### Special Report – DOE and NRC Budgets

### DEPARTMENT OF ENERGY

# Nuclear budget up in FY 2014; FY 2015 request down slightly

ven in the most amicable of political times, a federal administration's budget request seldom resembles what is eventually appropriated by Congress and signed into law. Given the current climate in the nation's capital, in which the impasse between House Republicans and the Obama administration produced a government shutdown last October, there would seem to be virtually no chance of a resemblance between requests and appropriations when (and if) appropriations are approved for fiscal year 2015, which begins on October 1. Still, many nuclear endeavors depend on federal funding to varying degrees, so a budget request at least reflects how those endeavors are regarded by the administration. Also, because the final budget for FY 2014 was enacted in mid-January and details were not available until later, this is our first opportunity to show what can actually be spent on federal programs from now through the end of September.

Perhaps the most significant expression of the administration's regard, as alluded to above, is its intention for the Mixed-Oxide Fuel Fabrication Facility at the Savannah River Site in South Carolina to be placed in "cold standby." A more detailed article on this decision appears in the Security section of this issue, on page 34. Conversely, an indication of how the administration's regard can be thwarted is contained in the enacted FY 2014 budget, with the resumption of operation of the Massachusetts Institute of Technology's Alcator C magnetic fusion experimental device. The administration had The Obama administration's budget request for next year arrived shortly after Congress approved a federal budget for this year.

sought to end operation of Alcator C and continue work there only through the analysis of data from earlier work, but the Massachusetts congressional delegation succeeded in restoring operational funding. Work resumed at Alcator C in February.

The enacted DOE budget for FY 2014 is \$27,224.81 million, an increase of 8.3 percent over the FY 2013 amount of \$25,137.431 million. The request for FY 2015 is \$27,940.428 million, 2.6 percent more than the FY 2014 amount. Despite the rancor over the funding of federal programs, the DOE has seen gains both in what it received for this year and in what it would like for next year. All of the major functional areas within the DOE have more money this year than they had in FY 2013, but most of them will see either smaller increases in FY 2015 or reductions.

The National Nuclear Security Administration has gone from \$10,575.789 million in FY 2013 to \$11,207.000 million in FY 2014, a 6 percent increase. The FY 2015 request would add 4 percent more, for a total of \$11,658 million. The DOE's Science area, which includes high-cost experimental programs in fields such as particle physics and nuclear fusion (but not inertial fusion at the National Ignition Facility, which is under the NNSA), went from \$4,681.195 million in FY 2013 to \$5,066.372 million in FY 2014 (up 8.2 percent), and the FY 2015 request is for a small additional increase, to \$5,111.155 million (up 0.9 percent from FY 2014). The Energy area, which includes programs for various fuel types (including nuclear), rose from \$3,320.222 million in FY 2013 to \$3,718.055 million in FY 2014 (12.0 percent); the FY 2015 request calls for another substantial increase, to \$4,087.165 million, 9.9 percent more than the FY 2014 amount.

Some of the changes in the accompanying table, and in the deeper and more detailed numbers, show steep percentage increases or decreases, but in general, these are for programs that have relatively little funding (so a large percent change may correspond to a modest amount of money), or show the effect of a program or project being moved in the organizational table from one area to another. Conversely, small percentage changes in large programs can correspond to substantial alterations, sometimes as a result of revised missions, and can affect many professionals (in the DOE itself and among its contractors) and the prospects for their work. At this writing, the detailed amounts for individual programs, and the DOE's justifications for them, had not been made public. It is expected that

DEPARTMENT OF ENERGY FY 2015 BUDGET BY ORGANIZATION
(DISCRETIONARY DOLLARS IN THOUSANDS)

