

Budget Battles Leave Wounds on R&D That Are Likely to Fester for Years

When the Federal government shut down for six days in November as a consequence of the protracted battles over balancing the budget in seven years and approving the appropriation bills for fiscal 1996, which began last 1 October, science research was one of the losers. The discussions that were to start on 20 November between CERN leaders and officials of several US departments and agencies on possible US contributions to the Large Hadron Collider were called off. The National Science Board's meeting on 17 November was postponed, thereby delaying funding decisions on the National Science Foundation's four supercomputer centers, the National Superconducting Cyclotron Laboratory at Michigan State University and the Indiana University Cyclotron Facility. At NSF, NASA, the National Institute of Standards and Technology and other agencies operating without fiscal 1996 appropriations and therefore running on 75% of their 1995 allocations, the backlog of program proposals piled up and decisions had to be put off when the staffs were sent home on furlough.

On 19 November Congress passed its third continuing resolution to keep the government operating, this time until 15 December. It was white-knuckle time for the departments and agencies not covered by appropriations acts. The situation was somewhat less desperate than in November, because the new continuing resolution enabled the agencies to function with funds assigned by either the House or Senate in preliminary spending bills that had not yet been completed for President Clinton's approval (or veto). The Energy Department, which was operating under a signed appropriation (P.L. 104-46), rescheduled its meeting with CERN's managers and representatives of NSF, the State Department, the White House Office of Science and Technology Policy and the Office of Management and Budget for 8-9 January. The Science Board met on 14 December and made the funding decisions for its physics facilities and supercomputer centers. And the program offices at NSF, NASA and NIST operated almost normally, under the abnormal circumstances.

By 1 December only 7 of the 13

appropriations bills for fiscal 1996 were enacted. And it's not only the government agencies and the R&D community that is unsettled by the situation. Much of the American public has become dismayed by the failure of Congress and President Clinton to agree on the Federal budget and a plan for eliminating the Federal deficit by 2002. The wording of the most recent continuing resolution was intended to establish a framework for further negotiations between the White House and Congress. The resolution states that the President and Congress "agree that the balanced budget must protect future generations, ensure Medicare solvency, reform welfare and provide adequate funding for Medicaid, education, agriculture, national defense, veterans and the environment. Further, the balanced budget shall adopt tax policies to help working families and to stimulate future economic growth." Nothing is said about science research, though according to White House sources, the phrase about stimulating economic growth might be broadly interpreted to mean that science is an essential precursor to the nation's technological strength.

A 'myopic view' of R&D

President Clinton said as much in his talk before the winners of the National Medals of Science and Technology on 18 October and in a letter to leaders of his own party in the Senate on 21 November. His remarks resonated among Senate Democrats, with John Glenn of Ohio lambasting the Republican majority for its "myopic view" of the R&D budget. "These modern-day Luddites would cut back on basic, non-defense research and development by 30% by the year 2002," said Glenn, a former Marine Corps fighter pilot and, in 1962, the first American astronaut to orbit the Earth.

In the House, Representative George E. Brown Jr of California, the senior Democrat on the Science Committee, organized a 16-member R&D task force that will attempt to publicize the inadequacies of the budget bills that have yet to pass through Congress. Brown has expressed fears that scientists, particularly those in research universities and national labs, have naively accepted assurances from Re-

publican leaders such as House Speaker Newt Gingrich of Georgia and Robert S. Walker of Pennsylvania, who heads the House Science Committee, that basic science would be protected. Brown's group, which includes several Democrats on the House Appropriations Committee, plans to meet with Clinton and Budget Director Alice Rivlin while the budget is being prepared for fiscal 1997, which begins next 1 October.

The big question now is whether there will be any sort of overarching budget deal before next year's budget is sent to Congress in February or, having reached an impasse, both sides will simply shelve the matter as something to be debated again during this year's election campaign. Right now, a balanced budget is little more than an aspiration. Making it a reality will demand a sustained discipline that Congresses and Administrations in the last 40 years have shown no appetite for.

