

# 2012 NEW REACTOR PROGRAM



## Cover

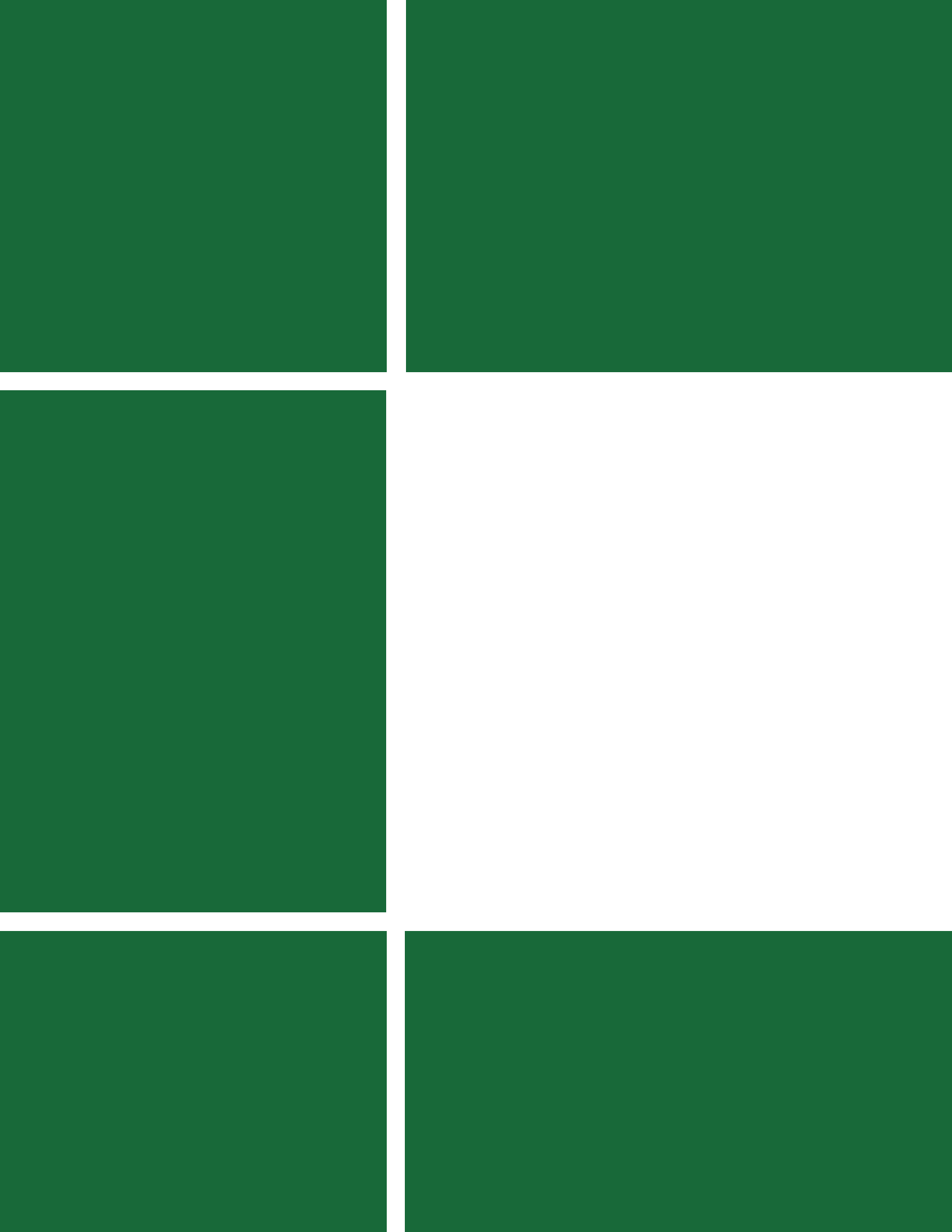
*The Vogtle Unit 3 reactor pressure vessel arrives in the United States.*

*Photo courtesy of Georgia Power, a Southern Company.*

# 2012 NEW REACTOR PROGRAM

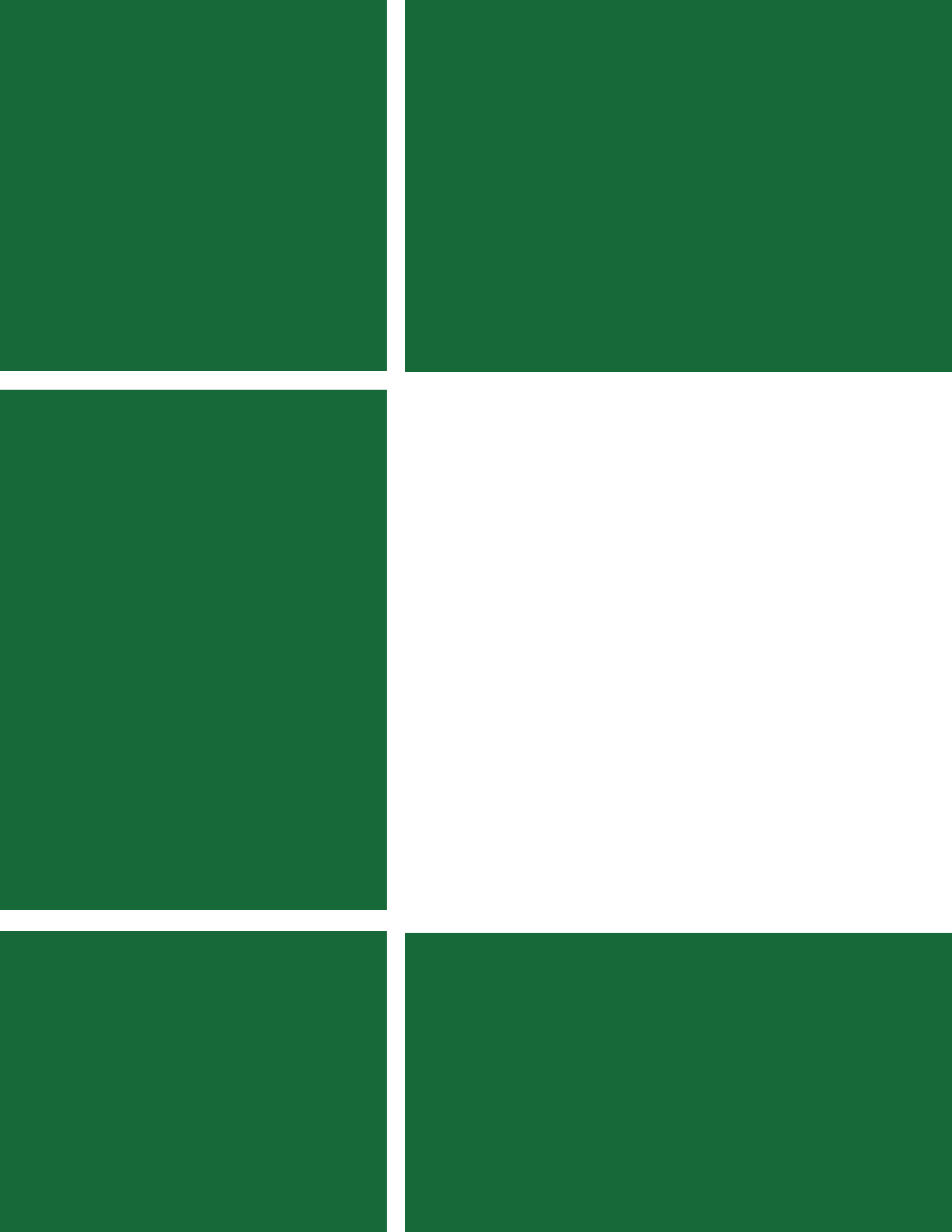


OFFICE OF NEW REACTORS



## Table of Contents

<b>I.</b>	<b>A Message from the Director</b>	1
<b>II.</b>	<b>Overview</b>	2
<b>III.</b>	<b>Activities and Accomplishments</b>	4
	New Reactor Licensing	5
	Oversight	11
	Advanced Reactor Program	17
	International Cooperation	21
<b>IV.</b>	<b>A Look Ahead</b>	25
<b>V.</b>	<b>At a Glance</b>	27





## A Message from the Director

The year 2012 was one of significant progress for the U.S. Nuclear Regulatory Commission's (NRC's) New Reactor Program. The NRC issued its first new reactor licenses in more than 3 decades.

Significant progress was also made in meeting the New Reactor Program's goals in other key areas, including vendor and construction inspections, design certification and combined license (COL) reviews, advanced reactor preparation, and a notable level of international cooperation. Safety remained our top priority as each milestone and accomplishment was achieved.

Since it was created in 2006, the Office of New Reactors (NRO) has continued to actively and fully support the agency's responsibility for ensuring U.S. public health and safety while enabling the safe, secure, and environmentally responsible use of nuclear power in meeting the Nation's future energy needs.

