Uranium Enrichment's $7-Billion Uncertainty

The federal government's enrichment program is getting back into the black, but disputes loom over the amount owed to the Treasury and the future of a major R&D program

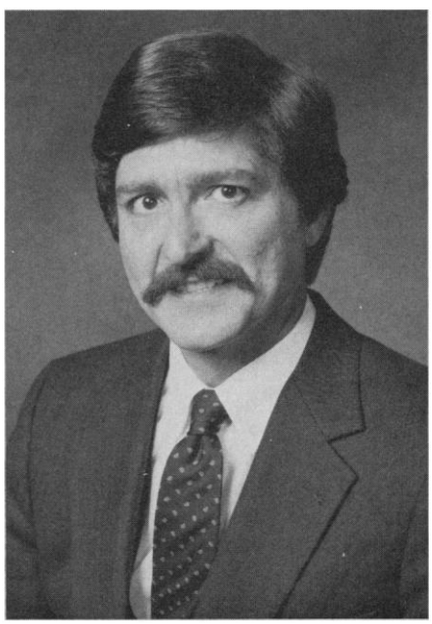
THREE years ago, the federal government's multibillion-dollar business enriching uranium for commercial reactors was on the brink of disaster. Demand for nuclear fuel was in a slump, U.S. utilities were negotiating contracts with overseas suppliers, and, thanks to some horrendous miscalculations, billions of dollars were being spent to build unneeded new capacity. A crisis loomed, thousands of jobs were threatened, and American dominance in a strategically important technology was slipping away (*Science*, 19 August 1983, p. 730).

Today, after some painful restructuring, there are indications that the program is getting back on track. The Department of Energy (DOE), which runs the enrichment business, has halted construction of a new plant on which nearly $3 billion had already been spent, mothballed one of its three existing plants, and performed some radical surgery on its R&D program. As a result, DOE has been able to drop the price it charges for enriching uranium and it is now more competitive with European suppliers. "It is now a good, healthy business," claims John R. Longenecker, who heads the program in DOE.

But the program's problems are far from over. Critics charge that DOE is illegally attempting to charge taxpayers for past mistakes by trying to write off some $4 billion of investment that, they argue, should be charged to utilities. The department is also being sued by the uranium mining industry, which claims that DOE's actions have undermined domestic uranium production. In addition, the Office of Management and Budget (OMB) has sown confusion and uncertainty in the research program by insisting that private industry, rather than the federal government, develop the next generation of enrichment technology. Once again, the enrichment program is entering a critical period as these fiercely contested issues come to a head.

Turmoil is nothing new in the program. In the past 3 years it has been turned upside down in an effort to overcome the results of a decade of miscalculation caused when DOE—along with just about everybody else—grossly overestimated the expansion of the nuclear industry.

In the early 1970's, it was anticipated that demand for enriched uranium fuel would outstrip supply in a decade or so. The United States at that time had a worldwide monopoly on commercial enrichment, but DOE closed its order books because it believed it lacked the capacity to take on any more work. At the same time, DOE began to expand its production facilities. It launched a $1.5-billion program to upgrade and extend its three gaseous diffusion plants—behemoths built during the 1940's and 1950's originally to produce weapons-grade uranium for the military. In addition, it began work in 1977 on a new facility in Portsmouth, Ohio, to produce enriched uranium with a supposedly more efficient technology based on gas centrifuges Finally, DOE got locked into take-or-pay contracts with the Tennessee Valley Authority (TVA) for electricity to operate the diffusion plants through the early 1990's.



John Longenecker

"You have a healthy program now. What do you want to do with it?"

Then the bottom dropped out of the nuclear business as utilities canceled reactors and drastically scaled back their construction plans. By the early 1980's, the world was awash with enriched uranium as utilities took delivery of fuel they had ordered but no longer needed. Two European consortia had also entered the market and were undercutting DOE's prices, and the Soviet Union was selling enriched uranium in the West at a discount. Consequently, DOE's expensively refurbished diffusion plants were being run at less than half capacity, the cost of constructing the centrifuge plant was drowning the business in red ink, and DOE was paying TVA vast sums for electricity it did not need. Something had to give.

The chief thing to give was the centrifuge plant. Last year, after an intensive review, DOE concluded that the plant was unlikely to produce enriched uranium more cheaply than its existing diffusion plants, and it decided to halt construction. Nearly $3 billion has been spent on the facility. In addition, DOE concluded that all three diffusion plants were not required, and it mothballed the oldest one, located at Oak Ridge, Tennessee.

Not only did DOE scrap the Portsmouth plant. It also shut off further research on the centrifuge technology. Instead, the entire R&D effort was concentrated on a laser process being developed at the Lawrence Livermore Laboratory. Known as AVLIS, for atomic vapor laser isotope separation, the process promises substantial cost reductions compared with the diffusion plants. The plan was to deploy the technology in the 1990's, thereby permitting DOE to reduce its prices further and stay ahead of its European competitors (*Science*, 21 June 1985, p. 1407). To be more competitive in the near term, DOE also offered its customers more flexible contracts and price breaks.

The strategy appears to be working. DOE has halted the erosion in its market share and now has firm purchase commitments that provide a solid basis from which to project future demand. Costs have been reduced to such an extent that in fiscal year 1987 DOE expects its revenues to exceed outlays by some $235 million—in spite of the fact that the enrichment program is now forking over some $450 million a year to TVA for electricity it does not even need. "The trend is in the right direction," says one congressional staff member who has followed the program closely for several years. "It is now on a firm business basis."