Despite the acrimony in Congress over the 1996 budget, the Republicans have been more or less kindly disposed to funding research programs—nothing generous, mind you. On 13 November the President signed the Energy and Water Appropriations Act enabling DOE national laboratories and other programs to remain open during the government shutdown. The department's budget for R&D is \$6.3 billion, up 1.7% from 1995. One beneficiary is the nuclear weapons program, which boasts an increase of 9.4%, mainly due to the new Accelerated Strategic Computing Initiative, which will provide simulation models of nuclear explosions, and the proposed National Ignition Facility, a massive laser fusion laboratory that would determine the safety and reliability of the US nuclear weapons stockpile and replace the need for underground tests (PHYSICS TODAY, January 1995, page 47). Neither the act nor its accompanying conference report indicate where NIF would be situated, though DOE has stated it should be built at the Lawrence Livermore National Laboratory.

The budget for DOE's basic energy sciences, a catch-all program consisting of materials sciences, chemistry, mathematics and biosciences, will increase by 10.1% over last year. The conference

report states that Congress made no recommendation "with regard to the siting of the new spallation source project," which had been touted for the Oak Ridge National Laboratory. Instead, says the report, the department "shall make that determination in a fair and unbiased manner. The conferees direct the department to evaluate opportunities to upgrade existing reactors and spallation sources as cost-effective means of providing neutrons in the near term for the scientific community while the next generation source is developed" and to make its recommendation to Congress during hearings on DOE's fiscal 1997 budget.

High-energy physics will rise by 3.9%, which leaves it nearly \$25 billion below the Administration's request and raises doubts about the department's ability to make a major contribution to CERN's LHC. Nuclear physics and magnetic fusion are hit badly. Nuclear physics is down 8.1% from last year, and fusion research is cut by a third to \$237 million.

A strategic plan for fusion

The House-Senate conference report calls on DOE to enlist the fusion community and the department's Fusion Energy Advisory Committee in preparing a strategic plan to restructure the nondefense fusion program and to complete the plan by the end of December 1995. In preparing its plan, says the conference report, DOE "should assume a constant level of effort in the base program for the next several years." Fusion's bottom line this year is significantly below the \$320 million suggested by the President's Council of Advisers on Science and Technology as a minimum for a robust program (PHYSICS TODAY, September, page 73). While the conference statement supports US participation in the International Thermonuclear Experimental Reactor, which is now undergoing engineering design, it perversely neglects to mention the future of the Princeton Tokamak Fusion Test Reactor and omits funding for the Tokamak Physics Experiment machine.

Despite these losses, the \$100 million Science Facilities Initiative, which DOE placed in its budget at the urging of its lab directors, would be fully funded within the line items for basic energy sciences and general sciences. Its purpose is to increase the use of accelerators, synchrotrons and neutron sources that have sometimes operated only 25% or 30% of the year because of funding shortfalls.

The only other physics-related R&D bill to be enacted by 1 December was Defense Department appropriations. President Clinton allowed the Penta-