The 2012 New Reactor Program annual review captures the variety of activities completed in the past year. These milestones were achieved through the expertise, hard work, and commitment of the staff dedicated to carrying out the New Reactor Program. Important contributions were made by NRO partner offices supporting the New Reactor Program, including the Office of General Counsel, the Office of Investigations, the Office of Nuclear Security and Incident Response, the Office of Regulatory Research, the Office of Enforcement, the Office of International Programs, the Office of Nuclear Reactor Regulation, and Region II. This third edition of the annual review is another opportunity to communicate with key internal and external audiences and provide them with information about the 2012 activities of the New Reactor Program.

The New Reactor Program continues to prepare for a changing workload that will shift from licensing large light-water reactors to licensing small modular reactors, preparation for advanced reactor designs and overseeing construction. The Office of New Reactors established the following six goals to direct its efforts in 2013 and beyond: (1) executing oversight of the four AP1000 reactors under construction, (2) implementing the agency's vendor inspection program, (3) developing a plan to transition from construction to operations, (4) completing review of the design certification, combined license, and early site permit applications submitted, (5) establishing the regulatory and technical infrastructure necessary to support the license review and construction oversight of small modular reactors, and (6) preparing the agency for licensing non light-water reactors.

We hope you will find our third annual review a thoughtful compendium of our activities and accomplishments during the past year that were achieved through contributions of staff in NRO and our partner offices. I extend my sincerest thanks to all of them.

A handwritten signature in black ink, appearing to read "Glenn M. Tracy". The signature is fluid and cursive, with a long horizontal stroke at the end.

Glenn M. Tracy  
Director  
Office of New Reactors



# Overview



Top, Region II Regional Administrator Victor McCree, far left, and Justin Fuller, the senior resident inspector at Vogtle Units 3 and 4, pen in hand, explain the latest construction activity to NRO Office Director Glenn Tracy, as Fred Brown, Deputy Regional Administrator for Construction, looks on.

Above, David Matthews, Director of the Division of New Reactor Licensing (DNRL), addresses the audience at the V.C. Summer combined license signing ceremony.

Right, NRC Chairman Allison Macfarlane makes a point at her first NRO All Hands Meeting.





In many ways, 2012 marked a new era in nuclear power plant regulation. The U.S. Nuclear Regulatory Commission (NRC) approved the building of new nuclear reactors for the first time since 1978 by issuing the first-ever construction and operating licenses to Vogtle Electric Generating Plant (Vogtle), Units 3 and 4, in Georgia, and to Virgil C. Summer Nuclear Station (V.C. Summer), Units 2 and 3, in South Carolina.

In 2012, the New Reactor Program again received full support from agency program, corporate, and regional offices and from the agency's advisory committees and the Commission. The New Reactor Program is grateful for this ongoing support that has helped lead to major achievements across key areas.

For example, in addition to issuing the first combined licenses (COLs), the NRC issued amendments to the design certifications (DCs) for the Advanced Passive 1000 (AP1000) and the advanced boiling water reactor (ABWR). It also issued the final environmental impact statement for Levy County Nuclear Power Plant (Levy County), Units 1 and 2. At the end of 2012, the NRC was actively reviewing 3 DC applications and another 10 combined operating license applications to build and operate 16 new reactors.

Based on lessons learned from the March 2011, earthquake and tsunami in Japan, the Office of New Reactors initiated actions to address lessons learned in the COL application reviews and continues to provide support to operating reactors. New reactor licensees are addressing—in the same manner as operating reactor licensees—those applicable actions that the licensing process did not already address. The agency has required that Vogtle Units 3 and 4, and V.C. Summer Units 2 and 3, address the requirements for mitigation strategies before fuel load to sustain core cooling, containment, and spent fuel pool (SPF) cooling capability functions indefinitely.

In 2012, the NRC staff began a 12-month pilot project for a revised and updated Construction Reactor Oversight Process (cROP) at the Vogtle site. This is a risk-informed and performance based oversight process that will provide assurance that the new nuclear power plant is constructed and will be operated in accordance with its licensing basis. The staff also conducted 27 vendor inspections during 2012, many with the cooperation of other national regulatory authorities. These inspections included providing technical support to ensure the safe operation of existing nuclear reactors.

In addition, NRO submitted a final rule package to the Commission in August 2012, which included

provisions for the maintenance of inspections, tests, analyses, and acceptance criteria (ITAAC). In its efforts to manage ITAAC closures more effectively, the New Reactor Program implemented an information technology system—verification of ITAAC closure, evaluation, and status (VOICES)—which tracks the closure verification process for each ITAAC closure notification and the associated ITAAC closure notifications.

Also in 2012, NRO and NRR created the Vendor Inspection Center of Expertise (COE), which plans and inspects new reactor and existing reactor plant vendors and supports allegation resolution. The center optimizes the interdependency among agency offices by streamlining vendor oversight activities.

In advanced reactors, the NRC continued its efforts to prepare for future reviews of small modular reactor (SMR) licensing applications. This preparation included undertaking preapplication activities with vendors, reviewing of technical reports that SMR vendors submitted, developing a regulatory framework to support reviews of these new designs, and conducting extensive outreach to external stakeholders. The NRC expects these activities to continue as vendors move closer to completing and submitting SMR applications to the agency for review. To address a provision identified in the House Committee Report on the Energy and Water Development Appropriations Act of 2012, the New Reactor Program developed a comprehensive report to Congress that identified the NRC's overall strategy for and approach to preparing for licensing advanced reactors.

The NRO's scope of international leadership and cooperation significantly grew this past year. In 2012, the NRO placed staff members on assignments in China, Korea (the first-of-a-kind for the agency), Czech Republic, and France. The NRC continued to strengthen international cooperation through leadership and participation in the Multinational Design Evaluation Program (MDEP), through which it cooperated with the regulatory authorities of 11 other countries on the design review and oversight of new reactors. The NRO participated in developing a new trilateral initiative for reviewing the APR1400 reactor design and formation of an APR 1400 working group under MDEP. NRO staff and management also played important roles in the NRC's International Regulatory Assistance Program. During the past year, the NRC also continued to engage international counterparts in construction and vendor oversight and inspection. ■

# Activities & Accomplishments



*Top, Jim Beardsley, Chief, Construction Inspection Program Branch, fields a question at a quarterly staff meeting.*

*Above, NRO employees pose for a photo during the Vogtle combined license signing ceremony held at NRC Headquarters.*

*Right, Office Director Glenn Tracy presents DNRL Project Manager Laura Quinn-Willingham with an Employee of the Month Award.*



## NEW REACTOR LICENSING

Accomplishments in the new reactor licensing area in 2012 culminated with the New Reactor Program's issuance of the first-ever combined licenses authorizing the building and operation of new nuclear power reactors to Southern Nuclear Operating Company for Vogtle, Units 3 and 4, located in Georgia. A month later, the New Reactor Program issued two additional combined licenses to South Carolina Electric & Gas Company and South Carolina Public Service Authority for Virgil C. Summer, Units 2 and 3, respectively. The U.S. Nuclear Regulatory Commission's issuance of these licenses marked the approval of new nuclear power plant construction for the first time in more than 30 years.

Applications for these new nuclear power plant units were submitted to the NRC under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." As of the end of calendar year 2012, the NRC was actively reviewing 10 additional combined license applications to build and operate 16 new reactors at the following sites:

- Calvert Cliffs Nuclear Power Plant (MD)
- South Texas Project (TX)
- North Anna Power Station (VA)
- William States Lee III Nuclear Generating Station (SC)
- Shearon Harris Nuclear Power Plant (NC)
- Levy County Nuclear Power Plant (FL)
- Fermi Nuclear Generating Station (MI)
- Comanche Peak Nuclear Power Plant (TX)
- Bell Bend Nuclear Power Plant (PA)
- Turkey Point Nuclear Generating Station (FL)

Information on the current review schedule for new reactor COL applications can be obtained from the NRC public Web site at <http://www.nrc.gov/reactors/new-reactors/col.html>.

As part of the licensing process, the NRC also can issue an early site permit (ESP) to approve a site for a nuclear plant independent of an application for a COL based on its review of site safety, environmental protection, and plans for coping with an emergency. To date, the NRC has issued four ESPs to the following applicants:

- System Energy Resources, Inc., for the Grand Gulf Nuclear Station (MS)

- Exelon Generation Company, LLC, for the Clinton Power Station (IL)
- Dominion Nuclear North Anna, LLC, for the North Anna Power Station (VA)
- Southern Nuclear Operating Company for the Vogtle site (GA), which includes a limited work authorization

In 2012, the NRC continued to review the ESP application for Public Service Electric and Gas (PSEG) Power, LLC, and PSEG Nuclear, LLC, for a site adjacent to Salem Nuclear Generating Station and Hope Creek Generating Station, which currently are in operation in Lower Alloways Creek Township, Salem County, NJ. The NRC is also engaged in precicensing activities for the Blue Castle Nuclear Power Plant ESP application, which it expects to receive in fiscal year (FY) 2013. In August 2012, Exelon Nuclear Texas Holdings, LLC, withdrew its ESP application submitted in 2010 for the Victoria County Station. Information on the current review schedule for the PSEG ESP application can be obtained from <http://www.nrc.gov/reactors/new-reactors/esp.html>.

