

RULEMAKING ISSUE (Notation Vote)

January 7, 2011

SECY-11-0006

FOR: The Commissioners

FROM: R. W. Borchardt
Executive Director for Operations

SUBJECT: PROPOSED RULE—ECONOMIC SIMPLIFIED BOILING-WATER
REACTOR DESIGN CERTIFICATION

PURPOSE:

To obtain the Commission's approval to publish in the *Federal Register* the enclosed proposed rule that would amend Title 10 of the *Code of Federal Regulations* (10 CFR), Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," to certify the Economic Simplified Boiling-Water Reactor (ESBWR) standard design.

BACKGROUND:

GE-Hitachi Nuclear Energy (GEH) submitted an application for certification of its ESBWR standard design on August 24, 2005. The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the ESBWR standard design and issued an advanced final version of its "Safety Evaluation Report Related to Certification of the ESBWR Standard Design" at Agencywide Documents Access and Management System (ADAMS) Accession No. ML103070392. The final version of the safety evaluation report (SER), which will only make editorial (correction of typographic, grammatical, and cross-referencing errors) and conforming changes to the final revision of the design control document (DCD) and reflect the Commission's staff requirements memorandum on this paper, will be issued prior to publishing the proposed rule in the *Federal Register*.

CONTACT: George M. Tartal, NRO/DNRL
301-415-0016

As of July 29, 2010, the standard design application has been referenced in the following combined license (COL) applications:

<u>COL Name</u>	<u>Docket Date</u>	<u>Docketing Federal Register Citation</u>	<u>Projected Safety Evaluation Report Completion Date</u>
Fermi Unit 3	December 2, 2008	73 <input type="checkbox"/> 73350	March 31, 2012

DISCUSSION:

Technical, Regulatory, and Policy Issues

Human Factors Engineering (HFE) Operational Program Elements Exclusion from Finality

The staff is implementing existing Commission policy, that operational programs should be excluded from finality except where necessary to find design elements acceptable, in a manner different from other existing design certification rules. This policy is described in the December 6, 1996, staff requirements memorandum to SECY-96-077, "Certification of Two Evolutionary Designs," dated April 15, 1996. The staff proposes to exclude the two HFE operational program elements in Chapter 18 of the ESBWR DCD from the scope of the design approved in the rule. There are 12 elements in the HFE program. Two of the elements concern operational programs (procedures and training) that are not used to assess the adequacy of the HFE design. However, the GEH description of these two HFE operational programs addresses existing NRC guidelines in NUREG-0711, Revision 2, "Human Factors Engineering Program Review Model," which are comprehensive, and go beyond the operational program information needed as input to the HFE design. In addition, the training and procedure elements included in the HFE program are redundant to what is reviewed as part of the operational programs described in Chapter 13 of the Standard Review Plan. Accordingly, the staff is revising the HFE regulatory guidance in NUREG-0711 to address this overlap, but the revised guidance is not expected to be completed until late 2011. In keeping with the established Commission policy of not approving operational program elements through design certification except where necessary to find design elements acceptable, the staff proposes to exclude the two HFE operational program elements in the ESBWR DCD from the scope of the design approved in the rule. This would be done explicitly in Section VI, Issue Resolution, of the rule, by excluding the two HFE operational program elements from the finality accorded to the design. In keeping with the Commission policy on this matter, the two HFE operational program elements in the ESBWR DCD are excluded from the scope of the design approved in the rule. This would be done explicitly in Section VI, Issue Resolution, of the rule, by excluding the two HFE operational programs from the finality accorded to the design. This exclusion would be unique to the ESBWR design because all other DCDs for the previously certified designs do not include operational program descriptions of HFE training and procedures and the respective design certification rules (DCRs) did not include specific exclusions from finality for it. The staff is coordinating with other design certification applicants to ensure that other DCRs need not include similar exclusions.

Aircraft Impact Inspection Results

On July 26-28, 2010, and August 30 to September 1, 2010, the staff conducted an inspection of GEH's aircraft impact assessment (AIA) performed in support of its proposed certification of the

ESBWR design. On October 5, 2010, the staff issued its inspection report and a Severity Level IV Notice of Violation (NOV) (ADAMS Accession No. ML102740292) to GEH for failing to use realistic analyses for certain aspects of its AIA and failing to fully identify and incorporate those design features and functional capabilities credited in the AIA into the design. With the exception of the issues identified in the NOV, the staff concluded that the AIA complies with the applicable requirements of 10 CFR 50.150. GEH submitted its response to the NOV on October 26, 2010 (ADAMS Accession No. ML103010047), stating it has resolved the staff's concerns in its submission of Revision 8 to the DCD. On November 10, 2011, the staff informed GEH that certain aspects of their response to the NOV need to be addressed in further detail. GEH responded to the staff's concerns by letter dated December 3, 2010 (ADAMS Accession No. ML103400150), and by submitting Revision 9 to the DCD. The staff finds GEH's letter and DCD Revision 9 to be generally responsive to the findings described in the NOV and has found the resolution to be acceptable. The staff has no outstanding issues from the inspection of the ESBWR AIA.

Design Acceptance Criteria (DAC)

The use of DAC for the ESBWR design is consistent with the policy implemented in all previous design certifications. The ESBWR includes DAC in the areas of piping, digital instrumentation and controls (I&C), and HFE. The DAC provided in Tier 1 of the DCD, combined with design information and appropriate design methodologies, codes, and standards provided in Tier 2 of the DCD, provide sufficient detail to provide an adequate basis for the NRC to make a final safety determination. The use of DAC for ESBWR is described in Section 14.3 of the DCD Tier 2. Chapters 3, 7, and 18 of the DCD describe the piping, digital I&C, and HFE design methodologies, codes, and standards, respectively.

Access to Safeguards Information (SGI) and Sensitive Unclassified Non-Safeguards Information (SUNSI)

Consistent with proposed rule for amending the Advanced Boiling Water Reactor (ABWR) design certification (ref. SECY-10-0142, page 6), the staff is proposing to include in this rule paragraph E of Section VI, "Issue Resolution," which describes the procedure that an interested member of the public must follow to obtain access to SGI and SUNSI for the ESBWR design to request and participate in proceedings that involve licenses and applications that reference the ESBWR design.

