

PERFORMANCE PLAN

2008

OFFICE OF NUCLEAR ENERGY







# Fiscal Year 2008 Nuclear Energy Performance Plan

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Foreword ..... 2

■ **Overview** ..... 3

Purpose and Mission..... 3

Organization ..... 4

Funding Summary ..... 6

■ **Performance** ..... 9

Strategic Context within the Department ..... 9

Measuring Fiscal Year 2007 Performance Results..... 11

Fiscal Year 2008 Annual Performance Plan ..... 18

President’s Management Agenda..... 21

Program Assessment Rating Tool..... 22

Nuclear Energy Activities that Address DOE  
Leadership Challenges..... 23

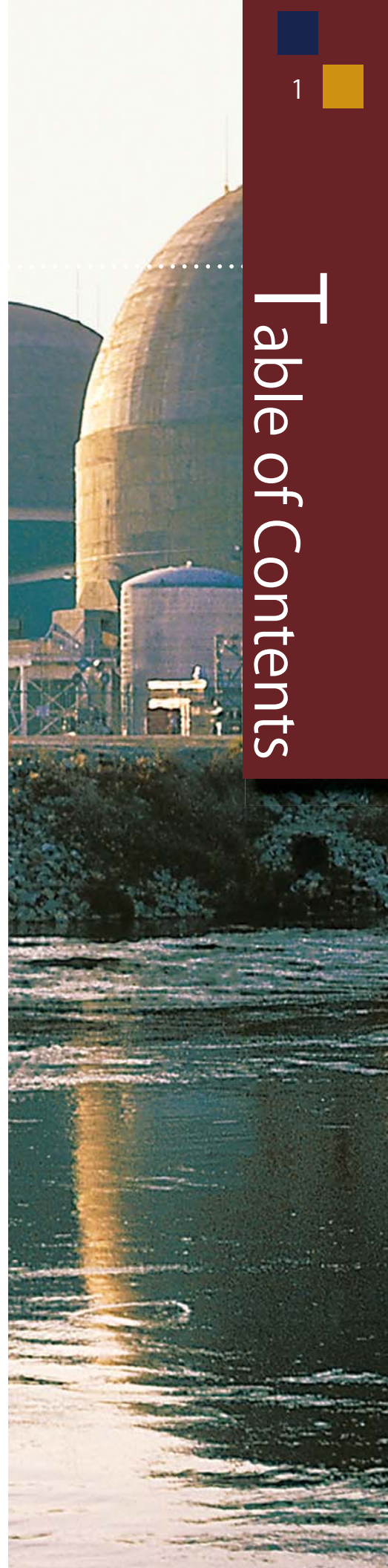
■ **Supporting Materials**..... 28

Key Events for Calendar Year 2008..... 28

Authorizing Legislation..... 29

Validation and Verification..... 29

List of Acronyms ..... 31





## Foreword

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This Performance Plan captures the Office of Nuclear Energy's (NE) performance in critical program areas for Fiscal Year (FY) 2007 and describes how progress will be assessed in FY 2008. In addition, it provides our stakeholders with an overview of NE's programs, funding profile, and the Office's designated role within the U.S. Department of Energy's (DOE) Strategic Plan. This document, which also contains FY 2009 budget request data, will be updated annually to reflect NE's continued progress toward meeting its long-term performance goals and objectives. It is our hope that this summary of the Office and its performance framework will help you understand the importance of our work and the contributions we are making toward advancing nuclear energy in the United States and abroad.

Nuclear energy is an important source of energy in the United States, supplying approximately 20 percent of the Nation's electricity. More than 100 nuclear power plants currently operate within the United States, providing baseload electricity reliably, affordably, and without air pollution or emissions of greenhouse gases. A plentiful, reliable supply of energy is the cornerstone of our sustained economic growth and prosperity.

Increasing the use of clean, safe nuclear power is a key component of the President's Advanced Energy Initiative and a key objective of the President's National Energy Policy. An important NE priority is to support expanded use of nuclear energy in the United States through programs such as Nuclear Power 2010 (NP 2010) as well as through implementation of incentives enacted in the Energy Policy Act of 2005 (EPAAct) that encourage building new nuclear plants in the United States. NE is also actively engaged in several international research and development (R&D) activities, including the development of advanced reactor designs through the Generation IV International Forum and through International Nuclear Energy Research Initiative projects.

The Global Nuclear Energy Partnership (GNEP) was initiated in February 2006 to support a large-scale increase in safe, secure nuclear energy without increasing the risks associated with proliferation and to effectively manage the impacts associated with waste disposal. To achieve this vision internationally, 21 nations have established a framework for development of an international fuel service program, and work is underway to provide infrastructure requirements for countries deploying nuclear power for the first time. Within the United States, GNEP is developing advanced technologies and planning the facilities needed to sustain the nuclear power renaissance through effective management of the entire fuel cycle. Deployment of domestic used fuel recycling will enable the United States to recover energy content, consume long-lived elements, and provide options for disposal of the residual waste.

The Office of Nuclear Energy leads Federal efforts to develop new nuclear technologies for energy and other applications and to maintain and enhance the national nuclear technology infrastructure. NE is committed to increasing advanced nuclear fuel cycle technologies that improve nuclear safeguards to meet non-proliferation objectives, maximize energy from nuclear fuel, and minimize the volume and toxicity of nuclear waste requiring ultimate disposal. NE aims to serve the present and future energy needs of the Nation by managing the safe operation and maintenance of the Department's nuclear infrastructure.

# Nuclear Energy Overview

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## *Purpose and Mission*

The Office of Nuclear Energy is responsible for leading the Federal government's investment in nuclear energy science and technology in a manner supporting the diversity and security of the U.S. energy supply and advanced energy competitiveness.

NE works with the private sector, overseas partners, and other agencies to assure that the benefits of nuclear technology continue contributing to the security and quality of life for Americans—and other citizens of the world—now and into the future. By focusing on advanced nuclear technologies, NE supports the Department's goal of developing new generation capacity while making improvements in environmental quality.

NE leads the development of fuel cycle technologies to improve nuclear energy generation and meet non-proliferation and climate change goals. Such new technologies maximize energy from nuclear fuel while maintaining and enhancing the national nuclear infrastructure. These activities build on important work started over the last three years to deploy new nuclear plants in the United States by early in the next decade and to develop advanced, next-generation nuclear technology.

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## Organization

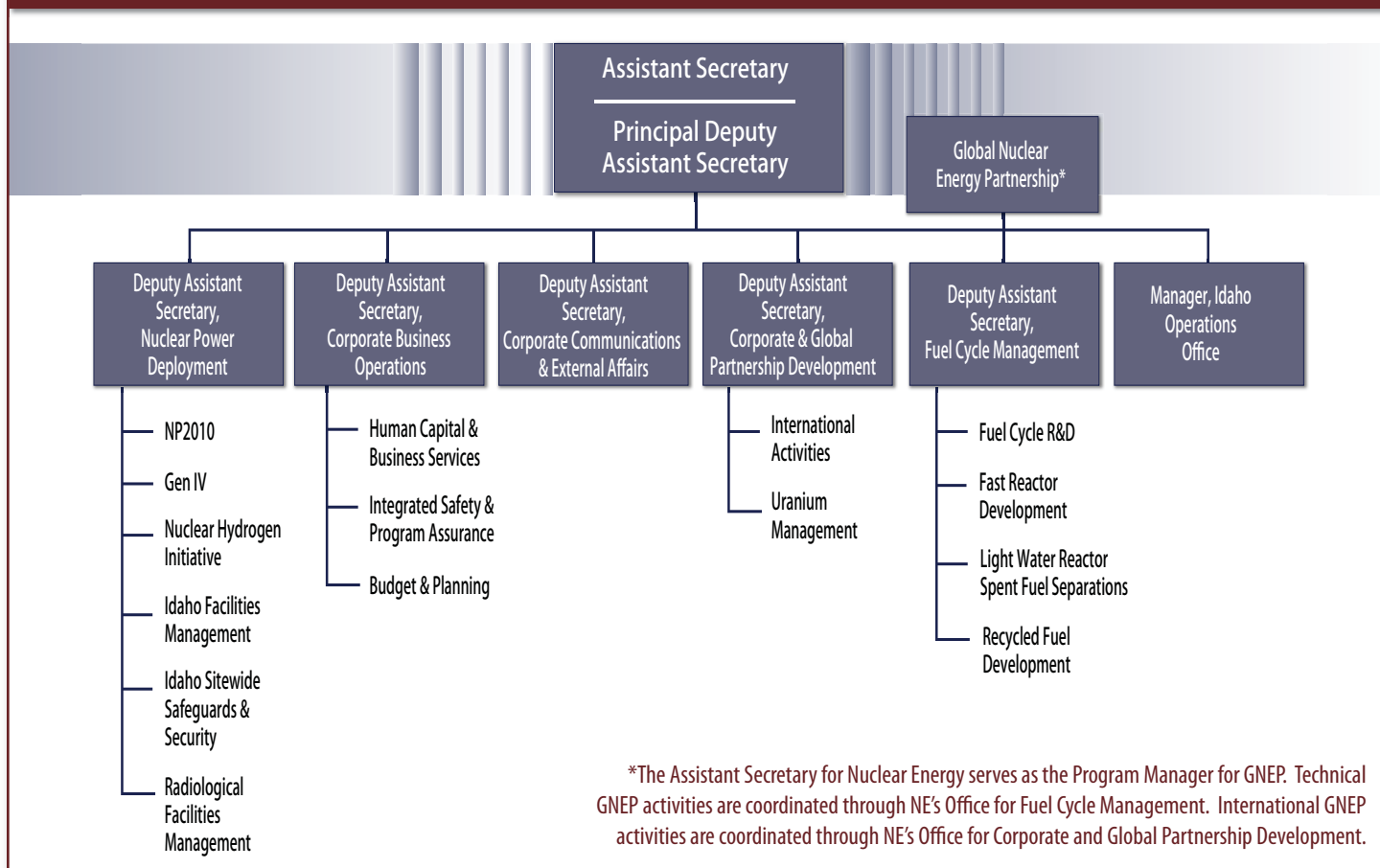
Under the Assistant Secretary for NE, the organization comprises five Deputy Assistant Secretaries (DAS) who oversee the NE functional areas, along with the Manager of the Idaho Operations Office. The NE reporting structure for each program element in relation to its DAS office and Idaho Operations Office is illustrated in Figure 1 and summarized hereafter.

