U.S. WEAPONS PROGRAM

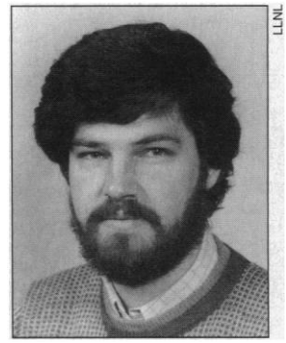
DOE Lifts the Veil of Secrecy From Laser Fusion

CHICAGO—For 30 years, U.S. research on inertial-confinement fusion (ICF) has been conducted in an intellectual fortress. Although well-funded, scientifically challenging, and important to both civilian energy and weapons research, the ICF program has suffered the stultifying effects of its classified status: rare publications in the open literature, few university collaborations, no graduate students, and no shop-talk at meetings.

The end of the cold war has prompted federal officials to reassess that policy. Last week Energy Secretary Hazel O'Leary announced a major change: the Department of Energy (DOE) will gradually declassify almost three-fourths of the remaining classified information on ICF (see sidebar below). Combined with previous declassifications that released about 25% of the material on hand, her decision should eventually leave just 20% of the information on ICF under wraps. The action "unties our scientists' hands," O'Leary said, and means that ICF researchers will soon be able to publish many of their results for the first time and to increase interaction with students, colleagues without security clearances, and foreign scientists.

"Science has always advanced by openness," says E. Michael Campbell, head of ICF at Lawrence Livermore National Laboratory, which includes experiments on the massive Nova laser (*Science*, 3 December, p. 1504). Campbell predicts widespread benefits to science when what he terms the "impressive and sophisticated" dataset from these experiments are made available. Edward Fuller, president of the American Nuclear Society, praised O'Leary as "a breath of fresh air at DOE" and foresees advances akin to the flowering of nuclear and plasma physics that followed the declassification of fission energy and Project Matterhorn (magnetic fusion) in the mid-1950s.

Others, though generally pleased, are more measured in their assessment of the impact of declassification. "There aren't any earth-shaking magic bullets that will come out," says Robert McCrory, director of the Laboratory for Laser Energetics at the University of Rochester, whose security clearance allows him to keep abreast of developments in the field. "What you're going to see is a lot of high-quality work that we've been doing for a long time but couldn't talk about."



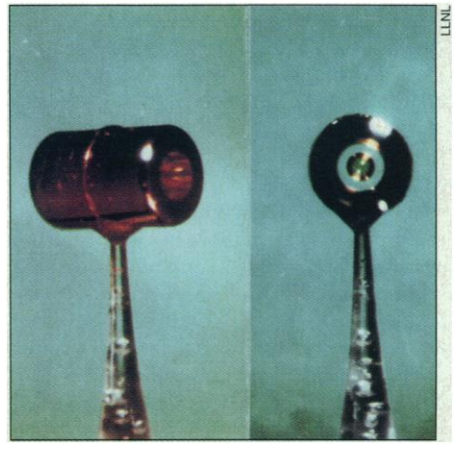
Open for business. Livermore's E. Michael Campbell welcomes the changes.

ICF's civilian goal is to explore the possibility of creating usable fusion energy by heating small pellets of deuterium and tritium with laser and particle beams. Eventually, researchers hope to generate more energy from the pellets than was used to ignite them. But the conditions inside a hot, compressed pellet can mimic those of a thermonuclear weapon—which is why ICF is also used to study the physics of nuclear explosions. As a result, much of the program has remained classified, despite several doses of partial openness over the past two decades. The earlier activity, for example, had resulted in declassifying so-called direct-drive ICF, in which laser or particle beams strike the fuel pellet directly.

The present declassification is expected to relate mainly to indirect-drive experiments. In this scheme, the beams first strike a gold shroud called a hohlraum, heating it to temperatures so high that it emits x-rays, which compress the pellet and start the nuclear reaction. The x-ray pattern is generally more uniform than the pattern from the original beams and therefore better suited to even compression.

