

**POLICY ISSUE  
NOTATION VOTE**

August 25, 2006

SECY-06-0187

FOR: The Commissioners

FROM: Luis A. Reyes  
Executive Director for Operations

SUBJECT: SEMIANNUAL UPDATE OF THE STATUS OF NEW REACTOR  
LICENSING ACTIVITIES AND FUTURE PLANNING FOR NEW  
REACTORS

PURPOSE:

This paper informs the Commission of the staff's new reactor licensing activities and accomplishments since the issuance of SECY-06-0019, "Semiannual Update of the Status of New Reactor Licensing Activities and Future Planning for New Reactors," dated January 31, 2006. In addition, this paper discusses strategies being developed to prepare for projected new reactor licensing activities in 2007 and beyond.

SUMMARY:

The U.S. Nuclear Regulatory Commission (NRC) staff is preparing to review new reactor license applications that are projected to be submitted during fiscal years (FY) 2007 through FY 2009. Consistent with Commission direction, the staff is developing plans and strategies for all low and medium uncertainty activities. The staff continues to develop and gain support for the design-centered review approach (DCRA) and continues to develop the licensing infrastructure and identify the NRC resources necessary to review the expected new reactor licensing applications. The NRC staff is also actively engaging with the Department of Homeland Security (DHS) to support their preparations for New Reactor licensing.

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Since the last update, the staff issued Commission papers discussing strategies for the new reactor Construction Inspection Program (SECY-06-0041 and SECY-06-0114), the proposed reorganization of the Office of Nuclear Reactor Regulation (NRR) and Region II (SECY-06-0144) and the Multinational Design Approval Program (MDAP) Stage 1 (SECY-06-0133). The staff also completed and supported key regulatory products. On March 13, 2006, the proposed rule revising Title 10, Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants," of the *Code of Federal Regulations* (10 CFR Part 52) was published in the *Federal Register* (71 FR 12781). On May 31, 2006, the staff issued Regulatory Issue Summary (RIS) 2006-006, "New Reactor Standardization Needed to Support the Design-Centered Approach."

#### BACKGROUND:

In SECY-01-0188, "Future Licensing and Inspection Readiness Assessment," dated October 12, 2001, the staff assessed its technical, licensing, and inspection capabilities, and described enhancements to support new reactor licensing. The staff also committed to giving the Commission semiannual updates of the status of new reactor licensing activities.

Staff requirements for SECY-05-0203, "Revised Proposed Rule to Update 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," dated January 30, 2006, directed the staff to provide resource and organization plans for the next four years and proposed strategies for staff review of expected applications and support for combined license (COL) hearings before the Atomic Safety and Licensing Board Panel (WITS200600063).

Staff requirements for COMGBJ-06-001, "Establishing a Policy for the Review of New Power Reactor Combined Operating Licenses," dated April 14, 2006, directed the staff to provide an update on activities related to the DCRA for COL applications in the next semiannual update on new reactor licensing. The Commission also directed the staff to inform it of any impediments to using the DCRA. Additionally, the Commission directed the staff to continue to use the planning, budgeting, and performance management (PBPM) process for new reactor licensing activities and to address policy issues related to new reactor applications.

Staff requirements for SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," dated February 22, 2006, directed that the staff consider codifying standard license conditions for fire protection and security issues in COL applications as part of the next rulemaking opportunity affecting the associated regulations for each condition and provide its assessment to the Commission as part of the proposed rule package (WITS 200600151).

Staff requirements for SECY-06-0071, "Chairman Review Thresholds for Contractual Decisions," dated April 18, 2006, directed the staff to provide the Commission a status report on the plans for contracting work in new reactor licensing and other new work areas.

A June 27, 2006, memorandum from NRC Chairman Nils J. Diaz to Luis A. Reyes, Executive Director for Operations, and Graham Wallis, Chairman of the Advisory Committee on Reactor Safeguards requested that, by August 31, 2006, the staff provide the Commission a status report on its interactions with stakeholders and on completing the master integrated schedule for new reactor licensing (WITS 200600279 and WITS 200600306).

This paper includes two enclosures to respond to the aforementioned SRMs. Enclosure 1 provides detailed information on recent new reactor projects including supporting infrastructure development for new reactor licensing activities and recent COL, design certification (DC), early site permit (ESP), and pre-application activities. It also describes interactions with stakeholders. Enclosure 2 provides an update on the staff's activities and plans for hiring and training new staff to support the review of multiple new reactor licensing applications.

## DISCUSSION:

The following paragraphs summarize key activities, accomplishments, plans, and strategies.

### **Key Activities and Accomplishments in New Reactors**

#### Construction Inspection Program

On April 21, 2006, the Commission approved an initial approach for implementing the Construction Inspection Program (CIP) for new reactors (Staff Requirements Memorandum [SRM] for SECY-06-0041, "Proposed Strategy to Support Implementation of the New Reactor Construction Inspection Program," dated April 21, 2006). This approach will create a dedicated organization in the Region II office in Atlanta, GA, that will have total responsibility for the execution of all construction inspection activities across the country. In the SRM for SECY-06-0144, "Proposed Reorganization of the Office of Nuclear Reactor Regulation and Region II," dated July 21, 2006, the Commission approved the creation of a deputy Regional Administrator for Construction in Region II. Region II plans to initially implement its Construction Inspection organization on October 1, 2006. Some pre-application inspection activities are already occurring and are discussed in more detail in Enclosure 1.

#### Security Requirements for New Reactors

On July 6, 2005, the staff provided the Commission SECY-05-0120, "Security Design Expectations for New Reactor Licensing Activities." On September 9, 2005, the Commission issued an SRM approving the actions proposed in SECY-05-0120. One of the proposed actions was to conduct rulemaking to require applicants to submit a security assessment and target set analysis. The NRC conducted two public meetings (March 6 and July 17, 2006) on this rulemaking and posted draft rule language on the Web for stakeholder information. This proposed rule is due to the Commission by September 29, 2006. Currently, NRR staff is coordinating with the Office of Nuclear Security and Incident Response (NSIR) to develop the guidance for the security assessment and target set analysis.

#### 10 CFR Part 52 Rulemaking

On March 13, 2006, the NRC published for comment a revised proposed rule for 10 CFR Part 52, and conforming changes throughout Title 10. The staff held two public workshops, March 14 and April 18, 2006, on the proposed rule during the public comment period. The comment period closed on May 30, 2006. The NRC received 19 comment letters during the comment period from industry representatives and members of the public. The staff will forward a final rule package for Commission consideration by October 31, 2006.

### ESBWR Design Certification

By letter dated December 1, 2005, the NRC formally accepted the General Electric (GE) economic simplified boiling water reactor (ESBWR) DC application and established a schedule for its review, with a milestone of October 11, 2007, for issuance of the safety evaluation report (SER) with open items. On June 19, 2006, the NRC and GE management met to discuss the status of the ESBWR review. Discussions focused on late submittals from GE. GE presented a schedule for completing all outstanding licensing topical reports and presented proposals to improve its response time to NRC requests for additional information (RAIs). By letter dated August 9, 2006, the NRC told GE that most of these revised commitments associated with topical reports had not been met. The staff also noted in the August 9, 2006, letter that a change to the design of the instrumentation and control system would impact the staff's review in this area. The NRC will meet the published schedule for completing the SER with open items; however, continued late or incomplete submittals from GE will result in additional open items in the SER.

### Early Site Permit Activity

The staff issued the final environmental impact statement (EIS) for the Grand Gulf site on April 7, 2006, and the Grand Gulf ESP final SER (FSER) as NUREG-1840 on April 14, 2006. The staff issued the FSER for the Clinton ESP application as NUREG-1844 on May 1, 2006, and the final EIS for the Clinton ESP on July 20, 2006. In October 2005, Dominion notified the NRC that it would be modifying the North Anna cooling water system design and submitting a revised ESP application. On April 14, 2006, Dominion submitted Revision 6 of the North Anna ESP application, and on May 4, 2006, the staff issued a letter to Dominion acknowledging receipt of Revision 6 and providing the review schedule for the revised application. Dominion issued Revision 7 of the North Anna ESP application on June 21, 2006, and Revision 8 on July 31, 2006 to address staff RAIs. The staff issued the supplemental draft EIS on July 6, 2006, the supplemental FSER on August 15, 2006 and expects to issue the final EIS on December 29, 2006 for the North Anna ESP. The staff received the Vogtle ESP application on August 15, 2006, and is currently performing an acceptance review of the application. As a result of previous ESP activities, lessons learned were developed that will be implemented on future ESP reviews. These include ensuring that the applicant engages with stakeholders (State permitting authorities, NRC, etc) early in the pre-application process. Additionally, to better deal with any public comments received via e-mail during the ESP process, the automated Comment Capture System was developed to greatly reduce the time in handling comment letters.

### Multinational Design Approval Program (MDAP)

In a September 8, 2005, SRM, the Commission approved moving forward with MDAP Stage 1, in which the NRC and its counterparts in other countries interested in participating in the program will determine working arrangements for cooperation in DC reviews. On June 8, 2006, the staff issued SECY-06-0133, "Multinational Design Approval Program Stage 1." This paper informed the Commission of activities and plans associated with Stage 1 of the program. NRC staff also met with their counterparts in France and Finland in January/February 2006 to discuss areas of cooperation for review at both the pre-application and application stages. The NRC and regulators from Finland and France signed bilateral administrative memoranda of

exchange for MDAP Stage 1, expressing their intentions to cooperate on the review of the Evolutionary Power Reactor (EPR) design in accordance with already established bilateral agreements.

The NRC sent two representatives to participate in the discussions of the French standing group of experts for reactors on EPR topics. To continue implementation of MDAP Stage 1, representatives from NRC's Office of International Programs (OIP) and NRR will attend a trilateral meeting September 4 - 12, 2006, with Finnish and French regulators to start technical information exchanges on the EPR design.

On June 19-20, 2006, staff from NRR and OIP attended the first MDAP Stage 2 meeting at the Nuclear Energy Agency (NEA) office in Paris. Other countries represented at this meeting included Canada, China, Finland, France, Japan, Korea, Russia, South Africa and the United Kingdom. During this meeting, consensus was reached regarding the initial scope and focus of the project, including the selection of pilot technical areas. The possibility of a follow-on meeting of a policy group of principals is being evaluated by the NEA. It is anticipated that during this policy group meeting each country would be asked to sign the Terms of Reference to indicate their desire to participate in the project. The staff will update the Commission on the status of MDAP Stage 2 activities in a separate Commission paper by the end of August 2006.

#### Regulatory Treatment of Operational Programs in the COL Process

The Commission approved the staff's proposal for treatment of operational programs in the SRM on SECY-05-0197, dated February 22, 2006. SECY-05-0197 stated that if a COL applicant can fully describe all the operational programs and their implementation (all operational programs which are required by regulation and that the staff expects to review in a COL application) — with inspections to verify their implementation, with the exception of emergency planning — then the NRC would not require inspections, tests, analyses, and acceptance criteria (ITAAC). The staff proposed that a COL include license conditions associated with the timing of program implementation.

This SRM also directed the staff to consider codifying standard license conditions for fire protection and security issues in COL applications as part of the next rulemaking opportunity affecting the associated regulations for each condition. The staff has evaluated this recommendation and agrees that this would be more efficient than including conditions in each license issued. The staff is also considering replacing the special license condition for the fire protection program with a modified rule that incorporates the generic requirements of the special license condition and reverts to 10 CFR 50.59 as the governing regulation for plant changes that impact the fire protection program. NSIR, in coordination with NRR, is evaluating the next opportunity to codify standard license conditions for security issues. These activities will be considered as part of the FY 2009 PBPM process.

#### Advanced Reactor (Non-Light-Water Reactor) Activities

The Office of Research (RES) continues to engage in activities related to advanced reactor designs (i.e., non-light-water reactor designs). These include the U.S. Department of Energy's (DOE's) Next Generation Nuclear Plant (NGNP) project, the pebble bed modular reactor

(PBMR) pre-application review, and high-temperature gas-cooled reactor (HTGR) knowledge management. Pebble Bed Modular Reactor Company, Ltd. (PBMR [Pty] Ltd.) continues to interact with the staff in pre-application review activities supporting the PBMR design, an HTGR design. The staff plans to attend the biannual HTGR 2006 conference in South Africa in October 2006 and meet informally with the South African nuclear regulators following the conference to discuss issues related to licensing an HTGR. The staff may face future challenges in hiring personnel with experience in HTGR technologies that will be necessary to support the Agency's regulatory role in the NGNP project.

### New Reactor Plans and Strategies

Since the last update, the number of expected COL applications for the period FY 2007 through FY 2009 has increased to a total of 19, and several of these applications will be for dual unit sites. Table 1 lists the NRC staff's anticipated activities for FY 2007 through FY 2009 based on current Commission guidance and subject to Commission approval of FY 2008-2009 budgets.

**Table 1 - FY 2007-2009 New Reactor Licensing Anticipated Activities**

FY 2007	FY 2008	FY 2009
Complete 2 ESPs: Clinton and Grand Gulf (currently in hearings)	Complete North Anna ESP	
Continue Southern ESP	Continue Southern ESP	Complete Southern ESP
Start ABWR applicant (Amarillo Power) ESP	Continue ABWR ESP	Continue ABWR ESP
DC pre-application activities for EPR, PBMR, IRIS and US APWR *	DC pre-application activities for EPR, PBMR, IRIS and US APWR	DC pre-application activities for IRIS
Continue ESBWR DC	Continue ESBWR DC	Continue ESBWR DC
	Start EPR DC	Continue EPR DC
	Start US APWR DC	Continue US APWR DC
	Start PMBR DC	Continue PBMR DC
Pre-application activities for potential COL applicants	Pre-application activities for potential COL applicants	Pre-application activities for potential COL applicants
Start SCE&G (Summer) COL	Continue SC E&G COL	Continue SC E&G COL
	Start Dominion (North Anna) COL	Continue Dominion COL
	Start UniStar (Calvert Cliffs) COL	Continue UniStar COL
	Start Duke (Lee) COL	Continue Duke COL
	Start NuStart 1 (Bellefonte) COL	Continue NuStart 1 COL
	Start NuStart 2 (Grand Gulf) COL	Continue NuStart 2 COL
	Start Southern (Vogtle) COL	Continue Southern COL
	Start UniStar (Nine Mile) COL	Continue UniStar COL
	Start three UniStar COLs	Continue three UniStar COLs
	Start NRG Energy (South Texas) COL	Continue NRG Energy COL
	Start Progress Energy (Harris) COL	Continue Progress Energy COL
	Start Progress Energy (Florida) COL	Continue Progress Energy COL
	Start Entergy (River Bend) COL	Continue Entergy COL
	Start Amarillo Power COL	Continue Amarillo Power COL
	Start two unannounced applicant COL	Continue two unannounced applicant COL

FY 2007	FY 2008	FY 2009
		Start FP&L COL
Regulatory infrastructure development and technical development	Regulatory infrastructure development and technical development	Regulatory infrastructure maintenance and technical development
Continue NGNP interactions with DOE	Submit joint NGNP licensing strategy to Congress	Continue NGNP interactions with DOE

\* Evolutionary Power Reactor (EPR), pebble bed modular reactor (PBMR), International Reactor Innovative and Secure (IRIS), Next Generation Nuclear Plant (NGNP), Department of Energy (DOE), Advanced Pressurized Water Reactor (APWR)

### Approach to Resource Allocation

In the SRM on COMGBJ-06-0001, the Commission stated that it was premature to establish a prioritization scheme for new reactor applications. Consequently, the NRC staff developed an FY 2008 budget request to accommodate all low and medium uncertainty activities known at the time, consistent with current Commission direction. The planning environment remains dynamic as potential new reactor licensing applicants continue to provide the Agency with information on additional applications. As a result, Table 1 includes several activities not included in the staff's submission to the Commission (such as the NRG Energy COL, the three unnamed Unistar COLs, the two unannounced COLs, and the US APWR DC). These additional activities are under consideration by the Commission as part of the FY 2008 budget development process. Furthermore, additional work may be identified after the budget request has been finalized. The staff is evaluating the capabilities of existing resource management tools to address potential increases in the number of licensing applications.

