

## **POLICY ISSUE** **(Information)**

January 8, 2003

SECY-03-0005

FOR: The Commissioners

FROM: William D. Travers  
Executive Director for Operations /RA/

SUBJECT: SEMIANNUAL UPDATE OF THE STATUS OF NEW REACTOR LICENSING  
ACTIVITIES

PURPOSE:

This paper informs the Commission of the staff's new reactor licensing activities since the issuance of SECY-02-0076, "Semi-Annual Update of the Future Licensing and Inspection Readiness Assessment," dated May 8, 2002.

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 supporting new reactor licensing. The staff also committed to providing the Commission with semiannual updates of the status of new reactor licensing activities. SECY-02-0076 provided the first of these updates.

DISCUSSION:

There continues to be significant interest and activity on new reactor licensing topics. The staff is currently reviewing the AP1000 design certification application and has six other designs in various stages of pre-application review. In addition, pre-application discussions are taking place in preparation for three early site permit (ESP) applications expected in 2003. The staff is also making infrastructure improvements to ensure that tools, information, and regulatory processes are in place for the efficient, effective, and realistic review of new site and reactor applications. The attachment to this paper provides the status of these activities, and describes interactions with stakeholders, including international and intergovernmental activities.

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Potential policy and technical issues related to new reactor licensing are discussed below.

### Security Issues

The staff has requested Commission authorization to make relevant portions of the interim safeguards and security compensatory measures for operating power reactors available to the current and prospective applicants for their consideration during current reviews or application preparation under suitable controls. Separately, the staff is developing options for review of the security aspects of new reactor designs and ESPs, and will present these options to the Commission.

### Early Site Permit Issues

In SECY-01-0188, the staff estimated that the review of an ESP application would take approximately 30 months from the submittal of the application to the granting of the permit. This was a preliminary estimate, based on the best information available at that time. The staff now estimates it will take about 33 months from the date of the initial submittal to the granting of the permit. This revision is derived from insights gained in preliminary interactions with industry representatives, and the staff's improved understanding of the nature and scope of issues which will be assessed. The staff estimates that 21 months will be required to issue the final safety evaluation report and the environmental impact statement. An additional 12 months will be required for the mandatory hearing required for an ESP decision. These estimates assume that the applicant provides a high quality application and is also dependent on the complexity of the issues to be addressed.

The staff is meeting regularly with the Nuclear Energy Institute (NEI) and the prospective ESP applicants to discuss generic issues which might impede the timely review and disposition of an ESP application. Principal topics of discussion have included:

- quality assurance requirements for ESP information
- use of the bounding plant parameter envelope (PPE) approach to characterize facility design information
- form and content of an ESP
- alternative site review
- use of bounding approach for providing fuel cycle and transportation information required by the National Environmental Policy Act (NEPA)
- staff review of severe accident mitigation alternatives and severe accidents to meet NEPA requirements
- deferral of radiological dose consequence calculations required by 10 CFR 52.17 to the combined license application review.

The staff will inform the Commission of any policy issues identified in the course of stakeholder interactions and staff efforts to resolve these issues prior to the receipt of the first ESP application.

#### Potential Technical and Policy Issues Related to Advanced Reactors

The staff is developing recommendations on policy issues related to the advanced reactor designs. In SECY-02-0139, "Plan for Resolving Policy Issues Related to Licensing Non-light Water Reactors," dated July 22, 2002, the staff identified issues with potential policy implications resulting from efforts to date. The Advisory Committee on Reactor Safeguards (ACRS) was briefed on October 10, 2002, and a public workshop was held on October 22-23, 2002, to discuss key issues and options for resolution. The staff presented key issues and preliminary recommendations to the ACRS on December 6, 2002. The paper discussing relevant details and the staff's recommendations will be submitted to the Commission in January 2003.

#### Research Infrastructure Assessment for Advanced Reactor Designs

To respond to a commitment made in SECY-01-0188, the staff is performing a research infrastructure assessment for advanced reactors. This assessment will identify technology gaps and the means to fill the gaps in the form of methods, tools, data, and expertise. The ACRS was briefed on the infrastructure assessment on July 8 and 11, 2002, and the Advisory Committee on Nuclear Waste (ACNW) on July 24, 2002. The staff received comments from the ACRS in a letter dated July 18, 2002, and concurred with the Committee's views in a response dated August 29, 2002. In a memorandum to the Commission, "Cooperative Research to Resolve Key Technical Issues on Advanced Reactors," dated July 22, 2002, the staff discussed major topics related to the advanced reactors and the necessary cooperative efforts. On November 6, 2002, the staff presented the infrastructure assessment findings at the joint meeting of the ACRS Safety Research Program/Future Plant Designs Subcommittees. Most of the ACRS comments and associated recommendations were either integrated into the infrastructure assessment or otherwise addressed by other ongoing activities. The ACNW briefing was for information only. A Commission paper on the infrastructure assessment will be submitted by March 2003.

