

NUCLEAR WASTE MANAGEMENT: GOVERNMENT AS A PROBLEM-SOLVER

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The comments received on the Interagency Review Group's (IRG) Report on nuclear waste management provide the point of departure for this essay. Although coming from diverse and often opposing sources, many of the responses developed a common theme. For example, officials from nine states observed that it "is the very failure of policy makers in the past to acknowledge and candidly confront the uncertainties and hazards associated with nuclear waste management that has prevented us from developing a solution that will be truly permanent in nature." One environmental organization maintained that "the Department of Energy (DOE), as currently organized and staffed, probably will be unable to develop and implement a satisfactory waste disposal program." Finally, a representative of seventeen utilities which own nuclear reactors asserted that "the nation's radioactive waste management program has long suffered from the Federal government's failure to make and stick to important decisions concerning nuclear waste. This indecisiveness has caused many observers to question the institutional ability of the Federal government to implement a radioactive waste policy."

Those indictments of government as a problem solver undoubtedly contain some elements of rhetoric but they are not empty of substance. They ought not to be dismissed as rice paper facades erected merely to camouflage ideological positions and to vent frustrations; rather the claims they advance deserve some consideration and appraisal. What follows is an attempt to do just that.

HISTORICAL OVERVIEW

The Federal government did not automatically accept the role of problem-solver in the management of high-level nuclear wastes. Prior to 1970, the government's policy, as articulated by the Atomic Energy Commission (AEC), was largely ad hoc. Depending on the circumstances, either the private sector alone or in cooperation with the states could take on the responsibility of problem-solving in this area. The licensing of the Nuclear Fuel Services (NFS) reprocessing plant in West Valley, N.Y., reflected that policy. Under its license, NFS could store wastes as liquids in below surface tanks. Once a tank was filled, NFS would turn it over to the state of New York Atomic Research and Development Authority for perpetual care. To accomplish

this, the state established a fund to replace the tanks twice every century and to maintain the site.

Advances in technology and changing attitudes at the AEC combined to alter this ad hoc approach. Pressure to re-consider the government's waste management policy came from Commissioner James Ramey and Milton Shaw, Director of the Division of Reactor Development and Technology. Their interest prompted a study by the Oak Ridge National Laboratory of the technical issues. Based on that study, the Commission staff noted that:

Ultimate disposal of high-level waste will require control and possible surveillance of the waste repository in perpetuity. Such requirements can best be met by limiting the ownership of the land upon which the repository is situated to the Federal Government.

On August 8, 1970, the Commission carried that view to its logical conclusion and approved what became Appendix F of 10 CFR 50. In doing so, the government committed itself to:

- 1) Certify an acceptable form of solidified waste;
- 2) Develop a Federal Repository to dispose of the wastes;
- 3) Control the land on which the repository was located; and
- 4) Assume physical responsibility for the waste.

Thus, the Federal government asserted virtually sole responsibility--- a monopoly if you will---for problem-solving in waste management.

Significantly, the government's expansion of responsibility and authority in this area went almost unchallenged. Allied Chemical Corporation did express concern that the government was confiscating private property by taking title to the wastes. Several industrial firms and trade associations did protest the requirement that a repository could only be sited on federally-owned land. But those objections, never intensely held in any event, were turned aside. A clear consensus, including the nuclear industry and Congress as represented by the Joint Committee on Atomic Energy, emerged which accepted as legitimate the Federal government's role as the primary actor in waste management problem-solving.

In retrospect, the adoption of Appendix F must be viewed as a sound public policy decision. The idea of placing in public hands the obligation of safeguarding such extremely poisonous material seems eminently sensible. Indeed, while we can only speculate about alternative futures, the experience at West Valley presents

some evidence about the limitations of private and/or state responsibility for problem-solving.

We need not belabor the point, but it has become increasingly clear that what began with the best of intentions has not yet reached fruition. As a result, a multi-billion dollar industry has literally become a hostage to the government's seeming inability to solve problems. Moreover, as one initiative regularly failed and was replaced another, public confidence was further undermined, the government's credibility was reduced, and additional obstacles to problem-solving in the future were erected. Why has that occurred?

