DOE BUDGET

Boosts sought for Gen IV, NP 2010, hydrogen

With the Department of Energy in general—and the executive branch as a whole—seeking less money in fiscal year 2006 than in FY 2005, the major nuclear energy programs fared well, with increases requested from Congress.

TO THE EXTENT that momentum may have been building over the past year toward a nuclear power renaissance, the Bush administration's fiscal year 2006 budget request to Congress generally does not put any obstacles in the path. Indeed, the Energy Department programs that provide the most support to both near-term power reactor deployment and long-term advanced reactor development have been recommended for increases in FY 2006 over their FY 2005 budgets, at a time when the proposed budget for the whole DOE—and the entire federal government—is leaner in the next fiscal year than it is in the current one. With the executive and legislative branches controlled by the same political party, the big-ticket nuclear programs may get what they want. The prospects of a renaissance, however, may depend on more legislation than just the Energy and Water Appropriations Bill, and the early signs are that prospects for this extra legislation are uncertain.

Nuclear advocates have made it clear in recent months that even if all regulatory matters were settled—early site permits, standard reactor design certification, and combined construction/operation licenses, provided through the demonstration projects supported by the DOE's Nuclear Power 2010 program—the actual ordering and building of new power reactors would depend heavily at first on financial incentives to reduce the cost burden to those organizations that build the first plants. Such incentives could be included in an energy policy bill, but the 108th Congress declined to pass such a bill despite the energetic support of Sen. Pete Domenici (R., N.M.). Senate Majority Leader Bill Frist (R., Tenn.) has stated that energy policy is one of the top 10 priorities for the 109th Congress (but just barely—it is listed in 10th place). With Social Security reform and the Iraq war drawing most of the attention in both parties, there is no obvious indication that incentives for new reactors will be more welcomed in this Congress than they were in the last one.

The nuclear community will also need more legislative help in the contentious matter of high-level waste disposal. The DOE's FY 2006 budget request for high-level waste disposal is not only lower than the FY 2005 appropriation, but the amounts in both years are well below what would have been needed to maintain the previous schedule for licensing the high-level waste repository at Yucca Mountain, in Nevada. The DOE has now delayed its target date for submission of its license application to the Nuclear Regulatory Commission until December 2005 (see page 75, this issue) because of the continued unavailability of money from the Nuclear Waste Fund (NWF). The previous Congress was unable to agree on legislation to redefine the fund to allow DOE access to the fund, which has been collected from power reactor licensees specifically for use in high-level waste disposal.

At the least, nuclear advocates may not have to worry about propping up existing DOE nuclear programs while campaigning for power reactor financial incentives and NWF access. The DOE is asking for more than twice as much money for its nuclear hydrogen initiative as it received in FY 2005, and increases of about 13 percent each are requested for Nuclear Power 2010 and the Generation IV development program. There are cutbacks planned, however, in areas such as naval reactors, cleanup of Defense Department nuclear sites, and the Nuclear Energy Research Initiative, which the DOE will try to terminate in FY 2006 as it tried (and failed) to do in FY 2005.

The big picture for FY 2006

Nuclear energy had a very brief moment on the nation's largest policy stage during President George W. Bush's State of the Union address on February 2. In the course of the hour-long speech, there was this: "Nearly four years ago, I submitted a comprehensive energy strategy that encourages conservation, alternate sources, a modernized electricity grid, and more production here at home—including safe, clean nuclear energy." He then touched briefly on fossil-plant emissions reduction, hydrogen fuel development, clean coal, and ethanol, and

DEPARTMENT OF ENERGY BUDGET BY APPROPRIATION
(DISCRETIONARY DOLLARS IN THOUSANDS)