Rulemaking Procedure

The standard design certification is being conducted under the applicable requirements of Subpart B of 10 CFR Part 52, "Standard Design Certifications," and 10 CFR Parts 2 and 51, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders" and "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." The rulemaking package includes the *Federal Register* notice of proposed rulemaking and the ESBWR environmental assessment. In addition, the *Federal Register* notice provides a 75-day period for the public to comment on those documents as well as the ESBWR DCD, which would be incorporated by reference into the DCR. The DCD is available on the NRC's public Web site at <http://www.nrc.gov/reactors/new-reactors/design-cert/esbwr.html>. Consistent with the ABWR proposed rule described above, the ESBWR proposed rule *Federal Register* notice provides the procedure for a member of the public to

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request access to SGI and SUNSI in order to comment on the ESBWR proposed rule.

RESOURCES:

The Office of New Reactors has budgeted 0.6 full-time equivalent (FTE) to manage this rulemaking in its fiscal year (FY) 2011 budget. The Office of the General Counsel and the Office of Administration have budgeted a total of 0.1 FTE each in FY 2011 for this rulemaking. The Office of Information Services has budgeted <0.1 FTE for FY 2011 for this rulemaking. Resources for FY 2012 and beyond, if necessary, will be requested through the planning, budget, and performance management process.

RECOMMENDATIONS:

That the Commission:

1. Approve the proposed amendment to 10 CFR Part 52 for publication in the *Federal Register*, including the proposed exclusion of HFE procedures and training from design certification finality.
2. Certify that this rule, if promulgated, will not have a negative economic impact on a substantial number of small entities in order to satisfy requirements of the Regulatory Flexibility Act (5 U.S.C. 605(b)).
3. Determine that neither the backfit rule (10 CFR 50.109, "Backfitting"), nor any of the finality provisions in 10 CFR Part 52, apply to this proposed design certification rule.
4. Note:
 - a. The proposed DCR ([Enclosure 1](#)) will be published in the *Federal Register* for a 75-day comment period.
 - b. An environmental assessment and finding of no significant impact has been prepared ([Enclosure 2](#)).
 - c. This proposed rule contains new information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). The information collection requirements must be submitted to the Office of Management and Budget for approval on or immediately after the date of publication of the proposed rule in the *Federal Register*.
 - d. The Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification regarding the economic impact on small entities and the reasons for it as required by the Regulatory Flexibility Act (Section XIII of [Enclosure 1](#)).
 - e. The appropriate congressional committees will be informed.
 - f. The Office of Public Affairs will issue a press release.
 - g. The staff will use a communications plan with frequently asked questions prepared specifically for the ESBWR standard design.

COORDINATION:

The Office of the General Counsel (OGC) has no legal objection to the proposed ESBWR design certification rulemaking. The Chief Financial Officer has reviewed this paper for resource implications and has no objections. The Office of Information Services has reviewed this paper for information technology and information management implications and concurs on it. The staff briefed the Advisory Committee on Reactor Safeguards (ACRS) on the ESBWR draft final safety evaluation report on October 7, 2010. The ACRS issued a letter dated October 20, 2010 (ADAMS Accession No. ML102850376), to the Commission stating that the ESBWR design is robust and there is reasonable assurance that it can be built and operated without undue risk to the health and safety of the public. An information copy of the [enclosed Federal Register](#) notice will be provided to the ACRS after publication.

/RA by Martin J. Virgilio for/

R. W. Borchardt
Executive Director
for Operations

Enclosures:

1. [Federal Register Notice](#)
2. [Environmental Assessment](#)

NUCLEAR REGULATORY COMMISSION

10 CFR Part 52

RIN 3150-AI85

NRC-2010-0135

ESBWR Design Certification

AGENCY: U.S. Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC or Commission) proposes to amend its regulations to certify the Economic Simplified Boiling-Water Reactor (ESBWR) standard plant design. This action is necessary so that applicants or licensees intending to construct and operate an ESBWR design may do so by referencing this design certification rule (DCR). The applicant for certification of the ESBWR design is GE-Hitachi Nuclear Energy (GEH). The public is invited to submit comments on this proposed DCR, the generic design control document (DCD) that would be incorporated by reference into the DCR, and the environmental assessment (EA) for the ESBWR design.

DATES: Submit comments on the DCR, DCD and/or EA by **[insert date 75 days after publication in the Federal Register.]** Submit comments specific to the information collections aspects of this rule by **[insert date 30 days after publication in the Federal Register.]** Comments received after the above dates will be considered if it is practical to do so, but assurance of consideration cannot be given to comments received after these dates.

ADDRESSES: Please include Docket ID NRC-2010-0135 in the subject line of your comments. For instructions on submitting comments and accessing documents related to this action, see Section I, "Submitting Comments and Accessing Information" in the SUPPLEMENTARY INFORMATION section of this document. You may submit comments by any one of the following methods.

Federal Rulemaking Web site: Go to <http://www.regulations.gov> and search for documents filed under Docket ID NRC-2010-0135. Address questions about NRC dockets to Carol Gallagher, telephone 301-492-3668; e-mail Carol.Gallagher@nrc.gov.

Mail comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.

E-mail comments to: Rulemaking.Comments@nrc.gov. If you do not receive a reply e-mail confirming that we have received your comments, contact us directly at 301-415-1966.

Hand Deliver comments to: 11555 Rockville Pike, Rockville, Maryland 20852 between 7:30 a.m. and 4:15 p.m. during Federal workdays (Telephone 301-415-1966).

Fax comments to: Secretary, U.S. Nuclear Regulatory Commission at 301-415-1101.

FOR FURTHER INFORMATION CONTACT: George M. Tartal, Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone 301-415-0016; e-mail: george.tartal@nrc.gov; or Bruce M. Bovol, Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone 301-415-6715; e-mail: bruce.bovol@nrc.gov.

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I. Submitting Comments and Accessing Information

Comments submitted in writing or in electronic form will be posted on the NRC Web site and on the Federal rulemaking Web site <http://www.regulations.gov>. Because your comments will not be edited to remove any identifying or contact information, the NRC cautions you against including any information in your submission that you do not want to be publicly disclosed. The NRC requests that any party soliciting or aggregating comments received from other persons for submission to the NRC inform those persons that the NRC will not edit their comments to remove any identifying or contact information, and therefore, they should not include any information in their comments that they do not want publicly disclosed.

