GAO Battles Pentagon on Chemical Weapons

A recommendation against binary weapons production by congressional auditors again proves persuasive in the House of Representatives

For more than 3 years, the Reagan Administration has sought congressional approval to begin the production of new chemical weapons. Several months ago, it appeared as if the Administration had finally won. The House of Representatives, which has consistently opposed the idea, authorized $163.6 million for the production of munitions filled with the nerve agents VX and GB.

In late October, however, the House reversed itself and recommended the elimination of all funds for chemical weapons production from the 1986 budget. Both critics and proponents agree that a major factor in this surprising decision was a General Accounting Office (GAO) report, completed in early June, that depicted serious technical problems with the munitions.

Although it is partly based on unclassified DOD data, the report was officially stamped "Secret" by the Pentagon shortly after its completion. Normally, this would have sharply limited its audience because most congressional staff members lack the requisite clearance. News of its contents began to circulate, however, after Donald Hicks, the under secretary of defense for research and engineering, released a critique of the secret report on 5 September.

In a barbed letter to Eleanor Chelimsky, the director of GAO's program evaluation and methodology division, Hicks charged that the GAO's work contained "serious errors" and presented "data taken out of context." He denied a GAO claim that the Pentagon had relaxed its technical criteria for one of the new munitions and insisted that a far greater percentage of munitions tests had succeeded than the GAO acknowledged.

Chelimsky was delighted by this attack because it gave her an opportunity to respond with an equally vigorous, open letter laying out the GAO's concerns. Chelimsky, who previously worked for NATO and the Mitre Corporation, and Kwai-Cheung Chan, a senior analyst who had previously worked at the Institute for Defense Analyses, together drafted a detailed rebuttal, which suggests that the principal new chemical munition has been inadequately tested and may suffer from design defects.

This munition, known as the Bigeye bomb, is designed to be released by airplanes over enemy air fields and command posts, well behind the battlefront. A so-called "binary," it consists of a casing filled with a nonlethal chemical, known as QL, and a hard sulfurous core, which is inserted just before the plane takes off. These two substances are violently combined when a small explosive charge propels the core into the chemical; vigorous stirring then "purifies" the mixture into a persistent nerve agent, which is meant to be absorbed through the skin and cause death within minutes.

The Bigeye's difficulties stem from the fact that its designers failed to foresee advances in Soviet air defenses, which require that it be carried for long distances at low—rather than high—altitudes, generating unexpected friction and heat. Three years ago, when the Pentagon first started testing the Bigeye at higher temperatures, a bomb exploded shortly after the stirring process began; since then, several others have either exploded or been seriously deformed from excessive pressure. The danger is that such an accident could jeopardize not only the pilot but also civilians or friendly forces beneath the plane's flight path.

The Pentagon believes it has solved this problem by adding a lanyard to the bomb so that mixing is automatically begun only after it falls away from the plane. The GAO believes that troubles persist, citing test results which indicate that inadequate mixing occurs at temperatures above 120°, commonly encountered during a low-altitude flight. In addition, it says that the Pentagon's solution has created a subsidiary problem: In order to allow sufficient time for purification after the bomb is released, the pilot must loft the bomb by releasing it during a steep, straight climb to a higher altitude two to four miles ahead of the target. The GAO says that this tactic "makes the aircraft more vulnerable to enemy defensive measures than the original tactic" of high-altitude attack.

Hicks countered that this method is also used by planes carrying nuclear or conventional munitions. But critics of the weapon seized on the GAO assessment and noted that even the Administration's own Chemical Warfare Review Commission (*Science*, 17 May, p. 831), said that due to "risk of [aircraft] loss and mission failure . . . Bigeye is not the optimal solution for the longer-range battlefield mission."

Hicks also maintained that adequate chemical mixing occurred in 19 of 22 "valid" tests. This view was seconded by Thomas Welch, the deputy assistant to the secretary of defense for chemical matters, who told reporters that "the bomb continues to be a success story. . . . It's clear to me and I think to most that if a weapons system is not going to work, the Secretary of Defense will not permit us to . . . produce it."

Pentagon research chief Donald Hicks (left) says that the GAO report contains serious errors but Eleanor Chelimsky of GAO (right) says that DOD's data is "confused."

Chelimsky did not buy these arguments. She responded first that Hicks's tally of successful tests is different from one previously provided by the Pentagon, and that "DOD's confusion about its own results and apparent inability to give us consistent information reflects poorly, in our view, on the quality of its evaluation program and the manner in which it has been implemented."

