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An Overview of Minnesota's Role in the Federal Nuclear Waste Disposal Process

GREGG LARSON

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Introduction

Ever since the dawn of the nuclear age, we have been assured that there was a solution to the problem of nuclear waste. In the case of high-level radioactive wastes, however, which are generated as byproducts of the defense nuclear weapons program and the commercial generation of electricity, resolution of the problem has been continually postponed. There was disagreement in the scientific community over the disposal method, dissension in the nuclear industry among those who viewed the reactor spent fuel as a resource versus those who viewed it as a waste, and disarray in the federal government where politics, inept management, and neglect played havoc with waste management programs. In the words of one former Atomic Energy Commission official, "It was not glamorous; there were no careers; it was messy; nobody got brownie points for caring about nuclear waste."

In the late '70s, pressure began to mount for a coordinated, national effort to contend with growing inventories of defense and commercial wastes. Reprocessing of spent fuel was not economically feasible, the wastes were an obstacle to nuclear industry expansion, storage pools at reactor sites were filling, leaks had occurred at defense installations, and the public sensitivity was aroused by a growing anti-nuclear movement and reactor safety problems.

Finally, in the last hours of the 1982 lame duck session, Congress passed the Nuclear Waste Policy Act. Four aspects of the Act are especially noteworthy: first, it ended the debate over method by mandating deep geologic disposal; second, it established schedules for the siting of two repositories; third, it assigned the federal government and the Department of Energy (DOE) with responsibility for disposal; and fourth, it recognized that states and Indian tribes had to be involved.

Storage vs. Disposal

It is important to understand the distinction between storage and disposal, because the words are frequently interchanged. A repository is not for temporary storage. Very simply, disposal, like a diamond, is forever. In this case, disposal is synonymous with permanent and irretrievable. After a short operating period of about 50 years, a repository will be forever sealed. It will not be possible to directly monitor the wastes, remedy problems, or remove the wastes if something unanticipated occurs during the 10,000 year isolation period. (If you have a difficult time visualizing 10,000 years into the future, think of the past. Going back 10,000 years takes us to the time of the early cave paintings in Europe and

to man's first attempts at agriculture.)

Because work was already underway at some potential disposal locations in the West prior to passage of the Act, those sites were grandfathered into the first repository program which is now focusing on basalt formations at Hanford, Washington, volcanic tuff at the Nevada Test Site, and bedded salts in the Texas Panhandle. The second repository program, which is eight years behind the first, includes Minnesota and other eastern states that have deposits of crystalline rock. In January of this year, DOE selected 12 sites in seven states for further study for a second repository. Three of the 12 are in Minnesota, as well as five other back-up sites.

In recent months it has become more apparent to us that there is no need for a secondary repository within the time frame of current planning efforts. Back in 1980, when Congress began to consider legislation, DOE estimated that 167,000 metric tons would need to be disposed of by the year 2020. By 1985, that figure had dropped to 106,000 metric tons. If one assumes no new reactor orders, which has been the case for the last seven years, that figure drops to 75,000 tons.

Last week the Governor of Minnesota testified before a U.S. House Subcommittee at an oversight hearing on the second repository program. He noted that nearly 15,000 Minnesotans voiced their alarm and opposition to this unnecessary siting program at DOE briefings and hearings. He also observed that scientists should be concerned because this program lacks the technical credibility and commitment to excellence that should be its hallmark.

Why Scientists Should Be Concerned

I would now like to consider why scientists should be concerned about this program.

First, the schedule drives the federal nuclear waste program. Nobody had a crystal ball back in 1982 when Congress wrote milestone dates into the Act, although clairvoyants are going to be necessary to ensure 10,000 years of isolation of wastes in the repository. The complexity of the task was never anticipated. We had a similar situation in 1985 in Minnesota when the legislature required that a herd of wild elk be relocated by September 1. Despite good intentions and advance planning, the legislature did not have the cooperation of the elk, and most of the herd is still defiantly roaming northwestern Minnesota.