A design certification approves a plant design independently from an application to construct or operate a plant. To date, the NRC has issued DCs for four reactor designs that can be referenced in an application for a nuclear power plant. These designs include the following:

- Advanced boiling water reactor (ABWR) and an amendment to the ABWR DC to address aircraft impacts
- System 80+
- Advanced Passive 600 (AP600)
- Amended AP1000

The final rule for an amendment to the AP1000 DC became effective on December 30, 2011. The NRC published the final rule for the ABWR amendment in late 2011, with the rule becoming effective on January 17, 2012.

The NRC issued final design approval for the economic simplified boiling water reactor (ESBWR) DC in 2011 and it is currently in the rulemaking process. Meanwhile, the NRC continues to review the following DC applications:

- U.S. Evolutionary Power Reactor
- U.S. Advanced Pressurized Water Reactor (U.S. APWR)

For the U.S. Evolutionary Power Reactor design, the

**New Nuclear Power Plant Applications  
Updated December 1, 2012**

Company (Project or Docket Numbers)	Date of Application	Design	Date Accepted	Site Under Consideration	Number of Units	State	Existing Operating Plant	Status
<b>Calendar Year (CY) 2007 Applications</b>								
NRG Energy (52-012/013)	09/20/07	ABWR	11/29/07	South Texas Project	2	TX	Y	Accepted/Docketed
NuStart Energy (52-014/015)	10/30/07	AP1000	01/18/08	Bellefonte	2	AL	N	Suspended
UNISTAR (52-016)	07/13/07 (Envir.) 03/13/08 (Safety)	EPR	01/25/08 06/03/08	Calvert Cliffs	1	MID	Y	FEIS Published Accepted/Docketed
Dominion (52-017)	11/27/07	USAPWR	01/28/08	North Anna	1	VA	Y	Accepted/Docketed
Duke (52-018/019)	12/13/07	AP1000	02/25/08	William Lee Nuclear Station	2	SC	N	Accepted/Docketed
<b>2007 Total Number of COL Applications Submitted = 5 Total Number of Units = 8</b>								
<b>Calendar Year (CY) 2008 Applications</b>								
Progress Energy (52-022/023)	02/19/08	AP1000	04/17/08	Harris	2	NC	Y	Accepted/Docketed
NuStart Energy (52-024)	02/27/08	ESBWR	04/17/08	Grand Gulf	1	MS	Y	Suspended
Southern Nuclear Operating Co. (52-025/026)	03/31/08	AP1000	05/30/08	Vogtle	2	GA	Y	Review Complete
South Carolina Electric & Gas (52-027/028)	03/31/08	AP1000	07/31/08	Summer	2	SC	Y	Review Complete
Progress Energy (52-029/030)	07/30/08	AP1000	10/06/08	Levy County	2	FL	N	Accepted/Docketed
Exelon Nuclear Texas Holdings, LLC	09/03/09	ESBWR	10/13/08	Victoria County Station	2	TX	N	Withdrawn
Detroit Edison (52-033)	09/18/08	ESBWR	11/25/08	Fermi	1	MI	Y	Accepted/Docketed
Luminant Power (52-034/035)	09/19/08	USAPWR	12/02/08	Comanche Peak	2	TX	Y	Accepted/Docketed
Energy (52-036)	09/25/08	ESBWR	12/04/08	River Bend	1	LA	Y	Suspended
AmerenUE (52-037)	07/24/08	EPR	12/12/08	Callaway	1	MO	Y	Suspended
UNISTAR (52-038)	09/29/08	EPR	12/11/08	Nine Mile Point	1	NY	Y	Suspended
PPL Generation (52-039)	10/10/08	EPR	12/19/08	Bell Bend	1	PA	Y	Accepted/Docketed
<b>2008 Total Number of COL Applications Submitted = 12 Total Number of Units = 18</b>								
<b>Calendar Year (CY) 2009 Applications</b>								
Florida Power and Light (763)	06/30/09	AP1000	09/04/09	Turkey Point	2	FL	Y	Accepted/Docketed
<b>2009 Total Number of COL Applications Submitted = 1 Total Number of Units = 2</b>								
<b>Calendar Year (CY) 2010-2012 Applications</b>								
No COL applications submitted in CY 2010-2012								
<b>2010-2012 Total Number of Applications Submitted = 0 Total Number of Units = 0</b>								
<b>Calendar Year (CY) 2013 Applications</b>								
No applicants are currently expected to submit new COL applications in CY 2013								
<b>2007 - 2013 Total Number of COL Applications Submitted = 18 Total Number of Units = 28</b>								



staff evaluated several key technical challenges, such as Generic Safety Issue (GSI)-191, “Assessment of Debris Accumulation on PWR [Pressurized-Water Reactor] Sump Performance,” cask analysis, and seismic and structural analysis.

In the US APWR DC review, the NRO staff made substantial progress on difficult technical topics in the DC document, including (1) the digital instrumentation and control system, (2) seismic and structural analysis, and (3) analysis for GSI-191.

The NRC received two applications to renew the certification for the ABWR from General Electric Hitachi Nuclear Energy, and Toshiba Corporation in 2010. The NRC did not receive any new large light-water reactor DC applications in 2012. The NRC anticipates the submittal of one DC application from Korea Hydro & Nuclear Power Company, Ltd., for the APR1400 design during FY 2013. Information on the current review schedule for new reactor DC applications can be obtained from the NRC public Web site at <http://www.nrc.gov/reactors/new-reactors/design-cert.html>.

As part of the agency’s response to the Fukushima accident and consistent with the Commission’s direction in Staff Requirements Memorandum SECY 12 0025, “Proposed Orders and Requests for Information in Response to Lessons Learned from Japan’s March 11, 2011, Great Tohoku Earthquake and Tsunami,” dated March 9, 2012, the NRC required both Vogtle, Units 3 and 4, and V.C. Summer, Units 2 and 3, to address the portions of Tier 1 Recommendations 4.2 and 7.1 that the referenced DC or COL review had not already covered. For 10 CFR Part 52 DC and COL applications currently under active staff review, the

staff will ensure that the Fukushima actions are addressed before certification or licensing. The staff has requested applicants to provide the required information by orders and request for information letters through the review process.

In 2012, the agency continued to enhance the regulatory framework for COLs to clarify requirements for applicants, licensees, and staff. Guidance documents do not contain regulatory requirements, although licensees may commit to following regulatory guides as conditions of their licenses. In 2012, the NRC issued the following two interim staff guidance (ISG) documents for COLs:

- (1) DC/COL -ISG 025, “Interim Staff Guidance COL-ISG-025 on Changes during Construction under Title 10 of the *Code of Federal Regulations* Part 52,” issued for use and comment on January 11, 2012.
- (2) DC/COL-ISG 022, “Interim Staff Guidance on the Impact of Construction (under a Combined License) of New Nuclear Power Plant Units on Operating Units at Multi Unit Sites,” issued as final on May 18, 2012.

In 2012, the NRC also issued the following eight section updates to the standard review plan:

- (1) SRP Chapter 8, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition—Electric Power,” Section 8.1, “Electric Power—Introduction,” issued February 2012.
- (2) SRP Chapter 8, Branch Technical Position (BTP) 8 8, “Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions,” issued February 2012.



Photo courtesy of V.C. Summer Construction Residents

Members of the Nuclear Energy Agency (NEA), the Committee on Nuclear Regulatory Activities (CNRA), and the Working Group on the Regulation of New Reactors (WGRNR), including several NRO employees, participate in a Vogtle construction site tour.

Photo courtesy of Roger Hannah



Photo courtesy of Roger Hannah



## Activities & Accomplishments

*Top, Senior Resident Inspector Justin Fuller takes notes during one of his daily inspections of the Vogtle site.*

*Above, Chad Huffman, Construction Resident Inspector Vogtle Unit 3 and 4, far right, leads a tour of the Unit 3 nuclear island with Michael Ernstes, left, Division of Construction Projects Branch Chief, Nilda Rivera-Feliciano, Construction Assessment and Enforcement Branch, and Justin Fuller, Senior Construction Resident Inspector Vogtle Unit 3 and 4.*

*Right, Office Deputy Director Gary Holahan shares an observation with the NRO team at a periodic staff session.*





- (3) SRP Chapter 7, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition—Instrumentation and Controls,” BTP 7 19, “Guidance for Evaluation of Diversity and Defense in Depth in Digital Computer Based Instrumentation and Control Systems,” issued July 2012.
- (4) SRP Chapter 19, Section 19.5, “Adequacy of Design Features and Functional Capabilities Identified and Described for Withstanding Aircraft Impacts,” issued for comments on July 2012.
- (5) SRP Chapter 19, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition—Severe Accidents,” Section 19.1, “Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk Informed Activities,” issued September 2012.
- (6) SRP Chapter 19, Section 19.0, “Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors,” Revision 3, issued September 2012.