The staff has developed the following approach to new reactor resource allocation. The staff will establish review schedules after licensing applications are accepted and those schedules will be commensurate with available resources. For activities that were included in the budget development, sufficient resources will be available and the review schedules will be consistent with the nominal timeframes (e.g., 30 months for a COL review). For activities that are identified after the budget development, the staff will conduct the licensing review as expeditiously as possible given available resources and will develop an appropriate review schedule. As directed by the Commission, the staff will use the PBPM process to identify resources. Changes in application submission dates and differences between actual review execution and the assumed budget model are both potential sources of additional resources. Additionally, the staff will use the mid-year funding request process to request additional agency resources for newly identified resource needs in the new reactor licensing program. The staff will inform the Commission of any redirection of resources between planned accomplishments in excess of the established reporting thresholds. In circumstances where identified resources cannot support all of the additional unplanned activities, preference will be given to COL reviews over ESP reviews, consistent with Reactor Safety Program Common Prioritization rankings. Furthermore, due to the significant long term commitment of Agency resources required for a design certification (DC) review, the staff will seek Commission direction prior to initiating any DC review that was not included in the Commission approved budget.

In the SRM to SECY-05-0203, the Commission directed the NRR staff and the Office of the General Counsel (OGC) to provide proposed resource and organization plans for the next four years, as well as proposed strategies for staff review of expected applications and support for COL hearings before the Atomic Safety and Licensing Board Panel. Estimating resource

requirements for the next several years remains a challenge. Last summer, prior to the passage of the Energy Policy Act of 2005, the Agency was aware of approximately three potential COL applications. The Act served as a major catalyst for new reactor interest, and now the staff is aware of at least 19 potential COL applications. Notwithstanding the dynamic nature of the planning environment, the most recent resource plans for FY 2007 and FY 2008 were provided to the Commission as part of the FY 2008 budget development process. The staff's planning model assumes a front-loaded review with almost half of the resources required for the review being used during the first year. As virtually all of the currently projected COL reviews will be initiated in FY 2008, resource needs in FY 2009 are expected to be reduced slightly with a significant decrease in FY 2010 as most of the technical reviews will be concluding. The magnitude of the decrease will be reduced or eliminated if additional applications are submitted.

#### Approach to Review

To implement the design-centered review approach and resource allocation models for the COL applications effectively, the staff issued RIS 2006-06, "New Reactor Standardization Needed to Support the Design-Centered Licensing Review Approach," dated May 31, 2006. The RIS explains the Agency's design-centered review approach (DCRA) to reviewing DC and COL applications and outlines expectations for applicants and vendors to standardize within a design in order to make the DCRA effective. The staff intended this RIS to promote the Commission's longstanding policy on standardization of COL applications and to facilitate the establishment of a predictable and consistent method for reviewing applications. To this end, the NRC staff stated in this RIS that it seeks voluntary submission of information on addressee schedules and plans for standardization. In a June 20, 2006, meeting with the New Plant Oversight Committee (NPOC) and the Nuclear Energy Institute (NEI), nuclear utility senior executives informed the NRC staff that they are in complete agreement with the DCRA and realize that the efficiencies gained from such an approach will benefit both the NRC and the industry. Industry responses to the RIS were submitted to the NRC in July 2006 and communicate support and endorsement of the DCRA. The staff also held design-centered working group (DCWG) meetings with the ESBWR DCWG on July 14, 2006, and with the AP1000 DCWG on July 27, 2006.

#### Approach to Span of Control

In the SRM to SECY-06-0144, the Commission approved the creation of the Office of New Reactors (NRO). The Commission's action was in response to the dramatic growth in this program and will improve span of control and organizational focus on new reactor licensing, while ensuring that appropriate focus is maintained on the safety of operating reactors. Detailed staffing and transition plans are currently being developed for NRO which will be initially staffed by January 2007. In order to take advantage of the DCRA, the office will be a strong project-based matrix organization. Specifically, based on the level of effort to support the reviews, the technical branches will be aligned with a specific design center. The office will have a dedicated technical review capability that will preclude competition for resources with NRR.

Support for security and emergency planning reviews will still be provided by NSIR. Consistent with the approach described in SECY-05-0188, "Proposed Reorganization of the Office of Nuclear Security and Incident Response," dated October 19, 2005, NSIR has established a New

Reactor Security Team within the Division of Security Policy devoted solely to new reactor security licensing in order to enhance management span of control and increase focus on this key activity. The Division of Preparedness and Response is considering a similar action at this time.

The Department of Homeland Security (DHS) also plays an important role in new reactor review activities. NSIR has been coordinating with DHS to clarify their role in the security and emergency preparedness areas. Recent meetings have helped to clarify DHS's understanding of the projected licensing demand. Work continues related to the details of DHS review schedules, and ensuring timely input to the NRC review process.

Similarly, the Office of the General Counsel (OGC) implemented a reorganization to provide increased focus and attention to new reactor licensing. Specifically, in April 2006, OGC created the Division of New Reactor Programs. The Office of Administration has added procurement, space management, and regulatory support staff, reorganized the Division of Facilities and Security, and is planning to reorganize the Division of Contracts to support the growth in new reactor licensing work.

#### Regulatory Infrastructure Development

The NRC is using the resources included in its FY 2006 budget for infrastructure development to hire and train staff and to update and revise the Standard Review Plan (SRP) and existing regulatory guides (RGs), the Environmental SRP, as well as to develop a new COL application RG, DG-1145, which is based in part on RG 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants." The staff held monthly public workshops in March - August 2006 with stakeholders to discuss DG-1145 and its contents. The staff posted a draft work-in-progress version of the 40 sections within the regulatory position section of DG-1145 on the NRC public Web site on June 30, 2006, and plans to formally issue DG-1145 for public comment on September 1, 2006. The staff will publish the final guide following the issuance of the 10 CFR Part 52 rulemaking. In addition, the staff has accelerated the schedule for revision of the SRP and referenced RGs to be issued in March 2007.

#### Contracting Strategy to Support New Reactor Licensing

New reactor licensing activities continue to focus on reviewing applications for DCs and ESPs and on preparing for the review of multiple COL applications. To acquire the necessary resources to support these reviews, the NRC staff is aligning with organizations capable of supplying qualified technical personnel both to complete previously identified outsourced review activities and to complement the staff for emergent needs. Through advanced planning and contracting efforts these resources should be in place to review the ESP and COL applications expected in FY 2008.

#### New Reactor Master Integrated Schedule

The staff is developing a master integrated schedule of ongoing and planned activities necessary to prepare the NRC for its new reactor licensing responsibilities. As a first step, a comprehensive activity list is being developed that includes the identification of responsible parties and scheduled completion dates. The staff is working with internal (including ACRS and

ASLB) and external organizations and stakeholders to develop this list. The staff has recently contracted for expertise which will be used to build upon this comprehensive list and to fully develop the master integrated schedule. The development of the master integrated schedule is expected to be completed by early 2007.

#### Potential Policy Issues

In the SRM on COMGBJ-06-0001, the Commission directed the staff to address policy issues related to new reactor applications in this paper. At this time, the staff has not identified any potential policy issues.

#### COMMITMENTS:

The staff is evaluating the appropriate rulemaking opportunities to codify standard license conditions for fire protection and security issues in COL applications. These activities will be considered as part of the FY 2009 PBPM process.

#### CONCLUSIONS:

New reactor licensing activities continue to focus on reviewing applications for DCs and ESPs and on preparing for the review of multiple COL applications. The staff is developing the necessary strategies and plans to undertake these reviews. The staff has accelerated the development of the technical infrastructure needed to complete these reviews and the regulatory infrastructure that will make the licensing process more effective and efficient. The NRC staff continues its interactions with stakeholders to ensure openness in these activities and that any future planning reflects the most recent industry plans and schedules.

#### RESOURCES:

As part of planning for the new reactor licensing applications expected in FY 2008, NRC received additional funding (\$20 Million) in FY 2006. As part of the FY 2007 budget process the Energy and Water Development Appropriation Bill (H.R. 5427) passed by the House of Representatives includes an additional \$40 million for the NRCs new reactor activities.

While the increased workload related to new reactors is impacting staffing throughout the Agency, the greatest impact by far is being felt by NRR. NRR is currently hiring staff to meet the projected full-time equivalent (FTE) for FY 2008. As of August 22, 2006, NRR has selected 242 employees in both technical and support areas. Of the 242 employees selected, 171 are on board and personnel are categorized as follows: 27 Nuclear Safety Professional Development Program (NSPD) candidates, 25 administrative and 119 technical. The 71 remaining employees selected are going through the security clearance process.

These additional FTE are being used to update the regulatory infrastructure (e.g., SRP) to support the multiple, simultaneous new licensing reviews expected in FY 2008. The Office of Nuclear Regulatory Research is also currently hiring additional staff to support the planned FY 2007 new reactor FTE allocation approved by the Commission in August 2005.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection. The Office of the Chief Financial Officer (OCFO) has reviewed this paper for resource implications and has no objections.

*/RA/*

Luis A. Reyes  
Executive Director  
for Operations

Enclosures:

1. Semiannual Update of the Status of  
New Reactor Licensing Activities —  
August 2006
2. Hiring and Training Strategies

# Semiannual Update of the Status of New Reactor Licensing Activities

August 2006

## **INTRODUCTION**

This enclosure to the August 2006 update of the status of new reactor licensing activities provides a brief history and current status of the Advanced Plant 1000 (AP1000) and the economic simplified boiling water reactor (ESBWR) design certification (DC) reviews, the combined license (COL) application interactions, the early site permit (ESP) reviews, pre-application activities for other reactor plant designs, regulatory infrastructure development, and stakeholder interactions.

## **DESIGN CERTIFICATION**

### **Advanced Plant 1000 (AP1000)**

On March 28, 2002, Westinghouse Electric Company, LLC (Westinghouse), submitted its application for final design approval (FDA) and standard DC for the AP1000 design. The U.S. Nuclear Regulatory Commission (NRC) staff issued the final safety evaluation report (FSER) and the FDA on September 13, 2004. The proposed DC rule was published in the *Federal Register* on April 18, 2005 (70 FR 20062). Subsequently, Westinghouse submitted changes to the AP1000 design information in Revision 15 to the design control document (DCD). The NRC staff evaluated these changes in a supplement to the FSER (NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," Supplement No. 1). The final rule was transmitted to the Commission by the Executive Director for Operations (EDO) on December 14, 2005 (SECY-05-0227, "Final Rule—AP1000 Design Certification"). On December 30, 2005, the Commission voted to approve the final DC rule for the AP1000 standard plant design and the final rule was signed by the Secretary of the Commission on January 23, 2006, after approval of the information collection requirements by the Office of Management and Budget.

On January 27, 2006, the NRC issued the AP1000 final design certification rule (DCR) in the *Federal Register* (71 FR 4464). Applicants or licensees intending to construct and operate an AP1000 design may do so by referencing the AP1000 DCR. On March 10, 2006, the NRC issued a revised final design approval (FDA) based on Revision 15 of the Westinghouse design control document (DCD). The staff is currently reviewing AP1000 design technical reports that address generic COL action items, identify standard design changes, provide standard design information on design process and design acceptance criteria (DAC), and address deferment of COL action items to as-built requirements.

AP1000 Milestone	Date
Issue FSER	September 13, 2004 (complete)
Issue FDA	September 13, 2004 (complete)
Issue FSER, Supplement No. 1	December 13, 2005 (complete)
Commission vote to approve final design certification rule	December 30, 2005 (complete)
Signed by Secretary of the Commission	January 23, 2006 (complete)
Published in <i>Federal Register</i>	January 27, 2006 (complete)
Issue FDA, Revision 1	March 10, 2006 (complete)

In a joint letter dated March 8, 2006, NuStart Energy Development, LLC (NuStart) and Westinghouse stated that they would be submitting to the NRC for review AP1000 technical reports during the pre-application phase for the Bellefonte COL application. These reports will provide information to:

1. Close all or part of specific generically-applicable COL items in the AP1000 certified standard design,
2. Identify standard design changes that are a result of the AP1000 detailed design efforts,
3. Provide specific standard design information in areas or for topics where the AP1000 design certification document (DCD) was focused on design process/methodology and design acceptance criteria (DAC), and
4. Defer COL information items to as-built requirements (inspections, test, analyses, and acceptance criteria [ITAAC], etc.).

Most of the technical reports are related to the closing or partial closing of the AP1000 DCD COL information items; however, the largest review effort will be the design changes which will be submitted and which will likely require rulemaking either to: (1) amend the certified design, or (2) adopt a new design certification rule with the proposed design changes. The design changes include: a redesign of the pressurizer, a revision to the seismic analysis to allow rock and soil conditions other than the hard rock conditions used for the AP1000 DC review, changes to the instrumentation and controls (I&C) systems, a redesign of the fuel racks, and a revision to the reactor fuel design. Another large resource area will be the review of DAC related items, such as the technical reports on human factors engineering (HFE), and the I&C design. Additionally, Westinghouse submitted one report which covers numerous COL information items which cannot be completed prior to issuance of the COL, but can only be completed after the plant is built. These items are being converted to either ITAAC, license conditions or license commitments.

As of July 7, 2006, Westinghouse has submitted 24 technical reports for the staff's review. Although submitted as part of the Bellefonte COL pre-application phase, these technical reports apply generically to the remaining COL applications that intend to reference the AP1000 design.

### **Economic Simplified Boiling Water Reactor (ESBWR)**

General Electric Company's (GE) ESBWR is a 4500-MWt (approx. 1550-MWe) reactor design that uses natural circulation for normal operation and has passive safety features. On April 18, 2002, GE requested a pre-application review of the ESBWR. The NRC staff has completed its review of the application of GE's Transient Reactor Analysis Code (TRACG) which is a thermal-hydraulic code, to ESBWR loss-of-coolant accidents (LOCAs). During the pre-application phase, the NRC staff also began the review of the application of the TRACG code to ESBWR anticipated operational occurrences (AOOs) and to ESBWR thermal-hydraulic stability analysis.

