Clinch River Dies

But the breeder R & D program lives on with $300 million to spend this year; the big question is who will pay to close Clinch River?

Buffeted by a storm of technical papers, demand forecasts, and accounting reports, the Clinch River breeder project went to its demise in the Senate on 26 October. The vote against it was more lopsided than expected, 56 to 40.

The decision came on a supplemental appropriation bill that would have provided what advocates said would be a one-time, final infusion of $1.5 billion in federal funds. This was to be added to a contribution of $1 billion from private investors, a sum which could have been raised only if a battery of investment guarantees—part of this supplemental package—was adopted as well. The House had already refused to go along and, in the end, so did the Senate. The proposers in the Department of Energy (DOE) simply could not convince Congress that this would be the final round in what had become a very tedious debate. Nor was it clear that this scheme really provided much additional private support for the breeder.

Breeder Research Corporation

Clinch River, the breeder site

Among the multimillion-dollar costs of closing the project will be returning the site to an environmentally "stable" condition, says a DOE official. The large bare spot at this bend in the river was created in the last year.

The groundwork for the decision was laid a year ago in a compromise struck between those in the House who wanted to kill the breeder and those in the Senate who wanted to save it. By 1982 the House had grown tired of the escalating construction costs, up from the original estimate of $700 million to as much as $4 billion. The original rationale for the breeder had also been undercut by the declining demand for uranium fuel, so that it was clear there would be no need for such a fuel-breeding system for many decades.

The agreement reached in 1982 was that the project would be kept alive long enough for DOE and the nuclear industry to come up with a new financing scheme by early 1983, one that would reduce federal and increase industry support. A group led by Gordon Corey of Chicago's Commonwealth Edison scrambled to come up with a workable plan. A proposal was put forward, withdrawn, touched up, and then formally submitted to Congress in August, leaving little time for analysis before the final vote this fall.

Charges and counterclaims went back and forth, but the killer analysis came from the director of Congress's own budget office, Rudolph Penner, a conservative economist. In a staff paper and testimony given on 20 September, Penner concluded that the new financing scheme was highly advantageous to the investors and, because of proposed federal guarantees, more expensive for the government than a straight appropriation. As Penner said, "Our base-case assumptions imply that the after-tax rate of return earned by the equity investors would be about 37 percent, while the after-tax rate of return for bondholders would be 7.5 percent." He added that the cost, after discounting for inflation, "is almost $250 million more than if the Congress chose to fully fund the project."

This point became so critical that the leader of the probreeder forces and the bill's manager, Senator James McClure (R–Idaho), tried mightily to discredit it. In debate on the Senate floor he said that "Even CBO [Penner's Congressional Budget Office] admits that that statement is not correct. They admit that their analysis is not correct and that those findings should not be used today." Several minutes later, the breeder's leading opponent, Senator Gordon Humphrey (R–N.H.), a conservative in temporary alliance with liberals William Proxmire (D–Wisc.) and Dale Bumpers (D–Ark.), rose in protest. Humphrey said that he had just phoned the CBO to find out whether McClure's shocking news was correct. "Mr. Penner's assistant checked into that and said that is not correct; the CBO still stands by that study."

Bumpers called the new financing scheme "outrageous," a sentiment shared by many opponents. "The DOE and the industry really have themselves to blame on this one," says Gerald Brubaker, an aide to Representative Richard Ottinger (D–N.Y.), an old hand in these debates. "A lot of people were looking for a way to endorse the program. But instead of getting additional nuclear industry or utility support, all they got was Wall Street speculators. And they got greedy, with big rates of return." The vote would have been closer, Brubaker thinks, if the probreeder forces had offered to withdraw the plan and lower the payback rates. "But they didn't, and Congress responded in a rational way."

The disappointment and exasperation among would-be supporters were evident in comments by Senators Roger Jepsen (R–Iowa) and Alan Simpson (R–Wyo.). Said Jepsen: "Though there is an appearance of increased private participation, the bottom line shows that the federal government is still far out on the limb with federal guarantees exceeding $1 billion. I can only say . . . that a golden opportunity has been lost."

Simpson, a strong backer of nuclear power, said, "I certainly fail to see how the plan before us represents the kind of cost-sharing arrangement that I think Congress—or I—had in mind. . . . It is time, Mr. President, to remove this absurd acid test from the arena of discussion about the future of the nuclear industry, in order that we can get about the task of restoring this industry to a position of strength. . . ."

DOE has put out the word that the project will be closed "in an orderly manner." Now the questions are: How much will this cost and where will the money come from? Ottinger had hearings on this topic 2 years ago and concluded, according to Brubaker, that cancellation of existing contracts would cost $177 million and additional litigation might bring the total to $300 million. A lot depends on how it is handled and on how the participants react. The costs could go up if courts decide that industry contributors are entitled to get back the dues they paid long ago.