Discretionary Summary By Appropriation	FY 2004 Comparable Appropriation	FY 2005 Comparable Appropriation	FY 2006 Request to Congress	FY 2006 vs. FY 2005	
Energy and Water Development Appropriation Summary					
Energy Programs					
Energy supply	794 897	932 319	902 674	-29 645	-3.2%
Non-defense site acceleration completion	167 272	157 316	172 400	15 084	+9.6%
Uranium enrichment D&D fund	414 027	495 015	591 498	96 483	+19.5%
Non-defense environmental services	307 795	288 966	177 534	-111 432	-38.6%
Science	3 536 373	3 599 546	3 462 718	-136 828	-3.8%
Nuclear waste disposal	188 879	343 232	300 000	-43 232	-12.6%
Departmental administration	109 276	119 284	130 259	10 975	+9.2%
Inspector general	39 229	41 176	43 000	1 824	+4.4%
Total, Energy Programs	**5 557 748**	**5 976 854**	**5 780 083**	**-196 771**	**-3.3%**
Atomic Energy Defense Activities					
National Nuclear Security Administration:					
Weapons activities	6 447 159	6 583 350	6 630 133	46 783	+0.7%
Defense nuclear nonproliferation	1 367 709	1 422 103	1 637 239	215 136	+15.1%
Naval reactors	761 872	801 437	786 000	-15 437	-1.9%
Office of the administrator	352 949	357 051	343 869	-13 182	-3.7%
Total, National Nuclear Security Administration	**8 929 689**	**9 163 941**	**9 397 241**	**233 300**	**+2.5%**
Environmental and other defense activities:					
Defense site acceleration completion	5 433 423	5 725 935	5 183 713	-542 222	-9.5%
Defense environmental services	895 015	845 704	831 331	-14 373	-1.7%
Other defense activities	675 824	672 590	635 998	-36 592	-5.4%
Defense nuclear waste disposal	387 699	229 152	351 447	122 295	+53.4%
Total, Environmental & Other Defense Activities	**7 391 961**	**7 473 381**	**7 002 489**	**-470 892**	**-6.3%**
Total, Atomic Energy Defense Activities	**16 321 650**	**16 637 322**	**16 399 730**	**-237 592**	**-1.4%**
Defense EM privatization (rescission)	-15 329	—	—	—	—
Power marketing administrations:					
Southeastern Power Administration	5 070	5 158	—	-5 158	-100.0%
Southwestern Power Administration	28 431	29 117	3 166	-25 951	-89.1%
Western Area Power Administration	176 873	171 715	53 957	-117 758	-68.6%
Falcon & Amistad operating & maintenance fund	2 625	2 804	—	-2 804	-100.0%
Total, Power Marketing Administrations	**212 999**	**208 794**	**57 123**	**-151 671**	**-72.6%**
Federal Energy Regulatory Commission	—	—	—	—	—
Subtotal, Energy and Water Development Appropriation	**22 077 068**	**22 822 970**	**22 236 936**	**-586 034**	**-2.6%**
Uranium enrichment D&D fund discretionary payments	-449 333	-459 296	-451 000	8 296	+1.8%
Excess fees and recoveries, FERC	-19 000	-15 000	-13 000	2 000	+13.3%
Colorado River Basins	1 458	-23 000	-23 000	—	—
Total, Energy and Water Development Appropriation	**21 610 193**	**22 325 674**	**21 749 936**	**-575 738**	**-2.6%**
Interior and Related Agencies Appropriation Summary:					
Fossil energy research and development	658 981	571 854	491 456	-80 398	-14.1%
Naval petroleum and oil shale reserves	17 995	17 750	18 500	750	+4.2%
Elk Hills school lands fund	36 000	36 000	84 000	48 000	+133.3%
Energy conservation	867 967	868 234	846 772	-21 462	-2.5%
Economic regulation	1 034	—	—	—	—
Strategic Petroleum Reserve	170 948	169 710	166 000	-3 710	-2.2%
Northeast Home Heating Oil Reserve	4 939	4 930	—	-4 930	-100.0%
Energy Information Administration	81 100	83 819	85 926	2 107	+2.5%
Subtotal, Interior Accounts	**1 838 964**	**1 752 297**	**1 692 654**	**-59 643**	**-3.4%**
Clean coal technology	-98 000	-160 000	—	160 000	+100.0%
Total, Interior and Related Agencies Appropriation	**1 740 964**	**1 592 297**	**1 692 654**	**100 357**	**+6.3%**
Total, Discretionary Funding	**23 351 157**	**23 917 971**	**23 442 590**	**-475 381**	**-2.0%**

added, "Four years of debate is enough: I urge Congress to pass legislation that makes America more secure and less dependent on foreign energy."