### Nuclear Power Deployment

This office leads programs that advance deployment of light-water and gas-cooled nuclear reactors and nuclear

power applications; manage collaborative R&D activities with universities; support the National Aeronautics and Space Administration and national security needs for radioisotope power systems; and serve as the operational interface in support of NE's Lead Program Secretarial Officer responsibilities at the Idaho National Laboratory (INL). Program elements that report to the DAS for Nuclear Power Deployment include Nuclear Power 2010 (NP 2010), Generation IV Nuclear Energy Systems Initiative (Gen IV), the Nuclear Hydrogen Initiative (NHI), Idaho Facilities Management (IFM), Idaho Sitewide Safeguards and Security, and Radiological Facilities Management.

Figure 1. Office of Nuclear Energy Organizational Chart



*Nuclear power produces over 70 percent of electricity generated by non-emitting sources.*



### **Corporate Business Operations**

This office provides support to NE operations, policy implementation, strategic planning, budget and administrative management, human resources, information technology, program performance measurement and evaluation, quality management programs, safety and security programs, and intergovernmental activities. This office is also responsible for overseeing National Environmental Policy Act (NEPA) compliance activities.

### **Corporate Communications and External Affairs**

This office provides NE programs with internal guidance and expertise for effectively disseminating information to key constituencies, preparing outreach activities for NE customers and stakeholders—including Congressional testimony and speeches—developing press releases and other corporate announcements related to NE programs. This office is also responsible for reviewing legislation and tracking implementation status of activities associated with the EPA Act.

### **Fuel Cycle Management**

The Office of Fuel Cycle Management is responsible for providing technical leadership and expertise in managing the Global Nuclear Energy Partnership, including advanced fuel cycle R&D and the planning, design, operations, and project management of nuclear fuel cycle facilities. They also are responsible for directing development of advanced nuclear reactor and fuel-processing facilities and assuring that relationships are maintained with members of the nuclear industry, universities, national laboratories, and multi-national partners in order to foster collaborative technology advancements. The program elements directly related to Fuel Cycle Management include the Advanced Fuel Cycle Initiative (AFCI) and GNEP.

### **Corporate and Global Partnership Development**

The responsibilities of this office are primarily those dealing with international components, including oversight of technical and business activities related to the export of U.S. nuclear goods and services (i.e., bilateral and multilateral cooperative efforts) and formulation of U.S. international nuclear energy policy in conjunction with other Federal agencies. Notably, the office is responsible for coordinating the development of the GNEP international framework. Activities related to managing the Department's uranium supply are also included within this office.

### **Idaho Operations Office**

The responsibilities of the Idaho Operations Office (ID) are to provide procurement, contract, cooperative agreement, and grant support for NP 2010, Gen IV, NHI, and AFCI. The ID mission within the context of the NE organization is to develop and deliver cost-effective solutions to both fundamental and advanced challenges in nuclear energy and other energy resources, national security, and environmental management. The overarching goals of ID include supporting the creation of INL as a world-class nuclear energy and national security R&D laboratory; completing environmental cleanup in a safe, cost-effective manner; and ensuring the safe, reliable, and efficient completion of DOE activities at INL.

In addition to INL, NE conducts program activities at many other national laboratories, universities, and private-sector partners involved in nuclear energy R&D, isotope production, and manufacture of radioisotope power systems. The primary locations where NE-sponsored R&D is being conducted are highlighted in Figure 2 on the next page.





## Funding Summary

NE's program activities support the Department's Energy Security strategic goal of developing new generation capacity to fortify U.S. energy independence and security while making improvements in environmental quality by reducing greenhouse gas emissions. Nuclear power is the third-most abundant source of electric energy in the United States, according to the Energy Information Administration, and existing plants are among the most economic sources of electricity on the grid today. NE focuses on the development of advanced nuclear technologies to assure diversity in the U.S. energy supply.

To facilitate the near-term deployment of new nuclear power plants in the United States, the NP 2010 program

supports licensing demonstration and nuclear reactor design finalization activities and implements nuclear power plant standby support, a program authorized by the EPAct. Under this authority, the Department will be able to offer delay risk insurance that will protect sponsors of new nuclear power plants against the financial impact of certain delays during construction or in gaining approval for operation that are beyond the sponsors' control.

Through its programs and initiatives, NE seeks to develop advanced nuclear fuel cycle technologies that maximize energy output, minimize wastes, and operate in a safe and environmentally sound manner. This advanced fuel cycle technology will also improve nuclear safeguard capabilities to meet both United States' and international non-proliferation goals. The AFCI develops technologies

Figure 2. Primary Nuclear R&D Energy Sites







to effectively manage the waste from used nuclear fuel, potentially increasing the capacity of a geologic repository. As of March 2008, the United States has joined 20 other countries in an international effort to pursue advanced technologies that could enable the safe expansion of nuclear energy while reducing overall proliferation risk. These efforts are continued under the AFCI program through the Global Nuclear Energy Partnership. Beginning in FY 2008, NE funds the Mixed Oxide (MOX) Fuel Fabrication Facility activities which are focused on producing fuel for reactors from surplus weapon-grade plutonium.

Under the Generation IV program, NE also supports development of new nuclear generation technologies that provide significant improvements in sustainability, economics, safety and reliability, and non-proliferation and improved security. The NHI will develop advanced technologies that can be used in tandem with next-generation nuclear reactors to generate economic, commercial quantities of hydrogen to support a sustainable, clean energy future for the United States. Gen IV establishes a basis for expansive cooperation with international partners to develop next-generation reactor and fuel-cycle systems that represent a significant leap in economic performance, safety, and proliferation resistance.

To support advanced nuclear energy R&D, NE's Infrastructure programs manage the planning, acquisition, operation, maintenance, and disposition of nuclear facilities and infrastructure to conduct advanced nuclear energy research and to provide radioactive and stable isotopes for research, industrial and medical applications, and radioisotope power systems for space exploration and national security missions.

Beginning in FY 2008, NE activities are funded through two appropriation accounts: Nuclear Energy and Other Defense Activities. All funding for R&D and Infrastructure activities is requested in the Nuclear Energy account. Funding for Safeguards and Security activities at INL, as well as for

the MOX Fuel Fabrication Facility, is requested within Other Defense Activities. A summary of FY 2007 and FY 2008 appropriations, as well as the FY 2009 budget request, is found in Figure 3 on the next page. For additional information on NE's FY 2009 budget request, please refer to: <http://www.nuclear.gov/budget/nebudgetfy09CongRequest.html>.



