Protecting People and the Environment

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

October 2010–March 2011

Note: The period of performance covered by this report includes activities occurring between the first day of October 2010 and the last day of March 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

Forty-four operating nuclear power reactors are currently committed to transition to a risk-informed, performance-based fire protection licensing basis permitted by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48(c), 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 or the one plant that has not yet started to transition. Staff of the U.S. Nuclear Regulatory Commission (NRC) issued safety evaluations for the two pilot plants: Shearon Harris (June 2010) and Oconee (December 2010). The completion of the second pilot plant safety evaluation marked the beginning of the remaining 6 months of enforcement discretion on most of the transitioning plants. Most licensees transitioning to NFPA 805 are expected, under current Commission enforcement policy, to submit their license amendment requests (LARs) by the end of June 2011. For the remaining reactors that have committed to transitioning to NFPA 805, the staff is proposing to the Commission a staggered submittal and review approach that, if approved, will result in a need to update the NRC Enforcement Policy.

The staff has met with Southern Nuclear Operating Company (Southern) to discuss plans to submit a proposal to implement 10 CFR 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components," for 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 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 for future reviews and submittals. Currently, the NRC has granted Southern's request to waive review fees for an allowed outage time submittal, which is under review as a 10 CFR 50.69 submittal.

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 Office of Public Affairs issued a press release on March 8, 2011, summarizing the 2010 annual end-of-cycle performance assessments and associated annual assessment letters for all nuclear plants. This information is publicly available on the NRC Web site.

The staff also issued SECY-11-0044, "FY 2010 Results of the Industry Trends Program for Operating Power Reactors," dated March 28, 2011, and made it available on the NRC public Web site.

The NRC hosted public meetings on October 20, 2010; December 1, 2010; January 20, 2011; February 16, 2011; and March 30, 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. Given the impact of the March 11, 2011, Tohoku-Taiheiyou-Oki earthquake and subsequent tsunami on the Fukushima Daiichi Nuclear Station, the NRC took the following actions:

- On March 18, 2011, the NRC issued Information Notice (IN) 2011-005, "Tohoku-Taiheiyou-Oki Earthquake Effects on Japanese Nuclear Power Plants," to inform all holders of or applicants for operating licenses for U.S. nuclear power reactors of the effects of the Tohoku-Taiheiyou-Oki earthquake on nuclear power plants in Japan.

- On March 23, 2011, the NRC issued Temporary Instruction (TI) 2515/183, "Followup to Fukushima Daiichi Nuclear Station Fuel Damage Event," for NRC inspectors to independently assess the adequacy of the near-term actions taken by licensees of U.S. nuclear power plants in response to the Fukushima Daiichi nuclear station fuel damage event.

The NRC staff participated in several meetings organized by the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) Committee for Nuclear Regulatory Activities. The meetings involved nuclear inspection practices and operating experience.

III Status of Issues Tracked in the Reactor Generic Issues Program

Five open generic issues (GIs) are currently being tracked in the Generic Issues Management Control System; the status of each 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," 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 plans to submit closeout memoranda to the Advisory Committee on Reactor Safeguards (ACRS) and the Executive Director for Operations by October 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," 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 Unit 2 equivalent to those measures verified to have been implemented at Watts Bar Unit 1. The NRC plans to close out this issue in October 2011.

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 GSI-191 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 owners group provided voluntary data regarding 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. Staff efforts to estimate the maximum potential void fraction are continuing through the conduct of scale experiments 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 being completed in early 2011. The staff received a final report on the Purdue findings in March 2011, which is now being reviewed.

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 issued its report on September 2, 2010. The panel recommended that further actions be taken to address GI-199 outside the GI program. The NRC issued IN 2010-18, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants," on 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 is developing a generic letter to request needed data from all power reactor licensees.

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 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 following table shows the actual FY 2009 and FY 2010 results, the FY 2011 goals, and the FY 2011 mid-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 Mid-Year Actual**
Licensing actions completed/year	1,022	988	≥ 950	361
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	87.5% ≤ 1 year and 99.6% ≤ 2 years
Other licensing tasks completed/year	541	625	600	178
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	96.5% ≤ 1 year and 99% ≤ 2 years

V Status of License Renewal Activities

The NRC has issued renewed licenses to 63 of the 104 units licensed to operate. During this period (October 2010 through March 2011), the NRC issued renewed licenses to Duane Arnold Energy Center, Cooper Nuclear Station, Kewaunee Power Station, and Vermont Yankee Nuclear Power Station. The NRC currently has 12 license renewal applications for 19 units under review. The following is a status of applications currently under review. Refer to previously issued semiannual reports for a description of activities that occurred before October 2010.

Pilgrim Nuclear Power Station

On January 27, 2006, Entergy Nuclear Operations (Entergy) submitted a license renewal application for the Pilgrim Nuclear Power Station (Pilgrim) to extend the operating license for an additional 20 years beyond the current license period. Pilgrim Watch intervened in the proceeding, and two contentions were admitted. One contention was decided in favor of Entergy following a hearing on the merits. The other contention regarding severe accident mitigation alternatives (SAMA) was dismissed on summary disposition. In March 2010, the Commission remanded part of Pilgrim Watch's contention on SAMA to the Atomic Safety and Licensing Board (ASLB). The ASLB held the hearing on the remanded SAMA contention in March 2011, and the staff is awaiting the ASLB's decision.

Indian Point Nuclear Generating Station, Units 2 and 3

On April 30, 2007, Entergy submitted a license renewal application for the Indian Point Nuclear Generating Station, Units 2 and 3, to extend the operating licenses for an additional 20 years beyond the current license period. The staff issued the final supplemental environmental impact statement (FSEIS) in December 2010. Various interveners submitted several new contentions, and activities related to the previously admitted contentions and the hearing process continue.

Prairie Island Nuclear Generating Plant, Units 1 and 2

On April 15, 2008, the Nuclear Management Company, now known as Northern States Power Company, submitted a license renewal application for the Prairie Island Nuclear Generating 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 staff continued to conduct the environmental and safety reviews of the application, in accordance with NRC regulations.

Palo Verde Nuclear Generating Station, Units 1, 2, and 3

On December 11, 2008, Arizona Public Service Company submitted a license renewal application for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3, to extend the operating licenses for an additional 20 years beyond the current license period. The NRC issued the final safety evaluation report (FSER) and the FSEIS in January 2011. The NRC issued a renewed license in April 2011.

Crystal River Unit 3 Nuclear Generating Plant

On December 16, 2008, the Florida Power Corporation submitted a license renewal application for the Crystal River Unit 3 Nuclear Generating Plant to extend the operating license for an additional 20 years beyond the current license period. The NRC issued the safety evaluation report (SER) with open items in December 2010, and the staff continued to conduct the environmental and safety reviews of the application, in accordance with NRC regulations. A second subcommittee meeting with the ACRS is scheduled to discuss the containment delamination issues at the plant.

Salem Nuclear Generating Station, Units 1 and 2

On August 18, 2009, Public Service Enterprise Group Incorporated (PSEG) Nuclear, LLC, submitted a license renewal application for the Salem Nuclear Generating Station, Units 1 and 2, to extend the operating licenses for an additional 20 years beyond the current license period. On November 17, 2010, the NRC staff held public meetings near the site to solicit public comments on the draft supplemental environmental impact statement (DSEIS). The NRC issued the FSER and the FSEIS in March 2011.

Hope Creek Generating Station

On August 18, 2009, PSEG Nuclear, LLC, submitted a license renewal application for the Hope Creek Generating Station to extend the operating license for an additional 20 years beyond the current license period. On November 17, 2010, the NRC staff held public meetings near the site to solicit public comments on the DSEIS. The NRC issued the FSER and the FSEIS in March 2011.

Diablo Canyon Power Plant, Units 1 and 2

On November 24, 2009, Pacific Gas and Electric Company 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. The NRC issued the SER with open items in January 2011, and the staff continued to conduct the environmental and safety reviews of the application, in accordance with NRC regulations. On August 4, 2010, the ASLB admitted contentions submitted by the San Luis Obispo Mothers for Peace. A petition for Commission review of the admission of the contentions was submitted, and activities related to the hearing process continue.

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. The staff continues to conduct the environmental and safety reviews of the application, in accordance with NRC regulations.

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. The staff conducted onsite audits related to the safety and environmental reviews of the license renewal application. On February 15, 2011, the ASLB admitted contentions submitted by several interveners, a petition to review the admission of contentions was submitted, and activities related to the hearing process commenced.

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. The staff performed an acceptance review and determined that the application was acceptable for docketing and review. On November 4, 2010, 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. The staff also conducted onsite audits related to the safety and environmental reviews of the license renewal application. On March 1, 2011, the ASLB heard oral arguments related to contentions submitted by several interveners. The staff is awaiting the ASLB's ruling on the admissibility of the contentions.

