Thirty Ways to Temporize on Waste

One year after Congress ordered a moratorium in the civil nuclear waste program, it is inclined to order another

CONGRESS must decide in the coming weeks whether it should try to revive the civil nuclear waste program or yield to politics and apply an anesthetic for a couple of years. The program is in such poor shape that Congress may have to do something. Thirty proposals have been introduced; most would derail or postpone the present plan for disposing of nuclear waste.

About 50 members of Congress would like to call a moratorium on field research at potential waste repository sites. They see this as the best way out of the present impasse—if a moratorium is a way out. But this decision would come as a blow to the nuclear utilities, already hard-pressed on several fronts. The last thing they want is a general review of the waste program.

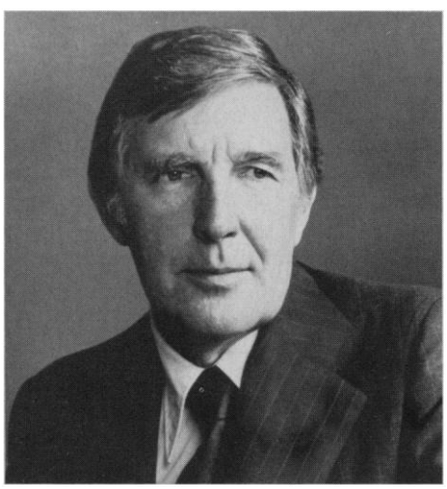
In the 1970s, critics said that nuclear electric power was so ill conceived that its planners had failed to provide for waste disposal. To rebut comments like this, utilities eagerly signed up in 1982—when it was clear there would be no U.S. fuel reprocessing—for a plan to develop two permanent fuel burial sites and a temporary holding center. The latter is known as a "monitored retrievable storage" (MRS) facility.

Utilities have paid $2.8 billion to a fund managed by the Department of Energy (DOE) in the expectation that DOE would build the facilities as promised and take care of the problem. Critics of the industry, meanwhile, have stalked the program in its many guises and locales, arguing that environmental "flaws" in each potential site make each one unsuitable. The public seems to mistrust DOE's critics less than it mistrusts DOE.

The result was evident in hearings before the Senate subcommittee on energy research and development on 16 and 17 July. Speaker after speaker said DOE's program is in a shambles. Several quoted Representative Morris Udall (D–AZ), the "father" of the existing waste program. "After billions of the ratepayers money have been collected and hundreds of millions of dollars spent," Udall said on 1 July, "the program is in ruins and our goal of siting a repository seems further away than ever."

Udall, chairman of the House Interior Committee, and Senator Bennett Johnston (D–LA), chairman of the Senate Energy and Natural Resources Committee, helped bring together the nukes and antinukes, the easterners and westerners, the utilities and consumers in support of a unified federal plan 5 years ago. The plan, the Nuclear Waste Policy Act of 1982, was supposed to remove the choice of nuclear waste sites from politics and turn it over to DOE's technicians. It also assured geographical balance, proposing one site in the West, where little waste is generated but land is available, and one in the East, where most of the waste is generated but land is scarce.

After the initial site screening, DOE announced in 1986 that it had three candidates for the first repository. Exploratory work



Morris Udall. *"Almost all of us" live near "a de facto nuclear waste dump."*

was to begin shortly afterward to determine which is suited to hold radioactive waste for 10,000 years. But DOE bungled the announcement, many observers say, and Congress intervened last summer to block funds for site preparation. That hold on funding expires in September, according to DOE officials, unless Congress renews it.

Many argue, as Udall did on the House floor in July, that the blame for the delay lies with the Administration—that "DOE blew it." In particular, Secretary of Energy John Herrington blew it, Udall and others say, when he promoted one of the less attractive five semifinalist sites (Hanford, Washington) to the list of three finalists in May 1986. (The other finalists are Yucca Mountain, Nevada, and Deaf Smith County, Texas.) Hanford would be convenient because DOE has owned land there since 1943 for its weapons production plants. Richland, Washington, the base of DOE's operations, is the definitive company town.

The site does have problems, though. For one, it is bounded on two sides by the Columbia River, a source of drinking water. For another, it is already contaminated with waste from DOE's plutonium factories (*Science*, 26 June, p. 1616). If a radioactive leak appeared, it would be hard to tell whether it had come from the new repository or the old military burial grounds.

Herrington compounded the May 1986 decision on western sites, critics say, by announcing an indefinite delay on eastern site research. Herrington claimed that he was trying to save money. The demand for uranium fuel has fallen off, he explained, so the search for a second repository can be put off for a decade. But others said the Administration wanted to help Republican candidates in the East who were feeling threatened by the nuclear waste issue. DOE denies the charge, and early this year it offered to resume work in the East. Congress did not take up the offer.

The now stagnant program calls for a billion-dollar field test at each of the three western candidate sites. It also calls for building a waste packaging and shipping center—the MRS—in Oak Ridge, Tennessee. This plant would hold as much as 15,000 metric tons of waste temporarily (20% of the capacity of a permanent repository). The congressional delegation from Tennessee, once eager to host federal nuclear projects, is now, like everyone else, a fierce opponent. Unlike others, however, Tennessee's leaders concede that the project does not threaten public health. They fault it instead as a source of bad publicity. Although the MRS may be safe, Tennessee does not want to take on the task of public education on that point.

The state also argues that the federal government would be wasting tax dollars on the MRS and could get the job done more

cheaply by requiring utilities to package waste on-site and ship it directly to the final respository. DOE disagrees. This may be the first time Tennessee has objected to having federal dollars frittered away inside its borders.

