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NEWS AND COMMENT

Carter's New Plutonium Policy: Maybe Less Than Meets the Eye

The fate of the Clinch River breeder reactor was called into question by President Carter's decision to defer indefinitely the use of plutonium fuel in the country's nuclear reactors, but reports of the demise of the $2.7 billion project—planned as a one-third size version of a commercial breeder that would produce 1000 megawatts of power and 1.5 tons of plutonium per year—may be greatly exaggerated.

The Carter Administration has not yet made a final decision on the fate or the form of the Clinch River project, and Washington insiders suggest it may take several months before the office of James Schlesinger, Carter's special adviser on energy, chooses among the various possible options. The Clinch River program may "never be the same," as one official said, but it is not yet clear whether the policy will be to slightly modify it, drastically alter it, or cancel it.

The liquid metal fast breeder reactor (LMFBR) program was raised to national preeminence by Richard Nixon in 1971, when he called it "our best hope" for future energy, and the Clinch River demonstration project has been the centerpiece of the country's energy R & D strategy throughout the 1970's. Any move to alter the project can be expected to meet stiff resistance from the Energy Research and Development Administration (ERDA), from the nuclear industry, and from Capitol Hill, where many districts are affected by the project's funding.

For 5 years critics of the breeder have said that the technology was too great a proliferation risk, was eating up R & D funds that could be better spent on other alternatives, and was being pursued with unnecessary urgency. But the program has survived numerous governmental reviews—the latest being a 5-week study performed by a 12-member LMFBR Steering Committee in response to Carter's call for "an intensive review" when the fiscal 1978 budget was announced. According to one Washington official, the latest breeder crisis is "another chapter in a saga that would make a Russian novel look like a throwaway paperback."

In his prepared statement on 7 April, Carter announced that he would restructure the breeder program to stress alternatives and slow the program's rush toward commercialization, but in response to a question he said that the Clinch River project "will not be terminated as such." Other Administration comments suggest it might be built as an R & D plant rather than a commercial prototype. What this might mean is difficult to discern, because the program already has a large R & D reactor nearing completion—the $1.1 billion Fast Flux Test Facility being built near Richland, Washington. But in the press conference, Carter indicated that he would like to ensure some continuation of the jobs and income that the Clinch River project would provide. Cancellation would affect not only east Tennessee, but also California, Pennsylvania, New Jersey, New York, and 17 other states.

With so much political and institutional momentum behind the project, near-heroic efforts are being made to save it and "there are so many ideas it is anybody's guess what they will settle out on," said one observer. But a leading contender is to emphasize alternative fuel cycles, particularly thorium.

At the end of the latest review, ERDA's acting assistant administrator for nuclear energy, Robert Thorne, wrote that the use of alternate fuel cycles "offers the possibility of improvement in proliferation aspects while maintaining maximum utilization of the LMFBR concept." In a memo to the head of ERDA, Thorne laid out four alternatives for the

breeder program, including the study of alternative fuels coupled with a 1- or 2-year delay in the Clinch River project, a severe constraint on funds for the project, and cancellation of it with a shift of funds to an expedited program for an advanced converter reactor (that is, one that does not breed more fuel than it burns, but might come close to doing so). Advanced converter reactors, sometimes called near-breeders, could stretch uranium reserves as much as five times further than present reactors; they were discussed in more detail in last week's issue (15 April, Research News, p. 284).

Some members of the steering committee took sharp exception to the idea that the Clinch River reactor would be less proliferative with a different fuel—particularly with the thorium fuel cycle suggested by ERDA, a so-called denatured concept that would dilute fissionable material to the point where it could not be used for bombs without isotope enrichment. While the denatured thorium idea might be very appealing for the present reactors, in the Clinch River reactor, it would produce too little of its intended product and too much plutonium—possibly enough for 100 bombs from each reactor each year, said four members of the steering committee.

In the absence of a final directive from the White House, the energy agency appears to be planning for a short delay in construction of the Clinch River reactor while other fuel cycles are considered, followed by a push for resumption of the original design. There is apparently some latitude to change the reactor core without introducing drastic changes in the rest of the design, but "as soon as you change the sodium coolant, you're talking about a different reactor," said one physicist. ERDA officials pointedly say that they are not even ruling out the possibility that the plant might eventually be a plutonium breeder after all.