*The Office of Nuclear Energy is helping enable industry to construct and operate new nuclear power plants.*

Figure 3. FY 2007 – FY 2009 Nuclear Energy Funding Summary (in \$ thousands)

Office of Nuclear Energy Activities	FY 2007 Appropriation	FY 2008 Current Appropriation	FY 2009 Budget Request
Nuclear Energy			
University Reactor Infrastructure and Education Assistance	\$16,547	-	-
Research and Development			
Nuclear Power 2010	80,291	133,771	241,600
Generation IV	35,214	114,917	70,000
Nuclear Hydrogen Initiative	18,855	9,909	16,600
Advanced Fuel Cycle Initiative	166,092	179,353	301,500
Infrastructure			
Radiological Facilities Management	46,775	48,119	38,700
Idaho Facilities Management	100,358	115,935	104,700
Idaho Sitewide Safeguards and Security*	75,949	75,261	78,811
Mixed Oxide Fuel Fabrication Facility**	-	278,789	487,008
Program Direction	62,600	80,872	80,544
Transfer from State Department	12,500	-	-
Less Security Charge for Reimbursable Work	(-3,003)	(-3,003)	-
Additional Adjustments	52	-	-
<b>Total, Nuclear Energy</b>	<b>\$612,230</b>	<b>\$1,033,923</b>	<b>\$1,419,463</b>

\* Funded in the Other Defense Activities appropriation

\*\*Funded in the Nuclear Energy appropriation for FY 2008; funded in the Other Defense Activities appropriation for FY 2009

## Nuclear Energy Performance

### *Strategic Context within the Department*

DOE's overarching mission is to "discover the solutions to power and secure America's future." DOE's mission and efforts to ensure America's energy safety and security are guided by the framework of the DOE Strategic Plan. The DOE Strategic Plan is designed to deliver results along five Strategic Themes:

Strategic Theme I: Energy Security

Strategic Theme II: Nuclear Security

Strategic Theme III: Scientific Discovery and Innovation

Strategic Theme IV: Environmental Responsibility

Strategic Theme V: Management Excellence

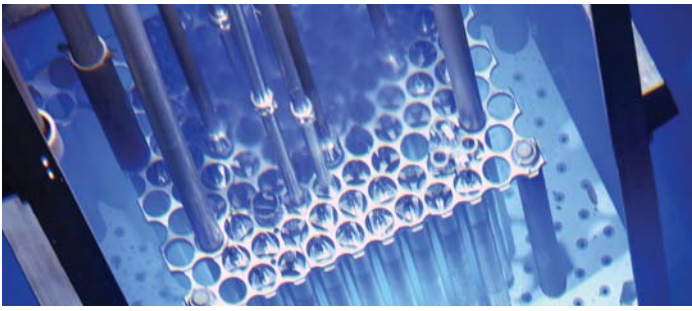
Within these themes, there are 16 Strategic Goals designed to help DOE achieve its ongoing mission. The Office of Nuclear Energy supports two of the 16 Strategic Goals. In Strategic Theme 1, Goal 1.2 is to improve the quality of the environment by reducing greenhouse gas emissions and environmental impacts to land, water, and air from energy production and use. NE partners with industry, academia, state and local governments, and other countries to promote nuclear facilities that rely upon advanced fuel technologies that will help to address nuclear waste disposal issues. In Strategic Theme 2, Goal 2.2 is to prevent the acquisition of nuclear and radiological materials for use in weapons of mass destruction and in other acts of terrorism. The MOX Fuel Fabrication Facility will help to eliminate surplus fissile materials.

Under these two Strategic Goals, NE directly supports three Government Performance and Results Act (GPRA) Program Goals (Figure 4).

Figure 4. Strategic Goals

Department of Energy Strategic Goals		
	Goal 1.2 Environmental Impacts of Energy	Goal 2.2 Weapons of Mass Destruction
GPRA Program Goals	Develop New Nuclear Generation Technologies	Dispose of Fissile Materials
	Maintain and Enhance National Nuclear Infrastructure	





The first GPR Program Goal is associated with NE's R&D activities, while the second represents NE's infrastructure activities. The third GPR Program Goal is associated with the MOX Fuel Fabrication Facility project (transferred from the National Nuclear Security Administration in the FY 2008 Omnibus Appropriation). Each GPR Program Goal and its contribution to the Department's mission is defined below.

**GPR Program Goal 1.2.14.00: Develop New Nuclear Generation Technologies** — By 2015, enable industry to construct and operate new nuclear power plants; promote safe, reliable, and carbon-free energy production through the standardization of Generation III+ plant designs; successfully demonstrate nuclear plant permitting and licensing processes; advance Gen IV plant technologies; construct pilot-scale hydrogen production experiments; and commence proliferation-resistant used nuclear fuel recycling technology demonstration activities.

**NE Contribution to GPR Program Goal 1.2.14.00** — The NE R&D program supports near-term technology development and demonstration activities that advance the goals of the National Energy Policy and EAct to enhance long-term U.S. energy independence and reliability and expand the contribution of nuclear power to the Nation's energy portfolio. The NP 2010 program supports this program goal by identifying sites for new nuclear power plants; developing and bringing to market advanced standardized nuclear plant designs; evaluating the business case for building new nuclear power plants; and demonstrating untested regulatory processes for nuclear plants in the United States, leading to an industry decision to build by 2010. Gen IV supports this program goal through the development of innovative, next-generation reactor technologies. The Gen IV program supports R&D that could help achieve the desired goals of sustainability, economics, and proliferation resistance. NHI contributes to this program goal by researching, developing, and demonstrating economical hydrogen production

technologies using high-temperature heat from advanced nuclear energy systems. NHI will develop hydrogen production technologies that are compatible with nuclear energy systems through scaled experiments. The APCI supports near-term technology development and demonstration activities that advance the goals of the National Energy Policy and EAct by developing the enabling technologies needed to reduce high-level waste volume and separate and transmute long-lived, highly radiotoxic elements, thus supporting the vision and goals of GNEP.

**GPR Program Goal 1.2.15.00: Maintain and Enhance National Nuclear Infrastructure** — Maintain, enhance, and safeguard the Nation's nuclear infrastructure capability to meet the Nation's energy, medical research, space exploration, and national security needs.

**NE Contribution to GPR Program Goal 1.2.15.00** — The Infrastructure program contributes to this goal by ensuring the Department's unique facilities, required for advanced nuclear energy technology R&D, are maintained and operated such that they are available to support national priorities. Key activities conducted under this program include ensuring NE facilities meet essential safety and environmental requirements and are maintained at user-ready levels. Other key activities include managing all special nuclear materials contained in these facilities and the disposition of DOE materials under NE ownership.

**GPR Program Goal 2.2.43.00: Fissile Materials Disposition** — Eliminate surplus Russian plutonium and surplus U.S. plutonium and highly enriched uranium.

**NE Contribution to GPR Program Goal 2.2.43.00** — NE funds the MOX Fuel Fabrication Facility program, which converts surplus U.S. weapon-grade plutonium into fuel for commercial light-water reactors. After irradiation, the plutonium is no longer directly usable for weapons purposes.

*DOE's overarching mission is to "discover the solutions to power and secure America's future."*



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## *Measuring Fiscal Year 2007 Performance Results*

As part of the annual budget submission to Congress, NE includes performance measures that describe critical activities necessary to the successful achievement of the program's mission and success. These measures are high-level, outcome-oriented, and demonstrate progress toward near- and long-term program goals. It is important to note that these measures are supported through hundreds of lower-level measures tracked internally at the individual program level, both at Headquarters and in the field.

Following from the discussion of NE's contribution to the Department's Strategic Plan in the previous section, NE FY 2007 performance results roll-up into the three GPRA program goals (Figures 5, 6, and 7). Referring to the figures that follow, commentary and action plan narratives are included for each annual measure. Commentary narrative is meant to provide additional context to the achievement of the performance measure, and the action plan narrative describes how the achieved performance contributes to future programmatic activities. Supporting documentation explains how each performance result is obtained.

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Figure 5. GPRA Program Goal 1.2.14.00

<b>GPRA Program Goal 1.2.14.00</b> <b>Develop New Nuclear Generation Technologies</b> <b>FY 2007 Rating = GREEN</b>			
Annual Targets	Significance of Achievement	Future Actions	Supporting Documentation
<p>1.2.14.1: Maintain total administrative overhead costs in relation to total program costs of less than 8 percent. <b>Rating = Green</b></p>	<p>For FY 2007, NE maintained a total administrative overhead cost efficiency of 7.97 percent in relation to total R&amp;D program costs. Achievement of the annual target shows that R&amp;D program management costs are being effectively controlled.</p>	<p>DOE is pursuing a common approach for calculating total administrative overhead costs in its applied R&amp;D programs, allowing some measure of comparability among program offices. NE will continue to work to increase its R&amp;D program management efficiency during FY 2008.</p>	<ul style="list-style-type: none"> <li>◆ Quarterly Measure Calculation</li> <li>◆ Program Manager Performance Certification Memorandum</li> </ul>
<p>1.2.14.2: Complete NP 2010 engineering and licensing activities, focusing on the resolution of reactor certification and design issues and the preparation and review of Construction and Operation License (COL) applications, to enable an industry decision in 2010 to build a new nuclear power plant. <b>Rating = Green</b></p>	<p>In FY 2007, the program met its annual performance measure through completion of combined COL cooperative agreement restructuring, and the review and acceptance of cost and schedule baselines from the program's two power company partners. Successful completion of these activities ensures that engineering and licensing activities necessary to enable an industry decision in 2010 are properly planned and executed.</p>	<p>NP 2010 will continue to support industry development of COL applications with the submission of two applications to the Nuclear Regulatory Commission (NRC) planned for early FY 2008; the program will also support interactions with NRC as they review the applications. Additionally, NP 2010 will support continuation of reactor vendor first-of-a-kind design finalization activities for the standardized reactor designs necessary to support an industry decision to build by 2010.</p>	<ul style="list-style-type: none"> <li>◆ Monthly Program Reports and documentation validating specific milestones</li> <li>◆ Program Manager Performance Certification Memorandum</li> </ul>