#### CONCLUSION:

Since the issuance of SECY-02-0076, the NRC staff has made substantial progress in its new reactor licensing activities. Principal staff activities and accomplishments over the past several months are:

- Issued requests for additional information on schedule for the AP1000 design certification application which was submitted March 28, 2002.
- Forwarded to the Commission proposed changes to 10 CFR Part 52 and recommendations regarding two NEI petitions for rulemaking.
- Identified policy issues relating to security reviews for new reactor licenses.
- Presented the Infrastructure Assessment for Advanced Reactors to the ACRS

- Conducted a public workshop on technical and policy issues associated with advanced reactors, presented these issues to the ACRS, and forwarded a paper to the Commission on this topic.
- Initiated ESP pre-application public meetings, discussing key issues with NEI and the expected applicants. The staff has also begun conducting public meetings in the vicinity of expected sites to inform the public about the ESP process and opportunities for public participation.
- Initiated pre-application review for the ESBWR and GT-MHR designs.
- Initiated cooperation and technical exchanges with international organizations, other regulatory bodies, the Department of Energy (DOE), and the Massachusetts Institute of Technology (MIT).
- Closed out the Exelon pebble bed modular reactor (PBMR) pre-application review.

In 2003, the staff expects to receive three applications for ESPs. The staff will issue the draft safety evaluation for the AP1000 design certification in June 2003. Pre-application review for the ESBWR and GT-MHR designs will continue, with additional pre-application reviews for the ACR-700, SWR 1000, and IRIS designs starting. Technical and regulatory infrastructure development will continue, with the goal of improving the efficiency, effectiveness, and realism of staff review, and ensuring that an appropriate level of safety is maintained for new reactor and site licenses.

COORDINATION:

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

*/RA/*

William D. Travers  
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Attachment:  
Semiannual Update of the Status of  
New Reactor Licensing Activities

- Conducted a public workshop on technical and policy issues associated with advanced reactors, presented these issues to the ACRS, and forwarded a paper to the Commission on this topic.
- Initiated ESP pre-application public meetings, discussing key issues with NEI and the expected applicants. The staff has also begun conducting public meetings in the vicinity of expected sites to inform the public about the ESP process and opportunities for public participation.
- Initiated pre-application review for the ESBWR and GT-MHR designs.
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 William D. Travers  
 Executive Director  
 for Operations

Attachment:

Semiannual Update of the Status of  
 New Reactor Licensing Activities  
 (WITS 200100018)

ADAMS ACCESSION NUMBER: ML023260341 \*see previous concurrence

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OFFICE	Region II	PMAS	DPBA/OCFO	NRR:ADIP
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# Semiannual Update of the Status of New Reactor Licensing Activities

December 2002

## INTRODUCTION

This attachment to the December 2002 update of the status of new reactor licensing activities summarizes the status of the AP1000 design certification review, early site permits (ESPs), pre-application activities for other designs, regulatory infrastructure development, and stakeholder interactions.

## AP1000 DESIGN CERTIFICATION

On March 28, 2002, Westinghouse Electric Company (Westinghouse) submitted its application for final design approval and standard design certification for the AP1000. Based on this application and supplemental information submitted through May 31, 2002, the staff completed its acceptance review of the application on June 25, 2002.

The NRC staff reviewed the information to formulate a complete design certification review schedule. Based on the information available to the staff regarding the similarities between the AP1000 design and the already-certified AP600 design, the experience gained during the three previous design certification reviews, and assumptions of high quality and timely responses by Westinghouse, the NRC staff issued its design certification review schedule on July 12, 2002. The staff established the following milestones and target dates for the review:

- issuance of requests for additional information (RAIs), minus the RAIs associated with the security and safeguards portions of the application, by September 30, 2002 (complete)
- Westinghouse response to the RAIs by December 2, 2002 (complete)
- issuance of the draft safety evaluation report by June 16, 2003
- issuance of the final safety evaluation report by September 13, 2004
- issuance of the final design approval by October 25, 2004
- completion of the design certification rulemaking by December 2005.

Completion of the design certification review in accordance with this schedule would result in a review that is significantly shorter than the 5 to 6 years required to complete the final design approvals and the 7 to 8 years required to complete the design certification rulemakings for the three certified designs (ABWR, System 80+, and AP600). Furthermore, the staff is working with Westinghouse in exploring ways to improve this schedule.

The staff met the first schedule milestone by issuing RAIs by the established target date of September 30, 2002. These RAIs cover all parts of the AP1000 design certification application, except the safeguards and security portions of the application. Westinghouse completed its milestone, providing responses to the RAIs by December 2, 2002. The staff is reviewing these responses.

The staff is evaluating the policy implications of new safeguards and security issues on new reactor licensing activities. The Office of Nuclear Security and Incident Response (NSIR) staff is reviewing the AP1000 application as its schedule and priorities allow, in coordination with the Office of Nuclear Reactor Regulation (NRR).