GOVERNMENT AS A PROBLEM-SOLVER

We usually associate government's inability to solve problems with domestic social programs, such as wars on poverty, welfare reform, efforts to improve the quality of education, and to insure the availability of adequate health care, decent housing, and a nutritious diet. In those areas, the problems attacked are rarely mitigated; more frequently failure merely increases urgency and provides a justification for expanded budgets. We can understand and accept failure to solve problems in these domains, however, by concluding that they are messy, intractable, or abounding with conflicting interests.

It, therefore, does come as a surprise to discover that the government also has difficulties in solving the problem of nuclear wastes, a domain which is so highly technical and which seems to stand in such stark contrast to domestic social programs. Not unreasonably, we expect greater successes in nuclear waste management. For one thing, our knowledge, while admittedly incomplete, certainly provides a firmer foundation for problem-solving than does our knowledge base for revitalizing urban centers. For another, few conflicting interests ought to exist; there is a stronger consensus on objectives in waste management than in reforming the welfare system.

Furthermore, if we believe prevailing administrative theories, including those articulated by Herbert Simon, this year's winner of the Nobel Prize in economics, the problem-solvers at the AEC appear to have acted in an eminently rational fashion. Faced with the highly complex task of developing means for producing energy through nuclear fission, policy makers proceeded to fragment the problem. They first choose to address those aspects which were the most immediate: encouragement of uranium exploration, fuel rod construction, and most importantly reactor design. This strategy accounts for the now-well

recognized low priority historically given nuclear waste management. When the problem could be finessed, it was; when it could not be, waste management was, as we pointed out, dealt with in *ad hoc* ways without consideration of anything but short-term consequences. The storage of liquid wastes from the military program in carbon steel tanks at Hanford was, of course, the classic instance of where waste management became, in effect, a residual category. Nevertheless, given the cognitive limitations of individuals, given a scarcity of resources and funds, given a belief, articulated by the National Academy of Sciences in 1954 and sanctified by the Joint Committee in 1959, that the problem was solvable, the AEC's efforts may have represented the soundest strategy available.

With the benefits of hindsight, we recognize today that, by placing a low priority on waste management, consequences arose which were neither anticipated nor desired. And while we need not dwell on the problems of the past, we cannot pretend that the past has not colored the present. We cannot simply say, let us start anew; the past, as it says on the archive building, is prologue. In my view, past program inadequacies have influenced present perceptions and present realities in such a profound way that efforts at problem-solving may only have a low probability of success.

A mechanical analogy may be useful in illuminating my logic. Imagine an ordinary spring. As ever-increasing amounts of weight are attached, the spring strains. But as long as sufficient slack exists within the spring, it can maintain its integrity. Once the weight exceeds a certain threshold, however, the spring abruptly fails, its resiliency lost permanently. Only radical efforts can restore the system's integrity; even then attempts at restoration often are unsuccessful.

In much the same way, policy-makers generate pent up tensions, dilemmas, and contradictions as they respond to highly complex and uncertain situations. Ignoring substantial interdependencies and avoiding addressing all but the most urgent of problems can be viable tactics for only a limited time. Organizational slack has only a limited capacity to absorb inconsistencies and marginal errors. Then, once that reserve has been exhausted, the consequences of those neglected relationships manifest themselves, sometimes gradually, but almost always inexorably. In the end, the policies break down, their failure apparent to all.

If policy-makers are fortunate, they can recognize their latent difficulties before they fully emerge. The sooner the dilemmas are detected, the easier it will be to take action to forestall their

development. If the policy domain is particularly complex, as I would contend is the case in nuclear waste management, the time period available for constructive rectification may be extremely short. I believe that government problem-solvers began to take serious action only when the policy was at the brink of collapse. That may have been too late.

As a result, government problem-solvers must confront this dilemma. On the one hand, for a variety of reasons, waste management being at least perceived as a major one, the nuclear industry has stagnated. One can construct a plausible case that some additional nuclear capacity may be necessary to meet our energy needs in the future. Thus, moving rapidly ahead to revitalize that industry could be in the public's interest. On the other hand, widespread and sincere concerns have been raised that efforts to relieve the industry's plight have been to hastily conceived and have sacrificed the public's safety. Thus, only a cautious and deliberative effort can be in this and future generations' interest.