Documents that are not publicly available because they are considered to be either Sensitive Unclassified Non-Safeguards Information (SUNSI) (including SUNSI constituting “proprietary information”¹) or Safeguards Information (SGI) may be available to interested persons who may wish to comment on the proposed design certification. Such persons shall follow the procedures described in the Supplementary Information section of this notice, under the heading, “VIII. Procedures for Access to SUNSI (Including Proprietary information) and Safeguards Information for Preparation of Comments on the Proposed ESBWR Design Certification Rule.”

¹ For purposes of this discussion, “proprietary information” constitutes trade secrets or commercial or financial information that are privileged or confidential, as those terms are used under the Freedom of Information Act and the NRC’s implementing regulation at Title 10 of the *Code of Federal Regulations* (10 CFR), Part 9.

You can access publicly available documents related to this document, including the following documents, using the following methods:

NRC's Public Document Room (PDR): The public may examine and have copied for a fee publicly available documents at the NRC's PDR, Room O-1F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland.

NRC's Agencywide Documents Access and Management System (ADAMS): Publicly available documents created or received at the NRC are available electronically at the NRC's Electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. From this page, the public can gain entry into ADAMS, which provides text and image files of NRC's public documents. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC's PDR reference staff at 1-800-397-4209, or 301-415-4737, or by e-mail to PDR.Resource@nrc.gov.

Federal Rulemaking Web site: Public comments and supporting materials related to this proposed rule can be found at <http://www.regulations.gov> by searching on Docket ID NRC-2010-0135.

II. Background

Subpart B to 10 CFR Part 52 sets forth the process for obtaining standard design certifications. On August 24, 2005 (70 FR 56745), GEH tendered its application for certification of the ESBWR standard plant design with the NRC. GEH submitted this application in accordance with Subpart B of 10 CFR Part 52. The NRC formally accepted the application as a docketed application for design certification (Docket No. 52-010) on December 1, 2005 (70 FR 73311). The pre-application information submitted before the NRC formally accepted the application can be found in ADAMS under Docket No. PROJ0717 (Project No. 717).

The application for design certification of the ESBWR design has been referenced in the following combined license (COL) application as of the date of this document:

Detroit Edison Company, Fermi Unit 3, Docket No. 52-033 (73 FR 73350; December 2, 2008)

III. Regulatory and Policy Issues

Human Factors Operational Programs

The NRC identified a policy issue during its review of Chapter 18 of the ESBWR DCD, which describes the Human Factors Engineering (HFE) program. There are 12 elements in the HFE program. Two of the elements concern operational programs (procedures and training) that are not used to assess the adequacy of the HFE design. However, the GEH description of these two HFE operational programs addresses existing NRC guidelines in NUREG-0711, Revision 2, "Human Factors Engineering Program Review Model," which are comprehensive, and go beyond the operational program information needed as input to the HFE design. In addition, the training and procedure elements included in the HFE program are redundant to what is reviewed as part of the operational programs described in Chapter 13 of the Standard Review Plan (SRP). Accordingly, the NRC is revising the HFE regulatory guidance in NUREG-0711 to address this overlap, but the revised guidance is not expected to be completed until 2011. In keeping with the established Commission policy of not approving operational program elements through design certification except where necessary to find design elements acceptable, the NRC proposes to exclude the two HFE operational program elements in the ESBWR DCD from the scope of the design approved in the rule. This would be done explicitly in Section VI, Issue Resolution, of the rule, by excluding the two HFE operational program elements from the finality accorded to the design.

Access to SUNSI and SGI In Connection With License Applications

In the four currently approved design certifications (10 CFR Part 52, Appendices A through D), paragraph VI.E sets forth specific directions on how to obtain access to proprietary information and SGI on the design certification in connection with a license application

proceeding referencing that design certification rule. These provisions were developed before the events of September 11, 2001. After September 11, 2001, Congress has changed the statutory requirements governing access to SGI, and the NRC has revised its rules, procedures, and practices governing control of and access to SUNSI and SGI. The NRC now believes that generic direction on obtaining access to SUNSI and SGI is no longer appropriate for newly approved DCRs. Accordingly, the specific requirements governing access to SUNSI and SGI contained in paragraph VI.E of the four currently approved DCRs should not be included in the design certification rule for the ESBWR. Instead, the NRC should specify the procedures to be used for obtaining access at an appropriate time in the COL proceeding referencing the ESBWR DCR. The NRC intends to include this change in any future amendment or renewal of the existing DCRs. However, the NRC is not planning to initiate rulemaking to change paragraph VI.E of the existing DCRs, in order to minimize unnecessary resource expenditures by both the original DCR applicant and the NRC.

IV. Technical Evaluation of the ESBWR

The NRC issued a final safety evaluation report (FSER) for the ESBWR design in [MONTH YEAR]. The FSER provides the basis for issuance of a design certification under Subpart B to 10 CFR Part 52 and a final design approval under Subpart E to 10 CFR Part 52. Westinghouse has requested the NRC provide its design approval for the ESBWR design under Subpart E. The final design approval for the ESBWR design will be issued before publication of a final rule.

The significant technical issues that were resolved during the review of the ESBWR design are the regulatory treatment of non-safety systems (RTNSS), containment performance, control room cooling, steam dryer methodology, feedwater temperature (FWT) domain, aircraft impact assessment and the use of Code Case N-782.

Regulatory Treatment of Non-safety Systems

The ESBWR relies on passive systems to perform safety functions credited in the design basis for 72 hours following an initiating event. After 72 hours, non-safety systems, either passive or active, replenish the passive systems in order to keep them operating or perform post-accident recovery functions directly. The ESBWR design also uses nonsafety-related active systems to provide defense-in-depth capabilities for key safety functions provided by passive systems. The challenge during the review was to identify the non-safety systems, structures and components (SSCs) that should receive enhanced regulatory treatment and to identify the appropriate regulatory treatment to be applied to these SSCs. Such SSCs are denoted as "RTNS SSCs." As a result of the NRC's review, the applicant added Appendix 19A to the DCD to identify the nonsafety systems that perform these post-72 hour or defense-in-depth functions and the basis for their selection. The applicant's selection process was based on the guidance in SECY-94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs."

