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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

April 9, 1992

52-001
52-002

MEMORANDUM FOR: The Chairman
Commissioner Rogers
Commissioner Curtiss
Commissioner Remick
Commissioner de Planque

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: QUARTERLY STATUS REPORT OF ADVANCED LIGHT WATER REACTOR REVIEWS (DECEMBER 1991 - FEBRUARY 1992)

In a memorandum of June 20, 1991, I directed the staff to prepare quarterly reports outlining the status of the NRC staff reviews of advanced reactor designs. The enclosed quarterly report is the third in the series and covers the period from December 1991 through February 1992.

In this report, the staff addresses the review status of the Electric Power Research Institute (EPRI) Utility Requirements Documents (URDs) for evolutionary and passive reactors, the General Electric Company advanced boiling water reactor (GE ABWR) design, and the Asea Brown Boveri/Combustion Engineering (ABB/CE) System 80+ design. Commissioner Curtiss previously requested that we include a discussion on maintenance, maintainability, the use of probabilistic risk assessments (PRAs), and the reliability assurance program in our quarterly reports. These issues are addressed in the enclosed report.

The report consists of an Executive Summary (Section I) and three other sections: (1) a discussion of technical and policy issues that could affect the schedule for more than one project (Section II), (2) the status of the review of each advanced reactor project (Section III), and (3) a discussion of maintenance, maintainability, the use of PRAs, and the reliability assurance program (Section IV). The staff assessed the progress toward resolving each technical issue discussed and noted any effect on schedules. The staff measured the progress in reviewing each advanced reactor project against milestones established in SECY-91-161, "Schedules for the Advanced Reactor Reviews and Regulatory Guidance Revisions." For instances in which significant milestones were not met, the staff estimated the effect on the overall schedules and described recovery actions that could minimize the effect on schedules.

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GE has delayed submitting key information for staff review in some areas beyond the SECY-91-161 dates. Therefore, the staff proposes to issue the final safety evaluation report (FSER) to the Commission and ACRS by the scheduled date (August 1992) with some issues unresolved. The staff would discuss the resolution of these issues in a supplemental FSER expected to be issued about 2 months later. This delay may prevent the staff from meeting the December 1992 date for issuing a complete FSER and granting final design approval (FDA) for the ABWR.

The staff's review of the CE System 80+ Design Certification application remains on schedule; however, CE has delayed submitting some important information, which will likely cause the staff to issue a draft safety evaluation report (DSER) containing several major open items.

The staff expects to meet all major SECY-91-161 milestones for the EPRI requirements document. The staff will forward the FSER for the EPRI URD on evolutionary LWRs to the Commission by about May 13, 1992, and will send the DSER for the EPRI URD on passive LWRs to the Commission by about April 14, 1992.

James M. Taylor
Executive Director
for Operations

Enclosure:
As Stated

cc: SECY
OGC

QUARTERLY STATUS REPORT OF ADVANCED LIGHT WATER REACTOR REVIEWS DECEMBER 1991 - FEBRUARY 1992

I. EXECUTIVE SUMMARY

This is the third quarterly report to the Commission on the status of the U.S. Nuclear Regulatory Commission (NRC) staff's design certification reviews of advanced light water reactors (ALWRs). The report addresses the Electric Power Research Institute (EPRI) Utility Requirements Document (URD) for evolutionary and passive reactors, the General Electric Company (GE) advanced boiling water reactor (ABWR) design, and the Asea Brown Boveri/Combustion Engineering (ABB/CE) System 80+ design. This report consists of three parts: (1) a discussion of issues that could affect the schedule for more than one project, (2) an assessment and comparison of the progress of project reviews with the schedules listed in SECY-91-161, "Schedules for the Advanced Reactor Reviews and Regulatory Guidance Revisions," of May 31, 1991, and (3) a discussion of maintenance, maintainability, the reliability assurance program, and the use of probabilistic risk assessments (PRAs) as requested by Commissioner Curtiss.

GE has substantially delayed submitting the complete inspections, tests, analyses, and acceptance criteria (ITAAC), an updated PRA, and other information for the staff to review. As a result, the staff proposes to issue the FSER to the Commission and the Advisory Committee on Reactor Safeguards (ACRS) on schedule (August 1992) with some issues unresolved. These issues would be resolved in a supplemental FSER expected to be issued about 2 months later for the Commission and ACRS to review. This delay may prevent the staff from meeting the December 1992 date for issuing a complete FSER and the final design approval (FDA) to GE for the ABWR (as discussed in SECY-91-161).