Tennessee sued to stop DOE from sending an MRS proposal to Congress. That caused a delay, but the Supreme Court turned down the appeal in March. In June, the MRS proposal was introduced in Congress.

Nevadans, Tennesseeans, Texans, and Washingtonians are vocal in their complaints about the waste program. Little progress has been made in a year, and Congress is about to try to fix things.

According to the nuclear electric industry, the fix should come in the form of good leadership. There are no serious technical flaws in the plan for burying waste, said Sol Burstein, vice chairman of the Wisconsin Electric Power Company and spokesman for the Edison Electric Institute. The government has become paralyzed by a search for a perfect solution. Perfection is not required, nor is it attainable, Burstein said. "We continue to urge Congress to keep the bargain" it made 5 years ago. One industry official says the utilities have "rattled the saber" in the past, threatening to stop payments to the DOE waste fund—to no effect.

Politicians from the target states see the situation quite differently. For example, Senator Chic Hecht (R) of Nevada claims that there are many technical weaknesses in the government's plan, including the risk of seismic damage from nearby bomb tests, and a threat to the state's tourist industry. "From my point of view," he said in earnest, "there is far too much politics in nuclear waste."

Senator Hecht has come forward with a slew of bills proposing something new—almost anything new. One would move the program off the land and into the ocean, putting nuclear waste in the deep seabed. Another would require that the waste be left to age for 50 years before going anywhere. Another calls for fuel reprocessing, a dead issue, in most people's view. Yet another bill, first proposed by Senator Daniel Evans (R–WA), would create temporary MRSs in four regions of the country. Evans has gone out on a limb, suggesting that his own state of Washington would accept an MRS but not a permanent repository, if other states would do the same.

The most popular idea, sponsored by 50 members from both parties, is to stop all action for 18 months and set up a study group. Congress would order this group to come up with orders for Congress. This nondecision would build squarely upon last year's, which was to put off action until this year.

When this idea won Udall's support at a packed press conference on 1 July, it ended "a dark, dark week" for the nuclear utilities, according to one lobbyist.

One exception to the wait-and-see pattern in Congress is a bill sponsored by Senators Bennett Johnston and James McClure (R–ID), backed by the nuclear utilities, and reported out of the Energy Committee on 29 July. It would simplify and speed up site selection by giving a large reward to any state willing to serve as a host. The money saved by canceling duplicate site investigations ($2 billion) could be spent on "incentives." The prize for a repository would be $100 million a year; for an MRS, $50 million a year. In return, the host would give up the right to block construction of the facility. This proposal, although pragmatic, has an air of desperation about it. It's been called the "bribe Nevada" plan.

On the House side, Representative Udall introduced another action-forcing bill on 15 July that would leave the task of finding a waste site to a kind of Henry Kissinger of the interior. This agent would serve as an internal diplomat for the federal government in quiet negotiations with state leaders. He would be empowered to offer unspecified incentives of the kind in the Johnston-McClure proposal, but any agreement for construction of a waste repository would have to get final approval from Congress.

Udall wants to serve again as a broker for progress. "We must not kid ourselves," he said. "We do our constituents no service by blocking the siting of a permanent geologic repository. Almost all of us already have a de facto nuclear waste dump closer to home than we care to think"—a reference to spent fuel storage chambers at 100 nuclear power plants.

Although there is not yet any physical urgency about removing the waste from the 100 widely distributed power plants, there is a political need to do so, according to Alvin Weinberg of the Institute for Energy Analysis at Oak Ridge, Tennessee. He testified that it is important to get on with the repository, even though his own preference would be to reprocess the fuel. If the siting squabble drags on for another decade or two, he said, "I fear we may lose the nuclear option." ■ **ELIOT MARSHALL**

Yale Accelerator to Be Dedicated

Dedication day for Yale University's upgraded ESTU-1 nuclear accelerator is 7 August. The tandem Van de Graaff electrostatic accelerator has a new booster section in its column that is designed to raise the terminal voltage to 25 megavolts, making it one of the most powerful machines of its type in the world. Although physicists expect the accelerator to bring about an improved understanding of the details of nuclear structure, they also hope the $11-million investment represents a strong Department of Energy (DOE) statement of the importance of university-based research in an age characterized by the increasing trend toward "big science" conducted in centralized facilities.

According to David Hendrie of DOE, the agency now spends about one-fourth of its nuclear physics budget on university research and facilities. The rest goes to the DOE national laboratories, which house several nuclear accelerators, both large and small. The frontier is moving toward higher energies as physicists increasingly recognize the importance of quarks and gluons, which are the constituents of protons, neutrons, and mesons, in determining nuclear structure. To this end, construction began this year on the new $255-million Continuous Electron Beam Accelerator Facility in Newport News, Virginia. And planning is well under way for the even more expensive Relativistic Heavy Ion Collider at Brookhaven National Laboratory.

Nonetheless, nuclear physics is a sufficiently diverse field that it has proven both possible and profitable to maintain a spectrum of comparatively low-energy machines at universities, which can then maintain their traditional and complementary roles of training students and engaging in forefront research. The ESTU-1 upgrade at Yale is one of five that are under way at universities having nuclear accelerators whose operations are supported by DOE. Others are at the University of Washington, Texas A&M University (where the improvements are being financed by the state and by private sources), Duke University, and the Massachusetts Institute of Technology. The improvements aim at providing a spectrum of different capabilities at the various facilities.

One forte of the ESTU-1 will be nuclear molecular physics, the exploration of the molecule-like spectrum of nuclear energy levels generated when two nuclei are briefly in close contact but not completely fused. This is a major area of low-energy nuclear research, but there is no generally agreed upon model for these so-called dinuclear resonances. ■ **ARTHUR L. ROBINSON**