Whether the White House will follow up on a comprehensive energy bill remains to be seen, but at least the FY 2006 budget request implies a somewhat higher relative priority for nuclear power. The DOE is asking for about $23.4 billion, 2 percent less than it received for FY 2005. The Energy Programs category is budgeted at $5.78 billion, down 3.3 percent. Within that category, the Uranium Enrichment Decontamination and Decommissioning Fund has been boosted nearly 20 percent, to $591.5 million, as work picks up on the cleanup activity; Science has been pared down to $3.46 billion, a 3.8 percent reduction; Nuclear Waste Disposal (Yucca Mountain and all related work) seeks $300 million, down 12.6 percent; and Energy Supply, which includes all the development work for the various fuels and production systems, has an FY 2006 request of $902 674 000, 3.2 percent lower than the amount provided for FY 2005.

As we get closer to the specific (and, whether it is admitted or not, competing) fuels, nuclear's favored treatment becomes more apparent. The Office of Nuclear Energy, Science and Technology is requesting

Continued on page 62

Continued from page 33

$510 776 000, 5.2 more than the FY 2005 appropriation. By comparison, the petroleum and natural gas technology R&D programs are to be terminated, with $20 million requested to close them out. The president's Coal Research Initiative would receive $286 million, up 4.9 percent, but a separate $257 million deferred from the clean coal program in FY 2005 will be canceled (only three of the program's 35 projects are not yet completed) and redirected to other fossil R&D programs in FY 2007. Energy Efficiency and Renewable Energy would get about $1.2 billion, down 4.9 percent, with wind power ($44 million, up 8.4 percent) and hydrogen technology ($99 million, up 5.4 percent) on the upswing, but solar at best steady ($84 million, down 1.3 percent), and declines for conservation ($847 million, down 2.5 percent), geothermal ($23.3 million, down 7.8 percent), and biomass (about $50 million, down 37.7 percent) and a virtual closeout of federally funded research in hydropower ($500 000, down 89.7 percent).

There are some significant dollar-amount changes under the umbrella headings of infrastructure and program direction, but these generally do not reflect policy. Rather they show the shifting of expenditures as organization charts evolve to reflect mission progress. For much of the nuclear community, the main focus is the Research and Development portion of the Office of Nuclear Energy, Science and Technology (NE) request: $191 million is sought, up 11.9 percent from the FY 2005 amount. The key specifics within R&D are as follows:

■ **Nuclear Power 2010,** the program in which the DOE shares costs with industry toward achieving a resumption of nuclear plant construction, would receive $56 million, up 12.9 percent from the $49 605 000 it has in FY 2005.

■ **The Generation IV Nuclear Energy Systems Initiative,** which funds R&D for reactors and fuels intended to become available in the coming decades, has a request of $45 million, up 13.4 percent from FY 2005.

■ **The Nuclear Hydrogen Initiative,** which explores systems and interfaces to couple reactor operation with large-scale separation of hydrogen, would be given $20 million, a whopping 124 percent increase over its FY 2005 funds.

■ **The Advanced Fuel Cycle Initiative,** with an increase of only 3.8 percent, seems static by comparison, but at $70 million would still have the largest budget of any project in this group. The work in this area is aimed at development of fuels that, among other things, deter weapons proliferation and minimize ultimate waste volume.

The bad news, discussed in greater detail elsewhere, is the request to eliminate all funding for the Nuclear Energy Plant Optimization program and the Nuclear Energy Research Initiative, which together account for less than $5 million in FY 2005. Congress restored some NERI funding in FY 2005 (at less than half of the FY 2004 amount), when the DOE had tried previously to terminate the program.

A setback for nuclear spacecraft

The kind treatment of nuclear energy in the FY 2006 budget does not extend beyond the Department of Energy. The National Aeronautics and Space Administration's (NASA) budget request states that the agency has decided to "defer" the Jupiter Icy Moons Orbiter (JIMO), which would have been the first space mission to use nuclear energy not just for onboard power, but also for propulsion. Despite NASA's word choice, the deferral is interpreted widely as a cancellation, because no schedule now exists for this mission.

Prometheus Nuclear Systems and Technology remains in the NASA budget as a general project area (or "theme," as NASA puts it), but without involvement in a specific mission or spacecraft. The budget states: "NASA is now conducting a Prometheus Analysis of Alternatives to identify a mission relevant to exploration and scientific goals, with reduced technical, schedule, and operational risk." The JIMO deferral translates to a 26 percent cut in the Prometheus budget, from the $431.7 million appropriated for FY 2005 to $319.6 million in FY 2006. Separately, there will be work in FY 2006 to produce qualification units for the testing of the Multi-Mission Radioisotope Thermoelectric Generator and the Sterling Radioisotope Generator, but plans for the second-generation Sterling and for radioisotope power conversion technology will be deleted.