The staff is performing the review of the CE System 80+ Design Certification application as planned. However, the staff is still awaiting initial submittals from CE for ITAAC, fire hazards analysis, severe accident mitigation design alternatives (SAMDAs), interface requirements, and deviations from the Standard Review Plan (SRP). The staff plans to meet the schedule published in SECY-91-161 for the draft safety evaluation report (DSER); however, the DSER will likely contain a significant number of major open items.

The staff also plans to meet all major SECY-91-161 milestones for the EPRI requirements document. The staff is preparing the FSER for the EPRI URD Volume II (Evolutionary LWRs) and expects to forward it to the Commission by May 13, 1992. The staff has nearly completed its review of the DSER for the EPRI URD Volume III (Passive LWRs) and will send it to the Commission by the SECY-91-161 schedule of April 14, 1992. On February 20, 1992, the staff provided the Commission with a draft Commission paper

describing the major issues for the passive plants and selected issues for evolutionary plants. This paper was subsequently provided to the ACRS.

II. TECHNICAL AND POLICY ISSUES THAT COULD AFFECT REVIEW SCHEDULES

In SECY-91-161, the staff described in detail the bases for its schedules for conducting ALWR project reviews. The staff also found many significant factors that could affect the schedules. In Items A through C, the staff discusses the status of three major policy issues, including key milestones associated with each issue, that may affect the schedules for reviewing advanced reactor designs.

A. NEPA/SAMDAS

In SECY-91-161, the staff stated that the resolution of the National Environmental Policy Act/severe accident mitigation design alternatives (NEPA/SAMDAs) issue may delay the projected review schedules.

On July 31, 1991, the staff submitted to the Commission SECY-91-229, "Severe Accident Mitigation Design Alternatives for Certified Standard Designs." In this paper, the staff requested that the Commission approve the staff's recommendations to (1) address SAMDAs for certified designs in a single rulemaking, (2) approve the staff's approach for considering the costs and benefits of reviewing SAMDAs for standard plant design certification, and (3) approve the staff's proposal to advise applicants for design certification that they must assess SAMDAs and provide rationale supporting their decision.

1. MILESTONES FOR LAST QUARTER

On October 25, 1991, the Commission issued the staff requirements memorandum (SRM) for SECY-91-229. In this SRM, the Commission approved the staff's recommendations. The Commission also requested to be apprised of the staff's progress for defining "remote and speculative" as it reviews the ABWR submittals. Commissioner Curtiss requested that the staff review its conclusion on conducting a parallel rulemaking. Commissioner Curtiss stated that, by conducting a parallel rulemaking to find and resolve those SAMDA issues that can be dealt with generically, the NRC can resolve SAMDA issues efficiently. The milestones were to (1) respond to Commissioner Curtiss' request and (2) to review vendors' responses to the staff's letters.

2. MILESTONES ACCOMPLISHED

The staff responded to Commissioner Curtiss' comments in a memorandum to the Commission of January 28, 1992. The staff reiterated its view that the most effective approach for considering SAMDAs is in a single rulemaking and that performing Part 52 and Part 51 rulemakings in parallel would increase the demand on the Agency's resources to address similar severe accident design issues in two separate proceedings. The staff is developing a final definition of "credible severe accident" for possible rulemaking.

Following the third recommendation in SECY-91-229, the staff prepared letters to the vendors, requesting that they assess SAMDAs and provide their rationale for determining if the SAMDAs would improve the safety of their designs. On November 21, 1991, the staff issued these letters to Westinghouse, GE, and CE. Although GE and CE have responded to these requests, neither GE nor CE has provided a comprehensive assessment of SAMDAs for its designs. The Westinghouse response is anticipated with the AP 600 application due in June 1992.

3. MILESTONES NOT ACCOMPLISHED

As discussed previously, GE and CE have not provided a comprehensive assessment of SAMDAs for their designs. The staff has discussed this issue with both GE and CE.

- GE has a submittal in-mtg. shortly

4. EFFECT ON SCHEDULE AND RECOVERY

Receipt of a less than thorough evaluation late in the review process will likely affect the scheduled issuance of a complete FSER.

5. MILESTONES PLANNED FOR NEXT QUARTER

The staff will continue to interact with the applicants to obtain comprehensive assessments on this issue.

