economic arguments in favor of fast breeders, the answer is likely to be "wait and see." The British Conservative government faces the political challenge of bringing to fruition a program to construct ten light water reactors announced by Prime Minister Margaret Thatcher, the first of which, at Sizewell in Suffolk, is due to become the subject of a public inquiry in January. In the circumstances, an earlier government promise of an inquiry into the commercial development of fast breeders now seems a distant prospect.

Certainly, the fast breeder does not lack enthusiastic supporters in Britain (or elsewhere in Europe, for that matter), such as Walter Marshall, until recently head of the United Kingdom Atomic Energy Authority. The main British utility, the Central Electricity Generating Board (which Marshall now heads), however, basing its assessment on economic rather than technical arguments, has always been less enthusiastic. For example, it turned down an invitation to contribute toward the cost of the UKAEA-financed fast breeder at Dounreay, which according to estimates by Colin Sweet of the South Bank Polytechnic in London, has a spotty operating record, reaching only 6.8 percent capacity over its first 8 years of operation.

Britain's medium-term plans for the fast breeder are currently being thrashed out in the U.K. Department of Energy. As noted earlier, substantial investment is likely to be delayed for the next 20 years.

Given the cost escalation, almost all countries agree that there is a strong case—again in principle—for the next step toward a commercial demonstration fast reactor to be taken internationally. The French, for example, have long said that they would welcome more foreign partners in the development of Super-Phénix II, a topic which is said to have been the subject of recent negotiations both with the Americans (a possible substitute for the Clinch River liquid metal fast breeder?) and with Japan.

Again, however, the hurdles to international collaboration are high, ranging from security and legal concern about the control of plutonium, to the equitable distribution of construction contracts. Furthermore, any effort to mount an international project is seen by some critics as an attempt by nuclear supporters to evade domestic criticism. "It looks as if the breeder people are going for another Concorde syndrome, so that if they get an international treaty, it will be impossible to cancel it," says Walter Patterson of Britain's Friends of the Earth.

At the time of the INFCE studies, any decision not to proceed with a commercial program of fast breeder reactors was portrayed as a major political gamble. Today the technology has lost its imperative. As a result, proceeding with the rapid development of fast breeders, given demand uncertainties and the apparent medium-term adequacy of uranium supplies, is coming to be seen in Europe as an economic and political gamble whose outcome is unpredictable—and perhaps equally risky.—**DAVID DICKSON**

Can OMB Cure Accountability Strife?

Agency seeks better way to audit university R & D fund management; Harvard's, meanwhile, faulted to tune of $1.7 million by federal auditors

The chronic tensions between universities and federal auditors flared again recently when the government released a report of an audit of the Harvard Medical School's handling of federal grant and contract funds over a 3-year period, recommending that Harvard pay back $1.7 million. The way Harvard figures, it may owe $1400, but certainly not $1.7 million. The decision is being appealed.

Underlying the dispute are deep-seated differences over the way universities use and account for federal R & D funds. The basic issues in the new case are the same that fueled a protracted wrangle over time and effort reporting under Office of Management and Budget (OMB) Circular A-21. That conflict was quieted by a compromise (*Science*, 27 August, p. 810), which, however, may prove to be a truce rather than a peace treaty.

An effort to find a broader modus vivendi is now being made under the aegis of OMB. The compromise effort is taking the form of an experiment with a so-called single audit. The "single" means mainly that an institution would be expected to have one audit of its whole research accounting system rather than audits of separate programs as is now done. An experiment funded by the Department of Health and Human Services (HHS) is also in progress under which institutions doing federal R & D work could be audited by private accounting firms under guidelines agreed to by the government, thus relieving federal auditors of a major share of their work load of auditing universities. Harvard, despite its troubles with the federal auditors or perhaps because of them, is in the forefront of the experiment.

In the new claims against Harvard, nearly $1.6 million of the disallowances involve disputed cost transfers. The federal auditors say that charges in that amount were improperly transferred to certain federal projects from other projects, federal and nonfederal, "to reduce cost overruns and/or utilize unexpended funds." The broad issue at Harvard and elsewhere remains the HHS auditors' insistence that the weakness of university accounting systems makes it impossible to relate salaries to effort expended.

Harvard denies any wrongdoing. The 3 years covered in the audit were 1975, 1976, and 1977, and Harvard's vice president for finances, Thomas O'Brien, says that the federal auditors looked at individual transactions so long after the fact that it was impossible to reconstruct the circumstances. O'Brien insists that the audit showed "no fraud, no abuse, no diversion of funds." What is involved, he says, is a disagreement over application of the accounting rules then in force.

HHS auditors conducted the audit at Harvard. HHS is not the only agency responsible for auditing R & D funds, but its auditors have acquired a reputation for being sticklers in applying the letter of regulations. University faculty and administrators saw HHS auditors as their main antagonists in the conflict over effort reporting under A-21. HHS audits about 95 percent of federal R & D projects but these involve only about 50 percent of the total funds.

