

funding was that no additional funds were requested in FY 1983 for the Nova neodymium glass laser and target irradiation facility at Livermore, scheduled for completion in 1985. (Estimated to cost \$195 million, this project has already received \$141 million and was scheduled to receive the bulk of the remaining \$54 million in FY 1983 to meet its construction schedule.) The elimination of FY 1983 funds would allow installation of only two laser beams of the ten beams included in earlier designs, but would include harmonic conversion to permit experiments with shorter wavelengths (green). This would represent a reduction in energy capabilities to 20 kilojoules from the 250 kilojoules planned for the facility originally authorized by Congress. Schriever told us that DOE is carefully reviewing the various options for Nova, and technical considerations indicate that Livermore "should now proceed with construction of a ten-beam Nova, capable of focusing about 100 kilojoules of energy (red) on target; such an option would include laser color conversion for the second (green) and third (blue) harmonics. Proceeding with this option will require additional funding in the future."

High-energy physics. For FY 1983 an increase is requested to \$429.0 million from \$364.5 million in FY 1982 for high-energy physics research (see page 20 of this issue for details).

Nuclear physics. Enloe Ritter, head of the DOE nuclear physics division, said the heavy-ion budget includes a major reduction in research on the Brookhaven Double MP Tandem Van de Graaff and the Berkeley Super Hilac facilities.

The Argonne Tandem Linear Accelerator System construction project (an extension of the existing superconducting linac), is a high priority for heavy-ion nuclear physics cited by Ritter. This facility will receive its final construction appropriation of \$3.7 million in FY 1983, to be spent as construction proceeds over the next three years. In contrast to Brookhaven, whose nuclear research funding is being cut 5% overall, Ritter said Argonne will receive a small increase to keep the scientific staff and the laboratory facility healthy, in preparation for this accelerator coming on line in 1985.

In identifying scientific priorities, Ritter indicated that three facilities were recognized by DOE as unique in the world: In addition to the Bevalac at Berkeley, he listed the Los Alamos Meson Physics Facility and the Bates linac at MIT. LAMPF and Bates and outside users of these facilities will receive 85-90% of the medium-energy budget of \$53.1 million, but precise allocations between them have not yet been made. Ritter expects LAMPF to operate 20% below levels achieved in

FY 1981 and Bates to operate at about FY 1981 levels. This estimate may prove somewhat optimistic if electric power costs exceed DOE projections.

Responsibility for the National Superconducting Cyclotron Laboratory construction project at Michigan State University is being transferred back to NSF, which initially had responsibility for its construction (PHYSICS TODAY, August 1981, page 21). Prior to the decision to transfer, DOE had planned \$6.8 million for this project in FY 1983.

Solid-state physics. The FY 1983 budget request for basic energy sciences is up from \$243.3 million in FY 1982 to \$282.8 million, almost entirely reflected in an increase in operating funds from \$226.3 million to \$261.3 million. Completing the \$6.8-million swap mentioned above, the Stanford Synchrotron Radiation Laboratory is being transferred to DOE from NSF, and is budgeted at \$6.8 million in FY 1983. SSRL funding is for machine operation only; research funds will come from various sources, including a small amount from DOE.

According to Richard Kropschot, director of DOE basic energy sciences research, if you deduct the SSRL, the budget increase "represents no growth, but we are keeping up with inflation." The operating budget is up about 15%. Kropschot said this was in part to meet research needs for three facilities that have recently come on line—the Combustion Research Facility at Sandia, the Intense Pulsed Neutron Source at Ar-

gonne and the National Synchrotron Light Source at Brookhaven, now in the final stages of completion. Using these facilities are not his only priority, Kropschot said, but they are a high priority.

The costs for running these machines have increased more than the growth in Consumer Price Index, he said, and have taken up more and more of his budget each year. Kropschot estimated that full utilization of NSLS, budgeted for FY 1983 at \$4.8 million, would cost about \$10 million, and full utilization for SSRL would cost \$6-7 million, and thus full utilization would require a more generous budget than this year's.

The DOE FY 1983 budget faces its normally lengthy budget process, compounded by the need for Congressional approval of Reagan's plan for DOE. Guy Fiske, Under Secretary of Energy, speaking at a budget briefing on 6 February, explained that a new budget request will be needed if Congress does not approve Reagan's proposed transfer.

John Dingell (D-Mich), chairman of the House Committee on Energy and Commerce, spoke about the cost of the transfer at an 18 February hearing of this committee. He stated that unless savings to taxpayers were demonstrable and an increased effectiveness for energy policy would result from these changes, the plan should be rejected. Fiske, asked about the reduced costs for DOE, said "the savings were the result of changes in energy policy and are not due to the reorganization." —JC

Pope sends warning of nuclear dangers

Pope John Paul II recently sent delegations from the Pontifical Academy of Science to convey to the leaders of the US, the USSR, England, France and the UN a statement warning that "conditions of life following a nuclear attack would be so severe that the only hope for humanity is prevention of any form of nuclear war" and recommending "that nuclear weapons must not be used at all in warfare and that their number should be progressively reduced in a balanced way."

The statement was prepared by a working group of the Academy that is studying nuclear weapons.

