

November 9, 2011

The Honorable Thomas R. Carper  
Chairman, Subcommittee on Clean Air  
and Nuclear Safety  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510

Dear Mr. Chairman:

On behalf of the Commission, I am pleased to submit the U.S. Nuclear Regulatory Commission's (NRC) semiannual report on the status of our licensing and other regulatory activities. Before reviewing our actions, I want to update you on the NRC's response to events in Japan.

At the time we submitted the last semi-annual report to you, the agency's Near Term Task Force had begun its work to identify immediate or short-term operational or regulatory issues potentially affecting operating reactors in the U.S. Contemporaneous with that activity, the agency conducted inspections at the nation's 104 operating nuclear power plants to assess the plants' abilities to deal with power losses or damage to large areas of a reactor site following extreme events. The agency determined as a result of those inspections that all reactors would continue to operate safely or could be safely shutdown if their safety systems were challenged by an event that exceeded its design basis, although a few plants needed to do a better job maintaining the necessary resources and procedures. The NRC is using its Reactor Oversight Process to further evaluate the inspection results and ensure any issues are resolved.

In early May, the staff issued a Bulletin to reactor licensees requesting information on how the plants are complying with requirements to deal with the potential loss of large areas of the plant after extreme events, and ensuring those mitigating strategies remain effective over time. In addition to providing insights into compliance with existing requirements, the Bulletin was intended to obtain information that the NRC would use to determine whether additional actions are needed to ensure continuing protection of public health and safety.

On July 12, the task force submitted its final report to the Commission. The task force report included a comprehensive analysis and a set of 12 overarching recommendations – many with both short- and long-term elements for Commission consideration. The Commission subsequently directed the staff to prepare a series of papers covering various aspects of the

recommendations a 21-day paper on actions to be taken without delay from Report recommendations 2 – 12; a 45-day paper prioritizing recommendations 2 – 12; and an 18-month paper providing options on recommendation 1 (revising NRC's regulatory approach). The Commission provided direction to the staff in the enclosed staff requirements memorandum concerning the 21-day and is still reviewing the 45-day paper. Additionally, the Commission held public meetings to obtain stakeholder input. The Commission approved the staff's proposed action to implement without delay the Near-Term Task Force's recommendations and to strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016.

On August 23, a 5.8 magnitude earthquake originating near Mineral, Virginia was felt at many operating plants in the central and eastern United States. The nearest plant, North Anna experienced an automatic reactor trip. The plant will remain shut down until the licensee has demonstrated to the NRC that no functional damage has occurred to those features necessary for continued operation with undue risk to the health and safety of the public.

During the reporting period, the NRC submitted seven events to the International Atomic Energy Agency for inclusion into the International and Radiological Event Scale (INES). The INES is a worldwide tool for communicating to the public the safety and significance of radiological events. Five events were related to overexposure of radiation workers and a stolen radiography camera containing radioactive material. Two events that were not safety significant resulted from the loss of offsite power due to the seismic event at the North Anna Nuclear Power Plant.

The enclosed report covers activities conducted by the NRC during the period April through September 2011. During this time, the NRC issued four reactor license renewals, completed both the safety and environmental portions of the first two new reactor combined license applications and the Commission conducted the mandatory hearing for the Plant Vogtle Combined Operating License Application. Nine license renewal applications covering 13 units and 12 combined license applications for 20 new reactor units are under active review.

On April 18, the NRC unveiled a redesign of the agency's public website. The redesign improves navigation, content, and accessibility, and includes upgrades and changes suggested by the public through online surveys, interviews, and focus groups held around the country. This is the first significant Web update since 2007.

In early June, the NRC's Office of Nuclear Material Safety and Safeguards held its sixth annual Fuel Cycle Information Exchange in Rockville, MD. The conference brought together NRC staff, industry representatives, licensees, certificate holders, and the public to discuss regulatory issues related to the nuclear fuel cycle. The issues addressed included licensing, certification and inspection of facilities for uranium conversion and deconversion, uranium enrichment, nuclear fuel fabrication, extended spent fuel storage, and reprocessing.

On June 8, the NRC issued its final Safety Culture Policy Statement that sets forth expectations that individuals and organizations involved in NRC-regulated activities establish and maintain a positive safety culture proportionate to the safety and security significance of their activities. The statement reinforces the NRC's emphasis on a "safety-first" focus, but is not a regulation and, as such, does not impose requirements. It outlines a series of nine traits

that emphasize nuclear safety, which the Commission expects the regulated community to foster, as appropriate, in their specific activities.

On June 29, the NRC released its annual report on abnormal occurrences for FY 2010, citing 15 events that occurred at licensed medical facilities. An accident or event is considered an abnormal occurrence if it involves a major reduction in the degree of protection of public health and safety. For FY 2010, there were no abnormal occurrences at the 104 NRC-licensed nuclear power reactors. Eight of the 15 occurrences at medical facilities involved NRC licensees, while the remainder involved Agreement State licensees. The report details investigations of each incident by the NRC, Agreement States, and licensees, as well as measures taken to ensure such incidents do not recur.

Also in late June, the agency's annual security inspection report to Congress was made available to the public in an unclassified version that outlines the previous calendar year's activities. The report is required under the Energy Policy Act of 2005, and covers the NRC's security inspection program, including force-on-force exercises, for commercial nuclear power reactors and Category I fuel cycle facilities. As discussed in the report, the agency conducted 172 baseline security inspections at 104 nuclear power plants and 25 force-on-force inspections, which use a well-trained mock adversary force to test a facility's ability to defend key safety systems and components.

On June 23, the Commission directed the agency staff to evaluate whether there are gaps in available data regarding doses being received by members of the public due to the release of patients being treated with medical isotopes, as well as how the agency could go about collecting additional data, if needed. The staff's study will weigh the utility of any additional data-gathering against the potential for intruding upon patient privacy protections and will fully utilize previous studies on patient release.

I was pleased to welcome back to the Commission William C. Ostendorff, on July 7, when he was sworn in for a five-year term ending June 30, 2016. Commissioner Ostendorff's previous 15 months of service on the Commission had ended June 30. His reappointment maintains the Commission at full strength, and enables us to continue to have the benefit of his wealth of experience and expertise.

On July 19, the NRC issued a materials license to Uranerz Energy Corp. to construct and operate the Nichols Ranch in-situ recovery project in Johnson and Campbell counties in Wyoming. The project will cover nearly 3,400 acres, of which about 300 acres will be directly affected by operations. The project will recover uranium for use in commercial nuclear power plants. On August 17, the agency issued a materials license to Lost Creek ISR, LLC, allowing it to recover uranium at its in-situ recovery facility in Sweetwater County, Wyoming. These are the second and third new uranium recovery licenses recently issued by the NRC.

Between July and September, the agency published three technical evaluation reports (TERs) detailing the agency staff's review of the Department of Energy's (DOE) license application for a high-level waste repository at Yucca Mountain in Nevada. These TERs were developed using the draft volumes of the staff's pre-closure safety evaluation reports and addressed the post-closure, programmatic and administrative information. Volume 1 of the SER, which addresses general information, was published in August 2010. These TERs are

intended as a public record of the staff's scientific and technical work in preparing for and reviewing the DOE application. The NRC completed orderly closure of the licensing review of Yucca Mountain by September 30, 2011, as directed by the Congress.

On July 25, the agency issued its final policy statement on the protection of sealed radiation sources containing cesium-137 chloride. Cesium chloride sources are used in blood irradiation, bio-medical and industrial research, and calibration of instrumentation and dosimetry. They have received special attention because cesium chloride powder is highly soluble and dispersible, which could present serious concerns if not properly secured. The policy statement describes the Commission's expectations on the secure use of cesium chloride sources and the agency's potential actions should the threat environment change.

Throughout this reporting period, the agency maintained an active program of regulatory enhancements. These included seeking public comment on a proposed rule requiring detailed safety analyses for uranium conversion and deconversion facilities; approving an amendment to the fitness-for-duty rule that will allow nuclear power plant licensees to use a different method to determine when employees must be given time off from work; finalizing changes to the emergency preparedness regulations that would enhance those requirements for existing and yet-to-be-built nuclear power plants, and for research and test reactors; and issuing final rule changes to the definition of "construction" for materials applicants that would allow them to conduct certain site-preparation activities before a license is issued, consistent with current regulations for nuclear power plant applicants and licensees.

In early September, the agency announced that it had issued mid-cycle assessment letters to the licensees for the nation's 104 operating commercial nuclear power plants. The mid-cycle assessment period concluded on June 30, 2011, and those assessments show that all plants continue to operate safely. At that time, 99 of the 104 nuclear plants were in the two highest performance categories. Three plants were assessed to be in the third performance category, and two plants were in the fourth category. No plants were in the unacceptable or fifth performance category.

The Commission held the mandatory hearing for the Plant Vogtle Units 3 and 4 combined licenses (COL). The purpose of this hearing was to receive testimony and exhibits regarding the COL application and the limited work authorizations (LWA) of Southern Nuclear Operating Company to construct and operate new nuclear power generation facilities at the existing Plant Vogtle site. The Commission will determine whether the staff's review has been adequate for the Commission to make its final decision.

To continue to enhance our ongoing communication with the public and to support Open Government, the NRC recently expanded its presence on social media by establishing Twitter and YouTube accounts to send news and provide a wide variety of other information to interested individuals. These tools join our existing NRC blog as well as its current methods of information distribution.

On September 6, the agency issued \$2.8 million in grants to Minority Serving Institutions (MSI), which completed the awarding of approximately \$12.4 million in grants to 91 higher education institutions for the 2011 fiscal year. The MSI grants were awarded for projects and activities that include nuclear, science, technology and mathematic disciplines; research and

development projects; human capital development; leadership and mentoring activities; education training programs; and various types of assistance to 26 programs at 53 institutions. MSIs include the Historically Black Colleges and Universities, Hispanic Serving Institutions, and the Tribal Colleges and Universities located in 24 states, Puerto Rico, and the District of Columbia.

From April through September 2011, the agency's Public Meeting Schedule noticed 519 public meetings addressing a full range of NRC issues that were held in the Washington, D.C. area and around the country. The meetings included Commission, Advisory Committee, Licensing Board, Advisory Committee on Medical Uses of Isotopes, and staff-sponsored events. Also during this time, the NRC received 215 Freedom of Information Act (FOIA) requests and closed 207 FOIA requests.

Finally, I am pleased to report that, for the second year in a row, the NRC ranked first in all four categories of the Office of Personnel Management's Federal Employee Viewpoint Survey released September 22. The four categories are leadership and knowledge management, results-oriented performance culture, talent management, and job satisfaction. This survey measures employees' perception of whether, and to what extent, their organizations have the types of characteristics typically associated with high-performing, successful organizations.

I believe these results are a testament to the NRC staff's professionalism and dedication to our safety and security missions.

Please contact me for any additional information you may need.

Sincerely,

*/RA/*

Gregory B. Jaczko

Enclosures:  
[As stated](#)

cc: Senator John Barrasso

Identical letter sent to:

The Honorable Thomas R. Carper  
Chairman, Subcommittee on Clean Air  
and Nuclear Safety  
Committee on Environment and Public Works  
United States Senate  
Washington, D.C. 20510  
cc: Senator John Barrasso

The Honorable Barbara Boxer  
Chairman, Committee on Environment  
and Public Works  
United States Senate  
Washington, D.C. 20510  
cc: Senator James M. Inhofe

The Honorable Fred Upton  
Chairman, Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515  
cc: Representative Henry Waxman

The Honorable Ed Whitfield  
Chairman, Subcommittee on Energy and Power  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515  
cc: Representative Bobby L. Rush

The Honorable John Shimkus  
Chairman, Subcommittee on Environment  
and the Economy  
Committee on Energy and Commerce  
United States House of Representatives  
Washington, D.C. 20515  
cc: Representative Gene Green

The Honorable Rodney Frelinghuysen  
Chairman, Subcommittee on Energy  
and Water Development  
Committee on Appropriations  
United States House of Representatives  
Washington, D.C. 20515  
cc: Representative Peter J. Visclosky

The Honorable Dianne Feinstein  
Chairman, Subcommittee on Energy  
and Water Development  
Committee on Appropriations  
United States Senate  
Washington, D.C. 20510  
cc: Senator Lamar Alexander



*Protecting People and the Environment*

---

SEMIANNUAL STATUS REPORT ON THE  
LICENSING ACTIVITIES AND REGULATORY DUTIES OF THE  
UNITED STATES NUCLEAR REGULATORY COMMISSION

**April 2011–September 2011**

Note: The period of performance covered by this report includes activities occurring from the first day of April 2011 to the last day of September 2011. The transmittal letter to Congress accompanying this report provides additional information to keep Congress fully and currently informed of the licensing and regulatory activities of the U.S. Nuclear Regulatory Commission.

# CONTENTS

I	Implementing Risk-Informed and Performance-Based Regulations .....	1
II	Reactor Oversight Process .....	1
III	Status of Issues Tracked in the Reactor Generic Issues Program .....	2
IV	Licensing Actions and Other Licensing Tasks .....	4
V	Status of License Renewal Activities .....	5
VI	Summary of Reactor Enforcement Actions .....	7
VII	Power Reactor Security and Emergency Response Regulations .....	14
VIII	Power Upgrades .....	15
IX	New Reactor Licensing .....	15

## **I Implementing Risk-Informed and Performance-Based Regulations**

Forty-four operating nuclear power reactors are currently committed to transition to a risk-informed, performance-based fire protection licensing basis permitted under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48(c); this licensing basis is also known as National Fire Protection Association (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants." This number does not include the four reactors represented by two pilot plants, which have already transitioned, or the one plant that has not yet started to transition.