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 period. The staff performed an acceptance review and determined that the application was acceptable for docketing and review. On March 3, 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. The public comment period ended on April 1, 2011.

Generic Aging Lessons Learned Report Update

In December 2010, the NRC issued Revision 2 to the license renewal guidance documents, which include the Generic Aging Lessons Learned Report and the License Renewal Standard Review Plan. This update focused on lessons learned from the review of recent license renewal applications, operating experience, emerging issues, and the incorporation of interim staff guidance.

Generic Environmental Impact Statement Update

The NRC is continuing the process of revising the Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants 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 GEIS, final rule, and associated guidance documents in FY 2012.

VI Summary of Reactor Enforcement Actions

Reactor Enforcement by Region

The reactor enforcement statistics below are arranged by region, half year, most recent half year, fiscal year to date, and two previous fiscal years for comparison purposes. The statistics are also depicted in separate tables for the nonescalated and escalated reactor enforcement data, as well as separate tables for the escalated enforcement data associated with traditional enforcement and the ROP. The assessment of the significance of a violation is generally reflected by the severity level assigned to the violation (i.e., traditional enforcement). 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 employs risk insights, where appropriate, to assist the NRC in determining the safety or security significance of inspection findings identified within the ROP. 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 follow these tables.

NONESCALATED REACTOR ENFORCEMENT ACTIONS						
		Region I	Region II	Region III	Region IV	TOTAL
Cited Severity Level IV or GREEN	1st Half FY 11	4	6	1	2	13
	2nd Half FY 11					
	FY 11 YTD Total	4	6	1	2	13
	FY 10 Total	3	1	0	4	8
	FY 09 Total	4	3	0	6	13
Noncited Severity Level IV or GREEN	1st Half FY 11	78	58	108	106	350
	2nd Half FY 11					
	FY 11 YTD Total	78	58	108	106	350
	FY 10 Total	81	67	97	162	407
	FY 09 Total	173	110	205	221	709
TOTAL Cited and Noncited Severity Level IV or GREEN	1st Half FY 11	82	64	109	108	363
	2nd Half FY 11					
	FY 11 YTD Total	82	64	109	108	363
	FY 10 Total	84	68	97	166	415
	FY 09 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 inspection report and enforcement development. These data exclude GREEN findings that do not have associated violations.

ESCALATED REACTOR ENFORCEMENT ACTIONS ASSOCIATED WITH TRADITIONAL ENFORCEMENT						
		Region I	Region II	Region III	Region IV	TOTAL
Severity Level I	1st Half FY 11	0	0	0	0	0
	2nd Half FY 11					
	FY 11 YTD Total	0	0	0	0	0
	FY 10 Total	0	0	0	0	0
	FY 09 Total	0	0	0	0	0
Severity Level II	1st Half FY 11	0	0	0	0	0
	2nd Half FY 11					
	FY 11 YTD Total	0	0	0	0	0
	FY 10 Total	0	0	0	0	0
	FY 09 Total	0	0	0	0	0
Severity Level III	1st Half FY 11	0	1	0	0	1
	2nd Half FY 11					
	FY 11 YTD Total	0	1	0	0	1
	FY 10 Total	1	0	1	0	2
	FY 09 Total	1	0	2	0	3
TOTAL Violations Cited at Severity Level I, II, or III	1st Half FY 11	0	1	0	0	1
	2nd Half FY 11					
	FY 11 YTD Total	0	1	0	0	1
	FY 10Total	1	0	1	0	2
	FY 09 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.

ESCALATED REACTOR ENFORCEMENT ACTIONS ASSOCIATED WITH THE REACTOR OVERSIGHT PROCESS						
		Region I	Region II	Region III	Region IV	TOTAL
Violations Related to RED Findings	1st Half FY 11	0	0	0	0	0
	2nd Half FY 11					
	FY 11 YTD Total	0	0	0	0	0
	FY 10 Total	0	0	0	0	0
	FY 09 Total	0	0	0	0	0
Violations Related to YELLOW Findings	1st Half FY 11	0	0	0	1	1
	2nd Half FY 11					
	FY 11 YTD Total	0	0	0	1	1
	FY 10 Total	0	3*	0	0	3
	FY 09 Total	0	0	0	0	0
Violations Related to WHITE Findings	1st Half FY 11	0	4	1	0	5
	2nd Half FY 11					
	FY 11 YTD Total	0	4	1	0	5
	FY 10 Total	2	0	4	1	7
	FY 09 Total	2	4	6	1	13
TOTAL Related to RED, YELLOW, or WHITE Findings	1st Half FY 11	1	4	1	1	7
	2nd Half FY 11					
	FY 11 YTD Total	1	4	1	1	7
	FY 10 Total	2	3	4	1	10
	FY 09 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 exclude RED, YELLOW, or WHITE findings that do not have associated violations.

*Data input for Region II has been revised because of a tracking error. These cases involved Browns Ferry Nuclear Plant (EA-09-307), St. Lucie Plant (EA-09-321), and Oconee Nuclear Station (EA-10-094).

Reactor Escalated Enforcement Actions as Well as Any Other Significant Actions Taken

NOTE: This list also includes security-related actions (noted with an asterisk) and confirmatory actions not included in the previous tables.

Omaha Public Power District (**Ft. Calhoun Station**)—EA-10-084: On October 6, 2010, the NRC issued a Notice of Violation to Omaha Public Power District for a violation of Technical Specification 5.8.1.a, "Procedures," at the Ft. Calhoun Station. This violation, which is associated with a Yellow Significance Determination Process finding, involved the licensee's failure to develop an adequate procedure for protecting vital facilities and equipment from external flooding events to the level described in the updated final safety analysis report

(UFSAR). Specifically, the inspectors identified that the licensee's strategy of using sandbags stacked on top of floodgates would not be effective in protecting the auxiliary building, intake structure, and turbine building basement because the tops of the floodgates were too small to support the necessary number of sandbags. This situation could have resulted in flooding impacting multiple, redundant trains of equipment required for safe shutdown of the plant.

Duke Energy, Inc. (**Catawba Nuclear Station**)—EA-10-101*: On October 20, 2010, the NRC issued a Notice of Violation to Duke Energy, Inc., for a violation associated with a Greater-than-Green Significance Determination Process finding at the Catawba Nuclear Station. The details of the finding are official use only—security-related information.

Pacific Gas and Electric Company (**Diablo Canyon Nuclear Power Station**)—EA-10-120*: On October 26, 2010, the NRC issued a Notice of Violation to Pacific Gas and Electric Company for a violation associated with a Greater-than-Green Significance Determination Process finding at the Diablo Canyon Nuclear Power Plant. The details of the finding are official use only—security-related information.

Exelon Generation Company (**Limerick Generating Station**)—EA-10-164*: On November 23, 2010, the NRC issued a Notice of Violation to Exelon Generation Company, LLC for a violation associated with a Greater-than-Green Significance Determination Process finding at the Limerick Generating Station. The details of the finding are official use only—security-related information.

R.E. Ginna Nuclear Power Plant, LLC (**R. E. Ginna Nuclear Power Plant**)—EA-10-184*: On December 2, 2010, the NRC issued a Notice of Violation to R.E. Ginna Nuclear Power Plant, LLC for a violation associated with a Greater-than-Green Significance Determination Process finding at the R.E. Ginna Nuclear Power Plant. The details of the finding are official use only—security-related information.

Carolina Power and Light Company (**H.B. Robinson Steam Electric Plant**)—EA-10-205: On December 7, 2010, the NRC issued a White finding with associated violation and Notice of Violation for a Severity Level III violation to Carolina Power and Light Company (doing business as Progress Energy Carolinas, Inc. (PEC)), as a result of inspections at the H.B. Robinson Steam Electric Plant Unit 2. The White finding involved the failure to identify and correct a problem associated with the "B" emergency diesel generator (EDG) output breaker in 2008. Again in 2009, a similar malfunction caused the EDG to be declared inoperable for a period greater than technical specifications. The NRC also assessed a Notice of Violation under 10 CFR 50.9, "Completeness and Accuracy of Information," for a Severity Level III violation associated with submitting materially inaccurate information. PEC provided information which stated that the breaker was tested in accordance with a maintenance procedure. However, the NRC determined that PEC had not conducted full testing in accordance with the procedure and had only completed the instructions for returning the breaker to service.

PPL Susquehanna, LLC (**Susquehanna Steam Electric Plant**)—EA-10-207: On December 16, 2010, the NRC issued a White finding to PPL Susquehanna, LLC as a result of inspections at the Susquehanna Steam Electric Plant, Units 1 and 2. The White finding involved inadequate procedures related to the maintenance and operation of the main condenser waterboxes and circulating water system, which resulted in an internal flooding event, a manual scram, and a loss of the normal reactor heat sink. No NRC violations were associated with the finding.