Federal officials concerned about accountability are critical of university bookkeeping systems and seem to regard

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many researchers as cavalier in their handling of public funds. In the universities, especially among faculty, there is a tendency to deplore a "bean counter" mentality on the part of federal auditors. HHS auditors are charged with following standard accounting procedures suited to auditing the procurement of goods, but inappropriate when applied to R & D. The critics note that there has been little friction with auditors from the Defense Department's auditing agency or Office of Naval Research, who are regarded as knowledgeable about research.

There is agreement on both sides, however, that the root of the difficulty is that faculty duties include both teaching and research and it is, in practical terms, very difficult to allocate time for federal reimbursement only to research activities as the law requires.

The conflict over accountability for salary costs is relatively new since federal auditors only recently turned their attention to direct-cost charges—those for salaries, materials, and other specific costs of research. For years, arguments about accountability had been dominated by indirect costs—charges by universities for use of lab space and offices for research, library facilities, and various support services. The sharper focus on direct costs is due not only to auditors' keenness, but to critical comment from the General Accounting Office and from Congress.

One result of the new interest in direct-cost issues was an effort by the HHS inspector general's office to prod universities to adopt better "on line" auditing measures to keep tabs on spending in a more timely fashion, rather than certifying research activity retrospectively, for example, 6 months or a year after the fact.

Another response is the HHS-funded experiment. The idea is that the individual institution will engage independent auditors—private accounting firms or state auditing agencies, for example—to carry out an audit of federally supported R & D activities which can be reviewed by federal auditors. The University of Pennsylvania apparently pioneered the scheme and Harvard has recently completed such an audit using the same firm, Coopers & Lybrand. A more broadly based pilot program initiated by HHS is now in progress. Some 22 major research institutions are participating and the program is being extended to 25 smaller colleges and universities.

The idea has definite attractions for the government. As the pressure for more frequent audits has increased so

Gore Proposes Oversight of Genetic Engineering

Legislation for a federally mandated committee to oversee genetic engineering is likely to be introduced when the new Congress convenes in January. On the basis of a recommendation from the President's Commission for the Study of Ethical Problems, Representative Albert Gore, Jr. (D–Tenn.) plans to introduce a bill to create some kind of oversight body, but its exact nature and the extent of its authority have yet to be determined.

The commission's recommendation of an oversight body was echoed again and again during three full days of hearings that Gore, chairman of the House subcommittee on investigations and oversight, held recently on all aspects of human genetic engineering. Some two dozen researchers, ethicists and legal scholars testified and reached what one House staffer called an "amazing consensus" in favor of a federal watchdog for the research and medical application. "Different people testified that the proposed body be essentially educational, others wanted it to have real regulatory authority, but no one was against the idea altogether," he said. "The congressman was surprised at that and very encouraged to go ahead."

Representative Albert Gore, Jr.

Testimony revealed a consensus for a watchdog committee

The hearings also reached near consensus on the idea that there are no fundamental ethical objections to gene therapy for debilitating diseases such as thalassemia and sickle cell anemia but there are serious issues to be resolved before using genetic engineering for "enhancement" of human characteristics including height or intelligence. In addition, the witnesses opposed far-out applications such as the hybridization of a human being and a chimpanzee. "The prospect of creating an actual being with partially human characteristics offends a deeply held taboo," said attorney Alex Capron of the President's commission. "There is, however, no legal or regulatory prohibition of such a step," he told Gore.—**BARBARA J. CULLITON**

Synfuels Program Runs Out of Projects

"The scope of this project is greater than the sum total of the interstate highway system, the Marshall Plan, and the space program all combined," President Carter said in 1980 as he installed the first chief of the Synthetic Fuels Corporation (SFC). Now, just 2 years after that grand christening, the SFC finds itself embarrassingly free of commitment, with a shrinking agenda. Five major synfuels sponsors have quit the market since 1980. Three of them gave up promised federal support.

The withdrawal of Ashland Oil on 22 November left the SFC with only one project in its portfolio, Union Oil's scheme to convert Rocky Mountain shale to crude oil. The plant, near Rifle, Colorado, is supposed to begin producing late next year at a rate of about 10,000 barrels a day. Even this was not an SFC original, but a hand-me-down commissioned by the Department of Energy (DOE) in July 1981 and passed along to the SFC for monitoring.

In the agreement with Union Oil, the government promised to support a price of over $40 a barrel for synthetic fuel produced in Colorado, with a maximum federal outlay of $400 million. That leaves the SFC today with $14.8 billion in uncommitted assets.

Ashland was the backer of one of two major synfuels projects that came

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have the costs. HHS is said to be following the law in using over 20 percent of its auditing resources in checking on R & D expenditures which amount to only 2 or 3 percent of the agency's total outlays. HHS and OMB officials say they would prefer to see the auditors redeployed to Medicare, Medicaid, and Social Security programs, which are regarded as more vulnerable to mismanagement and fraud than R & D.

