

US weapons labs face curb on civilian role

New Mexico. Hundreds of Cooperative Research and Development Agreements (CRADAs), through which national laboratories funded by the US Department of Energy (DOE) have established new partnerships with industry, face dissolution under budget cuts being supported by the Republican majority in Congress.

Proposals now being considered to discontinue funding for 'technology transfer' activities are likely to have a devastating effect on the laboratories. According to Sig Hecker, director of the Los Alamos National Laboratory, collaboration with industry keeps Los Alamos at the forefront of technology; terminating it would damage the quality of all of the laboratory's work.

But Republicans in Congress say that the technology transfer work should end, partly to leave room in the budgets for basic research. "These are nice things to do, but they shouldn't be done at the expense of real scientific work," says a spokesman for Dana Rohrabacher (Republican, California), chair of the energy and environment subcommittee in the House, and an opponent of allocating money for technology transfer.

The question of whether government

should help private industry to develop technology has become a central point of conflict between the Clinton administration and the Republican Congress. The conflict is being watched closely by the vast Los Alamos and Sandia weapons laboratories in New Mexico, which will spend \$150 million between them this year on CRADAs, a sum matched by their industrial partners.

Lacking a development programme for new nuclear weapons, both laboratories are struggling to find a new role — and the development of key technologies of interest to industry has emerged recently as one of their most important activities.

But earlier this year, an independent panel chaired by an industrialist, Bob Galvin, ruled that these activities should not be a "core mission" of the laboratories, sending laboratory managers scurrying to ensure that each CRADA they are engaged in supports their core mission. In the case of Los Alamos and Sandia, that means they must support "stockpile stewardship" — the new and somewhat nebulous role of ensuring the safety and reliability of the US nuclear weapons stockpile (see box).

Sandia is the engineering laboratory

IMAGE
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Peace work: Sandia laboratories adapts parachutes developed for nuclear weapons (background) for testing automobiles.

which used to design everything in an American atomic bomb except the nuclear warhead itself. It has a strong tradition of collaboration with industry which it hopes can survive this year's budget upheavals.

Because Sandia is responsible for everything from the springs that hold weapons components in place to the electronics that detonate them, it can sensibly argue that most of its CRADA work is directly relevant to its core mission. For example its work on the dynamics of rubber with Goodyear, a tyre manufacturer, can be justified because the resultant computer codes can be used to update the design of weapons components.

Los Alamos, however, is a scientific laboratory whose special knowledge of fissile materials is less obviously relevant to the outside world, and whose links with industry are newer.

A collaboration with General Motors on the use of plasmas to harden metal surfaces is relevant to the laboratory's work with plutonium components. But officials conceded that other CRADAs which Los Alamos has pursued have had no direct bearing on weapons work.

Al MacLachlan, deputy undersecretary for technology partnerships at the DOE, says that the department is engaged in 1400 CRADAs, and will spend about \$1.5 billion on technology transfer this year. Much of that money is spread across the research in energy supply, which is likely to be virtually halved by Congress.

But the most radical cuts being proposed are in money that is explicitly set aside for the laboratories to spend on technology transfer. \$220 million was allocated this year from the nuclear weapons programme — most of it for Sandia and Los Alamos — and another \$60 million from energy supply research, divided between the DOE's ►

50 years on, success has bitter taste

New Mexico. At 5.30 a.m. on 16 July 1945, the Manhattan project reached its culmination with the successful testing of the world's first atomic bomb at the Trinity test site in southern New Mexico. The plutonium-implosion weapon was tested because its designers were unsure if it would work. A simpler, uranium-based device was used — untested — to attack Hiroshima on 6 August, and a plutonium-implosion weapon used on Nagasaki three days later.

Fifty years on, scientists at the Los Alamos laboratory, where these instruments of mass destruction were conceived, are slowly, and sometimes reluctantly, coming to accept a new regime of no tests, no new weapons, and steady retrenchment in the scope of their work.

At Los Alamos, the number of nuclear weapons scientists has dropped from 1800 eight years ago to 750 today. Officially, this group does not work on new weapons design but on 'stockpile stewardship', relying chiefly on theoretical calculations, test data and computer simulations to assess the future safety and reliability of the weapons stockpile.

But although the weapons team has shrunk, the laboratory continues to employ 7,500 people, spending over

\$1 billion each year on fields ranging from anti-nuclear proliferation to health research. Three-quarters of the work is still related to nuclear weapons in some way, and is paid for either the weapons or nuclear clean-up programmes of the Department of Energy.

Sig Hecker, the director of Los Alamos, concedes that the laboratory's transition since testing stopped in 1992 has been difficult for his staff. But he claims that many of them are now "not only engaged in, but excited by" their new mission.

Jas Mercer-Smith, deputy director of weapons technology at Los Alamos, says assessing the degradation of weapons over time is more technically demanding than their initial design, as they lose their symmetry. "Take a vase, and take a chip out of it," he says. "Has it lost its functionality? This is very challenging science."

But Mercer-Smith and Hecker admit that the laboratory is suffering morale problems as researchers are diverted to non-weapons work — or leave altogether. Mercer-Smith says he is addressing the "demographics problem" on the weapons programme by seeking postdoctorate students to work on related, non-classified projects such as inertial confinement fusion. **C. M.**