

# UPDATE TO THE FUTURE LICENSING AND INSPECTION READINESS ASSESSMENT

MAY 2002

## INTRODUCTION

This attachment to the May 2002 update to SECY-01-0188, "Future Licensing and Inspection Readiness Assessment," summarizes the status of pre-application activities, regulatory infrastructure development, and stakeholder interactions.

## SUMMARY OF PRE-APPLICATION ACTIVITIES

### Early Site Permits

In a December 20, 2001, letter to Chairman Meserve, the Nuclear Energy Institute (NEI) provided an update on industry activities, identifying three potential applicants for an early site permit (ESP):

- Exelon Generation 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) has indicated it will apply for an ESP at the North Anna site in 2003.
- Entergy Operations, Incorporated (Entergy) has indicated it will make an ESP application for the Grand Gulf site in 2003.

Entergy, Exelon and Dominion are seeking funding from the Department of Energy to offset some of their application costs through the "Nuclear Power 2010" initiative discussed below.

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

### AP1000

The Westinghouse AP1000 passive advanced light-water reactor design is a larger version of the AP600 design certified under 10 CFR Part 52 in December 1999. On March 28, 2002, Westinghouse applied for design certification of the AP1000. The staff is performing the application acceptance review, and will inform Westinghouse of its review plans and schedule.

The AP1000 pre-application review, completed in March 2002, addressed the following issues:

- Applicability of the AP600 test program to the AP1000 design
- Applicability of the AP600 analysis codes to the AP1000 design
- Acceptability of Westinghouse's proposed use of design acceptance criteria (DAC) in the instrumentation and control (I&C), control room (human factors), and piping design areas for the AP1000
- Acceptability of applying three exemptions granted for the AP600 to the AP1000 design

The staff's assessment regarding the DAC issue was presented to the Advisory Committee on Reactor Safeguards (ACRS) on March 8, 2002, and was forwarded to the Commission in SECY-02-0059 on April 1, 2002. The staff's assessments of the other three issues were provided to Westinghouse on March 25, 2002.

#### Pebble Bed Modular Reactor (PBMR)

On December 5, 2000, Exelon asked the NRC staff to conduct a pre-application review of the PBMR design and technology for possible licensing in the United States. The staff's recommendations for the PBMR pre-application review were described in SECY-01-0070, "Plan for Pre-Application Activities on the Pebble Bed Modular Reactor," dated April 25, 2001, which were approved in a June 19, 2001, Staff Requirements Memorandum (SRM).

On April 16, 2002, Exelon announced that it will not be proceeding with the PBMR project beyond the completion of the current feasibility study phase. The staff is assessing the impact of this announcement on new reactor licensing activities. The staff plans to meet with Exelon in May 2002, to discuss plans and schedules for bringing the PBMR pre-application review to a logical conclusion. Following this meeting, the staff will determine what products will be prepared to document the staff's assessment of the PBMR design.

During 2001 and early 2002, the staff conducted a series of public meetings with Exelon and interested stakeholders to obtain information on topics related to the staff's pre-application review. At Exelon's request, NRC's initial pre-application review focused on legal and financial issues and Exelon's proposed licensing approach. In SECY-01-0207, "Legal and Financial Issues Related to Exelon's Pebble Bed Modular Reactor (PBMR)," dated November 20, 2001, the staff provided its preliminary position on operator staffing, fuel cycle impacts, financial qualifications, decommissioning funding, minimum decommissioning costs, antitrust review, number of licenses, annual fees, financial protection, and testing requirements for a combined license (COL).

On March 27, 2002, the staff held a public workshop to discuss the positions presented in SECY-01-0207 with Exelon and other stakeholders. Following the workshop, General Atomics submitted written responses to the issues discussed in the paper. NEI has requested a meeting with the staff for additional discussions. After this meeting, NEI will provide written feedback on these issues. Based on these submittals and stakeholder comments received at the workshop, the staff will revise its positions, as necessary, and make recommendations on policy issues related to the legal and financial matters for Commission approval in August 2002.