In April 2011, the Commission approved a policy paper (SECY-11-0033, "Proposed NRC Staff Approach to Address Resource Challenges Associated with Review of a Large Number of NFPA 805 License Amendment Requests," dated March 4, 2011) that allowed the remaining license amendment requests (LARs) to be submitted on a staggered basis, similar to the approach used for license renewal applications. Correspondingly, the Commission changed the Enforcement Policy (see SECY-11-0061, "A Request to Revise the Interim Enforcement Policy for Fire Protection Issues on 10 CFR 50.48(c) to Allow Licensees to Submit License Amendment Requests in a Staggered Approach," dated April 29, 2011) to match this staggered approach. Currently, 7 LARs (eight reactors) are scheduled to be submitted in 2011, 10 more are scheduled for 2012, another 10 in 2013, and the remaining two in 2014. One licensee has informed the U.S. Nuclear Regulatory Commission (NRC) staff that, at one of its sites, it intends to start the transition to NFPA 805 after the agency approves its other two sites to transition. Licensees for two reactor sites that were actively transitioning have informed the staff of their intent to remain in their current licensing basis and not transition to NFPA 805. Therefore, the staff is currently planning on a total of 49 reactors transitioning to NFPA 805, which is 47 percent of the current commercial power reactors licensed to operate in the United States.

The staff has continued to meet with Southern Nuclear Operating Company (Southern) to discuss their plans to submit a proposal to implement 10 CFR 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors," for Plant Vogtle Electric Generating Plant, Units 1 and 2. The staff also discussed Southern's plan to submit a proposal to implement risk-informed allowed outage times in Plant Vogtle's technical specifications. Implementing these voluntary risk-informed initiatives is complex, and the NRC sometimes waives its staff review fees because lessons learned from these efforts are then used to improve staff guidance and improve the efficiency and effectiveness of future reviews and submittals. The NRC has granted Southern's request to waive review fees for an allowed outage time submittal and a 10 CFR 50.69 submittal. The NRC expects both of these submittals in early 2012.

## **II Reactor Oversight Process**

The NRC continues to implement the Reactor Oversight Process (ROP) at all nuclear power plants. The NRC also continues to meet with interested stakeholders on a periodic basis to collect feedback on the effectiveness of the process, which is then considered in making future refinements to the ROP.

The agency's most recent performance assessments show that all plants continue to operate safely. The NRC issued a press release on September 6, 2011, summarizing the 2011 midcycle performance assessments and associated midcycle assessment letters for all nuclear plants. This information is publicly available on the NRC Web site.

The staff issued SECY-11-0073, "Staff Proposal to Reintegrate Security into the Action Matrix of the Reactor Oversight Process Assessment Program," dated June 5, 2011. The Commission approved this proposal and asked the staff to discuss the reintegration effort in the annual ROP self-assessment for calendar year (CY) 2012. Both papers are available on the NRC public Web site.

The staff issued SECY-11-0076, "Improving the Public Radiation Safety Cornerstone of the Reactor Oversight Process," dated June 9, 2011. This paper is available on the NRC public Web site.

The NRC hosted public meetings on May 4, 2011, July 13, 2011, and September 21, 2011, attended by the ROP Working Group and other interested stakeholders, to provide a forum for external feedback on staff initiatives. The ROP Working Group comprises representatives from industry and the NRC staff who work toward continuously improving the ROP and reactor safety.

Other recent ROP-related activities include the following:

- On May 11, 2011, the NRC staff issued a bulletin requesting information concerning how the 104 operating nuclear plants are complying with requirements to deal with the potential loss of large areas of the plant after extreme events.
- On May 13, 2011, the NRC issued inspection results for Temporary Instruction (TI) 2515/183, "Followup to Fukushima Daiichi Nuclear Station Fuel Damage Event," dated March 23, 2011. The TI's objective was to perform a high-level examination of the industry's preparedness for events that may exceed the design basis for a plant.
- On June 6, 2011, the NRC issued inspection results for TI 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines (SAMGs)," dated April 29, 2011. The objective of TI 2515/184 was to determine (1) whether SAMGs are available and how they are being maintained, and (2) the nature and extent of licensees' implementation of SAMG training and exercises.

### **III Status of Issues Tracked in the Reactor Generic Issues Program**

The staff is currently tracking five open generic issues (GIs) in the Generic Issues Management Control System; the status of each issue is described below.

#### **GI-186, "Potential Risk and Consequences of Heavy Load Drops in Nuclear Power Plants"**

In July 2008, the Nuclear Energy Institute (NEI) submitted final industry-developed guidelines in NEI 08-05, "Industry Initiative on Control of Heavy Loads," to address reactor vessel head drop consequence analyses and to establish a highly reliable handling system for reactor vessel head lifts. Subsequently, the NRC issued Regulatory Issue Summary (RIS) 2008-28, "Endorsement of Nuclear Energy Institute Guidance for Reactor Vessel Head Heavy Load Lifts," dated December 1, 2008, to notify stakeholders of the NRC's endorsement of the guidelines in NEI 08-05. The NRC staff is continuing to conduct sampling inspections to validate initial implementation of the guidelines. The staff has submitted a closeout memorandum for review

by the Advisory Committee on Reactor Safeguards (ACRS) and is planning to submit a closeout memorandum to the Executive Director for Operations by December 2011.

### **GI-189, “Susceptibility of Ice Condenser and Mark III Containments to Early Failure from Hydrogen Combustion during a Severe Accident”**

On June 15, 2007, the NRC staff issued letters to affected licensees accepting their commitment to implement enhancements in plant capabilities to mitigate the potential for early containment failure from hydrogen combustion. Since that time, licensee implementation and NRC verification inspections performed in accordance with TI 2515/174, “Hydrogen Igniter Backup Power Verification,” dated February 12, 2008, have been completed at all nine affected sites. In November 2010, the staff received a commitment from the Tennessee Valley Authority (TVA) to implement measures at Watts Bar Nuclear Plant, Unit 2, equivalent to those measures verified to have been implemented at Watts Bar Unit 1. Because reactor events in Japan are related to this issue, the staff intends to suspend closeout activities pending review of the Near-Term Task Force recommendations.

### **GI-191, “Assessment of Debris Accumulation on PWR Sump Performance”**

This generic issue concerns the possibility that, following a loss-of-coolant accident (LOCA) in a pressurized-water reactor (PWR), debris accumulating on the emergency core cooling system (ECCS) sump screen may result in clogging and restrict water flow to the pumps. As a result of this GI and the related generic letter (GL) 2004-02, “Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors,” dated September 13, 2004; all PWR licensees increased the size of their containment sump strainers, significantly reducing the risk of strainer clogging. An associated issue, which needs to be resolved to close GI-191, concerns the potential for debris to bypass the sump strainers and enter the reactor core. In 2008, the NRC staff determined that additional industry-sponsored testing was necessary to support resolution of this issue. Some testing was performed, but testing and NRC evaluation are continuing because of staff concerns about the testing results and related assumptions. The Commission issued a staff requirements memorandum (SRM) in December 2010. The Commission determined that it was prudent to allow the nuclear industry to complete testing on in-vessel effects and zone of influence in 2011 and to develop a path forward by mid-2012. The SRM directed the staff to evaluate alternative approaches, including risk-informed approaches, for resolving Generic Safety Issue (GSI) 191, “Assessment of Debris Accumulation on PWR Sump Performance,” and to present them to the Commission by mid-2012. The Commission further agreed that modifications should be completed within two operating cycles for smaller LOCAs and three operating cycles for larger LOCAs after development of the path forward. The NRC staff will determine a closure date for this GI after meeting with the Commission in mid-2012.

### **GI-193, “BWR ECCS Suction Concerns”**

The action plan to resolve this GI involves an evaluation of suppression pool designs, the dynamics of air entrainment in the suppression pool, and the effects of air entrainment on ECCS pump performance. Based on a staff request, the Boiling-Water Reactor (BWR) Owners Group provided voluntary data on the characteristics of LOCA phenomena at the earliest stages of the postulated accidents, as well as general information about wetwell geometries in relation to ECCS suction strainers. The staff is continuing its efforts to estimate the maximum potential void fraction based on scale experiments conducted at Purdue University. The experiments should clarify the potential for bubbles formed during a simulated LOCA blowdown to be

transported in the wetwell to the ECCS pump inlets and, consequently, ingested into the ECCS pump impellers. Testing began in mid-June 2010, with both steady-state tests and transient tests completed by late 2010. The staff received a final report on the Purdue findings in March 2011. The staff is in the process of evaluating the test results and developing recommendations for a path forward.

### **GI-199, “Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants”**

While reviewing new reactor applications and updating seismic hazard information from the U.S. Geological Survey, the staff found that the estimated seismic hazard levels at some current central and eastern U.S. nuclear sites may be higher than the values used in designs and previous evaluations. For the safety risk assessment, the NRC evaluated the effects of new seismic hazard data and methods on U.S. nuclear plants and collaborated with the Electric Power Research Institute to ensure a sound technical approach. The Safety/Risk Assessment Panel recommended in September 2010 that further actions be taken to address GI-199 outside the GI program. The NRC issued Information Notice (IN) 2010-18, “Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants,” dated September 2, 2010, to inform stakeholders of the issuance of the GI-199 safety risk assessment report. The IN also stated that the NRC will follow the appropriate regulatory process to request that operating plants and independent spent fuel storage installations provide specific information relating to their facilities to enable the staff to complete the regulatory assessment and identify and evaluate whether additional regulatory actions are necessary. The staff developed a draft GL to request needed data from power reactor licensees. The request was originally intended only for power reactor licensees in the central and eastern United States, but, in light of the recent Japanese earthquake, the staff expanded the scope of the request to include all U.S. power reactor licensees. As the Commission’s direction on the Near-Term Task Force recommendations are implemented, the technical content of the GL and input from the public will form the basis for either revising the current draft GL or pursuing another regulatory approach to address seismic risk evaluations for operating reactors.

## **IV Licensing Actions and Other Licensing Tasks**

Operating power reactor licensing actions are defined as orders, license amendments, exemptions from regulations, relief from inspection or surveillance requirements, topical reports submitted on a plant-specific basis, notices of enforcement discretion, or other actions requiring NRC review and approval before they can be implemented by licensees. The fiscal year (FY) 2011 NRC Performance Budget plan incorporates two output measures related to licensing actions: the number of licensing actions completed per year and the age of the licensing action inventory.

Other licensing tasks for operating power reactors are defined as licensee responses to NRC requests for information through Generic Letters or bulletins; NRC responses to petitions filed under 10 CFR 2.206, “Requests for Action under this Subpart”; NRC review of generic topical reports; responses by the NRC’s Office of Nuclear Reactor Regulation to regional office requests for assistance; NRC review of licensee analyses under 10 CFR 50.59, “Changes, Tests and Experiments,” and final safety analysis report (FSAR) updates; or other licensee requests not requiring NRC review and approval before they can be implemented by licensees. The FY 2011 NRC Performance Budget plan incorporates two output measures related to other

licensing tasks: the number of other licensing tasks completed per year and the age of the other licensing task inventory.

The table below shows the actual FY 2009 and FY 2010 results, the FY 2011 goals, and the FY 2011 end-of-year results for the two NRC performance plan output measures for operating power reactor licensing actions and other licensing tasks.

PERFORMANCE PLAN				
Output Measure	FY 2009 Actual	FY 2010 Actual	FY 2011 Goals	FY 2011 End-of-Year Actual
Licensing actions completed/year	1,022	988	≥ 950	849
Age of licensing action inventory	93.3% ≤ 1 year and 100% ≤ 2 years	93% ≤ 1 year and 100% ≤ 2 years	95% ≤ 1 year and 100% ≤ 2 years	90.3% ≤ 1 year and 99.9% ≤ 2 years
Other licensing tasks completed/year	541	625	600	465
Age of other licensing tasks inventory	90% ≤ 1 year and 100% ≤ 2 years	94% ≤ 1 year and 100% ≤ 2 years	90% ≤ 1 year and 100% ≤ 2 years	94.2% ≤ 1 year and 99.6% ≤ 2 years

## V Status of License Renewal Activities

The NRC has issued renewed licenses to 71 of the 104 power reactor units licensed to operate. During this reporting period, the NRC issued renewed licenses to Palo Verde Nuclear Generating Station, Prairie Island Nuclear Generating Plant, Salem Nuclear Generating Station, and Hope Creek Generating Station.

### Applications Currently under Review

The NRC currently has nine license renewal applications for 13 units under review. The following is the status of applications currently under review. Previously issued semiannual reports describe activities that occurred before April 2011.

#### *Pilgrim Nuclear Power Station*

On January 27, 2006, Entergy Nuclear Operations (Entergy) submitted a license renewal application for the Pilgrim Nuclear Power Station to extend the operating license for an additional 20 years beyond the current license period. In July 2011, the NRC issued a supplement to its June 2007 safety evaluation report (SER). In addition, activities related to the Atomic Safety and Licensing Board (ASLB) hearing process continued.

#### *Indian Point Nuclear Generating Units 2 and 3*

On April 30, 2007, Entergy submitted a license renewal application for Indian Point Nuclear Generating Units 2 and 3 to extend the operating licenses for an additional 20 years beyond the current license period. In August 2011, the NRC issued a supplement to its August 2009 SER. In addition, activities related to the ASLB hearing process continued.

### *Crystal River Nuclear Generating Plant, Unit 3*

On December 16, 2008, the Florida Power Corporation submitted a license renewal application for Crystal River Nuclear Generating Plant, Unit 3, to extend the operating license for an additional 20 years beyond the current license period. In May 2011, the NRC issued the draft supplemental environmental impact statement (SEIS). The staff also continued the safety review of the application. A projected date for a license renewal decision is currently to be determined, pending Florida Power Corporation's final plans to repair the site's containment and submission of an acceptable containment aging management plan.