**Legend**

Green (G)—Met    Yellow (Y)—Partially Met    Red (R)—Unmet



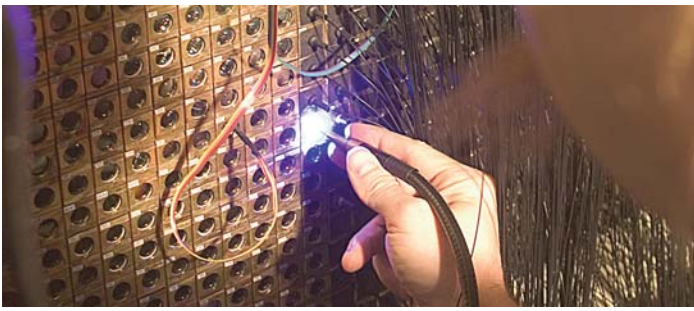


Figure 5. GPRG Program Goal 1.2.14.00 (continued)

<b>GPRG Program Goal 1.2.14.00</b> <b>Develop New Nuclear Generation Technologies</b> <b>FY 2007 Rating = GREEN</b>			
Annual Targets	Significance of Achievement	Future Actions	Supporting Documentation
<p>1.2.14.3: Complete Gen IV R&amp;D activities, focusing on fuels and materials testing and plant system optimization, to inform the functional and operational design requirements of a next-generation nuclear power plant by FY 2011. <b>Rating = Green</b></p>	<p>In FY 2007, Gen IV met its annual performance measure through a number of research, design, and regulatory activities, including the issuance of a Pre-Conceptual Design Report that establishes preliminary functional and operational design requirements for the Next Generation Nuclear Plant (NGNP). Successful experimental activities included operational testing of the Graphite Creep Test capsule and fuels irradiation that began in December 2006. These activities significantly contribute to the program's 2011 selection of functional and operational design requirements of the NGNP in accordance with EPCRA.</p>	<p>As a result of its FY 2007 accomplishments, the program is prepared to award conceptual design work to several nuclear vendors in FY 2008. Experimental activities will include continuation of fuels irradiation testing and expansion of testing of environmental effects on high-temperature materials. The major deliverable for FY 2008 is the NGNP Licensing Strategy Report to Congress that is being prepared jointly with the NRC.</p>	<ul style="list-style-type: none"> <li>Monthly Program Reports and documentation validating specific milestones</li> <li>Program Manager Performance Certification Memorandum</li> </ul>
<p>1.2.14.4: Complete NHI research and development activities focused on thermochemical and high-temperature electrolysis (HTE) processes to support the Department's selection of a hydrogen production technology in 2011. <b>Rating = Green</b></p>	<p>In FY 2007, NHI met its annual performance measure through the construction and completion of shakedown testing of integrated laboratory-scale system experiments for the Sulfur-Iodine and HTE technologies, and the completion of activities associated with the examination of alternative and Hybrid-Sulfur thermochemical cycles. These activities significantly contribute to the program's 2011 selection of a technology that will be demonstrated in a pilot-scale hydrogen production project. This technology may also be employed in the demonstration of NGNP.</p>	<p>Successful achievement of FY 2007 performance measures will allow NHI researchers to begin collection of performance data on processes to confirm the technical viability of the integrated hydrogen production systems. The results from these integrated tests and other research on membranes, catalyst and materials performed in FY 2008 will be used to inform the 2011 selection of a hydrogen technology that will be demonstrated in a pilot-scale project scheduled for 2013.</p>	<ul style="list-style-type: none"> <li>Monthly Program Reports and documentation validating specific milestones</li> <li>Program Manager Performance Certification Memorandum</li> </ul>

**Legend**

Green (G)—Met    Yellow (Y)—Partially Met    Red (R)—Unmet



*NE leads the development of new nuclear energy generation technologies to meet energy and climate change goals.*

Figure 5. GPRA Program Goal 1.2.14.00 (continued)

<b>GPRA Program Goal 1.2.14.00</b> <b>Develop New Nuclear Generation Technologies</b> <b>FY 2007 Rating = GREEN</b>			
Annual Targets	Significance of Achievement	Future Actions	Supporting Documentation
1.2.14.5: Complete research and development activities focused on advanced fuel cycle technology development and demonstration to support the Secretary of Energy's determination of the need for a second geologic repository for used nuclear fuel by FY 2008. <b>Rating = Green</b>	In FY 2007, the program met its annual target through the completion of key advanced fuel cycle R&D activities in the areas of used fuel separations and fast reactor fuel fabrication, as well as through facility design activities for the Consolidated Fuel Treatment Center, Advanced Burner Reactor and Advanced Fuel Cycle Facility. The successful completion of these activities significantly adds to DOE's body of knowledge on advanced fuel cycle technologies that will help inform a Secretarial determination on the need for a second geologic repository for used nuclear fuel, as well as a path forward for GNEP.	Achievement of the FY 2007 annual target validates the need for continuation of advanced fuel cycle R&D and is the basis for facility design activities in FY 2008. R&D and design results to date will be collected in early FY 2008 to inform the Secretarial determination of a path forward for GNEP. This data will also be submitted to the Office of Civilian Radioactive Waste Management in FY 2008 to support the Secretarial determination on the need for a second geologic repository, due by FY 2010.	<ul style="list-style-type: none"> <li>◆ Monthly Program Reports and documentation validating specific milestones</li> <li>◆ Program Manager Performance Certification Memorandum</li> </ul>

**Legend**

Green (G)—Met    Yellow (Y)—Partially Met    Red (R)—Unmet



Figure 6. GPR Program Goal 1.2.15.00

<b>GPR Program Goal 1.2.15.00</b> <b>Maintain and Enhance National Nuclear Infrastructure</b> <b>FY 2007 Rating = GREEN</b>			
Annual Targets	Significance of Achievement	Future Actions	Supporting Documentation
1.2.15.1: Consistent with safe operations, achieve cumulative variance of less than 10 percent from each of the cost and schedule baselines for the Radiological Facilities Management and IFM programs at the Idaho National Laboratory. <b>Rating = Green</b>	For FY 2007, the program met its target by achieving cumulative cost and schedule variances at INL of less than 10 percent. The cumulative cost variance was + 3.2 percent and the schedule variance was - 4.4 percent. Monitoring performance against established baselines helps managers achieve desired program results consistent with NE's budget execution strategy and provides early identification of possible problems in program execution.	This measure will be tracked in FY 2008 to continue to demonstrate the program's ability to execute work within established cost and schedule baselines. Maintaining this standard will enable NE to ensure critical infrastructure at INL is available to help meet program goals.	<ul style="list-style-type: none"> <li>◆ Monthly IFM Project Management Reports</li> <li>◆ Program Manager Performance Certification Memorandum</li> </ul>
1.2.15.2: Maintain operability of key Radiological Facilities Management and IFM-funded facilities to enable accomplishment of Nuclear Energy, other DOE, and Work-for-Others milestones by achieving a Facility Operability Index (FOI) of 0.9 or greater. <b>Rating = Green</b>	For FY 2007, the Medical Isotopes program achieved a perfect FOI, while IFM and Space and Defense Power Systems achieved FOI values above 0.9. Successful achievement of the milestones indicates that essential infrastructure and associated activities are operational to ensure that DOE's unique nuclear infrastructure, required for advanced nuclear energy research and development, is available to support national priorities.	This measure will continue to be tracked in FY 2008. The Space and Defense Power Systems and Medical Isotopes program will continue to track the same elements from FY 2007. IFM will evaluate its current list of critical operability elements and determine if revisions are required for FY 2008. All three programs will continue to maintain a FOI of 0.9 or above.	<ul style="list-style-type: none"> <li>◆ Annual Operating Plans and Monthly Performance Reports</li> <li>◆ Program Manager Performance Certification Memorandum</li> </ul>

**Legend**

Green (G)—Met    Yellow (Y)—Partially Met    Red (R)—Unmet





Figure 6. GPRA Program Goal 1.2.15.00 (continued)

<b>GPRA Program Goal 1.2.15.00</b> <b>Maintain and Enhance National Nuclear Infrastructure</b> <b>FY 2007 Rating = GREEN</b>			
Annual Targets	Significance of Achievement	Future Actions	Supporting Documentation
1.2.15.3: Complete FY 2007 activities to protect DOE interests from theft, diversion, sabotage, espionage, unauthorized access, compromise, and other hostile acts, which may cause unacceptable adverse impacts on national security, program continuity, or the health and safety of employees, the public or the environment at SECON 3 Modified level. <b>Rating = Green</b>	In FY 2007, the program met its annual target by maintaining critical posts at a full state of readiness in accordance with the INL Site Safeguards and Security Plan. Force-on-force exercises were successfully completed to evaluate security force robustness and validate no security vulnerabilities against the 2003 Design Basis Threat (DBT). Successful achievement of this measure helps ensure that DOE's critical nuclear infrastructure, required for advanced nuclear energy research and technology, was available to support national priorities.	The program will continue activities in FY 2008 to validate the absence of security vulnerabilities against the 2003 DBT and helps position NE to meet future safeguards and security commitments, including the implementation of the 2005 DBT.	<ul style="list-style-type: none"> <li>◆ Monthly report from Federal Security Director and contractor completion documents</li> <li>◆ Program Manager Performance Certification Memorandum</li> </ul>