B. ITAAC

In SECY-91-161, the staff stated that the resolution of the ITAAC may delay the projected review schedules.

1. MILESTONES FOR LAST QUARTER

The staff reviewed ITAAC submittals as they were submitted by the vendors. The staff also indicated that it was preparing a response to an SRM associated with SECY-91-178, "ITAAC for Design Certifications and Combined Licenses."

2. MILESTONES ACCOMPLISHED

a. GE submitted nine pilot ITAAC in a letter of September 20, 1991. The pilot ITAAC represented a cross section of ABWR systems that required ITAAC. The staff met with GE on these draft ITAAC on October 16 and 17, 1991, and sent preliminary review comments to GE on October 23, 1991. On December 6, 1991, the NRC staff gave GE its detailed comments, which reflected the staff's concern for additional details in the ITAAC.

b. On January 27-28, 1992, senior NRR staff met with GE representatives in the GE office in San Jose, California, to discuss items from the staff's review of the standard safety analysis report (SSAR) for the ABWR. The objective of the meeting was to agree on the content and format of a set of ITAAC for the ABWR. The staff and GE also discussed high priority open issues from the NRC staff's review and schedular items.

c. On February 27, 1992, the staff and GE representatives met to discuss interface requirements, the number and scope of generic ITAAC, and the number and scope of additional system ITAAC.

d. On February 19, 1992, the staff submitted SECY-92-053, "Use of Design Acceptance Criteria During 10 CFR Part 52 Design Certification Reviews." The ACRS provided comments on the use of design acceptance criteria (DAC) in a letter of February 14, 1992.

3. MILESTONES NOT ACCOMPLISHED

None

4. EFFECT ON SCHEDULE AND RECOVERY

The staff has met its current milestones for the ITAAC. However, neither GE nor CE have yet submitted a complete ITAAC for the staff to review. In SECY-91-210, "Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Requirements for Design Review and Issuance of a Final Design Approval (FDA)," and during the August 21, 1991, Commission briefing, the staff stated that the schedule for design certification will be delayed if ITAAC submittals are significantly delayed or incomplete. In a letter of October 23, 1991, the staff informed GE that a complete draft ITAAC with sufficient detail had to be submitted by the end of 1991 or the review schedule would be affected.

GE plans to submit about 30 new system ITAAC, 2 generic ITAAC, and 2 DAC by the end of March and the remaining ITAAC (about 50) by the end of May 1992. The staff proposes to issue the FSER to the Commission and the ACRS in August 1992, which will address many of the ITAAC. The staff will address the remaining ITAAC in one or more FSER supplements. The review and approval of the DAC is especially important to the overall review process since the DAC are needed for the staff to arrive at a final safety determination on certain issues. As the DAC are completed by the staff, they will be forwarded to the Commission and the ACRS. The staff expects to forward its first completed DAC review in May 1992.

CE expects to submit its ITAAC by May 1992. Although this submittal will be too late for the staff to consider in developing the CE System 80+ DSER, which is scheduled to be issued to the Commission in August of 1992, the FSER issuance date of July 1993 is not expected to be affected.

5. MILESTONES PLANNED FOR NEXT QUARTER

The staff will review ITAAC submittals from GE and CE when they are received. In April 1992, the staff is scheduled to provide an update on ITAAC activities which will include a response to an SRM associated with SECY-91-178.

C. LEVEL OF DESIGN DETAIL

The staff found several areas in the ABWR application in which it needed additional information to resolve its safety concerns. The design detail necessary to resolve all of the staff's safety concerns will constitute the level of detail needed to support design certification in accordance with the SRM for SECY-90-377, "Requirements for Design Certification under 10 CFR Part 52." The staff previously noted that the level of design detail ultimately required could affect the schedules for all of the standard plant applications that the NRC has received.

In a meeting with GE during the week of October 8, 1991, senior NRC managers and GE representatives discussed areas of the review for which the designer has not provided final design details. These areas include (1) piping design and leak before break, (2) control room design and advanced instrumentation and control (I&C), and (3) radiation protection and shielding. The staff and GE agreed to develop DAC, with associated NRC "check points," for a few limited areas of the design. To accomplish this, the NRC would base its safety determination at design certification on acceptance criteria that are general and objective. The "check points" would serve as milestones to confirm compliance with system requirements and the acceptance criteria after the combined operating license has been issued. GE would document these issues in the safety analysis report (SAR) and the ITAAC, as appropriate.