Second, Chelimsky suggested that some of the "valid" tests should have been excluded from the tally because they occurred before the most recent design changes. And third, she suggested that the Pentagon had relaxed its criteria for a successful test from one in which minimum purity was obtained for a period of 25 seconds to one in which minimum purity was obtained *at any moment* over a 25 second period. "The importance of this from an evaluative viewpoint is clear: (1) there is confusion about what the criteria actually are; (2) they seem to be in a quasi-constant flux; and (3) the validity of the criteria and hence the effectiveness of the bomb are open to question," Chelimsky wrote.

Another GAO report, issued on 16 September, added that there was uncertainty about the Bigeye bomb's accuracy and the reliability of its fuse and noted that a final design for the QL production plant would not be completed until March 1987. An aide to Representative John Porter (R–Ill.), a persistent chemical weapons opponent, said that all of these points were "crucial to our success. It kept our supporters solidly behind us and persuaded some of the moderates to come on over." Porter was able to bring details of the secret study to his colleagues' attention by arranging for the House Appropriations Committee to exclude the public from its final voting session, in which 26 voted against production and 24 voted for it. No effort was made to reinstate the funds on the House floor because of even more lopsided opposition.

The House did agree to reconsider the Administration's proposal for new production in October 1986 if the President certifies that the destruction of old stocks will proceed promptly and if U.S. allies formally agree "to accept storage and deployment . . . within their territories."

The Senate, however, is expected to approve funding for new production without these conditions, and the issue will ultimately be decided by a conference committee. The total chemical weapons program is expected to cost $15 billion to $26 billion over the next 10 years.—**R. JEFFREY SMITH**

Congress Questions SSC Cost

A prestigious group of European and American physicists went before the House subcommittee on energy development and applications on 29 October to press their case for the superconducting supercollider, a 20-trillion-electron-volt colliding beam accelerator that would be some 90 kilometers in circumference if and when it is completed in the 1990's. Chairman Don Fuqua (D–Fla.) and his colleagues greeted the physicists with praise for the scientific quality of the supercollider concept—and skepticism about the viability of the $4-billion project in the face of a mounting federal deficit.

One intriguing statement of support for the supercollider came from Herwig Schopper, director-general of the European Center for Particle Physics (CERN), and from Harvard University's Carlo Rubbia, who has been a prime mover behind the development of European high energy physics, and who shared the 1984 Nobel prize for the discovery of the W and Z particles at CERN. A year ago the Europeans were pushing for the construction of a so-called Large Hadron Collider at CERN as an inexpensive alternative to the U.S. supercollider; the idea was that a ring of advanced superconducting magnets placed in the 27-kilometer circumference tunnel of CERN's Large Electron-Positron (LEP) machine, now under construction, could achieve nearly half the supercollider's energy for perhaps one-tenth the cost.

At the hearings, however, Schopper and Rubbia alike emphasized that the CERN machine would be at most a stepping stone to the supercollider, *not* a replacement. The CERN collider, constrained by having to fit into a preexisting tunnel, would not be the optimal machine for exploring this energy range. "The supercollider is what you would build if you started with a blank slate," said Rubbia. Given the fiscal realities in Europe, highlighted by Britain's recent threat to cut its contribution to CERN by 25 percent (*Science*, 28 June, p. 1509), it is all CERN can do at the moment to handle LEP. "LEP has strained our money and manpower resources to the limit," said Rubbia.

Following Schopper and Rubbia, Yale University's Jack Sandweiss, chairman of the Department of Energy's High Energy Physics Advisory Panel, described the panel's recently completed study on the transition to the supercollider era, assuming that the machine is built according to the current schedule. In fiscal year 1987, for example, the energy department's high energy physics budget will be $618 million in fiscal 1987 dollars. By 1995, said Sandweiss, routine operation of the supercollider together with the department's other high energy physics programs could be accommodated with a budget about 10 percent higher ($680 million in 1987 dollars). In-between, however, new money would be needed for construction; funding would peak at $1400 million in fiscal year 1991.

Not surprisingly, Sandweiss and his colleagues urged that the energy department maintain a vigorous program of research at existing high energy physics facilities during the intervening years. However, they also identified a short list of experiments as being especially deserving of support, tacitly recognizing that some of the others may have to be sacrificed. Indeed, at the hearing Sandweiss explicitly talked about the need to either close down some facilities or to divert them to non-high energy work.

For all of that, the hearing was rife with concerns about the financial viability of the supercollider. The sharpest exchange came when Representative Joe Barton (R–Texas) questioned the physicists about their recent selection of a high-field magnet design for the project (*Science*, 4 October, p. 50). He wondered whether an alternative design—championed by the Texas Accelerator Center, as it happens—might have been substantially cheaper. The physicists made a strong argument that the cost differential would be negligible. But either way, the question may prove academic. Symbolically, the House was debating the Gramm-Rudman deficit reduction measure even as the hearings were in session; many physicists and Capitol Hill staffers alike are saying privately that the supercollider in its present form is now a hopeless dream.—**M. MITCHELL WALDROP**