**Legend**

Green (G)—Met    Yellow (Y)—Partially Met    Red (R)—Unmet

*Future use of nuclear energy is vital to meet U.S. needs for carbon-free, dependable, and economical electric power.*

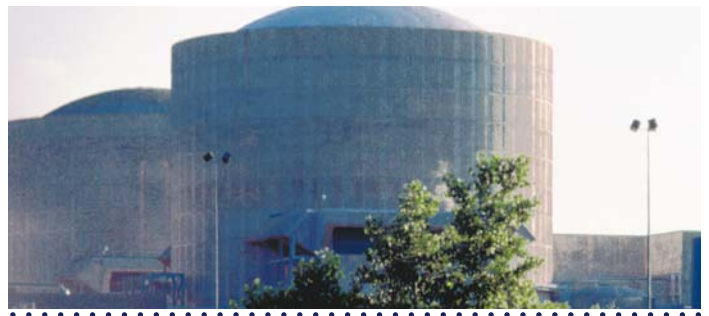


Figure 7. GPRA Program Goal 2.2.43.00

<b>GPRA Program Goal 2.2.43.00</b> <b>Fissile Materials Disposition</b> <b>FY 2007 Rating = GREEN</b>			
Annual Targets	Significance of Achievement	Future Actions	Supporting Documentation
2.2.43.01: Complete cumulative percentage of the design, construction, and cold start-up activities for the MOX Fuel Fabrication Facility. <b>Rating = Green</b>	This result demonstrates progress toward the Department's goal of disposing at least 34 metric tons of surplus U.S. weapons-grade plutonium. The annual target was 24 percent (FY 2007 result was 24 percent).	The annual target will increase to 30 percent (cumulative percentage) in FY 2008 in support of the design, construction, and cold start-up activities completed for the MOX Fuel Fabrication Facility by 2016.	Earned Value Management System data from MOX Fuel Fabrication Facility Monthly Status Report

**Legend**

Green (G)—Met    Yellow (Y)—Partially Met    Red (R)—Unmet



## *Fiscal Year 2008 Annual Performance Plan*

In Spring 2007, the Department initiated a review of corporate performance measures included in the annual budget submission to Congress. Efforts were made to make FY 2008 measures more outcome oriented and to align budget measures with those tracked as a component of the Office of Management and Budget's (OMB) Program Assessment Rating Tool (PART). GPRAs require that DOE establish annual performance goals and then report the actual results achieved toward those goals. NE's FY 2008 performance measures reflect the outcome of that process.

NE reports actual results achieved through the CFO's performance monitoring and reporting system, an internal DOE database that contains a complete set of final goals and measures for each fiscal year. NE's individual measures are categorized according to which GPRAs program goal they support.

As with its FY 2007 measures, NE's FY 2008 performance measures focus on progress made toward critical program goals. Through the review cycle, it was determined that a reallocation of performance measures was necessary to better represent the scope of work being conducted by NE programs. In FY 2008, APCI program performance is represented through four measures, which chart the program's progress in R&D efforts as well as three projects related to GNEP. In addition, a determination was made during the review of performance measures to cease tracking safeguards and security activities at INL at the corporate level (however, performance for this program is still tracked internally).

Finally, the FY 2008 Omnibus Appropriation transferred funding for the MOX Fuel Fabrication Facility from the NNSA to NE. The performance of this project is associated with the third GPRAs program goal, focused on Fissile Material Disposition.

Fiscal Year 2008 includes eight performance measures that support GPRAs Program Goal 1.2.14.00 (Develop New Nuclear Generation Technologies); two measures that support GPRAs Program Goal 1.2.15.00 (Maintain and Enhance National Nuclear Infrastructure); and one measure that relates to GPRAs Program Goal 2.2.43.00 (Fissile Materials Disposition). NE's performance measures and associated supporting documentation for FY 2008 are outlined in the following section. Supporting documentation is most often comprised of program reports that validate specific milestones, as well as performance certification memorandums provided by individual program managers.

### **GPRAs Program Goal 1.2.14.00: Develop New Nuclear Generation Technologies —**

**Target 1.2.14.01** — Maintain total administrative overhead costs in relation to total R&D program costs of less than 8 percent.

**Supporting Documentation** — Quarterly Measure Calculation and Program Manager Performance Certification Memorandum.

**Target 1.2.14.02** — Enable industry to make a decision to build a new nuclear power plant by 2010 by supporting New Nuclear Plant Licensing Demonstration Projects and by administering the Department's standby support program.

**Supporting Documentation** — Program reports and documentation validating specific milestones; Program Manager Performance Certification Memorandum.





**Target 1.2.14.03** — Determine a path forward for the design and construction of an NGNP by 2011 by submitting an NGNP licensing strategy to Congress and completing NGNP conceptual design technology selection studies.

**Supporting Documentation** — Program reports and documentation validating specific milestones and Program Manager Performance Certification Memorandum.

**Target 1.2.14.04** — Select a hydrogen production technology by 2011 that will be demonstrated in a pilot-scale experiment by conducting integrated laboratory-scale experiments on sulfur-iodine, thermochemical, and high-temperature electrolysis processes.

**Supporting Documentation** — Program reports and documentation validating specific milestones and Program Manager Performance Certification Memorandum.

**Target 1.2.14.05** — Determine a path forward for GNEP in 2008 by creating a technology development document on recycling technology options, including their readiness and risks, the state of technology development achieved to date, future R&D, and economic evaluations needed to achieve the GNEP vision.

**Supporting Documentation** — Program reports and documentation validating specific milestones and Program Manager Performance Certification Memorandum.

**Target 1.2.14.06** — Determine a path forward for GNEP in 2008 by completing trade-off studies of new versus existing facilities for an Advanced Fuel Cycle Facility, including economic evaluations.

**Supporting Documentation** — Program reports and documentation validating specific milestones, final NEPA Record of Decision, and Program Manager Performance Certification Memorandum.

**Target 1.2.14.07** — Determine a path forward for GNEP in 2008 by completing initial industry design studies for the Advanced Burner Reactor, including an evaluation of the development costs for the various prototype options.

**Supporting Documentation** — Program reports and documentation validating specific milestones, final NEPA Record of Decision, and Program Manager Performance Certification Memorandum.

**Target 1.2.14.08** — Determine a path forward for GNEP in 2008 by completing technical and economic evaluations of four industry-led conceptual design studies for a nuclear fuel-recycling center.

**Supporting Documentation** — Program reports and documentation validating specific milestones and Program Manager Performance Certification Memorandum.

**GPRA Program Goal 1.2.15.00: Maintain and Enhance National Nuclear Infrastructure —**

**Target 1.2.15.01** — To ensure unique nuclear facilities are available to support critical Departmental missions, achieve cumulative variance of less than 10 percent from cost, and schedule baselines at INL for IFM program facilities and activities (which include facilities used by the Radiological Facilities Management program), consistent with safe operations.

**Supporting Documentation** — Monthly Idaho Facilities Management Reports and Program Manager Performance Certification Memorandum.



*The Office of Nuclear Energy's budget must build on important work to deploy new nuclear plants by the next decade.*

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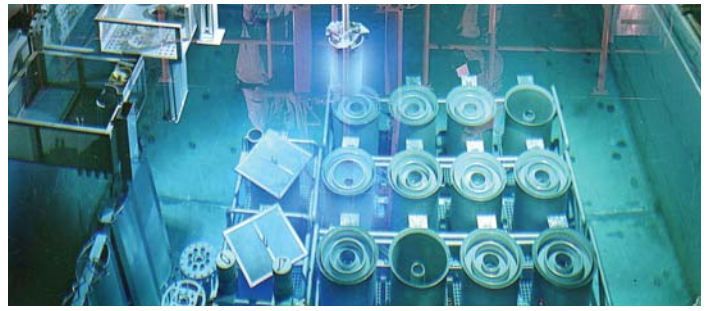
**Target 1.2.15.02** — To ensure unique nuclear facilities are available to support critical Departmental missions, maintain a facility operability index of 0.9 for key IFM and Radiological Facilities Management program facilities.

*Supporting Documentation* — Monthly reports from four National Laboratories (Idaho, Los Alamos, Oak Ridge, and Brookhaven) and the Isotope Business Office and Program Manager Performance Certification Memorandum.

**GPRA Program Goal 2.2.43.00: Fissile Materials Disposition** —

**Target 2.2.43.01** — Achieve 30 percent (cumulative percentage) of the design, construction, and cold start-up activities completed for the MOX Fuel Fabrication Facility.

*Supporting Documentation* — Earned Value Management System data from MOX Fuel Fabrication Facility Monthly Status Report.



## President's Management Agenda

In 2001, President George W. Bush unveiled the President's Management Agenda (PMA) and challenged the Federal Government to become more efficient, effective, results oriented, and accountable. Over the past six years, the PMA has become the primary framework by which the Department has implemented changes to support the President's management goals. The PMA reflects the President's ongoing commitment to achieve immediate and measurable results that matter to the American people.