I use the term dilemma in its precise lexicographical meaning: a situation requiring a choice between two equally unsatisfactory alternatives. One may sympathize with the government for the position it finds itself in. Nevertheless, choices must be made. Not unreasonably, the government in its problem-solving efforts has striven to adopt a middle position. Yet, almost invariably, that stance seems to have, at the very least, not facilitated problem-solving and may have actually exacerbated not ameliorated the situation. In short, past neglect has led to present dilemmas which show no sign of being resolved.

THE DILEMMA MANIFESTED

What evidence exists to support this view of waste management problem-solving? Admittedly it is not conclusive; but I believe it is highly suggestive. Consider two aspects of the government's efforts: managing relationships among agencies with a stake in the issue and satisfying the obligations of the National Environmental Policy Act (NEPA).

Several agencies have overlapping and joint jurisdictions over waste management. The most obvious example is the presence of a developer, DOE, and regulator, the Nuclear Regulatory Commission (NRC). There are several ways in which the two can relate. One might be for the developer to proceed with its efforts using the implicit assumption that ultimately any facility submitted for licensing would have to be accepted by the regulator. A second approach would conceive of regulation and development as interactive and iterative activities. The developer provides information to the regulator about what is technically feasible and disregards options which seem unlikely to be viewed

positively by the regulator. Thus, the developer and the regulator work together through the site selection process and up to the time licensing commences. A third approach would require an arms length relationship with the developer conforming to standards and criteria established independently by the regulator. Under this approach, the developer would only be able to proceed generically until specific standards and criteria became available.

The first approach would, if successful, allow repository construction to proceed most rapidly. The third would be the most cautious and deliberative.

The government has selected the second approach. It allows for continued field investigations and at least tentative siting decisions while the regulator formulate its views. Yet, such an approach must be carefully coordinated or else it may run into difficulty. And in fact that seems to have happened.

NRC's regulatory efforts were initially designed to track ERDA's and now DOE's development plans. As those plans shifted, NRC found itself in the position of having to recast its own priorities. Moreover, the developer's shifts have sometimes eluded the regulator. Although DOE presently considers bedded salt, domed salt, and basalt as equally likely candidates for a repository emplacement media, NRC will probably not be able to license, under current plans, a domed salt or basalt repository until well into the 1980's. Thus, taking a median position has not facilitated problem-solving but may have retarded it.

Among the regulators themselves a similar situation has arisen. NRC had always assumed that it could promulgate its specific regulations prior to the Environmental Protection Agency's (EPA) publication of its general standards of acceptability. Once EPA's final standards were issued, NRC presumed that it could easily bring its own into conformity. Recent events suggest that may not be as simple as anticipated. Again, the government's need to move ahead rapidly but cautiously contributed to this state of events. Again problem-solving suffered.

The second aspect of governmental problem-solving which has been retarded because of the fundamental dilemma is satisfying the obligations of NEPA. Historically, the nuclear agencies' commitment to NEPA has been less than overwhelming. Perhaps this has been because of a desire to avoid exposing those organizations to unsettling external influences. In any event, the law was often seen merely as one more barrier standing in the path of policy-making.

Presently, the government has adopted a stance which seeks to reconcile the need for rapid visible progress with the need for caution and deliberation. The government has managed to interpret NEPA in a fashion which draws criticism from those who believe it is "an unworkable concept that may readily interrupt the effective operation of the entire country," and from those who claim that if the "NEPA process is to remain truly unprejudiced, an objective and equal assessment of all policy alternatives must be made." In staking out a median position, however, the government has done more than draw fire from both sides. It has arguably impeded problem-solving.

The evolution of the Waste Isolation Pilot Plant (WIPP) environmental impact statement illustrates this point. It is no secret that important forces within the Department of Energy envision WIPP as something more than a repository for the TRU waste at Idaho. Rather it is conceived as an "event" which would demonstrate either progress toward or the solution itself of the waste management problem. It is thought that by demonstrating progress pressure for a premature commitment to a national repository could be avoided. However, for this strategy to succeed the WIPP project, including the WIPP EIS, had to be pushed forward aggressively.