There is, however, a major question concerning the legality of some of DOE's actions. It is a $7-billion question.

The department is required by law to recover the costs of the enrichment program over a reasonable period of time from the prices it charges utilities. This has not been happening, however. The General Accounting Office and OMB have calculated that the program has amassed a debt to the Treasury of more than $7 billion, including interest.

DOE and utility companies have argued that those figures include items such as part of the investment in the diffusion plants that should not be charged to the nuclear industry. They claim that the debt in fact is less than $1 billion. In written comments recently, the Edison Electric Institute (EEI), which represents investor-owned utilities, called OMB's calculations "inappropriate, unwarranted, and unacceptable."

Last year, after a lengthy battle, DOE and OMB compromised on a figure of $3.5 billion. This was arrived at by simply writing off all the investment in the centrifuge plant and 60% of the investment in the diffusion plants, on the grounds that they are not benefiting commercial customers. Put simply, the compromise would mean that taxpayers rather than the nuclear industry would pay for the unneeded investment in upgrading the diffusion plants and the scrapped centrifuge plant.

The General Accounting Office has, however, concluded that this write-off is illegal because it conflicts with the requirement that the enrichment program must recover all its costs. The dilemma this decision poses is stark. If these write-offs are permitted, it will be viewed as a hidden subsidy to the nuclear industry. But if DOE is required to recover the full $7 billion through its enrichment prices, its customers will quickly turn to Europe and the U.S. enrichment business will be in dire straits.

This battle is likely to be fought out on Capitol Hill over the next few months. The basis for DOE's calculations is contained in a set of proposed new rules that are currently open for public comment. When they are in final form, Congress will have 45 days to disapprove them before they take effect. Already, some members of Congress, including Edward J. Markey (D–MA), who chairs a key energy subcommittee, have announced that thay will oppose the proposed write-off.

A second major uncertainty in the long-term prospects for the U.S. industry is the Administration's plans for developing the AVLIS technology. Last year, when DOE decided to put all its eggs in the AVLIS basket, the plan was to spend $420 million on the program in FY 1986–88, with the goal of demonstrating the technology in the late 1980's and operating a commercial plant around 1992. As concern over the deficit began to mount in the fall, however, spending was cut to $275 million and the target for commercial operations was moved back 4 years.

The ink was barely dry on this plan when OMB drastically altered the rules. It decreed that private industry, rather than the federal government, should develop the technology. As a result, DOE was forced to slash planned spending once again, to $164 million in FY 1986–88. The expectation is that private industry will begin investing in the program next year and will take it over entirely in FY 1989.

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Nobody seems to believe that this will happen, however. It is estimated that at least $2 billion will be required to complete the R&D and construct a production facility. With no return on this investment expected much before the end of the century, investors are not likely to rush to plunk down their money. "Nongovernment funding for the development of AVLIS does not appear to be a realistic expectation," concluded John F. Eager, vice president of Middle South Services, in recent testimony on behalf of EEI.

In the meantime, the AVLIS program is beset with uncertainty. With little prospect of private funds making up for federal cuts, the timetable for commercial operation is now up in the air and program managers are concerned that researchers either will soon start leaving or will have to be fired.

John Emmett, Livermore's Associate Director for Lasers, estimates that the United States currently has a 4-year lead in development of the technology, but warns that the Europeans—particularly the French—have been aggressively pursuing laser enrichment in recent months. If the U.S. program is allowed to falter, he warns, the United States will lose its best chance of regaining its dominant position in world markets, and with it an opportunity to recover some of those past investments in unwanted facilities.

Congress may be receptive to this argument. Representative Marilyn Lloyd (D–TN), chairman of a science and technology subcommittee that oversees the enrichment program, recently said the privatization proposal "may be ill-conceived because it slows the pace of the AVLIS program." Lloyd's subcommittee recently added $50 million to the Administration's request for AVLIS, but, in a year in which cutting the deficit is the chief political game in town, that increase may be difficult to sustain.

Meanwhile, an even more ambitious proposal to turn the enrichment business over to private industry is under consideration in the Administration. This would involve trying to get the private sector to run everything—including the diffusion plants. The Administration is said to like this idea because it believes that private industry is better than the federal government at running a business; if enrichment had been run more like a business in the late 1970's and early 1980's, for example, some of those bad investments might have been shut off much earlier.

A more practical rationale is that, because the diffusion plants would provide short-term revenues, taking over the entire operation may be more attractive to investors than just developing and operating an AVLIS facility. DOE is said to have concluded that this approach is the only feasible way of privatizing enrichment, although exactly how it would be carried out is unclear. Options under discussion range from selling off existing assets to private investors, to the formation of a corporation like Comsat, in which the federal government would maintain a majority interest.

The first formal step toward privatizing the enrichment enterprise was taken by DOE with a notice in the 7 April *Federal Register* inviting companies to say whether they are interested in participating in some or all of the program. The notice states that DOE has no preconceived ideas about how privatization should be carried out.

Privatizing the whole operation would, however, require some tough decisions, not the least of which is how much of the debated $7 billion should be returned to the Treasury. There is also a serious question concerning the conditions under which private industry would be permitted to operate facilities that produce nuclear material for weapons. And there are likely to be problems in agreeing on the guarantees that will probably have to be given to entice investors into the business.

Nevertheless, those familiar with the program anticipate that a major debate over privatizing the operation will take place during the coming year. Says DOE's Longenecker, Congress is faced with the following question: "You have a healthy program now. What do you want to do with it?" ■

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