To provide reasonable assurance that RTNSS SSCs will be available if called upon to function, the applicant established availability controls in DCD Tier 2, Appendix 19ACM, and Technical Specifications (TS) in DCD Tier 2, Chapter 16, when required by 10 CFR 50.36. The applicant also included all RTNSS SSCs in the reliability assurance program described in Chapter 17 of DCD Tier 2 and applied augmented design standards as described in DCD Tier 2, Section 19A.8.3. The NRC finds the applicant's implementation of the RTNSS process described in the DCD acceptable.

Containment Performance

The passive containment cooling system (PCCS) maintains the containment within its design pressure and temperature limits for design-basis accidents. The system is passive and does not rely upon moving components or external power for initiation or operation for 72 hours

following a loss-of-coolant accident (LOCA). The PCCS and its design basis are described in detail in Section 6.2.2 of the DCD Tier 2. The NRC identified a concern regarding the PCCS long-term cooling capability for the period from 72 hours to 30 days following a LOCA. To address this concern, the applicant proposed additional design features credited after 72 hours to reduce the long-term containment pressure. The features are the PCCS vent fans and passive autocatalytic recombiners as described in DCD Tier 2 Section 6.2.1. These SSCs have been indentified in DCD Appendix 19A as RTNSS SSCs.

The applicant provided calculation results to demonstrate that the long-term containment pressure would be acceptable and that the design complies with general design criterion (GDC) 38. The NRC's independent calculations confirmed the applicant's conclusion and the NRC accepts the proposed design and licensing basis. The NRC also raised a concern regarding the potential accumulation of high concentrations of hydrogen and oxygen in the PCCS and isolation condenser system (ICS), which could lead to combustion following a LOCA. The applicant modified the design of the PCCS and ICS heat exchangers to withstand potential hydrogen detonations. The NRC concludes that the design changes to the PCCS and ICS are acceptable and meet the applicable requirements.

Control Room Cooling

The ESBWR primarily relies on the mass and structure of the control building to maintain acceptable temperatures for human and equipment performance for up to 72 hours on loss of normal cooling. The NRC had not previously approved this approach for maintaining acceptable temperatures in the control building. The applicant proposed acceptance criteria for the evaluation of the control building structure's thermal performance based on industry and NRC guidelines. The applicant incorporates by reference an analysis of the control building structure's thermal performance as described in Tier 2, Sections 3H, 6.4, and 9.4. The applicant also proposed ITAAC to confirm that an updated analysis of the as-built structure continues to

meet the thermal performance acceptance criteria. The NRC finds that the applicant's acceptance criteria are consistent with the advanced light-water reactor control room envelope atmosphere temperature limits in NUREG-1242, "NRC Review of Electric Power Research Institute's advanced light water reactor Utility Requirements Document," and the use of the wet bulb globe temperature index in evaluation of heat stress conditions as described in NUREG-0700, "Human-System Interface Design Review Guidelines." The NRC finds the control building structure thermal performance analysis and ITAAC acceptable based on the analysis using bounding environmental assumptions which will be confirmed by the ITAAC. Accordingly, the NRC finds that the acceptance criteria, control building structure thermal performance analysis, and the ITAAC, provide reasonable assurance that acceptable temperatures will be maintained in the control building for 72 hours. Therefore, the NRC finds that the control building design in regard to thermal performance conforms to the guidelines of SRP Section 6.4 and complies with the requirements of GDC 19.

Feedwater Temperature Operating Domain

In operating boiling-water reactors the recirculation pumps are used in combination with the control rods to control and maneuver reactor power level during normal power operation. The ESBWR design is unique in that the core is cooled by natural circulation during normal operation, and there are no recirculation pumps. In Chapter 15 of the DCD, GEH references the licensing topical report (LTR) NEDO-33338, Revision 1, "ESBWR Feedwater Temperature Operating Domain Transient and Accident Analysis." This LTR describes a broadening of the ESBWR operating domain, which allows for increased flexibility of operation by adjusting the FWT. This increased flexibility accommodates the so-called "soft" operating practices, which reduce the duty to the fuel and minimize the probability of pellet-clad interactions and associated fuel failures.

By adjusting the FWT, the operator can control the reactor power level without control blade motion and with minimum impact on the fuel duty. Control blade maneuvering can also be performed at lower power levels.

To control the FWT, the ESBWR design includes a seventh feedwater heater with high-pressure steam. FWT is controlled by either manipulating the main steam flow to the No. 7 feedwater heater to increase FWT above the temperature normally provided by the feedwater heaters with turbine extraction steam (normal FWT) or by directing a portion of the feedwater flow around the high-pressure feedwater heaters to decrease FWT below the normal FWT. An increase in FWT decreases reactor power, and a decrease in FWT increases reactor power. The applicant provided analyses that demonstrated ample margin to acceptance criteria. The NRC concludes that the applicant has adequately accounted for the effects of the proposed FWT operating domain extension on the nuclear design. Further, the applicant has demonstrated that the fuel design limits will not be exceeded during normal or anticipated operational transients and that the effects of postulated transients and accidents will not impair the capability to cool the core. Based on this evaluation, the NRC concludes that the nuclear design of the fuel assemblies, control systems, and reactor core will continue to meet the applicable regulatory requirements.

Steam Dryer Design Methodology

As a result of reactor pressure vessel (RPV) steam dryer issues at operating BWRs, the NRC issued revised guidance concerning the evaluation of steam dryers. The guidance requested analysis to show that the dryer will maintain its structural integrity during plant operation in spite of or in the face of acoustic and hydrodynamic fluctuating pressure loads. This demonstration of RPV steam dryer structural integrity consists of three steps:

- 1) Predict the fluctuating pressure loads on the dryer,
- 2) Use these fluctuating pressure loads in a structural analysis to qualify the steam dryer

design, and

3) Implement a startup test program for confirming the steam dryer design analysis results during the initial plant power ascension testing.