A delegation visited President Reagan on 14 December. Its members were Victor Weisskopf of MIT and Howard Hiatt, dean of the Harvard School of Public Health, both members of the Academy and of the working group, and David Baltimore of MIT and Marshall Nirenberg of the National Institutes of Health, both members of the Academy who could not attend the working meeting held in Rome. They were introduced to the President by William Wilson, the President's Envoy

to the Holy See, and Archbishop Pio Laghi, the Apostolic Delegate in the US.

After introductions, Weisskopf explained the purpose of the Academy and its working group on nuclear war. Hiatt described what effect a one-megaton bomb would have detonated over the White House. According to US Arms Control and Disarmament Agency reports, at once 600 000 people would be dead; another 800 000 would be severely wounded. More than half of the physicians in the area would be killed or too seriously injured to treat the wounded. Citing the medical care the President received following the attempt on his life in March 1981, Hiatt estimated that a dozen patients in the President's condition brought simultaneously would have overwhelmed the resources of George Washington University Hospital. Further, in the event of a bombing that hospital would have been destroyed and survivors would require much more medical support than the President needed. Medical capacities would be exhausted immediately.



Victor Weisskopf (right) presented a statement from the Pope to President Reagan on the dangers of nuclear war. At the center is the President's Envoy to the Holy See, William Wilson.

Baltimore said that Government policy does not seem to recognize adequately the enormous distinction between conventional weapons on the one hand and nuclear weapons, both tactical arms and bombs, on the other.

Reagan agreed that prevention of nuclear war is extremely important but added that negotiations must be carried out from a position of strength, which he said the US lacks in relation to the USSR today.

According to Weisskopf, the visit lasted about 15 minutes. The President did not ask the delegates to sit down. Weisskopf reported that delegations that visited Margaret Thatcher, François Mitterand, and Leonid Brezhnev were given longer meetings, and in France and the USSR, more cordial receptions. Brezhnev, says Weisskopf, related that the Soviet Government, for the first time recognizing the Vatican, was willing to work further with it on this issue.

The Pontifical Academy of Science was founded centuries ago to advise popes on scientific matters. Composed of 70 scientists from all over the world, only a few of whom are Catholic, it ordinarily meets every two years to take up broad topics such as genetic engineering and cosmology. It also sets up study weeks and working groups to investigate immediate problems with the aid of experts.

The Academy has been particularly active during recent years owing to the Pope's interest in it and the leadership provided by Carlos Chagas, a Brazilian

medical biologist, Weisskopf told us.

At the Pope's request Chagas convened the present working group of about a dozen scientists in the spring of 1980 to discuss the consequences of nuclear war and to offer the Pope suggestions for statements and actions. There have been several meetings, including the one in October 1981 that focused on the medical consequences of the use of nuclear weapons. Among the participants, in addition to Chagas, Weisskopf and Hiatt, were Edoardo Amaldi of the University of Rome, Louis Leprince-Ringuet of the Ecole Polytechnique in Paris, Alexander Rich of MIT and Alexander Leaf of Harvard. The content of the discussion was transmitted to the Pope, who decided to ask the heads of government of the four nuclear powers to receive delegations to present the statement of the Academy.

The statement begins by pointing out that

Recent talk about winning or even surviving a nuclear war must reflect a failure to appreciate a medical reality: Any nuclear war would inevitably cause death, disease and suffering of pandemic proportions and without the possibility of effective medical intervention. That reality leads to the same conclusion physicians have reached for life-threatening epidemics throughout history: Prevention is essential for control.

In contrast to widespread belief, much is known about the catastro-

phe that would follow the use of nuclear weapons. Much is known too about the limitations of medical assistance. If this knowledge is presented to people and their leaders everywhere, it might help interrupt the nuclear arms race.

After the statement quotes an eyewitness to the bombing of Nagasaki, it continues:

The suffering of the surviving population would be without parallel. There would be complete interruption of communications, of food supplies and of water. Help would be given only at the risk of mortal danger from radiation for those venturing outside of buildings in the first days. The social disruption following such an attack would be unimaginable.

The exposure to large doses of radiation would lower immunity to bacteria and viruses and could, therefore, open the way for widespread infection. . . .

Our knowledge and credentials as scientists and physicians do not, of course, permit us to discuss security issues with expertise. However, if political and military leaders have based their strategic planning on mistaken assumptions concerning the medical aspects of a nuclear war, we feel . . . we must inform them and people everywhere of the full-blown clinical picture that would follow a nuclear attack and of the impotence of the medical community to offer a meaningful response. If we remain silent, we risk betraying ourselves and our civilization.

The statement concludes with that appeal. —DG

in brief

The National Science Foundation has published *Federal Funds for Research and Development, fiscal years 1979-81, vol. 29, NSF 81-306*. Single copies are available without charge from NSF, Division of Science Resource Studies, Washington, D.C. 20550.

AIP has published *Physics Goes Public*, a 33-page guide to providing science public information. The authors, Audrey Likely and David Kalson of AIP's Public Information Division, explain how to issue a news release, run a news room or publicize a discovery. The guide is available for \$1.25 (\$1 for ten or more copies) prepaid from the Division.

The Council of Engineering and Scientific Society Executives has elected AIP Director H. William Koch to be vice-president for 1981-82. □