To delay construction while proceeding with licensing might not hold up the project much, because "right now licensing is on the critical path," says Thomas Cochran of the Natural Resources Defense Council, a long-time breeder critic and member of the steering committee. The agency still needs a limited work authorization permit to begin clearing the site and bringing in support facilities. Such authorization, originally expected this summer, must be granted under the National Environmental Policy Act (NEPA), and further authorization is needed to actually begin construction. In the best of circumstances, construction of the Clinch River breeder

*The steering committee members who called for proceeding promptly with the breeder option were T. G. Ayers, chairman of Commonwealth Edison Company; M. T. Benedict, nuclear engineering professor at Massachusetts Institute of Technology; F. L. Culler, deputy director of Oak Ridge National Laboratory; J. L. Everett, president of Philadelphia Electric Company; R. V. Laney, deputy director of Argonne National Laboratory; C. D. Perkins, president of the National Academy of Engineering; C. Starr, president of the Electric Power Research Institute; and C. Walske, head of the Atomic Industrial Forum. The steering committee members who called for cessation of breeder demonstration activities were Thomas B. Cochran of the Natural Resources Defense Council; Russell E. Train, former head of the Environmental Protection Agency; Frank von Hippel of Princeton University; and Robert H. Williams of Princeton University.

Gene Splicing Preemption Rejected

Opposition by Senator Edward Kennedy (D-Mass.) and others has put an unexpected twist in the development of federal legislation to govern recombinant DNA research. A proposal that state laws in the area should be preempted by federal law has itself been struck down because of congressional and White House opposition.

The aim of the preemption clause, proposed in draft legislation prepared by an interagency committee, was to forestall the development of a crazy-quilt pattern of differing local research standards, some of them possibly stricter than the NIH guidelines. Preemption was one of the chief reasons for which the NIH and many scientists supported federal regulation of the research.

But the clause ran into trouble on political grounds. "There are political implications in preempting the states which some people would find distasteful and which a lot of congressmen would find hard to justify to their constituents," remarks a congressional staff aide.

After some hurried negotiations, Kennedy introduced the Administration's bill into the Senate on 1 April without the preemption clause. In its place is the stipulation that state or local laws will prevail if the Secretary of Health, Education, and Welfare finds that they are as or more stringent than the federal law and likely to be properly administered.

An NIH official described the new clause as an equitable compromise: "With the Secretary involved, a state cannot just go ahead and write a more stringent law on its own." Once federal legislation is in being, states may no longer see the same need to write laws of their own, the official observed.

At a hearing last week before the Senate health subcommittee, Kennedy made clear that he wanted the governance of gene splicing to be vested in a centralized authority. Secretary of HEW Joseph A. Califano assured him that in developing legislation "We headed off a number of attempts within the executive branch to fragment authority and make a list of exceptions."

Califano resisted the idea of a special commission on gene splicing, complaining to Kennedy that he already had 320 outside committees advising the department and that he was reaching the point "where nobody knows who is advising whom on what."

The Secretary added that he was troubled at having the government intrude into the area of scientific inquiry: "I am less concerned about the government being involved in [regulating] the applications of knowledge than with government involvement in the search for knowledge."

Kennedy, however, said he believed that the public should be involved not only in decisions on the application of knowledge but "at the ground level, in the scientific development as well as the application."

A similar attitude exists in the House, where a bill now in preparation may take steps to widen the range of scientific disciplines represented on the NIH committee on recombinant DNA, and to include a minority of nonscientist members.

Kennedy praised the Cambridge City Council and its citizens review board, suggesting that its actions might set a pattern for the rest of the country. He asked a witness, Governor Michael Dukakis of Massachusetts, if a local authority should be allowed to prohibit research in a facility. "I don't have any problem with that," Dukakis said—Kennedy said he didn't either—but the governor added he did not believe any community would make such a decision.

Both the House and Senate health subcommittees hope to have their bills reported out of full committee by mid-May.—N.W.

plant was not supposed to begin before late 1978.

The role of the breeder steering committee turned out to be pro forma only. The committee finished its work on the evening of 6 April, and Carter announced his breeder policy the next morning. The committee's membership was heavily weighted with nuclear industry representatives and breeder program officials, but in the end it did not make much difference. Two conflicting reports were drawn up by two segments of the committee,* one stressing that the breeder would be needed in the next few decades because of the limited supply of uranium, the other recommending cancellation of breeder demonstration plans, saying that the country could safely rely on "proliferation resistant uranium-conserving reactors over the next century." The minority report used ERDA's uranium estimate (3.7 million tons), and characterized its finding as insensitive to the growth rate of nuclear power through the year 2000, so long as the nuclear generating capacity leveled off early in the next century.