Each agency is held accountable for its performance in carrying out the PMA through quarterly scorecards issued by OMB. As with the GPRA program goals, agencies are scored green, yellow, or red on their status in achieving overall goals or long-term criteria, as well as their progress in implementing improvement plans. The Department is scored on six PMA initiatives: five government-wide areas and one agency-specific area. The Department and the OMB consider progress made over the previous year and create a plan for the upcoming year's PMA-related activities. The plan is used by the Department to guide further management reforms and by the OMB as the baseline for assessing the Department's quarterly performance.

Responsibility for individual PMA initiatives is assigned to corporate offices within the Department. Departmental performance on individual initiatives is derived in large part from activities performed at the program level. Most of the activities represented in the performance plans negotiated between the Department and the OMB require individual program office actions. These actions are captured in quarterly performance scorecards issued by each responsible Departmental office. For further information on OMB's management of the PMA, please refer to: <http://www.results.gov>.

NE actively supports Departmental efforts to fulfill PMA initiative commitments. At the end of FY 2007, NE was rated Green in all six initiative areas by the DOE offices with ownership over the PMA initiatives (Figure 8).

Figure 8. PMA Initiative Scores

DOE	NE	Initiative
G	G	<b>Budget &amp; Performance Integration</b> Supported Department's performance budget formulation process; and Created outcome-oriented corporate performance metrics and improved alignment with PART measures.
R	G	<b>Competitive Sourcing</b> Initiated A-76 competition for the Radiological and Environmental Sciences Laboratory at Idaho National Laboratory.
G	G	<b>Human Capital</b> Continued to implement provisions within NE's Human Capital Management Plan.
R	G	<b>Financial Performance</b> Supported Department's successful effort to achieve an unqualified audit opinion for FY 2007.
Y	G	<b>E-Government</b> Met requirements for Capital Planning and Investment Controls, cyber security, enterprise architecture, and other general e-Gov requirements.
G	G	<b>Real Property Asset Management</b> Achieved quarterly maintenance targets, and supported drawdown of deferred maintenance in accordance with Departmental guidance.

Legend: Green (G)—Implementation is proceeding according to plan; Yellow (Y)—Some slippage or other issue(s) requiring adjustment; Red (R)—Initiative in serious jeopardy absent significant management intervention.





## Program Assessment Rating Tool

The Program Assessment Rating Tool (PART) was developed by OMB to provide a standardized way to assess the effectiveness of the Federal portfolio of programs. The structured framework of PART provides a means through which programs can assess their activities differently than through traditional reviews. NE's programs have carefully considered the results of PART assessments and have taken the necessary steps to continue to improve management and performance.

Each PART assessment is broken down into four sections and defined as follows:

**Section I** — Program Purpose and Design;

**Section II** — Strategic Planning (improving the linkage between budget and performance data at the DOE level);

**Section III** — Program Management (measuring and achieving cost effectiveness in program execution); and,

**Section IV** — Program Results/Accountability (evaluating the program's progress against established annual and long-term goals).

The most recent PART assessments took place in FY 2003 for NE R&D programs (in support of the FY 2005 budget request) and in FY 2004 for the IFM program (in support of the FY 2006 budget request). The results for both NE's R&D and Infrastructure programs are described in Figure 9. In FY 2008, NE will conduct a PART reassessment for the NP 2010 program.

Generally speaking, NE programs were found to be well designed and managed, with adequate performance measurement frameworks. The lower scores in Section IV reflect the inability of the program to sufficiently demonstrate significant progress against established performance metrics. In the case of the National Nuclear Infrastructure assessment, the 0% score in Section IV was due to the recent transition of INL to NE from the Office of Environmental Management and the creation of a new set of performance metrics consistent with building a world-class nuclear research laboratory.

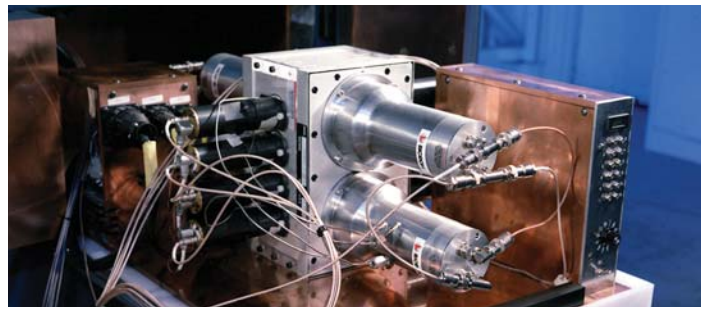
In each assessment, OMB recommended follow-up actions to improve program management and performance. These recommendations can be generally categorized as the need for better outcome-oriented performance metrics and the need for more independent program evaluations.

Figure 9. PART Scores

NE Program	Section I	Section II	Section III	Section IV	Overall Program PART Rating
Nuclear Power 2010	100%	89%	88%	45%	Adequate
Generation IV Nuclear Energy Systems Initiative	100%	90%	100%	60%	Moderately Effective
Advanced Fuel Cycle Initiative	100%	90%	100%	53%	Moderately Effective
National Nuclear Infrastructure*	100%	89%	100%	0%	Results Not Demonstrated

\*Includes IFM Program

*The Office of Nuclear Energy promotes safe, reliable, and carbon-free energy production.*



### **Outcome-Oriented Performance Metrics**

In general, OMB PART assessments found that NE programs relied too heavily on process-oriented, output-based performance metrics that did not indicate whether the program was demonstrating meaningful progress against its long-term goals. Where possible, the programs have revised their annual performance targets to clearly identify the outcomes of performance milestones. By focusing on a future outcome, the new measures allow for trending of annual progress toward a consistent objective. NE has attempted to balance the need for more outcome-oriented measures with Departmental concerns over the ability to audit annual performance measure results.

### **Independent Program Evaluations**

PART assessments take into consideration the results of independent program evaluations. OMB has established strict guidelines on what constitutes an “independent” evaluation. Generally, advisory committees established under the auspices of the Federal Advisory Committees Act are not automatically determined to be qualified to perform independent evaluations. Drawing from PART guidance issued by OMB, the Nuclear Energy Advisory Committee (NEAC) formed a separate subcommittee on evaluations in FY 2004.

In FY 2006, as a follow-up action to the National Nuclear Infrastructure assessment, NE contracted with the National Academy of Sciences to conduct an extensive, comprehensive, and independent evaluation of R&D and Infrastructure program goals and plans, including the process for establishing program priorities and oversight. The draft report was released in October 2007; the final report was issued in April 2008.

These resources have proved valuable as NE continues to work to enhance its program, such that it is able to more effectively and efficiently achieve its mission.

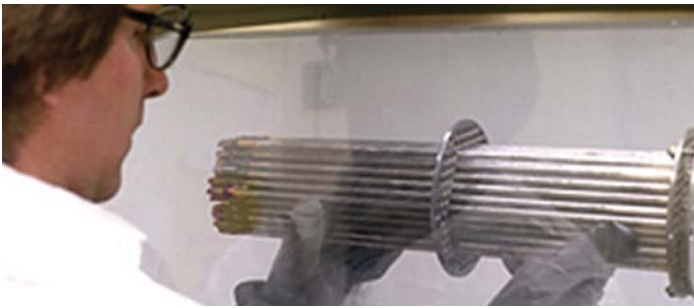
## *Nuclear Energy Activities that Address DOE Leadership Challenges*

DOE carries out multiple complex and highly diverse missions. Although the Department is continually striving to improve the efficiency and effectiveness of its programs and operations, there are some specific areas that merit a higher level of focus and attention. These areas often require long-term strategies for ensuring stable operations and represent the most daunting leadership challenges the Department faces in accomplishing its mission.

The Reports Consolidation Act of 2000 requires DOE’s Office of the Inspector General (IG) to annually prepare a statement summarizing what it considers to be the most serious management and performance challenges facing DOE. These challenges are included in the Financial Results section of the FY 2007 Annual Financial Report. Similarly, in FY 2003 the Government Accountability Office (GAO) identified six major management challenges and program risks to be addressed by the Department.

After considering the areas identified by the IG, GAO, and all other critical programs within the agency, the Department has identified 10 leadership challenges that represent the most important strategic management issues it faces now and in the coming years. It is DOE’s goal that the strategies to address these areas will also help mitigate related IG and GAO management challenges.

NE is actively contributing to the Department’s overall efforts in seven of the 10 leadership challenges through a variety of activities, as described on the following pages.



## Contract Administration

**Challenge** — Improvements are needed in the oversight of contractors managing and operating the Department's facilities. Specific oversight problems have been identified at environmental cleanup sites and laboratories conducting national security and scientific activities. Adequate oversight is needed to ensure that contractor operations are effective and efficient and that contractors have the appropriate workforce size and skill mix.

**NE Activities<sup>1</sup>** — In 2005, NE became the Lead Program Secretarial Office for the Idaho National Laboratory. NE and the Idaho Operations Office work together to ensure that INL's contractor, Battelle Energy Alliance, manages and operates the laboratory in compliance with contract requirements. NE and ID provide formal written guidance, review detailed work plans and monthly status reports, and conduct frequent face-to-face reviews at the staff and senior management levels.

A 2006 review by the Department's IG recommended improvements in management controls for performance fees within the INL contract. NE and ID have worked to improve the use of outcome-oriented metrics to more appropriately assess and reward contractor performance. Specific performance milestones are captured in the Performance Evaluation Management Plan (PEMP). The PEMP, reviewed annually, ties the contractor's achievements to its performance fee.