John Thereault, director of DOE's nuclear planning division, says the department once figured shutdown costs at between $200 and $500 million. The numbers are no longer valid, he points out, because "since then we've made a huge hole in the ground" and there will have to be some kind of "environmental repair or stabilization." After a court decision allowed construction to proceed, the local site manager rushed out at around midnight and began felling trees with a bulldozer. Now a large foundation has been blasted out of rock and a concrete base has been laid.

The shutdown funds cannot come from Clinch River's budget, because it is due to run dry in a matter of weeks. Thereault says Congress may have to vote another supplemental 1984 appropriation. One congressional aide notes that, "Unless they come up with a clear explanation of what they want to do with the program, maybe it should come out of their hide," meaning, out of DOE's R & D budget. DOE has not formally begun to reexamine its programs in the light of the Senate vote, but changes are coming.

William Nelson, director of DOE's "base program" of R & D on breeders, says that he began to brace for this event over a year ago. Very little of his budget now supports work specifically applicable to Clinch River. Most of the $300-million-plus budget this year is aimed at generic breeder problems or advanced reactors. There are no plans at present for a large new demonstration project like Clinch River. "There is general agreement," Nelson says, "that it would be really nifty if the next plant were to come about through a private sector initiative." He adds that three companies are working on new breeder designs. Westinghouse has a "modular breeder." General Electric has something he refers to as the "Volkswagen breeder"—small and cheap. And Rockwell International is working on a project known as EBR-III, in honor of the prototypes, Experimental Breeder I and II. Interestingly, Nelson says these models are meant to be economically competitive with light water reactors, and the companies are "going after inherent safety features with a vengeance." It is also interesting that, while Clinch River's backers dismissed the notion that the French "pot" design for cooling by natural circulation

Next on the Firing Line?

Now that the Clinch River breeder reactor seems finally to have bitten the dust, the next major nuclear energy program on the firing line is likely to be the $10-billion uranium enrichment plant that the Department of Energy (DOE) is building at Portsmouth, Ohio.

The plant, which has already drawn criticism because its capacity will not be needed for decades, faces reauthorization by Congress next year for the first time in 3 years. Some preliminary shots in the expected congressional battle were fired at a hearing on 21 October, when the critics got a new piece of ammunition in the form of a report by the General Accounting Office (GAO).

Critics are arguing that the development of new technologies could make the plant obsolete before it is completed, and are urging that construction at least be put on hold for a few years (*Science*, 19 August, p. 730). The GAO study lent some support with a conclusion that alternative technologies do indeed promise to be more cost-effective. Representative Richard Ottinger (D-N.Y.), who chaired the hearings, promptly announced that "If the current course is pursued, billions of dollars will be wasted."

DOE is now overhauling the uranium enrichment program, and will announce its intentions for the Portsmouth plant early next year as part of its fiscal year (FY) 1985 budget proposals. The original justification for the plant has already disappeared. Construction was authorized in 1976, when demand for enriched uranium was projected to exceed supply by the mid-1980's. But instead of a shortage, a huge glut has developed, and it could persist until the end of the century. Nevertheless, DOE now argues that because the Portsmouth plant will be much more efficient than existing plants, it should still be built so that DOE's other aging facilities can be phased out. The plant will use gas centrifuge technology, a far less energy-intensive process than the gaseous diffusion technology currently used.

Some $2 billion has already been spent on the plant, and the first two of eight planned process buildings have been completed. So far, DOE has not made a commitment to complete the other six buildings, but it is about to request bids for some 6480 centrifuge machines for the first two. The critics are essentially arguing that those bids should be put on hold and further construction be deferred at least until more advanced technologies are developed.

Presenting this argument at the hearing were Tom Cochran and Jeffrey Sands of the Natural Resources Defense Council, which was a longtime foe of the breeder program. They contended that if DOE continues building the Portsmouth plant and installing the current generation of centrifuges, it could close out its options for choosing a better technology. The two leading alternative technologies are a more efficient gas centrifuge and a process based on lasers, both of which should be ready for large-scale use by the late 1980's. The GAO report concluded that these technologies appear to offer some cost advantages, and Ottinger interpreted that to mean DOE should put its plans for the Portsmouth plant on hold.

Witnesses from DOE declined to discuss their latest plans for the plant. They will wait until the FY 1985 budget is unveiled, and then defend the program in authorization hearings. Ottinger will chair those hearings in the House.—**COLIN NORMAN**

was better than Clinch River's "loop," all three of the companies mentioned above are tinkering with pot and loop designs.