The staff also completed a preliminary assessment of Exelon's proposed licensing approach for the PBMR. Exelon's approach was to conform with the current regulations while recognizing that many of the current regulatory requirements are based on light water reactor (LWR) technology. A risk-informed process would be used to define events for which the plant is to be designed, acceptance criteria, and a classification process whereby design requirements are specified for structures, systems, and components. In its preliminary evaluation, dated March 26, 2002, the staff concluded that the licensing approach proposed by Exelon, if adequately implemented, is a reasonable process for ensuring that the Commission's regulations are met and for identifying PBMR-specific regulatory requirements.

Implementation of Exelon's proposed licensing approach requires additional design and PRA information that has not yet been provided. A detailed PRA is required for implementation of Exelon's proposed risk-informed regulatory approach. Furthermore, the degree to which the staff may be able to rely on PRA information for the PBMR will be a consideration due to the limited operating experience for such designs. In its preliminary evaluation, dated March 26, 2002, the staff informed Exelon that while the PRA confirms risk insights for a design, licensing activities will be a mix of "deterministic" analyses supplemented with risk insights. The staff would continue to assess issues such as treatment of uncertainties, margins of safety, and defense-in-depth as part of its review.

The staff had planned to prepare a Commission paper this summer to engage the Commission on potential policy issues associated with the PBMR design, including proposed licensing-basis accidents, the need for containment versus confinement, application of a mechanistic source term, and reduced emergency planning zones. The staff is evaluating the need to interact with the Commission on these issues at this time in light of the change in Exelon's plans.

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

On February 18, 2002, General Atomics (GA) submitted a pre-application licensing plan for the GT-MHR. This plan describes the proposed scope of and a tentative schedule for GA's future interactions with the staff on the GT-MHR pre-application review. On March 29, 2002, the staff informed GA of its plans to proceed with the GT-MHR pre-application review. Many of the activities and information contained in SECY-01-0070, "Plan for Pre-application Activities on the Pebble Bed Modular Reactor (PBMR)," and SECY-01-0207, "Legal and Financial Issues Related to Exelon's Pebble Bed Modular Reactor (PBMR)," will also apply to the GT-MHR pre-application review. Resource estimates for the pre-application review were previously provided to the Commission in SECY-01-0188.

Output from the GT-MHR pre-application review will include SECY papers to the Commission on policy, technical and safety issues, seeking guidance and approval of proposed staff actions. Feedback will be provided to GA on technical and process issues once Commission guidance is received.

It is estimated that the pre-application review will take approximately 21 months, assuming timely submittals and responses to staff requests for additional information. Consistent with the Commission's 1995 fee policy for advanced reactor designs, GA will be assessed fees under 10 CFR Part 170 for NRC's pre-application activities that are specific to the GT-MHR.

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

The IRIS design is an integral light water reactor, with all reactor coolant piping and heat transport systems located inside the reactor vessel. There have been no new activities related to IRIS. The request for IRIS pre-application review may be received later in calendar year 2002.

#### Framatome Boiling and Pressurized Water Reactors

Framatome ANP is considering whether to apply for design certification, and is evaluating two designs: a PWR and a BWR incorporating passive safety features. Framatome met with the

staff on March 13, 2002, to present the features of its SWR-1000 BWR design, and to discuss the design certification process. The SWR-1000 design was developed in Germany by Siemens. Framatome will present its PWR design in mid-2002. This design is similar to the large EPR (European PWR) jointly developed by Framatome and Siemens.

Framatome intends to hold additional discussions with the staff on the NRC requirements for design certification. A decision to proceed with the design certification application will be made early next year.

### European Simplified Boiling Water Reactor (ESBWR)

The ESBWR is a 4000 MWt reactor, using natural circulation for normal operation, with passive safety features. On April 18, 2002, the General Electric Company (GE) requested a pre-application review of the ESBWR. This design is based on the certified advanced BWR (ABWR) and the simplified BWR (SBWR) designs. The staff will discuss this request with GE, and will provide schedule and budget information in the next FLIRA update.

### Reactivated Plants

Watts Bar Nuclear Plant, Unit 2, and the Bellefonte units remain in a deferred status. On October 24, 2000, NRC issued an order extending the construction permit (CP) for Watts Bar Unit 2 to December 31, 2010. On July 11, 2001, the Tennessee Valley Authority requested extension of the construction permits for Bellefonte Units 1 and 2 to October 1, 2011, and October 1, 2014, respectively. The staff is currently reviewing this request.