At the same time the impact statement had to be credible. This tension affected the statement preparation. Just prior to its scheduled release, it was discovered that the analysis of alternatives, a crucial part of the statement was, in DOE's own view, inadequately carried out. The statement was withheld. It remains to be seen whether the new analysis will satisfy critics both inside and outside the government. But whether it does so or not may be irrelevant. The Department's admission simply confirms the beliefs of all those who see the government as inept. The dilemma is re-inforced; problem-solving becomes more difficult.

WHAT MIGHT BE DONE?

If taking a more or less median position has failed to resolve the dilemma engendered by past neglect and has, in fact, served to impede progress toward problem-solving, what might be done? Moving toward either horn of the dilemma, even if it were desirable--which I personally do not find it--would virtually be politically impossible. The advocates of both positions have too much at stake to accept docilely a shift toward the opposition. And our pluralist system of checks and balances and multiple veto points provides each side with sufficient resources and opportunities to block the other perhaps indefinitely. Rather in my view a fundamental re-orientation of waste management policy making is required.

It would be foolish for me to specify a course of action in any great detail. But I can think of several tactics which, if adopted, might make the dilemma less excruciating, thereby facilitating problem-solving.

1. The government should move vigorously to implement the President's October, 1977 spent fuel policy. This includes the construction of the least one away-from-reactor storage facility. In suggesting this, I am mindful of the incremental risks what would arise from the additional handling and transportation of spent fuel. But I see a strong advantage in having a facility which would dampen pressures to act and which would buy time to develop a repository in a highly credible scientific, technical, and institutional manner.

2. Having bought time, it must be used not abused. The IRG has claimed that the direct costs---both economic and health---of interim storage of spent fuel to the year 2000 were marginal. Significantly, that claim was never challenged. Thus, there appears to be some slack, some flexibility, some room for maneuver. While the possibility does exist that the flexibility will simply be used as an excuse for inaction, the probability of such an event appears to be low. Times have changed since the 1950's the 1960's and even the early 1970's.

Given this room for maneuver, a highly diverse and redundant research and development program along the lines suggested by option two of the IRG report ought to be implemented. For ultimately, the acceptability of any site or facility is a social choice. Choice means precisely that---not a fiat accompli---no matter how technologically sound. (In this regard, the WIPP project serves as a good model of what not to do.)

3. We must recognize that waste management is an open-ended although not a never ending endeavor. We need not await complete certainty, but we should not impose closure until there is manifest social agreement that the risks associated with the residual uncertainties are acceptable. A corollary to this view is that government should take care in announcing schedules for completing various portions of a waste management system. In practical terms, most informed participants recognize schedules for what they are: fictions. In psychological terms, however, schedules often take on a life of their own exacerbating the fundamental dilemma and rendering problem-solving more difficult.

4. When the cost of error can be high, institutional redundancies can provide protection. Thus, calls for streamlining and for avoiding duplication are often misdirected. The putative time and money saved may only be illusory. It follows that proposals to eliminate overlapping

regulatory jurisdictions should be given close scrutiny and viewed skeptically. One might even argue that institutional redundancies should be created whereby competing teams become responsible for advocating and implementing different portions of the diverse R&D program.

5. Additional consideration should be given to reorganizing responsibility for waste management R&D. This is not because the current developers are incompetent or venial but because they are associated with the legacy of the past which resulted in today's dilemma. An institution not so burdened might find it easier to engage in problem-solving.

6. I have left for last the most troubling issue: whether there should be a linkage between future licensing of reactors and resolution of the waste problem. Philosophically, I have always believed that such a connection made considerable sense. I voted for a link in California and agreed with that state's energy commission's actions in this area. I would not favor changing those decisions if only because they have helped create and sustain a long-absent sense of urgency about waste management.

Yet, the logic of my analysis suggests that a formal and legal linkage at the Federal level would be counterproductive. To establish such a connection would significantly increase the stakes, contribute to further polarization, and retard problem-solving by making the dilemma that much more excruciating.

I can offer no guarantee that these ideas provide a certain path to successful problem-solving. Nevertheless, I do believe that some sort of reorientation is required, if not as a cure then as a palliative for pathologies which impede problem-solving. There is too great of a danger that the dilemma will intensify resulting only in inaction. That I think is something which all parties have a vested interest in avoiding.