The staff is continually assessing resources needed to support the design certification. Thus far, the resource estimates have been consistent with the estimates given in SECY-01-0188, "Future Licensing and Inspection Readiness Assessment," dated October 12, 2001. Adjustments to the resource requirements are made using the staff's planning, budgeting, and performance management (PBPM) process, with consideration of other agency needs and priorities.

### EARLY SITE PERMITS

In SECY-02-0076, "Semi-Annual Update of the Future Licensing and Inspection Readiness Assessment," dated May 8, 2002, the staff informed the Commission that there were three potential applicants for an ESP:

- Exelon Generating Company (Exelon) stated in a March 1, 2002, letter, that it intends to apply for an ESP by June 2003. Exelon announced on April 30, 2002, that this application will be for the Clinton site.
- Dominion Generation (Dominion) indicated in an April 1, 2002, meeting (summary in ADAMS Accession No. ML021010275) that it will apply for an ESP for the North Anna site by September 2003.
- Entergy Operations, Incorporated (Entergy) stated in an April 15, 2002, letter that it will submit an ESP application for the Grand Gulf site by June 30, 2003.

Entergy, Exelon, and Dominion have obtained funding from the Department of Energy (DOE) to offset some of their application costs through the Nuclear Power 2010 initiative discussed below.

In SECY-01-0188, the staff estimated that the review of an ESP application would take approximately 30 months from the submittal of the application to the granting of the permit. The staff now estimates that it will take about 33 months from the date of the initial submittal to the granting of the permit. This revision is derived from insights gained in preliminary interactions with industry representatives, and the staff's improved understanding of the nature and scope of issues which will be assessed. The staff estimates that 21 months will be required to issue the final safety evaluation report and the environmental impact statement. An additional 12 months will be required for the mandatory hearing required for an ESP decision. These estimates assume the applicant provides a high quality application and is also dependent on the complexity of the issues to be addressed.

The staff is meeting regularly with the Nuclear Energy Institute (NEI) and the prospective ESP applicants to discuss generic issues which might impede the timely review and disposition of an ESP application. Principal topics of discussion have included:



- quality assurance requirements for ESP information
- use of the bounding plant parameter envelope (PPE) approach to characterize facility design information
- form and content of an ESP
- alternative site review
- use of bounding approach for providing fuel cycle and transportation information required by the National Environmental Policy Act (NEPA)
- staff review of severe accident mitigation alternatives and severe accidents to meet NEPA requirements
- deferral of radiological dose consequence calculations required by 10 CFR 52.17 to the combined license application review.

The staff will inform the Commission of any policy issues identified in the course of stakeholder interactions and staff efforts to resolve these issues prior to receipt of the first ESP application.

During ESP pre-application activities between now and June 2003, the staff will identify reviewers, establish contracts, schedule meetings with applicants, and interact with the public and other interested stakeholders. Specific pre-application activities include:

- Development of an ESP review standard to provide (1) all stakeholders with a clear scope of the existing regulatory guidance applicable for a review of an ESP application and (2) a work planning framework to enhance the quality and efficiency of the ESP review effort.
- Development of the inspection and other administrative procedures necessary to support the ESP review effort.
- Completion of an integrated work schedule which utilizes a planning tool to document the process steps necessary for the ESP review and to assign critical skills and resources to each step.
- Completion of site visits by the staff to observe applicant data gathering activities and to confer with individual ESP applicants on site-specific issues.
- Completion of pre-application public meetings in the vicinity of the potential ESP sites. The purpose of these meetings is to provide information regarding the NRC ESP review process, as well as to outline future opportunities for public involvement in that process. On November 14, 2002, the staff conducted the first pre-application ESP public meeting in Port Gibson, Mississippi, for the Grand Gulf site.

## SUMMARY OF PRE-APPLICATION ACTIVITIES

### ESBWR

The General Electric (GE) ESBWR is a 1390 MWe reactor using natural circulation for normal operation with passive safety features. This design is based on the certified advanced boiling-water reactor (ABWR) design and the simplified boiling-water reactor (SBWR) which the staff started to review in the early 1990s. On April 18, 2002, GE requested a pre-application review of the ESBWR and proposed that the pre-application review be conducted in two phases. During Phase 1, which was completed on August 30, 2002, GE and the staff discussed the scope, schedule, and resource estimate for the pre-application review. It was agreed that the scope of Phase 2 of the pre-application review will include an assessment of the technology basis for passive safety systems and the analysis methodology for transients and accidents.

On June 20 and 21, 2002, the staff held a public meeting where GE provided an overview of the ESBWR design, a description of the planned pre-application submittals, and discussed the proposed schedule for the pre-application review. GE submitted six topical reports on August 30, 2002, in support of the pre-application review. These documents discuss the ESBWR test and analysis program description, the ESBWR test program, the SBWR test program, and qualification of the TRACG analysis method. A report on the TRACG computer code was submitted on November 19, 2002. An additional report on ESBWR scaling will be submitted in the near future. The staff plans to complete the review of these submittals in January 2004. This phase of the pre-application review will also include discussions of the format and content of a design certification application and the schedule and resource estimate for the design certification review.