### *Diablo Canyon Power Plant, Units 1 and 2*

On November 24, 2009, Pacific Gas and Electric Company (PG&E) submitted a license renewal application for the Diablo Canyon Power Plant, Units 1 and 2, to extend the operating licenses for an additional 20 years beyond the current license period. During the reporting period, the NRC issued the SER in June 2011. The staff's review of the application is currently on hold, with the exception of ongoing consultations with the California State Office of Historic Preservation, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. PG&E requested the hold because of a delay in its ability to satisfy the requirements of the Coastal Zone Management Act. In addition, an admitted contention remains pending before the ASLB.

### *Columbia Generating Station*

On January 20, 2010, Energy Northwest submitted a license renewal application for the Columbia Generating Station to extend the operating license for an additional 20 years beyond the current license period. In August 2011, the NRC issued the SER with open items and the draft SEIS. A request for admission of a contention is pending before the ASLB.

### *Seabrook Station*

On June 1, 2010, NextEra Energy Seabrook, LLC, submitted a license renewal application for the Seabrook Station to extend the operating license for an additional 20 years beyond the current license period. In August 2011, the NRC issued the draft SEIS. In addition, the staff continued the safety review of the application, and activities related to the ASLB hearing process remains ongoing.

### *Davis-Besse Nuclear Power Station*

On August 30, 2010, FirstEnergy Nuclear Operating Company submitted a license renewal application for the Davis-Besse Nuclear Power Station to extend the operating license for an additional 20 years beyond the current license period. During the reporting period, the staff continued the safety and environmental review of the application. In addition, activities related to the ASLB hearing process continued.

### *South Texas Project, Units 1 and 2*

On October 28, 2010, South Texas Project Nuclear Operating Company (STPNOC) submitted a license renewal application for the South Texas Project (STP), Units 1 and 2, to extend the operating license for an additional 20 years beyond the current license periods. During the reporting period, the staff conducted onsite audits related to the safety and environmental

reviews of the application. In August 2011, the ASLB denied the Sustainable Energy and Economic Development (SEED) Coalition's (the intervenor's) petition for intervention and request for hearing. The SEED Coalition did not appeal this decision, thereby concluding the hearing process.

### *Limerick Generating Station, Units 1 and 2*

On June 22, 2011, Exelon Generating Co., LLC, submitted a license renewal application for Limerick Generating Station, Units 1 and 2, to extend the operating license for an additional 20 years beyond the current license period. During the reporting period, the staff performed an acceptance review and determined that the application was acceptable for docketing and review. On September 22, 2011, the staff held public meetings near the site to provide an overview of the NRC's license renewal review process and to solicit public comments concerning the scope of the environmental review.

### **Generic Environmental Impact Statement Update**

The NRC is continuing the process of revising NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," issued May 1996, and the associated guidance documents in support of a rulemaking amending and updating environmental protection regulations for the renewal of nuclear power plant operating licenses. The NRC plans to publish the revised generic environmental impact statement, final rule, and associated guidance documents in FY 2012.

## **VI Summary of Reactor Enforcement Actions**

### **Reactor Enforcement by Region**

The reactor enforcement statistics in the tables below are arranged by region, half year, most recent half year, FY to date, and two previous FYs for comparison purposes. Separate tables provide the nonescalated and escalated reactor enforcement data, as well as the escalated enforcement data associated with traditional enforcement and the ROP. The severity level assigned to the violation (i.e., traditional enforcement) generally reflects the significance of a violation. However, for most violations committed by power reactor licensees, the significance of a violation is assessed using the significance determination process under the ROP, which uses risk insights, where appropriate, to assist the NRC in determining the safety or security significance of inspection findings identified within the ROP.

These tables are followed by brief descriptions of the escalated reactor enforcement actions associated with both traditional enforcement and the ROP (as well as any other significant actions) taken during the applicable calendar half-year.

<b>NONESCALATED REACTOR ENFORCEMENT ACTIONS</b>						
		Region I	Region II	Region III	Region IV	TOTAL
<b>Cited Severity Level IV or Green</b>	1st Half FY 2011	4	6	1	2	13
	2nd Half FY 2011	0	10	0	3	13
	FY 2011 YTD Total	4	16	1	5	26
	FY 2010 Total	3	1	0	4	8
	FY 2009 Total	4	3	0	6	13
<b>Noncited Severity Level IV or Green</b>	1st Half FY 2011	78	58	108	106	350
	2nd Half FY 2011	87	55	120	154	416
	FY 2011 YTD Total	165	113	228	260	766
	FY 2010 Total	81	67	97	162	407
	FY 2009 Total	173	110	205	221	709
<b>TOTAL Cited and Noncited Severity Level IV or Green</b>	1st Half FY 2011	82	64	109	108	363
	2nd Half FY 2011	87	65	120	157	429
	FY 2011 YTD Total	169	129	229	265	792
	FY 2010 Total	84	68	97	166	415
	FY 2009 Total	177	113	205	227	722

**NOTE:** The nonescalated enforcement data above reflect the cited and noncited violations either categorized at Severity Level IV or associated with green findings during the referenced time periods. The numbers of cited violations are based on Enforcement Action Tracking System data that may be subject to minor changes following verification. The monthly totals generally lag by 30 days because of the time needed for inspection report and enforcement development. These data do not include green findings that do not have associated violations.

<b>ESCALATED REACTOR ENFORCEMENT ACTIONS ASSOCIATED WITH TRADITIONAL ENFORCEMENT</b>						
		Region I	Region II	Region III	Region IV	TOTAL
Severity Level I	1st Half FY 2011	0	0	0	0	0
	2nd Half FY 2011	0	0	0	0	0
	FY 2011 YTD Total	0	0	0	0	0
	FY 2010 Total	0	0	0	0	0
	FY 2009 Total	0	0	0	0	0
Severity Level II	1st Half FY 2011	0	0	0	0	0
	2nd Half FY 2011	0	0	0	0	0
	FY 2011 YTD Total	0	0	0	0	0
	FY 2010 Total	0	0	0	0	0
	FY 2009 Total	0	0	0	0	0
Severity Level III	1st Half FY 2011	0	1	0	0	1
	2nd Half FY 2011	0	0	0	1	1
	FY 2011 YTD Total	0	1	0	1	2
	FY 2010 Total	1	0	1	0	2
	FY 2009 Total	1	0	2	0	3
<b>TOTAL Violations Cited at Severity Level I, II, or III</b>	1st Half FY 2011	0	1	0	0	1
	2nd Half FY 2011	0	0	0	1	1
	FY 2011 YTD Total	0	1	0	1	2
	FY 2010 Total	1	0	1	0	2
	FY 2009 Total	1	0	2	0	3

**NOTE:** The escalated enforcement data above reflect the Severity Level I, II, or III violations or problems cited during the referenced time periods.

<b>ESCALATED REACTOR ENFORCEMENT ACTIONS ASSOCIATED WITH THE REACTOR OVERSIGHT PROCESS</b>						
		Region I	Region II	Region III	Region IV	TOTAL
Violations Related to Red Findings	1st Half FY 2011	0	0	0	0	0
	2nd Half FY 2011	0	1	0	0	1
	FY 2011 YTD Total	0	1	0	0	1
	FY 2010 Total	0	0	0	0	0
	FY 2009 Total	0	0	0	0	0
Violations Related to Yellow Findings	1st Half FY 2011	0	0	0	1	1
	2nd Half FY 2011	0	0	0	0	0
	FY 2011 YTD Total	0	0	0	1	1
	FY 2010 Total	0	3	0	0	3
	FY 2009 Total	0	0	0	0	0
Violations Related to White Findings	1st Half FY 2011	0	4	1	0	5
	2nd Half FY 2011	2	0	4	2	8
	FY 2011 YTD Total	2	4	5	2	13
	FY 2010 Total	2	0	4	1	7
	FY 2009 Total	2	4	6	1	13
<b>TOTAL Related to Red, Yellow, or White Findings</b>	1st Half FY 2011	0	4	1	1	6
	2nd Half FY 2011	2	1	4	2	9
	FY 2011 YTD Total	2	5	5	3	15
	FY 2010 Total	2	3	4	1	10
	FY 2009 Total	2	4	6	1	13

**NOTE:** The escalated enforcement data above reflect the violations or problems cited during the referenced time periods that were associated with either red, yellow, or white findings. These data do not include red, yellow, or white findings that do not have associated violations.

### **Reactor Escalated Enforcement Actions as Well as any Other Significant Actions Taken**

The list below also includes security-related actions as well as confirmatory actions that are not included in the tables above. Details of security-related violations are not publicly available.

*PPL Susquehanna, LLC (Susquehanna Steam Electric Station)—EA-11-032*

On April 28, 2011, the NRC issued a notice of violation (NOV) to PPL Susquehanna, LLC, for a violation associated with a greater-than-green significance determination process finding at the Susquehanna Steam Electric Station. The details of the finding are official use only—security-related information.

*Tennessee Valley Authority (Browns Ferry Nuclear Power Plant, Unit 1)—EA-11-018*

On May 9, 2011, the NRC issued a violation of technical specifications associated with a red significance determination process finding involving the failure to implement an inservice testing program in accordance with the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants, 1995 Edition, 1996 Addenda, Section ISTC 4.1. In a letter dated June 8, 2011, TVA appealed the final significance determination of this red finding. The NRC performed an independent review of this finding and, in a letter dated August 16, 2011, concluded that TVA failed to establish adequate programs, as required by 10 CFR 50.55a(b)(3)(ii), to ensure that motor-operated valves continued to be capable of performing their design-basis safety functions. The inadequacy of TVA programs resulted in the Unit 1 low-pressure coolant injection system outboard injection valve, 1-FCV-74-66, being left in a significantly degraded condition and the Unit 1 low-pressure coolant injection system/residual heat removal loop II unable to fulfill its safety function. The basis and outcome of the final risk significance determination evaluation on this red finding remained unchanged.

*Omaha Public Power District (Fort Calhoun Station)—EA-11-035*

On May 26, 2011, the NRC issued an NOV to Omaha Public Power District for a violation associated with a greater-than-green significance determination process finding at the Fort Calhoun Station. The details of the finding are official use only—security-related information.

*Nebraska Power Public District (Cooper Nuclear Station)—EA-11-024*

On June 10, 2011, the NRC issued a violation of Criterion V, “Instructions, Procedures, and Drawings,” and Criterion XVI, “Corrective Action,” of Appendix B, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants,” to 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” associated with a white significance determination process finding involving the failure to establish measures to assure that a condition adverse to quality was corrected and to ensure that the activities affecting quality were prescribed by documented procedures appropriate to the circumstances. Specifically, Violation 05000298/2008008-1, dated June 13, 2008, identified a condition adverse to quality in that two procedures would not work as written. While correcting that violation, the licensee failed to perform sufficient evaluation of the circuits to identify and correct a problem with three motor-operated valves needed to establish core cooling. Failure to correct the condition adverse to quality resulted in inadequate procedures that contained steps that were inappropriate to the circumstances because they would not work as written to reposition the three motor-operated valves.

*Omaha Public Power District (Fort Calhoun Station)—EA-11-025*

On July 18, 2011, the NRC issued a violation of Criterion XVI of Appendix B to 10 CFR Part 50 associated with a white significance determination process finding involving the failure to assure

that the cause of a significant condition adverse to quality was determined and corrective actions taken to preclude repetition. Specifically, between November 3, 2008, and June 14, 2010, the licensee failed to preclude shading coils from repetitively becoming loose material in the M2 reactor trip contactor. The licensee failed to identify that the loose parts in the trip contactor represented a potential failure of the contactor if they became an obstruction and, therefore, failed to preclude repetition of this significant condition adverse to quality that subsequently resulted in the contactor failing.

*Southern California Edison Company (San Onofre Nuclear Generating Station)—EA-11-083*

On August 4, 2011, the NRC issued an NOV to San Onofre Nuclear Generating Station for a Severity Level III violation involving the failure to certify that the qualifications and status of a senior operator licensee were current and valid and that the senior operator licensee had completed a minimum of 40 hours of shift functions under the direction of an operator or senior operator, as required by 10 CFR 55.53(e) and (f). Specifically, on October 21 and October 27, 2010, the licensee did not certify that the qualifications of the senior operator licensee were current and valid and scheduled the senior operator to perform licensed activities (core alterations) as refueling senior operator supervisor while his license was inactive. Additionally, the senior operator was not medically qualified in accordance with American National Standards Institute 3.4-1996, "Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants," to perform licensed duties.

*Dominion Nuclear Connecticut, Inc. (Millstone Power Station, Unit 2)—EA-11-047*

On August 8, 2011, the NRC issued a white significance determination process finding and an NOV for two violations to Dominion Nuclear Connecticut, Inc., as a result of inspections at Millstone Power Station, Unit 2. The finding was based on multiple human performance errors, and the NOV was based on two violations that involved the licensee's failure to meet its technical specifications requirements. Together, these failures caused and exacerbated the February 12, 2011, unanticipated 8-percent reactor power increase during testing of the main turbine control valve.

*Northern States Power Company (Prairie Island Nuclear Generating Plant)—EA-11-110*

On August 17, 2011, the NRC issued an NOV to Northern States Power Company for a violation associated with a white significance determination process finding. The violation involved the failure to maintain the direct current electrical power subsystems operable in Modes 1 through 4, as required by Technical Specification 3.8.4. Specifically, from December 21, 1994, to approximately October 22, 2010, all battery chargers in Unit 1 were susceptible to a common-mode failure under design-basis accident conditions. Under those conditions, the battery chargers would stop providing an output, or lock up, when their alternating current input voltage dropped below their nameplate minimum voltage at the battery charger motor control center.

*Duke Energy Inc. (Oconee Nuclear Station)—EA-11-074*

On August 18, 2011, the NRC issued an NOV to Duke Energy Inc. for a violation associated with a greater-than-green significance determination process finding at Oconee Nuclear Station. The details of the finding are official use only—security-related information.