Carolina Power and Light Company (**Brunswick Steam Electric Plant**)—EA-10-192: On December 21, 2010, the NRC issued a violation of 10 CFR 50.54(q) associated with a White Significance Determination Process finding involving the failure to follow and maintain in effect emergency plans which required activation of the operations support center, technical support center, and emergency operations facility within 60 to 75 minutes following the declaration of an Alert or higher emergency classification. Specifically, on June 6, 2010, the licensee failed to activate the operations support center, technical support center, and emergency operations facility until approximately 2.5 hours after an Alert was declared.

Carolina Power and Light Company (**H.B. Robinson Steam Electric Plant**)—EA-10-257: On January 31, 2011, the NRC issued a Notice of Violation to Carolina Power and Light Company for two violations associated with two White Significance Determination Process findings. The first violation involved the failure to adequately implement, as mandated by Technical Specifications 5.8.1, "Procedures," the requirements of multiple procedures during an uncontrolled cooldown of the reactor coolant system and subsequent safety injection. Specifically, on March 28, 2010, following a reactor trip, the licensee (1) failed to take required procedural actions to stop an uncontrolled cooldown that resulted in a safety injection, (2) failed to identify a loss of component cooling water flow to the thermal barrier heat exchangers coincident with a failure to identify a loss of charging pump suction that resulted in inadequate seal injection flow, and (3) reenergized electrically faulted equipment that damaged surrounding equipment and resulted in electrical ground alarms, which required an Alert emergency declaration. The second violation involved failure to adequately design and implement operator training based on learning objectives, as required by 10 CFR 55.59(c)4. Specifically, before March 28, 2010, training lesson material failed to identify the basis of a procedural action involving reactor coolant pump seal cooling, as required by a systems approach to training, as defined in 10 CFR 55.4, "Definitions."

Florida Power & Light Company (**Turkey Point Plant**)—EA-10-241*: On February 7, 2011, the NRC issued a Notice of Violation to Florida Power and Light Company (FPL) for a violation associated with a Greater-than-Green Significance Determination Process finding at the Turkey Point Nuclear Plant. The details of the finding are official use only—security-related information.

Entergy Nuclear Generation Company (**Pilgrim Nuclear Power Station**)—EA-10-237*: On March 1, 2011, the NRC issued a Notice of Violation to Entergy Nuclear Operations for a violation associated with a Greater-than-Green Significance Determination Process finding at the Pilgrim Nuclear Power Station. The details of the finding are official use only—security-related information.

Entergy Nuclear Operations (**Fitzpatrick Nuclear Power Station**)—EA-10-143*: On March 10, 2011, the NRC issued a Notice of Violation to Entergy Nuclear Operations for a violation associated with a Greater-than-Green Significance Determination Process finding at the Fitzpatrick Nuclear Power Station. The details of the finding are official use only—security-related information.

Exelon Generation Company (**Byron Station Unit 2**)—EA-11-014: On March 14, 2011, the NRC issued a violation of Criterion V 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 provide appropriate quantitative or qualitative acceptance criteria related to maintenance on the 2A diesel generator. Specifically, on January 17, 2010, a work order package did not contain a final torque verification to ensure that the 2A diesel

generator upper lube oil cooler spool piece connections were torqued to the required values. As a result, the spool piece flange connection to the upper lube oil cooler did not meet the minimum torque ranges. Subsequently, during routine testing on November 17, 2010, the flange connection on the 2A diesel generator upper lube oil cooler failed. Because the 2A diesel generator was inoperable since January 17, 2010, and because the licensee was not aware of the inoperability, the outage time of 14 days allowed by technical specifications was also exceeded.

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 published its rulemaking pertaining to the physical protection of plants and materials requirements (10 CFR Part 73, "Physical Protection of Plants and Materials") in the *Federal Register* on March 27, 2009. Licensees were required to comply with these regulations no later than March 31, 2010. The NRC approved 40 requests from individual licensees for schedule exemptions from the revised 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors against Radiological Sabotage," because of an inability to complete site reconfiguration requirements needed to achieve full compliance with certain technical aspects of the rule. All licensees remain in full compliance with the earlier security requirements and most of the new requirements.

The NRC staff completed its revision of licensees' plans to ensure that they meet the intent of these specific regulations. The NRC staff and the North American Electric Reliability Corporation have completed a memorandum of understanding on a regulatory oversight framework for cyber security to minimize the potential for overlapping 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 using the adversary characteristics that were developed as a result of the threat environment. The purpose of the force-on-force inspections is to assess licensees' defensive strategies in place at licensed facilities and highlight areas that need improvement. During the first and second quarters of FY 2011, the NRC completed force-on-force inspections at 10 sites and reinspected two sites. The current 3-year force-on-force cycle ended 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, which contains the implementing provisions for Section 161A of the Atomic Energy Act (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 the ability of 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* on September 11, 2009 (74 FR 46800), and published the proposed rulemaking in the *Federal Register* on February 3, 2011 (76 FR 6200). The NRC continues to make progress on implementing a comprehensive revision to emergency preparedness regulations and associated guidance. The NRC staff submitted the draft emergency

preparedness final rule package, as well as the three associated NRC guidance documents, to the ACRS in late FY 2010 in support of the ACRS subcommittee briefing on plant operations and fire protection that was held on November 1, 2010. The staff also facilitated several public meetings requesting additional external stakeholder feedback on the proposed implementation dates for the final emergency preparedness rule in early FY 2011. As a result of these efforts, the NRC staff continues to engage with internal and external stakeholders on the status of the emergency preparedness rulemaking and has begun developing an integrated transition and implementation plan for the final rule and associated guidance.

The proposed final emergency preparedness rule was made publicly available on www.regulations.gov and was delivered to the Commission in April 2011; however, several milestones still remain. After submitting the proposed final rule package to the Commission, the staff continues to (1) coordinate with stakeholders to finalize the integrated transition and implementation plan, (2) prepare for the public Commission meeting on May 3, 2011, that will discuss the final emergency preparedness rule, and (c) engage with the Federal Emergency Management Agency on the future 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." Once the emergency preparedness final rule is approved by the Commission and published, the staff will conduct public workshops on its implementation plan. Publication of the final emergency preparedness rule is planned before the end of calendar year (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.

On March 30, 2011, the Commission finalized its SRM on the proposed rule, "Requirements for Access Authorization and Physical Protection during Nuclear Power Plant Construction." The final SRM stipulated that the staff should terminate this rulemaking effort and directed the staff to communicate NRC's support for industry's voluntary implementation of access authorization controls and physical protection measures described in the NEI document, "Security Measures during New Reactor Construction." The SRM also directed the staff to continue to focus on the plant's transition from construction to its operational phase, including implementation of the requirements of 10 CFR 73.55, to ensure that the safety-related structures, systems, and components are protected. The staff's effort will include updating the necessary regulatory guidance.

VIII Power Uprates

There are three types of power uprates. A measurement uncertainty recapture (MUR) power uprate is a power uprate of less than 2 percent and is based on the use of more accurate feedwater flow measurement techniques. Stretch power uprates (SPUs) are power uprates that are typically up to 7 percent and are within the design capacity of the plant. SPUs require only minor plant modifications. Extended power uprates (EPUs) are power uprates beyond the original design capacity of the plant and, thus, 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 135 power uprates to date. Approximately 17,429 megawatts-thermal (MWt) or 5,810 megawatts-electric (MWe) in electric generating capacity (the equivalent of about 5.8 nuclear power plant units)

have been gained through the implementation of power uprates at existing plants. The NRC currently has 14 plant-specific power uprate applications under review. The 14 applications include two MUR power uprates and 12 EPUs.

In December 2010, the NRC staff conducted a survey of all nuclear power plant licensees to obtain information on whether they planned to submit power uprate applications over the next 5 years. Based on updates to this survey, licensees plan to request power uprates for 35 nuclear power plants over the next 5 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's primary focus is on the licensing and construction activities necessary to support near-term-build applications (i.e., plants expected to begin operation in 2016–2017). To position itself for success in the advanced reactor program, the NRC is also investing in activities to establish the necessary regulatory framework and infrastructure for advanced reactors. In allocating resources and scheduling reviews, the NRC will consider resource needs for the successful implementation of the subprograms, as well as information regarding an applicant's plans for construction and commercial operation and its support for issue resolution. The NRC is using international experience and lessons learned to ensure safe designs, both domestically and internationally.

The NRC expects to license most of the next generation of nuclear power plants using10 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 has three DC applications and two DC amendments under review. Thorough and timely reviews of these DC applications are critical to the successful completion of the combined license application (COLA) reviews. As of March 31, 2011, the NRC received 18 COLAs, 12 of which are under active review. The NRC's experience with these applications has demonstrated that 10 CFR Part 52 and the design-centered review approach have been successful in achieving standardization of selected designs and have resulted in a clear safety focus and resource savings.