The Plant Based Load Evaluation (PBLE) methodology is an analytical tool developed by GEH to predict fluctuating pressure loads on the steam dryer. Section 3.9.5 of the DCD references the GEH LTR NEDE-33313P, "ESBWR Steam Dryer Structural Evaluation," which references LTR NEDE-33312P, "ESBWR Steam Dryer Acoustic Load Definition," which references the PBLE load definition method. The PBLE method is described in LTR NEDC-33408P, "ESBWR Steam Dryer-Plant Base Load Evaluation Methodology." This LTR provides the theoretical basis for determining the fluctuating loads on the ESBWR steam dryer, describes the PBLE analytical model, determines the biases and uncertainties of the PBLE formulation, and describes the application of the PBLE method to the evaluation of the ESBWR steam dryer.

The NRC's review of the PBLE methodology concludes that it is technically sound and provides a conservative analytical approach for definition of flow-induced acoustic pressure loading on the ESBWR steam dryer. The application of the PBLE load definition process together with the design criteria from the American Society of Mechanical Engineers (ASME) Code, Section III, Article NG-3000 in combination with the proposed start up test program provide assurance of the structural integrity of the steam dryer. Implementation of the analytical, design, and testing methodology for the ESBWR steam dryer demonstrate conformance with the general design criteria of 10 CFR Part 50, Appendix A, GDCs 1, 2, and 4.

Aircraft Impact Assessment

Under 10 CFR 50.150, which became effective on July 13, 2009, designers of new nuclear power reactors are required to perform an assessment of the effects on the designed facility of the impact of a large, commercial aircraft. An applicant for a new design certification

rule is required to submit a description of the design features and functional capabilities identified as a result of the assessment (key design features) in its DCD together with a description of how the identified design features and functional capabilities show that the acceptance criteria in 10 CFR 50.150(a)(1) are met.

To address the requirements of 10 CFR 50.150, GEH completed an assessment of the effects on the designed facility of the impact of a large, commercial aircraft. GEH also added Appendix 19D to DCD Tier 2 to describe the design features and functional capabilities of the ESBWR identified as a result of the assessment that ensure the reactor core remains cooled and the spent fuel pool integrity is maintained.

The NRC finds that the applicant has performed an aircraft impact assessment using NRC-endorsed methodology that is reasonably formulated to identify design features and functional capabilities to show, with reduced use of operator action, that the acceptance criteria in 10 CFR 50.150(a)(1) are met. The NRC finds that the applicant adequately describes the key design features and functional capabilities credited to meet 10 CFR 50.150, including descriptions of how the key design features and functional capabilities show that the acceptance criteria in 10 CFR 50.150(a)(1) are met. Therefore, the NRC finds that the applicant meets the applicable requirements of 10 CFR 50.150(b).

Code Case N-782

Under 10 CFR 50.55a(a)(3), GEH requested NRC approval for the use of Code Case N-782 as a proposed alternative to the rules of Section III Subsection NCA-1140 regarding applied Code Editions and Addenda required by 10 CFR 50.55a(c), (d), and (e). Code Case N-782 provides that the Code Edition and Addenda endorsed in a certified design or licensed by the regulatory authority may be used for systems and components subject to ASME Code, Section III requirements. These alternative requirements are in lieu of the requirements that base the Edition and Addenda on the date of the COL or manufacturing license, or the

application for a construction permit, standard design approval, or standard design certification. Reference to Code Case N-782 will be included in component and system design specifications and design reports to permit certification of these specifications and reports to the Code Edition and Addenda cited in the DCD. The NRC's bases for approving the use of Code Case N-782 as a proposed alternative to the requirements of Section III Subsection NCA-1140 under 10 CFR 50.55a(a)(3) for the ESBWR are described in Section 5.2.1.1.3 of the FSER.

Exemptions

The NRC is proposing to approve an exemption from 10 CFR 50.34(f)(2)(iv) as it relates to the safety parameter display system. This provision requires an applicant to provide a plant safety parameter display console that will display to operators a minimum set of parameters defining the safety status of the plant, capable of displaying a full range of important plant parameters and data trends on demand and indicating when process limits are being approached or exceeded. The ESBWR design integrates the safety parameter display system into the design of the non-safety related distribution control and information system, rather than use a stand-alone console. The NRC's bases for providing the exemption are described in Section 18.8.3.2 of the FSER.

V. Section-by-Section Analysis

The following discussion sets forth the purpose and key aspects of each section and paragraph of the proposed ESBWR DCR. All section and paragraph references are to the provisions in the proposed Appendix E to 10 CFR Part 52 unless otherwise noted. The NRC has modeled the ESBWR DCR on the existing DCRs, with certain modifications where necessary to account for differences in the ESBWR design documentation, design features, and EA (including severe accident mitigation design alternatives (SAMDAs)). As a result, the DCRs are standardized to the extent practical.

A. Introduction (Section I)

The purpose of Section I of proposed Appendix E to 10 CFR Part 52 (this appendix) is to identify the standard plant design that would be approved by this DCR and the applicant for certification of the standard design. Identification of the design certification applicant is necessary to implement this appendix for two reasons. First, the implementation of 10 CFR 52.63(c) depends on whether an applicant for a COL contracts with the design certification applicant to provide the generic DCD and supporting design information. If the COL applicant does not use the design certification applicant to provide the design information and instead uses an alternate nuclear plant vendor, then the COL applicant must meet the requirements in 10 CFR 52.73. The COL applicant must demonstrate that the alternate supplier is qualified to provide the standard plant design information. Second, paragraph X.A.1 would require the design certification applicant to maintain the generic DCD throughout the time this appendix may be referenced. Thus, it is necessary to identify the entity to which the requirement in paragraph X.A.1 applies.

B. Definitions (Section II)

During development of the first two DCRs, the Commission decided that there would be both generic (master) DCDs maintained by the NRC and the design certification applicant, as well as individual plant-specific DCDs maintained by each applicant and licensee that reference this appendix. This distinction is necessary in order to specify the relevant plant-specific requirements to applicants and licensees referencing the appendix. In order to facilitate the maintenance of the master DCDs, the NRC proposes that each application for a standard design certification be updated to include an electronic copy of the final version of the DCD. The final version would be required to incorporate all amendments to the DCD submitted since the original application as well as any changes directed by the NRC as a result of its review of the original DCD or as a result of public comments. This final version would become the master

DCD incorporated by reference in the DCR. The master DCD would be revised as needed to include generic changes to the version of the DCD approved in this design certification rulemaking. These changes would occur as the result of generic rulemaking by the Commission, under the change criteria in Section VIII.