O'Leary stressed that the information released would deal with conditions quite different from those inside weapons. "Believe me," says a classification officer in ICF, "if it was a short step [from typical ICF experiments to a bomb], the program would stay classified for a long time."

The declassification has already paid some dividends to civilian researchers in the



Clearer view. This picture of a hohlraum target is the first ever released by a U.S. laboratory under new rules for ICF research.

An 'Openness Initiative'

The Department of Energy (DOE) last week promised to release 32 million pages of once-secret documents as part of a new policy bearing the slogan: "The Cold War's Over...And We're Coming Clean." Press coverage has focused on the revelations of 204 previously unannounced nuclear tests, the amount of plutonium stockpiled at certain DOE facilities, some details of radiation experiments on humans over the past half-century, and the amount of mercury used and released in weapons production. Those were jarring disclosures. But for researchers, the real news is that DOE hopes to reduce the amount of material that gets routinely classified in the first place.

Details of the new "Openness Initiative" will not be available until after DOE meets in February with its "stakeholders"—historians, environmental groups, state officials, and others with compelling reasons to obtain the information. The public meeting will discuss DOE's declassification priorities and possible reform of what O'Leary called the "badly outdated" 1946 Atomic Energy Act that dictates what DOE now holds secret. Changes are already in the works. DOE will double (from three to six) the number of employees reviewing Freedom of Information Act requests with the goal of reducing turnaround time from an average of 18 months to as little as 3. The agency also plans to lend up to six technical experts to the National Archives and Records Administration, where DOE estimates that 1000 linear feet of documents could be declassified. And it expects to improve public access to DOE facilities by consolidating classified programs to small restricted areas and loosening security elsewhere.

O'Leary has promised a progress report in 6 months. But the overall direction is already clear, says DOE spokesman Sam Grizzle. Evoking an old cigarette slogan, he explains that DOE intends to "classify less and enjoy it more."

–Christopher Anderson

field. Previously secret numbers now available include the approximate temperature of the hohlraum—up to 300 eV, or 3.5 million degrees kelvin—and the approximate size of the hohlraum and pellet—roughly a millimeter and one-third of a millimeter, respectively. But information on underground ICF experiments involving nuclear explosions, as well as computer codes modeling thermonuclear reactions that predict pellet performance, is not expected to be declassified. (The codes could be scaled up to match the parameters for weapons.)

For the moment, however, many practicing researchers in ICF are simply happy to be free of some of the shackles on normal scientific discourse. Particularly satisfying is a loosening of the "no comment" rule, which prohibits reaction to research presented openly by scientists from other countries if the work would be considered classified by the U.S. government.

Those restrictions have muzzled Melissa Cray, acting head of ICF at Los Alamos National Laboratory, during visits to foreign research institutions. "All I can say is 'Mm... Mm-hm,'" explains Cray. "Even ooh-ing and ah-ing is not allowed—that counts as a comment. It's been a pain in the butt."

Rank-and-file researchers in ICF are still learning how the guidelines will affect dissemination of their work. Some wonder, for example, if use of classified codes in part of a study will make the entire work ineligible for publication. "I think everyone's excited about being able to publish," says Chris Keane, a physicist at Livermore. "But I don't know if there's going to be a stampede." Whether it's a stampede or just a leisurely walk, however, researchers on ICF are starting to feel much better about the conditions under which they do science.

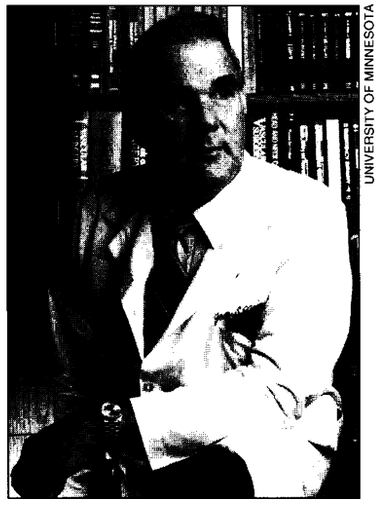
–James Glanz

James Glanz is a science writer in Chicago.