	FY 2013	FY 2014	FY 2015	FY 2015 vs	. FY 2014
National Nuclear Security Administration	Current	Enacted	Request	\$	%
Weapons Activities	6,966,855	7,781,000	8,314,902	+533,902	+6.9%
Defense Nuclear Nonproliferation	2,237,420	1,954,000	1,555,156	-398,844	-20.4%
Naval Reactors	994,118	1,095,000	1,377,100	+282,100	+25.8%
Federal Salaries and Expenses <sup>1</sup>	377,457	377,000	410,842	+33,842	+23.8%
•		377,000	0	+33,842	
Cerro Grande Fire Activities	-61				N/A
Total, National Nuclear Security Administration	10,575,789	11,207,000	11,658,000	+451,000	+4.0%
Science and Energy	4 / 01 105	5 0// 272	F 111 1FF	44 700	10.0%
Science	4,681,195	5,066,372	5,111,155	44,783	+0.9%
Energy		1 000 ( 41	2 214 740		121.0%
Energy Efficiency and Renewable Energy	1,691,757	1,900,641	2,316,749	+416,108	+21.9%
Electricity Delivery and Energy Reliability	129,196	147,242	180,000	+32,758	+22.2%
Fossil Energy	699,059	779,290	711,030	-68,260	-8.8%
Nuclear Energy	798,282	888,376	863,386	-24,990	-2.8%
Office of Indian Energy Policy and Programs	1,928	2,506	16,000	+13,494	+538.5%
Total, Energy	3,320,222	3,718,055	4,087,165	+369,110	+9.9%
Total, Science and Energy	8,001,417	8,784,427	9,198,320	+413,893	+4.7%
Advanced Research Projects Agency–Energy	250,636	280,000	325,000	+45,000	+16.1%
Energy Information Administration	99,508	116,999	122,500	+5,501	+4.7%
Credit Programs					
Title 17 - Innovative Technology					
Loan Guarantee Program	0	20,000	7,000	-13,000	-65.0%
Advanced Technology Vehicles Manufacturing Loan	5,686	6,000	4,000	-2,000	-33.3%
Total, Credit Programs	5,686	26,000	11,000	-15,000	-57.7%
Management and Performance					
Environmental Management	5,298,742	5,830,315	5,621,688	-208,627	-3.6%
Civilian Radioactive Waste Management	-727	0	0	0	N/A
Office of Legacy Management	155,699	176,983	171,980	-5,003	-2.8%
Chief Information Officer	78,885	82,062	71,959	-10,103	-12.3%
Management	59,437	57,599	68,293	+10,694	+18.6%
Chief Human Capital Officer	23,458	24,488	25,400	+912	+3.7%
Hearings and Appeals	3,803	5,022	5,500	+478	+9.5%
Economic Impact and Diversity	7,204	8,956	7,247	-1,709	-19.1%
Office of Small and Disadvantaged Business Utilization	0	0,750	2,253	+2,253	N/A
Total, Management and Performance	5,626,501	6,185,425	5,974,320	-211,105	-3.4%
Corporate Management	3,020,301	0,105,425	3,774,320	-211,105	-3.4/0
Office of the Secretary	4,849	5,008	5,008	0	0.0%
Cost of Work and Revenues	-63,086		-77,171	-17,520	-29.4%
		-59,651		,	
Chief Financial Officer	49,576	47,825	47,182	-643	-1.3%
Congressional and Intergovernmental Affairs	4,521	4,700	6,300	+1,600	+34.0%
Public Affairs	3,664	3,597	3,431	-166	-4.6%
General Counsel	31,863	33,053	31,000	-2,053	-6.2%
Policy and International Affairs	25,991	0	0	0	N/A
International Affairs	0	15,873	18,441	+2,568	+16.2%
Energy Policy and Systems Analysis	0	19,269	38,545	+19,276	+100.0%
Total, Corporate Management	57,378	69,674	72,736	+3,062	+4.4%
Health, Safety and Security	230,184	251,917	0	-251,917	-100.0%
Environment, Health, Safety and Security	0	0	180,998	+180,998	N/A
Independent Enterprise Assessments	0	0	73,534	+73,534	N/A
Specialized Security Activities	171,396	202,242	202,152	-90	-0.0%
Office of the Inspector General	39,803	42,120	39,868	-2,252	-5.3%
Power Marketing Administrations	79,412	85,242	82,000	-3,242	-3.8%
Federal Energy Regulatory Commission	-279	-26,236	0	+26,236	+100.0%
Total, Discretionary Funding by Organization					

they will be available by the time this issue goes to press, at <http://energy.gov/budget-performance>.