1. MILESTONES FOR LAST QUARTER

Conduct technical and management meetings with GE and CE to resolve the level of detail and DAC issues including I&C, piping design, human factors, and control room design.

2. MILESTONES ACCOMPLISHED

a. Conducted a number of followup meetings with GE in December 1991, January 1992, and February 1992.

b. Conducted a meeting between senior NRC managers and CE in January 1992 on the level of detail for the I&C, the piping design, and the control room design.

c. Issued SECY-92-053 on the DAC on February 19, 1992.

d. Met with the ACRS in December 1991 and in January and February 1992 to discuss the use of DAC.

e. Received ACRS comments on DAC on March 10, 1992.

3. MILESTONES NOT ACCOMPLISHED

None

4. EFFECT ON SCHEDULE AND RECOVERY

The Commission provided guidance on the level of design detail necessary to support a design certification application (SRM on SECY-90-377, February 15, 1991). GE continues to work with the staff to develop acceptable DAC; however, GE has not yet submitted all the information needed for the staff to make a safety determination in several areas. This has compressed the review schedule by requiring the staff to issue requests for additional information (RAI) before the reviews can be completed.

5. MILESTONES PLANNED FOR NEXT QUARTER

The staff has scheduled an audit of the ABWR main steam, feedwater, and safety relief valve (SRV) piping analyses in March 1992 and an audit of ABWR seismic design in April.

III. ALWR PROJECT MILESTONES

A. ABWR

In September 1987, GE submitted to the NRC its initial application for certification of the ABWR design. GE has amended the standard SAR for the ABWR 18 times. The staff issued requests for additional information from February 1988 through December 1990. GE responded to them through July 1991. The staff has issued the DSER.

1. MILESTONES FOR LAST QUARTER

a. Assign priorities to open issues and resolve each issue according to its assigned priority.

b. Submit information about advanced reactors to the ACRS and its subcommittees to support meetings for the next quarter.

c. Review the ITAAC as they are submitted by GE.

d. Receive GE's responses to the ABWR DSER.

2. MILESTONES ACCOMPLISHED

a. As of March 16, about 25 percent of the approximately 350 open items prioritized for the GE ABWR have been resolved. About 10 percent of the approximately 50 priority open items have been closed. The staff anticipates resolving most of the open items with FSER inputs to be supplied to the project manager by June 25, 1992.

b. The staff has participated in numerous ACRS Full Committee and subcommittee meetings during the last quarter.

3. MILESTONES NOT ACCOMPLISHED

The staff anticipated receiving most of the ITAAC and the PRA for the GE ABWR during the last quarter. However, GE has not fully met this milestone.

4. EFFECT ON SCHEDULE AND RECOVERY

In Section II.B, the staff stated that GE has informed the staff that it will not be able to submit over 50 percent of the ITAAC for the NRC to review until the end of May 1992. GE also informed the NRC that it would not submit the complete PRA until July 1992. To meet the SECY-91-161 review schedule, the staff must issue the FSER to the Commission and the ACRS in August of 1992. This will likely provide insufficient time for the staff to finish its review of the ABWR ITAAC and PRA and prepare an SER input. Consequently, the staff has determined that it will need to supplement the FSER to meet the December 1992 date for issuing a complete FSER and FDA to GE for the ABWR, as stated in SECY-91-161.

The staff proposes to issue the FSER to the Commission and the ACRS on schedule (August 1992) with some issues unresolved. The staff will discuss the resolution of these issues in one or more supplements to the FSER.

5. MILESTONES PLANNED FOR NEXT QUARTER

a. Conduct a meeting between the senior management and GE representatives on March 25-26 in San Jose, California.

b. Conduct an audit of the ABWR main steam, feedwater, and SRV piping analyses from March 23 through 27, 1992.

c. Conduct an audit of the ABWR seismic design from March 30 through April 3, 1992

d. Conduct a design inspection of the ABWR from March 30 through April 3, 1992

e. Continue to receive and evaluate late GE responses to the ABWR DSEP due on February 21, 1992.

f. Continue to evaluate and close DSER open items, ITAAC, DAC, and other information submitted late by GE to support the ABWR application.

B. CE SYSTEM 80+

On March 4, 1991, ABB/CE submitted its application for design certification review. In a letter of May 1, 1991, the staff informed the applicant that it had reviewed and docketed the CE System 80+ design certification application. However, this application does not include ITAAC, the reliability assurance program, or a detailed analysis of fire hazards.