Bottom Lines: Physics-related R&D budgets for fiscal 1996

	FY 95 actual**	FY 96 request	FY 96 House	FY 96 Senate	FY 96 enacted
(millions of dollars)					
Department of Energy					
General science and research*	973.6	1006.6	981.5	961.5	971.5
High-energy physics	642.1	685.6	677.0	657.0	667.0
Physics research	139.9	147.2	146.0	136.0	141.0
SLAC B-Factor	44.0	57.6	52.0	52.0	52.0
Fermilab main injector	43.0	62.4	52.0	52.0	52.0
Nuclear physics*	331.5	321.1	304.5	304.5	304.5
Brookhaven relativistic heavy ion collider	70.0	70.0	70.0	65.0	65.0
Basic energy sciences*	710.2	801.4	763.7	782.2	782.2
Materials sciences	275.7	348.3	367.4	367.4	368.4
Chemical sciences	163.5	181.6	198.4	198.4	198.4
Argonne 6-7 GeV synchrotron light source	58.4	3.2	3.2	3.2	3.2
Magnetic fusion energy*	349.4	356.4	221.1	274.1	236.6
Princeton Plasma Physics Laboratory TPX	—	49.0	0	0	0
Advanced Neutron Source	21.0	0	0	0	0
Solar and renewable energy	388.1	423.4	266.4	283.6	275.2
Nuclear energy R&D	174.1	229.9	106.8	134.3	124.3
Laboratory technology transfer	57.5	58.8	0	25.0	18.0
University and science education programs	65.5	55.4	0	30.0	20.0
Environmental restoration and waste management	744.0	713.0	626.5	627.6	621.5
Defense activities					
Weapons stockpile stewardship	1050.1	1109.7	1103.1	1209.7	1159.7
Inertial fusion	176.5	240.7	213.3	240.7	240.7
National Ignition Facility	—	37.4	0	37.4	37.4
Environmental restoration and waste management	4892.7	6008.0	5265.5	5989.8	5557.5
Nonproliferation verification and arms control	669.7	763.0	654.7	769.9	761.0

*Sums in this line do not include about \$10 million for program direction and management.
 **Reduced to reflect recisions made by Congress last April.

Department of Defense					
Army basic research (6.1)	223.8	204.6	204.6	181.6	190.3
Navy basic research (6.1)	417.9	385.9	385.9	373.9	373.9
Air Force basic research (6.1)	239.6	239.9	254.4	230.5	240.0
Defense-wide basic research (6.1)	87.5	89.7	84.7	86.3	81.3
Exploratory development (6.2)	3069.9	2722.8	2855.4	2836.7	2907.4
Defense-wide university research initiatives	249.7	236.2	221.2	231.2	231.2
Defense-wide focused research initiatives	5.9	14.0	9.0	0	9.0
Advanced Research Projects Agency	2228.0	2639.2	2179.7	2293.0	2286.7
Ballistic Missile Defense Organization	2467.6	2442.2	3041.1	3037.2	3057.0
Former Soviet Union Threat reduction	380.0	371.0	200.0	325.0	300.0

gon's \$243 billion appropriation to become law (P.L. 104-61) without his signature while he was on a whirlwind visit to Britain, Ireland and Spain. He noted, though, that although the bill contained about \$7 billion more than he had asked for he planned to use a portion of that money for the US peacekeeping mission in Bosnia. About two-thirds of the \$7 billion that Congress added to Clinton's budget request was earmarked for weapons, including \$493 million for additional B-2 stealth bombers. The largest increase in the R&D budget will go to the Ballistic Missile Defense Organization, the successor to the Strategic Defense Initiative, or "Star Wars" program, which is now up to \$3.43 billion, nearly 20% more than the President's original re-

quest and 24% more than in fiscal 1995.

Basic research (the 6.1 category) in the Pentagon's budget does not fare well. The \$1.2 billion total is 3.5% below last year's. Much of DOD's support for research at universities is in the 6.1 budget category. The bill saves the Technology Reinvestment Project with a \$195 million appropriation, a compromise between the House bill, which eliminated the program, and the Senate bill, which provided \$238 million. The project's original 1995 level was \$443 million. This was later reduced to \$220 million by recisions. The bill allocated \$39 million for the last year of Federal support for the Sematech consortium, which has helped rouse the US semiconductor industry from its doldrums in the 1980s. Se-

matech's appropriation was another compromise between the House bill, which zeroed out the program, and the Senate allocation of \$89.6 million.

The Veterans Affairs, Housing and Urban Development and Independent Agencies appropriations bill was stalled for a month and a half over a dispute concerning 17 riders imposed by House members that would limit the enforcement powers of the Environmental Protection Agency. When the bill's conference report finally reached the House floor, it was sent back to the House-Senate committee for changes—most notably, the addition of \$213 million for veterans' health care programs. Even so, the bill is in peril of the President's veto, because it still eliminates funding for his pet national service program and has major reductions in

housing and environmental programs.