The Commission would also require each applicant and licensee referencing this appendix to submit and maintain a plant-specific DCD as part of the COL Final Safety Analysis Report (FSAR). This plant-specific DCD would include or incorporate by reference the information in the generic DCD. The plant-specific DCD would be updated as necessary to reflect the generic changes to the DCD that the Commission may adopt through rulemaking, plant-specific departures from the generic DCD that the Commission imposed on the licensee by order, and any plant-specific departures that the licensee chooses to make in accordance with the relevant processes in Section VIII. Thus, the plant-specific DCD would function like an updated FSAR because it would provide the most complete and accurate information on a plant's design basis for that part of the plant within the scope of this appendix. Therefore, this appendix would define both a generic DCD and a plant-specific DCD.

Also, the Commission decided to treat the TS in Chapter 16 of the generic DCD as a special category of information and to designate them as generic TS in order to facilitate the special treatment of this information under this appendix. A COL applicant must submit plant-specific TS that consist of the generic TS, which may be modified under paragraph VIII.C, and the remaining plant-specific information needed to complete the TS. The FSAR that is required by 10 CFR 52.79 will consist of the plant-specific DCD, the site-specific portion of the FSAR, and the plant-specific TS.

The terms Tier 1, Tier 2, Tier 2*, and COL action items (license information) are defined in this appendix because these concepts were not envisioned when 10 CFR Part 52 was developed. The design certification applicants and the NRC used these terms in implementing

the two-tiered rule structure that was proposed by representatives of the nuclear industry after issuance of 10 CFR Part 52. Therefore, appropriate definitions for these additional terms are included in this appendix. The nuclear industry representatives requested a two-tiered structure for the DCRs to achieve issue preclusion for a greater amount of information than was originally planned for the DCRs, while retaining flexibility for design implementation. The Commission approved the use of a two-tiered rule structure in its staff requirements memorandum (SRM), dated February 14, 1991, on SECY-90-377, "Requirements for Design Certification under 10 CFR Part 52," dated November 8, 1990. This document and others are available in the Regulatory History of Design Certification (see Section V of this document).

The Tier 1 portion of the design-related information contained in the DCD would be *certified* by this appendix and, therefore, subject to the special backfit provisions in paragraph VIII.A. An applicant who references this appendix would be required to include or incorporate by reference and comply with Tier 1, under paragraphs III.B and IV.A.1. This information consists of an introduction to Tier 1, the system based and non-system based design descriptions and corresponding ITAAC, significant interface requirements, and significant site parameters for the design (refer to Section C.I.1.8 of Regulatory Guide 1.206 for guidance on significant interface requirements and site parameters). The design descriptions, interface requirements, and site parameters in Tier 1 were derived from Tier 2, but may be more general than the Tier 2 information. The NRC staff's evaluation of the Tier 1 information is provided in Section 14.3 of the FSER. Changes to or departures from the Tier 1 information must comply with Section VIII.A.

The Tier 1 design descriptions serve as requirements for the lifetime of a facility license referencing the design certification. The inspection, test, analysis, and acceptance criterion/criteria (ITAAC) verify that the as-built facility conforms to the approved design and applicable regulations. Under 10 CFR 52.103(g), the Commission must find that the acceptance

criteria in the ITAAC are met before authorizing operation. After the Commission has made the finding required by 10 CFR 52.103(g), the ITAAC do not constitute regulatory requirements for licensees or for renewal of the COL. However, subsequent modifications to the facility within the scope of the design certification must comply with the design descriptions in the plant-specific DCD unless changes are made under the change process in Section VIII. The Tier 1 interface requirements are the most significant of the interface requirements for systems that are wholly or partially outside the scope of the standard design. Tier 1 interface requirements must be met by the site-specific design features of a facility that references this appendix. An application that references this appendix must demonstrate that the site characteristics at the proposed site fall within the site parameters (both Tier 1 and Tier 2) (refer to paragraph IV.D of this document).

Tier 2 is the portion of the design-related information contained in the DCD that would be *approved* by this appendix but not certified. Tier 2 information would be subject to the backfit provisions in paragraph VIII.B. Tier 2 includes the information required by 10 CFR 52.47(a) and 52.47(c) (with the exception of generic TS and conceptual design information) and the supporting information on inspections, tests, and analyses that will be performed to demonstrate that the acceptance criteria in the ITAAC have been met. As with Tier 1, paragraphs III.B and IV.A.1 would require an applicant who references this appendix to include or incorporate by reference Tier 2 and to comply with Tier 2, except for the COL action items, including the availability controls in Appendix 19ACM of the generic DCD. The definition of Tier 2 makes clear that Tier 2 information has been determined by the Commission, by virtue of its inclusion in this appendix and its designation as Tier 2 information, to be an approved sufficient method for meeting Tier 1 requirements. However, there may be other acceptable ways of complying with Tier 1 requirements. The appropriate criteria for departing from Tier 2 information would be specified in paragraph VIII.B. Departures from Tier 2 information would not negate the requirement in paragraph III.B to incorporate by reference Tier 2 information.

A definition of “combined license action items” (COL information), which is part of the Tier 2 information, would be added to clarify that COL applicants who reference this appendix are required to address COL action items in their license application. However, the COL action items are not the only acceptable set of information. An applicant may depart from or omit COL action items, provided that the departure or omission is identified and justified in the FSAR. After issuance of a construction permit or COL, these items would not be requirements for the licensee unless they are restated in the FSAR. For additional discussion, see Section IV.D of this document.

The availability controls, which are set forth in Appendix 19ACM of the generic DCD, would be added to the information that is part of Tier 2 to clarify that the availability controls are not operational requirements for the purposes of paragraph VIII.C. Rather, the availability controls are associated with specific design features. The availability controls may be changed if the associated design feature is changed under paragraph VIII.B. For additional discussion, see Section IV.C of this document.