The staff has estimated that approximately 4 full-time-equivalent (FTE) positions and \$1 million will be required for the agency's pre-application review by NRR and the Office of Nuclear Regulatory Research (RES). Estimates for the design certification review will be developed based on experience gained from the pre-application effort. Additional resources will be needed to develop infrastructure to support a future design certification application. These activities could include the development of methods, tools, and data to be used for independent safety assessments or confirmatory calculations.

It is anticipated that GE will submit a design certification application for the ESBWR design in early calendar year (CY) 2004.

### ACR-700

On June 19, 2002, Atomic Energy of Canada, Limited (AECL), requested a pre-application review of the ACR-700 reactor design. The ACR-700 is a 731 MWe, heavy-water moderated, light-water cooled, pressurized-water reactor (PWR) design which utilizes an online refueling capability.

The NRC has hosted two meetings with AECL regarding the ACR-700 design at NRC Headquarters:

- July 24, 2002 - AECL provided a series of presentations on the ACR-700 design and plans for pre-application interactions. During the meeting, AECL provided an overview of the ACR-700 design, safety basis, and evolution of the design.
- September 25-26, 2002 - AECL provided a broad overview for the staff on the design and technology base for the ACR-700 as well as more detailed presentations in several technical areas. The staff identified potential areas for early staff interaction with AECL on technology-specific expertise, analysis capabilities, and data needed for assessing the ACR-700 design. AECL provided a proposed pre-application review plan, which is currently under review by the staff. The staff intends to provide feedback to AECL on the submitted plan to ensure that any major NRC concerns with the ACR design, along with supporting information required for NRC review, are identified early in the licensing process.

AECL has proposed a completion date of June 2003 for the Phase 1 pre-application review, and June 2004 for the Phase 2 pre-application review. During Phase 1 of the ACR-700 pre-application review, AECL and the staff plan to reach an agreement on the schedule and cost estimates for Phase 2 of the pre-application review. Additionally, during Phase 1 of the pre-application review, the NRC staff will familiarize themselves with the ACR design and scope of the planned analysis, testing, and operational experience in support of the design. These goals will be accomplished through a series of presentations, tours of applicable test facilities and operating CANDU reactors, and review of technical information provided by AECL. The Phase 2 pre-application review will allow for further assessment of the design and technology base for the ACR-700, finalize resolution strategies for identified issues, and assess the resource, schedule, and cost estimates for design certification. The staff plans to hold further discussions with AECL to determine if any adjustments need to be made to this schedule.

#### SWR 1000

In SECY-02-0076, the staff informed the Commission that Framatome Advanced Nuclear Power (ANP) was considering whether to apply for design certification and was evaluating two designs, a PWR and the SWR-1000, which is a 1253 MWe boiling-water reactor incorporating passive safety features. On May 31, 2002, Framatome ANP informed the staff of its intent to submit a design certification application for the SWR-1000 by the end of CY 2005. Framatome ANP has not indicated any further interest in pursuing certification of the PWR design in the United States.

Framatome stated that it intends to begin submitting material for a pre-application review of the SWR-1000 in mid-CY 2004. Prior to the submittal of material, Framatome ANP has requested meetings with the staff to identify and clarify issues related to the certification process and on matters of particular importance to the SWR-1000 design. Framatome ANP is particularly interested in obtaining feedback from the staff regarding the adequacy of the research and testing already completed and currently planned for the SWR-1000.

In a meeting with the staff on August 15, 2002, Framatome ANP provided an overview of the SWR-1000 design and a description of completed and planned testing. The staff requested that Framatome ANP provide its future SWR-1000 testing plans. The tentative test schedule

was provided to the staff on August 29, 2002, with a description of the testing to be conducted and the location of the test facilities. All of the test facilities are in Europe. Consistent with past reviews, the staff plans to witness several of the tests that will be used to support the design certification application for the SWR-1000.

The staff expects a limited effort in fiscal years 2003 and 2004 on the SWR-1000, mainly focused on interactions with Framatome regarding their test program and their plans for analyses. For the longer term, the staff hopes to use, as much as possible, the same review team for the SWR-1000 review and the ESBWR design review. The staff believes that the tentative schedules provided by the applicants will support such an approach. Since the issues associated with the reviews are very similar, the staff believes this approach will be more efficient than forming two independent teams.

Resource estimates for pre-application review efforts will be developed as part of the planning of those activities. Estimates for the design certification review will be based on experience gained from the pre-application effort.

#### Gas Turbine Modular Helium Reactor (GT-MHR)

On February 18, 2002, General Atomics (GA) submitted a pre-application review plan for the GT-MHR that proposed the scope and schedule for interactions with the staff. In its March 29, 2002, response, the staff specifically identified the need to expand the scope of review to address certain critical issues. Subsequently, on May 13, 2002, the staff updated its plans, reiterating that the staff planned to use a pre-application process similar to that used for the pebble bed modular reactor (PBMR). The staff also stated its understanding that the review would build on the Fort St. Vrain high temperature gas-cooled reactor (HTGR) license and the Modular High-Temperature Gas-Cooled Reactor (MHTGR) pre-application review. Therefore, many GT-MHR pre-application issues are expected to be similar to issues documented in NUREG-1338, "Draft Pre-application Safety Evaluation Report for the Modular High-Temperature Gas-Cooled Reactor," and would not require extensive additional NRC review.