Nevertheless, research did quite well in the conference agreement, all things considered. NSF would receive a total of \$3.18 billion, of which \$2.27 billion would fund research and related activities and \$585 million would go to education and human resources programs.

In the VA/HUD appropriations bill, NASA would get a total of \$13.82 billion, which is more than either the House or Senate bill contained. Mission to Planet Earth would receive \$1.26 billion, slightly less than the Senate level but much higher than the House allocation. All ongoing missions in the Office of Space Science would be fully funded, and funds are included for several new starts, including SOFIA (Stratospheric Observatory for Infrared Astronomy), SIRTf (Space Infrared

Telescope Facility) and the Solar-Terrestrial Probes. Life and microgravity sciences are slated to get \$484 million, essentially the same as in fiscal 1995. Academic programs would receive \$102.2 million, exactly the same as last year, though \$16.5 million less than the President's budget request. The space station would get \$2.1 billion, which is the same amount as last year.

"Everybody knows at some point there is going to be an end game," a senior White House official acknowledged. "Everybody knows we're going to have to give up something. The hope here is that science will not suffer and end up skint."

An official at one science agency said, "There will be a deal and we will be at risk. We know that only too well."

IRWIN GOODWIN

Senator Bennett Johnston Talks About Physicists in Politics

*A*mong the 23 House members and 12 senators who have decided not to seek reelection in November is Senator J. Bennett Johnston Jr, a four-term Louisiana Democrat known as a power broker on energy and science issues. Johnston earned the characterization by doing what he does best: mastering the technical details of arcane topics, forging bipartisan coalitions to back his approach and negotiating trade-offs and compromises with his opponents. As chairman of the Senate's Energy and Natural Resources Committee and the appropriations subcommittee on energy and water development and as a member of the Appropriations Committee, he is, at the age of 63, one of the chamber's most influential lawmakers. What distinguishes Johnston from many of his colleagues is his skill in applying political policies to some contentious real-world problems, such as deregulating oil and gas prices, establishing a nuclear waste dump in Nevada and championing the Superconducting Super Collider.

Physics will lose a dedicated advocate when Johnston retires at the conclusion of this 104th Congress. He announced his intention on the Senate floor last year in a voice choked with emotion: "There are rhythms and tides and seasons in life," he said. "I've been fortunate in my life to sense the rhythm and sail it full tide, and now I believe that the season for

a new beginning approaches."

On energy and science issues Johnston has been a force to be reckoned with ever since he came to the Senate in 1973. A graduate of Louisiana State Law School and a former practicing attorney in Shreveport, he decided as a Washington legislator to delve into the minutiae of science and technology matters. He almost single-handedly navigated a landmark energy bill through the rocky shoals of the Capitol in the 102nd Congress. As the *National Jour-*

nal once put it: "[Johnston is] an undisputed master of the give and take . . . happy to give his adversaries something to take away from the table. But they've learned to read the fine print as carefully as he's composed it."

Johnston first demonstrated his finely honed political judgment in 1972, just months after he lost the race for governor of Louisiana by fewer than 4500 votes. Taking advantage of his name recognition after the election, Johnston, who had then served four years in both the State House and State Senate, entered the Democratic primary for the US Senate seat in a long-shot bid against Allen J. Ellender, then chairman of the Senate's powerful Appropriations Committee. When the 81-year-old Ellender died of a heart attack just three weeks before the primary, Johnston won easily. Johnston's election for a fourth term in 1990 became a hot topic in the news media as he fought off a serious challenge by a former Ku Klux Klan leader and overt Nazi sympathizer, David Duke. Johnston won 54% of the vote to Duke's 44%, the slimmest margin of victory in his Senate career.

Since Huey Long's time as governor and then US senator in the late 1920s until his assassination in 1935, Louisiana politics has been a struggle between reformist and conservative forces, populists and demo-



JOHNSTON: Power broker on energy and science.