Office of Nuclear Energy
FY 2014 Budget Request

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President Obama's Commitment to Clean Energy

"With rising oil prices and a warming climate, nuclear energy will only become more important. That's why, in the United States, we've restarted our nuclear industry as part of a comprehensive strategy to develop every energy source."

President Barack Obama
Seoul, Republic of Korea
March 2012

Department of Energy Mission and Goals

DOE Mission

The mission of the Department of Energy is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions.

Transform our Energy Systems

Goal 1: Catalyze the timely, material, and efficient transformation of the nation's energy system and secure U.S. leadership in clean energy technologies.

The Science and Engineering Enterprise

Goal 2: Maintain a vibrant U.S. effort in science and engineering as a cornerstone of our economic prosperity with clear leadership in strategic areas.

Secure Our Nation

Goal 3: Enhance nuclear security through defense, nonproliferation, and environmental efforts.

Management and Operational Excellence

Goal 4: Establish an operational and adaptable framework that combines the best wisdom of all Department stakeholders to maximize mission success.

NE FY 2014 Congressional Request
Funding Summary

(Dollars in Thousands)

	FY 2012 Current		FY 2014 Request	
Integrated University Program	5,000		0	
SMR Licensing Technical Support	67,000		70,000	
Reactor Concepts RD&D	110,652		72,500	
Fuel Cycle R&D	180,993		165,100	
Nuclear Energy Enabling Technologies	71,307		62,300	
Radiological Facilities Management	69,510		5,000	
International Nuclear Energy Cooperation	2,983		2,500	
Idaho Facilities Management	154,097		181,560	
Idaho Safeguards and Security [a]	93,350		94,000	
Program Direction	91,000		87,500	
Adjustments	7,924	[b]	-5,000	[c]
Total, Nuclear Energy	**853,816**		**735,460**	

a) Requested within Nuclear Energy in FY 2014 (retains Defense function), appropriated within Other Defense Activities in FY 2012.
b) Includes +$7,924,00 transfer from Department of State.
c) Use of Prior Year Balances

Small Modular Reactor Licensing Technical Support

Budget Summary
$ in thousands

Program Element	FY 2012 Current	FY 2014 Request
SMR Licensing Technical Support	67,000	70,000
Total:	**67,000**	**70,000**

- **Mission**
  - Support design certification (DC) and licensing activities for SMR designs through cost-shared arrangements with industry partners in order to promote deployment of SMRs that can provide safe, clean, affordable power options
- **FY 2014 Planned Accomplishments**
  - Complete cooperative agreement negotiations with vendor(s) selected under second SMR FOA
  - Ensure awardees complete site characterization activities for the selected SMR project site under the first FOA.
  - Ensure awardees complete conceptual design reports for SMR design(s) selected under the second FOA.
  - Awardee under first FOA should submit the Design Certification Application to the NRC for selected SMR design.

Program will provide $452M over 6 years

Reactor Concepts
Research, Development, and Demonstration

Budget Summary
$ in thousands

Program Element	FY 2012 Current	FY 2014 Request
Small Modular Reactor Advanced Concepts R&D	24,529	20,000
Next Generation Nuclear Plant (NGNP)	39,644	0
Light Water Reactor Sustainability	24,795	21,500
Advanced Reactor Concepts	21,683	31,000
Total:	**110,652**	**72,500**

- **Mission**
  - Develop new and advanced reactor designs and technologies that advance the state of reactor technology to improve competitiveness, helping nuclear contribute to our nation's energy portfolio, and address environmental challenges
- **FY 2014 Planned Accomplishments**
  - Complete safety framework, PRA development on siting, and analyze potential reduced staffing requirements for advanced SMRs.
  - Test Risk Informed Safety Margin Characterization approach using an LWR case study for enhanced accident-tolerance design changes.
  - Continue research related to development of technologies to enable in-service-inspection of systems and components within liquid metal coolant environments.
  - Complete irradiation of AGR-3/4 fuel experiment in ATR and complete fuel fabrication and characterization of AGR-5/6/7 fuel qualification experiments.