- (7) SRP Chapter 19, Section 19.1, “Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,” Revision 3, issued September 2012.
- (8) SRP Chapter 19, Section 19.3, “Regulatory Treatment of Non-Safety Systems for Passive Advanced Light Water Reactors,” issued for comments October 2012.



*Division of Engineering (DE) General Engineer Marieliz Vera inspects the weld of a Vogtle Unit 4 containment penetration.*



*At the V.C. Summer Unit 3 site, NRC Senior Geologist Gerry Stirewalt takes an “up close and personal” look at the foundation grade level bedrock surface.*

*Photo courtesy of V.C. Summer Construction Residents*



Photo courtesy of Roger Hannah



Photo courtesy of V.C. Summer Construction Residents

## Activities & Accomplishments

*Top, preparation activities take place at V.C. Summer nuclear island.*

*Above, Region II Regional Administrator Victor McCree, second from left, tours the V.C. Summer site with Commissioner William Ostendorff. Deputy Regional Administrator for Construction Fred Brown, center, joins the tour.*

*Right, DNRL Senior Project Manager Ravindra Joshi, center, coordinates activities at the Vogtle combined license signing ceremony.*



## OVERSIGHT

Significant milestones were achieved in oversight responsibilities ranging from construction and vendor inspection to quality assurance and licensee performance assessment. The U.S. Nuclear Regulatory Commission's role in construction oversight includes inspecting (1) construction and operational programs, (2) the licensees' completion of their inspections, tests, analyses, and acceptance criteria (ITAAC), and (3) vendors supplying components and services for construction.

In 2012, agency staff began the 12 month pilot implementation of a revised and updated Construction Reactor Oversight Process (cROP). The cROP is a risk informed and performance based oversight process that will provide reasonable assurance that the plant is constructed and will be operated in accordance with its licensing basis. The key elements of the cROP include the inspection of construction activities, the assessment of licensee performance during construction, and the enforcement of noncompliance with regulatory requirements. The NRC initiated the construction assessment process for V.C. Summer, Units 2 and 3, during March 2012, with the issuance of the combined license. It conducted the first midcycle assessment of the cROP pilot for the Vogtle and Summer sites, with both projects continuing in the baseline program. The cROP pilot and the 2012 assessment period for both Vogtle and Summer ended on December 31, 2012. The end-of cycle review for both sites is scheduled for February 2013.

After the NRC issued COLs to Southern Nuclear Operating Company on February 10, 2012, for two Advanced Passive 1000 (AP1000) units at the Vogtle Electric Generating Plant near Augusta, GA, and to South Carolina Electric & Gas Company on March 30, 2012, for two AP1000 units at the V.C. Summer Nuclear Station, the pace of construction inspection increased significantly. In 2012, Vogtle, Units 3 and 4, and V.C. Summer, Units 2 and 3, construction activities focused on the nuclear island and fabrication of primary containment and structural modules. The NRC inspection activity this past year focused on inspection of the licensees' quality assurance programs, welding, security, and civil engineering activities. The NRC's inspection activities will increase as licensees broaden their scope of construction activities.

Construction resident inspectors and region-based inspectors conduct the majority of inspection activities, with the support of headquarters staff as needed. NRC Region II has assigned staff to both Vogtle and V.C. Summer construction resident inspector's offices. Each office now has a construction senior resident inspector and two construction resident inspectors. In addition,

Region II routinely sends construction inspectors from the NRC's Region III office in Atlanta, GA, to conduct team inspections of construction activities at the sites. Over time, the number of full-time construction resident inspectors at the site will increase from three to about five inspectors.

The inspection program also examines operational programs to provide assurance that these activities and programs are in compliance with program requirements. The program incorporates lessons learned from the inspection programs used in the previous construction of plants licensed under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and it accounts for modular construction at remote locations.

Information in 10 CFR Part 52, "Licenses, Certification, and Approvals for Nuclear Power Plants," identifies the ITAAC as those construction activities that, if met, provide reasonable assurance that a facility has been constructed and will operate in conformance with the COL and the NRC's regulations. The licensee is responsible for completing the ITAAC. The NRC's inspection program samples the licensee's processes for ITAAC completion and performs inspections to verify that the licensee will provide reasonable assurance that it has met all ITAAC acceptance criteria.

The NRC continues to refine its approach to ITAAC closure and to the maintenance of closed ITAAC through public workshops related to ITAAC completion, closure documentation, and maintenance. The Nuclear Energy Institute (NEI), industry representatives, and other external stakeholders participate in these public workshops.

In 2012, the NRC amended the regulations related to ITAAC verification. The NRC staff provided the final rulemaking package to the Commission for review on February 23, 2012. The new provisions in the amended rule require a licensee (1) to report new information that materially alters the basis for determining if it had performed inspections, tests, or analyses as required or if it had met acceptance criteria, and (2) to notify the NRC of its completion of all ITAAC activities. The Commission approved publication of the final rule on May 11, 2012. The staff published the final rule and Revision 1 to Regulatory Guide 1.215, "Guidance for ITAAC Closure under 10 CFR Part 52," in August 2012. (Draft Regulatory Guide 1250, "Guidance for ITAAC Closure under 10 CFR Part 52").

The staff received the first ITAAC closure notifications (ICNs) in November 2012, and anticipates the receipt of a significant number of additional ICNs in 2013. The staff expects to continue interacting with



# Activities & Accomplishments

*Top, Commissioner William Magwood thanks employees at the V.C. Summer combined license signing event.*

*Above, Commissioner William Ostendorff provides his insights at the third annual NRC Workshop on Vendor Oversight for New Reactor Construction.*

*Right, Office Director Glenn Tracy, left, EDO Bill Borchardt and Region II Regional Administrator Victor McCree brief the Commission on the strategic considerations associated with new reactors.*





stakeholders to resolve and refine ITAAC process elements. The staff plans to complete the ITAAC demonstration project action items, such as identifying additional ICN examples for inclusion in NEI 08 01, “Industry Guideline for the ITAAC Closure Process under 10 CFR Part 52,” clarifying expectations for reporting and referencing ITAAC, and to continue discussions on ITAAC quality, clarity, and objectiveness.

On the enforcement front, New Reactor Program activities include processing enforcement actions and coordinating reviews with the Office of Enforcement (OE) and regional offices. To support initial construction oversight at Vogtle under the limited work authorization, the NRC staff developed and issued Enforcement Guidance Memorandum (EGM) 11 002, “Enforcement Discretion for Licensee Identified Violations at Power Reactor Construction Sites Pursuant to Title 10 of the *Code of Federal Regulations* Part 52,” dated June 3, 2011, to encourage licensees to identify and correct performance issues. This document provides guidance to exercise enforcement discretion when dispositioning Severity Level IV licensee identified violations at power reactors that are under construction as noncited violations. The revised enforcement policy was issued in May 2012. As part of the cROP pilot, the staff will continue to identify lessons learned and evaluate the need for additional NRC Enforcement Policy revisions.

Yet another achievement in the oversight area in the last year was the growing success of the Construction Experience (ConE) Program, which provides NRC inspectors and Office of New Reactors (NRO) technical reviewers with insights on the design, construction, and preoperational testing of new reactors. The ConE program supported the issuance of 4 information notices, 11 operating experience communications on construction related insights and lessons learned, and 11 ConE issues for resolution of events requiring further technical evaluation. Furthermore, the staff is incorporating lessons learned from the ConE Program’s event evaluations and reviews into NRC programs. For example, the staff is revising two inspection procedures and is developing new ITAAC for the advanced boiling water reactor turbine building seismic design.

Meanwhile, NRO and NRR jointly created the agency’s Vendor Inspection Center of Expertise (COE) within NRO. Established in April 2012, the COE conducts inspections of new nuclear reactor and existing reactor plant vendors and supports allegations. These inspections verify the effective implementation of vendor quality assurance programs that ensure the quality of materials, equipment, and services supplied to the commercial nuclear industry. The COE also supports initiatives to address and deter the potential

use of counterfeit, fraudulent, and suspect items (CFSIs) in safety-related applications. The NRC developed the center to optimize the interdependency between offices by streamlining vendor oversight activities. Additionally, NRO and the Office of Investigations entered into an interagency agreement with the Department of Homeland Security’s Immigration and Customs Enforcement (DHS/ICE) to become the 21st organization to join the DHS/ICE National Intellectual Property Rights Coordination Center.