In the case of the nuclear waste program, DOE is willing to compromise technical quality in an effort to meet the Act's unrealistic deadlines. Few observers believe that the goal of a

first repository operation date of 1998 is attainable in a program that is already nearly a year and a half behind schedule, yet DOE still clings to an overly optimistic schedule at the expense of program credibility and the time needed for scientific investigation.

Second, in the rush to conform to deadlines, and in the light of political expediency and preconceived notions of how the job should be done, a commitment to technical excellence is missing. Last week, the State of Minnesota released a report that was highly critical of the conduct of the national survey of crystalline rock that was used to justify selection of the 17 second repository states, all in the eastern half of the country. This survey is the very foundation of the second repository siting process. Yet a review of materials obtained following a Freedom-of-Information-Act request revealed that, in the words of the contractors, the survey was prepared "almost as a formality. . . it has never been the intent for this to be a really thorough study. . . something less than 1.0 man-year was expended on this task." These observations were borne out by the harsh criticism directed at the survey by the scientific community when it was released in draft form in 1979. In fact, a final survey was never issued. Yet DOE directed that work begin in the areas identified in that flawed draft.

Three years later, after the Act was passed, DOE spent less than four months resuscitating the same survey. It was released again, without public review, to confer legitimacy on the 1983 selection of 17 crystalline states. Not only was the effort less than adequate, but the survey was technically flawed and illogically executed, creating a bias that resulted in picking crystalline rock bodies only in the East.

Last year, the states had to go to court to win the right to funding for their own technical confirmation studies after DOE denied the State of Nevada money for drilling studies. DOE was willing to allow review of *its* data, but no collection of independent data.

Third, even though the jury is still out on the suitability of crystalline rock for waste isolation, as well as on a number of geophysical, geochemical, and hydrologic questions, the federal government is still proceeding with site selection. Canada is far ahead of the U.S. in crystalline rock research. However, the Canadians have stated that they won't be ready to make a decision on the suitability of crystalline rock until after the turn of the century, and only then will they begin to consider sites. Here in the U.S., we've bought into that very same research (the U.S. recently agreed to spend about 17 million dollars on cooperative research in Canada) yet we've already made the decision to pursue disposal in crystalline rock and are in the process of selecting sites. We've put the cart before the horse.

Fourth, the siting program is tarnished with conflicts-of-interest. DOE relies heavily on contractors. In some instances, the prime contractors charged with oversight and quality assurance responsibility are also conducting the actual work. In others, the experts that the Nuclear Regulatory Commission (NRC) hopes to use for its independent licensing review are the same experts that DOE is dependent on for siting work. Money talks, and in the DOE siting program, it's yelling at experts who also are being sought by the NRC and the states. The difficulty in finding untainted experts has led the NRC to propose a stable of "kept" reviewers that could be separated from DOE activities until licensing begins in the mid-90's. Also, in the second repository program, contractor responsibility has been assigned by geographic region. This affects objectivity because it is in the contractor's economic self-interest to ensure that sites in their region remain under

consideration. We're all too familiar with inadvisable projects that develop a momentum of their own when money, jobs, and reputations are at stake.

Fifth, research money for waste reduction and other waste management alternatives is being eliminated. In addition, DOE wants to drop demonstration programs for extended fuel burn-up, a technique that would substantially reduce the amount of waste by burning reactor fuel more efficiently. Penny-wise and pound foolish, DOE would cut a few million dollars that would promote a very promising technology that could save billions by further diminishing the need for a second repository.

Sixth, the federal government does not, and I repeat, does not, have as its goal selection of the safest possible sites. DOE readily admits that all they're looking for are sites that meet the minimum licensing criteria. How is DOE ever going to be able to convince a prospective host state to shoulder this national burden if they're unable to argue that it was chosen because it was the safest possible?