The budget request for FY 2015 is highly speculative, but the process also includes projections for the following four years (or "outyears"), which are even less likely to resemble what will actually be appropriated. Under these projections, Nuclear Energy would increase by roughly \$15 million every year, to \$923.61 million by FY 2019. That would be less than 2 percent per year, but a gain nonetheless. It is difficult, however, to imagine the circumstances that would make exactly those amounts available.

#### **Nuclear Energy**

The items under the Nuclear Energy heading are funded at \$893.376 million in FY 2014, up 26.1 percent from FY 2013, with the majority of the increase accounted for by the addition of more than \$50 million <sup>1</sup>Formerly Office of the Administrator

to the Idaho Facilities Management budget and the placement in Nuclear Energy of \$94 million for Idaho Sitewide Safeguards and Security. In FY 2013, the latter's \$89.853 million appropriation had been under Other Defense Activities. For FY 2015, \$863.386 million is sought, down 3.4 percent from FY 2014.

Among the main items in Nuclear Energy, Nuclear Energy Enabling Technologies has \$71.109 million for FY 2014 (up 4.7

percent from FY 2013) and would rise to \$78.246 million in FY 2015 (up 10 percent). Reactor Concepts Research, Development, and Demonstration has \$112.822 million in FY 2014 (up 7.7 percent), but would drop to \$100.540 million (down 10.9 percent, and below the FY 2013 amount). Fuel Cycle Research and Development has \$186.205 million this year (up 9.6 percent) and would go to \$189.1 million next year (up 1.6 percent). Small Modular Reactor Licensing Technical Support has received \$110 million for FY 2014 (up 75.5 percent) and would get \$97 million in FY 2015 (down 11.8 percent). The sharp changes in the SMR budget generally follow what are seen to be the needs of the program, to share the costs of certifying the designs of the mPower and NuScale reactors, and of the reviews of license applications.

Also under Nuclear Energy is a new program request for FY 2015: \$27.5 million for the Supercritical Transformational Electric Power (STEP) Generation line item. This would be a collaborative effort (meaning that costs would be shared with industry) on the validation and pre-commercial development of advanced Brayton cycle energy conversion technology based on supercritical carbon dioxide as a working fluid. Advanced Brayton and Rankine cycle systems, which could operate at high efficiency from the hot- and cold-leg temperatures that are expected with high-temperature gas-cooled reactors and other advanced reactor concepts, have often been proposed as ways to maximize the benefits of advanced reactors. STEP-produced systems might also be usable for other thermal power plants, but for now, at least, the DOE's costs are charged to the Nuclear Energy area.

#### **Environmental Management**

The DOE's Office of Environmental Management (EM) is tasked with supporting the department's Strategic Objective 8: "Continue cleanup of radioactive and chemical waste resulting from the Manhattan Project and Cold War activities." For FY 2015, EM has requested \$5,621 million, which is \$208 million less than what was enacted for FY 2014, a 3.6 percent decrease.

Among the EM programs, the largest single funding reduction in budget dollars came from the Richland Operations Office, which shares cleanup responsibilities at the DOE's Hanford Site near Richland, Wash., with the Office of River Protection. Richland Operations' budget was cut by \$98.32 million, or 9.7 percent, from FY 2014, but EM has requested that the Office of River Protection's budget be increased by \$24.78 million, to \$1,210 million for FY 2015. The combined requested FY 2015 budget for Hanford is \$2,149 million, \$73.5 million (3 percent) less than FY 2014's enacted budget.

River Protection is responsible for the management and treatment of Hanford's approximately 56 million gallons of radioactive and chemical waste currently stored in 177 underground tanks, as well as the construction of the Waste Treatment and Immobilization Plant (WTP). Leaks in the single-shell tanks and in one of the double-shell tanks continue to pose challenges in managing the waste, and the DOE has suspended some construction work at the WTP as it works on a strategy to overcome technical issues with the plant (see page 61, this issue).