One idea that would be politically quite popular, but which DOE is not ready to endorse, is a "once-through" breeder fuel system, obviating the need for reprocessing. The goal would be to eliminate the commerce in plutonium, the breeder's by-product and fuel. It is also usable in atomic weapons and thus a major problem in the breeder concept. Nelson says that he has yet to see any elaboration of this idea which obeys the laws of physics and economics. He is frankly more optimistic about schemes that would have the reprocessing done on site, in small facilities within the reactor compound. DOE is not about to back any once-through breeder programs.

The indications are that the full impact of Congress's action has not yet registered at DOE, and that when it does, the entire breeder program will come in for a profound review.—**ELIOT MARSHALL**

Pork Barrel Funding Deemed Not Kosher

The recent spate of pork barrel politics involving university research and teaching facilities has prompted three separate academic organizations to decry the practice. The Association of American Universities (AAU) and the council of the National Academy of Sciences passed resolutions in late October urging universities and Congress not to bypass peer review in parceling out funds for research projects and facilities. And the American Physical Society (APS) chimed in with a letter from APS president Robert Marshak to every member of Congress asking "that this recent trend toward special interest funding of major scientific projects be reversed."

Although only the APS letter mentioned specific incidents of pork barrel funding that the society deemed troubling, officials in all three organizations say they were particularly upset by the way grants were secured for research facilities at Catholic and Columbia universities. Both institutions hired a Washington, D.C., consulting firm, Schlossberg-Cassidy and Associates, to push their proposals, and funds were obtained through an amendment first proposed on the floor of the House (*Science*, 3 June, p. 1024). What particularly rankled was that money for the two universities was taken out of the budgets of other projects that had gone through various levels of review. Several other universities have since been the beneficiaries of amendments offered on the floor of the House or Senate, but these moves have drawn less criticism because the funding has not so obviously been taken from somebody else's budget.

It is not just Congress that has been guilty of pushing projects through without peer review. There has been a lot of concern in the materials research community about the way that funding for the National Center for Advanced Materials (NCAM) at the Lawrence Berkeley Laboratory was inserted into the Department of Energy's (DOE's) budget, largely at the behest of George Keyworth, President Reagan's science adviser. The proposal was reviewed neither by DOE nor by other materials scientists, many of whom fired off letters to Congress earlier this year protesting their lack of input. (Congress subsequently virtually eliminated NCAM's budget and a DOE committee recently raised doubts about the synchrotron light source that was to be the center's core facility.)

These episodes prompted the AAU to discuss the whole problem of pork barrel politics at its annual meeting on 25 October. Those who attended were in a somewhat awkward position. For one thing, some of the AAU's own members had been the beneficiaries of special interest amendments, and for another, the AAU, which represents 50 of the nation's largest research universities, did not want to appear to be telling other, less well endowed institutions how to behave. In the end, the meeting adopted a carefully worded resolution that drew only a few opposing votes.

The resolution noted that the system of peer review has served U.S. science well, and urged "scientists, leaders of America's universities, and Members of Congress . . . to refrain from actions that would make scientific decisions a test of political influence rather than a judgment on the quality of work to be done." In addition, the resolution pointed out that federal funds for university facilities dried up at least a decade ago, and urged Congress and the Administration "to deal promptly with the decay of physical plant that houses much of the nation's basic research."

Five days later, the Academy council passed a resolution stating that "Informed peer judgments on the scientific merits of specific proposals, in open competition, should be a central element in the awarding of all federal funds for science." It urged the academic community and public officials to ensure that proper review be applied "not only for the support of scientific research proposals, but also for major scientific facilities and instrumentation." The council discussed whether to follow the AAU line and recommend renewed federal funding for university facilities, but according to one observer, the members decided that such a proposal might seem too self-serving.

The APS letter, which went out in the last week of October, mentioned the Columbia, Catholic, and NCAM proposals, and said "In our opinion, confidence in the system has been seriously shaken by these instances and will be restored only by rigorous adherence to the established procedures in all future scientific funding."

Kenneth Schlossberg, whose consulting firm shepherded the Catholic and Columbia proposals through Congress, argues that the AAU and the Academy "are taking the high ground without offering any reasonable alternative to institutions that have pressing needs." Proclaiming himself "a little mystified" by the reaction to his firm's successes, Schlossberg said "AAU members, when it is in their own interests, are the first to use congressional influence on behalf of their projects. They maintain large government relations staffs for that purpose. What we have got here is outrage among those who are least entitled to be outraged."

Until federal money is made available for university facilities, Schlossberg predicts that universities will continue to seek special interest amendments. He said that his firm has received several inquiries recently from universities seeking funds for facilities.—**COLIN NORMAN**