## Security

**Challenge** — Unprecedented security challenges have evolved since the events of September 11, 2001. The need for improved homeland defense, highlighted by the threats of terrorism and weapons of mass destruc-

tion, created new and complex security issues that must be surmounted to ensure the protection of our critical energy resources and infrastructure. These have made it necessary for the Department to reassess and strengthen its security postures.

**NE Activities** — NE has accomplished various activities to bolster security and protect vital assets at INL. In May 2005 the de-inventory of Category I material at CPP-651 was completed, leaving only two co-located Category I facilities at the Materials and Fuels Complex.<sup>2</sup> On September 30, 2006, the 2003 Design Basis Threat (DBT) was fully implemented at INL. The DBT is an approach for designing safeguards systems to protect against acts of radiological sabotage and to prevent the theft of special nuclear material. NE is now in the process of implementing the 2005 DBT at INL. Additionally, NE is partnering with the Idaho Operations Office and the Office of Health, Safety and Security to test and develop new security technologies at INL.

## Nuclear Waste Disposal

**Challenge** — Construction of a repository for the disposal of used nuclear fuel and high-level radioactive waste, authorized under the Nuclear Waste Policy Act, at Yucca Mountain, Nevada, has been delayed because of external factors and program adjustments. Funding shortfalls, and the scientific and technical challenges encountered in this first-of-a-kind endeavor to develop a disposal system that must potentially endure a compliance period of one million years, have complicated the steady progress necessary to achieve previously published milestones. Finalizing the Environmental Protection Agency radiation protection standards and addressing the NRC licensing requirements to submit and defend a license application are the keys to achieving the new milestones published in July 2006.

<sup>1</sup> Activities within this challenge area also relate to the IG's Acquisition Process Management Challenge area.

<sup>2</sup> "Category I" refers to the storage of strategic special nuclear material with the risk and potential for its direct use in a clandestine nuclear weapon or for its use in the production of nuclear material for use in a nuclear weapon. Category I material requires an especially high level of security.





**NE Activities** — NE's AFCI program develops fuel cycle technologies that will support the economic and sustained production of nuclear energy while minimizing waste and satisfying requirements for a controlled, proliferation-resistant nuclear materials management system.

In FY 2006, AFCI refocused its efforts on implementing the Global Nuclear Energy Partnership, a key component of the President's Advanced Energy Initiative. GNEP is a domestic and international program designed to support expansion of nuclear energy production worldwide while advancing non-proliferation goals and reducing the impacts associated with disposal of future used nuclear fuel. Internationally, GNEP is working to establish a framework to ensure that nuclear power expansion can be achieved appropriately with reduced risk of nuclear weapons proliferation. Through GNEP's reliable fuel services and infrastructure working groups, the United States and its 20 GNEP partner nations would reduce the risk of proliferation by providing countries with nuclear energy options without the spread of enrichment and reprocessing technologies. Domestically, GNEP is developing the advanced technologies and facilities needed to change the nuclear fuel cycle to one in which used nuclear fuel is recycled. Once deployed, this new approach will allow the United States to separate used fuel into waste and usable components, allowing reactors to extract additional energy, and providing options for more effective management of the residual waste. AFCI is developing these new technologies so that they may be deployed as part of the nuclear fuel cycle to support operation of current nuclear power plants, Generation III+ advanced light-water reactors, and Generation IV advanced reactors. These R&D activities will also support the Department's efforts in nuclear waste disposal by helping inform the Secretary of Energy's determination of the need for a second geologic repository to store used fuel.

## Project Management

**Challenge** — The Department needs to improve the discipline and structure for approving and controlling program and baseline changes to projects as well as the Department-wide approach for certifying Federal Project Directors (FPD) at predetermined skill levels to ensure competent management oversight of resources. In addition, the Department needs stronger policies and controls to ensure ongoing projects are re-evaluated frequently in light of changing missions.

**NE Activities** — NE initiated the application of project management principles contained in DOE Order 413.3A *Program and Project Management for the Acquisition of Capital Assets* to programs in FY 2005. Through this effort, an earned value management system is applied to selected major NE programs to track a program's cost, technical, and schedule performance against the program's baseline and assure greater control of the program and its resources. This program performance is tracked quarterly through a database (the Program Information Collection System) tailor-made for this purpose. A report is provided to NE management and to the Deputy Secretary as an input for the Chief Financial Officer's Consolidated Quarterly Performance Report. Additionally, as required by DOE Order 413.3A, NE ensures all of its capital asset projects develop and track their baselines using earned value when appropriate. When projects are mature enough to track earned value (at critical decision [CD]-2), NE tracks this internally through the same reporting mechanism used for tracking the earned value for programs. Project performance reviews are held quarterly, starting when a project attains CD-0, with the NE acquisition executive to ensure project performance is assessed regularly.

Within the area of FPD certification, NE is preparing to hold multiple sessions of two Project Management Career Development Program (PMCDP) courses to



*Existing nuclear power plants are among the most economic on the grid today.*

provide continuing education opportunities (to maintain certification) for its certified FPDs in the spring of FY 2008. Additionally, NE is preparing to hold a PMCDP Level 1 boot camp, bringing required level-one PMCDP courses to NE staff who are not yet certified and providing support to help them attain certification. NE held its first boot camp in FY 2006, training over 50 staff members whose job required fundamental knowledge of program and project management principles.

### **Cyber Security**

**Challenge** — In FY 2006, the Secretary of Energy, along with the Deputy Secretary, established an initiative to develop a comprehensive DOE cyber security program, following concerns about cyber security raised by the IG, the Office of Health, Safety and Security, and Congress, as well as the increased overall cyber threat environment facing the Department.

**NE Activities** — NE, in collaboration with the DOE Idaho Operations Office and the Battelle Energy Alliance, is working to enhance INL's cyber security framework. In FY 2006, a cyber security project was established to implement unclassified cyber security requirements as defined in the National Institute of Standards and Technology (NIST) 800-53, DOE Orders and Manuals, and the Undersecretary of Energy's Program Cyber Security Plan (PCSP). Contracted services and experts have been added to INL staff to develop and implement cyber security improvements. As part of the systematic and disciplined approach to solving cyber issues, cyber improvement plans are independently reviewed by industry experts and/or a Site Assistance Visit team. Independent industry experts also perform operational readiness reviews and System Testing and Evaluations of the effectiveness of new policies, standards, processes, and technology.

INL and ID unclassified information system networks have been reconfigured based on NIST standards and received Designated Approval Authority to commence operations. The first phase of a three-step, risk-based plan to implement additional cyber security improvements, as defined in the PCSP, was initiated in FY 2007. The first-phase improvements will be completed in FY 2008; additional activities will extend into FY 2009 and beyond.

Additional cyber security projects have been established to implement classified cyber security requirements. NE is working diligently with ID and INL to convert classified computers to diskless workstations by the end of FY 2008. Steps are being taken to resolve cyber issues identified in an Office of Health, Safety and Security inspection of classified computing systems and to implement classified cyber security requirements, as defined in DOE Orders and Manuals and the PCSP.

### **Human Capital Management**

**Challenge** — The Department's workforce is aging and getting smaller. Since 1995, the Department has experienced over a 30 percent reduction in the size of its workforce. The average employee is age 49. Twenty-six percent of the workforce will be eligible to retire in the next three years. Twenty-seven percent of DOE's scientists and engineers will be retirement-eligible in 2008. The decline in staffing levels and potential future attrition have left the Department with a significant challenge: to reinvest in its human capital to ensure the right people with the right skills necessary to successfully meet its missions are available.

**NE Activities** — NE is one of the most programmatically diverse organizations in DOE. NE faces a variety of critical human capital challenges in pursuing its mission and meeting the requirements set for it by the President and the Secretary of Energy. The NE Human Capital Plan is to develop and maintain a talent pool of well-qualified candidates with skills to



meet current and projected needs through: (1) recruiting, redeploying, and promoting qualified personnel from inside and outside NE; (2) implementing leadership development programs; and (3) working to demonstrate a strong commitment to reducing the under-representation of women and minorities.

NE faces challenges in the job market today. To assist with the challenge, NE is pursuing a wide variety of recruiting and outreach initiatives. Among these activities are participation in hiring fairs, development of an NE Cooperative Education program, participation in the Presidential Management Fellowship program, and advertising recruitment notices—especially those in professional publications targeting minority groups. In November 2007, NE partnered with the Department’s Office of Human Capital Management in a pilot program to offer on-the-spot hiring opportunities at the American Nuclear Society international conference held in Washington, D.C. With regard to attracting qualified candidates, NE offers a variety of recruitment incentives such as recruitment bonuses, relocation expenses, advance-in-hires, and student loan repayment.

responsibilities possess appropriate knowledge, skills, and abilities for safety oversight and provide a clear process for the delegation of critical safety authorities. NE continues to augment the safety staff and to address gaps identified in staff safety coverage. NE oversight activities and delegation of safety authorities are implemented per approved standard operating procedures. NE is conducting line management assessments and safety oversight of the Idaho National Laboratory, with the participation of the Idaho Operations Office, in accordance with an integrated oversight schedule.