In January 2006, the staff briefed the Advisory Committee on Reactor Safeguards (ACRS) thermal-hydraulic subcommittee regarding the application of TRACG for stability, and the subcommittee recommended the staff approve the TRACG application for ESBWR thermal-hydraulic stability analysis. The staff issued an SER regarding its approval of TRACG for stability analysis in May 2006. GE submitted TRACG for anticipated transient without scram (ATWS) review in January 2006. The staff is currently reviewing the TRACG applications to ESBWR ATWS and AOOs as part of the DC review.

By letter dated August 24, 2005, GE submitted its application requesting standard DC for the ESBWR pursuant to Title 10, Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licences for Nuclear Power Plants," of the *Code of Federal Regulations* (10 CFR Part 52). In accordance with 10 CFR 2.101(a)(2), the staff conducted a 30-day acceptance review of the application to determine whether the application was sufficiently complete to allow the staff to proceed with its detailed technical review. The staff communicated the results of its acceptance review to GE by letter dated September 23, 2005, and requested that additional information be submitted before the application could be formally accepted for docketing. By letter dated December 1, 2005, the staff accepted the application, as revised and supplemented. A notice published in the *Federal Register* on December 9, 2005, announced the docketing of the application.

At this time, the ESBWR DC review is progressing in all areas. Some key activities include public meetings with GE and interactions with GE to address requests for additional information (RAIs). During the week of November 14, 2005, the staff conducted an inspection of the GE quality assurance (QA) program. The staff evaluated the implementation of the GE QA program and issued a Notice of Nonconformance as a result of this inspection. In April 2006, the staff conducted a QA followup inspection to review the corrective actions taken by GE as described in GE's response letter to NRC's Notice of Nonconformance. The staff also conducted a piping design audit at the GE facility in Wilmington, NC, in May 2006, a seismic design audit at the GE facility in San Jose, CA, in June 2006, and a structural design audit at the GE facility in San Jose, CA, in July 2006. The staff visited the GE Nuclear Fuels facility in March and June 2006 for closed meetings to discuss proprietary information associated with the ESBWR fuel design and critical heat flux correlation.

### **COMBINED LICENSE (COL) PRE-APPLICATIONS**

Since the last update, the number of expected COL applications for the period of FY 2007 to FY 2009 has increased to 19, and several of these applications will be for dual unit sites. The prospective applicants include two consortia which are receiving funding from the U.S. Department of Energy's (DOE's) Nuclear Power 2010 program.

The consortium led by Dominion Resources (Dominion) submitted a proposal to DOE, in March 2004, to demonstrate the NRC's process for licensing the construction and operation of new nuclear power plants. The Dominion consortium has selected the GE ESBWR technology.

On April 26, 2004, NuStart submitted its proposal to DOE to demonstrate NRC's process for licensing the construction and operation of new nuclear power plants. On May 6, 2005, NuStart issued a press release stating that it had signed a cost-sharing agreement with DOE. On September 22, 2005, and in its letter dated November 17, 2005, NuStart announced the selection of its two sites and the associated reactor designs. The Bellefonte site will be a dual-unit site and will reference the Westinghouse AP1000 design, and the Grand Gulf site will be a single-unit site and will reference the GE ESBWR design and the Grand Gulf ESP, if granted. The first of these applications is scheduled to be submitted in late CY 2007. On February 7, 2006, the NRC staff held a public meeting with NuStart to discuss the Bellefonte COL pre-application activities. NuStart stated that it is planning on using some of the existing structures at the Bellefonte site, such as the cooling towers, intake structure, switchyard and meteorological tower (with new meteorological instruments). During the meeting, the NRC staff and NuStart discussed the concept of the design-centered approach and standardization of COL applications among other applicants referencing the AP1000 design. On July 27, 2006, the staff met with the AP1000 Design Centered Working Group (DCWG) regarding the planned COL applications for the AP1000 sites. The AP1000 DCWG representatives discussed their efforts to prepare a standard COL application consistent with the design centered review approach (DCRA), and their response to Regulatory Information Summary (RIS) 2006-002.

On August 17, 2005, Southern Nuclear Operating Company (SNC) notified the NRC staff that Georgia Power Company had directed them to pursue an ESP/COL at the Vogtle Electric Generating Plant site, located near Waynesboro, GA. SNC is scheduled to submit an ESP application in August 2006, and a COL application in March 2008. On January 27, 2006, SNC announced that it will pursue the Westinghouse AP1000 as the reactor technology for potential new nuclear units at the Vogtle site.

AREVA and Constellation Energy announced on September 15, 2005, the formation of UniStar Nuclear. This joint enterprise is intended to provide a single source for design, construction, and operation of new nuclear plants. UniStar Nuclear will market the evolutionary power reactor (EPR) design. AREVA and Constellation Energy each own half of Unistar. On June 21, 2006, Unistar Nuclear submitted a letter of intent notifying the NRC of their plans to submit a COL in the fourth quarter of 2007 for the Calvert Cliffs site (if the site is selected). This date represents an acceleration of the previous schedule of June 2008. Unistar also estimated that three additional COL applications would be submitted during the first half of 2008. Finally, Unistar projects that a COL application for the Nine Mile Point site could be submitted in the third quarter of 2008 (if the site is selected). All applications are for the EPR design.

By letter dated February 1, 2006, Progress Energy notified the NRC staff that it plans to submit two COL applications using the Westinghouse AP1000 reactor technology. Progress Energy has selected one site in the Carolinas (Harris Nuclear Plant) and one site located in Florida. The

Florida location will be determined in the near future. On February 21, 2006, the NRC staff met with Progress Energy to discuss Progress preparations for submitting a COL application. In its July 12, 2006, response to RIS-2006-006, Progress informed the staff of its intent to submit its first COL application in October 2007 for the Harris site, and a second application for a Florida site in July 2008.

On November 15, 2005, the NRC staff met with Entergy Nuclear to discuss planning related to COL applications for its Grand Gulf and River Bend sites. The Grand Gulf application will be a joint venture with NuStart and will reference its ESP (if granted), and both submittals will reference the GE ESBWR. On July 14, 2006, the staff met with the ESBWR DCWG, comprised of representatives from NuStart, Dominion, Entergy, GE, Bechtel and Enercon) regarding the planned COL applications for the Grand Gulf, North Anna, and River Bend sites. The ESBWR DCWG representatives discussed their efforts to prepare a standard COL application consistent with the DCRA, and their response to RIS-06-002. They also informed the NRC of their intent to submit North Anna and Grand Gulf COL applications (each for one Unit) in November 2007, and a River Bend COL application in May 2008.

On December 5, 2005, South Carolina Electric and Gas (SCE&G) submitted a letter of intent to pursue new nuclear capacity. A COL application will be for two units, and is targeted for submittal in the third quarter of 2007. In a February 10, 2006, letter to the NRC staff, SCE&G stated that it has chosen the Westinghouse AP1000 as the reactor technology and has selected the existing Virgil C. Summer Nuclear Station (V.C. Summer) site as the location. The COL application is scheduled to be submitted during the third calendar quarter 2007.

On March 13, 2006, the NRC staff received a letter of intent from Amarillo Power announcing their intent to pursue two GE Advanced Boiling Water Reactors (ABWRs). The applicant intends to submit an ESP application before the last quarter of 2007, and a COL application as soon thereafter as practicable. The March 13, 2006, letter contained proprietary information submitted under 10 CFR 2.390, which was subsequently made public through a July 27, 2006, letter from Amarillo Power.

On March 16, 2006, Duke Energy (Duke) announced that it had selected the former Cherokee site, near Gaffney, SC as the site for the development of a COL application utilizing two AP1000 units. Duke also announced the designation of two additional sites for possible future ESP development, these sites are in Davie County, NC, and Oconee County, SC. On June 14, 2006, Duke announced that the facilities proposed to be licensed as a part of the Cherokee County project will be named the William S. Lee, III, Nuclear Station Units 1 and 2, effective immediately, in honor of former Duke Power Company chairman, William States Lee, III. In its July 17, 2006, response to RIS-2006-006, Duke informed the staff of its intent to submit its COL application in October 2007.

On April 3, 2006, Florida Power and Light (FPL) informed the NRC that it will be submitting an application for a COL for a site in Florida in 2009. The letter stated that FPL is evaluating site selection and reactor technology options and will inform the NRC when the evaluations are complete.

On June 19, 2006, NRG Energy submitted a letter of intent notifying the NRC of its plans to submit a COL application in late 2007, for two Advanced Boiling Water Reactor units at the

South Texas Project site. On July 27, 2006, the staff conducted a public meeting with NRG to discuss their planned COL application.

On June 27, 2006, the NRC received a letter of intent from an unannounced applicant notifying the NRC of their plans to submit a COL application in the first half of 2008. The applicant has not yet selected a site or technology. The letter was submitted as proprietary in accordance with 10 CFR 2.390.

On July 12, 2006, the NRC received a letter of intent from an unannounced applicant notifying the NRC of their plans to submit a COL application in the third quarter of 2008. The applicant has not yet selected a reactor technology. The letter was submitted as proprietary in accordance with 10 CFR 2.390.

The new reactors design-focused projects branches continue to interact with the potential applicants that have communicated an intent to submit a COL application. In addition, NRC regional inspectors have accomplished the first pre-combined license visits at six potential sites (Lee [Cherokee], Harris, Calvert Cliffs, Grand Gulf, V.C. Summer, and Bellefonte) to observe COL pre-application subsurface investigation activities. A combination of headquarters-based geotechnical experts and project managers accompanied the inspectors on site visits; quality assurance experts were also involved to ensure the scope of the observations dovetailed with planned future QA inspections. Interactions with the applicant's experts provided a forum for discussing the potential site geological attributes, discussing the applicants site exploration program, and observing different geophysical and geotechnical investigations.

Table 1 lists the COL applications anticipated based on correspondence received from potential applicants (As of August 1, 2006). This information is organized consistent with the staff's design centered review approach.

**Table 1 - Potential Combined License Applications**

Potential Applicant	Sites under Consideration *	Date
<b>AP1000 Certified Design</b>		
Duke (William S. Lee III Nuclear Station)	Cherokee (2)	Oct 2007
NuStart Energy	Bellefonte (2)	Oct 2007
Progress Energy (2 COLs)	Harris (2)	Oct 2007
	Florida (2)	July 2008
South Carolina Electric and Gas	V.C. Summer (2)	3 <sup>rd</sup> Qtr 2007
Southern Nuclear Operating Company	Vogtle (2)	8/2006: ESP 3/2008: COL
<b>ESBWR Design (DC Application submitted 8/24/05)</b>		
Dominion	North Anna	Nov 2007
Entergy	River Bend	May 2008
NuStart Energy	Grand Gulf	Nov 2007
<b>EPR Design (DC Application expected 12/2007)</b>		
Unistar (5 COLs)	Calvert Cliffs 3 COLs - TBD Nine Mile Point	4 <sup>th</sup> Qtr 2007 1 <sup>st</sup> half of 2008 3 <sup>rd</sup> Qtr 2008
<b>ABWR Certified Design</b>		
Amarillo Power	TBD (2)	3 <sup>rd</sup> Qtr 2007: ESP (COL: soon after)
NRG Energy	South Texas Project (2)	Late 2007
<b>Unannounced Technology</b>		
Florida Power & Light	TBD	2009
Unannounced Applicant	TBD	1 <sup>st</sup> half 2008
Unannounced Applicant	TBD	3 <sup>rd</sup> Qtr 2008

\* Numbers in parentheses are the announced number of units to be built at the site.

**EARLY SITE PERMITS (ESPs)**

The staff is currently reviewing three ESP applications. The NRC staff received ESP applications in September and October 2003 from Exelon Generation Company, LLC (Exelon), for the Clinton site; from System Energy Resources, Inc. (SERI), a subsidiary of Entergy

Corporation, for the Grand Gulf site; and from Dominion Nuclear North Anna, LLC (Dominion), for the North Anna site.

### **ESP Safety Reviews**

Prior to issuance of the FSER for the Clinton ESP, Exelon requested that the NRC staff review its revised analysis for determining the probable maximum flood (PMF) elevation at Clinton Lake. Exelon also requested that the NRC staff consider adopting the revised PMF elevation as the site characteristic in the staff's FSER. Exelon's revised PMF analysis included changes to the maximum rainfall rate, the maximum hydrostatic PMF water surface elevation, the coincident wind wave activity, and the maximum storm surge. Exelon presented PMF calculations using two different synthetic unit hydrograph methods (the Snyder method and the Soil Conservation Service method) with two different conceptual watershed layouts (a two-basin plus lake model and a seven-basin plus lake model). The staff evaluated Exelon's revised PMF analysis and the information in Revision 4 of the Clinton ESP application and concluded that the revised analysis conservatively estimated the hydrostatic PMF elevation. The staff performed several independent analyses that confirmed Exelon's hydrostatic PMF elevation. The staff documented this conclusion in its FSER, which was issued on May 1, 2006, as NUREG-1844, "Safety Evaluation Report for an Early Site Permit (ESP) at the Exelon Generation Company, LLC (EGC) ESP Site."

The staff issued its FSER for the Grand Gulf ESP application on October 21, 2005. During the December 8, 2005, ACRS meeting on the SERI ESP application and staff's FSER, the ACRS identified a concern on the evaluation conducted for potential hazards along the Mississippi River that could impact the ESP site. In light of the ACRS' concern, the staff determined that the applicant did not meet Regulatory Guide (RG) 1.91, "Evaluations of Explosions Postulated To Occur on Transportation Routes Near Nuclear Power Plants," and therefore requested additional information from the applicant to demonstrate compliance with 10 CFR Part 100. On March 8, 2006, SERI submitted revision 3 to the ESP application where it provided an alternate approach to meeting the regulations with respect to potential hazards along the Mississippi River. The staff reviewed this analysis and performed its own confirmatory analysis to verify SERI's conclusions. On April 6, 2006, the staff met with the ACRS to present its analysis of SERI's submittal, and on April 14, 2006, the ACRS issued its final letter report on the FSER documenting its satisfaction with the staff's conclusions. The staff incorporated changes to the affected sections of the FSER and documented these changes in NUREG-1840, "Safety Evaluation Report for an Early Site Permit (ESP) at the Grand Gulf Site," which was issued on April 14, 2006.

The staff issued its FSER for the North Anna ESP on June 16, 2005. On October 24, 2005, Dominion notified the staff that it was changing the design of the cooling system for proposed Unit 3 from a once through cooling system to a closed cooling system, and increasing the power level of the proposed new units from 4300 MWth to 4500 MWth. The cooling system change was made to address the water usage concerns expressed by the Commonwealth of Virginia and local citizens. The change requires revisions to the application, the Environmental Impact Statement (EIS), and the FSER. On April 13, 2006, Dominion submitted Revision 6 of the North Anna ESP application, and on May 4, 2006, the staff issued a letter to Dominion acknowledging receipt of Revision 6 and providing the review schedule for the revised application. On May 24, 2006, Dominion provided a response to NRC's request for additional information (RAI) letter,

dated May 10, 2006, related to Revision 6 of the application. Dominion incorporated the RAI responses and issued Revision 7 of the North Anna ESP application on June 21, 2006. Dominion issued Revision 8 of the North Anna ESP application on July 31, 2006, to address additional staff RAIs. Consistent with the North Anna ESP review schedule issued by the staff on May 04, 2006, the staff expects to issue the Supplemental FSER on August 15, 2006, for the North Anna ESP.

