Scientific Research

Budget cuts pull the plug on national labs

by Dr. John Schoonover

The cuts in funding for basic scientific investigation and research and development in the United States proposed by the Office of Management and Budget will mean a serious erosion in the capability of U.S. research laboratories.

After 1967, the federal funding for science programs began to level off, and in recent years has gone into absolute decline. As a result, the production rate of qualified scientists and engineers in the United States has decreased. Basic laboratory research equipment has grown obsolete, and some of the larger experimental equipment, particularly the high-energy particle accelerators, have either been shut down, or are forced to run for reduced periods of time. Furthermore, research teams that have been working together for years are disintegrating as experiments are shut down or curtailed.

EIR has made a preliminary survey of some of the major U.S. laboratories to find out what the effects of proposed fiscal year 1982 funding will be.

The case of **Brookhaven National Laboratory** in Upton, N.Y., is probably the most dramatic. Brookhaven employs approximately 3,640 scientific and support personnel activities ranging from energy production and utilization experiments, through the use and design of high energy accelerators, to elementary particle research. In fiscal 1982, Brookhaven expects an operating budget of $182 million, down from $197.7 million in 1981. This absolute budgetary decline, coupled with double-digit inflation, has forced the laboratory to announce the planned layoff of about 520 people, 15 percent of the staff.

Currently, Brookhaven is building two new facilities, the National Synchrotron Light Source and the ISA BELLE accelerator. Although the operating budget does not cover construction costs for either project, it does include operating costs. When the effects of past budgetary austerity are considered, there is good reason to wonder whether it will be possible to take full advantage of these new facilities.

The Alternating Gradient Synchrotron, a high energy particle accelerator that will become a part of ISABELLE, has been running at reduced levels since 1978. It is projected that AGS will operate only 22.5 weeks out of a possible 42 in 1981, 21.5 weeks in 1982.

Wayne Bennett, budget officer for the **Stanford Linear Accelerator** (SLAC), emphasizes that the most important effect of budget cutting is in the reduction of the small margin of extra funds, 1 or 2 percent, left after operating costs have been accounted for. It is this extra margin of funding that allows a facility to carry out innovative activity. The Stanford facility is a single-purpose laboratory devoted to experiments using a two-mile-long electron accelerator to probe the structure of matter at the microscopic level. Energy costs began to erode the utilization of this accelerator as early as 1972. Today, it can be run only long enough to produce 27 percent of the high-energy electrons it is capable of generating over the course of a year.

Bennett pointed out that funding for high-energy projects in Europe, such as CERN in Geneva, Switzerland and DESY in Hamburg, West Germany, have benefited from several times the amount of funding granted to installations in the United States. The one bright spot in SLAC's future is that its $100 million fund for construction of the Linear Collider has not been touched. This machine will allow collisions of very high energy particles that could confirm the existence of some massive elementary particles that current theories have hypothesized.

The situation for the **Fermi National Laboratory** in Batavia, Illinois is very similar to that at Stanford. In neither case is the level of budget cuts as drastic as it is for multipurpose laboratories such as Brookhaven. But it still represents a significant bite out of an already austere budget.

Fermilab operates a high-energy (400 GeV) particle accelerator used for elementary particle research. Since 1977, the use of this accelerator has progressively declined through a combination of budget cuts and rising electricity costs. Although the accelerator could be run 46 to 48 weeks per year, it was projected to run for 36 weeks in 1981, but will be reduced to 27 weeks because of a new hike in the cost of electricity.

Fermilab is currently undergoing several modifications to its accelerator to make it more energy efficient, including replacement of conventional magnets with superconducting magnets. At the same time, the energy attainable by the machine will increase from 400 GeV to 500 GeV, and, at a second stage, to 1,000 GeV, and it will be possible to collide beams of protons and antiprotons at this very high energy.

Acting Deputy Director Philip Livdahl points out, however, that the Soviet Union has just given authorization for the construction of an accelerator capable of delivering protons at 5,000 GeV at the Serpukhov installation near Moscow. The Soviet Union, at its recent party congress, reaffirmed its commitment to a rapid development of nuclear fusion energy, and announced a significant upgrading of its research and development programs.