Fuel Cycle Research and Development

Budget Summary
$ in thousands

Program Element	FY 2012 Current	FY 2014 Request
Separations and Waste Forms	31,273	35,300
Advanced Fuels	57,154	37,100
Systems Analysis & Integration	16,527	21,500
Materials Protection, Accounting & Control Technology	5,000	7,600
Used Nuclear Fuel Disposition	57,890	60,000
Fuel Resources	3,501	3,600
Spent Nuclear Fuel Analysis	9,648	-
Total:	**180,993**	**165,100**

- **Mission**
  - Develop used nuclear fuel management strategies and technologies; conduct R&D on fuel cycle technologies and options.
- **FY 2014 Planned Accomplishments**
  - Continue activities that support the Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste
  - Develop design concepts for consolidated storage facilities
  - Explore the logistics for shipping orphan fuel to a consolidated interim storage facility
  - Identify promising candidate accident tolerant fuel cycle concepts for study
  - Advance salt repository science for disposal of heat-generating waste
  - Continue research to understand deep borehole disposal
  - Complete an analysis for initial used fuel shipments from shutdown reactor sites

Administration Focus on Disposition of Used Nuclear Fuel

- The program is a very long term, flexible, multi-faceted approach to dispose of the nation's commercial and defense waste. The estimated programmatic cost of this effort over its first 10 years is $5.6 billion including:
  - construction and operation of a pilot interim waste storage facility
  - progress on both full-scale interim storage and long-term permanent geologic disposal
- Proposed funding will consist of:
  - Ongoing discretionary appropriations of up to $200M beginning in 2014 and continue for the duration of the waste management mission
  - Mandatory appropriations from the fee collections and balance of the Nuclear Waste Fund in addition to the discretionary funding provided annually beginning in 2017 to fund the balance of the annual program costs
- Other Strategy Elements in President's Budget
  - funding and authority for EPA to begin the revision of generic (non-site specific) disposal standards to help guide the siting of used fuel and high-level waste facilities

The President's FY 2014 Budget includes $60M for Strategy Implementation Activities

- **Research and Development: $30M**
  - R&D to support extended storage of used fuel
  - R&D on alternative disposal environments (modeling, evaluation and experiments)
  - Implement field tests to advance salt repository science for disposal of heat-generating waste
  - Borehole Research: Undertake R&D as necessary to further the understanding of hydro-geochemical, physical geology, structural geology, geophysical state and engineering properties of deep crystalline rocks
  - Increase involvement with international organizations to leverage existing international knowledge
  - R&D to support transportation of extended storage fuel: field testing to assess realistic loadings during transport

- **High-Level Waste Management and Disposal System Design Activities: $30M**
  - Continue developing plans for a consent-based siting process
  - Complete an analysis for initial used fuel shipments from shutdown reactor sites
  - Continue the conceptual design for a generic storage facility and supporting transportation system
  - Conduct system architecture and operating evaluations of various used fuel management systems
  - Continue the evaluation of standardized containers for storage, transportation, and potentially disposal
  - Continue to work cooperatively with the state regional groups on transportation issues
  - Update the National Transportation Plan to address initial shipments from shutdown reactors to a generic consolidated storage facility

Nuclear Energy Enabling Technologies

Budget Summary
$ in thousands

Program Element	FY 2012 Current	FY 2014 Request
Energy Innovation Hub for Modeling & Simulation	23,517	24,300
Crosscutting Technology Development	19,806	13,901
Nuclear Energy Advanced Modeling and Simulation	13,874	9,536
National Scientific User Facility	14,110	14,563
Total:	**71,307**	**62,300**

- **Mission**
  - Conduct research and development on crosscutting technologies that directly support and complement NE's R&D efforts and encourage transformative and creative solutions
- **FY 2014 Planned Accomplishments**
  - Issue version 4.0 of the Virtual Environment for Reactor Analysis (VERA)
  - Award competitive research projects on selected crosscutting nuclear concepts topics
  - Release NEAMS Toolkit capability for detailed Light Water Reactor oxide fuel analysis
  - Award NSUF projects for irradiation and post-irradiation examination services

Radiological Facilities Management

Budget Summary
$ in thousands

Program Element	FY 2012 Current	FY 2014 Request
Space and Defense Infrastructure	64,524	--
Research Reactor Infrastructure	4,986	5,000
Total:	**69,510**	**5,000**

- **Mission**
  - Maintain NE-managed nuclear facilities and capabilities at Idaho National Laboratory, Oak Ridge National Laboratory, Los Alamos National Laboratory and Sandia National Laboratories
- **FY 2014 Planned Accomplishments**
  - Complete transition to full cost recovery for RPS infrastructure activities.
  - Procure 40 and deliver 36 plate fuel elements required annually by MURR and MIT as determined by need and fuel availability.
  - Complete up to 6 used fuel shipments to SRS and Idaho National Laboratory (INL), pending resolution of moratorium on such shipments to INL.