RESEARCH ETHICS

Scandal Scars Minnesota Medical School

University of Minnesota organ transplant researcher Arthur Matas knew that relations between the medical school and the university administration had finally hit rock bottom when he received an anonymous response to a memo he wrote to the university's president and board of regents. "If your academic and surgical skills are as inept as your writing ability, it is no surprise that the transplant program has fallen into disrepute," the venomous missive begins. Matas had complained about the administration's crackdown on the medical school in the wake of a scandal involving the manufacturing and sale of an experimental drug to prevent the rejection of transplanted organs. But the response made it clear someone in the administration saw the medical school faculty as profiteering prima donnas who deserved to be punished. "You ask how things can have deteriorated to this point," the poison-pen letter continued. "The answer is simple—it's greed."



Surgical removal. Transplant surgeon John Najarian is under fire.

Strong words. But sentiments like these have become the norm at the University of Minnesota, where a scandal in the medical school's transplant surgery program, one of the top two in the nation, has pitted faculty against administrators and may cost the school some of its leading researchers. Investigations over the past year have revealed that an arm of the medical school's transplant department manufactured and sold a leading antirejection drug for more than 20 years without necessary federal approval. The resulting fallout has raised questions about the university's ability to properly oversee researchers who become involved in commercial ventures. And outside the university, patients and transplant surgeons are trying to cope with the loss of what many consider to be the best and least expensive immunosuppressant drug available.

More than a year after the local paper, the *Minneapolis-St. Paul Star Tribune*, first raised questions about the drug sales, separate university and federal investigations have brought many of the facts in the tangled affair to light. In 1971, University of Minnesota transplant surgeon John Najarian received permission from the Food and Drug Administration (FDA) to manufacture and experimentally use a drug, antilymphocyte globulin (ALG), that prevents the immune system from rejecting transplanted organs. Since then, at least 50,000 transplant patients have been treated with ALG, which is available only from the Minnesota program, generating sales exceeding $60 million.

There's only one problem: The sales were almost all illegal, since ALG has never been approved for commercial use. Until 1980, interstate sales of investigational new drugs (IND) were prohibited, and after that they were allowed only under certain circumstances with explicit FDA approval. The news shouldn't have been a surprise to ALG program officials: The FDA told ALG program officials on five occasions over 19 years that they could not sell ALG, according to a university investigative report released in October.

Who's to blame? Last year the ALG program came to a screeching halt when the FDA placed a "clinical hold" on ALG, prohibiting its use. Among the offenses cited were the fact that, although ALG was officially an experimental drug in clinical trials, case reports for many of the estimated 100,000 patients who got the drug were never filed, informed consent was not always obtained, and some side effects and three deaths related to ALG were not reported to the FDA.

The FDA and federal law enforcement agencies began investigations to determine whether criminal charges were warranted and, if so, whether they should apply only to individuals or to the university as a whole. In response, the administration hired two law firms and accused the ALG program of having misled university officials about the legal status of the drug and of failing to notify the university of FDA's concerns. In September 1992, the university began procedures to fire Richard Condie, the program's director, and later accused him of diverting $174,000 from ALG-related revenues to his personal bank accounts. A federal grand jury is investigating Condie in connection with the ALG sales, and earlier this month he resigned from the university. (Condie says the $174,000 represented legitimate consulting fees.)

The reverberations continued into 1993. In February, university president Nils Hasselmo asked Najarian to resign as head of the surgery department and took away the department's oversight of the ALG program. By June, both the university's vice president for health science and the dean of the medical school had resigned. In October, the university began proceedings to strip Najarian of tenure and fire him.

As federal investigators pore over the case, one question stands out: Why didn't Minnesota simply file the paperwork to make ALG sales legal? Najarian says the program was trying to do just that when the FDA shut it down last year. After clinical trials have shown efficacy, he says, "there is one rule of getting a license, and that is that [the drug] must come from a licensed facility." Univer-