In the course of a budget's progress through Congress, it is always possible that programs slighted by the administration can find new champions on Capitol Hill, but the chances for a quick rehabilitation of JIMO seem slim. There is far greater public outcry over NASA's decision not to send a servicing mission for the Hubble Space Telescope, which effectively dooms the Hubble to closure in a few years, long before the proposed James Webb Space Telescope could be built and launched. Space advocates are more likely to focus their lobbying efforts on saving the Hubble—a spacecraft that is already in existence and fulfilling a mission—than on a long-range outer-planet project.—*E.M.B.*

Security programs

The top national security priority, according to the Bush budget, is to prevent weapons of mass destruction from falling into the hands of terrorists. In that regard, the FY 2006 request of more than $1.4 billion for Defense Nuclear Proliferation (DNP), under the DOE's semi-autonomous National Nuclear Security Administration (NNSA), represents what the budget calls "an unprecedented effort to protect the homeland and U.S. allies from this threat."

The DNP's request includes:

■ About $98 million for the Global Threat Reduction Initiative (GTRI), which has a mission to identify, secure, and remove (or facilitate the disposition of) high-risk, vulnerable nuclear and radiological materials and equipment around the world that pose a potential threat to the United States and the international community. Falling under the GTRI umbrella are the Reduced Enrichment for Research and Test Reactors program, the Russian Research Reactor Fuel Return program, the Kazakhstan Spent Fuel program, the Highly-Enriched Uranium (HEU) Research Reactor Fuel Purchase program, the U.S. Foreign Research Reactor Spent Nuclear Fuel Return program, the U.S. Radiological Threat Reduction program, the International Radiological Threat Reduction program, and the Emerging Threats program. All told, the GTRI request is an increase of more than $4.1 million from FY 2005's appropriation.

■ More than $653 million for the Fissile Materials Disposition program, an increase of about $40 million from the previous appropriation. The program's goal is to eliminate surplus Russian plutonium and surplus U.S. plutonium and HEU.

■ About $272 million for Nonproliferation and Verification Research and Development, an increase of more than $48 million from FY 2005's appropriation. This program develops new technologies to improve U.S. capabilities to detect and monitor nuclear weapons production, proliferation, and prohibited nuclear explosions worldwide.

■ About $343.5 million for the International Nuclear Materials Protection and Cooperation program, an increase of about $49 million from FY 2005. This program's goal is to prevent nuclear terrorism by working in Russia and other regions of concern to secure and eliminate vulnerable nuclear weapons and weapons-usable material and to install detection equipment at border crossings and seaports to prevent and detect the illicit transfer of nuclear material.

The Bush budget also includes funding to combat nuclear terrorism through the Department of Homeland Security (DHS) and its Domestic Nuclear Detection Office

(DNDO). That office integrates domestic nuclear detection efforts undertaken by federal agencies, state and local governments, and the private sector, and is linked with international efforts. The DNDO focuses on federal capabilities in areas such as research, where it will oversee a coordinated approach to radiological and nuclear R&D at the DHS, the DOE, and the Department of Health and Human Services. The budget request is $262 million, more than twice the amount provided in FY 2005, for R&D of advanced detection devices to minimize the likelihood of a radiological or nuclear device entering the United States.

The DHS's budget also requests $873 million for its Information Analysis and Infrastructure Protection Directorate, which coordinates the federal government's efforts to protect the nation's critical infrastructure, including nuclear power plants, government facilities, commercial assets (e.g., stock exchanges), dams, national monuments and icons, chemical plants, bridges, and tunnels.

In addition, the Environmental Protection Agency's budget requests $185 million for homeland security activities, including $19 million to develop the necessary capabilities for detection and decontamination of threat agents.

Under the NNSA's Naval Reactors program, the request of $786 million is a decrease from FY 2005's appropriation of more than $801 million. Overall for the NNSA, the budget asks for about $9.4 billion, which is almost 40 percent of the DOE's total budget request for FY 2006. The NNSA's request is 2.5 percent greater than was appropriated in FY 2005.