Requested FY 2015 funding for other EM cleanup sites-including Oak Ridge, Paducah, the West Valley Demonstration Project, Moab, and Idaho National Laboratory-was also decreased by 10.4 percent, 16.9 percent, 8.4 percent, 5.7 percent, and 5.1 percent, respectively. Likewise, EM has requested a slight decrease in funding for the Waste Isolation Pilot Plant, Sandia National Laboratories, and Los Alamos National Laboratory, reducing their budgets by 0.3 percent, 0.5 percent, and 0.1 percent, respectively. EM has requested no funding for its Separation Process Research Unit at the Knolls Atomic Power Laboratory in New York, which had an enacted FY 2014 budget of \$23.7 million.

In addition to the 2 percent increase in the Office of River Protection's budget, EM has also requested increases for Portsmouth (11.2 percent), Nevada (4.8 percent), and Savannah River (2.1 percent).

#### Science, including fusion

New facilities, and upgrades to existing facilities, that were authorized in recent years continue to receive committed funding for construction and other developments, accounting for growth in Nuclear Physics in FY 2014 (\$569.138 million, up 12.2 percent) and again for FY 2015 (\$593.573 million, up 4.3 percent). Included here are the construction of the Facility for Rare Isotope Beams at Michigan State University, the operation of the Relativistic Heavy Ion Collider at Brookhaven National Laboratory, the Argonne Tandem Linac Accelerator, and the commissioning of the upgrade to the Continuous Electron Beam Accelerator Facility at the Jefferson Laboratory in Virginia.

Also heading for construction is the Muon to Electron Conversion Experiment at Fermi National Accelerator Laboratory, under the High-Energy Physics heading. Funding in this area also supports detector operation at the Large Hadron Collider in Switzerland and a variety of experiments and feasibility studies in realms such as the hypothesized "dark matter" and "dark energy." For High-Energy Physics, \$796.521 million has been appropriated in FY 2014 (up 9.5 percent), and the request for FY 2015 is \$744 million (down 6.6 percent).

The string of funding amounts for Fusion Energy Sciences continues to draw peaks and valleys, to some extent representing disagreement between the administration and Congress. The FY 2014 appropriation is \$504.677 million, up 33.6 percent from FY 2013 and considerably more than the administration's request. Congress's restoration of Alcator C operation had something to do with that. For FY 2015, the request is \$416 million (down 17.6 percent, but 10.1 percent more than the FY 2013 amount). The FY 2015 request covers the resumption of operation at another major magnetic fusion facility in the United States, NSTX at the Princeton Plasma Physics Laboratory, which was shut down for upgrade work. Also included is the United States' contribution to the International Thermonuclear Experimental Reactor in France, which sometimes draws criticism from some congressional committee members.

#### **NNSA**

The majority of the funding for this semiautonomous unit of the DOE goes to Weapons Activities, which has seen overall growth both in the FY 2014 appropriation (\$7,781 million after adjustments, up 11.7 percent from FY 2013) and in the FY 2015 request (\$8,314.902 million, up 6.9 percent). This increase is reflected somewhat in one of the two biggest line items, Directed Stockpile Work, with \$2,442.033 million in FY 2014 (up 26.5 percent) and \$2,746.604 million in the FY 2015 request (up 12.5 percent). The other large line item, Readiness in Technical Base and Facilities, is declining slightly, with \$2,067.425 million in FY 2014 (down 1.1 percent) and \$2,055.521 million sought in FY 2015 (down 0.6 percent). Perhaps reflecting the graving of the "baby boom" generation, Legacy Contractor Pensions rose to \$279.597 million in FY 2014 (up 64.3 percent) and would increase to \$307.058 million in FY 2015 (up 9.8 percent).

Defense Nuclear Nonproliferation Programs have \$1,954 million to use during FY 2014 (down 12.7 percent), and the FY 2015 request is \$1,555.156 million (down 20.4 percent). Much of the decline is shown in the Fissile Materials Disposition line item, which has \$526.057 million this year (down 20.7 percent) and would get \$311.125 million next year (down 40.9 percent). This line item includes the Mixed Oxide Fuel Fabrication Facility, and while the disposition of this material is called "vital to the nation's arms control and nuclear nonproliferation efforts," cost increases and the current budget environment have prompted the DOE to place the facility in cold standby "to further study more efficient options for plutonium disposition."