On August 16, 2002, General Atomics (GA) requested that NRC begin an initial limited-scope pre-application review of the preliminary GT-MHR design. GA's areas of interest involve an initial scope of review that would focus on fuel quality assurance, fission product source-term and radiological confinement, qualification of nuclear graphite sources for the GT-MHR, and high-temperature metals qualification.

The staff held a public meeting with GA and interested external stakeholders on September 24, 2002, to initiate the GT-MHR pre-application review. GA provided a technical overview of the GT-MHR preliminary design and safety approach, the design and development status of the GT-MHR project, and GA's objectives and areas of interest for the GT-MHR pre-application review. Discussions addressed the technical information that would be provided for each technical topic, review schedule, resources required, and nature of the feedback that the staff would provide. A public meeting is planned for early 2003 to discuss GT-MHR fuel fabrication quality control and quality assurance requirements and methods, source term calculations, and an experimental database for GT-MHR fission product transport models. Other topical meetings and submittals would be defined and scheduled for GA presentation and staff review

over the course of the pre-application review. GA plans to provide these technical papers to the staff beginning in late 2003.

The specific review scope for these topics will be limited and carefully delineated in order to ensure that the applied resources can provide a reasonable assessment and useful feedback to GA in their technical areas of interest.

#### Pebble Bed Modular Reactor (PBMR)

The final public meeting between the NRC staff and Exelon on the PBMR pre-application review was conducted on May 16, 2002. At this meeting, Exelon discussed its plans for closure of PBMR pre-application review activities, including the submittal of information addressing issues in the D. A. Powers trip report for the "High-Temperature Gas-Cooled Reactor Safety and Research Issues Workshop" (ADAMS Accession No. ML020450645). Exelon also stated that it planned to summarize pre-application review activities and correspondence and to provide a position paper on PBMR containment and a summary of German fuel testing. The staff documented issues regarding these topics in a September 9, 2002, letter to Exelon. This letter also formally notified Exelon that the PBMR pre-application review was officially closed.

The staff has documented and retained the results of the work that has been performed on the PBMR in the event that a pre-application review of this design is again requested. Much of the information is also considered useful for reviews of similar gas-cooled reactor designs.

In October 2002, representatives of PBMR Pty., Republic of South Africa (RSA), Westinghouse, and Exelon informed the NRC staff of its current and future plans for the PBMR project. The PBMR Pty. representatives discussed future interactions with the NRC related to the PBMR design certification and the possible resumption of PBMR pre-application activities. A decision on the construction of a prototype PBMR demonstration plant in the RSA is expected in the near future. The PBMR Pty. representatives indicated that the technical feasibility study and decisions on several important design issues have been completed. The next phase is procurement of the equipment and services needed to build a PBMR demonstration plant in South Africa.

Three areas for possible PBMR-related interactions prior to the resumption of a pre-application review were identified: (1) DOE/NRC cooperative TRISO fuel testing program; (2) interaction with NRC related to the staff's review and endorsement of American Society of Mechanical Engineering Code (ASME) Cases N-201 and N-499 for the qualification of metals at high temperatures; and (3) interactions with the NRC related to PBMR Pty.'s development of the testing program for the PBMR prototype plant in South Africa. PBMR Pty. will formally contact NRC regarding these topics if it is decided to build a prototype plant. This decision is expected in the first quarter of CY 2003. Assuming there is a favorable decision, the PBMR pre-application efforts could resume in CY 2004, with a design certification application in CY 2006.

## IRIS

The IRIS design is an integral light-water reactor, with all reactor coolant piping and heat transport systems located inside the reactor vessel. On October 3, 2002, the staff held a public meeting with Westinghouse to discuss the IRIS pre-application review. Westinghouse emphasized changes that have been made to the design since the public meeting held on May 7, 2001, including a 1000 MWt core with improved core performance and a low pressure drop design. Westinghouse noted that the pre-application process will rely on the AP600 and the AP1000 precedents. Westinghouse intends to submit technical reports on the details of the IRIS design in January 2003.

Resource estimates for pre-application review work will be developed as part of the planning of those activities.

## REGULATORY INFRASTRUCTURE

### 10 CFR Part 52 Rulemaking

The staff has proposed a rulemaking to revise 10 CFR Part 52. This revision is based on lessons learned during the previous design certification reviews, and on discussions with nuclear industry representatives about the ESP and combined license (COL) review processes. The proposed rule is described in SECY-02-0077, "Proposed Rule to Update 10 CFR Part 52, 'Early Site Permits, Standard Design Certifications, and Combined Licenses for Nuclear Power Plants'," dated May 8, 2002.