Certain Tier 2 information has been designated in the generic DCD with brackets and italicized text as “Tier 2*” information and, as discussed in greater detail in the section-by-section analysis for Section H, a plant-specific departure from Tier 2* information would require prior NRC approval. However, the Tier 2* designation expires for some of this information when the facility first achieves full power after the finding required by 10 CFR 52.103(g). The process for changing Tier 2* information and the time at which its status as Tier 2* expires is set forth in paragraph VIII.B.6. Some Tier 2* requirements concerning special preoperational tests are designated to be performed only for the first plant or first three plants referencing the ESBWR DCR. The Tier 2* designation for these selected tests would expire after the first plant or first three plants complete the specified tests. However, a COL action item requires that subsequent

plants also perform the tests or justify that the results of the first-plant-only or first-three-plants-only tests are applicable to the subsequent plant.

The regulations at 10 CFR 50.59 set forth thresholds for permitting changes to a plant as described in the FSAR without NRC approval. Inasmuch as 10 CFR 50.59 is the primary change mechanism for operating nuclear plants, the Commission believes that future plants referencing the ESBWR DCR should use thresholds as close to 10 CFR 50.59 as is practicable and appropriate for new reactors. Because of some differences in how the change control requirements are structured in the DCRs, certain definitions contained in 10 CFR 50.59 are not applicable to 10 CFR Part 52 and are not being included in this proposed rule. The Commission is including a definition for a “departure from a method of evaluation” (paragraph II.G), which is appropriate to include in this rulemaking so that the eight criteria in paragraph VIII.B.5.b will be implemented for new reactors as intended.

C. Scope and Contents (Section III)

The purpose of Section III is to describe and define the scope and contents of this design certification and to set forth how documentation discrepancies or inconsistencies are to be resolved. Paragraph III.A is the required statement of the Office of the Federal Register (OFR) for approval of the incorporation by reference of Tier 1, Tier 2, and the generic TS into this appendix. Paragraph III.B requires COL applicants and licensees to comply with the requirements of this appendix. The legal effect of incorporation by reference is that the incorporated material has the same legal status as if it were published in the *Code of Federal Regulations*. This material, like any other properly-issued regulation, has the force and effect of law. Tier 1 and Tier 2 information, as well as the generic TS, have been combined into a single document called the generic DCD, in order to effectively control this information and facilitate its incorporation by reference into the rule. The generic DCD was prepared to meet the technical information contents of application requirements for design certifications under 10 CFR 52.47(a)

and the requirements of the OFR for incorporation by reference under 1 CFR Part 51. One of the requirements of the OFR for incorporation by reference is that the design certification applicant must make the generic DCD available upon request after the final rule becomes effective. Therefore, paragraph III.A would identify a GEH representative to be contacted in order to obtain a copy of the generic DCD.

Paragraphs III.A and III.B would also identify the availability controls in Appendix 19ACM of the generic DCD as part of the Tier 2 information. During its review of the ESBWR design, the NRC determined that residual uncertainties associated with passive safety system performance increased the importance of non-safety-related active systems in providing defense-in-depth functions that back-up the passive systems. As a result, GEH developed administrative controls to provide a high level of confidence that active systems having a significant safety role are available when challenged. GEH named these additional controls "availability controls." The Commission included this characterization in Section III to ensure that these availability controls would be binding on applicants and licensees that reference this appendix and would be enforceable by the NRC. The NRC's evaluation of the availability controls is provided in Chapter 22 of the FSER.

The generic DCD (master copy) for this design certification would be electronically accessible under ADAMS Accession No. ML103440266; at the OFR; and at www.regulations.gov by searching under Docket ID NRC-2010-0135. Copies of the generic DCD would also be available at the NRC's PDR. Questions concerning the accuracy of information in an application that references this appendix will be resolved by checking the master copy of the generic DCD in ADAMS. If the design certification applicant makes a generic change (rulemaking) to the DCD under 10 CFR 52.63 and the change process provided in Section VIII, then at the completion of the rulemaking the NRC would request approval of the Director, OFR, for the revised master DCD. The Commission would require that the design

certification applicant maintain an up-to-date copy of the master DCD that includes any generic changes it has made under paragraph X.A.1 because it is likely that most applicants intending to reference the standard design would obtain the generic DCD from the design certification applicant. Plant-specific changes to and departures from the generic DCD would be maintained by the applicant or licensee that references this appendix in a plant-specific DCD under paragraph X.A.2.

In addition to requiring compliance with this appendix, paragraph III.B would clarify that the conceptual design information and GEH's evaluation of SAMDAs are not considered to be part of this appendix. The conceptual design information is for those portions of the plant that are outside the scope of the standard design and are contained in Tier 2 information. As provided by 10 CFR 52.47(a)(24), these conceptual designs are not part of this appendix and, therefore, are not applicable to an application that references this appendix. Therefore, the applicant would not be required to conform with the conceptual design information that was provided by the design certification applicant. The conceptual design information, which consists of site-specific design features, was required to facilitate the design certification review. Conceptual design information is neither Tier 1 nor Tier 2. Section 1.8.2 of Tier 2 identifies the location of the conceptual design information. GEH's evaluation of various design alternatives to prevent and mitigate severe accidents does not constitute design requirements. The Commission's assessment of this information is discussed in Section X of this document.

Paragraphs III.C and III.D would set forth the way potential conflicts are to be resolved. Paragraph III.C would establish the Tier 1 description in the DCD as controlling in the event of an inconsistency between the Tier 1 and Tier 2 information in the DCD. Paragraph III.D would establish the generic DCD as the controlling document in the event of an inconsistency between the DCD and the FSER for the certified standard design.

Paragraph III.E would clarify that design activities that are wholly outside the scope of this design certification may be performed using actual site characteristics, provided the design activities do not affect Tier 1 or Tier 2, or conflict with the interface requirements in the DCD. This provision would apply to site-specific portions of the plant, such as the administration building. Because this statement is not a definition, this provision has been located in Section III.