Given all the disposal uncertainties and the 10,000 year length of the isolation period, we should expect nothing less of DOE than a commitment to find the sites with the greatest margin of safety. DOE likes to respond to this criticism by arguing that there will never be full agreement on where the safest possible sites are. They are probably right, but we are still certain that the program would greatly benefit from this objective. At a recent hearing before a very unreceptive Senate Subcommittee, Minnesota argued for just such an approach. In a follow-up written interrogatory, the Chairman of the Subcommittee asked whether a search for the safest possible site wasn't analogous to setting out across the country looking for the best restaurant — how would you ever know or agree that you had found it? We didn't think the analogy was very appropriate, but we carried it a step further by responding that, even if the outcome were uncertain, the endeavor would still be worthwhile if you knew that you had to eat three meals a day at the chosen restaurant for the next 10,000 years.

Finally, permanent disposal may not be the best solution. Ever since the Atomic Energy Commission first looked at the nuclear waste problem in 1955, the mindset has been disposal. The National Academy of Sciences Committee that was created that year issued their first report recommending geological disposal in 1957. This solution shouldn't have come as a surprise because it was a product of the "Committee on Geological Aspects of Waste Disposal."

There was a short flirtation with storage in later years, but it was abandoned because the federal government and nuclear power proponents were vulnerable to the charge that there was no "final" solution. In the 1980 Environmental Impact Statement on nuclear waste management, storage was labeled the no-action alternative and dismissed in one paragraph. That's about the same amount of space that the *National Lampoon Magazine* gave to their proposal for waste disposal in tupperware containers because "they close up tight and keep something just about forever." When the Act was finally passed in 1982, Congress chose deep geological disposal. The *Wall Street Journal* called it the "Geologist's Full Employment Act" and noted that, "it was the largest public works program ever foisted onto the American public by Congress."

Why the obsession with burial? The two reasons most often given are first, it reduces the likelihood of reprocessing and possible proliferation of weapons-grade plutonium and, second, it eliminates the need for institutions that must have the longevity to guarantee a secure and safe storage site. But disposal provides no assurance that reprocessing or prolifera-

tion won't occur anyway, and it's difficult to understand the concern over institutional control when a similar concern exists for nuclear weapons and toxic chemicals.

I think there also are less visible agendas. Some in industry feel that an "out of sight, out of mind" waste policy is the only way to revive nuclear power. Some opponents of nuclear power view disposal as a costly, slow process that could further delay that revival.

Advantages of Long-Term Storage

But long-term storage warrants another look because it has some very distinct advantages. Geology is less important, so there are fewer siting constraints. Direct monitoring of the waste would be possible, and any unforeseen problems could be remedied. Future technological development could result in safer disposal or a new use for the waste. Even if there were no such technological developments, the fuel would have cooled in the interim, both thermally and radioactively. Last, but certainly not least, long-term storage would be less costly than disposal, and it might even be politically easier to site. I can't help but believe that future generations would prefer to have passed on to them the options associated with responsible storage, rather than the uncertainties associated with permanent and irretrievable disposal. In fact, the only thing certain about deep geologic disposal is that the people making the decisions won't be around to answer for them.

Conclusion

In conclusion, I want to note that this is a political, as well as technical process. Anyone who tells you otherwise is either

incredibly naive or a liar. Concentration on politics alone, however, is inadvisable. When told the results of an overwhelmingly negative Wisconsin referendum in 1984, in which 89 percent of the voters opposed a repository, DOE responded that it was very encouraged by the 11 percent that favored a site.

While you're all probably aware of the position the Governor, the Legislature, and our Congressional delegation have taken in opposing a disposal site in Minnesota, you're probably less aware of the technical side to our effort, which is just as important. Since 1983, the State has actively monitored the federal program. We have retained outside technical and state agency contractors, we testify before the NRC, we review all documents released by the DOE and other federal agencies working on this program, and we have submitted hundreds of pages of analysis and comments.

We aren't dissuaded by the "not in my backyard" label — it's currently a very trendy way to dismiss public concern and legitimate questions. Our philosophy has been to take as critical an approach as possible, maintaining that the burden of proof rests with the federal government. We intend that the burden be a heavy one, and we will ask every question and explore every avenue along the way.

Author's note: On May 28, 1986, the U.S. Department of Energy "postponed indefinitely" the second repository program. The DOE cites some of the same arguments raised in this article with respect to declining waste generation projections to justify postponement. Nonetheless, most of the critical points raised here still apply to the DOE nuclear waste program.