NEI submitted two petitions for rulemaking regarding Part 52 in July 2001. In the first petition, NEI proposed two new sections to 10 CFR Part 52 to allow existing siting and programmatic information that was previously reviewed and approved by the NRC to be incorporated by reference and treated as resolved. NEI's second petition proposed to eliminate the requirement that applicants and licensees analyze and the NRC evaluate alternative sites, alternative energy sources, and the need for power with respect to the siting, construction, and operation of nuclear power plants. The NRC published these petitions for public comment and the staff provided its recommendations on the two petitions to the Commission in September and November 2002.

On December 18, 2002, NEI provided a letter with additional information regarding their second petition. In their letter, NEI attached a new legal analysis related to the review of alternative sites. NEI stated that, as a result of this more recent analysis, they have concluded that the modifications to 10 CFR Part 52, Subpart A, that were proposed in their original petition letter of July 18, 2001, should not be adopted. Further, NEI stated that they continue to believe, as indicated in their original petition, that 10 CFR Part 51 should be modified to eliminate all references to an evaluation of the need for power and alternate energy sources because of the developments in the electricity industry that have occurred since those provisions were written.

The NRR staff is currently consulting with the staff in Rules and Directives Branch in the Office of Administration and with the staff in the Office of the General Counsel on how best to handle the recent NEI letter. Submittal of the letter by the petitioner at this late date raises some unique issues for the staff and there does not appear to be a precedent for such an action by a petitioner. The staff plans to review the existing guidance and consult with the Petition Review

Board to develop a proposed resolution plan. The staff will submit the proposed resolution plan to the EDO by January 17, 2003.

#### Security Requirements for New Reactors

The staff recently informed the Commission of policy questions regarding security requirements for new reactors. The staff informed the Commission that it will proceed with reviewing applications for design certifications and ESPs in accordance with current requirements, pending the completion of the Commission's comprehensive review of safeguards and security programs and promulgation of any additional or revised requirements. In addition, the staff requested Commission authorization to make relevant portions of the interim safeguards and security compensatory measures for operating power reactors available to the applicants for their consideration during current reviews or application preparation, subject to appropriate safeguards controls. The staff informed the Commission that it plans to develop a second paper to provide the bases for a Commission decision on security requirements for new reactors.

#### Alternative Sites

The NRC regulations implementing the National Environmental Policy Act (NEPA) are contained in 10 CFR Part 51, with 10 CFR 51.45 providing general requirements for the contents of environmental reports, including consideration of alternatives to proposed actions. Alternative sites must be considered in applications for a construction permit (CP) under 10 CFR Part 50, and for an ESP or a COL under 10 CFR Part 52, unless the COL application makes reference to an ESP.

The staff believes that clarifying the regulatory criteria for the alternative site review in 10 CFR Part 51 will reduce the licensing uncertainty on this matter, supporting a timely and efficient review. The staff is currently developing the technical basis for rulemaking to specifically define the requirements for consideration of alternative sites. A formal rulemaking plan will not be developed until the technical basis is completed.

#### 10 CFR Part 51 Tables S-3 and S-4 Rulemakings

Tables S-3 and S-4 of 10 CFR Part 51 were originally promulgated in the early 1970s to generically address the environmental impacts of the light-water reactor (LWR) uranium fuel cycle that are to be considered in environmental analyses for CPs. The revisions to Tables S-3 and S-4 are independent of each other and would be accomplished through two separate rulemakings. Table S-3 is a list of the environmental data to be used in the environmental report for a CP or ESP application as the basis for evaluating the environmental effects of the front and back ends of the LWR uranium fuel cycle. Table S-4 lists the environmental impacts of transportation of unirradiated fuel to, and spent fuel and other radioactive wastes from an LWR. These impacts are to be considered in assessing the environmental costs of licensing a reactor. Since the tables were last updated, a number of issues have emerged, prompting the staff to initiate development of the technical basis for rulemaking to determine the revised impacts to list in Tables S-3 and S-4. A formal rulemaking plan will not be developed until the technical basis is completed.

The staff believes that updating these tables will help reduce licensing uncertainty on these issues, support a timely and more efficient review, and may result in a decrease in resource expenditure for the hearings for such applications; however, this decrease is difficult to quantify.

#### 10 CFR Part 50 Appendix I Rulemaking

Appendix I to 10 CFR Part 50 provides dose criteria for demonstrating acceptable compliance with the as-low-as-reasonably-achievable (ALARA) radiation protection principle for LWRs. In 1994, the NRC revised 10 CFR Part 20 to incorporate the International Council on Radiation Protection 26 methodology. At that time, the Commission decided not to revise Appendix I because there would not be a substantial safety benefit. However, the NRC and industry agreed that Appendix I should be updated if new reactor applications were received.

The staff believes that revising Appendix I will reduce the licensing uncertainty on this issue, support a timely and efficient review, and may decrease resource expenditures for the hearings for new applications. The staff will engage stakeholders in the next few months to discuss the scope of technical issues to be addressed.