Yucca Mountain and DOE sites

The budget asks for $651 million for the Yucca Mountain repository project in FY 2006, a considerable boost from the $572.4 million comparable appropriation in FY 2005, but still hundreds of millions of dollars less than the $907 million requested in FY 2005. In addition, because of the budgetary shortfalls the project has previously experienced, the Bush administration is calling for the reclassification of the fees currently paid by utilities to the federal government's Nuclear Waste Fund (NWF) to finance the repository. If Congress agrees to reclassify the funds, the approximately $750 million paid into the NWF each year would be made available to the Yucca Mountain project.

Funding levels varied for the DOE's national laboratories and sites. Work to be funded by the FY 2006 budget will include diverse participation in such programs as the Generation IV Nuclear Energy Systems Initiative, the Advanced Fuel Cycle Initiative, the Nuclear Hydrogen Initiative, University Reactor Information and Education Assistance, and Nuclear Power 2010. Work will no longer involve the Nuclear Energy Research Initiative or the Nuclear Energy Plant Optimization program, which have been zeroed out for funding in the budget.

For the Chicago Operations Office, which manages the Argonne and Brookhaven national labs and the Idaho facilities, the FY 2006 request increased by $419 000, from $14.2 million in FY 2005 to $14.6 million in FY 2006 (Argonne would receive a $508 000 gain, Brookhaven an $89 000 loss, and the Idaho facilities would remain even).

For the Idaho Operations Office, which includes the Idaho National Laboratory (INL), the University of Nevada–Las Vegas (UNLV), and the Idaho Operations Office, the amount requested in FY 2006 is about a $20.5-million increase, from $361 million in FY 2005 to $382 million in FY 2006 (INL would receive an additional $11 million above the FY 2005 request, Idaho Operations an additional $14 million, and UNLV about a $5-million decrease).

For the NNSA Service Center, which includes the Lawrence Livermore, Los Alamos, and Sandia national labs, there is a slight budget drop, from $35.5 million in FY 2005 to $34.7 million in FY 2006 (Lawrence Livermore would gain $65 000 over its FY 2005 appropriation, while Los Alamos would lose $3.3 million and San-

dia would lose about $2.5 million).

For the Savannah River Site, a $1.75-million request was made for FY 2006, compared with a $1.2-million request in FY 2005.

For the Oak Ridge Operations Office, which includes the Oak Ridge and Pacific Northwest national labs, the FY 2006 request is $45.8 million, compared with $47 million in FY 2005 (Oak Ridge would see a $1-million decrease in funding and Pacific Northwest a $200 000 decrease).

The DOE's Washington headquarters is budgeted for $35.1 million in FY 2006, compared with $33.6 million in FY 2005.

Fusion and high-energy physics

For the magnetic fusion community, the FY 2006 budget request is a good news/bad news joke. The good news is that the Fusion Energy Sciences budget request is up by 6.1 percent from FY 2005, to $290 550 000. The bad news is that if the $47 million for presumed U.S. involvement in the International Thermonuclear Experimental Reactor (ITER) is not included, the budget for programs carried over from FY 2005 is actually about $243 million, down more than 11 percent. Under ideal circumstances, this might be appropriate, given that a major intention of ITER is to allow many nations to share the cost of the most capital-intensive experiments to demonstrate the practicality of fusion power. As things stand now, however, there is no worldwide consensus on where to site ITER, and the site-selection deadlock threatens to delay, and perhaps terminate, the project. This could leave about $47 million in budget authority without a home, and there is no guarantee that unused funds would stay within the realm of fusion R&D.

Many government-supported high-tech projects measure their ability to progress, or even survive, in terms of the number of hours the project is allowed to operate. There are three DOE-funded magnetic-confinement fusion research facilities operating in the United States today, and their total operating hours are dwindling. The optimal total of hours per year for the three combined is 3000. Planned hours have gone from 2320 in FY 2004 to 1920 in FY 2005; the forecast for FY 2006 is 680 hours.

In FY 2006, the DIII-D tokamak at General Atomics in San Diego and the Alcator C-Mod tokamak at the Massachusetts Institute of Technology will have fewer operating hours. The National Spherical Tokamak Experiment, at the Princeton Plasma Physics Laboratory in New Jersey, will not operate at all, and its personnel will spend the fiscal year analyzing data from the previous two fiscal years and preparing for new experiments planned for FY 2007. Despite this, the research funding at each facility is down only slightly, because in some cases the work at each site has been geared to support aspects of the ITER mission. Funding is also declining for the National Compact Stellarator Experiment, to be built at Princeton: $15 900 000 for FY 2006, down about 9.2 percent from FY 2005.