International Nuclear Energy Cooperation

Budget Summary
$ in thousands

	FY 2012 Current	FY 2014 Request
International Nuclear Energy Cooperation	2,983	2,500
Total:	**2,983**	**2,500**

- **Mission**
  - Serve as the overall lead for the Office of Nuclear Energy in implementing international cooperative R&D activities and provide advice and support to DOE and other Federal agencies engaging in international civil nuclear policy activities
- **FY 2014 Planned Accomplishments**
  - Engage multilaterally on the CFS concepts and continue needed analytical studies to support this engagement.
  - Effectively integrate and coordinate NE's international nuclear R&D activities.
  - Maintain the existing bilateral and multilateral cooperation commitments as appropriate and develop new cooperation commitments with advanced and developing nuclear energy countries to support both the Office of Nuclear Energy and U.S. Government strategic priorities and objectives.

Idaho Facilities Management

Budget Summary
$ in thousands

Program Element	FY 2012 Current	FY 2014 Request
INL Nuclear Research Reactor Operations and Maintenance	67,599	81,226
INL Non-Reactor Nuclear Research Facility Operations and Maintenance	57,879	60,734
INL Engineering and Support Facility Operations and Maintenance	10,015	10,653
INL Regulatory Compliance	14,673	10,549
Advanced Post Irradiation Examination (PIE) Capabilities	3,931	2,000
13-D-905, Remote Handled Low-Level Waste Disposal Project, INL	0	16,398
Total:	**154,097**	**181,560**

- **Mission**
  - Manage the planning, acquisition, operation, maintenance, and disposition of nuclear facilities and resources at INL
- **FY 2014 Planned Accomplishments**
  - Conduct 45 ATR irradiation campaigns
  - Complete facility modifications identified in the Materials and Fuels Complex Documented Safety Analyses.
  - 1-3 shipments of NE-owned special nuclear material for off-site disposition
  - Treat approximately 76 kilograms of EBR-II used nuclear fuel
  - Complete 6 transfers of UNF from wet storage in accordance with the 1995 Idaho Settlement Agreement.
  - Award Design Build Contract and prepare for construction of the RH-LLW disposal project.
  - Continue support for resumption of transient testing and technical option studies for advanced post-irradiation examinations capabilities

Idaho Sitewide Safeguards and Security

Budget Summary
$ in thousands

	FY 2012 Current	FY 2014 Request
Idaho Sitewide S&S	93,350	94,000
Total:	**93,350[a]**	**94,000[b]**

a) FY 2012 appropriated within Other Defense Activities.
b) FY 2014 requested within Nuclear Energy Appropriation, retains Defense Function designation.

- **Mission**
  - Provide protection of nuclear materials, classified matter, Government property, and other vital assets at INL
- **FY 2014 Planned Accomplishments**
  - Complete implementation of Contractor Assurance System (CAS) operating procedures and supporting processes
  - Purchase and install cyber security and physical security systems life cycle equipment replacement

Program Direction

Budget Summary
$ in thousands

Program Element	FY 2012 Current	FY 2014 Request
Salaries and Benefits	64,451	64,000
Travel	2,000	1,850
Support Services	6,647	5,050
Other Related Expenses	17,902	16,600
Total:	**91,000**	**87,500**

- **Mission**
  - Provide the Federal staffing resources and associated costs required for the overall direction and execution of NE, including responsibilities under the Nuclear Waste Policy Act
- **FY 2014 Planned Accomplishments**
  - Support 184 FTEs at Headquarters
  - Support 187 FTEs at Idaho Operations Office
  - Support 8 at Oak Ridge Operations Office
  - Support 19 FTEs for the Radiological and Environmental Sciences Laboratory
  - Support 18 FTEs at Nevada Site Office