Major accomplishments during this reporting period include the following:

- completion of two acceptance reviews for applications for the renewal of the Advanced Boiling Water Reactor (ABWR) DC

- the publication of the proposed rule on the Advanced Passive (AP)1000 DC rule amendment and the ABWR DC Rule Amendment for Aircraft Impact in the *Federal Register* for public comment

- the issuance of the Economic Simplified Boiling-Water Reactor (ESBWR) Final Safety Evaluation Report (FSER) and Final Design Approval (FDA) and publication of the proposed rule in the *Federal Register* for public comment; the revision of five COLA

review schedules to align them with schedule changes resulting from delays arising to their corresponding DC review schedules

- the issuance of the final environmental impact statement (FEIS) for the STP Units 3 and 4 COLA and the FSEIS for the Vogtle Electric Generating Plant, Units 3 and 4, COLA

- notification from the U.S. Environmental Protection Agency (EPA) that the NRC received draft environmental impact statement (DEIS) ratings on implementing the National Environmental Policy Act of environmental concerns-2 (EC-2) for the Comanche Peak, Units 3 and 4, COLA and Levy County, Units 1 and 2, COLA.

The NRC is making good progress on the 10 CFR Part 52 applications currently under review. However, the progress of these reviews is impacted by the FY 2011 budget continuing resolution. This has resulted in redirecting resources toward the highest priority work. In addition, COL and DC applicants are revising the submittal dates for responses to requests for additional information (RAIs), thereby causing schedule delays. The NRC is working with applicants to overcome these challenges and is focused on driving the remaining technical issues to resolution. The NRC has moved forward on reviewing applications and is on a closure path for many issues.

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 County Station ESP application.

The NRC staff began the Victoria County Station ESP application safety and environmental reviews on October 1, 2010. However, the unavailability of funds for contractor support stemming from the FY 2011 budget continuing resolution has impacted the review. At this time, the staff is assessing how much of the review can continue without external resources.

The NRC published the *Federal Register* 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 *Federal Register* on November 23, 2010. A petition to intervene was filed and a pre-hearing conference was held on March 16–17, 2011, in Victoria, Texas.

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, 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.

However, a lack of contract funds resulting from the FY 2011 budget continuing resolution led to the staff's inability to conduct the geology, seismology, and geotechnical engineering audits as planned under the issued review schedule. The NRC staff is evaluating the impact of this lack of funds on the review schedule.

Design Certification Reviews

The NRC is currently reviewing the following DCs: the General Electric Hitachi Nuclear Energy (GEH) ESBWR; the Westinghouse Electric Company, LLC (Westinghouse) AP1000 DC rule amendment; the AREVA Nuclear Power (AREVA) U.S. Evolutionary Power Reactor (U.S. EPR); the Mitsubishi Heavy Industries, Ltd. (MHI) U.S. Advanced Pressurized-Water Reactor (US-APWR); and the STPNOC ABWR DC rule amendment. The following sections describe the status of the work that has been accomplished during this reporting period.

ESBWR

The NRC received the ESBWR DC application on August 24, 2005. The SER with open items was completed in December 2008. The advanced FSER was completed in October 2010. The ACRS issued a favorable letter on October 20, 2010. The NRC issued the FSER and FDA on March 9, 2011.

The NRC staff provided the proposed DC rule to the Commission on January 7, 2011, in SECY-11-0006, "Proposed Rule: Economic Simplified Boiling-Water Reactor Design Certification." The Commission issued its SRM on March 8, 2011. On March 24, 2011, the NRC published the proposed ESBWR DC rule in the *Federal Register* for public comment. Under the current public schedule, the NRC anticipates publishing the final rule in September 2011.

AP1000 DC 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).

On November 23, 2010, the staff issued the final chapter (Chapter 1) of its safety evaluation of the AP1000 DC amendment application. The technical review of the amendment application is now complete. On December 2, 2010, the staff made a presentation to the ACRS full committee, and Westinghouse submitted Revision 18 of the DCD. The ACRS issued a letter regarding 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. The 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.

On December 20, 2010, ACRS issued a letter on long-term core cooling, concluding that the regulatory requirements for long-term core cooling for design-basis accidents have been adequately met, thereby closing the issue for the AP1000 design.

On January 19, 2011, ACRS issued a letter on aircraft impact assessment (AIA), concluding that the Westinghouse AIA for the design described in the AP1000 DC amendment application, as modified to resolve NRC inspection findings, complies with the requirements of 10 CFR 50.150, "Aircraft Impact Assessment." Analyses show that the containment remains

intact following the impact of a large commercial aircraft. The reactor core remains cooled, and spent fuel pool integrity is maintained. On February 24, 2011, the NRC published the proposed rule on the AP1000 DC amendment in the *Federal Register* for public comment. The *Federal Register* notice proposes to certify an amendment to the Westinghouse AP1000 standard plant design to (1) replace the COL information items and design acceptance criteria (DAC) with specific design information, (2) address the effects of the impact of a large commercial aircraft, (3) incorporate design improvements, and (4) increase standardization of the design. The public is invited to submit comments on the proposed rule and its supporting documents. The 75-day comment period ends on May 10, 2011. The NRC's goal is to complete the final rule by the end of September 2011.

U.S. EPR DC

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

On May 13, 2010, the staff informed AREVA that it had completed the review of the digital instrumentation and control (DI&C) design with respect to communication independence and diversity and defense in depth. However, the staff could not approve this aspect of the design because AREVA had not provided sufficient information. On October 1, 2010, AREVA submitted Revision 3 of the closure plan, which addressed the staff's concerns regarding continuous connection between the nonsafety service unit and the safety division. AREVA no longer intends to pursue continuous, bidirectional connection of the service unit. AREVA provided a final closure plan scope letter on November 23, 2010, and has committed to submitting all necessary technical information by March 31, 2011.

The NRC staff conducted an audit of AREVA's in-process progress in December 2010, and, in accordance with the last closure plan, conducted a public meeting on February 15, 2011, to discuss the current design changes as they apply to the issues for resolution. All areas appear to be progressing toward successful resolution for completion of a Phase 2 safety evaluation (with open items). The current schedule remains challenging because of the volume of new material to be submitted.

The applicant is trying to resolve an issue in its application related to GI-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 has committed to provide all technical information regarding GI-191, with the exception of in-vessel downstream effects testing, by March 31, 2011. With regard to in-vessel downstream effects, AREVA has committed to provide a strategy for a path forward by April 30, 2011.

AREVA changed its analytical methodology to complete the seismic and structural design. On April 26-30, 2010, the staff conducted an audit of Sections 3.7 and 3.8 (seismic and structural design) of the U.S. EPR DC FSAR. The audit identified many problems with the modeling and reanalysis that the applicant had performed. A path forward was identified for approximately 40 items that require analyses and calculations to be redone to resolve NRC technical concerns with the design. As a followup to this audit, the NRC conducted public meetings on

June 9, 2010, and November 16, 2010, to discuss AREVA's new schedule for completion of this reanalysis work and to finalize the associated RAI responses. Recently, a number of final RAI responses have slipped to the April/May 2011 timeframe.

US-APWR DC

MHI submitted its US-APWR DC application on December 31, 2007. MHI has been implementing a plan since August 2009 to address DI&C issues in the areas of software program manuals, communications independence, and quality assurance (QA).

On October 13, 2010, MHI submitted the documents identified in its closure plan to address all deficiencies. The NRC staff determined that the revised software program manuals did not resolve the deficiencies. The NRC issued a letter to MHI on December 22, 2010, identifying specific deficiencies in the software program manuals. On January 31, 2011, MHI submitted revised software program manuals for staff review. The NRC established a new review schedule and conducted a public meeting on February 22-23, 2011, to discuss the software program manuals. The NRC staff will review MHI's document submissions and plans to conduct a public meeting in early April 2011.

MHI made structural changes to its design that required performing a new seismic analysis. MHI also changed the soil-structure interaction (SSI) seismic analysis methodology for all safety-related structures from a "soil-spring" approach to a "finite element" approach. The results of this seismic reanalysis impact the design of all structures, piping, equipment, and components. MHI has submitted the new seismic reanalysis technical reports to the NRC, which the NRC staff is now reviewing. On January 31, 2011, MHI submitted a revision to the methodology report, as well as three additional reports needed to resolve the issue of "Category II over Category I" for the turbine building, auxiliary building, and the access control building (i.e., MHI must demonstrate through modeling that a seismic Category II structure failure will not impact the safety functions of a seismic Category 1 structure).

The large-break LOCA analysis review requires (1) additional computational fluid dynamics (CFD) submissions for outputs from the advanced accumulator and (2) a revised topical report. The NRC held a public meeting on January 31 through February 1, 2011, to discuss the advanced accumulator and CFD analysis and the large-break LOCA topical report. MHI will submit its revised advanced accumulator topical report, large-break LOCA topical report, and CFD analysis on March 31, 2011.