From the perspective of activities, rather than facilities, the most severe casualty is the materials research funded under the heading of Enabling R&D. Supported with $7 323 000 in FY 2005, it will receive nothing in FY 2006, as the bulk of ITER-related materials research is expected to be carried out by other nations participating in the project.

The tally of operating hours tells much of the story in the larger realm of the DOE's Science office, which includes fusion. The FY 2006 request for the office's work is $3 462 718 000, down 3.8 percent from the FY 2005 amount. Some of the programs of interest to the nuclear community fared as follows:

■ **The Spallation Neutron Source (SNS),** under construction at Oak Ridge National Laboratory, is to be finished in FY 2006, so the $38.1 million decrease in construction funding (down from $79.9 million to $41.8 million) is more than offset by the $73.8 million provided as new funding for initial operation. The SNS will provide the most intense pulsed neutron beams available from any facility in the world. Also under the Basic Energy Sciences category, $30 million is being transferred from High-Energy Physics for work on the linear accelerator that is now the older, smaller facility at the **Stanford Linear Accelerator Center (SLAC)**.

■ The Nuclear Physics category as a whole is being trimmed by 8.4 percent, with $370 741 000 to be provided in FY 2006. The **Relativistic Heavy Ion Collider** at Brookhaven National Laboratory will have its operating hours cut by 61 percent and will receive $126.3 million in FY 2006, down 7.6 percent. The **Thomas Jefferson National Accelerator Facility** in Virginia, home of the continuous electron beam accelerator, will have 29 percent fewer operating hours, with $79 million, down 8 percent from FY 2005.

■ The High-Energy Physics category is to receive $713 933 000, down 3.1 percent from FY 2005. The main projects here are **FermiLab** ($304.2 million, up 0.2 percent), with 6 percent more operating hours, and **SLAC** ($144 million, down 13.3 percent), with a 54-percent increase in operating hours, thanks to the linac funding through Basic Energy.

Research programs

The DOE's Nuclear Energy Research Initiative (NERI) "has helped to maintain the nuclear research infrastructure" and has "focused attention on the United States as a nuclear research and development leader," according to the budget. Despite those laudatory words, the NERI program has been zeroed out for FY 2006 funding.

Begun in 1999, the NERI program promoted R&D on next-generation nuclear energy systems, proliferation-resistant nuclear fuel cycle technologies, the generation of hydrogen using nuclear power, improvements in light-water reactor technology, and fundamental areas of nuclear science that have a direct impact on the long-term success of nuclear energy.

In FY 2004, however, the DOE integrated NERI's activities directly into other R&D programs—such as the Generation IV Nuclear Energy Systems Initiative (Gen IV), the Advanced Fuel Cycle Initiative (AFCI), and the Nuclear Hydrogen Initiative (NHI)—"to achieve greater participation from U.S. universities," according to the budget. The result was a steady drying up of funds for NERI—from $6.4 million in FY 2004, to $2.5 million in FY 2005, and now $0 for FY 2006.

One of the programs that is replacing NERI—Gen IV—has a budget request of $45 million in FY 2006, a $5.3-million increase over FY 2005's level. Gen IV is a program that addresses the fundamental research and development issues necessary to establish the viability of next-generation nuclear energy system concepts. The budget said that successfully addressing the fundamental research and development issues of Gen IV system concepts that excel in safety, sustainability, cost-effectiveness, and proliferation-resistance will allow these advanced systems to be considered for commercial development and deployment by the private sector, thus realizing their considerable promise for the future.

Another NERI replacement, the AFCI program, has an FY 2006 budget request of $70 million, an increase of about $2.5 million from the FY 2005 request. The mission of AFCI is to develop and demonstrate technologies that will enable the United States and other advanced countries to implement an improved, long-term nuclear fuel cycle that provides substantial environmental, nonproliferation, and economic advantages over the current once-through fuel cycle. The budget noted that AFCI is designed to develop these new technologies so that they may be deployed to support the operation of current nuclear power plants, Generation III+ light-water reactors, and Gen IV reactors in order to achieve a significant reduction in the amount of high-level radioactive waste requiring geologic disposal, to reduce significantly accumulated plutonium in civilian spent fuel, and to extract more useful energy from nuclear fuel.

