American Association for the Advancement of Science — New York

Administration hints at clampdown on biotechnology exports

AMID charges from the Department of Defense (DoD) and US intelligence agencies that the Soviet Union is applying biotechnology to biological warfare research, the Reagan Administration is beginning to suggest that biotechnology may have to be brought under export control regulations designed to halt the flow of "militarily critical technologies" to potential adversaries.

The Reagan Administration's interpretation of the export control rules has been the subject of controversy, particularly in the crackdown on exports of computer components and in DoD's recent efforts to shut out foreign nationals — even those from NATO countries — from scientific meetings held under its sponsorship.

At the AAAS meeting here, John Birkner of the Defense Intelligence Agency predicted that "dual use" biotechnology — items with both peaceful and military applications — would sooner or later have to be restricted. He asked scientists in industry and at universities to help DoD learn "how our technology may be turned against us" so that a "prudent" list of militarily critical technologies can be compiled for biotechnology.

Items listed as militarily critical can be exported only with a licence issued by the Department of Commerce. To qualify for the list, a technology must not already be possessed by "principal adversaries" nor available to them from a third party. Birkner said that specialized polymers, synthetic elastomers and detectors for chemical and biological warfare agents would all be likely candidates for inclusion on the list.

The charges that the Soviet Union is already exploiting biotechnology for biological warfare have emerged in recent weeks from official DoD sources, the Central Intelligence Agency and a series of articles in the *Wall Street Journal*. DoD's recent report on Soviet military power asserts that the Soviets have an active research and development programme to investigate the utility of biological weapons; Birkner said that "there are at least seven biological warfare centres in the Soviet Union that are under strict military control" and which are applying "selected aspects of genetic engineering to their work". The *Wall Street Journal* articles made similar accusations, and in turn have been sharply criticized by many US researchers for imputing sinister motives to research activities that are indistinguishable from US efforts in biotechnology and basic genetic engineering.

The putative activities of the Soviet Union would constitute a violation of the

1975 convention banning the possession or development of biological weapons. The United States had earlier accused the Soviets of violating the treaty (and the 1925 chemical warfare treaty) by using toxin and chemical weapons in Afghanistan and South-East Asia.

Meanwhile, some new light has been shed on the US military's own programme of recombinant DNA and hybridoma research. Thomas Dashiell of the Office of the Secretary of Defense appeared at the meeting here with a list of 43 biotechnology research projects funded by DoD as of 30 April. The bulk of the projects deal with development of vaccines against disease endemic in areas where US troops might be sent or against possible biological warfare agents, such as anthrax. Other projects are aimed at developing enzymes to decontaminate chemical warfare agents and at producing materials such as epoxies, lubricant stabilizers, biofuels and marine anti-fouling agents.

The research, which is divided between in-house efforts (mainly at Fort Detrick in Frederick, Maryland — the former biological warfare research establishment) and sponsored research at universities (among them Massachusetts Institute of Technology, Texas A&M University, Rockefeller University, Purdue University and the Universities of California, Massachusetts, and Maryland), is all unclassified. Dashiell suggested, however, that if the research moves beyond the basic stage — which he says is not likely to happen for eight years at least — some of the development work may be subject to secrecy restrictions.

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Peter David adds: In Washington meanwhile, Congress received an unexpected signal last week that the Reagan Administration may be softening its stance on the control and publication of research findings. Dr Edith Martin, Deputy Under-Secretary of Defense for research and engineering, announced during a hearing of the House Science and Technology Committee that the administration intended to rely on formal classification procedures to keep sensitive research out of the hands of foreign nations.

Apparently reading from the still-unpublished report of a senior interagency group examining technology transfer, Dr Martin said it was the policy of the administration that "no restrictions may be placed on the conduct or reporting of research that has not received national security classification".