MHI completed the sump head loss testing and the in-vessel downstream effects testing (also known as core inlet blockage testing) and submitted the testing results to the NRC in December 2010. The sump head loss testing provided some unexpected results. The NRC staff is reviewing the recently submitted revision to the sump strainer performance technical report and the core inlet blockage test technical report and awaits a submission date for the revised RAI responses regarding the debris mass value (floating fiber and particulate effects). MHI has formed a task force with the Luminant Generation Company LLC (Luminant) and Dominion to resolve sump strainer issues. A public meeting is planned for April 2011 for MHI to address the sump design and downstream effects.

ABWR DC 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 AIA rule by referencing the amended design. The proposed rule was published for public comment on January 20, 2011. The public comment period ended on April 5, 2011.

DC 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 the staff had determined that the application was acceptable for docketing. The staff is developing information for a technical review schedule. However, 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 the staff had determined that the application was acceptable for docketing. The staff is developing information for a technical review schedule.

COLA Activities

As of March 31, 2011, the NRC has received 18 COLAs for review. Six of the reviews have been suspended because of changes in the applicants' business strategies, as described below. The NRC is actively reviewing 12 applications. Based on letters from potential applicants, the NRC expects two new COLAs by the end of FY 2013.

The NRC is reviewing the following applications:

<u>Calvert Cliffs COLA</u>

On July 13, 2007, Calvert Cliffs 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 March 2011, the NRC issued safety evaluations with open items for 9 of the 19 chapters.

On November 3, 2010, the counsel for Calvert Cliffs Unit 3 Nuclear Project, on behalf of the applicants, filed a letter with the ASLB panel indicating that Eléctricité de France (EDF), 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 regulatory requirements. The applicants submitted a package containing the seismic information required for the review of FSAR Section

3.7 to the NRC on December 29, 2009. The applicants intend to revise this section of the FSAR again to incorporate the AREVA NP results of a reanalysis resulting from changes in the dynamic model for the nuclear island. The applicants estimate that they will submit their updated FSAR section by March 31, 2011.

The staff issued its DEIS in April 2010 and is currently resolving comments to support issuance of the FEIS. The FEIS schedule will be extended pending a U.S. Army Corps of Engineering (USACE) determination that recent information provided is sufficient to close any final issues. As of March 4, 2011, the NRC has rebaselined the FSER schedule because of recent U.S. EPR DC schedule modifications. The FSER date is now July 2012.

South Texas Project COLA

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.

On February 24, 2010, STPNOC submitted a letter identifying schedule challenges pertaining to the issuance of some chapters of the SER with open items in order to meet the Phase 2 milestone. On March 26, 2010, the NRC responded identifying three chapters that have issues which must be resolved; until such time, the schedule milestones would be characterized as "To Be Determined." These issues involve ground water hydrology models, SSI analyses requiring additional detail, flow-induced vibration of components, and spent fuel pool criticality and load drop analysis. Once the required information is provided to resolve the issues, the staff will reassess the overall schedule impacts. In a followup letter dated December 13, 2010, the staff reiterated concerns with these issues in Chapters 3 and 9. The safety evaluations for other chapters are moving forward.

By letter dated January 26, 2011, the applicant for STP Units 3 and 4 changed from STPNOC to Nuclear Innovation North America, LLC. This resulted in changes to several portions of the application. Due to advanced notice to the NRC staff and rapid attention by the staff, these changes have not resulted in any significant impact on the review schedule.

The NRC completed the FEIS on February 24, 2011, with the EPA publishing a notice of availability in the *Federal Register* on March 4, 2011.

Bellefonte COLA

On October 30, 2007, TVA submitted a COLA for two AP1000 units to be located at its Bellefonte site near Scottsboro in Jackson County, Alabama. The hydrology review is delayed because of data pending from the applicant. On August 20, 2010, the TVA board authorized funding to proceed with engineering studies to support the completion of Bellefonte Unit 1, an existing Babcock & Wilcox (B&W) design. Despite the shift towards completion of the partially constructed units, the COLA for Units 3 and 4 remains an option for TVA. The completion and operation of Unit 1 will require significant revisions to the environmental report and the site safety analysis report (SAR). TVA expects to complete the additional requisite site studies and changes to the COLA by the second quarter of CY 2013.

In a letter dated September 29, 2010, TVA requested that the NRC defer most of its review of the AP1000 COLA for Bellefonte, Units 3 and 4, as detailed in its enclosure to the letter. TVA also requested that the NRC provide it with a plan and schedule for completing the requested work. TVA has made no decision on Bellefonte Unit 1, but the TVA board is expected to

consider final approval in late summer 2011. TVA informed the NRC that it will notify the agency if it pursues completion of Unit 1.

By letter dated November 24, 2010, the NRC informed TVA that it agreed to defer the Bellefonte, Units 3 and 4 COLA review efforts indefinitely. The NRC also agreed to review hydrology topics following the receipt of critical hydrology studies. TVA estimates that these studies may take up to 15 months to complete.

North Anna COLA

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

The applicant publicly announced its decision to switch from ESBWR to US-APWR technology. 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 3 application and has begun to evaluate the revised application. The new review schedule for the North Anna 3 application incorporates the changes in the review schedules for the US-APWR DC and Comanche Peak reference COLAs. The NRC will supplement the EIS that was completed in February 2010 based on the ESBWR design.

William States Lee III COLA

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. As a result, the NRC staff's efforts to complete the AP1000 DC amendment have significantly impacted the review schedules for plants referencing the AP1000 design. Currently, the staff is reviewing the applicant's response to followup RAIs regarding makeup pond C.

Shearon Harris COLA

On February 19, 2008, PEC submitted a COLA for two AP1000 units to be located at its Shearon Harris site, near New Hill in Wake County, North Carolina. The staff, working with USACE as a cooperating agency for the development of the EIS, has 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.

The staff prepared RAIs regarding the need for power from two proposed AP1000 units at the Shearon Harris site. The staff is awaiting the applicant's responses to the RAIs. A response to the need for power RAIs should arrive by March 31, 2011, with responses to all other RAIs by September 30, 2011. PEC's 2010 Integrated Resource Plan, submitted on September 13, 2010, to the North Carolina and South Carolina Utilities Commission, proposed a revised commercial operation date of 2025. On January 6, 2011, the NRC issued a letter to PEC

revising the COLA review schedule to reflect the applicant's above circumstances. The revised COLA schedule is consistent with Office of New Reactors' (NRO's) practice of focusing resources on the completion of the review of DCs, limited work authorizations (LWAs), and COLAs needed for new nuclear projects that are expected to start operating during CY 2016 and 2017.

Grand Gulf COLA

On February 27, 2008, Entergy submitted a COLA for an ESBWR to be located at its Grand Gulf 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 the Grand Gulf Nuclear Station, Unit 3. Entergy plans to reconsider the GEH ESBWR reactor technology, which was the basis for the COLA. The NRC has responded to the request and suspended the review; the review remains suspended.

Virgil C. Summer COLA

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

The safety review schedule was rebaselined in an October 29, 2010, letter to reflect the current AP1000 DC amendment application and reference COL review schedules.

On January 10 and 11, 2011, the NRC staff briefed the AP1000 ACRS subcommittee regarding the Summer COLA. On February 10, 2011, the NRC staff briefed the ACRS full committee regarding the Summer COLA. The ACRS provided a favorable letter report on February 17, 2011, concluding that there is reasonable assurance that Summer Units 2 and 3 can be built and operated without undue risk to the health and safety of the public.

Vogtle COLA

On March 28, 2008, Southern Nuclear Operating Company (Southern) submitted a COLA for two AP1000 units to be located at its Vogtle site near Augusta in Burke County, GA. The initial application also referenced the Vogtle ESP application, Revision 5, dated December 23, 2008. The NRC staff issued an SER for an ESP application for the 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).

In a letter dated October 29, 2010, the staff established a new schedule to rebaseline the review so that it will be consistent with the DCD schedule contained in the June 21, 2010, letter to Westinghouse. The NRC staff is scheduled to complete the FSER in June 2011.

The ACRS issued a letter on January 24, 2011, on the Vogtle COLA, concluding that there is reasonable assurance that Vogtle, Units 3 and 4, can be built and operated without undue risk to the health and safety of the public. The EPA issued the DSEIS on September 3, 2010. The public meeting on the DSEIS took place on October 7, 2010, in Waynesboro, Georgia. The public comment period ended November 24, 2010. The staff reviewed comments to the DSEIS

for inclusion in the FSEIS. On March 25, 2011, the staff issued the FSEIS, ahead of the published public milestone.