### **ESP Environmental reviews**

On the environmental side of the reviews, the staff established an integrated environmental review schedule for first-of-a-kind ESP applications concurrent with license renewal reviews, extended power uprate reviews, and other operating reactor licensing actions. The staff published the draft EIS for Dominion's application in December 2004, Exelon's in March 2005, and SERI's in April 2005. The staff issued the final EIS for the Grand Gulf ESP on April 7, 2006, and the final EIS for the Clinton ESP on July 20, 2006.

The Commonwealth of Virginia, in a letter dated February 10, 2004, identified its concerns to Dominion on the impacts of the once through cooling system on Lake Anna. In response to the Commonwealth of Virginia concerns, on October 24, 2005, Dominion notified the NRC staff that it would revise its North Anna ESP application to incorporate a closed-cycle cooling system, thereby reducing the evaporative losses of Lake Anna, and increase the power level of the proposed new units from 4300 MWth to 4500 MWth. At that time, the staff was two months from the scheduled issuance of its final EIS on December 23, 2005. In order to address the design changes, the schedule has been delayed by one year. The staff is scheduled to issue the final EIS for the North Anna ESP application on December 29, 2006.

The NRC staff's public outreach efforts on the draft EISs generated significant interest in the ESP process and led to large turnouts at public meetings. More than 300 people attended the public meeting on the draft EIS for the Dominion ESP application, and more than 1,300 people provided over 13,000 comments on the draft EIS. Similarly, the number of substantive public comments for the Exelon and SERI ESP draft EIS, although less than the amount received for Dominion, were also significantly more than expected. Based on this experience, the staff is evaluating its entire comment capture and resolution process, and is implementing an automated web-based electronic comment capture system for storage, review, distribution, tracking and disposition of stakeholder comments.

Major remaining schedule milestones for the NRC staff's review of the three applications are shown in the table following this paragraph. In all cases, the mandatory hearing and Commission decision processes are assumed to require a total of 12 months after completion of the NRC staff's safety and environmental reviews.

ESP Milestone	Dominion (North Anna)	SERI (Grand Gulf)	Exelon (Clinton)
Draft environmental impact statement (EIS) issued to EPA	12/10/04 C	04/21/05 C	03/02/05 C
Supplemental Draft EIS issued to EPA	07/06/06 C	NA	NA
Final EIS issued to EPA/NRC Notice of Availability Issued	12/29/06 T	04/07/06 C	07/20/06 C
Draft safety evaluation report (SER) issued	12/20/04 C	04/07/05 C	02/10/05 C
Supplemental draft SER issued	NA	NA	08/26/05 C
Final SER issued	06/16/05 C	10/21/05 C	02/17/06 C
Supplemental final SER issued	08/15/06 T	NA	NA

C - Complete  
T - Target

### ESP Proceedings/Hearings

With regard to the ongoing ESP proceedings, *Federal Register* notices of hearing and opportunity to petition for leave to intervene were published for all three ESP applications. Subsequently, petitions to intervene were received on all three ESP applications. For the Dominion application, the petitioners were Blue Ridge Environmental Defense League, Nuclear Information and Resource Service (NIRS), and Public Citizen. The same groups petitioned for leave to intervene in connection with the Exelon ESP application, along with two other groups, the Environmental Law and Policy Center and the Nuclear Energy Information Service. Four organizations petitioned for leave to intervene in the SERI ESP application proceeding: NIRS, the Mississippi Chapter of the Sierra Club, Public Citizen, and National Association for the Advancement of Colored People Claiborne County, Mississippi Branch.

On March 22, 2004, the Chief Administrative Judge of the Atomic Safety and Licensing Board (ASLB) Panel established an ASLB for the proceedings. An initial prehearing conference was held June 21–23, 2004, for all three applications. On August 6, 2004, the ASLB issued rulings in each of the three proceedings, admitting one environmental contention in the Clinton proceeding and portions of two environmental contentions in the North Anna proceeding, and denying intervention in the Grand Gulf proceeding. Three separate ASLBs were then established in the three proceedings.

On July 28, 2005, the ASLB denied amending the environmental contention in the Clinton proceeding and granted summary disposition of the contention. This resulted in termination of the contested portion of the Clinton proceeding. On August 12, 2005, the petitioners for the

Clinton proceeding filed a petition for review of the ASLB's dismissal of the environmental contention. On December 12, 2005, the Commission denied the petition for review. On February 8, 2006, the Interveners petitioned the U.S. Court of Appeals for the Seventh Circuit for review of the Board and Commission decisions. On June 12, 2006, the NRC filed its brief opposing the petition for review.

Following the issuance of the Grand Gulf and Clinton ESP FSERs, the ASLB issued orders on April 17, 2006, and April 19, 2006, requesting the staff to provide the ASLB with documents and briefings to support the upcoming mandatory hearings for the ESPs. In both cases the staff filed motions for reconsideration of the ASLB's orders. The ASLB responded to the staff's motions for reconsideration by granting in part some of the requests and denying in part others. The staff filed requests for interlocutory reviews of these issues for the Clinton and Grand Gulf proceedings. The Commission issued its decision on July 26, 2006.

On August 1, 2006, the ASLB issued an Order Establishing Tentative Case Schedule in the proceeding involving the Grand Gulf ESP application. On August 2, 2006, the ASLB issued an Order establishing a preliminary schedule in the proceeding involving the Clinton ESP application.

### **Future ESPs**

In a letter dated August 17, 2005, Southern Nuclear Operating Company (SNC) informed NRC that it has selected Alvin W. Vogtle Electric Generating Plant (Vogtle) site near Waynesboro, GA, as the site to pursue an ESP. On January 27, 2006, SNC further announced that they are pursuing the Westinghouse AP1000 as the nuclear reactor technology for the potential new nuclear units at Vogtle. This ESP application is the first to reference a certified design (AP1000), whereas the 3 current ESP applications utilize a plant parameter envelope approach. SNC submitted its ESP application on August 15, 2006. In support of the application, the staff conducted a pre-application public meeting on May 11, 2006, in Waynesboro, GA. The staff performed pre-application activities for the environmental review for the SNC ESP application for the Vogtle site in February 2006. The staff also visited Vogtle and alternate ESP sites in March and April 2006.

By letter dated March 16, 2006, Duke Energy stated that they were designating two additional sites for possible future ESP development. These two sites, in Davie County, NC, and Oconee County, SC, will undergo limited site characterization in the future. Duke Energy did not indicate a schedule for future interactions with the NRC staff.

## **PRE-APPLICATION ACTIVITIES**

### **Evolutionary Power Reactor (EPR)**

The U.S. EPR is a large pressurized water reactor of evolutionary design, with a design output of about 1600 MWe, designed by AREVA NP (AREVA). Design features include four divisions of engineered safety features (ESF) and a "core catcher" for containment and cooling of core materials for severe accidents resulting in reactor vessel failure. The design also includes a shield building around the containment, two of four ESF divisions, the control room, and spent fuel pool. The design does not rely on passive safety features.

The first EPR is currently being constructed at the Olkiluoto site in Finland. An EPR is also planned for the Flamanville site in France, and AREVA has submitted a bid for EPR construction in China. AREVA expects to apply for NRC certification of the U.S. EPR design in late CY 2007. Constellation Energy has stated it plans to reference the U.S. EPR design in a COL application in the fourth quarter CY 2007.

AREVA presently has about 200 engineers in the United States working to convert the Olkiluoto EPR design to U.S. codes and standards. This conversion is intended to demonstrate explicit compliance with U.S. regulatory requirements. AREVA does not intend to demonstrate that evaluations conducted to support licensing in other countries are adequate to fulfill U.S. requirements.

Phase 1 of the U.S. EPR pre-application review was completed earlier this year. This phase consisted of familiarizing the NRC staff with the U.S. EPR design and identifying topics to be discussed in Phase 2.

A February 3, 2006, letter provided AREVA's proposal for Phase 2 of the U.S. EPR pre-application review, describing a series of meetings and submittals on a variety of topics. Three key topical report submittals were identified on transient analysis computer code applicability, severe accidents, and critical heat flux correlation. AREVA also identified other technical topics as the subject of other meetings and submittals, including digital instrumentation and controls (I&C), fire protection, probabilistic risk assessment, and quality assurance. Licensing topics such as AREVA's strategy to address design acceptance criteria were also proposed. The NRC staff confirmed its commitment to support AREVA's planned scope of activities in an April 7, 2006, letter. The staff expects to begin receiving submittals on the topics described in AREVA's February 3, 2006, letter later this year. AREVA has indicated that it will occasionally update its list of planned activities as additional topics are identified and as more specific schedule information can be provided.

AREVA met with the NRC staff on February 23, 2006, to discuss its proposal for resolution of design process and verification issues for the U.S. EPR. Previous DCs have used DAC to address topics where technology is rapidly changing, such as I&C, or where detailed engineering information is not available at the time of the certification application, such as piping design. DAC define the design development process that will be applied when a COL application references a certified design so there is confidence detailed engineering will be conducted in an approved manner.

For the U.S. EPR, AREVA plans to take advantage of the first-of-a-kind engineering being completed for the EPR at Olkiluoto which informs AREVA's conversion of the design to U.S. standards. AREVA also expects to take advantage of detailed engineering performed to support planned COL applications which will be ongoing during NRC review of the design certification application (DCA). AREVA believes these efforts will minimize the need for DAC in the U.S. EPR DC.

Following the February 23, 2006, meeting, AREVA documented its proposed approach to piping, I&C, and human factors engineering in a May 24, 2006, letter, seeking NRC agreement on their proposal. The NRC staff is reviewing this letter and will provide feedback to AREVA.

Other recent U.S. EPR pre-application meetings include a March 29, 2006, presentation by AREVA on its efforts to identify regulatory requirements and guidance and to address lessons learned from previous design certification reviews; an April 27, 2006, meeting providing an overview of the U.S. EPR digital I&C design; a May 31, 2006, meeting discussing technical specifications; a June 20, 2006, meeting on fire protection and electrical separation issues; and a July 25, 2006, meeting on severe accident testing and analysis.

While the EPR is an evolutionary design, some of its features require research to provide the tools, knowledge, and data to support the staff's review of the design's safety. Accordingly, a research plan has been developed to provide these tools.

### **Mitsubishi U.S. APWR**

On July 13, 2006, the NRC hosted a public meeting in response to a request by Mitsubishi Heavy Industries, Ltd. (MHI) to start pre-application review activities on the U.S. APWR standard design. The U.S. APWR is a derivative of the APWR that is under construction permitting review in Japan for eventual construction at the Tsuruga site. During this meeting MHI personnel presented information about the company and its current operations, as well as the overall U.S. APWR design. MHI personnel also proposed additional meetings to start the pre-application review and announced its intent to submit a design certification in March 2008. MHI previously submitted letters dated May 15 and June 20, 2006 discussing its intent. No utility has yet publicly stated interest in referencing this design in a COL application.

### **Pebble Bed Modular Reactor (PBMR)**

The PBMR is a helium-cooled high-temperature reactor. A full-scale demonstration plant is being planned for construction in the Republic of South Africa. NRC has entered into pre-application discussions with the company responsible for the design, construction, and operation of the reactor, Pebble Bed Modular Reactor Company, Ltd. (PBMR [Pty] Ltd.), based on its stated purpose to pursue a DC under 10 CFR Part 52. The company intends to eventually seek deployment of the PBMR in the United States.

PBMR (Pty) Ltd. projects in its most recent schedule that the pre-application phase will extend to the end of CY 2007, and has proposed submitting a DCA in CY 2008. Consistent with resource allocations, the staff has committed to engage in a limited pre-application review at this time.

PBMR (Pty) Ltd submitted a letter dated December 8, 2005, providing a summary of pre-application outcome objectives and planned white papers (WPs) to support pre-application interactions with the NRC. The staff discussed these objectives and plans in a meeting held on December 12, 2005. Subsequently, the staff and PBMR (Pty) Ltd. met on February 28 and March 15, 2006, to familiarize NRC staff with the PBMR design and related issues. PBMR (Pty) Ltd. had proposed submitting a series of 20 WPs as part of pre-application activities. Each WP would include a substantive discussion on a specific PBMR topic, including technical, regulatory, and policy issues pertinent to the topic.

The staff reviewed PBMR (Pty) Ltd.'s proposal and agreed to review a limited set of WPs as part of pre-application activities. By letter dated April 24, 2006, the staff communicated its intention

to review and provide feedback on the three WPs on "Licensing-Basis Event Selection," "System Structure and Component Classification," and "Defense-in-Depth." Collectively, these WPs provide the framework of PBMR (Pty) Ltd.'s planned DC approach. The process and results of these reviews would serve as the basis for any future interaction.

These three WP topics represent a significant portion of the technical and policy challenges involved in the entire set of proposed WPs. Outcomes of the staff's pre-application review would include identification of key technical, regulatory, and policy issues that would need to be resolved in support of an effective DCA for PBMR (Pty) Ltd. PBMR (Pty) Ltd. was informed of the importance of proposing and developing sound methods, tools, and data to resolve key technical issues. Resolution of key regulatory and policy issues would follow the Commission decision process.

By letters dated May 25, 2006, and June 27, 2006, the staff informed PBMR (Pty) Ltd. that it would consider reviewing a WP on, "Probabilistic Risk Assessment (PRA) Approach," as well as the paper on the proposed format and content for the DCA for PBMR (Pty) Ltd., to the extent that such reviews enable the staff to better understand the PBMR (Pty) Ltd. safety approach and planned format and content for the DCA. The staff considers that gaining an understanding of the DCA approach is fundamental to accomplishing mutual goals for the pre-application activity. The staff also clarified that, although the PBMR (Pty) Ltd. pre-application review may take place concurrent with the NRC's ongoing development of a regulatory framework that can be applied to non-light-water-cooled reactors (non-LWRs), the two activities are not directly related. The staff's objective for the PBMR pre-application review continues to focus on resolving PBMR-specific technical, regulatory, and policy issues pertinent to design certification. The feedback from the pre-application review would enable PBMR (Pty) Ltd. to prepare a high quality, non-LWR DCA, consistent with 10 CFR Part 52.

On June 13 and July 3, 2006, PBMR (Pty) Ltd. submitted white papers entitled, "Probabilistic Risk Assessment Approach for the Pebble Bed Modular Reactor," and, "Licensing Basis Event Selection for the Pebble Bed Modular Reactor," respectively. The staff will establish a review schedule for these and the other papers mentioned above based on available resources and the relative priorities of NRC's work load.