Overseeing manufacturers and suppliers of safety related components is an important aspect of the oversight program. NRC inspectors determine if licensees are appropriately carrying out technical requirements and if they are in compliance with quality assurance and defect reporting requirements. The NRC conducted vendor inspections at manufacturers’ and suppliers’ facilities principally to examine, through observation of safety significant activities, their compliance with Appendix B, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants,” to 10 CFR Part 50, as procurement contracts with licensees require.

The NRC also observes licensee oversight of manufacturers and suppliers. Licensees typically perform such oversight audits through participation on the Nuclear Procurement Issues Committee. The NRC also performs inspections to determine whether applicants for design certificates, early site permits, or COLs have effectively implemented quality assurance processes and procedures for activities related to their applications. These inspections focus on assessing compliance with the provisions of 10 CFR Part 21, “Reporting of Defects and Noncompliance,” and with selected portions of Appendix B to 10 CFR Part 50.

In 2012, the staff conducted 27 vendor inspections, 3 quality assurance implementation inspections, and several observations. Many of these inspections were conducted in cooperation with other national regulatory authorities through the Multinational Design Evaluation Program. The NRC inspectors continue to identify issues with the commercial grade dedication of commercial items intended for use in safety related applications, design control, software dedication, and implementation of 10 CFR Part 21. These findings indicate that licensee oversight of suppliers could be improved.

Additionally, the staff is continuing to implement the CFSI action items outlined in a 2011 Commission paper that assesses the agency’s response to CFSI and provides recommendations for staff implementation. Of particular interest is the staff’s current effort to engage industry in developing practices that can be carried out as part of the licensee’s quality assurance program to



## Activities & Accomplishments



*Top, Commissioner George Apostolakis comments on new reactor licensing activity during an NRO All Hands Meeting.*

*Above, Coleman Abbott, right, Construction Resident Inspector Vogtle Unit 3 and 4, describes where and how the CA20 Auxiliary Building Module will be placed in the facility's nuclear island to Darrell Roberts, center, Acting Deputy Regional Administrator for Construction, and Michael Ernstes, Division of Construction Projects Branch Chief.*

*Right, Commissioner Kristine Svinicki speaks with NRO employees at an event marking the staff's work completing the combined license reviews for Vogtle and Summer.*





prevent CFSIs from entering the supply chain.

On September 29, 2011, the staff issued to the Commission its plans to clarify the regulations for reporting of defects and noncompliance in accordance with 10 CFR Part 21. The staff focused on the areas of “reporting and evaluating” and “commercial grade dedication.” The staff hosted public meetings to seek early input and presented the preliminary rulemaking issues to industry groups, including a presentation at the 2012 Workshop of Vendor Oversight for New Reactor Construction. The staff issued the draft rule for public comment on December 10, 2012.

The NRC staff also continues to develop the operator licensing process for new reactors. The agency issued NUREG 2103, “Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Westinghouse AP1000 Pressurized Water Reactors,” in October 2011, and NUREG 2104, “Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Advanced Boiling Water Reactors,” in December 2011. The development of operator training and the content of the operator licensing examinations are based on these knowledge and abilities catalogs. The NRC issued these reports as drafts for use until the staff can integrate operating experience into them; when this integration occurs, the agency will issue a final NUREG report.

Mock simulator exams using the Vogtle, Units 3 and 4, simulator were conducted in August 2012. Additionally, the NRC staff observed the Institute of Nuclear Power Operations accrediting process for the operator

training programs for both Vogtle and V.C. Summer. The staff issued NRC Regulatory Issue Summary 2012 07, “Preparation and Scheduling of Operator Licensing Examinations,” dated June 8, 2012, to request updated information from licensees on projected site specific operator licensing examination schedules. This information will be used to develop NRC examination schedules for new reactors. The NRC is working on the tools needed to support these schedules. For example, the staff is working on a new examination format for highly integrated control rooms and is adjusting examination processes that will substantially reduce the number of NRC examiners needed to conduct the examination.



*From left to right, Reactor Operations Engineer Mahmoud Jardaneh, Senior Reactor Operations Engineer Chris Welch, and NRO Branch Chief Mark Kowal visit V.C. Summer Unit 2 to discuss Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) closure program activities.*



*Photo courtesy of Georgia Power, a Southern Company*

*Vogtle Unit 3 nuclear island; rebar placement in preparation for six-foot thick concrete basemat pour.*



# Activities & Accomplishments

*Top, Branch Chief Stewart Magruder in the Division of Advanced Reactors and Rulemaking (DARR) discusses small modular reactors at a quarterly staff meeting.*

*Above, DARR Senior Project Manager Gregory Cranston provides NRO employees with an update on design-specific review guidance.*

*Right, Senior Project Manager Joelle Starefos gives an overview of the mPower™ Project during an NRO All Hands Meeting.*





## ADVANCED REACTOR PROGRAM

Continuing a trend in recent years, 2012 marked a year of strong congressional support for small modular reactors (SMRs). This has led to growing interaction between the U.S. Nuclear Regulatory Commission and vendors of these reactors. The New Reactor Program is preparing to receive and review two SMR design certifications and associated licensing applications by the end of fiscal year 2014. The Office of New Reactors expects a moderate increase in the development of construction inspection infrastructure for SMRs in FY 2014. In addition, the office anticipates that non-light-water reactor (non-LWR) designs will continue to evolve, with the NRC staff developing and carrying out a strategy to ensure that the office is ready for these advanced reactor designs.

Current interest in advanced reactors focuses on SMRs that use light-water reactor (LWR) technology. Starting in the early 2000s, the U.S. Department of Energy (DOE) began funding work at Oregon State University to develop a small, integral pressurized LWR. This work led to the formation of a private company, NuScale Power, LLC (NuScale), to commercialize this evolutionary reactor technology. Beginning in 2009, other reactor designers interested in developing small, integral pressurized LWRs contacted the NRC. Industry-identified potential benefits, including lower costs, a wider range of users, enhanced safety, and the ability to replace older coal-fired units has driven interest in these types of reactors.

In 2012, the NRC continued to prepare for future reviews of SMR licensing applications. These preparation efforts included preapplication activities with vendors, developing the regulatory framework to support reviews of these new designs, and conducting extensive outreach to external stakeholders. The NRC also reviewed technical reports that SMR vendors submitted. The agency expects these activities to continue as vendors move closer to completing and submitting SMR applications.

Earlier in 2012, DOE announced a cost-shared industry partnership program for SMRs to promote the accelerated commercialization of SMR technologies. This program is funding one SMR vendor currently undergoing preapplication activities with the NRC. In addition, DOE announced plans to issue a follow-on solicitation open to other companies and manufacturers focused on furthering SMR efficiency, operations, and design.

The following sections briefly describe the status of SMR designs currently engaged in preapplication activities with the NRC.

## Babcock & Wilcox Nuclear Energy, Inc., mPower™

The NRC has been engaged in preapplication activities with Babcock & Wilcox Nuclear Energy, Inc. (B&WNE) since mid 2009, after receiving the company's letter of intent to submit a DC application for the B&WNE mPower™ advanced LWR.

The mPower™ design is a dual-unit integral pressurized LWR. The reactor and steam generator are located in a single-reactor vessel in an underground containment. Each mPower™ reactor unit has a rated thermal output of 530 megawatts thermal (MWt) and an electrical output of 180 megawatts electric (MWe).

As part of prelicensing activities, B&WNE plans to submit several topical or technical reports before it submits its licensing application, which the NRC expects to receive in 2014. The NRC staff has reviewed reports on topics such as quality assurance, design descriptions, critical heat flux testing plans, and integrated system testing plans.

In preparation for B&WNE's license application, the NRC staff is preparing design specific guidance for SMR designs, which are called design-specific review standards (DSRSs). These are plant-specific and similar in structure to NUREG 0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition." The NRC will use the DSRSs as guidance to perform plant-specific reviews. Significant progress has been made toward completing the mPower™ DSRS. Additional information on the mPower™ design can be found on the NRC public Web site at <http://www.nrc.gov/reactors/advanced/mpower.html>. In late 2010, the Tennessee Valley Authority indicated its interest in building several B&WNE mPower™ plants at the Clinch River Nuclear Power Plant site in Roane County, TN.

## NuScale Power

The NRC staff has been engaged in preapplication activities with NuScale since early 2008. NuScale is a natural circulation LWR; the reactor core and helical coil steam generator are located in a common reactor vessel in a cylindrical steel containment. The reactor vessel or containment module is submerged in water in the reactor building safety-related pool. The reactor building, which is located below grade, is designed to hold 12 SMRs. Each NuScale SMR has a rated thermal output of 160 MWt and an electrical output of 45 MWe, which yields a total capacity of 540 MWe for 12 SMRs.

The NRC has received technical and topical reports from NuScale for review that include quality assurance,



Babcock & Wilcox mPower™ small modular reactor schematic.

Illustrations courtesy of Babcock & Wilcox



A cutaway view of a dual unit B&W modular reactor.