Callaway COLA

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

Levy County COLA

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 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. This audit resolved all issues related to SSI analyses, pending confirmation of the applicant's final RAI responses in May 2011.

Previous issues relating to probable maximum flood and storm surge have been resolved. The hydrology review requires resolution of issues related to tsunami flooding. In February 2011, the staff issued RAIs that served as the basis for a public meeting with the applicant. The applicant's final tsunami flooding RAI responses, which are scheduled to be submitted in April 2011, are expected to reflect discussions from this public meeting. USACE is a cooperating agency for development of the EIS and requires information that affects its least environmentally damaging practicable alternative (LEDPA) decision under the Clean Water Act. USACE identified several deficiencies in the applicant's LEDPA analysis. The applicant provided a revised analysis to USACE on June 30, 2010.

On August 6, 2010, the NRC issued the DEIS. The public comment period ended on October 27, 2010. The NRC held a public meeting to solicit comments on the DEIS on September 23, 2010. On October 26, 2010, the staff received notification that its DEIS received an EC-2 rating from the EPA. The staff is currently evaluating the DEIS comments to support issuance of the FEIS by April 2012.

Victoria County Station COLA

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 a *Federal Register* notice announcing the withdrawal.

On June 7, 2010, Exelon Nuclear Texas Holdings, LLC (Exelon) submitted an ESP application for the Victoria County Station site. Details regarding the Victoria ESP application are presented earlier in this report.

Fermi COLA

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 regarding 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 regarding the revised site layout. The NRC staff is reviewing details of the new site layout information for incorporation into the DEIS, which will include related findings of USACE personnel. DTE submitted a revised COLA on February 14, 2011, including a considerably modified environmental report that will require thorough staff review and incorporation into the DEIS. The proposed site layout changes did not impact the safety review schedule.

Limited funding for contractor support, stemming from the FY 2011 budget continuing resolution, presents a high risk to the environmental review schedule, which is the critical path for the project.

Comanche Peak COLA

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 of 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 arising from the US-APWR DC review schedule.

The NRC staff determined that Luminant did not provide sufficient information in Part 1, "Administrative and Financial Information," with regards to 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. The NRC staff reviewed the RAI responses and determined that Luminant did not adequately address the negation of foreign ownership. This issue remains open and under review.

On August 6, 2010, the NRC issued the DEIS. The staff held a public meeting in the vicinity of the site to solicit comments on the DEIS on September 21, 2010. The public comment period for the DEIS ended on October 27, 2010, and the NRC staff completed Phase 3 of the environmental review. On October 26, 2010, the staff received notification that its DEIS

received an EC-2 rating from the EPA. The staff is currently evaluating the DEIS comments to support issuance of the FEIS by May 2011.

River Bend COLA

On September 25, 2008, Entergy submitted a COLA for an ESBWR to be located at its River Bend Station site near St. Francisville, LA. 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 Nuclear Station Unit 3. The review remains in suspension.

Nine Mile Point COLA

On September 30, 2008, Nine Mile Point Nuclear Project, LLC, and UniStar Nuclear Energy (UNE) submitted a COLA for a U.S. EPR (Unit 3) to be located at its Nine Mile Point site in Oswego, New York. On December 1, 2009, UNE submitted a letter requesting that the NRC 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 10 CFR 50.71(e) (3) (iii) and proposed delaying its submittal of updates to the FSAR until December 31, 2012. The NRC staff is currently processing this exemption request.

Bell Bend COLA

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 "exceptional value" wetlands to satisfy USACE's need 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 applicant submitted an updated submittal schedule to the NRC on July 16, 2010; however, the applicant has delayed submitting many of the revised environmental report sections. 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 April 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 impact of this decision could be significant depending upon the applicant's decision on water storage. The EIS evaluates the impacts of proposed water storage and alternatives (e.g., flood abandoned mines, build reservoir). The staff continues to monitor interactions between the applicant and the SRBC on a proposed water storage and allocation plan for the Susquehanna River basin.

The USACE and EPA have concerns about PPL's alternative sites analysis. The USACE is requesting a detailed description of environmental impacts at all candidate sites in order to inform its LEDPA decision.

Turkey Point COLA

On June 30, 2009, FPL submitted a COLA for AP1000 units to be located at the existing Turkey Point 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 amendment. 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.

FPL delayed delivery of much of the information requested at the June 2010 environmental site audit, including revisions to the ground water model. This will delay RAI development, but the NRC staff will continue with its preparation of the DEIS as resources allow. The NRC staff will review information as FPL makes it available. The NRC published a *Federal Register* notice for environmental scoping on June 15, 2010, with the scoping period closed on August 16, 2010. The NRC published the notice of opportunity to petition for leave to intervene and request a hearing in the *Federal Register* on August 16, 2010. Oral argument for the 20 contentions that were submitted through three petitions was held on November 19, 2010. On February 28, 2011, the ASLB panel admitted portions of three contentions.

The NRC staff is developing a revised environmental schedule based on FPL's delays in responding to the staff's information requests.

The NRC staff invited National Park Service to become a cooperating agency with the NRC in preparing the EIS.

Expected Application Submittals to the NRC

In response to RIS 2010-10, "Process for Scheduling Acceptance Reviews of New Reactor Licensing Applications and Process for Determining Budget Need for Fiscal Year 2013," dated November 15, 2010, the NRC received several letters of intent, which are described below.

In a letter dated December 14, 2010, Ameren Missouri stated that it anticipates submitting an ESP application for the Callaway Site in the second half of 2011. It stated that Union Electric Company doing business as Ameren Missouri will be the applicant and license holder.

In a letter dated December 15, 2010, Duke Energy stated that it expects to submit routine amendments or supplements to the Lee COLA to reflect RAI responses and routine semiannual and annual updates as required by regulation. Additionally, Duke Energy anticipates submitting one or more COL license amendments in FY 2013, following issuance of the COL, to reflect design changes, technical specification changes, and updated analyses. Duke Energy anticipates the process for these additional submittals to be similar to that used following issuance of the license to the AP1000 reference plant.

In 2006, Duke Energy Carolinas, LLC announced designation of two additional sites, one in Davie County, NC, and one in Oconee County, SC, for possible future ESP development. Duke Energy Carolinas stated that, while limited site characterization has been conducted on these two sites, substantive work that would require preapplication interactions with the staff is not anticipated in the near term.

In a letter dated December 15, 2010, Duke Energy Ohio, Inc., indicated that an ESP application will not be submitted in FY 2013, as previously planned.

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.

Inspections, Tests, Analyses, and Acceptance Criteria Maintenance Rulemaking

The NRC has developed a proposed rulemaking 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. The staff provided the proposed rulemaking package to the Commission for review in SECY-10-0117, "Proposed Rule: Requirements for Maintenance of Inspections, Tests, Analyses, and Acceptance Criteria," dated August 30, 2010. The Commission approved publication of the proposed rule, with changes, on February 4, 2011.

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 fuel load and operation. Additionally, the notifications would ensure that interested persons have access to information on ITAAC at a level of detail sufficient to address the Atomic Energy Act 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 proposed rule for public comment, as well as the draft revision of Regulatory Guide (RG) 1.215, "Guidance for ITAAC Closure under 10 CFR Part 52," in late April 2011.

Access Authorization and Physical Protection Requirements for Nuclear Power Plant Construction Rulemaking

The NRC staff developed a proposed rulemaking to establish personnel access authorization and physical protection requirements for nuclear power plants during the construction phase. Over the past several years, the NRC has held numerous meetings with the industry's New Plant Security Task Force to discuss the need for (and the scope of) security measures at nuclear power reactor construction sites. Based in part on this collaborative effort with the industry, the NRC developed a technical basis to pursue an access authorization and physical protection rulemaking during nuclear power plant construction. The NRC solicited input from stakeholders through public workshops during the rulemaking process.

On March 30, 2011, the Commission disapproved the proposed rule, but supports industry's voluntary implementation of the controls described in NEI 09-01, "Security Measures During New Reactor Construction.

Aircraft Impact Assessment Rulemaking Implementation

The NRC published the final rulemaking on AIAs in the *Federal Register* on June 12, 2009 (74 FR 28111), which became effective on July 13, 2009. The rule at 10 CFR 50.150 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 RG (DG)-1176, "Guidance for the Assessment of Beyond-Design-Basis Aircraft Impacts," which was issued in July 2009.