The Global Threat Reduction Initiative has been appropriated \$442.102 million in FY 2014 (down 4.5 percent from FY 2013), and would get \$333.488 million in FY 2015 (down 24.6 percent). A major reason for the reduction is said to be the end, by FY 2015,

#### Special Report – DOE and NRC Budgets

of the major expenditure on the establishment of domestic production capability of molybdenum-99 for medical uses. NNSA has taken the lead on backing several Mo-99 projects, both to ensure its availability here and to shift production away from dependence on high-enriched uranium.

The Inertial Confinement Fusion and High-Yield Campaign, under Weapons Activities, is funded at \$513.957 million in FY 2014 (up 12.5 percent) and would stay at roughly the same level in FY 2015, with \$512.895 million (down 0.2 percent). With the goal of ignition of fusion fuel in the National Ignition Facility not having been met by the end of FY 2012, experiments have continued, and some further headway has been made (see page 66, this issue). Perhaps around the end of FY 2015 there will be a conclusion from an external review of which laser driver approach (direct, indirect, or pulsed) holds the most promise for achieving ignition.

#### NRC

## Another small budget increase, to \$1,059.5 million

The Nuclear Regulatory Commission's budget is rarely controversial, in part because the agency recovers about 90 percent of its funding through fees imposed on li-

censees, applicants, and other recipients of NRC services. The appropriation for fiscal year 2014, signed into law on January 16, is within \$1 million of the requested amount, and for a budget of more than a billion dollars, the difference is slight. The \$1,059.5 million sought by the NRC for FY 2015 is an increase of about 0.3 percent from the FY 2014 appropriation. Only two areas within the agency would receive more funding in FY 2015 than in FY 2014, the New Reactors activity within the Nuclear Reactor Safety program, and the Fuel Facilities activity within the Nuclear Materials and Waste Safety program. All of the other activities would receive less funding, although none of the decreases amounts to as much as 5 percent.

First, here's a look at the requested and enacted amounts for FY 2014, which support the agency from now through the end of September. For the NRC as a whole, \$1,055.0 million was sought, and \$1,055.9 million was received. The Nuclear Reactor Safety proposal was \$812.4 million, and the appropriation is \$811.4 million. The Nuclear Materials and Waste Safety request was \$231.5 million, and the enacted amount is \$232.5 million. The Office of Inspector General (OIG), funded separately so as to maintain its autonomy, had an \$11.1-million request and a \$12.1-million appropriation. (The numbers given here may not add up precisely because of rounding.)

The offsetting user fees had been projected at \$930.7 million, with the remaining \$124.3 million to be the actual cost to the federal government. The user fee projection held, and so the federal funding is \$125.2 million. Within the federally funded amount, the proposed \$19.5 million for Homeland Security and \$1.4 million for Waste Incidental to Reprocessing also carried through to enactment. The federal funding also includes \$0.9 million for the NRC's OIG to provide inspector general services permanently for the Defense Nuclear Facilities Safety Board.

Within Nuclear Reactor Safety, \$571.9 million was sought for the Operating Reactors activity, and \$590.1 million was enacted. The New Reactor activity proposal was \$240.5 million, and \$221.3 million was provided. In Materials and Waste, the Fuel Facilities activity went from a \$60.2-million request to a \$54.9-million appropriation; Nuclear Materials Users rose from \$86.9 million to \$90.2 million; Spent Fuel Storage and Transportation also gained, from \$45.4 million to \$47.6 million; and Decommissioning and High-Level Waste asked for \$39.0 million and received \$39.8 million.

Separately from the money, the enacted law includes a passage requiring the NRC chairman to inform the other commissioners and the responsible congressional committees within one day of assuming emergency authority and to provide justification for doing so. During the Fukushima Daiichi accident in Japan in March 2011, then chairman Gregory Jaczko assumed emergency authority and took actions that were later criticized, including the issuance of an advisory to Americans within 50 miles of the damaged plant to evacuate, based on reports that the Unit 4 spent fuel pool no longer contained water. It was later determined that the pool still had water in it and that all of the fuel was covered to a significant depth.