1. MILESTONES FOR LAST QUARTER

Conduct meetings with CE to provide guidance and direction for responding to RAI and for completing submittals required for design certification.

2. MILESTONES ACCOMPLISHED

On February 26, 1992, senior NRR staff met with CE representatives to discuss DAC for system interactions, piping, cable trays, ductwork, and pneumatic lines.

3. MILESTONES NOT ACCOMPLISHED

Although CE responded to most of the RAI by February 1992, CE has delayed its scheduled response to approximately 45 questions on shutdown risk until August 1992. The staff is awaiting initial submittals from CE regarding ITAAC, fire hazards analysis, SAMDAs, interface requirements, and deviations from the SRP.

4. EFFECT ON SCHEDULE AND RECOVERY

The staff expects to meet the DSER schedule published in SECY-91-161, but will need the support of ABB/CE in ensuring that it receives timely, high quality submittals for review. The staff will closely monitor the technical review and continue to interact frequently with ABB/CE on the status of both the design certification application and the response to the staff's RAI.

5. MILESTONES PLANNED FOR NEXT QUARTER

a. Review the fire hazards analysis, scheduled to be submitted in March 1992, and SAMDAs and ITAAC scheduled to be submitted in May 1992.

b. Meet with CE to begin the DAC and ITAAC review process.

c. Meet with CE on I&C and human factors issues.

C. EPRI UTILITY REQUIREMENTS DOCUMENT FOR EVOLUTIONARY REACTORS

1. MILESTONES FOR LAST QUARTER

Continue developing the FSER, which is expected to be submitted to the Commission in the third quarter of FY 1992.

2. MILESTONES ACCOMPLISHED

The staff has completed its technical review and begun preparing the FSER. The staff expects to meet the May 13, 1992, date for providing the FSER to the Commission and the ACRS.

3. MILESTONES NOT ACCOMPLISHED

None

4. EFFECT ON SCHEDULE AND RECOVERY

The staff expects to meet the SECY-91-161 date of May 13, 1992, for providing the FSER to the Commission and the ACRS.

5. MILESTONES PLANNED FOR NEXT QUARTER

a. Issue the FSER to the Commission and the ACRS.

b. Conduct a senior management meeting with EPRI in Denver, Colorado, to discuss policy issues regarding the EPRI URD.

D. EPRI UTILITY REQUIREMENTS DOCUMENT FOR PASSIVE REACTORS

1. MILESTONES FOR LAST QUARTER

a. Prepare Commission papers on policy issues that affect the staff's review of the EPRI Utility Requirements Document for passive reactors.

b. Begin preparing the DSER.

2. MILESTONES ACCOMPLISHED

a. Provided the Commission with a draft Commission paper on February 20, 1992, describing major passive and selected evolutionary issues. Forwarded the paper to the ACRS and made it available to the public on February 27, 1992.

b. Completed all of the technical review activities. Has begun preparing the DSER document.

3. MILESTONES NOT ACCOMPLISHED

None

4. EFFECT ON SCHEDULE AND RECOVERY

The staff expects to meet the SECY-91-161 date of April 14, 1992, for providing the DSER to the Commission and the ACRS.

5. MILESTONES PLANNED FOR NEXT QUARTER

a. Provide the DSER to the Commission and the ACRS.

b. Conduct a senior management meeting with EPRI in Denver, Colorado, to discuss policy issues regarding the EPRI URD.

IV. MAINTENANCE, MAINTAINABILITY, RELIABILITY ASSURANCE, AND THE USE OF PRAs

The staff is continuing its efforts to address advanced reactor program issues concerning maintenance, maintainability, the reliability assurance program, and the use of PRAs. The staff is providing this information in response, in part, to Commissioner Curtiss' request in a staff requirements memorandum of November 12, 1991.

A. MAINTENANCE AND MAINTAINABILITY

The EPRI URD, both Volume II (Evolutionary) and Volume III (Passive), contains the section "Operability and Maintainability." In this section, EPRI emphasized requirements that enhance the operability and maintainability of the plant, through incorporating the lessons learned from the operation and maintenance of LWRs.