Information to comply with the rule has been submitted for all design centers currently under NRC review. Review of the amended ABWR design is complete, and the NRC issued a proposed rule for public comment certifying an amendment to the ABWR DC to comply with the AIA rule in January 2011. During the first half of FY 2011, the NRC staff also completed its review of the ESBWR and AP1000 designs and began reviewing the AIA submittals for the U.S. EPR and US-APWR designs. In addition, the NRC staff issued inspection reports for the ESBWR and AP1000 AIA inspections. Inspections for the U.S. EPR and US-APWR are planned for the latter half of FY 2011. The NRC staff presented the AIA review and inspection results for both the EWBWR and AP1000 designs to the ACRS in early FY 2011. 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

NRO 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 the LARs for plant changes or modifications identified after the licensing basis freeze point once the license is issued. The NRC staff started to work with the industry to clarify the change processes to maintain the licensing basis during the construction period until the 103(g) finding, which is the NRC's finding that the acceptance criteria in the COL have been met and ultimately will authorize the licensee to operate the newly constructed nuclear power plant. Because this is a new area, industry has raised some concerns about how quickly amendments would be processed during construction. As a result, the NRC staff is considering a new elective process, referred to as a preliminary acceptability review for inspectability. This draft approach could be part of the license amendment process established by a license condition, which could provide a way for a licensee to request to proceed with the installation and testing of the proposed plant change or modification requiring a license amendment during the time the NRC is reviewing the LAR. 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.

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 suppliers for a single design. The NRC published the proposed rule, which seeks public comment on the staff's recommendation, in the *Federal Register* on January 20, 2011. The public comment period ended on April 5, 2011.

Regulatory Guides

During the first half of FY 2011, NRO reviewed approximately 33 draft and final RGs in preparation for their issuance for public comment, for final issuance, or for withdrawal. The NRC is developing DG-1176 (proposed RG 1.217, "Guidance for the Assessment of Beyond Design Basis Aircraft Impacts") and issued DG-1254, "Qualification of Connection Assemblies for Nuclear Power Plants," in February 2011. In March 2011, the NRC withdrew RG 8.5, "Criticality and Other Interior Evacuation Signals."

Interim Staff Guidance

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 SRPs, when those documents are updated.

The NRC issued the following ISG in the second quarter of FY 2011:

- DC/COL-ISG-022, "Interim Staff Guidance on Impact of Construction on New Nuclear Power Plants on Operating Units at Multi Unit Sites" (issued for public comment in February 2011)

Standard Review Plan

The SRP is the primary 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 which 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 4 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 late FY 2011.

The update will also include guidance for reviewing new applications for the four advanced reactor technologies under consideration.

International Activities

The NRC continues to use international experience and lessons learned to assist other regulatory authorities to ensure safe designs, both domestically and internationally. All of the new reactor designs under review in the United States are also under review, being constructed or in operation in other countries. During this period, the NRC participated in multilateral and bilateral activities as part of a multinational design evaluation program, attending conferences and workshops, hosting assignees from other regulatory bodies, and supporting the IAEA requests for expert participation.

International Assistance

On October 15–23, NRC supported an international assistance workshop on siting in Johannesburg, South Africa.

On February 18–27, 2011, NRC supported an international assistance workshop on siting in Jakarta, Indonesia.

Multinational Design Evaluation Program

On November 15–19, 2010, the NRC participated in the Multinational Design Evaluation Program (MDEP) EPR Working Group, EPR Instrumentation and Control (I&C) Subgroup, Accident and Transients (A&T) Subgroup, and Probabilistic Safety Assessment (PSA) Subgroup meetings. On December 1–3, 2010, NRC participated in the MDEP Vendor Inspection Coordination Working Group in Paris, France.

The Steering Technical Committee met in January 2011. At this meeting, new levels of membership, as well as specific membership criteria, were established for MDEP. The new membership levels include associate membership, for design-specific activities only, and candidate, for countries with mid-to-long-term plans to pursue new reactor licensing.

On February 7–9, 2011, NRC staff traveled to Paris, France, to participate in the MDEP meeting of the issue-specific Digital Instrumentation and Controls Working Group.

Conferences and Workshops

On October 16–21, 2010, NRC staff participated in the High Temperature Reactor (HTR) 2010 Conference, hosted by the nuclear regulator of the Czech Republic.

From October 30 through November 4, 2010, NRC staff participated in meetings related to the voluntary consensus standards development activities for the American Society of Mechanical Engineers Boiler and Pressure Vessel Code in Vancouver, British Columbia, Canada.

On November 3–5, 2010, NRC staff participated in the meeting of the NEA Committee on Nuclear Regulatory Activities (CNRA) Working Group on Inspection Practices, which discussed current and future working group initiatives, such as using operating experience feedback in inspection practices and recent operating experience and inspection insights from nonconformance of spare parts. From November 21 through December 2, 2010, NRC staff

traveled to Japan to participate in the following activities: bilateral discussions with the Nuclear Energy Safety Organization and Japan Railway Technical Research Institute; the 1st Kashiwazaki International Symposium on Seismic Safety of Nuclear Installations; the IAEA visit to the Shika nuclear power plant; and the IAEA consultants' meeting on seismic instrumentation for shutdown and restart. On December 6–7, 2010, NRC management participated in the annual December CNRA meeting in Paris, France. Presentations were made on the topic of counterfeit, fraudulent, and suspect Items (CFSI).

From February 5–10, 2011, NRC management traveled to India to participate in the organizational meeting of the 2011 Structural Mechanics in Reactor Technology Conference to be held in November 2011 in India.

On March 8, 2011, NRC management and staff participated in the semiannual CNRA bureau meeting in Rockville, Maryland.

On March 21–24, 2011, NRC management chaired a meeting of the Working Group on Regulating New Reactors (WGRNR) in Paris, France. The WGRNR is a working group under the CNRA and provides a forum to examine construction experience and the regulatory issues of the siting, licensing, and regulatory oversight of generation III+ and generation IV nuclear reactors.

Bilateral Support

During the week of October 29 to November 5, 2010, NRC staff traveled to China to participate in a bilateral exchange on construction and vendor inspection programs. During the week of March 7, 2011, NRC participated in bilateral meetings with counterparts from Canada, China, the Czech Republic, Finland, France, Italy, IAEA, Korea, Japan, NEA/CNRA, and Russia. The discussion focused on cooperation in staff exchange in the area of design reviews and construction and vendor inspections. In particular, participants were made aware of NRC's work in the area of CFSI.

IAEA Request

From November 17–19, 2010, NRC staff participated in a workshop entitled, "Licensing Experiences for Past High Temperature Gas Cooled Reactors (HTGRs) and Challenges for Future HTGR Nuclear Power Plants (NPPs)," in Vienna, Austria, at the request of the IAEA.

Other

On January 25–28, 2011, NRC staff traveled to Japan to participate in the trilateral cooperative initiative between the United States, France, and Japan on sodium-cooled fast reactors.

Construction Inspection Program Developments

The NRC has begun inspection activities on the construction underway at the Vogtle Unit 3 and 4 site. Infrastructure is in place to support near-term inspection activities to verify quality construction. During FY 2010, site construction officially began at Vogtle Unit 3, with the start of engineered backfill operations authorized under the LWA. NRC Region II construction inspectors were present to view the initial activities and to begin the first onsite ITAAC inspection. Region II placed the construction senior resident inspector and resident inspector at Vogtle in FY 2010.

The staff continues to make significant progress in the development of programs and procedures to support construction inspection and achieved several milestones, including those described below.

The staff continues to refine concepts for ITAAC closure and maintenance of closed ITAAC. The staff conducted numerous public meetings within the past year to provide a forum for stakeholders to participate in and comment on staff proposals for ITAAC closure, ITAAC maintenance, and other construction inspection program issues. In July 2010, the staff received Revision 4 to NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52," for 10 CFR Part 52 applicants and licensees regarding the requirements for the ITAAC closure process. The industry guideline was revised to add critical sections of ITAAC maintenance, which had been vetted through public ITAAC workshops. The ITAAC maintenance period covers the time from when the licensee submits an ITAAC closure letter to the time when the Commission authorizes the facility to operate. Using Revision 4 as the current reference point, the staff is revising RG 1.215, which endorses the industry guide. The staff plans to issue the draft revision to RG 1.215 for public comment by the end of April 2011, concurrent with the publication of the proposed ITAAC maintenance rulemaking.

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. The U.S. Department of Energy (DOE) sponsored the exercise. During the exercise, the licensee simulated the closure and submittal of six ITAAC samples from the Westinghouse AP 1000 design. Southern Nuclear Operating Company and Westinghouse are participating as industry and have completed stage one of the demonstration by simulating the performance of ITAAC and submitting 10 CFR 52.99(c)(1) notifications for the selected ITAAC. The first stage also included staff performing a simulated inspection of the completed ITAAC by reviewing the ITAAC completion packages. In the second stage of the demonstration, the staff simulated closure verification through the process proposed in SECY-10-0100. The exercise also included an action to evaluate the surge in ITAAC closure submittals expected during the last year of construction of a new nuclear power plant. The exercise concluded in March 2011, and a report summarizing the lessons learned will be issued in May 2011.