*Entergy Operations, Inc. (River Bend Station)—EA-11-096*

On August 24, 2011, the NRC issued a confirmatory order (effective immediately) to Entergy Nuclear Operations, Inc., and Entergy Operations, Inc. (collectively Entergy), to formalize commitments made as a result of an alternative dispute resolution (ADR) mediation session held on July 18, 2011, in Washington, DC. By letter to Entergy Operations, Inc., dated May 20, 2011, the NRC identified an apparent violation of 10 CFR 50.7, "Employee Protection," based on the NRC's Office of Investigations report dated March 17, 2011 (OI Case No. 4-2010-053). Specifically, the NRC had reached a preliminary conclusion that an employee at the River Bend Station was rated lower in his or her 2008 annual performance appraisal based in part on the employee questioning the qualifications necessary to perform certain work activities in compliance with applicable plant procedures.

Before the issuance of the NRC's letter dated May 20, 2011, but following a separate NRC inquiry, Entergy conducted its own internal investigation of the circumstances giving rise to the apparent violation. The NRC recognized that, as a result of its investigation, Entergy took several specific actions at the River Bend Station and several fleetwide actions. The fleetwide actions included conducting training on 10 CFR 50.7 for supervisory and employee concerns program personnel; reviewing all closed internal retaliation-type cases in 2008 and 2009; reviewing all 2009 appraisals for employees with overall "improvement required" ratings; and revising several quality-affecting procedures.

As a result of the settlement agreement from the ADR mediation session, Entergy agreed to take a number of additional fleetwide actions, including (1) reorganizing the quality control organization's reporting structure, (2) reinforcing the company's commitment to a safety-conscious work environment through a written communication from a senior Entergy executive, (3) reviewing and, as necessary, revising the existing general employee training on 10 CFR 50.7 to include insights from the circumstances giving rise to this matter, (4) reviewing and, as necessary, revising training for new supervisors on 10 CFR 50.7 to include insights from the circumstances giving rise to this matter, and (5) conducting an effectiveness review of the employee concerns program enhancements and training that were implemented relating to the underlying matter. Entergy also agreed to conduct a plantwide safety culture survey at the River Bend Station before December 31, 2012.

In recognition of Entergy's prior actions and in exchange for the additional actions, the NRC agreed not to pursue further action relating to this matter, which may have otherwise resulted in the issuance of an NOV with a base civil penalty had the parties not reached a settlement agreement.

*First Energy Nuclear Operating Company (Perry Nuclear Power Plant)—EA-11-148*

On August 25, 2011, the NRC issued an NOV to First Energy Nuclear Operating Company for three violations associated with a white significance determination process finding involving work activity during the retraction of a stuck source range monitor from the reactor vessel. The first violation involved the failure to perform an evaluation of the potential radiological hazards associated with the work activity, as required by 10 CFR 20.1501, "General." The second violation involved the failure to perform a complete radiological characterization of the source range monitor, as required by Technical Specification 5.7.1.b. The third violation involved the failure to establish a procedure that addressed the control of highly radioactive materials removed from the reactor vessel, as well as the failure to implement a procedure to ensure that

the licensee's as low as is reasonably achievable (ALARA) plan contained steps to ensure that the ambient radiation fields in the work areas were being controlled and that the workers' actions were in accordance with ALARA considerations, as required by Technical Specification 5.4.1.

## **VII Power Reactor Security and Emergency Response Regulations**

The NRC continues its security inspection and oversight activities, as well as its rulemaking activities to incorporate applicable security and emergency preparedness enhancements into the regulations.

The NRC is continuing force-on-force inspections at each nuclear power reactor and Category I fuel cycle facility on a normal 3-year cycle. The purpose of the force-on-force inspections is to assess the defensive strategies in place at licensed facilities and highlight areas that need improvement. During the third and fourth quarters of FY 2011, the NRC completed force-on-force inspections at 13 sites and reinspected one site. The current 3-year force-on-force cycle began in January 2011. The NRC remains committed to working with industry to improve the realism and effectiveness of the force-on-force inspection program.

The NRC developed a revised proposed rule amending the requirements associated with enhanced weapons and firearms background checks in 10 CFR Part 73, "Physical Protection of Plants and Materials," to implement the statutory authority provided by Section 161A of the Atomic Energy Act of 1954, as amended (AEA) (42 U.S.C. 2201a). The revised regulation would require new firearms background checks for armed security personnel and will permit certain NRC licensees to obtain enhanced weapons (preempting individual State laws prohibiting private entities from obtaining such weapons). The NRC worked with the U.S. Department of Justice, including the Federal Bureau of Investigation and the Bureau of Alcohol, Tobacco, Firearms, and Explosives, to develop the firearms guidelines required by Section 161A of the AEA. The NRC published the guidelines in the *Federal Register* (FR) on September 11, 2009 (74 FR 46800), and published the proposed rulemaking in the FR on February 3, 2011 (76 FR 6200). The public comment period for the proposed rule closed on August 2, 2011 (76 FR 23515).

The NRC continues to make progress in implementing a comprehensive revision to emergency preparedness regulations and associated guidance. The staff delivered the draft final emergency preparedness rule package to the Commission on April 8, 2011, and discussed the draft final rule at a public Commission meeting on May 3, 2011. The Commission voted to approve the draft final rule on August 30, 2011. Throughout this process, the NRC staff continued to engage with internal and external stakeholders on the status of the emergency preparedness rulemaking and developed an integrated transition and implementation plan for the final rule and associated guidance. Several milestones remain, however, before the final emergency preparedness rule becomes effective. The staff continues to (1) engage with the Federal Emergency Management Agency on the initiative to revise NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," issued November 1980, and (2) prepare for public workshops on its implementation plan. Publication of the final emergency preparedness rule and associated guidance is planned before the end of CY 2011.

To date, all emergency preparedness and physical security program licensing reviews are on schedule for new power reactor applications. The NRC continues to work with the

U.S. Department of Homeland Security and the Federal Emergency Management Agency to ensure that milestones are accomplished in accordance with the predetermined schedules.

## **VIII Power Uprates**

There are three types of power uprates. A measurement uncertainty recapture power uprate is a power uprate of less than two percent and is based on the use of more accurate feedwater flow measurement techniques. Stretch power uprates are power uprates that are typically up to seven percent and are within the design capacity of the plant. Stretch power uprates require only minor plant modifications. Extended power uprates are power uprates beyond the original design capacity of the plant and, therefore, require major plant modifications.

Licensees have applied for and implemented power uprates since the 1970s as a way to increase the power output of their plants. The NRC staff has reviewed and approved 139 power uprates to date. Approximately 18,063 megawatts thermal (MWt) or 6,021 megawatts electric (MWe) in electric generating capacity (the equivalent of about 6.0 nuclear power plant units) have been gained through the implementation of power uprates at existing plants. The NRC currently has 19 plant-specific power uprate applications under review. These applications include eight measurement uncertainty recapture power uprates and 11 extended power uprates.

In June 2011, the NRC staff conducted its most recent survey of nuclear power plant licensees to obtain information on whether they planned to submit power uprate applications over the next five years. This latest information indicates that licensees plan to request power uprates for 24 nuclear power plants over the next five years.

## **IX New Reactor Licensing**

The new reactor program consists of three subprograms: licensing, construction inspection, and advanced reactors. The NRC allocates its available resources to ensure that all three subprograms are successful. The NRC is focusing on the licensing and construction activities necessary to support near-term-build applications (i.e., plants expected to begin operation in 2016–2017) and on positioning itself for success in the advanced reactor program by also investing in activities to establish the necessary regulatory framework and infrastructure for advanced reactors. The NRC new reactor program is actively engaged in several international cooperative activities to promote enhanced safety in new reactor designs, strengthen reactor siting reviews, and improve the effectiveness and efficiency of inspections and the collection and sharing of construction experience.

### **Application Review**

The NRC expects to review the applications for most new nuclear power plants using 10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” which governs the issuance of standard design certifications (DCs), early site permits (ESPs), and combined licenses (COLs) for nuclear power plants. The NRC is engaged in numerous ongoing interactions with vendors and utilities regarding prospective new reactor applications and licensing activities.

The NRC is preparing the final rule packages for both the General Electric Hitachi Nuclear Energy (GEH) economic simplified boiling-water reactor (ESBWR) and the Westinghouse Electric Company, LLC (Westinghouse), AP1000 DC amendment and is currently reviewing two

DC applications (for the U.S. evolutionary power reactor (EPR) and the U.S. advanced pressurized-water reactor (US-APWR)). In addition, the advanced boiling-water reactor (ABWR) final rule package was completed by the NRC staff and is with the Commission for action. The NRC received two ABWR DC renewal requests in early FY 2011. As of September 30, 2011, the NRC has 12 combined license applications (COLAs) under active review.

Major accomplishments for the new reactor licensing program during this reporting period include the following:

- The final rule for the ABWR amendment was sent to Commission for action.
- The final safety evaluation for the AP1000 DC amendment was issued.
- The final safety evaluation report for the Plant Vogtle Units 3 and 4 COL was issued.
- The NRC completed mandatory hearing for the COL for Vogtle Units 3 and 4.
- The final safety evaluation report for the COL for Virgil C. Summer Nuclear Station, Units 2 and 3 was issued.
- The staff sent its statement in support of mandatory hearing for the COL for Plant Vogtle Units 3 and 4 to Commission.
- The staff sent its statement in support of mandatory hearing for the COL for Virgil C. Summer Units 2 and 3 to Commission.
- The final environmental impact statement (FEIS) for the COL for Calvert Cliffs Nuclear Power Plant was issued.
- The FEIS for the COL for Virgil C. Summer Units 2 and 3 was issued.
- The FEIS for the COL for Comanche Peak Nuclear Power Plant was issued.
- The Commission held the mandatory hearing for the Plant Vogtle Units 3 and 4 COL.

The NRC is making good progress on the 10 CFR Part 52 applications currently under review. COL and DC applicants are revising the submittal dates for responses to requests for additional information (RAIs), thereby impacting the review schedule. The NRC has worked with applicants to overcome these challenges and has focused on driving the remaining technical issues to resolution.

#### *Early Site Permit Reviews*

##### Victoria County Station

On June 7, 2010, Exelon Nuclear Texas Holdings, LLC (Exelon) submitted an ESP application for the Victoria County Station site. On August 31, 2010, the NRC issued a schedule letter to Exelon for the review of the Victoria ESP application.

The NRC staff began the Victoria ESP application safety and environmental reviews on October 1, 2010.

The NRC published the FR notice for environmental scoping on November 2, 2010, with the scoping period closing on January 3, 2011. The staff held public scoping meetings on December 2, 2010, in Victoria, Texas. The NRC published the notice of opportunity to petition for leave to intervene in the FR on November 23, 2010. A petition to intervene was filed on January 24, 2011; the petition was granted. The staff issued its environmental scoping summary report in July 2011.

#### PSEG Power, LLC, and PSEG Nuclear, LCC

PSEG Power, LLC, and PSEG Nuclear, LLC, submitted an ESP application on May 25, 2010. On August 4, 2010, the NRC notified the applicants that it found the ESP application for a site adjacent to the Salem and Hope Creek Generating Stations located in Salem County, New Jersey, to be acceptable for docketing.

This ESP uses the plant parameter envelope approach, which includes in its scope four of the designs discussed below. The NRC staff issued a review schedule for this application on November 29, 2010. The staff conducted the environmental scoping meeting on November 4, 2010. In addition, the staff conducted a hydrology audit on February 15–16, 2011.

#### *Design Certification Reviews*

The NRC is currently reviewing the following DC applications: the GEH ESBWR (in the rulemaking phase); the Westinghouse AP1000 DC rule amendment (in the rulemaking phase); the AREVA Nuclear Power (AREVA) U.S. EPR; the Mitsubishi Heavy Industries, Ltd. (MHI) US-APWR; and the STPNOC ABWR DC rule amendment (in the rulemaking phase). The sections below describe the status of the work that has been accomplished during this reporting period.

#### Economic Simplified Boiling-Water Reactor

The NRC received the ESBWR DC application on August 24, 2005. The staff completed the SER with open items in December 2008 and the advanced final safety evaluation report (FSER) in October 2010. ACRS issued a favorable letter on October 20, 2010. The NRC issued the FSER and final design approval on March 9, 2011.

On March 24, 2011, the NRC published the proposed ESBWR DC rule in the FR for public comment. The public comment period ended on May 10, 2011. The NRC received five public comment submissions and is addressing the public comments and developing a final rule.

#### AP1000 Design Certification Amendment

On May 26, 2007, Westinghouse submitted an application to amend the AP1000 DC rule, as well as Revision 16 to the AP1000 design control document (DCD). Subsequent revisions updated the application.

The NRC staff completed its review, and ACRS issued a letter about the DC amendment on December 13, 2010, which concluded that the changes proposed in the AP1000 DC amendment maintain the robustness of the previously certified design. ACRS further concluded

that it believes there to be reasonable assurance that the revised design can be built and operated without undue risk to the health and safety of the public. In September 2011, ACRS issued another letter that reached the same conclusion based on its review of Revision 19 to the DCD (submitted on June 13, 2011) and the staff's FSER issued on August 5, 2011.

On February 24, 2011, the NRC published the proposed rule on the AP1000 DC amendment in the FR for public comment. The 75-day comment period ended on May 10, 2011. The NRC received over 13,500 comment submissions across a range of topics, including Fukushima, spent fuel pools, shield buildings, containment, severe accident mitigation design alternatives, and environmental concerns. The majority of the comment submissions were form letters. Comment submissions also included four "petitions" requesting suspension of the rulemaking, which were treated as public comments. The NRC staff is in the final phase of completing responses to all comments. The NRC anticipates publishing the final rule in January 2012.

### U.S. Evolutionary Power Reactor Design Certification

AREVA submitted the U.S. EPR DC application on December 11, 2007.