The third NERI replacement—the NHI program—would get more than an $11-million boost in FY 2006 funding over the FY 2005 level. The budget request of $20

million in FY 2006 would be used by the NHI to conduct research and development (R&D) on enabling technologies, demonstrate nuclear-based hydrogen production technologies, and study potential hydrogen production schemes to support the Bush administration's vision for a future hydrogen economy. The objective of the NHI, according to the budget, is to develop technologies that will apply heat available from advanced nuclear energy systems to produce hydrogen at a cost competitive with other alternative transportation fuels.

That same $0 budget request that was made for the NERI program was made for the Nuclear Energy Plant Optimization (NEPO) program. NEPO was started in FY 2000 to address the technical issues that may prevent the continued operation of existing nuclear power plants. Examples of recent results from NEPO's R&D include new electrical cable monitoring techniques for improved prediction of cable lifetimes; development of techniques to qualify digital instrumentation transmitters to replace existing analog transmitters that are less accurate, difficult to maintain, or no longer available from the vendors; and the development of guidelines for the implementation of hybrid and digital control room technology. NEPO R&D received about $2.9 million in FY 2004 and about $2.5 million in FY 2005. No funding was requested for FY 2006, and the budget offered no explanation for the program's shutout.

The DOE's University Reactor Infrastructure and Education Assistance program did receive a budget request—$24 million for FY 2006—about the same amount as appropriated in FY 2005. The program's mission is to enhance the national nuclear education infrastructure to meet the manpower requirements of the nation's energy, environmental, health care, and national security sectors.—*E. Michael Blake, Rick Michal*

NRC BUDGET

$702 million sought, 80 percent from fees

The Nuclear Regulatory Commission has proposed a budget of $701 692 000 for fiscal year 2006, with $567 128 000, or roughly 80 percent of the total, to be recovered through fees and other assessments to be paid by NRC licensees. The agency's ability to recover this much of its funding from the entities it regulates, however, may be curtailed sharply unless specific action is taken by Congress before FY 2006 begins on October 1.

The Omnibus Budget Reconciliation Act (OBRA) of 1990 shifted the NRC from full appropriation by the federal government to a system of user-fee recovery, with about 90 percent of the agency's budget to be provided by fees. (The 80 percent recovery in this case has to do with the Nuclear Waste Fund, as explained below.) As written, the 1990 OBRA is scheduled to reduce the NRC's fee authority to only 33 percent of its budget in FY 2006, with the remainder to be provided from the U.S. Treasury. It is expected that the agency's authority for 90 percent recovery will be extended by Congress in time to prevent the NRC from seeking more of its funding through conventional appropriations.

As was the case in FY 2005, the NRC is requesting slightly more money from the Nuclear Waste Fund (NWF) than it is from the Treasury. The $69 050 000 sought from the NWF would be devoted entirely to the agency's work on licensing the Department of Energy's proposed high-level waste repository at Yucca Mountain, in Nevada. This leaves $65 514 000 requested from the Treasury, for a total of $134 564 000 that would not be provided through fee recovery. With the NWF amount excluded, the fee recovery request is about 90 percent of the total of fee recovery plus Treasury funding.

The total FY 2006 request is almost 5 percent greater than the amount approved for FY 2005. As always, reactor regulation (covering power, research, and test reactors) accounts for the majority of the agency's needs, with $469 148 000 requested, up about 6 percent from FY 2005. There are increases sought for both subheadings, licensing and inspection, with inspection to receive $194 263 000 (about 8 percent more than in FY 2005) and licensing $274 885 000 (about 4 percent more).

Among its other programs, the NRC is proposing a slight reduction for fuel facility licensing and inspection ($36 587 000, down from $38 542 000 in FY 2005), but increases elsewhere (see accompanying table). Most of these hikes are small, but the area of decommissioning and low-level waste is budgeted at $28 097 000, up more than 16 percent from the FY 2005 amount.