A major hurdle facing the experiment is getting agreement on the guidelines the private auditors would observe in looking at the books. HHS produced a bulky draft audit guide at which university officials bridled. Modifying suggestions were then made by the Council on Government Relations (COGR), the organization through which the big research universities mainly negotiate with the government on financial issues. The COGR proposals were largely ignored by HHS in providing a revised version of the guide. The universities made known their disappointment and are, in effect, waiting to see what new terms will be offered. How HHS receives the new Harvard audit by a private firm will be taken as a significant indication of HHS attitudes.

The OMB-led quest for a single audit scheme is centered on a revision of OMB Circular A-110 which contains uniform accounting requirements for universities and other nonprofit institutions. There is a precedent for the single-audit idea in the rules now being applied for auditing of federal funds spent by state and local governments. Plenty of problems remain. It is not clear that the single audit is working well with state and local governments. And the answers to questions such as the level of funding at which the single audit principle should be applied and frequency with which audits should be conducted are far from agreed upon.

At this point, the attitude of the universities toward the proposed reforms seems to be one of cautious pessimism. Conversion to a single audit and the use of independent auditors could bring welcome relief. But before that is accomplished, many hard, practical issues remained to be resolved. How, for example, would the not inconsiderable private auditors' fees be paid? Would they be chargeable as indirect costs? No answer is available. And there is skepticism that OMB could effectively enforce a revised A-110. The drawback is what might be called Catch A-21: Everyone may embrace the reform principle, but it is the interpretation by particular agencies, even by individual auditors, that continues to cause the bind.—**JOHN WALSH**

The Dense Pack Debate Begins

A vigorous congressional debate is expected in the wake of President Reagan's announcement, on 22 November, that he intends to deploy the MX nuclear missile in a basing mode generally known as Dense Pack. Under his proposal, 100 MX's will be placed in a series of closely spaced missile silos, to be constructed between 1984 and 1989 on remote plains to the northeast of Cheyenne, Wyoming.

According to the Pentagon's best estimates, the construction of this system will cost at least $26 billion (not including inflation), yet it will protect only a portion of the missiles, and even then for only a few hours after the start of a Soviet attack. At best, this guarantee runs only from 1989 to 1995; after that, the Soviets will have developed the means to kill all of the missiles right away, and a multibillion dollar fix will be required (*Science*, 26 November, p. 865).

Politicians in Wyoming are warm to the idea, confirming the state's long-standing reputation for hawkishness in foreign affairs. Senators Alan Simpson (R–Wyo.) and Malcolm Wallop (R–Wyo.), who are among the most business- and defense-oriented in Congress, have enthusiastically endorsed the Dense Pack proposal. Governor Ed Herschler, a Democrat, has been more reserved, calling it a mixed blessing because of its potential to boost the state's economy as well as to alter its environment. It is, he said, a little like "a teen-age daughter coming home at 3 a.m. with a Gideon Bible under her arm."

On the day before the President's announcement, Herschler joined with seven other Western governors in calling for the preparation of a formal environmental impact statement and the organization of public hearings prior to any MX deployment. The Pentagon is expected to reject this request, claiming that it would create too much delay. Congress will have to approve any exemption from the requirements for a formal statement, and the Pentagon faces a difficult fight.

Opposition to the proposal may develop among some of Wyoming's cattle ranchers or oil and gas firms. The Dense Pack scheme will remove about 20 square miles of land from prospective commercial use, all of which is now in private hands. Little opposition is expected in Cheyenne itself, which has become accustomed to the presence of 200 Minuteman III nuclear missiles at nearby Warren Air Force Base. But residents of neighboring states are apparently worried about the proximity of Dense Pack. Governor Richard Lamm of Colorado, a Democrat, says that he fears that it will make the entire region into a more attractive nuclear target.

In Washington, much of the debate is expected to revolve around the implications of Dense Pack for arms control. The Soviet Union has focused on the usefulness of the MX in a potential first-strike by the United States, denouncing the deployment proposal as "a new dangerous step on the path of stepping up the strategic weapons race, of preparing for a nuclear war." In an article in *Pravda* on 25 November, the Soviets noted specifically that it will violate a central provision of the SALT I and SALT II arms agreements—the requirement that neither side create any new fixed, underground launchers.

The Reagan Administration argues that Dense Pack skirts this provision by means of a neat technical trick. The MX, unlike existing U.S. nuclear missiles, is not actually launched from the silo itself. It is launched from a canister that sits inside the silo. The canister can be moved from place to place, although it will not be moved at all under the existing Reagan plan. Nevertheless, the Administration says that because of this, the silos are not actually launchers, the capsules are not really fixed, and no treaties will be abrogated.

As it happens, Paul Warnke, who led the U.S. negotiating effort for SALT II, disagrees vehemently with the Reagan Administration's interpretation. "Dense Pack is a violation of both SALT I and SALT II," he says. Senator Larry Pressler (R–S.D.), the chairman of a key arms control subcommittee, takes a similar view.—**R. JEFFREY SMITH**

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