To prepare for the PBMR pre-application process, the staff has initiated internal discussions among the various technical staff who would be involved in the detailed review of PBMR submittals. The staff expects to take advantage of the earlier efforts relative to the pre-application process that occurred in 2001 and 2002 directed at the PBMR concepts presented by Exelon Corporation.

### **International Reactor Innovative and Secure (IRIS)**

The last public meeting regarding IRIS was held on September 28, 2005, when the staff and Westinghouse discussed WCAP-16392, "IRIS Test Plan," WCAP-16318, "IRIS Small Break LOCA Phenomena Identification Ranking Table," and the submittal of scaling analysis in support of the IRIS test program.

On May 30, 2006, Westinghouse representatives met with the Chairman's Office and the NRC staff. Westinghouse discussed the current status of the IRIS development and its interest in applying the Multinational Design Approval Program (MDAP) to IRIS licensing. Westinghouse informed the staff that the planned submittal of a DCA for IRIS has been changed from CY 2008 to CY 2010. Regarding possible application of MDAP to IRIS, the staff suggested that Westinghouse first initiate interactions with regulatory agencies in countries where IRIS may be deployed.

Westinghouse plans to submit a "roadmap," outlining the planned submittal, in CY 2006 and CY 2007, of additional topical reports related to the IRIS test programs in support of the pre-application review. Westinghouse's objective for the pre-application review is to obtain agreement that the IRIS test program is sufficiently comprehensive to support DC.

### **Small Liquid-Metal Reactor for Galena, Alaska**

The city of Galena, Alaska, has stated it is evaluating the possibility of building a small liquid-metal reactor to provide electrical power to the community. The reactor design being evaluated is the Toshiba 4S, which has an output of about 10 MWe (approximately 30 MWt). The reactor has a compact core design, with steel-clad metal-alloy fuel. The core design does not require refueling over the 30-year lifetime of the plant. Its three-loop configuration includes: a primary system (sodium cooled), an intermediate sodium loop between the radioactive primary system and the steam generators, and a water loop to generate steam for the turbine. The basic layout is a "pool" configuration with the pumps and intermediate heat exchanger inside the primary vessel.

The city of Galena received funding from the State of Alaska to develop a series of white papers (WPs) to explore various aspects, such as nuclear liability, physical security, and emergency preparedness, related to the feasibility of siting a reactor in Galena. The Galena City Manager requested to meet with NRC staff to discuss the WPs and other issues relating to the potential filing of an ESP application for a 4S reactor in Galena. The staff agreed to approve the meeting request, however, subsequent meetings between NRC and the City of Galena would be fee-billable.

To date, Toshiba has not requested a pre-application review; however, the staff has provided Dr. Norihiko Handa, of the Toshiba Corporation, with a brief overview on how to request a pre-application review and the review process. Subsequent to the pre-application review, Toshiba intends to submit a DCA.

In addition, staff instituted a Tribal Consultation Team (TCT), which consists of representatives from the Offices of State and Tribal Programs (STP) as the lead office, the General Counsel (OGC), Nuclear Regulatory Research (RES), NRR, Nuclear Material Safety and Safeguards, and Region IV. The TCT's objective is to engage in consultation with the appropriate Native American Tribal Governments who may be affected by the potential application for licensing of a nuclear reactor to be sited in Galena, AK.

STP will continue to serve as the lead office and point of contact for communication with Indigenous Tribes, First Nations, and Tribal organizations, such as the Yukon River Inter-Tribal

Watershed Council. However, NRR will now serve as the lead office and point of contact with the city of Galena, as a potential applicant.

### **High-Temperature Teaching and Test Reactor (HT3R), University of Texas**

On May 11, 2006, the NRC staff held an initial public meeting with the University of Texas and General Atomics (GA) to discuss the potential licensing of a proposed test reactor at the University of Texas of the Permian Basin (UTPB) campus. As described by UTPB and GA, the proposed test reactor, HT3R, would be a small HTGR with prismatic graphite fuel blocks, 10 percent enriched uranium-oxide coated particle fuel, a thermal power level of 25 megawatts, and a helium coolant outlet temperature of 850 °C (1562 °F). The passive safety characteristics of the HT3R would be similar to those of proposed commercial modular HTGR designs such as GT-MHR and PBMR.

The HT3R would potentially be used for (1) testing and demonstrating HTGR technology and its application to Brayton cycle electric power generation, hydrogen production, water desalination, and other uses of high-temperature process heat; and (2) isotope production, basic research, teaching, and operator training. UTPB has indicated that its preliminary plans include submitting a license application in early 2009, starting construction in early 2010, and completing construction and licensing by the end of 2012. Pursuant to these plans, UTPB and GA would request (1) NRC staff input on the test reactor licensing process to support planning during the remainder of the HT3R pre-conceptual design phase in 2006 and (2) NRC staff review of the licensing plan developed during the conceptual design phase in 2007.

### **REGULATORY INFRASTRUCTURE**

This section provides a status of the 10 CFR Part 52 rulemaking, construction inspection program (CIP) development, COL issues, and other regulatory guidance for both light-water reactor (LWR) and non-LWR technologies.

#### **10 CFR Part 52 Update**

On March 13, 2006, the NRC published, for comment, a revised proposed rule for 10 CFR Part 52. The revised proposed rule contained a rewrite of 10 CFR Part 52, as well as changes throughout the Commission's regulations to enhance NRC's regulatory effectiveness and efficiency in implementing the licensing and approval processes in Part 52 and to clarify the applicability of various requirements to each of the regulatory processes in Part 52 (i.e., ESP, standard design approval, standard DC, COL, and manufacturing license). This rulemaking was based on lessons learned during DC and ESP reviews and on discussions with stakeholders on the review processes. The staff held two public workshops on the proposed rule during the public comment period. The comment period closed on May 30, 2006. The NRC received 19 comment letters during the comment period from the Nuclear Energy Institute (NEI), prospective COL applicants, nuclear steam supply system vendors, Federal Government agencies, and private citizens. The staff will forward a final rule package to the Commission for consideration by October 31, 2006.

The staff is working on a supplementary proposed rulemaking addressing some issues raised in

the public comments on the Part 52 proposed rule that were beyond the scope of the proposed rule. This supplementary proposed rulemaking will address proposals to modify the limited work authorization process in 10 CFR 50.10 to facilitate site preparation activities in advance of issuance of a COL.

### **Design Centered Review Approach (DCRA)**

The staff's DCRA strategy is based on a concept of industry standardization of COL applications referencing a particular design (e.g., COL applications referencing either the AP1000, ESBWR, ABWR, or EPR reactor designs). This approach will use, to the maximum extent practical, a "one issue, one review, one position" strategy to optimize the review effort, the resources needed to perform these reviews, and the review schedules. In effect, the staff will conduct one technical review for each reactor design issue and use this one decision to support the decision on a DC and on multiple COL applications. In order for the DCRA to be fully effective, the DC and COL applicants achieve a consistent level of standardization among related COLs.

Currently, the NRC envisions that its DCRA will focus reviews on four designs — AP1000, ESBWR, ABWR, and EPR — by using standardization and coordination of approaches and applications, call for complete and high-quality applications, increasing the use of DC rulemaking to codify issue closure, and, to the maximum extent practicable, using a single technical evaluation to support multiple related COL applications. In order for the DCRA to be fully effective, applicants referencing a particular design must standardize their applications to the maximum extent practicable (standardize design features, analyses, assumptions, and methods) such that the technical review and decisions are made against a standard application, known as the reference COL (R-COL) application. If this is done, those decisions will be applicable to subsequent COL (S-COL) applications that reference the standard. The NRC's DCRA uses the DC review or the review of the R-COL as the basis for acceptance. The DC or R-COL application review will identify those technical areas to be considered standard for a given design (AP1000, ESBWR, ABWR, and EPR). S-COL applicants who use the standard application and actively work with the R-COL applicant to standardize will significantly benefit from the DCRA and the goal of having "one issue, one review, one position" for multiple COL applications.

The DCRA focuses the staff's review on the R-COL application and encourages other COL applicants referencing a particular design to standardize the overall design and their applications to the greatest extent possible by referencing the staff's review of the R-COL application. If the S-COL applicants maximize standardization, significant resource savings and schedule benefits result. The DCRA permits significant streamlining of S-COL application reviews because standardization results in the review becoming a verification that the previously completed R-COL application review applies to S-COL applications rather than being a unique review. This reasoning, however, does not apply to those portions of the S-COL application setting forth unique site-specific matters that cannot be standardized. The NRC understands that applicants acknowledge that there are significant near-term licensing review and longer term operational benefits that can be realized through standardization and that applicants are willing to implement the level of standardization needed to make the DCRA an effective and efficient licensing review process.

As a supplement to the DCRA, the NRC recognizes that pre-COL application review of standard technical issues using the NRC's topical report process is an option that applicants could use to

gain further COL review process efficiencies. The use of pre-application topical report reviews for complex design issues such as digital I&C, human factors, piping design, and various operational programs could provide a greater assurance that R-COL and S-COL application review schedules can further be optimized while ensuring the review remains clearly focused on safety.

During a February 21, 2006, public meeting and in RIS-2006-006, "New Reactor Standardization Needed to Support the Design-Centered Approach," dated May 31, 2006, the NRC described the DCRA. The NRC staff believes that the key to success of the DCRA is consistent implementation of standardized COL submittals. The staff believes that standardization of an S-COL application is best achieved by incorporating the R-COL application into the S-COL application by reference and that those unique site-specific conditions that cannot be standardized should be clearly identified in the application. Alternate wording should not be used if standard wording may be applied. Use of alternate wording in portions of S-COL applications intended to be standardized may be interpreted as being a deviation from the R-COL.

In RIS-2006-006, the staff requested specific information of potential COL applicants in order to better prepare for its review of COL applications. The staff requested applicants' views as to what topics or issues will be standardized during the review of the R-COL and those that are likely to be addressed in site-specific submittals related to specific applications.

The NRC also suggested that the COL applicants and applicant for certification of each design form a design-centered working group (DCWG). Such a group would facilitate standardization of COL applications and responses to NRC RAIs. The NRC staff requested the applicants' intent to form DCWGs for each of the four designs (AP1000, ESBWR, ABWR, and EPR).

A key assumption in planning for COL reviews using the DCRA model is identification of the R-COL application for each design (AP1000, ESBWR, ABWR, and EPR) and the anticipated schedule for submitting each R-COL and S-COL application. It should be noted that this schedule information is essential for NRC resource planning. This information was also requested in RIS-2006-006.

Inevitably, during licensing reviews, such as review of COL applications, the NRC staff will have RAIs in order to complete its reviews. The DCRA necessitates that R-COL and S-COL applications have significant standardization, including responses to RAIs associated with these COL applications. To maintain the anticipated review schedules, applicants will need to adhere to an RAI response period.

The NRC staff believes that COL applications that contain insufficient standardization should be considered as deviating from the standardized COL application. The NRC will give priority to R-COL and S-COL applicants that have standardized to the reference and have maximized the facilitation of the "one issue, one review, one position" strategy. For deviating applications, the NRC will establish a schedule and allocate resources to the review on an application-by-application basis.

The staff received ten letters responding to the information requested in RIS-2006-006. The responses provided support and endorsement of the DCRA. The staff is currently reviewing

these responses to determine expected levels of site specific versus generic (standard) COL application sections. This review will assist the staff in developing its integrated planning and scheduling models.

### **Construction Inspection Program Development (CIP)**

In April 2006, the NRC issued Inspection Manual Chapters (IMC) 2503, "ITAAC Inspections," and IMC 2504, "Non-ITAAC Inspections," describing two aspects of the inspection program applicable to new construction. Together with IMC 2501 on ESP inspections and IMC 2502 on inspections to support issuance of a COL, IMCs 2503 and 2504 complete the overall design of the CIP. SECY-06-0114, "Description of the Construction Inspection Program for Plants Licensed Under 10CFR Part 52," provides a detailed description of the development of the CIP.

Work is on-going to develop the detailed guidance to be used by inspectors when examining the performance of ITAAC-related work during construction. One key activity related to ITAAC inspections under IMC 2503 that was completed over the last six months was the selection of ITAAC to be targeted for direct inspection in the field. The staff has used expert panels, consisting of regional inspectors and headquarters technical reviewers, to select the AP1000 and ABWR ITAAC samples. The expert panels have completed the prioritization of the ITAAC for each design and have identified those ITAAC where inspection activities can provide the greatest benefit. Work is now proceeding on the development of the inspection procedures to be used when inspecting ITAAC-related field work. Completion of the 26 ITAAC inspection procedures is currently targeted for the end of calendar year 2006.

The issuance of IMC 2504 has enabled the staff to initiate the process of updating the guidance for inspecting operational programs. Applicants will include the description of the operational programs in the license application and the technical staff will review these program descriptions using the Standard Review Plan (SRP). Since the programs will be approved when the COL is issued, the inspection procedures for operational programs are being revised to focus the guidance on program development and implementation. The staff is coordinating the procedure revision process with the SRP update project to ensure that the inspection guidance complements the reviews performed to support issuance of the COL. In addition to operational programs, IMC 2504 also addresses the inspection of other non-ITAAC activities, including the pre-operational test and start up test programs and the transition to the reactor oversight process. In total, approximately 150 inspection procedures will be developed or revised to support IMC 2504 activities. The work is scheduled to be completed over the next 24 months.

The construction inspection team has worked with the Office of Information Services and with the Information Management Branch in NRR to complete the basic design of the Construction Inspection Program Information Management System (CIPIMS), a database that will allow the NRC staff to manage inspection-generated information. Over the next year, the system will be built and the functions tested. The system is scheduled for deployment in late FY 2007.

### **Regulatory Treatment of Operational Programs in the COL Process (formerly Programmatic ITAAC) and Emergency Planning ITAAC**

The Commission approved the staff's proposal for treatment of operational programs and emergency planning ITAAC in the staff requirements memorandum (SRM) on SECY-05-0197,

“Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria,” dated February 22, 2006. In SECY-05-0197, the NRC staff concluded that a COL applicant can fully describe all the operational programs and their implementation, which are required by regulation and which the staff expects to review in a COL application and inspect to verify their implementation, with the exception of emergency planning. Therefore, if these programs and their implementation are fully described in a COL application, they will not require ITAAC. The staff proposed that a COL include license conditions associated with implementation. The staff also proposed to allow using the SRP update effort currently undertaken by the staff to identify any additional operational programs to those discussed in the paper. The paper also proposed to allow the use of the generic emergency planning ITAAC, as discussed in SECY-05-0197, as the minimum set of ITAAC for emergency planning included in a COL application.

### **Regulatory Guides**

The NRC continues aggressive development of Draft Guide (DG) -1145, “Combined License Applications for Nuclear Power Plants (LWR Edition).” This DG is based, in part, on RG 1.70, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants” and will be applicable to all light-water reactor COL applications submitted under 10 CFR Part 52, whether referencing a certified design, an ESP, both, or neither. The publication of this RG will provide consistent and efficient application guidance. Final publication of the RG will depend on issuance of the final 10 CFR Part 52 rule. The NRC developed this guide using an open process through monthly public workshops. NRC staff has used its external Web site to facilitate public interactions by posting work-in-progress technical sections in advance of the workshops. A draft work-in-progress version of the 40 sections within the Regulatory Position Section of DG-1145 was posted on the NRC public Web site on June 30, 2006. The staff plans to formally issue DG-1145 for public comment on August 31, 2006.