The increase in the agency's total request over last year's approved amount is $32 430 000. Of that, about $11.8 million is needed to cover pay raises and other

SUMMARY OF NUCLEAR REGULATORY COMMISSION BUDGET AUTHORITY MAJOR PROGRAMS
(DOLLARS IN THOUSANDS)

Summary	FY 2004 Enacted* $	FY 2004 Enacted* FTE†	FY 2005 Estimated Full Cost $	FY 2005 Estimated Full Cost FTE	FY 2006 Full Cost $	FY 2006 Full Cost FTE	Change From FY 2005 $	Change From FY 2005 FTE
Budget Authority by Major Programs								
Nuclear reactor licensing	198 694	883	263 257	1 128	274 885	1 140	11 628	12
Nuclear reactor inspection	107 419	802	179 798	1 013	194 263	1 034	14 465	21
Subtotal Nuclear Reactor	**306 113**	**1 685**	**443 055**	**2 141**	**469 148**	**2 174**	**26 093**	**33**
Fuel facility licensing and inspection	21 674	143	38 542	200	36 587	186	-1 955	-14
Nuclear materials users licensing and inspection	45 343	278	63 637	330	65 928	319	2 291	-11
High-level waste repository	32 905	77	68 498	163	69 050	164	552	1
Decommissioning and low-level waste	19 448	86	24 081	112	28 097	127	4 016	15
Spent fuel storage and transportation licensing and inspection	19 680	105	23 937	115	24 566	116	629	1
Subtotal Nuclear Materials and Waste Safety	**139 050**	**689**	**218 695**	**920**	**224 228**	**912**	**5 533**	**-8**
Infrastructure and support	173 165	619	0	0	0	0	0	0
Subtotal	**618 328**	**2 993**	**661 750**	**3 061**	**693 376**	**3 086**	**31 626**	**25**
Inspector General	7 297	47	7 512	47	8 316	49	804	2
Total	**625 625**	**3 040**	**669 262**	**3 108**	**701 692**	**3 135**	**32 430**	**27**
Reimbursable FTE		18		22		19		-3
Total	**625 625**	**3 058**	**669 262**	**3 130**	**701 692**	**3 154**	**32 430**	**24**

*Beginning in FY 2005, the NRC included the agency's infrastructure and support costs as a portion of total program costs. FY 2004 enacted numbers do not reflect these allocated costs.
†"FTE" indicates full-time-equivalent employees.

nondiscretionary compensation and benefits increases. Roughly $17.7 million is needed to cover the increase in program costs, with $10.2 million added in reactor inspection. The increase in licensing is about $7.5 million, with a further $2.5 million sought to meet new NRC responsibilities for oversight of DOE radioactive waste incidental to fuel reprocessing.

The increase for inspection is intended to improve the effectiveness of design/engineering inspections, enhance reactor security through added inspections and oversight, fund infrastructure and support cost allocation, and update the Significance Determination Process (SDP) notebooks to reflect external initiating events. The SDP is used by the NRC to determine the color code of an inspection finding at a licensee site (green for low safety significance, white for low to moderate, etc.), within the reactor oversight process.

The extra funding for licensing is sought to reduce the backlogs of research and test reactor license renewals and licensing action inventory, conduct research to obtain fission product data representative of accidents in spent fuel pools, support nuclear safety cooperation initiatives with India and Pakistan, fund infrastructure and support cost allocations, and continue work on standard reactor design certification applications. Within that item, the NRC expects to issue the standard design certification rulemaking for the Westinghouse AP1000 advanced pressurized water reactor during FY 2006 and will conduct its review of what the budget request referred to only as "two design certification applications." One of these would likely be the General Electric ESBWR advanced boiling water reactor, which is now in the pre-application stage. The only other design that has been proposed lately is AECL Technologies' ACR-700 pressurized heavy-water reactor, but its candidacy for design certification by the NRC has recently been cast into doubt by Dominion Energy's decision to switch from the ACR-700 to the ESBWR as it pursues a license application demonstration under the DOE's Nuclear Power 2010 program (*NN*, Feb. 2005, p. 17).

In its request, the NRC has also specified the funding that has significance to homeland security (HS) within each program area. For FY 2006, the HS amount requested for reactor regulation, $35 265 000, is about 2 percent lower than the FY 2005 amount, but the HS request for materials and waste safety, $25 743 000, is about 12 percent higher than the FY 2005 figure. The main boost is for nuclear materials users licensing and inspection ($12 822 000, up 15 percent). Among other things, the NRC stated that it intends to "improve control of radioactive materials to prevent their potential use in radioactive dispersal devices.—*E. Michael Blake* NN