Although the statement referred specifically to "fundamental" research, it was taken by observers at the AAAS meeting to

imply that the Department of Defense (DoD) had dropped a controversial plan to restrict the publication of applied research that was sensitive but not formally classified. Drafted as part of a wide-ranging review of the Pentagon's approach to international technology transfer, the plan would have insisted that DoD contracts for work that was both "applied" and "sensitive" should in future give the Pentagon the right to prevent publication of the resulting findings.

In meetings with universities in recent months, Dr Martin had argued that total reliance on classification, in which it would be necessary to show that publication of the research would constitute a direct threat to national security, was too inflexible. But her proposal to create a new category of sensitive research whose publication would be controlled by DoD was fiercely opposed. Three universities — Stanford and the California and Massachusetts Institutes of Technology — wrote to DoD and to the White House science office claiming it would prevent them from undertaking certain categories of research for DoD. □

Europe uneasy at CERN rival

DR Herwig Schopper, director general of the European Organization for Nuclear Research (CERN), is sowing seeds of dissent to the ambitious US plan for a massive new particle accelerator. Speaking here at the AAAS meeting, Schopper suggested that the tunnel now being completed for LEP, CERN's 100-GeV electron positron collider, could be used for a future proton machine with capabilities approaching those of the US design, and at substantially lower cost.

While careful to stress the importance of "complementarity" between European and US efforts in high-energy physics, Schopper clearly implied that the United States could find itself competing with CERN for the claim to the next large accelerator.

The United States made an initial commitment to its proton collider, known formally as the Superconducting Super Collider (SSC) (and earlier known as the "Desertron"), last year when the High Energy Physics Advisory Panel endorsed the concept. The panel, which represents the particle physics research community and which makes recommendations to the Department of Energy (DoE), at the same time voted to abandon Brookhaven ►

National Laboratory's unfinished ISABELLE accelerator, recognizing the unprecedented concentration of technical and financial support that SSC would require.

As now envisaged, SSC would attain centre-of-mass energies in the neighbourhood of 40 TeV — sufficient, in the view of current theory, to explore the so-called Higgs sector. Leon Lederman, director of Fermilab, who also spoke here, said that experimental exploration of this energy region is vital to resolving the "crisis" that Lederman says his "theoretical colleagues" now find themselves in. "They're speculating wildly", he says, for lack of solid data.

According to cost estimates developed earlier this year at a marathon session at Lawrence Berkeley Laboratory (some 150 researchers from the national laboratories and universities were, as one participant put it, locked in a room by Department of Energy officials until they could agree on some definite numbers to be used in preparing next year's budget request), SSC could be built using existing magnet technologies for \$3,000 million, with a completion date in 1994. DoE is now considering whether to submit a request for research and development funds in the budget for fiscal year 1986. Lederman says that it would probably take two or three years to develop a definite design that optimizes costs. The "reference design" document produced at Lawrence Berkeley considered three different combinations of ring size and magnet field strength, and concluded that costs would be roughly equal in each case. The original idea of SSC, and thus the name Desertron, was to use relatively low field, "cheap" magnets in an enormous ring that could presumably fit nowhere but the southwestern desert.

Lederman said he considered the \$3,000 million figure to be a maximum, as it assumes the use of existing "dumb" magnet technology, as he put it.

Schopper, on the other hand, placed a price tag of \$500 million on the European version of the proton collider, the cost savings coming from the use of CERN's existing tunnel and injectors. The energy of the machine, however, would be only 10 to 12 TeV if existing magnets technology is assumed, although it could be as much as 18 TeV if the as yet undeveloped Nb₃N 10-tesla magnets become available in time.

Both Lederman and Schopper spoke of the need to coordinate US and European plans; both also said they had little idea how this could actually be accomplished. Lederman said, however, that it would probably be a political impossibility to persuade the countries in question to build both machines. He also questioned whether the CERN proton collider's energies would be sufficient to explore the Higgs sector.