## Activities & Accomplishments



DARR Director Michael Mayfield notes progress made on the regulatory framework to support SMR reviews.

human factors engineering, program management, accident analyses, and thermal hydraulic and neutronics phenomena identification and ranking. The NRC is preparing plant-specific DSRS for NuScale. Additional information on the NuScale design can be found on the NRC public Web site at <http://www.nrc.gov/reactors/advanced/nuscale.html>.

## Other SMR Designs

Westinghouse (200 MWe) and Holtec (160 MWe) also have proposed SMR designs. Both vendors are in the conceptual design phase and initial stages of preapplication interaction with the NRC.

## Advanced Non-LWR Reactor Designs

In response to a provision in the House Committee Report on the Energy and Water Development Appropriations Act of 2012, the advanced reactor program issued a comprehensive and well-received report to Congress on advanced reactor licensing. The report addresses the NRC's overall strategy for and approach to preparing for the licensing of advanced reactor designs, particularly for reactor technologies other than the LWR technology used in the current U.S. commercial nuclear fleet. The report discusses the anticipated licensing scope over the next 1 to 2 decades and beyond, the overall research and development activities that should be conducted, the projected resource requirements to support the NRC, and the overall plan for using and sharing resources between industry and the Government.

DOE established the Next Generation Nuclear Plant (NGNP) project as required by the Energy Policy Act of 2005 (EPAc-2005). EPAc-2005 defined an overall plan and timetable for NGNP research, design, licensing, construction, and operation by the end of FY 2021. When EPAc 2005 was enacted, the NGNP project was envisioned to be conducted in two phases:

- Phase I (2005–2011) was to select and validate hydrogen generation technology; carry out enabling research and development on associated technologies and components (energy conversion, nuclear fuel development, materials selection, reactor and plant); determine if it is appropriate to produce electricity, hydrogen, or both; and carry out initial design activities for the prototype nuclear power plant.
- Phase II (2011–2021) was to continue first phase activities and to competitively develop a final detailed design, obtain an NRC license for construction and operation, and construct and startup operations for the NGNP.

In 2011, DOE informed Congress that given current fiscal constraints, competing priorities, projected cost of the prototype, and an inability to reach agreement with industry on cost share, DOE would not proceed with the design activities of Phase II. DOE also notified Congress that the initial design parameters for the NGNP were not selected during Phase I and that they will be chosen instead by the public-private partnership once it is formed.

Early in 2012, the NRC staff issued a letter to DOE outlining the scope of NGNP activities that the staff would complete to support DOE's interest in making progress with the NRC on a licensing framework. These preapplication interactions focused on key policy and technical issues associated with source term, containment functional performance, licensing-basis event selection, and emergency planning. Supporting discussions were conducted in 2012, through a series of public working meetings and conference calls informed, in large part, by the preliminary NRC assessment reports completed in 2011, on several related NGNP white paper submittals.

These activities support the New Reactor Program's goal of preparing the NRC for the licensing of non-LWRs.



*To address a provision in legislation, the agency submitted a report to Congress on advanced reactor licensing during the summer of 2012.*





# Activities & Accomplishments

*Top, NRO Deputy Director Gary Holahan, seated in the center of the front row, meets with the Multinational Design Evaluation Program (MDEP) Steering Technical Committee in Beijing, China.*

*Above, Office Director Glenn Tracy participates in the First Americas' Workshop held at NRC Headquarters in Rockville, MD.*

*Right, Office Director Glenn Tracy welcomes two foreign assignees from the Korean Institute of Nuclear Safety for one-year assignments in NRO. Dr. Taekmo Shim, right, a geologist, is working in the Division of Site and Environmental Analysis (DSEA). Left, Dr. Ku Young Chung, a reactor oversight inspector, is on assignment to the Division of Construction Inspection and Operational Programs (DCIP).*



## *INTERNATIONAL COOPERATION*

The Office of New Reactors' international mission continues to center on leveraging its resources and knowledge with the vast experiences of national regulatory authorities around the world.

The NRC proactively partners with the international community through mutually beneficial exchanges of information on the design, siting, and construction of new reactors. Moreover, the New Reactor Program continues to play a pivotal role in the NRC's international cooperative activities. The creation of the NRO in 2006 paralleled formation of the Multinational Design Evaluation Program (MDEP). This international body is comprised of the regulatory authorities of 12 countries that cooperate on the licensing review for new reactor designs. The creation of the New Reactor Program also corresponded with the NRC's full cooperative program with China and several other countries that were embarking on a new reactor initiative.

Multilaterally, NRO engages counterparts under the MDEP, the International Atomic Energy Agency (IAEA), and the Nuclear Energy Agency (NEA) Committee on Nuclear Regulatory Activities (CNRA). Bilaterally, the NRO continues to meet individually with nuclear safety regulatory authorities for the new reactor programs in France, Canada, Czech Republic, United Arab Emirates, India, United Kingdom, Finland, Japan, and Korea. NRO also provides regulatory assistance to countries such as Indonesia, Lithuania, Poland, Vietnam, and several countries in Africa—all of which are on a path to develop or expand their nuclear programs.

The New Reactor Program leads the way for the NRC's international staff exchange. In 2012, NRC staff members were placed on temporary assignments to China, France, Korea, Poland, and the Czech Republic. The assignments to Korea were the first-of-their-kind for the NRC. NRO Branch Chiefs were placed on assignments with the Korean Institute of Nuclear Safety. Their assignments have provided opportunities to better understand the safety analysis review of the Korean Advanced Power Reactor 1400 (APR1400) design, which the NRO staff is preparing to review.

An NRO reactor operations engineer was assigned to the Beijing Northern Regional Office of China's National Nuclear Safety Administration (NNSA). The operations engineer witnessed China's vendor inspection program and was able to provide NRC staff with a better understanding of NNSA's organization. An NRO senior systems reviewer completed an assignment to the French Nuclear Safety Authority (ASN), where he worked on the French input and response to the European Union's

post Fukushima stress tests. An NRO technical reviewer was in Poland from August to December 2012 to work with Polish regulators, institutions of higher education, and other stakeholders as that nation builds a safe and secure civilian nuclear power program. His stay was representative of an ongoing partnership between the United States and Poland in the field of nuclear energy.

Additionally, an NRO Branch Chief provided technical assistance to the Czech Republic nuclear regulator on new reactor instrumentation and control regulations and guidance. These staff exchanges have been invaluable to the New Reactor Program and have furthered the NRC's cooperative relationship with these regulatory authorities. Similarly, during the last year, NRO hosted 10 foreign assignees from Germany, France, United Arab Emirates, Indonesia, Czech Republic, and China.

During the past year, the NRC participated in developing a new trilateral initiative among the NRC, United Arab Emirates, and Korea to review the Korean Hydro and Nuclear Power Company's APR1400 reactor design.

NRO staff and management play important roles in the NRC's International Regulatory Assistance Program. Under the direction of the Office of International Programs, NRO staff was frequently asked to participate and lead international workshops on nuclear executive training and siting of new nuclear power plants. These workshops were given and hosted by emerging nations or nations just embarking on a nuclear power program. Also in 2012, NRO staff and management provided on-the-job training to foreign assignees from Indonesia. These assignees worked alongside senior technical staff in NRO's Division of Site and Environmental Analysis. The NRO staff also developed a training workshop on environmental and site analysis for Poland's regulatory authority.

During the past year, NRO continued to engage international counterparts in construction and vendor oversight and inspection. For example, in July 2012, NRO hosted a vendor inspection workshop that had more than 600 participants, including international counterparts. The NRO staff also participated in many vendor inspections that included participation or observation by foreign counterparts from China, Korea, France, and Japan.

NRO is also a major player in the NRC's bilateral cooperation with China and India. The NRO Office Director leads the NRC–NNSA/China Annual Steering Committee Meeting and participates in the broader U.S.–China Joint Commission Meeting on Science and Technology Cooperation, which is





# Activities & Accomplishments

*Top, DE Branch Chief Terry Jackson, right, visits the Temelin nuclear power plant as part of NRC effort to provide technical assistance on instrumentation and control to the Czech Republic.*

*Above, NRO Branch Chief Hossein Hamzehee and Seon Ho Song of KINS stand next to a low-pressure turbine at Doosan Heavy Industries (DHI) in Korea. DHI is building steam generators for new reactors at Vogtle.*

*Right, NRO Program Analyst Toni Sakadales, standing, works with Michaela Ratajova, an assignee from the Czech Republic.*



organized by the White House Office of Science and Technology Policy and the U.S. Department of State. The NRO Director of the Division of Engineering continues to lead the coordination of bilateral activities with India, including a semiannual bilateral meeting and coordination with the U.S. Department of Energy and the U.S. Department of State.

NRO staff maintains a leadership role in MDEP. It chairs the MDEP Steering Technical Committee, the Digital Instrumentation and Control Working Group, and the AP1000 Design Specific Working Group and participates in all MDEP working groups. Accomplishments under MDEP and a detailed description of the working groups, including the annual report, can be found on the NEA Web site at [www.oecd-nea.org](http://www.oecd-nea.org).