#### On to FY 2015

For the NRC as a whole, \$1,059.5 million is sought for FY 2015, up from the \$1,055.9 million enacted for FY 2014. This corresponds to an increase in staff of 66.8 fulltime employee equivalents. Nuclear Reactor Safety would receive \$815.2 million in FY 2015, up by 0.5 percent. Nuclear Materials and Waste Safety has a proposal of \$232.2 million, down by 0.1 percent. The OIG request is \$12.1 million, up by 0.8 percent.

The Operating Reactors activity remains the highest-funded within the agency, with \$577.3 million sought for FY 2015, but a decline of 2.2 percent from the enacted FY 2014 amount. The request is based on the NRC's reckoning of the costs for work during FY 2015 on the following:

Licensing activities related to cybersecurity.

■ Fukushima Daiichi lessons-learned activities of high (Tier 1) and middle (Tier 2) priority, especially reviews related to mitigating strategies.

Resolution of Generic Safety Issue 191, to avert pressurized water reactor sump strainer blockage and core damage.

Reviews of applications for new medical isotope production facilities.

■ Completion of decommissioning reviews at Crystal River, Kewaunee, and San Onofre.

■ Work on 900 licensing actions, including six power uprates, 15 adoptions of National Fire Protection Association Standard 805, and 100 Fukushima-related amendments.

■ Also on the Fukushima aftermath, the continuation of seismic and flooding reviews, inspections and closeout of licensee actions on mitigating strategies, spent fuel pool instrumentation, safety evaluations for accident-capable hardened vents, and related emergency preparedness work.

Reviews of the 11 pending license renewal applications for 19 reactors at 12 sites.
Reviews of 18 high-priority and three medium-priority rulemakings.

■ Research on Fukushima lessons learned, fire safety, digital and electrical systems, materials degradation, code development and analysis, radiation protection, probabilistic risk assessment, and natural-event hazard evaluation. ■ Ensuring the agency's ability to respond around the clock to events and to collect and disseminate the necessary information.

The \$237.9 million for New Reactors is a boost of 7.5 percent over the FY 2014 funding, although about 1 percent less than what was originally requested for FY 2014. Increases and decreases in activity funding may merely reflect the expected cost demands of specific tasks, rather than whether the industry itself is doing (and spending) more or less in that activity. The projection was developed over the past several months, so while work in New Reactors was said to include additional small modular reactor applications, Westinghouse Electric Company and Holtec International recently told the NRC that they no longer have target dates for the submittal of design certification applications (NN, Mar. 2014, p. 18). Also projected is continued work on the US-APWR certification, although Mitsubishi Heavy Industries had planned to suspend work on the application at the end of March.

With five power reactors under construction, NRC activity in general will continue, although the development of the construction inspection oversight program has advanced to the point where there will be less work on the program's development. In FY 2015, however, TVA Nuclear's Watts Bar-2 is expected to be nearing completion and startup, so the NRC plans to increase its oversight of that project. Much of the remaining New Reactors work will be continuations of reviews for active license applications and vendor inspections and the start of reviews on the NuScale SMR.

Nuclear Materials and Waste Safety is seeking \$232.2 million, down 0.1 percent from the enacted FY 2014 funding. The 11.3 percent boost in the Fuel Facilities activity, to \$61.1 million, results in part from the expected application from GE Hitachi Nuclear Energy for a laser uranium enrichment plant at Paducah, Ky. The request for Nuclear Materials Users is \$86.5 million (down 4.1 percent). Spent Fuel Storage and Transportation would receive \$45.3 million (down 4.8 percent), and Decommissioning and Low-Level Waste would get \$39.3 million (down 1.3 percent).

In the responses of the NRC and industry to the Fukushima Daiichi accident, most of the attention has centered on power reactors, but one of the work areas in Fuel Facilities will involve inspections related to the prevention and mitigation of the kinds of emergencies that overcame the Japanese plant. No significant changes are expected from FY 2014 to FY 2015 in either Nuclear Materials Users or Decommissioning and Low-Level Waste, but a key action in Spent Fuel Storage and Transportation is the completion of the Waste Confidence Rule. In fact, the NRC recently stated that it will not be finished until October, at least a few days into FY 2015. 22