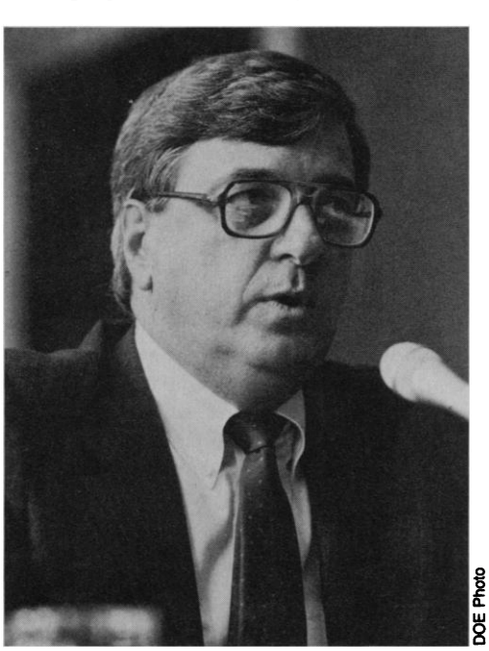
High-Energy Management Stirs Up Energy Research

In his drive to keep R&D programs at the Office of Energy Research productive, Robert O. Hunter, Jr., has shaken up scientists and angered many legislators

WHEN ROBERT O. HUNTER, JR., came to Washington just over a year ago to head the Department of Energy's $1.7-billion basic research program, few people had even heard of him. Thanks to a few controversial moves, however, Hunter has certainly made his presence felt—both among the thousands of scientists whose projects he controls and in the congressional committees that oversee his budget.

Whether it is adjusting the course of the magnetic fusion energy program, overseeing the mammoth $6-billion Superconducting Super Collider, or reshaping the tiny geophysical research program, Hunter has managed to ruffle the feathers of top scientists. Not only have program officials been uneasy with his scrutiny of entrenched DOE research programs, but numerous interviews conducted by *Science* reveal that many research leaders are insecure if not intimidated by him.

But in a recent interview with *Science*, Hunter said that he is merely carrying out his responsibility to make sure DOE's research programs "have clear goals" and are "producing front-line research." To maintain quality and to move forward on new fronts, the 42-year-old director of the Office of Energy Research says it sometimes is necessary to reshape R&D efforts and redirect funds. But the suddenness with which some programs have been altered and the absence at times of open discussion of the merits have stirred up segments of the research community and put heat on Hunter.



DOE Photo

Controversial manager. *Robert Hunter says his aim is to maintain the quality of DOE's research.*

Most of the scientists who were asked to critique Hunter's policies and performance, in fact, agreed to do so only if they were not identified. This chilling atmosphere has been created partly because Hunter ousted the directors of the offices of carbon dioxide research and magnetic confinement fusion (*Science*, 20 January, p. 303) several months after taking over the Office of Energy Research. Program staff and many national laboratory officials saw the action as arbitrary and without cause. Further spooking some program leaders is Hunter's use of scientific advisers from outside the department's network of established advisory groups and his exclusion of some ranking managers from policy and budget decisions.

Hunter, a holdover appointee of the Reagan Administration, volunteered that not all researchers are happy with his management of the Office of Energy Research. But he insists that there have been "no substantial changes" in any research efforts. His "most ambitious activity," he says, is simply to try "to maintain the flow of new ideas and . . . the quality of the research."

