outside established institutions. Formulated in a period when a closed expert community presided over nuclear fortunes, these institutions have, despite continuing reorganization and shuffling, been unable to internalize the elements of the debate. It is significant, for example, that the Keystone mediation effort could so quickly finger the Department of Energy's lack of credibility as a major obstacle to a successful radioactive waste program. The demise of the Joint Committee on Atomic Energy has resulted in a fragmented congressional presence. The Nuclear Regulatory Commission is still struggling to act as an independent commission. The Interagency Review Group on Nuclear Waste speaks to the need to create ad hoc institutional arrangements if requisite credibility is to be attained.

This is not the place to go into the intricacies of institutional reform.

Suffice it to note that the winning of institutional credibility must begin with the recognition that:

• Nuclear opposition is legitimate and its leaders must be accorded full representation at all levels of institutions and at all stages of processes. This pluralism, often used in multinational societies, has already begun.

• The value conflicts that run through nuclear power issues cannot be resolved by managerial or regulatory institutions or by an outpouring of technical reports and factual data. This fact suggests the need for a much more substantial presidential and congressional role and for a willingness to abandon otherwise desirable programs if value consensus cannot be achieved.

• A double standard is required for process as well as policy. What is good enough for other technological decisions is not good enough for nuclear. It is time to stop fighting (or ignoring) this truth and to accept the unique burden. Specifically this means that the substance of governmental research and efforts should square with the oft-repeated statements that the primary obstacles to nuclear power reside in institutional and public acceptance problems. This will involve such things as an overhaul of licensing procedures for nuclear facilities, institutional reform, the reduction of fiscal inequities in facility siting, new ventures in public education and participation, and improved candor and openness in decisions.

We are unsure whether these changes will suffice to produce the historic compromise required for nuclear energy. But we are convinced that in the absence of major redirections, the acrimonious debate over nuclear energy will continue to sap our efforts to fashion an overall energy policy. □