The staff reviewed the proposed generic ITAAC wording changes for the US-APWR DC application. These changes resulted from ITAAC issues identified in RIS 2008-05, Revision 1, "Lessons Learned to Improve Inspections, Tests, Analyses, and Acceptance Criteria Submittal, dated September 23, 2010, and lessons learned from the AP1000 and ESBWR applications. MHI formed a design center working group (DCWG) to proactively enhance ITAAC quality, clarity, and inspectability. The staff interacted with the US-APWR design center working group at several public meetings to provide feedback on the changes. Additionally, the staff completed the review of the ESBWR, Revision 8, ITAAC for inspectability. The staff continues to review the AP1000, Revision 18, ITAAC for prioritization and the U.S. EPR, Revision 2, ITAAC for certification. The staff has also initiated the existing protocol to prioritize the ESBWR, Revision 8, ITAAC.

The DAC task working group was formed in November 2009 to respond to an STP request for review of DI&C DAC products related to the design of STP Units 3 and 4. Efforts have been focused on developing a viable DAC inspection process. Elements include developing a process framework in parallel with developing DAC inspection procedures. The initial focus was on DI&C procedures, but procedures to address inspection of piping and human factors

DAC are also being developed. To date, the staff has developed the process framework and completed drafts of the DI&C and piping DAC procedures. Inspection procedure development is continuing.

In June 2010, the Division of Construction inspection and Operational Programs and Region II conducted an initial pre-COL inspection of the STP DI&C software lifecycle planning phase to assess the viability of the DI&C DAC procedure. The DAC task working group will continue to compile and assimilate lessons learned for DAC inspection. Concurrent with these efforts, elements of the STP initiative will be incorporated into a generic DAC inspection methodology, which will be subsequently documented in NEI 08-01 and RG 1.215.

In the March 21, 2011, SRM associated with SECY-10-0140, "Options for Revising the Construction Reactor Oversight Process Assessment Program," dated October 26, 2010, the Commission directed the staff to develop a construction assessment program which 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 use of a construction action matrix to determine the appropriate NRC response to degrading licensee performance. The staff will routinely meet with external stakeholders to finish the developmental work for this task and plans to pilot the new construction assessment program in parallel with the current assessment process for 12 months beginning October 1, 2011. The staff will provide updates to the Commission and brief the ACRS, as directed in the SRM.

Advanced Reactors

The NRC staff has undertaken a variety of activities to prepare for applications for small modular reactors (SMRs) that may arrive as early as CY 2012. The staff has 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 Next Generation Nuclear Plant (NGNP) Program and on integral pressurized-water reactors (iPWRs).

<u>Next Generation Nuclear Plant</u>

Staffs from the NRC and DOE are coordinating research and preapplication activities related to Phase 1 of the NGNP Program. The staff communicates often with DOE and the lead laboratory, Idaho National Laboratory (INL), regarding research and development activities, as well as the efforts to support the future licensing of the NGNP prototype and subsequent commercial units.

The staff is currently reviewing INL white papers 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 reactor (HTGR); 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 regarding the overall approach and issues associated with each topic and inform 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 is requesting additional information, as needed, to address the objectives described by INL. The staff is addressing

some topics, such as emergency planning and modular plant licensing, as part of the NRC's 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), NRC's Office of Nuclear Regulatory Research has activities underway to support the NGNP licensing program. The most significant of these NRC research activities involves the development of computer codes and models to support independent NRC evaluations of the behavior of high-temperature gas-cooled reactor systems.

A subcommittee of the DOE Nuclear Energy Advisory Committee (NEAC) is reviewing progress in NGNP research, design, and preapplication licensing discussions (Phase 1 of the project, as described by the Energy Policy Act of 2005). DOE is considering means to encourage participation by private partners in Phase 2 of the project, which includes preparation of the final NGNP design, review by the NRC of a license application, and subsequent construction and startup of the prototype facility. The NEAC is expected to make a recommendation to the Secretary of Energy regarding Phase 2 sometime in FY 2012. A decision by the Secretary of Energy on Phase 2 will follow sometime thereafter.

Integral Pressurized Water Reactors

NuScale Power, Inc.

The 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 staff has been engaged in preapplication activities with NuScale since early 2008. NuScale informed the staff that it intended to file its formal DC request during the second quarter of FY 2012. In advance of its DC application, NuScale informed the NRC of its intent to submit 15 topical or technical reports. To date, the NRC has received reports on the LOCA phenomena identification and ranking table and human factors engineering (HFE) program management plan, cyber security plan, QA topical report, the dynamical system scaling methodology, and the HFE implementation plan. The staff has reviewed the HFE, cyber security, and QA reports. The staff has issued RAIs to NuScale in conjunction with the QA Topical Report and will prepare and issue a draft SER for the QA Topical Report by the fourth quarter of FY 2011. The NRC staff also met with NuScale personnel at their offices in Corvallis, OR, on March 1-3, 2011, to conduct an audit/review of the NuScale plant Level 1 probabilistic risk assessment.

In January 2011, the SEC initiated a civil action against affiliates of the Michael Kenwood Group, NuScale's principal investor. This action has prevented the firm from meeting funding obligations to NuScale and has forced NuScale to significantly reduce its spending. The SEC has not made any allegations of improper activities by NuScale, and NuScale is not a party in the SEC action. As a result, NuScale is pursuing alternative financing strategies. On March 18, 2011, NuScale submitted a letter to the NRC requesting that the agency suspend all preapplication activities.

Babcock & Wilcox 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.

The staff has been engaged in preapplication activities with B&W since mid-2009. In October 2010, B&W sent a letter to the NRC detailing its plans to submit a total of 29 reports during preapplication before submitting its DC application, which is expected during the first quarter of FY 2014. To date, the NRC has received technical reports on the following topics: QA plan for DC, plant design overview, 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 staff is establishing review schedules and is providing feedback to B&W through meetings and other appropriate methods. The staff held detailed technical meetings with B&W on core nuclear design codes, critical heat flux test plan, security design, and control rod drive mechanism design. The next meeting with B&W is scheduled for April 21, 2011, to discuss the mPower comprehensive design overview.

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 staff responded to TVA's letters explaining its assumptions and concluded that no existing 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. The staff plans to begin a series of public meetings with TVA to discuss the details associated with the regulatory framework for the Clinch River construction permit application in the near future. Related activities are anticipated to continue from FY 2011 through FY 2012, with initial license application submittal anticipated in the fourth quarter of FY 2012.

Other Reactor Technologies

The staff has been contacted by two other vendors that are proposing to submit small light-water reactor designs for NRC review. Westinghouse is developing its SMR design and is planning to submit a DC application in late CY 2012. Holtec is developing the Holtec Inherently Safe Modular Underground Reactor (HI-SMUR) design and is also planning to submit a DC application. The staff intends to meet with Westinghouse and Holtec, as resources allow, to gain a basic understanding of their designs.

The 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. While no meetings were held during this reporting period on these types of designs, 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).

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 has 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 6 weeks for the remainder of 2011.

On February 18, 2011, in accordance with its issue resolution plan, the NRC staff issued SECY-11-0024, "Use of Risk Insights To Enhance the Safety Focus of Small Modular Reactor Reviews," which proposes an approach to developing a framework to apply risk insights in the licensing of SMRs in order to improve the efficiency and safety focus of the staff's reviews. Upon Commission approval, the NRC staff will begin developing the framework to apply to future SMR application reviews. In addition, to address concerns that SMR licensees would have to pay a disproportionate amount of annual reactor fees, the NRC staff developed a memorandum to the Commission, dated February 7, 2011, describing a variable annual reactor fee approach based on licensed thermal power. The NRC staff will be preparing a proposed rule to codify the variable annual fee for reactors and expects to provide the proposed rule to the Commission in FY 2013.

Infrastructure Development

Focusing the attention of staff on the NGNP Program and on iPWRs continues to enhance the effectiveness and efficiency of other advanced reactor activities by doing the following:

- providing the information necessary to develop resource estimates for reviewing the designs for advanced reactors
- allowing the NRC technical review staff sufficient time to become familiar with advanced reactor design concepts
- providing feedback to potential applicants on key design, technology, safety research, and licensing issues
- identifying interrelated or cross-cutting regulatory safety issues and identifying reasonable resolution paths for these issues

- identifying technical skills necessary to review these designs and, as appropriate, hiring staff and contractors who possess the requisite knowledge, skills, and abilities

The staff is working with the DOE laboratories to resolve generic policy and technical issues, develop guidance documents for both staff and industry, and conduct preapplication reviews of topical reports and white papers submitted by potential suppliers. The staff is developing its longer term contracting strategy, which will likely involve commercial contractors for the review of actual design and licensing applications.

The staff is also working with the DOE national laboratories to develop training for both HTGRs and iPWRs. During this quarter, the staff was successful in coordinating preliminary training sessions for both HTGRs and iPWRs.