NRO staff and management also hold leadership roles in IAEA's International Seismic Safety Center (ISSC). Through the ISSC, IAEA conducts activities related to natural hazards with a goal of developing guidance for hazard evaluations and evaluation of plant responses to natural hazards. These activities have increased since the Fukushima accident in Japan and are divided into several working areas, including those that address seismic and tsunami hazards. NRO staff members participate in these working areas as members, leaders, or expert consultants. A senior manager from NRO

is a program organizer for many ISSC activities, including the 2012 IAEA International Experts Meeting to discuss lessons learned from the Fukushima event. Also in 2012, two NRO staff members visited the Japanese Onagawa Nuclear Power Plant as a part of the IAEA's walkdown mission.

NRO plays a vital role in the NEA/CNRA Working Group on the Regulation of New Reactors. In October 2012, the Office of New Reactors, on behalf of the U.S. Government, hosted the Second CNRA International Workshop on New Reactor Siting, Licensing, and Construction Experience. NRO management also led the CNRA Task Group on counterfeit, fraudulent, and suspect items (CFSI). The NRC was recognized and praised for its leadership in bringing the CFSI issue to the international regulatory community.

Finally, NRO staff and management initiated and hosted the first Americas Workshop. This initiative provides a platform for nuclear regulators in North, South, and Central America to share common interests, insights, and lessons learned related to new reactor licensing and construction. Representatives from Argentina, Brazil, Canada, Mexico, and the United States have committed to engage on topics such as digital instrumentation and controls, siting and external hazards, and small modular reactors. ■



*NRO's Cindy Rosales-Cooper, center left, and Glenn Tracy, third from right, represent the NRC at Brazil's Technical Meeting on Recent Licensing of Nuclear New Builds. Included are representatives from the regulatory authorities of Argentina, Brazil, China, Finland, France, Korea, India, and the IAEA.*



# A Look Ahead

*Photo courtesy of V.C. Summer Construction Residents*



*Photo courtesy of Georgia Power, a Southern Company*



For the New Reactor Program, 2013 and the coming years will provide ample opportunity to carry out effective regulations that enable the safe, secure, and environmentally responsible use of nuclear power to fulfill the Nation's future energy needs. As the program remains focused on meeting the expected challenges in its core areas of new reactor licensing, vendor and construction inspection, advanced reactors, and international cooperation, the Office of New Reactors is ready to embrace an ever-changing workload and to address the challenges with an organizational culture committed to quality, and a vision of success, transparency, and integrity.

Our focus in 2013 and beyond includes oversight of the four reactors under construction and implementation of the U.S. Nuclear Regulatory Commission's well-established vendor inspection program. As activities progress in the construction process, so, too, will our close monitoring. We will properly and safely develop the procedures necessary to support the operational readiness of licensees. These inspections will be conducted in cooperation with the agency's Region II office and the new reactor resident inspectors, who are already on site.

Over the next few years, the New Reactor Program anticipates completing design certification, combined license, and early site permit applications currently under consideration. The program expects to receive an additional application for certification for one large light-water reactor design and another ESP application during the next year.

Meanwhile, we will continue to advance our regulatory infrastructure initiatives to resolve further fundamental policy and technical issues for small modular reactors. As noted, the NRC issued Commission papers in 2012, outlining the approaches needed to resolve policy issues with these types of reactors, including emergency preparedness and security considerations. We will continue efforts to support timely resolution of these key issues to support our review of the SMR designs that we expect to start receiving in 2014.

Internationally, the growing leadership role of the New Reactor Program will continue to position the NRC at the forefront of cooperative activities. The program will continue to partner with the international nuclear community through new and existing mutually beneficial exchanges of people and information related to new reactor activities. We will also partner with the international community and incorporate construction experience gained worldwide into our ever-expanding knowledge base.

As we move forward, our mandate and regulatory responsibilities will require an unyielding focus on our critical safety mission. The New Reactor Program's team of committed employees fully supports this goal, as well as our guiding principles and values, and a culture built on transparency, trust, and effective and respectful communications. We look forward to a future filled with promise and dedication to fulfilling our mission to enable the safe, secure, and environmentally responsible use of nuclear power in meeting the Nation's future energy needs. ■



*Photo courtesy of Georgia Power, a Southern Company*

# At a Glance



*Top, Office IT Specialist Luc Phuong explains the intricacies of the agency's public web site to Rena Cando, a student at the Gaithersburg High School Academy of Information Technology, during IT Shadow Day at the NRC.*

*Above, DNRL Director David Matthews and Michael Johnson, NRC Deputy Executive Director for Reactor and Preparedness Programs, participate in the V.C. Summer combined license signing ceremony.*

*Right, Charles Ader, Director of the Division of Safety Systems and Risk Assessment (DSRA), presents a Special Act Award to Senior Systems Engineer Chang Li.*





The New Reactor Program is responsible for the licensing and oversight of construction of new nuclear reactor facilities. Our mission is to protect the public health, safety, and the environment and to promote the common defense and security. NRO works with other NRC offices to accomplish this mission.

For example, NRO works closely with the Center for Construction Inspection in NRC's Region II, located in Atlanta, GA. The center's mission is to provide assurance in the safety of future operations at new nuclear facilities by ensuring that licensees construct the facilities according to approved designs, using appropriate practices and quality materials.

NRO also coordinates activities with OGC; NSIR, which works to prevent nuclear security incidents and prepare for and respond to safety and security events; and RES. The mission of RES furthers the regulatory mission of the NRC by providing technical advice, technical tools, and information for identifying and resolving safety issues, and promulgating rules and guidance. RES also conducts independent experiments and analyses, develops technical bases for supporting realistic safety decisions by the agency, and prepares the NRC for the future by evaluating safety issues involving current and new designs and technologies. RES develops its program with consideration of Commission direction and input from program offices, including NRO, and other stakeholders.

NRO consists of the following divisions:

### **Division of Advanced Reactors & Rulemaking (DARR)**

DARR leads, manages, and facilitates advanced reactor projects (safety and environmental) including: pre-application activities, design approval application reviews, design certification application reviews, manufacturing license application reviews, construction permit/operating license reviews, and combined license application reviews. DARR leads, manages, and facilitates the development of policy, rulemaking, and guidance for all activities involving the licensing of new and advanced reactors nuclear power plants. DARR leads stakeholder interactions on issues pertaining to advanced reactor projects and new advanced reactor policy, rulemaking, and guidance. DARR also manages the internal guidance developed to support the licensing process.

#### **Branches**

Small Modular Reactor Licensing Branch 1 (SMRLB1)

Small Modular Reactor Licensing Branch 2 (SMRLB2)

Policy Branch (APOB)



Photo courtesy of V.C. Summer Construction Residents

*NRC Executive Director for Operations Bill Borchardt, center, and Region II Regional Administrator Victor McCree, far right, join licensee officials in examining the modular assembly building at the V.C. Summer site.*

### **Division of Program Management, Policy Development, and Analysis (PMDA)**

PMDA provides administrative and management support for the office that includes all corporate functions, project management activities associated with planning and scheduling for licensing and inspection-related work in NRO, contract management activities, and organizational process improvements. PMDA leads, manages, and facilitates the office budget through the planning, budgeting, and performance management process; resource allocation through the staffing plan; analysis of office performance through coordination of the operating plan; and internal controls for financial management. It provides and enhances communication for internal and external stakeholders. PMDA provides oversight and support of information management and technology, including strategies for implementation, large-scale project management tools, schedule and resource planning, and tracking.

#### **Branches**

Financial and Performance Management Branch (FPMB)

Planning & Scheduling Branch (PSB)

Business Services Management Branch (BSMB)

Contract Management Branch (CMB)

Information Technology Management Branch (ITMB)



## At a Glance



*Top, Senior Health Physicist Jean-Claude Dehmel, center, prepares to receive an NRO Vision of Success Award from Office Director Glenn Tracy. Division of Site Safety and Environmental Analysis (DSEA) Director Scott Flanders joins in recognizing Dehmel.*

*Above, Senior Reliability and Risk Engineer Mark Caruso addresses the use of risk insights to enhance NRO's focus on safety.*

*Right, Materials Engineer Tim Steingass voices his thoughts at a Division of Engineering All Hands Meeting.*



## Division of New Reactor Licensing (DNRL)

DNRL leads, manages, and facilitates design certification application reviews, early site permit application reviews, combined license application reviews, and new reactor pre-application activities. It is responsible for the project management (safety and environmental) of these applications. DNRL has the lead for interaction with stakeholders on issues pertaining to large, light-water reactors, and issuance of design certifications and combined licenses.