Hunter's office sponsors a broad spectrum of research, including molecular biology, material science, nuclear and high energy physics, and magnetic confinement fusion. A physicist by training, Hunter seems fascinated with the diversity, whether it be the use of x-ray crystallography to illuminate large-scale proteins, the calculation of the mass of Z particles at the Stanford Linear Collider, or the challenge of improving ground-based methods to remotely sense various greenhouse gases in the atmosphere. But what is grabbing the headlines are his attempts to redirect other research programs. These actions include:

- An indefinite delay in the construction of the Compact Ignition Tokamak (CIT), the next generation magnetic confinement fusion experiment, infuriating much of the fusion community. Fusion experimentalists were ready to build the machine on the basis of scaling laws supported by operational experience. But Hunter put off the $700-million project, asserting that physics questions surrounding the loss of heat and plasma behavior in tokamak fusion reactors need to be adequately addressed.
- A proposal to create a civilian inertial confinement fusion (ICF) program that would compete with magnetic fusion in a race to determine the feasibility of building a practical commercial power reactor. A restructuring was needed, says Hunter, who cites magnetic fusion as a research program that "appears to have . . . lost a clear sense of direction."
- A special underground imaging program to improve three-dimensional mapping techniques for geological formations. His aim: to increase the resolution of imaging technology used for characterizing petroleum and geothermal reservoirs, aquifers, and underground waste storage structures. The problem: the $3.5-million grants program was imposed without consultation with the staff of the engineering and geosciences division, sources say. Consequently, the funding was taken out of other geophysics programs and ongoing research was cut.

These shifts are justified, says Hunter, who wants to integrate emerging technologies being developed outside of the department with ongoing DOE research efforts. Hunter says this initiative has received positive review from an outside group, "The Jasons," a Mitre Corporation scientific panel that DOE occasionally uses to assess programs.

The common complaint cited by critics has less to do with the substance of Hunter's moves than with his secretive and authoritarian style, which is sometimes associated with industrial scientist-managers. Except for a stint in the Air Force, most of Hunter's career has been spent in industrial- and defense-related research involving lasers and optical physics. Hunter's only major experience with government seems to have been when he served as a member of the White House Science Council from 1982 through 1985.

Prior to joining DOE, he ran Western Research Corporation, a company he founded in 1978. According to the former chief operating officer, Douglas Pewitt, the firm conducted classified research on krypton fluoride excimer lasers and optical sys-

tems under Department of Defense contracts. Hunter sold the company in 1988 before taking the DOE post. He previously had worked at Maxwell Laboratories in San Diego, which he joined after obtaining his doctorate from the University of California at Irvine.

Although he admits to coming to the job with an industrial and defense orientation, Hunter says there is no "doctrinal" mind-set driving management decisions affecting DOE and more than a dozen research laboratories. While he seeks the advice of outside scientists, he says it generally has been for special problems—such as to ensure that DOE research reactors are operated in compliance with tightening safety standards. As for his assessment of the career research managers and scientists that work under him, Hunter says, his division has "some very competent, talented public servants."

So what is behind the controversy surrounding Hunter? One Hunter supporter, plasma physics theorist Kim Molvig of the Massachusetts Institute of Technology, contends that it is a fear of change and of Hunter's efforts to redirect research programs when necessary in the face of pressure to maintain the status quo. Says Molvig, "A lot of these people in these positions are malleable when under political pressure, and he is not."

Indeed, some observers who are neither friend nor foe to Hunter say that a good deal of the turbulence associated with many of his actions can be traced to his reluctance to build a strong consensus on policy changes before moving ahead. Consequently, they say, he has found it hard at times to implement changes and has damaged his standing in Congress and in some corners of the Bush Administration. Says one Administration official, "I wouldn't have too much trouble with what he is doing if it were phased in properly."

What has to be Hunter's most criticized action to date is his plan to fund a competition between magnetic fusion and the laser-based ICF technology out of the same limited program budget. The scheme was hatched by a friend of Hunter's, Colonel Thomas Johnson, a physicist based at West Point who now is Energy Secretary James Watkins' special assistant for military systems. Magnetic fusion physicists, however, say the plan is flawed because ICF is years behind magnetic fusion in the development of reactor concepts.