On January 30, 2002, NRC issued an order extending the CP for Energy Northwest Nuclear Project No. 1 (WNP-1) to June 1, 2011. On April 24, 2002, Energy Northwest announced that a consultant's report recommended that WNP-1 not be completed as a commercial nuclear power plant. The staff will not provide additional updates on the status of WNP-1, unless it appears this recommendation will not be followed.

The Browns Ferry Nuclear Plant Unit 1 is already licensed to operate. The staff considers recovery of this reactor to be a restart activity rather than a new reactor licensing activity. Therefore, this plant will no longer be included in future updates of new reactor licensing activities.

## SUMMARY OF REGULATORY INFRASTRUCTURE ACTIVITIES

The FLIRA report described regulatory infrastructure changes that would make future licensing reviews for both evolutionary and new reactor technologies more effective and efficient, as well as reducing unnecessary regulatory burden during a licensing review. A summary of regulatory infrastructure activities for the past several months is given below.

### 10 CFR Part 52 Rulemaking

The staff is preparing a rulemaking to revise 10 CFR Part 52, "Early Site Permits, Standard Design Certifications, and Combined Licenses for Nuclear Power Plants." This revision is based on lessons learned during the previous design certification reviews, and on discussions with

nuclear industry representatives about the early site permit and combined license review processes. The proposed rule is described in SECY-02-xxxx, which is expected to be issued in May 2002.

NEI has submitted two petitions for rulemaking regarding Part 52. In the first petition, NEI proposes 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 proposes to eliminate the requirement for an ESP applicant to include, and for the NRC to review, alternative sites, alternative energy sources, and need for power in an ESP application. The NRC published these petitions for public comment, and is currently reviewing the petitions and stakeholder comments. The staff plans to provide recommendations on the petitions to the Commission in September 2002.

#### Alternative Site Review Rulemaking

The NRC regulations implementing the National Environmental Policy Act are contained in 10 CFR Part 51. Section 51.45 sets forth the 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 under 10 CFR Part 50, and for an early site permit or a combined license under 10 CFR Part 52, unless the combined license application makes reference to an early site permit.

The staff believes that clarifying the regulatory criteria for the alternative site review in 10 CFR Part 51 will reduce licensing uncertainty on this matter, supporting a timely and efficient review. The staff is currently preparing a rulemaking plan on this topic. In addition, as noted above, a recommendation on an NEI petition on alternative siting will be given to the Commission in September 2002.

#### 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 it 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 this rulemaking will reduce licensing uncertainty on this issue, support a timely and efficient review, and may decrease resource expenditures for the hearings for new applications. Because of the changes in industry schedules, the prioritization of current workload, and staffing issues, this rulemaking activity will begin in FY 2003 as opposed to FY 2002, as reported in the FLIRA.

#### Construction Inspection Program (CIP)

Dominion, Entergy, and Exelon have indicated their intent to submit ESP applications in 2003. Therefore, high priority has been given to revising the inspection guidance for these activities. A team composed of NRR and regional personnel is reviewing existing guidance and determining

what CIP changes are needed. The team is also using contract resources to review current construction inspection procedures to determine if new procedures need to be developed.

Industry and staff representatives are working on issues associated with ESP applications and inspections, tests, analyses, and acceptance criteria (ITAAC) implementation guidance. The staff and NEI are discussing ESP data collection activities which take place prior to the permit application to ensure needed information is included in the applications, and to provide appropriate inspection and audit guidance.

NEI provided its position regarding ITAAC implementation and the transition to power operations on November 20, 2001. Staff comments on ITAAC implementation will be provided to NEI in May 2002.

Staff positions on programmatic ITAAC were forwarded to the Commission in SECY-02-0067 on April 15, 2002. The Commission's decision on programmatic ITAAC could affect what inspections are performed and the inspection sequence. The team will revise the CIP based on the Commission's decision.