### *Branches*

Licensing Branch 1 (LB1)

Licensing Branch 2 (LB2)

Licensing Branch 3 (LB3)

Licensing Branch 4 (LB4)

Environmental Projects Branch 1 (EPB1)

Environmental Projects Branch 2 (EPB2)

## Division of Safety Systems & Risk Assessment (DSRA)

DSRA performs technical reviews focused on safety-related and non-safety related systems (e.g., containment, ventilation, and balance of plant), probabilistic risk assessment (PRA), technical specifications, design basis and severe accidents, core physics, and core thermal hydraulic performance for new and advanced reactor plant designs, license applications and amendments, and construction oversight. DSRA provides technical support and expertise for special projects, programs, and policy activities; and develops and implements policies and guidance for the use of PRA and associated analyses in regulatory design making for new and advanced reactors.

### *Branches*

Balance of Plant & Fire Protection Branch (BFPF)

Balance of Plant & Technical Specifications Branch (BPTS)

Containment and Ventilation Branch (SCVB)

PRA and Severe Accidents Branch (SPRA)

Reactor System, Nuclear Performance, and Code Review Branch (SRSB)

## Division of Construction Inspection & Operational Programs (DCIP)

DCIP develops policy and provides overall program management and planning for the construction inspection program for new commercial nuclear power plants. It also coordinates with Region II, the Office of Nuclear Reactor Regulation, and other offices on program implementation, including licensee performance assessment, allegations, and enforcement activities. It implements programs and procedures to systematically assess and coordinate the follow-up of construction-related issues, and recommends corrective plant-specific and generic actions. DCIP also develops and implements the quality assurance and vendor inspection programs, and reviews the quality assurance programs at vendors, fabricators, applicants, and construction licensees. In addition, DCIP develops policies and guidance and implements the national program for the licensing of new nuclear reactor operators. DCIP develops programs and conducts reviews to ensure the effective consideration of human factors engineering in new nuclear power plant design and operation, and assesses the adequacy of facility personnel training programs and emergency operating procedures.

### *Branches*

Construction Assessment & Enforcement Branch (CAEB)

ITAAC Branch (CITB)

Construction Inspection Program Branch (CIPB)

Operator Licensing & Human Performance Branch (COLP)

Construction Electrical Vendor Branch (CEVB)

Construction Mechanical Vendor Branch (CMVB)

Quality Assurance Branch (CQAB)





*Top, DCIP Senior Reactor Operations Engineer Jeff Jacobson asks a question of senior management at a quarterly staff meeting.*

*Above, NRO staff members happily gather for a group photo following the successful hosting of the Third NRC Workshop on Vendor Oversight for New Reactor Construction, which was held in Baltimore, MD.*

*Right, Senior Technical Advisor – I&C Daniel Santos dicusses the ongoing activities of the Open Collaborative Work Environment (OCWE) Working Group.*



## **Division of Site Safety & Environmental Analysis (DSEA)**

DSEA performs site safety evaluations of site characteristics, site-related design parameters, and transient and accident analyses of large light-water and advanced reactor licensing applications. Specifically, DSEA reviews probabilistic seismic hazard analyses; site hazards from nearby transportation, military, and industrial facilities; effects of natural phenomena on plant design (i.e., average and extreme rainfall, snowfall, wind, flooding, and other weather conditions); postulated accidents for siting and environmental reviews; plant occupational radiation safety; and public radiation safety due to radiological effluents. DSEA provides site safety and health physics technical support for large, light-water and advanced reactor environmental reviews. It develops and maintains the site safety and environmental regulatory infrastructure necessary to support applications for new facilities and designs.

### *Branches*

- Hydrology & Meteorology Branch (RHMB)
- Environmental Technical Support Branch (RENV)
- Geosciences & Geotechnical Engineering Branch 1 (RGS1)
- Geosciences & Geotechnical Engineering Branch 2 (RGS2)
- Radiation Protection & Accident Consequences Branch (RPAC)

## **Division of Engineering (DE)**

DE performs engineering-related safety reviews of applications for design certification, combined licenses, construction oversight, and new reactor pre-application activities. It provides technical expertise to support regional activities, special projects, international programs, rulemaking, regulatory, and policy activities. DE reviews may be performed in support of topical reports, consensus standard changes, or new reactor designs.

### *Branches*

- Component Integrity Branch (CIB)
- Engineering Mechanics Branch (EMB)
- Instrumentation & Controls Branch (ICB)
- Instrumentation & Controls & Electrical Engineering (ICE)
- Structural Engineering Branch 1 (SEB1)
- Structural Engineering Branch 2 (SEB2)

## **Region II – Center for Construction Inspection (CCI)**

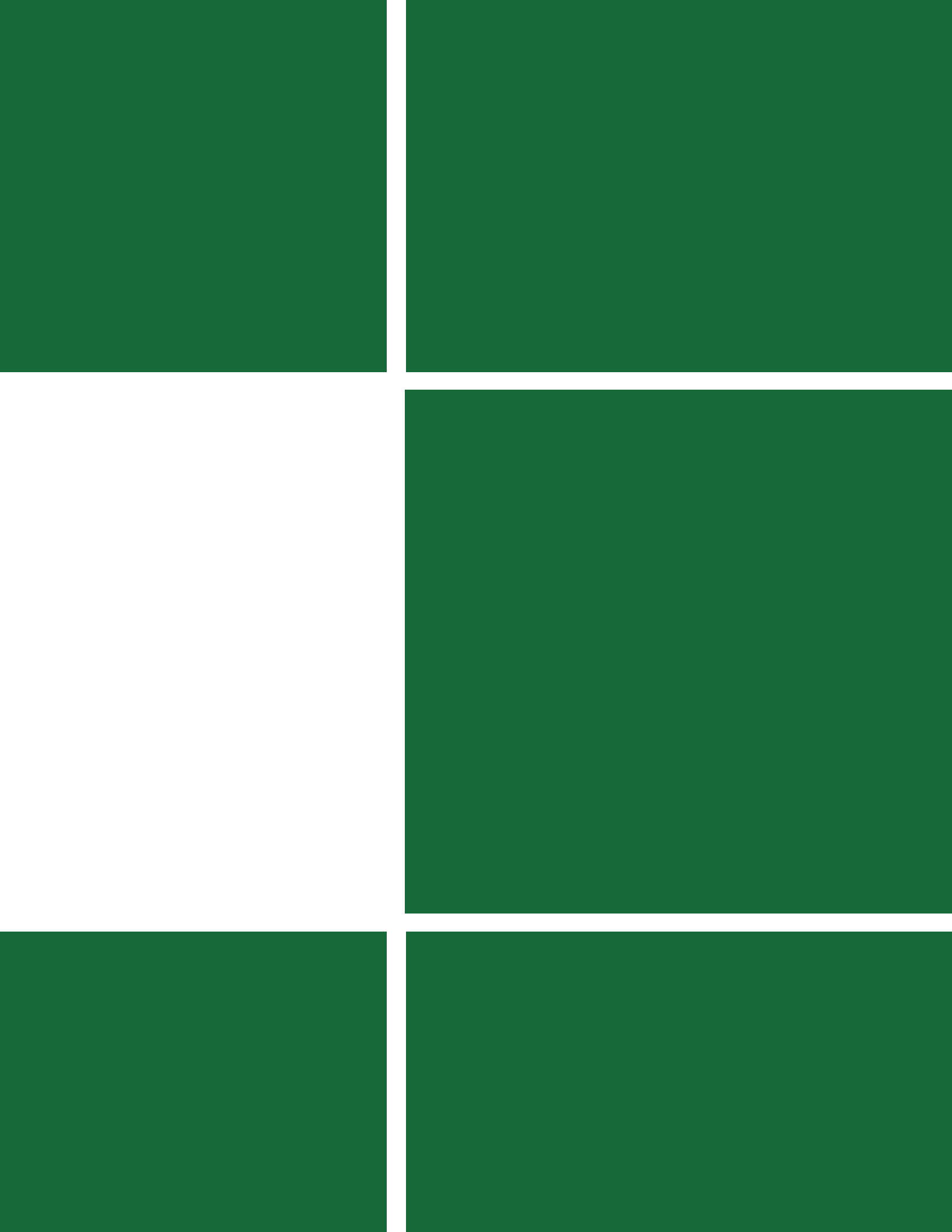
CCI serves as the agency center of expertise for nuclear facility construction inspection activities; manages the construction inspection program; develops infrastructure for construction inspection program and staff; carries out construction inspections at new facilities and associated vendors; evaluates performance of applicants; and provides regulatory bases for agency decisions.

### *Divisions and Branches*

- Division of Construction Inspection (DCI)
  - Inspection Branch 1
  - Inspection Branch 2
  - Inspection Branch 3
- Division of Construction Projects (DCP)
  - Construction Projects Branch 1
  - Construction Projects Branch 2
  - Construction Projects Branch 3
  - Construction Projects Branch 4 ■









NUREG/BR-0476, Volume 2  
March 2013