The staff had received sufficient digital instrumentation and control information from AREVA as of June 2011 and sufficient seismic and structural design information as of July 2011 to complete its Phase 2 safety evaluation with open items.

The applicant is trying to resolve an issue in its application related to GSI-191. Specifically, the NRC staff believes that the analysis and testing supporting the adequacy of the sump design does not sufficiently address key technical topics, such as downstream effects, and it does not contain a complete evaluation of sump performance that considers additional sump strainer testing performed in July and August 2010. AREVA did not meet its commitment to provide a revision to the technical report by October 22, 2010. In addition, AREVA did not meet its commitment to provide a path-forward strategy by the end of October 2010, but it did provide a detailed path-forward strategy on December 14, 2010. The NRC staff witnessed additional strainer head loss and bypass testing in early February 2011. AREVA had committed to providing all technical information regarding GSI-191, with the exception of in-vessel downstream effects testing, by March 31, 2011. For in-vessel downstream effects, AREVA had committed to providing a complete revision to the technical report by August 31, 2011. However, AREVA informed the NRC staff that it was not able to meet the August 2011 date. In an August 18, 2011, letter to AREVA, the NRC staff asked AREVA to revise its closure plan for this topic area. AREVA sent its revised closure plan by letter dated August 25, 2011, committing to provide responses to all outstanding questions related to GSI-191 and the revised technical report by November 18, 2011. The Phase 2 public milestone was extended to December 23, 2011, to accommodate this. The U.S. EPR FSAR included a new design for spent fuel dry cask loading that has a sealed penetration at the bottom of the cask loading pit, which is directly connected to the spent fuel pool through a gate. The design has not been previously approved and is not currently used at U.S. operating nuclear plants.

On March 15, 2011, the NRC staff held a public meeting to present various options for the scope of the DC application and COLA reviews regarding the spent fuel cask design and handling. AREVA later informed the NRC staff that it had selected the option of providing the full design detail at the DC stage and committed to provide a revised FSAR section by the end of June 2011. The staff received responses to its questions on August 31, 2011, sufficient to write a draft safety evaluation with open items for this portion of the review.

## U.S. Advanced Pressurized-Water Reactor Design Certification

MHI submitted its US-APWR DC application on December 31, 2007. MHI has been implementing plans to address seismic and structural design changes and completion of the sump design and GSI-191 requirements.

MHI's changes to the design-basis seismic model and analysis methodology for the reactor building complex require additional staff review. The lumped mass stick model did not capture all seismic responses, so MHI is developing a finite element model. MHI has a comprehensive approach to address issues identified by staff, including seismic design-basis models, effects of concrete cracking, soil profiles, structure-soil-structure interaction, water table effects, embedment effects on seismic response, high frequency consideration of certified seismic design response spectra, foundation analysis, sliding stability, gap between structures, steel concrete modules, and steel liner plate strain near the prestressed concrete containment vessel.

MHI submitted to the NRC a revised completion plan for the US-APWR seismic and structural analyses on September 1, 2011. A public meeting took place on September 22, 2011, to discuss MHI's proposed changes to the standard plant design and its updated completion plan. MHI informed the staff that it plans to increase the gap between adjacent buildings to address potential pounding issues, add shear keys to the foundation to address potential sliding, and revise the earthquake record and supporting soil profiles to address unexpected analysis results. MHI stated that the proposed changes do not impact the analysis or design methodologies submitted to date and will only delay the completion of three technical reports by one month. The staff is evaluating the impacts of the proposed changes.

MHI issued a GSI-191 closure plan letter to the NRC in May 2011 and has completed additional strainer head loss testing and core inlet blockage testing. The staff audited and inspected the additional sump head loss testing in June 2011 and audited and inspected the additional core inlet blockage testing in July 2011. MHI is in the process of demonstrating that its containment sump design provides adequate core cooling capability to meet requirements of 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors." The applicant will submit new sump design reports and testing results to the NRC by mid-October 2011.

## Advanced Boiling-Water Reactor Design Certification Rule Amendment for Aircraft Impact

On June 30, 2009, STPNOC submitted an application to amend the ABWR DC rule to address the requirements of the aircraft impact rule. The Commission approved publication of the proposed rule to amend Appendix A, "Design Certification Rule for the U.S. Advanced Boiling Water Reactor," to 10 CFR Part 52 so that applicants or licensees intending to construct and operate an ABWR may comply with the aircraft impact assessment (AIA) rule by referencing the amended design. The NRC published the proposed rule for public comment on January 20, 2011. The public comment period ended on April 5, 2011. The NRC received three comment letters on the proposed rule. The NRC staff submitted the final rule package to the Commission on August 4, 2011. The current public schedule for publishing the final rule is December 2011.

### *Design Certification Renewals*

On May 12, 1997, the NRC issued the ABWR DC rule in Appendix A to 10 CFR Part 52, which is effective for 15 years.

On November 2, 2010, Toshiba Corporation Power Systems Company (Toshiba) tendered an ABWR DC renewal application. By letter dated December 14, 2010, the NRC informed Toshiba that the acceptance review for Toshiba's ABWR DC renewal application was complete, and that the staff had determined that the application was acceptable for docketing. By letter dated February 9, 2011, Toshiba notified the staff of its intent to submit a revised application no later than June 30, 2012, and requested that the technical review begin after the revision has been submitted.

On December 8, 2010, GEH tendered an ABWR DC renewal application. By letter dated February 14, 2011, the NRC informed GEH that the acceptance review for its ABWR DC renewal application was complete, and that the staff had determined that the application was acceptable for docketing.

### *Combined License Application Activities*

As of September 30, 2011, the NRC has received 18 COLAs for review. Five of the reviews have been suspended because of changes in the applicants' business strategies, as described below. The Victoria COL application was withdrawn following docketing of the Victoria ESP application. The NRC is actively reviewing 12 applications.

#### Plant Vogtle Combined License Application

On March 28, 2008, Southern submitted a COLA for two AP1000 units to be located at its Plant Vogtle site near Augusta in Burke County, Georgia. The initial application also referenced the Plant Vogtle ESP application, Revision 5, dated December 23, 2008. The NRC staff issued an SER for an ESP application for the Plant Vogtle site in February 2009. The NRC issued an ESP for the Vogtle site on August 26, 2009. Since then, the agency has issued three amendments to the ESP permit (on May 21, 2010, June 25, 2010, and July 9, 2010).

On March 25, 2011, the staff issued the final SEIS, ahead of the published public milestone. The staff completed the FSER on August 5, 2011. The mandatory hearing for this review took place on September 27–28, 2011.

#### Virgil C. Summer Combined License Application

On March 27, 2008, South Carolina Electric & Gas submitted a COLA for two AP1000 units to be located at its Virgil C. Summer site in Fairfield County, South Carolina.

The NRC published the FEIS in April 2011 and the FSER on August 17, 2011. The mandatory hearing on the COL review was held on October 12–13, 2011.

#### Levy County Combined License Application

On July 30, 2008, Progress Energy Florida, Inc., submitted a COLA for two AP1000 units to be located at its site in Levy County, Florida.

The complex geologic site characteristics necessitate a complicated review of the applicant's proposed roller compacted concrete (RCC) foundation design. This unique foundation design requires a complex technical review of the site-specific seismic soil-structure interaction (SSI) analyses. In 2010, the staff issued several RAIs related to RCC and SSI. In March 2011, the staff completed a detailed audit of the applicant's SSI analyses in which issues related to SSI analyses were resolved.

Previous issues relating to probable maximum flood, tsunami, and storm surge have been resolved. The U.S. Army Core of Engineers (USACE) is a cooperating agency for development of the environmental impact statement (EIS) and requires information that affects its least-environmentally-damaging-practicable-alternative determination under Section 404(b)(1) of the Clean Water Act. USACE issued its position letter in June 2011, which requested additional information from the applicant primarily in the areas of avoidance and minimization of impacts to wetlands, ground water modeling, and alternatives to the use of ground water at the Levy County site. Two meetings took place in July 2011 to discuss the issues, and the applicant and USACE have agreed to additional meetings to address outstanding issues and to discuss technical analyses. The applicant cites mid-November as the target for fully responding to USACE RAIs.

On August 6, 2010, the NRC issued the draft environmental impact statement (DEIS). The staff is currently evaluating DEIS comments to support issuance of the FEIS by April 2012.

#### William States Lee III Combined License Application

On December 13, 2007, Duke Energy Carolinas, LLC (Duke), submitted a COLA for two AP1000 units to be located at its Lee site near Charlotte in Cherokee County, South Carolina.

The NRC issued a revised schedule letter, dated January 11, 2011, to Duke modifying the public milestone review schedule. The FSER date was changed from February 2011 to August 2012. The revision was necessary because of technical issues in the AP1000 DC amendment that have required resources well beyond those originally planned.

#### Turkey Point Combined License Application

On June 30, 2009, Florida Power & Light submitted a COLA for AP1000 units to be located at the existing Turkey Point Nuclear Generating site in Miami-Dade County, Florida.

On May 28, 2010, the NRC issued a schedule for the COLA for Turkey Point Units 6 and 7, which incorporates by reference the AP1000 DC as amended. The schedule for the safety review shows completion dates for the advanced SER with no open items in May 2012 and completion of the FSER in December 2012. The environmental review schedule shows the issuance of the DEIS in October 2011, with the FEIS issued in October 2012.

Florida Power and Light delayed delivery of much of the information requested at the June 2010 environmental site audit, including revisions to the ground water model. This has delayed RAI development, but the NRC staff will continue with its preparation of the DEIS as resources allow. The NRC published an FR notice for environmental scoping on June 15, 2010, with the scoping period closing on August 16, 2010. The NRC published the notice of opportunity to petition for leave to intervene and request a hearing in the FR on August 16, 2010. On February 28, 2011, the ASLB panel admitted portions of three contentions.

The NRC staff is developing a revised safety and environmental review schedule.

#### Shearon Harris Combined License Application

On February 19, 2008, Progress Energy Carolina, Inc., submitted a COLA for two AP1000 units to be located at its Shearon Harris Nuclear Power Plant site, near New Hill in Wake County, North Carolina.

The NRC staff, working with USACE as a cooperating agency for the development of the EIS, identified several issues that remain unresolved for the environmental review. The staff anticipates that clarifying resolution strategies for these issues will enable the establishment of a revised environmental review schedule. On August 27, 2010, the NRC informed the applicant of outstanding issues related to the environmental review and stated that the schedule for the EIS will depend on the resolution of these issues. On January 6, 2011, the NRC issued a letter to Progress Energy Carolina, Inc., revising the COLA review schedule to reflect the above circumstances.

In a letter dated January 13, 2011, the NRC transmitted to the applicant three environmental review RAIs regarding the need for power from two proposed AP1000 units at the Shearon Harris site, alternative system needs, and geographic information system data needs. The NRC staff received a response, dated March 31, 2011, to the RAI about the need for power and this response is under staff review; the NRC received a response to all other environmental RAIs on September 29, 2011.

#### Bellefonte Combined License Application

On October 30, 2007, TVA submitted a COLA for two AP1000 units (Units 3 and 4) to be located at its Bellefonte site near Scottsboro in Jackson County, Alabama.

In August 2010, the TVA board authorized funding to proceed with engineering studies to support the completion of Bellefonte Unit 1, an existing partially constructed reactor of Babcock & Wilcox (B&W) design. In a letter dated September 29, 2010, TVA asked the NRC to defer most of its review of the AP1000 COLA for Bellefonte Units 3 and 4. The NRC responded by letter dated November 24, 2010, informing TVA that it agreed to defer the Bellefonte COLA review efforts indefinitely. On August 18, 2011, the TVA board approved plans for the completion of Bellefonte Unit 1, with the goal of having it completed and operational by 2020.

Despite the shift toward completion of the partially constructed unit, the COLA for Units 3 and 4 remained a viable option for TVA. However, in a September 2, 2011, report to the ASLB, TVA noted that it will complete a full analysis by the end of this CY on whether, and to what extent, it will seek to maintain its current COLA.

The future of the COLA notwithstanding, the NRC agreed, in the letter dated November 24, 2010, to review hydrology topics following the receipt of critical hydrology studies from TVA relevant to the licensing of Bellefonte Unit 1. TVA estimated that these studies would take up to 15 months to complete.

#### South Texas Project Combined License Application

On September 20, 2007, STPNOC submitted a COLA for two ABWR units to be located at its STP site near Bay City in Matagorda County, Texas.

By letter dated February 24, 2010, STPNOC noted that it was facing schedule challenges for development of information associated with ground water hydrology models, SSI analyses, flow-induced vibration of components, and spent fuel pool criticality and structural analysis. In response, the NRC staff informed STPNOC that it would continue the review but the milestone dates would be listed as "To Be Determined."

By letter dated January 26, 2011, the applicant for STP Units 3 and 4, changed from STPNOC to Nuclear Innovation North America, LLC (NINA). On August 2, 2011, NINA submitted a letter containing a revised schedule for the submittal of various documents. Many of the technical issues identified in STPNOC's February 24, 2010, letter have since been resolved, and the staff plans to use the information in NINA's August 2, 2011, letter to develop a revised schedule.

The NRC completed the FEIS on February 24, 2011, with the U.S. Environmental Protection Agency (EPA) publishing a notice of availability in the FR on March 4, 2011. The ASLB heard testimony on one of the two admitted environmental contentions in August in Austin, Texas. The hearing for the second contention is scheduled for October 31, 2011.

#### Calvert Cliffs Combined License Application

On July 13, 2007, Calvert Cliffs Unit 3 Nuclear Project, LLC, and UniStar Nuclear Operating Services, LLC (UniStar), submitted a partial COLA for a U.S. EPR to be located at the Calvert Cliffs site near Lusby in Calvert County, MD. The COLA was submitted in two parts and several supplements between July 13, 2007, and May 15, 2008. As of September 2011, the NRC issued safety evaluations with open items for nine of the 19 chapters.