#### Risk-Informed, Performance-Based Initiatives

The staff's current risk-informed, performance-based rulemaking initiatives are intended to reflect the results of risk assessments and the current understanding of reactor safety issues. The staff is developing a common set of risk-informed objectives that will be used to evaluate the current regulatory structure and to develop proposed changes, which will apply both to operating and advanced reactors.

NEI intends to submit a white paper proposing a risk-informed, performance-based regulatory framework later in 2002. NEI's proposed scope of work for this framework involves the actions needed to develop a conceptual framework of regulations, including general design criteria and general operating criteria.

Staff efforts will be informed by the NEI proposal. Additional details regarding these efforts will be provided to the Commission in the June 2002 update to the Risk-Informed Regulation Implementation Plan.

#### SUMMARY OF STAKEHOLDER INTERACTIONS

The staff has been actively seeking interactions with stakeholders, including internal, public, national and international. Meetings with applicants and industry representatives have been open to the public. The staff plans to continue its open interactions with all stakeholders throughout its new reactor licensing activities.

#### Intergovernmental Interactions

"Nuclear Power 2010" is a Department of Energy (DOE) initiative with the aim of building 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 licensing of new

plants, and (3) conduct research needed to make the safest and most advanced nuclear plant technologies available in the United States. To this end, DOE is planning to share part of the applicant's cost of demonstrating the Part 52 licensing process. DOE continues to support HTGR development, and has begun research, with NRC cooperation, to ensure that these technologies can be considered as options in the United States.

#### International Interactions

During 2001, the staff visited Germany, Japan, China, South Africa and the United Kingdom to exchange technical information for infrastructure development in support of future licensing work. These visits focused on HTGR design, technology and safety, the regulatory infrastructure in other countries, technical issues such as fuel qualification and performance, nuclear-grade graphite behavior, high temperature materials performance, and codes and standards. Foreign regulators assigned to the NRC have participated in advanced reactor activities such as the pre-application review of the AP1000 design. The staff is discussing additional exchanges of experts with our foreign counterparts.

NRC will continue to draw on the existing international HTGR-related experience and research. Foreign countries have extensive gas-cooled reactor operational experience, including fuel performance and qualification data, and graphite behavior data. The NRC's future research programs will take full advantage of currently available information, and will explore cooperative efforts with international partners. It is expected that the international HTGR community (China, Japan, and the European Commission) will play an important role in providing experimental data and means for code validation.

Formal bilateral agreements are being discussed with various international partners. NRC's active participation in the ongoing research programs, as well as initiating new cooperative efforts with various countries and organizations in formulating future research programs, will deliver mutual benefits while offsetting costs. Such joint efforts will reduce the scope of the additional confirmatory research that the NRC may have to conduct. The advanced reactor research plan will also address domestic and international cooperation.

#### HTGR Safety and Research Workshop

In October 2001, RES sponsored a workshop on HTGR safety and research issues, focusing on identifying HTGR safety issues and the need to support licensing reviews of new HTGR designs. Various national and international experts attended. Priorities were assigned to various research topics which would be helpful in planning future research programs, and assessing and allocating optimum resources. Insights from the workshop were a significant input in the staff's development of the draft advanced reactor research plan.

#### Nuclear Safety Research Conference (NSRC)

In October 2001, a special NSRC session was held on safety and research issues related to the advanced reactors. This conference provided a forum for dialogue among various participants to develop useful insights in planning future research programs.

### OECD/CSNI Workshop

In February 2002, NRC staff representatives attended the Organization for Economic Cooperation Development (OECD) Committee for Safety of Nuclear Installations (CSNI) Workshop on Advanced Nuclear Reactor Safety Issues and Research Needs. This workshop provided an overview of the advanced reactor designs being considered worldwide. Participants discussed advanced reactor concepts being studied, and identified safety issues and research needs.

### Regulatory Information Conference (RIC)

On March 5, 2002, the staff conducted a session on new reactor licensing at the RIC. The theme of the session was "The regulatory challenges associated with new plant licensing actions." A panel of experts from NRC, DOE's Near-term Deployment Roadmap Panel, NEI, and a public interest group representative discussed a series of questions with the audience.

### Legal and Financial Issues Workshop

Details regarding the March 27, 2002, workshop on legal and financial issues are provided in the PBMR discussion above.