#### Legal, Financial, and Other Issues

Industry representatives requested that NRC review requirements related to antitrust reviews, decommissioning funding assurance, and financial qualifications because of the possibility of future nuclear power plants being operated as merchant plants. It was also suggested that NRC review Price-Anderson secondary protection and NRC rules governing annual fees because of the potential financial impact on modular reactor designs.

Preliminary positions on these issues were given in SECY-01-0207, "Legal and Financial Issues Related to Exelon's Pebble Bed Modular Reactor (PBMR)," dated November 20, 2001, informing the public of these positions, and seeking stakeholder feedback. On June 17, 2002, NEI responded to SECY-01-0207, providing its integrated approach for licensing modular reactors. The staff has considered stakeholder input from NEI and other stakeholders, and has provided final policy recommendations to the Commission on these issues. After the staff receives Commission guidance, it will consider rulemaking on issues related to licensing of merchant and modular plants.

#### Construction Inspection Program (CIP) Development

The staff continues to give high priority to the development of inspection guidance associated with ESP applications. A team composed of NRR and regional personnel is reviewing existing guidance and determining what CIP changes are needed. The respective regional representatives of the team led site visits to observe data collection activities associated with the ESP applications for Grand Gulf and Clinton. A similar visit to the North Anna site is planned. The team issued the ESP inspection manual chapter (IMC) on October 8, 2002. The team is presently revising and updating the inspection procedures associated with the IMC.

The team is also developing inspection guidance to support issuance of a COL and for construction activities associated with a COL. Contract resources are being used to review inspections, tests, analyses, and acceptance criteria (ITAAC) from the approved designs to determine what changes need to be made to the construction inspection procedures and if new



procedures need to be developed. The staff continues to meet with NEI regarding ITAAC implementation issues; the most recent meeting was held on June 25, 2002. Additional meetings will be held to clarify and identify issues associated with ITAAC implementation.

The CIP team has also conducted meetings with vendors and construction companies to discuss their construction scheduling software in order to determine how best to develop a construction inspection program information management system (CIPIMS). The CIPIMS is discussed in Attachment 4 of the "Draft Report on the Revised Construction Inspection Program," dated October 1996 (ADAMS Accession No. ML01160096). The staff met with Westinghouse and Bechtel on August 20 and 22, 2002, respectively, and has discussed the issue with GE and AECL. The staff has found that each organization plans to rely heavily on offsite modular construction techniques for future nuclear power plant construction. Such techniques are being used throughout the construction industry today for other large projects. It has been estimated that 40 to 60 percent of the total craft fabrication activities could be performed offsite, either at domestic or foreign shipyards, or other manufacturing facilities. The staff will factor the information learned from these discussions into the revision of the CIP and updating of the CIPIMS.

The CIP team is also discussing visiting nuclear sites under construction in foreign countries to gain insights into the revision of the CIP. The CIP team is working with the Office of International Programs (OIP) to arrange such trips.

The staff position on programmatic ITAAC was forwarded to the Commission in SECY-02-0067, "Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) for Operational Programs (Programmatic ITAAC)," on April 15, 2002. The Commission provided its decision on the issue in a staff requirements memorandum (SRM) dated September 11, 2002. In the SRM, the Commission directed the staff to bring added predictability to the process by developing appropriate guidelines, with Commission approval of the final product, to support the submission of necessary and sufficient information on programs in COL applications, and clarify when programs beyond emergency planning, if any, require or are likely to require ITAAC in the COL application. The Commission directed the staff to provide a report on the issue by March 1, 2004. The staff is developing a plan to implement the Commission's decision. The staff intends to develop and implement a plan that not only improves the predictability of the COL process, but also provides for the timely verification of proper operational information and standards, confirming the acceptability of the applicant's program.

#### Early Site Permit Review Standard

The NRC staff is developing a review standard for ESP applications. The primary purpose of the review standard is to provide guidance to the NRC staff on the process for reviewing an ESP application and on criteria for that review. The standard consolidates existing guidance, updated to reflect the ESP licensing process, and identifies the scope of the ESP review. A secondary purpose is to provide information to stakeholders on information required of an ESP application. The draft standard is expected to be released for interim use and public comment in December 2002. After addressing public comments, the staff plans to release the final ESP review standard by the end of 2003.

## ADDITIONAL STAKEHOLDER INTERACTIONS

In addition to the stakeholder interactions discussed above, the staff has hosted and participated in conferences, meetings, and workshops on its new reactor licensing activities. NRC-sponsored meetings held during this period were open to the public and were widely attended by potential applicants and vendor representatives as well as consultants and members of the public. These forums also presented opportunities to develop a greater understanding of the national and international knowledge and expertise, assess research needs, identify areas of mutual interest, and establish a dialogue for future cooperation. NRC will continue to draw upon the existing domestic and international HTGR-related experience and research. NRC will actively participate in ongoing research programs and new cooperative efforts with various international organizations for optimum mutual benefits while offsetting costs. Some cooperative agreements with various partners are being finalized and the scope and details of other agreements are being discussed.