On November 3, 2010, counsel for Calvert Cliffs Unit 3 Nuclear Project, on behalf of the applicants, filed a letter with the ASLB panel indicating that Électricité de France, a foreign business entity, had acquired Constellation's 50-percent interest in UniStar. On November 4, 2010, Constellation filed a Schedule 13D with the U.S. Securities and Exchange Commission (SEC) confirming this transaction. Based on this information, the NRC staff issued an RAI asking the applicants to justify how they comply with the requirements of 10 CFR 50.38, "Ineligibility of Certain Applicants." The applicants provided a response to the NRC staff's RAI on January 31, 2011. The NRC staff reviewed the RAI response and concluded that the proposed ownership structure did not comply with the requirements of 10 CFR 50.38. While the NRC will continue to review the remaining portions of the application, the agency will not issue a license until the requirements of 10 CFR 50.38 are met.

The staff issued its FEIS in May 2011. The contested hearing on an environmental issue is scheduled to take place in January 2012.

Because of the recent U.S. EPR DC schedule modifications, the staff is reassessing the review schedule for the FSER.

#### Bell Bend Combined License Application

On October 10, 2008, PPL Bell Bend, LLC (PPL), submitted a COLA for a U.S. EPR to be located at a new site adjacent to its Susquehanna Steam Electric Station, in Luzerne County, Pennsylvania.

The applicant proposed site layout changes to reduce impacts to wetlands to satisfy USACE's concerns related to PPL's request for a Section 404 permit under the Clean Water Act. These wetland avoidance issues for Bell Bend require the applicant to move the power block to avoid the currently impacted wetlands. The applicant is expected to submit revised information in several technical areas to address the power block move. The staff will need to revisit large portions of the geology, seismic design, and hydrology reviews based on the revised submittals. The applicant intends to submit the full scope of the changes by July 2012.

The Susquehanna River Basin Commission (SRBC) issues permits for water withdrawal from the Susquehanna River. SRBC has informed the applicant that it does not intend to approve water withdrawal during low-flow periods unless there is low-flow augmentation (water storage). The applicant is developing a pooled assets approach among its facilities within the Susquehanna River Basin, such that overall water withdrawal from the Susquehanna River remains at current levels. This plan is being discussed with SRBC. A final decision by the SRBC on the applicant's permit application could be made by December 2012.

USACE and EPA have concerns about PPL's alternative sites analysis. USACE is requesting a detailed description of environmental impacts at all candidate sites in order to inform its least-environmentally-damaging-practicable-alternative decision. The applicant performed a sensitivity analysis on several criteria in the alternative site analysis to satisfy USACE concerns, which was submitted in May 2011. USACE and EPA are currently reviewing the analysis.

#### Nine Mile Point Combined License Application

On September 30, 2008, Nine Mile Point Nuclear Project, LLC, and UniStar Nuclear Energy submitted a COLA for a U.S. EPR (Unit 3) to be located at its Nine Mile Point Nuclear Station site in Oswego, New York. On December 1, 2009, UniStar Nuclear Energy submitted a letter asking the NRC to temporarily suspend the COLA review, including any supporting reviews by external agencies, until further notice. The review remains suspended. On December 9, 2010, the Nine Mile Point COL applicants requested an exemption from annual submission requirements 10 CFR 50.71(e)(3)(iii) and proposed delaying the submittal of updates to the FSAR until December 31, 2012.

#### Callaway Combined License Application

On July 28, 2008, Ameren UE submitted a COLA for a U.S. EPR to be located at its Callaway Plant site in Callaway County, Missouri.

The NRC suspended the Callaway review at the request of the applicant in June 2009, and it remains suspended. In a letter dated November 22, 2010, Ameren Missouri, a subsidiary of Ameren Corporation, notified the NRC that it anticipates that an ESP application will be submitted in the second half of 2011, but that it intends to maintain the present COLA as a suspended application and plans to provide further correspondence on any future direction related to its status. Union Electric Company, doing business as Ameren Missouri, would be the applicant and license holder. Ameren Missouri stated that it would keep the NRC informed of its progress and any changes to its plans.

### Comanche Peak Combined License Application

On September 19, 2008, Luminant submitted a COLA for two US-APWR units to be located at its Comanche Peak site near Glen Rose in Somervell County, Texas. Luminant submitted Revision 1 to the COLA on November 20, 2009.

By letter dated March 2, 2011, the NRC staff issued a letter to Luminant providing changes to the public milestone review schedule. This schedule change resulted from delays in the US-APWR DC review schedule.

The NRC staff determined that Luminant did not provide sufficient information in Part 1, "Administrative and Financial Information," on negation of foreign ownership. The NRC staff issued RAIs in March 2010 and October 2010. Luminant provided its responses to these RAIs in June 2010 and December 2010, respectively. This issue remains open and under review.

The NRC published the FEIS in May 2011.

### North Anna Combined License Application

On November 27, 2007, Dominion Virginia Power (Dominion) submitted a COLA for an ESBWR to be located at its North Anna Power Station site near Richmond in Louisa County, Virginia.

The applicant subsequently publicly announced a decision to switch from ESBWR to US-APWR technology and, on June 28, 2010, Dominion submitted its revised application to reference the US-APWR design. On March 2, 2011, the staff issued a new review schedule to accommodate the new technology for the North Anna Unit 3 application and has begun to evaluate the revised application. The new review schedule for the North Anna Unit 3 application incorporates the changes to the review schedules for the US-APWR DC and Comanche Peak reference COLAs. Changes to the design-basis seismic model and analysis methodology in the US-APWR DCD will require additional review by the NRC staff. Dominion has to assess the impact of the revised methodology and perform site-specific analysis for North Anna Unit 3. The NRC will supplement the EIS that was completed in February 2010, which was originally based on the ESBWR design.

### Fermi Combined License Application

On September 19, 2008, Detroit Edison Company (DTE) submitted a COLA for an ESBWR to be located at its Fermi site near Newport City in Monroe County, Michigan.

On December 15, 2010, the staff issued a letter to DTE stating that public milestones for the COL review had been reestablished. On January 10, 2011, DTE submitted a significantly revised site layout plan to address the Detroit District USACE's concerns about impacts to water and wetland resources, which are critical for the USACE permit application. On February 1, 2011, DTE presented the plan to USACE and other interested Federal and State agencies. It was noted in this meeting that some additional mitigation and adjustments may be identified before permits are issued, but no significant concerns were expressed about the revised site layout. The NRC staff plans to issue the DEIS in October 2011. The proposed site layout changes did not impact the safety review schedule.

In July 2011, DTE submitted a revised site-specific analysis comparing the Fermi Unit 3 plant structural design to the standard plant design. Evaluation of the revised analysis does not significantly impact the safety review schedule.

#### Victoria Combined License Application

On September 2, 2008, Exelon submitted a COLA for two ESBWR units to be located at its Victoria County Station site near Victoria City in Victoria County, Texas. Exelon requested that the COLA for Victoria Units 1 and 2, which it submitted to the NRC on September 2, 2008, be withdrawn upon docketing of the Victoria ESP application. On July 20, 2010, the NRC accepted Exelon's request to withdraw the Victoria COLA and issued an FR notice announcing the withdrawal.

On June 7, 2010, Exelon submitted an ESP application for the Victoria site. Details about the Victoria ESP application are presented earlier in this report.

#### Grand Gulf Combined License Application

On February 27, 2008, Entergy submitted a COLA for an ESBWR to be located at its Grand Gulf Nuclear Station site near Port Gibson in Claiborne County, Mississippi.

By letter dated January 9, 2009, Entergy asked the NRC to suspend, until further notice, its review of the docketed COLAs for the River Bend Station, Unit 3, and Grand Gulf Unit 3. Entergy plans to reconsider the GEH ESBWR reactor technology, which was the basis for the COLA. The NRC responded to the request and suspended the review; the review remains suspended.

#### River Bend Station Combined License Application

On September 25, 2008, Entergy submitted a COLA for an ESBWR to be located at its River Bend Station site near St. Francisville, Louisiana. By letter dated January 9, 2009, Entergy requested a suspension, until further notice, of the NRC's review of the docketed COLAs for River Bend Station, Unit 3, and Grand Gulf Unit 3. The review remains in suspension.

#### Expected Application Submittals to the NRC

The staff anticipates the submittal of two ESP applications during FY 2012 (Callaway and Blue Castle).

### **Regulatory Infrastructure**

The NRC continues to enhance the effectiveness and the efficiency of the review processes for new reactor applications. This includes pursuing changes to regulations, updating key guidance documents for NRC activities and application preparation, developing strategies and work products for optimizing the review of applications, and creating an inspection program for new construction activities.

Examples of recent infrastructure activities are described below.

#### *Rulemaking for Inspections, Tests, Analyses, and Acceptance Criteria Maintenance*

The NRC published for public comment a proposed rule to amend the regulations related to the verification of nuclear power plant construction activities through inspections, tests, analyses, and acceptance criteria (ITAAC) under a COL (76 FR 27925). The staff is reviewing the comments received and preparing the final rulemaking package for submission to the Commission for review during the second quarter of FY 2012.

Specifically, the NRC is proposing new provisions that apply after a licensee has completed an ITAAC and submitted an ITAAC closure letter. These new provisions require a licensee to report new information that materially alters the basis of the inspections, tests, or analyses performed as required or when acceptance criteria are no longer met. These notifications will support the finding that the Commission must make under 10 CFR 52.103(g) (i.e., that all ITAAC in the COL are met) before it allows operation. Additionally, the notifications would ensure that interested persons have access to information on ITAAC at a level of detail sufficient to address the threshold for requesting a hearing on ITAAC closure. The NRC worked with external stakeholders to establish the thresholds for determining what types of unplanned events or licensee actions would materially alter the original ITAAC determination basis and developed regulatory guidance for implementing the proposed rule. The NRC staff expects to issue the final rule, as well as the revision to Regulatory Guide (RG) 1.215, "Guidance for ITAAC Closure under 10 CFR Part 52," during the third quarter of FY 2012.

#### *Implementation of Aircraft Impact Assessment Rulemaking*

The NRC published the final rulemaking on Aircraft Impact Assessment in the FR on June 12, 2009 (74 FR 28111), which became effective on July 13, 2009. The rule at 10 CFR 50.150, "Aircraft Impact Assessment," requires applicants for new nuclear power reactors to perform a design-specific assessment of the effects of the impact of a large commercial aircraft. The rule requires applicants to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact and either spent fuel cooling or spent fuel pool integrity is maintained. The NRC staff endorsed industry guidance on the methodology for performing an AIA for new plant designs in Draft Regulatory Guide (DG) 1176, "Guidance for the Assessment of Beyond-Design-Basis Aircraft Impacts," issued July 2009. Inspections for the U.S. EPR and US-APWR are planned for the first half of FY 2012. In addition to performing AIA reviews and inspections in FY 2011, the NRC staff began work to incorporate lessons learned during these early reviews and inspections into the AIA guidance documents.

#### *Changes during Construction under 10 CFR Part 52 Guidance*

The NRC is working to clarify the change processes available for plant changes or modifications during the construction of new nuclear power plants. A new reactor application is frozen during the review process, with subsequent proposed modifications to the licensing basis carried forward until after the COL is issued. It is expected that the new licensee will submit LARs for plant changes or modifications identified after the licensing-basis freeze point once the license is issued. The NRC staff continues to work with the industry to clarify the change processes to maintain the licensing basis during the construction period until the Commission's 10 CFR 52.103(g) finding, which is the NRC's finding that the acceptance criteria in the COL are

met and that the licensee may operate the newly constructed nuclear power plant. The process provides the ability for a licensee, in conjunction with an LAR, to request a notification that the NRC has no objection to the licensee constructing the proposed changed design feature pending the NRC's review of the LAR. If the LAR is subsequently approved, the licensing basis in the FSAR would be changed. If the LAR is subsequently denied, then the licensee must return the facility to its then-current licensing basis. The NRC staff presented its views in this area to industry during December 2010 and to the public during the NRC's 2011 Regulatory Information Conference in March. The NRC issued the related Interim Staff Guidance (ISG) 025, "Changes during Construction, Under 10 CFR Part 52" for comment and use on February 7, 2011.

### *Design Certification with Multiple Vendors*

In June 2009, STPNOC submitted a request to amend the ABWR DC to comply with the AIA rule. The staff completed its review of the STPNOC amendment to the ABWR DC concerning AIA and submitted the associated proposed rule to the Commission. In that proposed rule, the staff recommended an approach for the treatment of multiple vendors for a single certified design. The Commission approved the proposed rule, including the staff's proposal to address multiple vendors for a single design. The NRC published the notice of the proposed rule, which sought public comment on the staff's recommendation, in the FR on January 20, 2011. The public comment period ended on April 5, 2011. The NRC received three comment letters on the proposed rule.

### *Interim Staff Guidance*

ISG serves as an interim measure to provide guidance to the NRC during licensing reviews. This guidance is also an important reference to assist applicants and licensees in understanding NRC expectations. The information contained in an ISG is incorporated into other permanent NRC documents, such as RGs and standard review plans, when those documents are updated. The NRC issued two ISGs in the second half of FY 2011: DC/COL-ISG-019, "Review of Evaluation to Address Gas Accumulation Issues in Safety Related Systems and Systems Important to Safety," as a final guide, and ISG-025, "Changes During Construction Under 10 CFR Part 52," for comment and use.

### *Standard Review Plan*

The Standard Review Plan (SRP) (NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition") is the primary guidance document used by the NRC to review and evaluate proposed licensing actions for nuclear power plants. It contains guidelines to ensure that the NRC's evaluations lead to clear and defensible findings that demonstrate that public health and safety will be maintained.