The NRC is developing this guide in close coordination with the SRP effort.

With respect to other RGs, the staff has used the SRP reprioritization effort to identify specific RGs to be evaluated for adequacy to support new site and reactor licensing. RES is characterizing these regulatory guides as follows:

- Existing RGs contain methodologies which may not be conservative for meeting regulations -- update by March 2007
- Existing RGs contain methods which may result in excess safety margin and technical bases available to support revision – update by March 2007
- Existing RGs contain methods which may result in excess safety margin but need development of technical bases to support revision – update in the future
- New RGs for which the technical bases exist to support development of the guide – issue by March 2007
- New RGs for which technical bases need to be developed — develop in the future

NRC staff has further reviewed those RGs that contain methods that are conservative and identified those that are acceptable "as-is," and do not require revision to support new reactor licensing but will be updated at a later date. Regarding those RGs that contain methods which may not be conservative for meeting regulations, the NRC staff is aggressively working to complete the updates by March 2007. This effort is being closely coordinated with the Standard Review Plan (SRP) update to ensure that, where necessary, interim guidance is developed and incorporated into the revision of the SRP to support the new reactor licensing activities.

The offices are working together to coordinate the development of these guides with the associated SRP section updates.

### **Standard Review Plans**

Given that 10 CFR 50.34(h) requires an applicant to perform an evaluation of conformance<sup>1</sup> with the SRP version in effect six months before the docket date of an application and that the announced new reactor license application schedules begin in September 2007, coupled with the need for regulatory stability to maximize standardization with the DCRA, NRC staff determined a need to accelerate the target issuance of the SRP to March 2007.

NRC staff is leveraging the initial efforts to categorize the updates into highs, mediums, and no actions, but recognized the need to have the SRP revisions completed by March 2007. Based on previous and ongoing efforts, NRC staff has determined most of the revisions do not represent new staff positions, but rather reflect accepted positions within the SRP.

To manage this effort, NRR has issued LIC-200, Revision 1, "Standard Review Plan (SRP) Process, dated May 8, 2006. This revision addresses treatment of operational programs consistent with Commission guidance on operational programs in the SRM on SECY-05-0197. In addition, staff is formalizing scoping efforts of the updates in order to engage internal and external stakeholders. Specifically, the staff will package SRP sections which do not represent new staff positions and recommend ACRS not review these sections.

The staff will also be issuing final revisions in lieu of draft for comment. These sections will be available for comment. Before the revision of individual sections, comment resolution may establish the basis for how alternatives to the NUREG-0800 acceptance criteria provide an acceptable method of complying with the NRC's regulations.

It is important to note that certain sections will not contain a complete set of acceptance criteria. One example of this is the staff review of the technical adequacy of the information pertaining to dynamic analysis models for jet thrust force and jet impingement load that are included in SRP Section 3.6.2, "Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping," and ANSI/ANS 58.2. See ACRS Safety Evaluation letters to the Chairman of the NRC (ACRSR-2097 - ML042920334, and ACRSR-2110 ML043450346). Due

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<sup>1</sup>Note: the SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences with the SRP acceptance criteria and evaluate how the proposed alternatives provide an acceptable method of complying with the NRC regulations.

to the complexity of these technical issues, staff will not have an updated technical position. Prior to the availability of the technical bases for the staff position, the staff will review the jet related issues on a case by case basis. Other sections depend on related activities (e.g., the update of SRP Section 13.6, "Physical Security," is dependent on ongoing efforts to revise 10 CFR Part 73, "Physical Protection of Plants and Materials"). For these sections the staff has identified those dependencies and is reviewing those schedules for opportunities to provide the SRP updates.

The staff has and will continue to solicit public feedback on the schedule. The staff has posted and will maintain the SRP schedule on its Web page

<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0800>. In addition, the staff will issue all SRP updates which contain new staff positions for public comment.

In March 2000, NRC issued NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants," (ESRP) which subsumed NUREG-0555, "Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants." Volumes 1 and 2 of NUREG-1555 were incorporated by reference into Review Standard (RS) -002, "Processing Applications for Early Site Permits." Based on experience gained from the initial ESP application reviews, changes in the electric power markets (related to benefits assessments), and changes in statutes and regulations, the staff will update selected sections of the ESRP. The staff has initiated work on the update of the ESRP and plans to ask external stakeholders for input on (1) the priority for individual update activities and (2) technical issues to be addressed in the updates. The staff will correspondingly update RS-002 and develop procedural guidance for the review of a COL application.

In addition to updating the relevant portions of the ESRP, the staff will initiate a series of activities to resolve certain generic issues. These were previously deferred because of higher priorities. These activities include the update of 10 CFR Part 51, Tables S-3 and S-4, Rulemaking Number (RN#) 116, PRM-51-01, an effort that was deferred to redirect technical assistance resources to higher priority license renewal reviews. The 10 CFR Parts 50, 51, and 52, alternative site review rule, RN# 313, was deferred (1) due to budgetary constraints, (2) the need to review the initial ESPs, and (3) to take advantage of the experience gained from the alternative site evaluations performed on the initial ESP reviews. There is no schedule for completion of these activities, however, COL application reviews can occur using application-specific analyses. The staff plans to reflect the updates and overall experience gained with ESPs and COLs in NRC RGs 4.2, "Standard Format and Content of Environmental Reports," and 4.7, "Reactor Site Criteria." These activities will be re-evaluated as part of the FY 2009 PBPM process.

### **Office Instructions**

The staff is developing procedures specifically for processing COL applications submitted under 10 CFR Part 52. These procedures will provide the technical staff as well as the project managers the necessary guidance to orchestrate the receipt, acceptance, review, and safety evaluation of COL applications. The staff is developing the procedures in coordination with the revision of 10 CFR Part 52 final rule expected in October 2006, the draft standard format and content guide (DG-1145) to be issued subsequent to the final rule, and the revision to the SRP

expected in March 2007. All process and supporting procedures are expected to be completed by July 2007.

### **Advance Notice of Proposed Rulemaking**

The SRM for SECY-05-0130, "Policy Issues Related to New Plant Licensing and Status of the Technology-Neutral Framework for New Plant Licensing," dated September 15, 2005, directed the staff to consider ACRS comments in developing a subsequent notation vote paper addressing the policy issues of level of safety and integrated risk. In addition, the Commission directed the staff to expeditiously develop an Advance Notice of Proposed Rulemaking (ANPR) to consider the spectrum of issues relating to risk-informing the reactor requirements and to incorporate into this ANPR the formal program to risk-inform 10 CFR Part 50, as well as other related risk-informed efforts. The Commission also directed that safety, security, and preparedness be integrated throughout this effort.

The staff prepared an ANPR incorporating the issues identified by the Commission in the SRM for SECY-05-0130. In accordance with the SRM for SECY-06-0007, "Staff Plan to Make a Risk-Informed and Performance-Based Revision to 10 CFR Part 50," dated March 22, 2006, the staff published the ANPR in the *Federal Register* (71 FR 26267, May 4, 2006). Additionally, the staff placed the latest working draft of the technology neutral framework on the RuleForum Web site to facilitate stakeholder comment on the framework as part of the ANPR. The staff will conduct a public workshop on this subject on September 14-15, 2006. The ANPR comment period ends December 2006. After assessing stakeholder comment on the ANPR and the technology neutral framework and considering the views of ACRS, the staff will recommend to the Commission whether and how to proceed with rulemaking to make the requirements of 10 CFR 50 risk-informed and performance-based.

### **Security Requirements for New Reactors**

On July 6, 2005, the staff provided the Commission SECY-05-0120, "Security Design Expectations for New Reactor Licensing Activities." On September 9, 2005, the Commission issued an SRM approving the actions proposed in SECY-05-0120. One of the proposed actions was to conduct rulemaking to require applicants to submit a security assessment and target set analysis. The NRC conducted two public meetings (March 6 and July 17, 2006) on this rulemaking and posted draft rule language on the web for stakeholder information. This proposed rule is due to the Commission by September 29, 2006. Currently, NRR staff is coordinating with the Office of Nuclear Security and Incident Response (NSIR) to develop the guidance for the security assessment and target set analysis.

### **Contracting Strategy to Support New Reactor Licensing**

The NRC staff has developed a contracting strategy in anticipation of the new reactor licensing activities that are projected to be increasing during FYs 2007 and 2008. This contracting strategy includes identification and use of a broad mix of contractors, early identification of needs and placement of contracts, and the use of the DCRA. In SECY-06-0071, "Chairman Review Thresholds for Contractual Decisions," dated April 18, 2006, the Commission directed the staff to provide a report on their plans for contracting work in the new reactor licensing area.

To manage the significant growth in new reactor licensing, NRR created a New Reactor Licensing Division including a New Reactor Infrastructure Planning Branch. This new branch is tasked with developing plans and initiatives to prepare the Agency to review new reactor licensing applications. Currently, the organization anticipates receiving more than 18 COLs beginning in late FY 2007 and estimates that NRR will need over 350 direct full-time employees (FTE) and approximately 60 million dollars in FY 2008 to support this level of review. Based on these estimates, the proportion of work for FY 2008 the NRC will be performing is approximately two-thirds and contractors one-third.

The funding for external support creates contracts that fall within two general groups. The first group has very specialized skills or expertise that the NRC staff does not possess and for which adding full-time staff would not be cost effective. The second group of contracts has more general engineering expertise that the staff possesses but not in sufficient numbers.

### **National Laboratories and Support Contractors**

In concert with the external support required to review the multiple applications there are parallel NRC staffing levels that must be fulfilled to guide the effort. The process underway by the Agency to hire several hundred permanent employees to meet the FY 2007 and 2008 workload will be challenging. To ensure success of the projects, NRR is developing a procurement contingency plan in the event its recruiting goals are not met.

The upcoming increase in contracting demand, as well as the diversity of skill sets needed, far exceed the capabilities of any one source. Therefore, staff in NRR and RES are seeking to acquire technical review support from a broad spectrum of qualified organizations. Entities that possess the needed qualifications vary from national laboratories to small businesses to other Government organizations. For example, the staff's program for updating regulatory guides is to be supported by a combination of commercial contracts. The following paragraphs provide details on organizations under consideration for supporting the staff in the review of new reactor license applications.

Finding organizations that are free from organizational conflict of interest (OCOI) is of utmost importance to ensure the independence of COL reviews. The advent of activity to reestablish a nuclear power industry has driven many companies to seek the largest growth potential opportunities. As a result, a number of companies appear to have committed to work with electric utilities or reactor vendors. Articles in the trade press referring to large companies such as Bechtel, CH2M HILL, and Shaw Group, and medium-sized ones like Enercon, indicate a commitment to the nuclear power industry. The staff are committed to ensuring that each laboratory agreement and contract is assessed for OCOI, and that requirements are placed on the laboratories and contractors to ensure compliance with NRC's OCOI rules.

To provide the NRC with access to a large, capable, and responsive staff to support the new reactor licensing process, the DOE Office of Science Laboratories (Argonne, Brookhaven, Oak Ridge, Pacific Northwest) are collaborating to establish a cooperative team. This "laboratory consortium" team is proposing to assist NRC in identifying technical resources and management skills so that the NRC can quickly and efficiently obtain the needed skill sets for supporting new reactor licensing reviews. Each laboratory will identify their staff skills to be compiled by the consortium into a matrix. The participating laboratories will independently

manage the project activities, including task assignments, review schedules, required deliverables, expenditures, and manpower utilization, under the direction of the NRC technical monitor and project manager. With access to this large, experienced and skilled work force, the NRC will be able to leverage this large workforce, rapidly placing task orders, and providing a timely response to changing task priorities. Additionally, the consortium teaming arrangement will ensure a single line for communication, accelerated discussion and resolution of any high level issues that arise. On January 12, 2006, the consortium provided a presentation to the NRC staff to describe its approach. Basic agreements with each of the four laboratories are expected to be finalized in September 2006. OCOI will be assessed before each order for a laboratory employee expert is placed.

The NRC will continue to give consideration to other DOE national laboratories, that are not members of the laboratory consortium, when their areas of expertise are needed to meet Agency needs. Both NRC staff and the consortium members have communicated their intent to negotiate agreements for the expertise of staff of these laboratories.

Options for use of the Center for Nuclear Waste Regulatory Analyses (CNWRA or Center), a Federally funded research and development center at Southwest Research Institute, are also under consideration. In response to SRM M060214 (ML060660065), dated March 7, 2006, the staff prepared SECY-06-0156, "Approaches for Expanding the Range of Regulatory Programs with which the Center For Nuclear Waste Regulatory Analyses can Provide Assistance," dated July 13, 2006. SECY-06-0156 explores four options for CNWRA including (1) increase the number of minimum charter program staff based on revised program review requirements, (2) identify additional work related to the Nuclear Waste Policy Act, (3) use sole-source awards, and (4) expand the CNWRA charter to cover additional levels of support, such as new reactors. NRR has entered into discussions with the Office of Nuclear Material Safety and Safeguards (NMSS) and the CNWRA to further understand the Center's capabilities and commitment to the Agency's needs. Determination of how to best utilize the CNWRA's expertise is ongoing.

NRR staff is also considering the use of other government agencies, such as the U.S. Army Corps of Engineers (USACE) and the U.S. Geological Survey (USGS). The NRR/USACE relationship dates back to the 1970s. The breadth of knowledge possessed by USACE in the area of EISs is extensive. The Agency is renewing its ties to USACE with the development of a new memorandum of understanding (MOU). The USGS currently provides services relating to seismic reviews. This type of work will likely continue with the COLs.

The Division of Contracts, Office of Administration, and NRR conducted a market survey (sources sought notice) and performed analysis to determine the range of available qualified commercial contractors and to assess their capabilities to assist the NRC in new reactor work. The purpose of the sources sought notice was to provide potential companies the opportunity to submit information on their capabilities to perform work for the NRC, and to determine the degree of OCOI each may have. The NRC invited all interested parties, including all categories of small businesses (small businesses, small disadvantaged businesses, 8(a) firms, women-owned small businesses, service-disabled veteran-owned small businesses, and HUBZone small businesses) to submit a response to the market research questions and submit a matrix of resource capabilities. Responses were received on April 28, 2006.

Numerous well qualified companies indicated their desire to primarily work for the government and seemed to have a very low potential for conflict of interest. These responses included input from 48 organizations and identified a total pool of personnel with technical backgrounds that exceeded 1200 candidates. There was a mix of employees and consultants, some of which were submitted by more than one organization. The compiled information on these organizations does provide reasonable assurance that enough technical resources exist and are potentially available to meet the identified needs. Of the 48 organizations, 20 organizations appear to be clear of OCOI, 5 appear to have OCOI issues, and 23 may have some degree of OCOI. As in the case of national laboratories, OCOI will be assessed before each award is made.