EPRI stated that it included the requirements in this section to acknowledge the strong relationship among operability, and maintainability, overall plant availability, and equipment reliability. In the guidance document, EPRI addressed areas such as design considerations for control locations (including the control room), I&C systems, the human-machine interface, and adequate space considerations in equipment layout to support inspection, maintenance, and replacement activities. GE and CE also discussed these concepts in their documents, although to a lesser degree.

Maintenance is an integral part of an ALWR reliability assurance program (RAP). The NRC will require the licensee to comply with the requirements of the new maintenance rule, 10 CFR 50.65, when it becomes effective.

B. RELIABILITY ASSURANCE PROGRAM

In SECY-89-013, "Design Requirements Related to the Evolutionary Advanced Light Water Reactors (ALWRs)," the staff listed several issues for ALWRs that may go beyond present acceptance criteria defined in the Standard Review Plan. One of these issues was the ALWR RAP, a program to ensure that the design reliability of safety significant systems, structures, and components is maintained over the life of a plant. The staff informed the Commission that the RAP would be required as part of the FDA application. In November

1989, the staff informed the nuclear steam supply system (NSSS) vendors involved in the design certification process that it was considering matters not addressed in the current SRP, that the NRC expects advance reactor designs to employ, including RAP.

The NRC first stated the need for a safety-oriented reliability effort for the nuclear industry in Section II.C.4 of NUREG-0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident," of August 1980. Initial research in this area focused on enhancing the reliability of safety systems and their supporting auxiliary systems. The staff later researched the feasibility and cost effectiveness of applying a reliability concept from the aerospace industry to commercial nuclear reactors as a regulatory option for the anticipated transient without scram (ATWS) problem. Work on this project continued until March 1985 when the research on operational safety reliability was consolidated into research on risk-based technical specifications. The NRC also reviewed the reliability assurance program for the Clinch River Breeder Reactor Program (CRBR) proposed by the U.S. Department of Energy as part of the license application review process for the CRBR until the CRBR was canceled.

The staff is developing a detailed guidance document for the ALWR RAP. The staff is also reviewing ALWR vendors' submittals pursuant to 10 CFR Part 52 for design certification and the EPRI evolutionary and passive utility requirements documents. The ALWR RAP applies at two distinct levels: the first level applies to vendor submittals for design certification (D-RAP) and the second level applies to a referencing applicant for a construction and operating license (O-RAP). The first level is a broad program that defines the scope, structure, and essential elements of an effective RAP. At the design level of the RAP, the vendor would determine the relevant aspects of plant operation, maintenance, and performance monitoring of the risk significant structures, systems, and components that the owner/operator needs to consider in developing the site-specific operational RAP. The owner/operator would complete the second level by fully developing and implementing the program using the plant-specific design information.

The staff is reviewing the EPRI and the ALWR vendors' D-RAP submittals and is preparing FSERs for both the evolutionary and passive EPRI ALWR URDs and the GE ABWR, and a DSER for the CE System 80+. The staff does not foresee any outstanding issues with the RAP that could adversely affect the review dates in the SECY-91-161 schedule.

C. THE USE OF PRAs

The staff does not intend that PRAs for evolutionary and passive designs merely be used to validate an already complete design, but rather that the PRAs be used as a design tool to optimize the design, enhance safety, and help provide valuable insights to specific plant vulnerabilities. Therefore, the staff expects evolutionary and passive plant vendors to use PRA insights to help ensure that designs have an appropriate balance of prevention and mitigation for severe accidents and that the designs benefit from PRA safety insights. In reviewing the PRAs for the evolutionary and passive designs, the staff will verify both the quality of the PRA and the degree to which the vendor and utility used the PRA to minimize the estimated core damage frequency and offsite consequences. Responding to the staff's request for additional information, EPRI modified the requirements to indicate that the design-specific PRA shall be integrated into the design process to enhance and optimize the design (including meeting EPRI's core damage frequency and public risk objectives). The staff also expects the ALWR vendors to provide the following information:

- The manner in which the PRA insights influenced the design process
- Which design features, if any, were added to or removed from the design as a result of PRA insights
- The manner in which the vendor considered plant operating experience in the design-specific PRA
- The criteria used to find any vulnerabilities in the plant design to internal and external events
- The manner in which the vendor used the PRA to develop an appropriate balance of prevention and mitigation

The NRC will base its certification of a design in part on a PRA of that design. The validity of a PRA is highly dependent on the assumed reliability of systems, structures, and components. Therefore, the staff has determined that the plant designer shall provide a RAP as part of the application for design certification.