Stephen E. Bodner, head of the laser fusion R&D program at the Naval Research Laboratory, says the proposal is potentially destructive because it would drain away magnetic fusion resources. He says Hunter's "judgment has been excellent" in identifying weaknesses in the magnetic fusion R&D program. But while ICF one day may have some energy applications, for now he thinks it is best that the laser fusion effort continue to be funded through DOE's nuclear weapons program. Says Bodner of Hunter's new fusion R&D plan, "The present course is going to cause a great deal of damage and not necessarily achieve much."

Hunter's plan has produced something more than controversy; it appears to have helped set the stage for the House and Senate appropriations committees to cut

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$20 million from the $350-million magnetic fusion program. In what some congressional aides and lobbyists say was a strategic mistake, Hunter proposed that magnetic fusion R&D be cut back by $50 million in order to free up some funds to start the new ICF initiative.

Congress reacted coolly to Hunter's plan to shift money into laser fusion, but the appropriations committees seized the opportunity to slash the magnetic fusion budget. Comments an aide to one western Senator, "He is very naïve about dealing with the Congress."

Worse yet for Hunter's political standing is that his proposal produced a torrent of protests from prominent legislators. Senators James McClure (R–ID), James Sasser (D–TN), Bill Bradley (D–NJ), Pete Domenici (R–NM), Brock Adams (R–WA), and Bob Kasten (R–WI) were just some of the powerful congressmen angered by Hunter's plan because the funding scheme most likely would require the elimination of a number of small fusion research efforts under way in their states. In the face of congressional pressure, Hunter had to retreat a bit and pledged to have a blue-ribbon panel review the entire fusion program before making any major changes.

This fiasco has prompted politicians and scientists alike to question Hunter's managerial skills. Says one ranking DOE laboratory official, reflecting on Hunter's track record in the job, "He is a very bright guy, but a rotten administrator."

By no means have all of Hunter's actions been political catastrophes, however. MIT's Molvig, whom Hunter has relied on to help reshape the magnetic fusion program, says it appears that most fusion physicists are preparing to live with Hunter's move to delay the construction of the CIT. Indeed, they have little choice, since the appropriations committees backed Hunter's freeze by withdrawing the CIT from its list of construction projects. As for his maverick style, some DOE officials say his occasional disregard for procedure is productive.

A case they cite is a Hunter initiative to have DOE's government laboratories help U.S. industry develop compact, easy-to-run synchrotron light sources. These devices will enable semiconductor manufacturers to produce submicron integrated circuits using x-ray lithography. The idea is supported by companies such as International Business Machines, because it gives them the option of buying x-ray rings from U.S. companies instead of the United Kingdom or Japan.

Although there was no funding in the Administration's 1990 budget for an x-ray lithography program, Hunter is credited with making the Senate Appropriations Committee aware of the need to transfer synchrotron technology to industry. The Senate has since appropriated $15 million for the effort. "It was an outstanding job of circumventing the system," says one DOE official, noting that the tactic goes against normal budget procedures.

But even this victory has its price: The House of Representatives and the Senate say that the money for the x-ray lithography initiative will have to be stripped from other research efforts throughout DOE's $549-million budget for basic energy sciences.

Despite his ups and downs, Hunter shows no outward signs of being discouraged. Molvig, who first met Hunter in graduate school at the University of California at Irvine, expects that he will weather the controversy that has surrounded his first year at the department. "He is extremely tough at standing up to criticism when he knows he is right," says Molvig, who is thought to be Hunter's pick to head the Office of Fusion Energy.

But it is not clear whether Hunter is destined to lead the Office of Energy Research for the duration of the Bush Administration. For months there have been rumors that Hunter might be leaving and neither the White House nor Watkins has issued any statement indicating that he will be retained. When confronted with the question, a DOE spokesman told *Science* that Watkins "had been too busy to focus on the question of Hunter's appointment." Not even Hunter seems able to say whether he is here for keeps, stating that "I serve at the pleasure of the President and I assume my performance is acceptable."

■ **Mark Crawford**