NRR in consultation with the Division of Contracts (DC) will compare the contractor skills and staffing requirements in proposed statements of work (SOWs) against the data collected in response to the sources sought notice to determine where adequate resources exist in the marketplace to conduct commercial competitions for specific requirements.

NRR is implementing a focused effort to begin the contracting process well in advance to ensure contracting vehicles are instituted before receipt of the first COL. Specifically, NRR is working with DC to develop several indefinite quantity contracts with technically qualified vendors by mid FY 2007 in order to mitigate staff shortages if they occur. In addition, contracts with commercial firms are under development or planned as additional resources for skills supporting new reactor licensing review.

By reviewing applicable management directives and interviewing the organizations responsible for the application reviews, NRR established a time line that arranges for advanced planning by all the affected organizations. The intent of this process is to allow each of the acquisition participants sufficient time to fulfill their duties. This will require that SOWs be provided to the DC by early FY 2007, allowing the maximum lead time for processing. This advanced planning also helps to ensure that committed resources are available for support.

### **Agency Infrastructure**

NRR is proactively addressing this substantial increase in procurement activities with new infrastructure support including organization, procedures, qualified personnel, integrated cooperation, and disciplined implementation.

NRR recently completed an effort to identify the COL procurement needs during the COL modeling process. This process involved interviews with organizations to determine the internal resources available to participate in the COL reviews and identify technical assistance needs. This process formed the basis for the magnitude of outsourcing to complete application reviews. NRR is performing a similar modeling process for the EIS.

NRR also proposed a DCRA program support structure with new roles and responsibilities. Initial steps to implement this organization have begun. NRR created a new program support organization in April 2006 which will begin contract planning activities in advance of receiving the first COL application. NRR is also developing procedures to formalize the process. In

parallel, NRR has requested organizations to increase their number of technical branch reviewers to support these activities.

NRR and DC also plan to utilize a design-centered approach in defining contracting requirements. For example, for a design center, such as AP1000, support for reviewing the reference and subsequent COL applications for an SRP section will be awarded to one vendor to the maximum extent possible. This will facilitate one decision for multiple applications and enhance consistent reviews and SER input.

NRR is developing an internal Web site to enhance the information sharing among internal team members in the acquisition process. The intent of this Web site is to provide acquisition strategy objectives, presentation slides, contractor listings, procurement activity information, communications, and procurement status. Documents including the SOWs and templates will be available internally to those participating in the reviews. Additionally, anyone within the Agency can enter the Web site to track the status of procurement activities.

### **Information Technology/Information Management**

As the agency prepares to conduct the review processes associated with new reactor licensing, the Office of Information Services (OIS) will coordinate closely with agency offices to define and document requirements and service levels in advance of the anticipated ESP and COL applications. OIS has designated a temporary Senior Level Advisor position for Integrated Business Processes as the lead responsible for coordinating the office's efforts. OIS conducted a preliminary review of the information technology/information management (IT/IM) infrastructure and held initial discussions with NRR and other offices. As a result of these discussions, a number of projects have been proposed to provide technology and services to meet program time lines.

OIS has initiated action to hire additional staff based upon an assessment of the number and complexity of these planned new reactor projects and a review of current workloads. Staff will plan, implement and support application enhancements and developments, technology improvements, security requirements, and other initiatives to address agency growth and our expanding HQ locations. Staff will also respond to increased information management requirements generated as the agency reviews the COL applications.

#### IT/IM Contracting Strategy

A diverse mix of contractors will be utilized under various contracting vehicles to effectively meet agency IT/IM support requirements. Whenever possible, OIS will employ a strategy of utilizing existing support and service contracts to quickly and efficiently meet agency needs. Existing contracts for desktop computers, network support, computer center operations, systems administration, applications development and support, telecommunications services and information management will be examined closely to determine the degree to which in-scope changes and enhancements. For requirements beyond these established contracts, additional commercial contracting requirements will be identified and competitive sources pursued. We will also explore General Services Administration and other interagency agreements as potential sources. All procurement activities will be documented in the Advance Procurement Plan provided to the Division of Contracts.

OIS contracting activities are driven by four primary reasons:

#### Agency Growth

The planned growth in agency staff and the expansion to additional offsite buildings will result in increased costs in a number of areas. Direct costs for computer workstations, telecommunications services, software licenses, and help desk support personnel are some examples of direct expenses. Additional capacity for Internet service, remote access, and audio conferencing are also requirements driven by agency growth and our expanding HQ locations. Most of these services will be acquired through modifications to existing contracts and interagency agreements.

#### Technology Requirements

The initial efforts to address technology requirements involve working directly with program offices to ensure that technology investments effectively meet business needs, minimize duplication of systems, maximize data sharing, and integrate well with the agency IT/IM infrastructure. Staff and contract resources will ensure systems projects are delivered on schedule and within scope and budget. Specific technology projects will be executed to address known and emerging requirements, such as, capturing e-mail in the Agency's Document and Access Management System (ADAMS) or modernizing the video teleconferencing (VTC) system. A combination of contract modifications, competitive procurements, and interagency agreements and will provide the expertise to deliver the required solutions.

#### End User and Systems Support

Contract resources will be integral to delivering an enhanced level of end user and system support as the efforts to review ESPs and COLs peak. In order to better support telecommuting and overtime work, resources have been requested to extend the hours of the Desktop Support Center from 6:00 AM to 6:00 PM to 6:00 AM to 9:00 PM weekdays, and add weekend support hours from 9:00 AM to 9:00 PM. Network and data center onsite support will also be extended beyond current business hours to provide immediate response capability to NRC's core infrastructure components (i.e., local and wide area networks, e-mail, ADAMS). A new Help Desk is planned to provide specialized support to ensure licensees, staff and citizens effectively utilize the processes and systems designed for electronic submission and review of ESP and COL documents. These enhanced support services will be acquired through a combination of contract modifications, competitive procurements, and interagency agreements.

#### Information Management

Resources are included in both the FY 2007 and FY 2008 budget requests to process an increased volume of documents generated during the new reactor licensing review process. In addition to incoming information, additional subscriptions and books will be acquired to enhance the Technical Library's capability to support the staff's reference material needs. Some examples include online journals from Elsevier's ScienceDirect collection; technical research databases, such as GeoRef, INSPEC and Ei Compendex; and additional online Codes & Standards, such as collections from the American Welding Society, Underwriters Laboratories, National Electrical Manufacturers Association and the Hydraulic Institute. These materials and services will be acquired through a combination of contract modifications, purchase card transactions and competitive procurements.

## **New Reactor Licensing Scheduling and Coordination**

The staff is developing a master integrated schedule of ongoing and planned activities necessary to prepare the NRC for its new reactor licensing responsibilities. As a first step, a comprehensive activity list is being developed that includes the identification of responsible parties and scheduled completion dates. This list is being developed based on input from all involved internal stakeholders, including the ASLB and the ACRS. It also documents scheduled interactions with external stakeholder agencies and parties and will be used as a management tool for identifying and tracking items through closure.

The comprehensive activity list is modeled after, but is more extensive than, the integrated High Level Waste (HLW) Licensing Support Project Plan. Like the HLW Licensing Support Project Plan, it is supported by more detailed project management-level schedules and plans.

The scope of issues tracked and monitored currently includes:

- Human Capital;
- Rulemaking, Guidance, and Policy Development;
- Information Technology and Information Management;
- Development of Licensing Project Management Plans and Strategies; and
- Development of Construction Inspection Program Plans and Capabilities.

The comprehensive activity list will be maintained as a living document as long as necessary to ensure the successful completion of required preparations for NRC new reactor licensing and inspection. The NRR New Reactor Business Process Integrator is currently responsible for the development and maintenance of this list. The staff has recently contracted for expertise which will be used to build upon this comprehensive list to fully develop the master integrated schedule. The development of the master integrated schedule is expected to be completed by early 2007.

## **TECHNICAL DEVELOPMENT ACTIVITIES**

### **Support for Light-Water Reactors**

The staff is using the TRACE thermal-hydraulics code to perform independent confirmatory analysis of ESBWR accidents and transients. Activities include model development, TRACE code assessment against test data, and confirmatory calculations.

To support the review of the ESBWR design, the staff has developed a version of the TRACE code, along with (1) ESBWR input decks, (2) a report documenting the results of calculations to demonstrate the ability of the code to model operating and accident scenarios (e.g., breaks in the gravity-driven cooling system line, bottom drain line, and main steam line), (3) descriptions of models included in the TRACE code, and (4) supporting documentation for code users.

In the area of ESBWR severe accidents, the staff has identified risk-dominant accident sequences for analysis to confirm DC data and supporting information provided by GE. The staff prepared MELCOR (the NRC's severe accident code) input decks and performed baseline calculations for one of the highest risk-dominant sequences. These calculations address severe accident issues identified in SECY-93-087, and include direct containment heating, hydrogen combustion, core-concrete interaction, steam explosion, and ex-vessel debris coolability. The staff also performed preliminary calculations of containment loading for design basis events along with selected code sensitivities to confirm the adequacy of ESBWR containment design. Additional severe accident and design basis containment analyses including alternative source term calculations and sensitivity studies are in progress.

The staff has developed an EPR research plan whose main objectives are to (1) identify key safety research area needs; and (2) describe subsequent research to develop the necessary tools, knowledge, and data to conduct an independent safety review of the EPR design. Key research areas include severe accident and thermal-hydraulics analyses, and digital instrumentation and control.

### **Support for Gas-Cooled Reactors**

The NRC staff's HTGR knowledge management efforts have involved maintaining and updating the NRC staff's cognizance of domestic and international developments in safety-related aspects of HTGR technology, ensuring that the HTGR analysis tools developed are documented and retrievable for future use by the NRC staff, and preserving and transferring the knowledge gained from the NRC staff's earlier efforts on HTGR technology. Under this activity, staff has been capturing critical internal and external HTGR information and establishing the capability to make the appropriate information available to cognizant NRC staff when and where it may be needed. The staff is preserving and sharing the HTGR information through a web-based HTGR community of practice, where information can be shared to facilitate current work assignments and knowledge transfer between expert and journeyman staff.

To effectively and efficiently begin development of NRC's HTGR technical and licensing infrastructure in FY 2007, the staff is currently reviewing and updating the 2003 NRC advanced reactor research infrastructure assessment and plan (SECY-03-0059, "NRC's Advanced Reactor Research Program"). The update will provide a current situation analysis focused on HTGR technology and related technology-neutral (i.e., generic) infrastructure assessment, needs and plans. This update will support development of the joint NRC-DOE licensing strategy for the Next Generation Nuclear Plant (NGNP) project as required by the Energy Policy Act of 2005. Additionally, in order to be ready to initiate limited infrastructure development activities in FY 2007 for small secure reactors, the staff will include an initial infrastructure assessment survey of key safety and technical issues and safety research and development needs associated with liquid metal cooled fast reactors (LMRs). The infrastructure assessment survey will be applicable to potential future applications involving a small, secure LMR or the liquid metal cooled "burner" fast reactor, which is part of the Global Nuclear Energy Partnership initiative.

### **Codes and Standards Development**

On March 21–22 and June 7–8, 2006, RES continued its participation in the quarterly meetings of the American Nuclear Society (ANS) 28 Subcommittee. The purpose of the ANS 28 Subcommittee is to prepare an ANS safety standard for modular HTGRs (i.e., "Nuclear Safety Criteria for the Design of Modular Helium-Cooled Reactor Plants"). The objective of the standard is to establish the nuclear safety criteria, functional performance, and design requirements of structures, systems, and components of modular gas reactor (MGR) plants consistent with established risk objectives. The NRC is participating on the subcommittee to provide input to the development of the standard in a way that maximizes its compatibility with the regulatory structure for new plant licensing proposed in NUREG-1860, Working Draft Report: Framework for Development of a Risk-Informed, Performance-Based, Technology-Neutral Alternative to 10 CFR Part 50, Appendices." The major focus areas of the most recent meetings involved the standards for defense in depth in the design, and the conduct of MGR safety analyses. The ANS 28 Subcommittee working group is now trying to complete the safety standard for review by the end of CY 2006.

Additionally, the staff is also working with Subcommittee 22 of the ANS to appropriately endorse existing safety criteria standards that have been used in advanced reactors such as AP1000, ESBWR, and EPR. These standards are based on deterministic principles that have provided the safety criteria for light-water reactors.

### **EXTERNAL STAKEHOLDER INTERACTIONS**

#### **Department of Energy**

The Energy Policy Act of 2005, Section 641, provides that the Secretary of Energy shall establish a project known as the "Next Generation Nuclear Plant Project" (NGNP). The NGNP Project consists of research, development design, construction, licensing and operation of a prototype plant, including a very high temperature reactor, that can be used to generate electricity and/or hydrogen. Section 644(a) of the Act provides that the NRC shall have licensing and regulatory authority for any reactor authorized under Sections 641–645 of the Act.

Section 644(b) of the Act requires the Secretary of Energy and the Chairman of the NRC to develop and jointly submit a licensing strategy for the prototype nuclear reactor within 3 years of the date of the law's enactment (i.e., August 7, 2008).

On February 28, 2006, NRC and DOE staff representatives met to continue informal initial discussions about the NGNP project plans and schedule, including development of a joint licensing strategy, coordination between NRC and DOE, future interactions and resources. Pursuant to the meeting, the NRC staff prepared a draft proposed NRC/DOE MOU for the development and documentation of the joint NGNP licensing strategy. On May 18, 2006, pursuant to the SRM on COMSECY-06-0020, the staff transmitted a proposed draft MOU to DOE to establish a joint licensing strategy for the NGNP reactor. The purpose of the MOU is to establish the framework for interactions between the NRC and DOE to develop and document the licensing strategy, respective organizational responsibilities, the interaction process and schedule, planned work products, and funding. On June 8, 2006, the NRC and DOE management and staff met to discuss the proposed MOU and other issues related to development of the joint NGNP licensing strategy. NRC and DOE staff are currently moving toward agreement on the MOU language.

The staff also worked with DOE and Office of Management and Budget staff to support publication of the DOE interim final rule and request for comment on "Standby Support for Certain Nuclear Plant Delays," which became effective on June 14, 2006. The final rule was published on August 11, 2006, and becomes effective on September 11, 2006.

## **Multinational Design Approval Program**

### MDAP Stage 1

In accordance the Commission's September 8, 2005, SRM, the NRC staff initiated the start of Stage 1 of the MDAP by meeting with counterparts in Finland (STUK) and France (ASN) in late January and early February 2006. The main objectives of the meetings were to obtain insights into the Finnish and French licensing processes as applied to the EPR including schedules and outputs, obtain preliminary information regarding the breadth and depth of French and Finnish regulatory design reviews of the EPR, provide an overview of the MDAP and the U.S. licensing process to the French and Finnish regulators, and to discuss logistical issues relative to the implementation of Stage 1 of the MDAP. STUK and ASN representatives both indicated willingness to cooperate in the EPR review. NRC's counterparts have also expressed interest in personnel exchanges to facilitate EPR cooperation.