The SRP contains approximately 250 sections covering the entire scope of a nuclear power plant. Updating the SRP and other associated guidance documents is important to ensuring that NRC evaluations reflect the latest information and knowledge related to the safe operation of nuclear power plants. The comprehensive SRP review and update program occurs approximately every four years.

The NRC staff issued a memorandum soliciting input from various users of the SRP guidance by September 15, 2010, and received responses from offices throughout the agency. The NRC

staff is tallying the results of the comprehensive survey and will compile them in the first quarter of FY 2012.

During the reporting period, the NRC staff issued guidance updates to the following SRP sections:

- (1) Revision 2 to SRP Section 1.0, "Introduction and Interfaces," added new guidance on deficiency notifications under 10 CFR Part 21, "Reporting of Defects and Noncompliance," for 10 CFR Part 52 applicants.
- (2) Revision 4 to SRP Section 8.1, "Electric Power—Introduction," issued a new Branch Technical Position 8-8, "Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions," in May 2011.

These two proposed guidance updates are currently in the public comment period.

#### *Enforcement Activities*

The NRC continues to work on the development of revisions to the Enforcement Manual to establish methods of identifying, evaluating, classifying, and reporting violations during the construction phase of facilities regulated by the NRC, including the new nuclear power plants licensed under 10 CFR Part 52. The proposed revisions to the Enforcement Manual that were developed by an internal working group were published in the FR (76 FR 48919) for public comment, and the NRC held a public meeting to introduce and explain the proposed revisions to the public and industry stakeholders. The staff will provide the final recommendations for revisions to the Enforcement Manual related to construction to the Commission during the fourth quarter of CY 2011.

#### *Late-Filed Allegations Process*

The NRC staff is working to develop an expedited allegations process mapped to a nominal review phase rulemaking schedule, such that coordinated decisions and timely actions can be made. Concurrently, the NRC staff is developing internal guidance to support this new process.

#### **International Activities**

During this period, the NRC participated in bilateral activities and multilateral activities as part of the Multinational Design Evaluation Program (MDEP). The NRC staff participated in conferences and workshops, hosted assignees from other regulatory bodies, and supported the International Atomic Energy Agency (IAEA) requests for expert participation.

#### *Multinational Design Evaluation Program*

- From June 27–29, 2011, the NRC staff participated in a meeting of the Digital Instrumentation and Controls Working Group in Paris, France, to discuss and finalize common positions in the area of digital instrumentation and controls.

- From September 15–16, 2011, the NRC Chairman and NRC staff participated in a second MDEP conference on new reactor design activities, attended by senior-level officials from the Organization for Economic Co-operation and Development, regulatory agencies from numerous countries, and vendors.
- From September 27–28, 2011, the NRC staff participated in an MDEP EPR working group meeting on technical specifications at NRC Headquarters.

#### *Bilateral Support*

- From July 30 to August 13, 2011, the NRC staff traveled to Taejeon, Korea, and met with the regulatory authority, the Korea Institute of Nuclear Safety, and exchanged information related to probabilistic risk assessment; Fukushima lessons; 10 CFR 50.46, “Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors,” rulemaking; the small modular reactor (SMR) licensing process; and severe accidents.
- On August 16, 2011, the NRC staff and management participated in a bilateral meeting with representatives from the Polish national and regional governments. The meeting focused on regulatory requirements for the siting of nuclear power plants and public and stakeholder involvement in the process.
- On August 17, 2011, the NRC staff and management participated in a bilateral meeting with regulatory officials from Hong Kong. This meeting focused on criteria for siting and stakeholder involvement.
- On August 18, 2011, the NRC staff participated in a bilateral meeting with the Korea Institute of Nuclear Safety. Topical issues related to piping integrity were discussed at the meeting.
- From August 22–26, 2011, the NRC staff and management visited the United Kingdom and Czech Republic and met with national regulators. A central theme for meetings in both countries was cooperation on the AP1000 design review and regulatory approaches to counterfeit, fraudulent, and suspect items (CFSI). In addition to the discussion on CFSI, the meetings with the United Kingdom’s Office of Nuclear Regulation also focused on coordination under MDEP.
- On September 14, 2011, the NRC staff met with representatives of the Belgian nuclear regulatory authority to discuss regulatory approaches for advanced nuclear reactor designs.

#### *IAEA Requests*

- From June 10–21, 2011, the NRC staff participated in an IAEA-led workshop in Indonesia on volcanic, seismic, and tsunami hazards. The NRC staff trained IAEA member states in attendance on the assessments of these hazards in relation to the siting of nuclear power installations.
- From July 18–23, 2011, the NRC staff cochaired an IAEA meeting on tsunami hazards. Tasks, work plans, and schedules were discussed for the development of an IAEA

tsunami hazard safety guidance document. The next meeting will take place in Japan in late November or early December 2011.

- From July 11–16, 2011, the NRC staff participated in and cochaired an IAEA meeting on seismic hazards. This meeting focused on establishing working plans for the IAEA seismic hazards work group leaders. Specifically, the meeting focused on the details of the working plans developed to date, identified technical experts to be consulted, and determined specific expectations from these experts.
- From August 23–25 and September 19–24, 2011, the NRC staff participated in the second and third IAEA consultancy meetings on the design safety margin evaluation program related to post-Fukushima actions.
- From September 22–26, 2011, the NRC staff participated in an IAEA mission to Jakarta, Indonesia, to review the work plan for site evaluation studies for selection of a nuclear power plant site in that country.
- From September 24–30, 2011, the NRC staff participated in the working group meetings in Madrid, Spain, on IAEA/International Seismic Safety Center (ISSC) Working Area 8, “Site Evaluation and External Events Safety Assessment.” This IAEA/ISSC activity involves several countries and organizations.

#### *Additional International Activities*

- From June 7–9, 2011, NRC senior management participated in the Nuclear Energy Agency/Committee on Nuclear Reactor Regulation (NEA/CNRA) meetings in Paris, France, where discussions centered on the progress of work done by the Working Group on the Regulation of New Reactors and CNRA activities related to post-Fukushima actions. Of significance was the NRC proposal and subsequent acceptance of a task group to focus on CFSI. NRC management also participated in the NEA forum on lessons learned from the Fukushima incident.
- From June 14–16, 2011, the NRC staff and managers met with members of the Institut de Radioprotection et de Sûreté Nucléaire at NRC Headquarters to collaborate on economic cost-benefit analyses. The staff made presentations on use of cost-benefit analysis in regulatory analyses and on plans for site-level probabilistic risk assessments.
- From June 12–18, 2011, the NRC staff participated in the NEA/CNRA joint Working Group on Operating Experience and Working Group on Inspection Practices workshop in Helsinki, Finland, where operating experience events having safety issues and generic importance and implications were discussed. The workshop primarily focused on the integration of operating experience into inspection and oversight processes and the challenge of dealing with nonconformance of parts.
- On July 26, 2011, the NRC supported a meeting with an Argentine delegation.
- In August 2011, the NRC supported a meeting with regulatory counterparts in the United Kingdom and the Czech Republic.

- From August 5–13, 2011, the NRC staff observed the Duke Power operating crew perform multiple scenarios on the Halden digitalized simulator in Oslo, Norway. This observation enabled the staff to determine the modifications needed to the existing operator competency worksheets of NUREG-1021, “Operator Licensing Examination Standards for Power Reactors,” issued May 2004, to create a valid tool for evaluating individual or crew performance in a simulator operating examination setting during performance of a simulator scenario.
- From September 8–16, 2011, the NRC staff conducted a team inspection of the Obayashi manufacturing facility in Japan. Obayashi is an international vendor contracted for the civil and structural design of the AP1000 for the U.S. market.
- From September 9–19, 2011, the NRC staff conducted a vendor inspection and vendor audit at the Westinghouse Electric Sweden Nuclear Fuel Facility in Vasteras, Sweden. The inspection and audit focused on the implementation of quality activities associated with the development and maintenance of evaluation models for the ECCS and transient, fuel, and core evaluation models.
- From September 12–23, 2011, the NRC staff participated in the CNRA Working Group on the Regulation of New Reactors in Paris, France.

### **Construction Inspection Program Developments**

The NRC has begun executing construction-related inspection activities for Plant Vogtle Units 3 and 4. Infrastructure is in place to support FY 2011 and FY 2012 inspection activities to verify quality construction and the completion of ITAAC. On March 8, 2010, safety-related construction officially began at Plant Vogtle Units 3 and 4, with the start of engineered backfill operations authorized under the limited work authorization (LWA). Construction inspectors from the NRC Region II Center for Construction Inspection (CCI) and Headquarters technical staff were present to observe the LWA holder’s initial activities and conduct the first onsite ITAAC inspection. CCI opened the Plant Vogtle construction resident inspector’s office with a construction senior resident inspector and resident inspector in 2010. CCI has conducted multiple inspections of the quality assurance program associated with LWA activities, in accordance with Inspection Procedure 35007, “Quality Assurance Program Implementation during Construction and Pre-Construction Activities.” The Plant Vogtle construction assessment process under Inspection Manual Chapter 2505, “Periodic Assessment of Construction Inspection Program Results,” started on July 1, 2010, and covered the period between July 1, 2010, and July 1, 2011. Plant performance for Plant Vogtle Units 3 and 4 for this period was within the “Baseline Program” column of the NRC’s Construction Action Matrix. The latest construction milestone is completion of the basemat/mudmat for the Unit 3 nuclear island; that level was reached in April 2011. Installation of the rubber waterproof membrane was completed in Unit 3 and is ongoing in Unit 4. CCI has conducted LWA ITAAC inspections on the activities noted above. Summer continues with its site preparation and preconstruction activities.

In addition to the plant construction activities at the Plant Vogtle site under an LWA, the applicant for the Virgil C. Summer plant continues with its site preparation and preconstruction activities.

The staff continues to refine concepts for ITAAC closure and the maintenance of closed ITAAC. On May 13, 2011, the staff issued for public comment DG-1250, “Guidance for ITAAC Closure

under 10 CFR Part 52,” which endorses the industry guidance document, NEI 08-01, Revision 4, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52,” issued July 2010, which was updated to include guidance on ITAAC maintenance. The final ITAAC maintenance rule and this associated regulatory guidance are expected to be published in the third quarter of FY 2012.

The staff participated in the simulated ITAAC closure and verification demonstration exercise described in SECY-10-0100, “Staff Progress in Resolving Issues Associated with Inspections, Tests, Analyses, and Acceptance Criteria,” dated August 5, 2010. A summary report dated July 15, 2011, documented the results of the simulated ITAAC closure and verification demonstration project, lessons learned, and next steps. Additional ITAAC closure notification examples will be developed to cover approximately 80 percent of the AP1000 ITAAC types. An evaluation of the expected ITAAC surge was also completed to identify potential mitigation strategies.

Moving forward, the staff is developing office instructions for its recommendation to the Commission on the 10 CFR 52.103(g) finding and for the ITAAC closure verification process. Additionally, the staff conducted internal training on ITAAC prioritization by assembling mock expert panels to prioritize the ESBWR Revision 9 ITAAC. On August 15, 2011, the staff submitted the 2011 annual ITAAC update to the Commission.

In SRM SECY-10-0140, “Options for Revising the Construction Reactor Oversight Process Assessment Program,” dated March 21, 2011, the Commission directed the staff to develop a construction assessment program that includes a regulatory framework, the use of a construction significance determination process to determine the significance of findings identified during the construction inspection program, and the adoption of a construction action matrix to determine the appropriate NRC response to degrading licensee performance. During this reporting period, the staff met with external stakeholders to finish the developmental work for this task and will continue to work with them to pilot the new construction assessment program, in parallel with the current assessment process, for 12 months beginning January 1, 2012. The staff will provide updates to the Commission and brief ACRS as directed in the SRM.

### *Vendor Inspections*

The NRC staff conducted 13 vendor inspections and three quality assurance implementation inspections during FY 2011. The NRC staff continued its participation in several quality assurance and inspection outreach activities, including meetings related to the Nuclear Procurement Issues Committee, ASME Boiler and Pressure Vessel Code Section III committee, and Nuclear Quality Assurance Committee activities. The NRC staff continues to make progress on actions in response to the Office of the Inspector General audit of the vendor inspection program. On May 26, 2011, the staff provided the first 6-month update to the Office of the Inspector General. The staff is also continuing its work to develop an agencywide approach for addressing the potential for CFSI to enter the nuclear supply chain.

The NRC staff completed the first engineering design verification inspection of the AP1000 reactor design in July 2011. The purpose of the inspection was to assess the implementation of Westinghouse’s processes for completing the detailed design of the AP1000 reactor and for transferring the design requirements contained in the DCD into engineering, procurement, and construction documents. The inspection scope included a review of both system-level and component-level design information. The team also identified that some key calculations and

analyses associated with the systems and components selected for review were still incomplete or undergoing revision. Consequently, the team was not able to complete its technical review and additional NRC inspections will be required once the calculations and analyses are complete.

## **Advanced Reactors**

Since its creation in 2008, the NRC's Advanced Reactor Program has been dedicated to preparing for the review of the Next Generation Nuclear Plant (NGNP) license application and future applications involving SMRs. Recently, the NRC has been engaged in significant preapplication activities with multiple SMR vendors. In addition, the NRC has made substantial progress in bringing to resolution the key policy, licensing, and technical issues facing SMRs and has begun to develop the guidance necessary to support the staff's review efforts. Furthermore, the NRC has continued to implement supporting initiatives aimed at ensuring readiness to review future SMR licensing applications.

The NRC staff has undertaken a variety of activities to prepare for SMR applications that may arrive in FY 2013. The staff evaluated past advanced reactor experience and interacted with stakeholders to identify issues that need to be addressed to support design and licensing reviews of SMR designs and deployment. Although approached by vendors and advocates for a variety of reactor technologies, the NRC staff has focused its attention on the NGNP program and on integral pressurized-water reactors (iPWRs).