## Safety and Health

**Challenge** — Ensuring the safety and health of the public and the Department’s workers is one of the top priorities in accomplishing our challenging scientific and national security missions. Due to the inherently critical nature of these issues, there is the need for continuous vigilance and improvement. Currently, the Department continues to address emerging safety issues identified within the past year.

**NE Activities** — NE continues implementation of DOE Order 226.1, Implementation of Department of Energy Oversight Policy. This effort includes development of an Oversight Proficiency Assurance Program to assure the personnel with oversight





## Nuclear Energy Supporting Materials

### Key Events for Calendar Year 2008

#### January 2008

- ◆ NRC docket and accepts for review a combined Construction and Operating License application submitted by Dominion and NuStart member Tennessee Valley Authority, NP 2010 industry partners.
- ◆ NRC docket and accepts for review Westinghouse Electric Company's AP 1000 reactor design certification document.

#### February 2008

- ◆ NE and NRC host a workshop on U.S. Nuclear Plant Life Extension.
- ◆ NE submits FY 2009 Budget Request to Congress.

#### March 2008

- ◆ GNEP Infrastructure Working Group meets in Vienna, Austria.
- ◆ GNEP Reliable Nuclear Fuel Services Working Group meets in Wilmington, NC.

#### May 2008

- ◆ GNEP issues the draft Programmatic Environmental Impact Statement.
- ◆ GNEP Steering Group meets in Dead Sea, Jordan.

#### June 2008

- ◆ Advanced Test Reactor (ATR) National Scientific User Facility Summer Session on Materials, Fuels, and Modeling at INL.

#### July 2008

- ◆ Second Annual ATR National Scientific User Facility Workshop at INL.

#### August 2008

- ◆ NE issues revised NHI 10-Year Program Plan.
- ◆ DOE and NRC submit joint report to Congress on NGNP Licensing Strategy.

#### September 2008

- ◆ GNEP Steering Group and Executive Committee Meeting.
- ◆ NE issues U.S. Nuclear Plant Life Extension Execution Plan.
- ◆ NE issues the U.S. Nuclear Plant Life Extension Implementation Roadmap.

#### October 2008

- ◆ NE sponsors High Temperature Reactor 2008 Conference in Washington, D.C.

*NE conducts various internal and external reviews and audits to validate and verify program performance.*



## Authorizing Legislation

NE is guided by authorizing legislation including the Atomic Energy Act, Energy Reorganization Act, Department of Energy Act, and the Energy Policy Act of 2005. Following are brief descriptions of the legislation.

### The Atomic Energy Act of 1954

This Act is the fundamental U.S. law on both the civilian and the military uses of nuclear materials. On the civilian side, it provides for both the development and the regulation of the uses of nuclear materials and facilities in the United States, declaring the policy that “the development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise.” The Act requires that civilian uses of nuclear materials and facilities be licensed. For more detailed information, please refer to: <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0980/ml022200075-vol1.pdf>.

### Energy Reorganization Act of 1974

Under the Atomic Energy Act, a single agency, the Atomic Energy Commission, had responsibility for the development and production of nuclear weapons and for both the development and the safety regulation of the civilian uses of nuclear materials. The 1974 Act split these functions into The Energy Research and Development Administration, Nuclear Regulatory Commission (NRC), and Energy Resources Council. For more detailed information, please refer to: <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0980/rev1/vol-1-sec-2-to-5.pdf>.

### The Department of Energy Organization Act of 1977

This Act brought the Federal Energy Administration, the Energy Research and Development Administration, and the Federal Power Commission into a single agency. On

October 1, 1977, DOE assumed the responsibilities of the aforementioned agencies, and parts and programs of several other agencies, under one organization governing the responsibility for the development and production of nuclear weapons, promotion of nuclear power, and other energy-related work. For more detailed information, please refer to: <http://uscode.house.gov/download/pls/42C84.txt>.

### The Energy Policy Act of 2005

The Act encourages the deployment of nuclear power through loan guarantees and protection tax credits for advanced nuclear power facilities. It offers a new form of federal risk insurance for the first six builders of new nuclear power plants. These incentives, coupled with the authorization of the Next Generation Nuclear Plant and R&D appropriations, move America closer to a vital national goal of energy independence with the aid of new nuclear power. For more detailed information, please refer to: <http://www.ne.doe.gov/energyPolicyAct2005/neEPACT2a.html>.

## Validation and Verification

NE conducts various internal and external reviews and audits to validate and verify program performance. Periodic program reviews evaluate progress against established plans. These reviews provide an opportunity to verify and validate performance. Monthly, quarterly, semi-annual, and annual reviews, consistent with program management plans and project baselines, are held to ensure technical progress, cost and schedule adherence, and responsiveness to program requirements.

Internally, NE provides continual management and oversight of its R&D and vital infrastructure programs. Examples of NE’s R&D programs include NP 2010, Gen IV, NHI, and AFCL. NE infrastructure programs, such as the Radiological Facilities Management program and the IFM Program, are also managed using similar oversight techniques.



NE's programmatic activities are subject to periodic external reviews by Congress, GAO, the Department's IG, NRC, the U.S. Environmental Protection Agency, state environmental and health agencies, and the Department's Office of Engineering and Construction Management. In addition, NE solicits the advice and counsel of external agencies such as Nuclear Energy Advisory Committee and National Academy of Sciences. Following are some examples of external validation and verification activities.

### **Government Accountability Office**

At the end of FY 2006, GAO issued the report, "Status of DOE's Effort to Develop the Next Generation Nuclear Plant," which stressed that the initial NGNP R&D activities are favorable and that the project has a well-organized schedule for completing construction of a demonstration plant by 2021 as authorized under EPAct. The report notes that a significant amount of R&D remains to be conducted and that DOE is making progress on its efforts to involve industry stakeholders. In FY 2007, the GAO began a comprehensive audit of GNEP. Released in April 2008, the findings help to inform the AFCI/GNEP implementation strategy. The report recommended that additional research and development on advanced fuel cycle technologies, including the construction of an advanced fuel cycle R&D facility and fast reactor, should proceed prior to either an engineering or commercial scale demonstration of a used fuel recycling facility. The program will revise its schedule to ensure proper alignment of development and deployment activities, and to work with industry to the extent possible.

### **National Academy of Sciences**

In FY 2006, NE contracted with the National Academy of Sciences in 2006 to conduct an extensive, comprehensive, and independent evaluation of R&D and Infrastructure program goals and plans, including the process for establishing program priorities and oversight. The evaluation resulted in a detailed set of policy and research recommendations and associated priorities for an integrated agenda of research

activities to support the long-term commercial energy option to provide diversity in energy supply. A pre-publication version of the report was issued in October 2007; the final report was published in April 2008. NE continues to review the report findings and is working with OMB to develop a viable strategy for implementing the committee's recommendations.

### **Nuclear Energy Advisory Committee**

The Department obtains advice on the direction of nuclear energy R&D programs from NEAC. An independent formal Federal advisory committee, NEAC provides expert advice on long-range plans, priorities, and strategies for the nuclear technology R&D and research infrastructure activities of NE. NEAC has several active subcommittees examining various aspects of nuclear technology R&D. Reports issued by these subcommittees that address the future of nuclear energy include: "Long-Term Nuclear Technology Research and Development Plan," "Nuclear Science and Technology Infrastructure Roadmap," "A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010," "A Technology Roadmap for Generation IV Nuclear Energy Systems," "Report of the Subcommittee on Nuclear Laboratory Requirements," and "An Evaluation of the Proliferation Resistant Characteristics of Light Water Reactor Fuel with the Potential for Recycle in the United States."



## List of Acronyms

Acronym	Definition	Acronym	Definition
AFCI	Advanced Fuel Cycle Initiative	IG	Office of the Inspector General, U.S. Department of Energy
ATR	Advanced Test Reactor	INL	Idaho National Laboratory
CD	Critical Decision	NE	Office of Nuclear Energy
COL	Construction and Operating License	NEAC	Nuclear Energy Advisory Committee
DAS	Deputy Assistant Secretary	NEPA	National Environmental Policy Act
DBT	Design Basis Threat (referring to security)	NGNP	Next Generation Nuclear Plant
DOE	U.S. Department of Energy	NHI	Nuclear Hydrogen Initiative
EPAct	Energy Policy Act of 2005	NP 2010	Nuclear Power 2010
FOI	Facility Operability Index	NRC	Nuclear Regulatory Commission
FY	Fiscal Year	OMB	Office of Management and Budget
GAO	Government Accountability Office	PART	Performance Assessment Rating Tool
Gen IV	Generation IV Nuclear Energy Initiative	PCSP	Program Cyber Security Plan
GNEP	Global Nuclear Energy Partnership	PEMP	Performance Evaluation Management Plan
GPRA	Government Performance and Results Act	PMA	President's Management Agenda
HTE	High Temperature Electrolysis	PMCDP	Project Management Career Development Program
ID	Idaho Operations Office	R&D	Research and Development
IFM	Idaho Facilities Management		





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