Schopper, in the face of repeated questions about the relative cost-effectiveness of the two plans, said "It's no use starting a

fight now"; more work needs to be done on the technology before a decision can be made, he said. And, apparently referring to hints of some new and puzzling discoveries coming out of CERN's SPS collider, suggested that in the two to three years needed for technology development, "the physics might be different".

Schopper suggested that another possible add-on to the LEP tunnel — one that certainly would not compete with SSC — would be an electron-proton collider.

Intellectual property

Consider the monoclonals

BRITISH universities seem to be rebelling against the mounting pressure on them to become more responsive to commercial considerations. The Committee of Vice-chancellors and Principals (CVCP), in a preliminary response to a government discussion paper on intellectual property rights, rejects the idea that universities should seek to protect research inventions with patents wherever possible, citing as an example the "serious disadvantages for generations of investigators" if monoclonal antibodies had been rigorously protected. And in a formal reply to a plea by the Engineering Council to spend more of their grant on training engineers, the committee reaffirms its opposition to having grants specially earmarked for engineering and its distaste for a rapid increase in provision for science and technology at the expense of other subjects.

CVCP dismisses the government's "green paper" on intellectual property, published at the end of last year, as "somewhat superficial". The paper made some radical suggestions on how the Patent Office might be moved out of the civil service and suggested some changes to intellectual property law. But, say vice-chancellors, it pays too little regard to the difficult balance that university researchers must maintain between possibilities for commercial exploitation and their commitment to intellectual progress. And CVCP dismisses the "implied criticism" that academics exchange information too freely and take protection too rarely. Universities have, the committee says, a clear policy on patenting. The government should, before considering legislation, thoroughly examine all aspects of intellectual property, including such problem areas as copyright and computer software. Some are concerned that biotechnology, in particular, might be adversely affected if very broad patents impede research.

Beyond this CVCP does not go, thus perhaps inviting the criticism that it, too, is being somewhat superficial. The committee excuses itself by blaming an unrealistic timetable for comment imposed by the Department of Education and Science. Discussion has had to be brief and consultation has been less than complete. A

Meanwhile, the United States is already worrying about selling the most expensive basic research project yet to Congress. Presidential science adviser George Keyworth was recently in Japan trying to drum up some tangible support from the Japanese Government for the project. And DoE officials are only half facetious when they suggest that the SSC ring might be arranged to pass through at least three states to boost regional support in Congress.

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fuller response will be prepared in due course.

The committee has however managed to find the time to prepare a full response to the Engineering Council, which earlier this year accused universities of not using their grant in the way that was intended. The council announced that it wanted a ten per cent swing in student numbers from arts-based to science-based subjects within the decade. That objective is thought by vice-chancellors to be totally unrealistic, given the pressures that already exist on the university system, and many vice-chancellors feel the Engineering Council has weakened its case by overstating it. **Tim Beardsley**

Argentines safe

Washington

THE new democratic government in Argentina is wasting no time in trying to re-establish contacts with expatriate Argentinian scientists and to offer assurances that the personal and political vendettas of past regimes will not be repeated.

Dr Carlos Abeledo, under-secretary for science promotion and director of the national research council of Argentina, was in the United States last week to spread the word among the hundreds of Argentinian scientists here that if they want to return they will be welcome and there will be financial support for them. Abeledo said that he did not expect more than a few dozen to take up the offer this year, but that he was also hoping to involve the expatriate scientists in the country's scientific effort through such activities as reviewing for Argentinian scientific journals, reviewing grant applications, and taking in Argentinian research fellows.

Abeledo was due to meet with some 200 Argentinian scientists at the American Association for the Advancement of Science meeting in New York; the previous week he was present at a gathering of 100 Argentinian scientists now living in France.

Albeledo was among the hundred or so scientists sacked in 1976-77 for political — and sometimes personal — reasons by the government. One of the first acts of the new government this year was to recognize the right of those scientists to return to their positions.

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