The policy that came out of the White House was remarkably similar to that recommended in the Ford Foundation–MITRE Corporation report, *Nuclear Power, Issues and Choices*, which stressed the diseconomy of reprocessing and breeders. But when representatives of the Ford-MITRE group—largely Washington insiders—briefed the steering committee, they were met with accusations of being dovishly aligned with the Arms Control and Disarmament Association (ACDA) and being incapable of judging the breeder program plan because no member had "hands on" nuclear experience. The acrimonious tone of the 3-hour briefing prompted Hans Landsberg, of Resources for the Future, to write to Thorne that it is "unfortunate" that the advocates of nuclear power seem to think "one must either buy the whole package—reprocessing, the breeder, and all—or else be considered an antagonist." Although the Ford-MITRE report was widely hailed as a sensible approach to the problems of plutonium and nuclear power, inside government circles the trend toward considering proliferation as a major component in nuclear policy was started more than a year ago by an ACDA report, "Moving toward life in a nuclear armed crowd?"

In spite of the firm announcement about plutonium and the unequivocal rejection of reprocessing, the Carter breeder policy leaves the program, and the Clinch River project in particular, in an ambiguous position. The only thing that seems sure at this point is that extra delay will be introduced into a project that has been delayed for most of its existence.

Some observers think Carter is planning to study the Clinch River project until it slowly dies, even though that would mean writing off $500 million that has already been spent on design and equipment. But the leading alternatives would apparently allow the project to go ahead in a form that would look remarkably like the original plan to anyone but a nuclear engineer—and, perhaps more importantly, could be readapted to the original plan at a later time.

While the new plutonium policy was designed to send abroad a strong signal that the United States has changed its nuclear intentions, a close reading of the policy with respect to the government's biggest nuclear energy project indicates that so far very little has changed.

—WILLIAM D. METZ

Particle Beams as ABM Weapons: General and Physicists Differ

The Soviet Union is successfully developing a proton beam as an antiballistic missile device, whereas the American effort to weaponize a charged particle beam was abandoned because it was staked on electrons.

So said Major General George J. Keegan, former head of Air Force Intelligence, in an elaboration to *Science* of a recent press briefing at the American Security Council in which he warned that the Soviet Union is "20 years ahead of the United States in its development of a technology which they believe will soon neutralize the ballistic missile weapon as a threat to the Soviet Union."

Keegan, who retired from the Air Force this January, has a reputation as a worst case analyst who sees Soviet military developments in the most threatening light. Other military analysts believe his views on the Soviet lead with the particle beam are overstated. Keegan himself says his aim is "to provoke and make enough people angry" about the situation.

Physicists knowledgeable about military affairs say that even if the beam weapon were possible, it would have all the same problems of conventional ABM systems, such as vulnerable radars and huge cost. "Keegan has put together a story from all kinds of odds and ends gathered together. He is trying to explain some facts and facilities for which there is no known purpose, but there are other explanations besides his. Even if what he is pointing to is a particle beam program, it takes a long time between demonstrating something in the lab and deploying it in the field. We could be there in 2 years, wherever that is," says a physicist involved in defense matters.

Accounts in the national press within the last 2 months have quoted unnamed military intelligence sources as saying that the Soviet Union has devoted an effort on the scale of the Manhattan project to developing the charged particle beam as an antimissile device.

Physicists who work at particle accelerators know that if the beam is discharged into a brick, the brick will absorb the energy and explode. In accelerators, however, the beams are propagated in a vacuum. Firing a beam through the atmosphere is a different proposition. But should it be feasible, a beam might deliver more energy than would a laser, say, on an incoming missile during the few seconds it was within range.

In his American Security Council briefing, published in the 28 March issue of *Aviation Week*, Keegan states that the Soviets "have every expectation that well before 1980, if they don't blow themselves up—and they may—[they] will perceive that they have technically and scientifically solved the problem of the ballistic missile threat."

In an interview with *Science* Keegan confirmed that the weapon he referred to was the charged particle beam. He said the Russians were working with a proton beam accelerated by an "explosive power generator." High power, in his view, is the solution to all the problems in