NRC staff also traveled to AREVA offices in Lynchburg, VA, on April 25, 2006, to discuss potential design differences between the EPR being built in Finland (Olkiluoto 3) and France and the U.S. EPR. These differences are a result of AREVA converting the Olkiluoto 3 engineering design to U.S. codes, standards, and regulatory requirements.

The Division of New Reactor Licensing (DNRL) staff is working with NRC's Office of International Programs (OIP) to generate a detailed plan on how to proceed with implementation of MDAP Stage 1 with the overall goal of utilizing Finnish and French experience gained in the review of the EPR to inform the staff's DC review of the U.S. EPR. This effort should result in

increased focus on safety significant issues and greater efficiency and effectiveness during the U.S. EPR design review.

## MDAP Stage 2

Stage 2 of the MDAP involves work toward international convergence of codes, standards, and safety goals; building a framework for multinational design review and approval of Generation IV reactor designs that facilitates sharing of regulatory review products; encourages standardization; and enhances safety and regulatory efficiency and effectiveness.

Stage 2, as currently envisioned, more extensive than Stage 1, would begin in parallel with the Stage 1 effort. At the beginning of Stage 2, technical representatives from a group of core countries would assemble to structure the MDAP process, leading to the formation of a Stage 2 steering committee. The steering committee would then formulate the policy direction and form working groups associated with specific technical modules. The primary objective of the Stage 2 modules would be to facilitate the licensing of the reactor designs emanating from the Generation IV program. This would be accomplished through convergence of the regulatory safety goals, design criteria, codes, and standards that are associated with approving the new reactor designs. It is, however, likely that the Stage 2 work could also be used to facilitate the licensing of more near-term reactors. The steering committee should also consider lessons learned from the recent Western Europe Nuclear Regulators Association initiative to harmonize reactor safety. The key messages of Stage 2 include the following:

- MDAP Stage 2 will be a long-term effort that will seek to converge, on a multinational basis, the safety goals, regulations, codes, and standards associated with the design requirements for new commercial power reactors.
- The NRC and other national regulatory authorities will retain responsibility for reactor licensing within the United States.
- Stage 2 will be implemented by forming work groups to focus on specific technical areas. As the products of the Stage 2 effort develop, they will be made available to any country that wants to reference them as part of their national licensing process.

On June 19-20, 2006, staff from NRR and OIP attended the first MDAP Stage 2 meeting at the NEAs office in Paris. Representatives from the regulatory authorities from France, the United Kingdom, Canada, China, Japan, Finland, Korea, South Africa and Russia participated in the MDAP meeting. During this meeting, consensus was reached regarding the initial scope and focus of the project, including the selection of pilot technical areas. A trip report providing details of the meeting has been issued and forwarded to the Commission by OIP.

During the meeting, two pilot topics were selected to begin work. The first topic, which is broad in nature, would include defining the licensing basis, scope of regulatory design review, and safety goals associated with new reactors. This topic would be assigned to the steering committee to begin work. The second topic, which is narrower in focus, would include issues associated with the international supply of reactor components, including the regulatory

oversight of vendors and vendor quality assurance requirements. It is anticipated that an expert level working group will be formed to address this topic.

The NEA is in the process of developing draft Terms of Reference which will serve as the project charter and which will be provided to each participating agency for comment. Once comments are received by the NEA, the NEA will issue final Terms of Reference.

The potential for a follow-on meeting of a policy group of principals is being evaluated by the NEA. It is anticipated that during this policy group meeting each country would be asked to sign the Terms of Reference to indicate their desire to participate in the project.

### **Department of Homeland Security**

In support of the new reactor licensing process, the staff continues to consult with the Department of Homeland Security (DHS) on matters relating to emergency planning and preparedness, and on security-related matters. There are two distinct, yet related, areas of interactions with DHS in support of new reactor licensing. These are the emergency planning and preparedness requirements, which are essentially the same as those for the existing LWR fleet, and the post-9/11 security-related requirements – some of which relate directly to emergency planning and response.

#### Emergency Planning and Preparedness

The responsibility for evaluating and approving emergency plans in support of new reactor licensing is shared between the NRC and DHS. DHS is the Federal agency with the lead responsibility for oversight of offsite emergency planning and preparedness. These responsibilities are executed by the Radiological Emergency Preparedness (REP) Program, formerly held by the Federal Emergency Management Agency (FEMA). The REP Program now resides within the Preparedness Directorate of DHS. While the responsibility for evaluating the emergency plans and procedures is shared between the DHS and the NRC under an MOU, which is reflected in 44 CFR Part 353, the final decision-making authority on the overall adequacy of emergency planning and preparedness rests with the NRC.

In preparation for the new reactor license applications, various regulatory infrastructure work has been completed pertaining to DHS's offsite emergency planning reviews, along with discussions relating to DHS's preparation for the necessary staff and contractors to perform the reviews (i.e., resource implications). The regulatory infrastructure work consists of the 10 CFR Part 52 rulemaking effort, updating section 13.3 (Emergency Planning) of the SRP (NUREG-0800), developing a related section 13.3 in DG-1145, and creating an emergency planning COL review "template" for use by NRC and DHS to ensure consistent and comprehensive application reviews. Initial drafts of these documents are currently undergoing DHS review, and will be provided to other stakeholders for review and comment.

On July 7, 2006, the Director of NSIR, along with representatives from NRR and OGC met with the DHS Assistant Secretary for Infrastructure Protection to discuss areas of mutual interest, including licensing of new reactors, their schedules, resource implications, and shared responsibilities for implementing the national energy policy. DHS had planned to hire 40 additional personnel to address new reactor licensing beginning in FY 2007. As a result of the

meeting, the DHS Assistant Secretary indicated that DHS would need to reevaluate what additional resources would be necessary for DHS to support required reviews and implement the mandates of the Energy Policy Act of 2005, in light of the increasing number of anticipated applications for ESPs and COLs. He agreed to evaluate the matter within DHS, and would look to the continued support of NRC management and staff in making available to DHS information on anticipated applications.

### Security

Section 657 of the Energy Policy Act of 2005 provides that before issuing a license for a utilization facility, the NRC shall consult with DHS concerning the potential vulnerabilities of the location of the proposed facility to terrorist attack. On July 27, 2006, the NRC staff met with DHS representatives to reach a mutual understanding on the DHS role and resource needs for new reactor licensing activities. The NRC staff also shared a draft proposal on the scope of DHS consultation needed to satisfy the Energy Policy Act of 2005. The staff will continue to interact with DHS to finalize the process and procedures in meeting these Energy Policy Act requirements.

## **Hiring and Training Strategies**

### **June 2006**

#### **INTRODUCTION**

While the increased workload related to new reactors is impacting staffing throughout the Agency, the greatest impact by far is being felt by the Office of Nuclear Reactor Regulation (NRR). To accommodate the increased staffing requirements, NRR has developed strategies for recruiting, hiring, training, supervising, and providing physical and IT infrastructure support. The strategies being implemented by NRR are outlined in this Enclosure.

Since the beginning of this fiscal year (FY), the Offices of Human Resources (OHR) and the NRR have hired a record setting number of employees to prepare for new reactor licensing activities. This enclosure describes how the U.S. Nuclear Regulatory Commission (NRC) staff is continuing to work cooperatively to hire, train, and support new employees.

#### **IDENTIFYING NECESSARY TALENT AND EXPERTISE**

For FY 2006 and FY 2007, NRR identified the positions and expertise needed for near-term activities and is working to identify the positions and expertise needed to meet the projected workload demands for new reactor licensing activities in FY 2008. To address these staffing and hiring challenges, NRR managers and the Human Resources Services and Operations (HRSO) team leader – servicing NRR – participate in a monthly human capital meeting. Additionally, HRSO and NRR human capital staff meet frequently to discuss on-going needs.

The New Reactor Planning and Scheduling Branch (NPLB) continues to inform the projections for staffing levels for new reactor licensing activities and the areas of expertise that are needed to meet the increased demand to create projected FY 2008 staffing plans. The budget adjustment proposals for FY 2007 and FY 2008 will reflect the impact of the NRR staffing increases.

As part of the OHR annual request for workforce skill gaps and training needs, offices identified the critical skill areas where gaps exist or were projected to exist in the coming year. Gap closure strategies included hiring, training, rehiring annuitants, and utilizing knowledge transfer activities. The offices are using the identified workforce skill gaps as guidance for recruitment and hiring needs.

#### **RECRUITMENT AND HIRING PROCESS**

NRR, in partnership with OHR, continues to evaluate job markets and professional conferences in various geographical locations to determine if advertising or recruitment activities would attract candidates with the skills and knowledge needed by the Agency.

In addition to improving the hiring process, the HRSO group in OHR is evaluating and improving recruitment strategies to attract highly qualified candidates to the Agency. The NRC staff finalized the policy of offering referral awards. The referral award provides employees with a

monetary “thank you” if candidates they refer to the Agency are hired. Finally, the NRC staff request for direct-hire authority from the Office of Personnel Management (OPM) was not approved. OPM opined that the law which authorizes direct-hire authority applies to the competitive service, not the excepted service, and therefore OPM could not approve the NRC’s request. NRC is exploring the possibility of obtaining direct-hire authority via direct legislation.

NRR will experience the largest growth in the Agency as a result of the new reactor licensing activities. In the last update in mid-January, NRR reported that 84 new employees were selected. As of August 22, 2006, NRR has selected 242 employees in both technical and support areas. Of the 242 employees selected, 171 are on board and personnel are categorized as follows: 27 Nuclear Safety Professional Development Program (NSPD) candidates, 25 administrative and 119 technical. The 71 remaining employees selected are going through the security clearance process. The table below details activities in the hiring plan for NRR employees.

<b>Hiring Tasks for NRR employees</b>			
	<b>Task</b>	<b>Status</b>	<b>Responsible group</b>
1	Review the existing recruitment locations and identify events and locations for additional recruitment events.	initial review completed; on-going	NRR/PMAS
2	Identify opportunities and create advertisements for targeted advertising in local newspapers as well as national publications, trade journals, etc.	initial completed; on-going as needed	OHR/HRSO; NRR/PMAS
3	Evaluate and improve recruitment and hiring strategies, including: <ul style="list-style-type: none"> <li>• revise the generic open vacancy announcement for mid-career engineers and scientists to provide additional flexibilities to offer relocation and recruitment incentives.</li> <li>• streamline the request and approval process for a standard incentive (i.e., a cash incentive for a pre-determined percentage of the offered salary)</li> <li>• create the government version of referral award</li> <li>• request direct hire authority</li> </ul>	on-going  completed  completed  completed completed	OHR/HRSO
4	Hold NRR monthly human capital meetings to discuss staffing challenges	on-going	NRR management

<b>Hiring Tasks for NRR employees</b>			
	<b>Task</b>	<b>Status</b>	<b>Responsible group</b>
5	Identify technical expertise and infrastructure support staff to meet FY 2007 staffing projections	Completed	NRR/NPLB; NRR/PMAS
	Identify technical expertise and infrastructure support staff to meet FY 2008 staffing projections	4 Qtr 2006	NRR/NPLB; NRR/PMAS

Finally, while the staff continues to focus on recruiting new staff as the principle vehicle for preparing for future challenges, it also is utilizing other staffing options to bridge the gap while new employees are being brought on board. Most notably, pension offset waivers for re-employed annuitants are being used when no other reasonable staffing option exists to accomplish mission critical tasks. Individuals are currently being used for their unique or specialized skills in a variety of tasks such as development of a construction inspection program, inspection support, and safety culture, as well as significant knowledge management/knowledge transfer activities such as completion of Standard Review Plan sections and mentoring and training of new staff.

### **TRAINING AND KNOWLEDGE MANAGEMENT/TRANSFER**

The rapid integration and training of a large number of new employees into the Agency is a significant challenge but is essential for the Agency's and the employees' future success and productivity. To address this, NRR is utilizing and expanding the use of existing training tools, including mentoring, on-the-job-training, formal classroom and on-line training, and self-study activities. NRR's updated training plan is provided below. Similar activities are underway in RES at a scope commensurate with its expected growth and turnover.

To help new employees succeed, NRR has developed and is using a new employee orientation and training guide. The staff is continuing to develop its qualification plans for engineers and scientists. Training the new employees will increase the need for courses held at the Technical Training Center and Professional Development Center. The staff is continuing the process of the job task analysis (JTA) and, based on the skill sets developed, the staff will examine pre-existing training to identify course work that either 1) provides the necessary training, 2) provides a degree of the necessary training and can be modified to meet a greater degree of the need(s) identified in the JTA, or 3) needs to be developed specifically to support the skill sets identified in the JTA. As a result of the JTA, the staff is developing a training course on the Part 52 licensing process. Additionally, the staff is letting a contract for developing and administering courses on new reactor design technologies (i.e., Advanced Plant 1000, Economic Simplified Boiling Water Reactor, and Evolutionary Power Reactor).

Additionally, for succession planning and knowledge management in critical skills and knowledge areas, supervisors and managers received an updated tool in April 2006. The staff created succession planning notebooks for NRR first-line supervisors to assist in closing

identified skill gaps, identifying new skill gaps and managing succession planning and knowledge transfer. The notebook included strategic workforce planning (SWP) staff and critical skill matrix, SWP Retirement Eligibility Report, 2006 Workforce Skill Gap report, staffing plan, external training priority guidance, and the draft knowledge transfer process.

<b>Training Tasks</b>			
	<b>Task</b>	<b>Status</b>	<b>Responsible group</b>
1	Identify training needs for new employees and to support new reactor licensing process	Feb 2006; interviews complete; on-going	OHR/HRTD NRR/DNRL NRR/PMAS
2	Assess existing training based on needs assessment	2nd Qtr FY 2006 preliminary courses identified; others on- going	OHR/HRTD
3	Develop training or modify existing training	3rd Qtr FY 2006	OHR/HRTD
4	Fill an administrative lead position for assisting new employees, coordinating Office seminars, and tracking the completion of new employee training	Complete	NRR/PMAS
5	Qualification Plans for technical staff	1st Qtr 2007	NRR/PMAS

### **SUMMARY**

The NRC staff is working aggressively to meet the demand for the recruitment, hiring, training, and support of new engineers, scientists, and other support staff.

Recruitment efforts have expanded to target experienced professionals, as well as to expand the Nuclear Safety Professional Development Program (NSPDP) for this year and next year (2009 class). Improvements in the hiring process have decreased the time for the hiring process and the burden on supervisors. The staff continues to use staffing models from the NRPB and identified workforce skill gap to assess the need for additional positions for engineers, scientists, and support staff to support new reactor licensing activities. The staff continues to conduct the JTA to assess the increased training needs for new employees.

NRR is currently hiring staff to meet the projected full-time equivalent for FY 2007 and is working towards projections for FY 2008 staffing. The impact of the NRR staffing increases will be reflected in the budget adjustments for FY 2007 and FY 2008. In the last update in mid-January, NRR had selected 84 employees. As of July 31, 2006, NRR has selected over 200 employees in both technical and support areas. The staff is dedicated to working to meet

the challenge of recruiting, hiring, training and integrating new employees into the Agency with the necessary infrastructure to support our activities.