### *Next Generation Nuclear Plant*

The NRC and U.S. Department of Energy (DOE) staffs are coordinating research and preapplication activities related to the NGNP Program. The NRC staff communicates often with DOE and the lead laboratory, Idaho National Laboratory (INL), about research and development activities as well as the efforts to support the future licensing of the NGNP prototype and subsequent commercial units.

The NRC staff is currently reviewing white papers submitted by INL that address topics such as the risk-informed, performance-based regulatory framework (e.g., defense in depth, licensing-basis event selection, and safety classification and treatment of structures, systems, and components); materials that may be used in the NGNP high-temperature gas-cooled reactor; fuel qualification; mechanistic source term; modular plant licensing; and emergency planning. These white papers are intended to serve as a basis for initial discussions between DOE and the NRC about the overall approach and issues associated with each topic, informing the prospective designer of issues that should be addressed in a future licensing application. The NRC staff is preparing assessment reports for these white papers and has issued extensive requests for additional information to address the objectives described by INL. The NRC is addressing some topics, such as emergency planning, as part of its resolution of generic SMR issues.

In addition to routine interactions with DOE and INL on major research and development efforts sponsored by DOE (e.g., fuels and materials testing programs), the NRC staff has activities underway to support the NGNP licensing program. The most significant of these research activities involves the development of computer codes and models to support independent NRC evaluations of the behavior of high-temperature gas-cooled reactor technology systems.

DOE's Nuclear Energy Advisory Committee reviewed progress in NGNP research, design, and preapplication licensing discussions (project Phase 1, as described in the Energy Policy Act of 2005). The committee's recommendations include accelerating efforts to form a public-private partnership to provide end-user input into design and licensing activities, and continuing interaction with the NRC on regulatory framework development. The Nuclear Energy Advisory Committee recommends that licensing under 10 CFR Part 50 be adopted, as opposed to the existing plan to license the facility using a COL issued under 10 CFR Part 52. The NRC is expecting a decision by the Secretary of Energy early in FY 2012 on the recommendations and a planned path forward.

### *Integral Pressurized-Water Reactors*

#### NuScale Power, Inc.

The NuScale Power, Inc. (NuScale), modular reactor is a 160-MWt, 45-MWe, natural circulation PWR design that consists of an integrated reactor vessel assembly, which includes the reactor core, pressurizer, control rods, and two helical steam generators, all located within the reactor vessel. NuScale is proposing that each plant be designed to accommodate up to 12 totally independent modules (reactor vessel and containment) for a total plant electrical capacity of up to 540 MWe.

The NRC staff has been engaged in preapplication activities with NuScale since early 2008. In January 2011, the SEC initiated a civil action against affiliates of the Michael Kenwood Group, NuScale's principal investor. This action prevented the Michael Kenwood Group from meeting funding obligations to NuScale and forced NuScale to significantly reduce its spending and staffing level. NuScale is not a party in the SEC action. As a result, NuScale began pursuing alternative financing strategies. On March 18, 2011, NuScale submitted a letter to the NRC requesting that the NRC suspend all preapplication activities. On May 16, 2011, the NRC received a progress status report from NuScale indicating that NuScale has been successful in attracting additional investors, including a lead investor who has the means and the commitment to provide the stable long-term funding that will allow NuScale to completely develop the NuScale SMR design, including submitting a DC application to the NRC. NuScale expects to be able to resume preapplication activities with the NRC by the end of CY 2011.

#### Babcock & Wilcox (B&W) mPower™

The mPower™ reactor is a 400-MWt (125-MWe) light-water reactor that consists of a self-contained module with the reactor core, reactor coolant pumps, and steam generator located in a common reactor vessel installed in an underground containment. B&W is considering designing the standard plant for two modules.

In response to RIS 2011-02, "Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs," dated February 2, 2011, B&W announced a new DC application submittal date of the fourth quarter of CY 2013 in support of the TVA Clinch River construction permit application.

The NRC staff has been engaged in preapplication activities with B&W since mid-2009. To date, the NRC has received technical reports on the quality plan for the DC, plant design overview, the critical heat-flux test and correlation development plan, core nuclear design codes and methods qualification, integrated system test (facility description and test plan), instrument

setpoint methodology, control rod drive mechanism design and development, and the security design assessment and program plan.

The NRC staff is providing feedback to B&W through meetings and other appropriate methods. During this reporting period, the NRC staff held detailed technical meetings with B&W on the mPower™ ECCS design and accident analysis methodology, the application of ASME Boiler and Pressure Vessel Code Sections III and XI to the mPower™ plant, an update on the process and procedures associated with software development, and an overview of the human factors engineering program plan. The next meeting with B&W is tentatively scheduled for October 27, 2011, to discuss the mPower™ cyber security program and the reactor coolant pump design.

The NRC staff has begun development of a design-specific review standard (DSRS) for the mPower™ design to identify the review plan for the mPower™ DC application anticipated by the NRC. The DSRS will function similarly to the SRP and will identify safety and risk categorization for the systems, structures, and components associated with the mPower™ design. The staff will engage public stakeholders before issuing the final mPower™ DSRS.

#### Tennessee Valley Authority

By letters dated October 8 and November 5, 2010, TVA stated that it was evaluating SMR activities under 10 CFR Part 50 instead of 10 CFR Part 52. In subsequent interactions with the NRC, TVA described its key assumptions to support a licensing review, under 10 CFR Part 50, for construction and operation of mPower™ SMR modules at the Clinch River site in Roane County, TN. TVA plans to develop a detailed regulatory framework for up to six SMR modules.

On January 31, 2011, the NRC staff responded to TVA's assumptions letters, concluding that no legal or licensing issues would prohibit TVA from applying for a construction permit or operating license under 10 CFR Part 50 for the licensing of a new nuclear facility. On September 20, 2011, the NRC staff met with representatives from TVA for the first in a series of public meetings to discuss TVA's development of its regulatory framework document associated with a 10 CFR Part 50 construction permit application for the Clinch River site. During that meeting, TVA announced that the Clinch River construction permit application, initially planned for fall 2012, would be delayed until CY 2013. TVA noted that it expects to complete its schedule development to support an announcement of a specific date by October 2011. Related activities are anticipated to continue through FY 2012 and FY 2013. These include visits to the Clinch River site by the NRC staff to observe site preparation activities and preliminary environmental review efforts.

#### Other iPWR Vendors

Two other vendors have contacted the NRC to propose submitting small light-water reactor designs for NRC review. Holtec International is developing the Holtec Inherently Safe Modular Underground Reactor (HI-SMUR) design and is planning to submit a DC application. The NRC staff intends to meet with Holtec, to gain an understanding of the HI-SMUR design. Westinghouse is developing its SMR design and is planning to submit a DC application late in CY 2012. The NRC staff met with Westinghouse to discuss schedule and preapplication activities on April 11, 2011. In addition, on July 12, 2011, the NRC staff held another meeting with Westinghouse representatives at Westinghouse headquarters in Cranberry, PA, to discuss plans for their SMR, an iPWR of approximately 225 MWe. Westinghouse presented preliminary reactor design information and discussed its planned approach for certification and licensing.

## Other Reactor Technologies

The NRC staff has occasional interactions with potential applicants using other advanced reactor designs, such as sodium-cooled fast reactors, lead-bismuth-cooled fast reactors, and fluoride salt-cooled high-temperature reactors. The NRC staff activities related to these designs are limited to low-level efforts (e.g., knowledge management) and nonresource-intensive interactions with vendors (e.g., occasional meetings).

### *Regulatory Framework Development*

## Generic Policy Issues

The NRC staff continues to focus on identifying and resolving policy and key technical issues and developing guidance for both the iPWRs and the NGNP Program. The NRC staff has developed and is executing specific resolution plans for the issues identified in SECY-10-0034, "Potential Policy, Licensing, and Key Technical Issues for Small Modular Nuclear Reactor Designs," dated March 28, 2010. The NRC staff is also working on a number of key technical issues associated with these technologies. Within the last year, the industry also formed groups to discuss and coordinate issues associated with SMRs. NEI and the American Nuclear Society have established various working groups to develop position papers on many of the generic issues identified in SECY-10-0034. To ensure close coordination between the NRC and its stakeholders, as well as timely resolution of the issues, the NRC and NEI have established routine public meetings to discuss generic approaches to resolving the policy, licensing, and key technical issues for the spectrum of advanced reactor technologies. These meetings began on July 22, 2010, and will continue to occur approximately every six weeks for the remainder of 2011.

During the last six months, the NRC staff made significant progress toward implementing policy issue resolution plans in support of conducting future licensing reviews. On June 12, 2011, the NRC staff developed a Commission paper, SECY-11-0079, "License Structure for Multi-Module Facilities Related to Small Modular Nuclear Power Reactors," describing the different license structure alternatives and the NRC staff's recommendations (issuance of individual reactor module licenses). The NRC staff plans to engage a broader range of stakeholders to discuss the different license structure alternatives. The NRC staff is proceeding with developing the specific aspects of its recommendation.

On July 22, 2011, the NRC staff issued a Commission paper, SECY-11-0098, "Operator Staffing for Small or Multi-Module Nuclear Power Plant Facilities," discussing the staff's ongoing efforts and plans for resolution of onsite licensed operator staffing requirements for SMRs. The NRC staff outlined a multifaceted approach that proposes both a near-term solution for expected SMR applications and a longer term solution that will allow the NRC staff to capitalize on review experience gained from upcoming submittals.

The NRC staff also developed a Commission paper, SECY-11-0112, "Staff Assessment of Selected Small Modular Reactor Issues Identified in SECY-10-0034," dated August 12, 2011, providing the staff's assessment and closeout of multiple issues identified in SECY-10-0034.

The NRC staff is currently working on two additional Commission papers addressing issues associated with emergency planning and security for SMRs. These papers should be completed by the end of CY 2011.

## Guidance Development

Consistent with SRM-SECY-11-0024, "Use of Risk Insights to Enhance the Safety Focus of Small Modular Reactor Reviews," dated May 11, 2011, the NRC staff has begun development of a framework that applies risk insights to the licensing of SMRs. The intent is to improve the efficiency and safety focus of the staff's reviews. The NRC staff is working with the DOE national laboratories to develop this framework in the form of DSRs. These standards will serve as guidance to support the NRC staff's review of future SMR applications.

October 18, 2011

MEMORANDUM TO: R. W. Borchardt  
Executive Director for Operations

FROM: Annette L. Vietti-Cook, Secretary */RA/*

SUBJECT: STAFF REQUIREMENTS – SECY-11-0124 – RECOMMENDED  
ACTIONS TO BE TAKEN WITHOUT DELAY FROM THE NEAR-  
TERM TASK FORCE REPORT

The Commission has approved the staff's proposed actions to implement without delay the Near-Term Task Force recommendations as described in SECY-11-0124, subject to the comments below.

The NRC should strive to complete and implement the lessons learned from the Fukushima accident within five years - by 2016.

The process for implementing new or modified regulatory requirements or programs should be transparent and the regulatory mechanism (e.g., order, rulemaking, 10 CFR 50.54(f) letter, generic letter, etc.) used to impose them should be as clear and specific as possible when issued.

As the staff evaluates Fukushima lessons-learned and proposes modifications to NRC's regulatory framework, the Commission encourages the staff to craft recommendations that continue to realize the strengths of a performance-based system as a guiding principle. In order to be effective, approaches should be flexible and able to accommodate a diverse range of circumstances and conditions. In consideration of events beyond the design basis, a regulatory approach founded on performance-based requirements will foster development of the most effective and efficient, site-specific mitigation strategies, similar to how the agency approached the approval of licensee response strategies for the "loss of large area" event under its B.5.b program.

Where gaps in knowledge in the analyses of the reactor accidents at Fukushima Dai-ichi interfere with the staff's ability to make an informed recommendation on regulatory action, the staff should inform the Commission of these gaps.

For Recommendation 2.1, when the staff issues the requests for information to licensees pursuant to 10 CFR 50.54(f) to identify actions that have been taken or are planned to address

plant-specific vulnerabilities associated with the reevaluation of seismic and flooding hazards, the staff should explain the meaning of “vulnerability.”

The staff should inform the Commission, either through an Information Paper or a briefing of the Commissioners’ Assistants, when it has developed the technical bases and acceptance criteria for implementing Recommendations 2.1, 2.3, and 9.3.

For NTTF recommendations 4.2 and 5.1 the staff should provide the Commission with notation vote papers for Commission approval of the orders once the staff has engaged stakeholders and established the requisite technical bases and acceptance criteria. For cases in which backfits cannot be justified using existing requirements, yet the staff believes that regulatory enhancements should be made, the staff should clearly explain the legal and policy bases for proceeding.

For Recommendation 4.1 -- “Station blackout regulatory actions,” the staff should initiate the rulemaking as an advance notice of proposed rulemaking (ANPR) rather than a proposed rule.

The staff should designate the station blackout (SBO) rulemaking associated with NTTF recommendation 4.1 as a high-priority rulemaking with a goal of completion within 24 to 30 months of the date of the Staff Requirements Memorandum for this SECY paper.

The staff should monitor nuclear industry efforts underway to strengthen SBO coping times and consider whether any interim regulatory controls (e.g., commitment letters or confirmatory action letters) for coping strategies for SBO events would be appropriate while rulemaking activities are in progress.

Concerning the potential to redefine what level of protection of public health and safety should be regarded as adequate, the Commission reaffirms its guidance to the staff in the SRM on SECY-11-0093 with respect to Recommendation 1.

cc: Chairman Jaczko  
Commissioner Svinicki  
Commissioner Apostolakis  
Commissioner Magwood  
Commissioner Ostendorff  
OGC  
CFO  
OCA  
OPA  
Office Directors, Regions, ACRS, ASLBP (via E-Mail)  
PDR