### International Cooperation

The staff has begun discussions with Canadian and United Kingdom (U.K.) regulatory authorities on new reactor designs. The Canadian Nuclear Safety Commission (CNSC) plans to begin the pre-licensing review of the ACR-700 in early 2003. The Nuclear Installations Inspectorate (NII) in the U.K. has received requests for pre-licensing activities on the ACR-700 and AP1000 designs. The NRC staff met with CNSC and NII representatives on October 16-17, 2002, to discuss potential cooperative efforts. In addition to exploring prospects of working with the British and Canadian regulators on activities related to the licensing of the ACR-700, cooperation with other countries that have CANDU experience, such as Korea, might also be explored in the future.

In September 2002, an NRC staff member began a 4-month assignment to the NII to learn about regulatory challenges, both technical safety issues and regulatory practices, in the use of graphite as a structural component and as a moderator in gas-cooled reactors. In October 2002, he represented the NRC at the International Atomic Energy Agency (IAEA) meeting in Vienna on a graphite properties database, and also participated in the Third International Graphite Specialists meeting held in Parma, Ohio.

The NRC staff has continued its communication with international partners to explore prospects for future cooperation on HTGR-related efforts. NRC is exploring collaboration with the European Commission (EC) in the High Temperature Reactor Technology Network (HTR-TN) research program. Currently, an NRC-EURATOM agreement is under negotiation. Major areas of collaboration with the EC include fuel analysis, nuclear analysis, high-temperature materials and graphite behavior, and licensing framework development. Similarly, agreements are also being negotiated with the regulators in Japan and China.

The NRC staff plans to participate in HTGR research and development efforts sponsored by IAEA, including various Coordinated Research Projects (CRPs). As part of CRP-5, the staff participated in the Research Coordination Meeting on "Evaluation of High Temperature Gas-Cooled Reactors," held in Vienna from September 30 through October 4, 2002. Additionally, the staff plans to participate in CRP-6. This CRP is on coated-particle fuel research and development and is part of IAEA's HTGR fuel technology development research program. Details of the scope of work are being finalized.

## Cooperation with Department of Energy (DOE)

Under the Nuclear Power 2010 initiative, DOE aims to support construction of a new nuclear power plant in the United States by the end of the decade. Under this initiative, the government and the private sector will work together to (1) identify sites for nuclear power plants; (2) demonstrate the efficiency and timeliness of key NRC processes for the licensing of new plants; and (3) conduct research needed to make the safest and most advanced nuclear plant technologies available. DOE also plans to share part of the applicants' costs of demonstrating the 10 CFR Part 52 licensing process.

On July 10, 2002, an NRC-DOE Interagency Agreement related to gas reactor technology and fuel evaluation was extended. Under this agreement, the NRC-DOE cooperative efforts encompass a wide range of HTGR issues. Both DOE and NRC are exploring opportunities for collaboration in international research and development efforts related to the gas-cooled reactor technology. The pre-application review of the GT-MHR which began in September 2002, is the impetus for the needed HTGR-related research. Research activities where long lead times are anticipated include development of a technology-neutral regulatory framework, TRISO-coated fuel irradiation testing, and high-temperature material (including nuclear-grade graphite) performance issues.

For several years ending in the early 1990s, DOE sponsored GA's MHTGR program. GA has an ongoing joint project with the Russian Federation to build an HTGR for plutonium disposal. This project is intended to lead to the development, fabrication, and demonstration of key GT-MHR components, such as the turbo machinery and its major components, reactor vessel and internal materials, and a plutonium oxide coated-particle fuel. While the Russian plant is not a commercial venture, the research for this plant could be transferrable to the commercial GT-MHR design. Along with a DOE representative, an NRC staff member was an observer to a delegation that visited Russia in July 2002. The purpose of this visit was to determine first-hand the status of the design of the Russian GT-MHR, learn the technical safety challenges in building the new reactor, and observe the technical capabilities of the Russian companies that might manufacture components that could be used for a commercial GT-MHR in the United States.

## Cooperation With the Massachusetts Institute of Technology (MIT)

In May 2002, the staff met with MIT representatives to discuss their ongoing research and development programs, including different advanced reactor concepts. Subsequently, the NRC signed a cooperative research agreement with MIT for the purpose of improving NRC's access to state-of-the-art knowledge and information on advanced reactors. MIT is currently conducting research at its Center for Advanced Nuclear Energy Systems on a number of topics associated with gas-cooled reactors and LWRs, as well as exploring regulatory improvements using risk perspectives. Students and faculty are engaged in research on core neutronics design, thermal fluid dynamics, fuel performance, economics, nonproliferation, and waste disposal. Through its participation, NRC expects that the insights gained into the technological and regulatory issues will assist in developing an appropriate regulatory framework for addressing the safety issues of this technology. This research also involves international

collaborations with Germany, Russia, China, Japan, and South Africa, in addition to MIT, with its consortium of universities, national laboratories, and industries. Prospects for additional cooperation with MIT on HTGR-related research topics, such as high temperature materials, may be explored.