D. Additional Requirements and Restrictions (Section IV)

Section IV would set forth additional requirements and restrictions imposed upon an applicant who references this appendix. Paragraph IV.A would set forth the information requirements for these applicants. This paragraph would distinguish between information and/or documents which must actually be *included* in the application or the DCD, versus those which may be *incorporated by reference* (*i.e.*, referenced in the application as if the information or documents were included in the application). Any incorporation by reference in the application should be clear and should specify the title, date, edition, or version of a document, the page number(s), and table(s) containing the relevant information to be incorporated.

Paragraph IV.A.1 would require an applicant who references this appendix to incorporate by reference this appendix in its application. The legal effect of such an incorporation by reference is that this appendix would be legally binding on the applicant or licensee. Paragraph IV.A.2.a would require that a plant-specific DCD be included in the initial application to ensure that the applicant commits to complying with the DCD. This paragraph would also require the plant-specific DCD to either include or incorporate by reference the generic DCD information. Further, this paragraph would also require the plant-specific DCD to use the same format as the generic DCD and reflect the applicant's proposed exemptions and departures from the generic DCD as of the time of submission of the application. The plant-specific DCD would be part of the plant's FSAR, along with information for the portions of the plant outside the scope of the

referenced design. Paragraph IV.A.2.a would also require that the initial application include the reports on departures and exemptions as of the time of submission of the application.

Paragraph IV.A.2.b would require that an application referencing this appendix include the reports required by paragraph X.B for exemptions and departures proposed by the applicant as of the date of submission of its application. Paragraph IV.A.2.c would require submission of plant-specific TS for the plant that consists of the generic TS from Chapter 16 of the DCD, with any changes made under paragraph VIII.C, and the TS for the site-specific portions of the plant that are either partially or wholly outside the scope of this design certification. The applicant must also provide the plant-specific information designated in the generic TS, such as bracketed values (refer to guidance provided in Interim Staff Guidance DC/COL-ISG-8, "Necessary Content of Plant-Specific Technical Specifications").

Paragraph IV.A.2.d would require the applicant referencing this appendix to provide information demonstrating that the proposed site characteristics fall within the site parameters for this appendix and that the plant-specific interface requirements have been met as required by 10 CFR 52.79(d). If the proposed site has a characteristic that does not fall within one or more of the site parameters in the DCD, then the proposed site would be unacceptable for this design unless the applicant seeks an exemption under Section VIII and provides adequate justification for locating the certified design on the proposed site. Paragraph IV.A.2.e would require submission of information addressing COL action items, identified in the generic DCD as COL information in the application. The COL information identifies matters that need to be addressed by an applicant who references this appendix, as required by Subpart C of 10 CFR Part 52. An applicant may differ from or omit these items, provided that the difference or omission is identified and justified in its application. Based on the applicant's difference or omission, the NRC may impose additional licensing requirement(s) on the COL applicant as appropriate. Paragraph IV.A.2.f would require that the application include the information specified by

10 CFR 52.47(a) that is not within the scope of this rule, such as generic issues that must be addressed or operational issues not addressed by a design certification, in whole or in part, by an applicant that references this appendix. Paragraph IV.A.3 would require the applicant to physically include, not simply reference, the SUNSI (including proprietary information) and SGI referenced in the DCD, or its equivalent, to ensure that the applicant has actual notice of these requirements.

Paragraph IV.A.4 would indicate requirements that must be met in cases where the COL applicant is not using the entity that was the original applicant for the design certification (or amendment) to supply the design for the applicant's use. Proposed paragraph IV.A.4 would require that a COL applicant referencing this appendix include, as part of its application, a demonstration that an entity other than GEH Nuclear Energy is qualified to supply the ESBWR certified design unless GEH Nuclear Energy supplies the design for the applicant's use. In cases where a COL applicant is not using GEH Nuclear Energy to supply the ESBWR certified design, the required information would be used to support any NRC finding under 10 CFR 52.73(a) that an entity other than the one originally sponsoring the design certification or design certification amendment is qualified to supply the certified design.

Paragraph IV.B would reserve to the Commission the right to determine in what manner this appendix may be referenced by an applicant for a construction permit or operating license under 10 CFR Part 50. This determination may occur in the context of a subsequent rulemaking modifying 10 CFR Part 52 or this design certification rule, or on a case-by-case basis in the context of a specific application for a 10 CFR Part 50 construction permit or operating license. This provision is necessary because the previous DCRs were not implemented in the manner that was originally envisioned at the time that 10 CFR Part 52 was promulgated. The Commission's concern is with the way ITAAC were developed and the lack of experience with design certifications in license proceedings. Therefore, it is appropriate that the Commission

retain some discretion regarding the way this appendix could be referenced in a 10 CFR Part 50 licensing proceeding.

E. Applicable Regulations (Section V)

The purpose of Section V is to specify the regulations that would be applicable and in effect at the time this proposed design certification is approved (i.e., as of the date specified in paragraph V.A, which would be the date that this appendix is approved by the Commission and signed by the Secretary of the Commission). These regulations would consist of the technically relevant regulations identified in paragraph V.A, except for the regulations in paragraph V.B that would not be applicable to this certified design.

In paragraph V.B, the Commission would identify the regulations that do not apply to the ESBWR design. The Commission has determined that the ESBWR design should be exempt from portions of 10 CFR 50.34 as described in the FSER (NUREG-XXXX) and/or summarized below:

(1) Paragraph (f)(2)(iv) of 10 CFR 50.34 – Contents of Construction Permit and Operating License Applications: Technical Information.

This paragraph requires an applicant to provide a plant safety parameter display console that will display to operators a minimum set of parameters defining the safety status of the plant, capable of displaying a full range of important plant parameters and data trends on demand, and capable of indicating when process limits are being approached or exceeded. The ESBWR design integrates the safety parameter display system into the design of the non-safety related distribution control and information system, rather than use a stand-alone console. The safety parameter display system is described in Section 7.1.5 of the DCD.

The Commission has also determined that the ESBWR design is approved to use the following alternative. Under 10 CFR 50.55a(a)(3), GEH requested NRC approval for the use of Code Case N-782 as a proposed alternative to the rules of Section III, Subsection NCA-1140,

regarding applied Code Editions and Addenda required by 10 CFR 50.55a(c), (d), and (e). Code Case N-782 provides that the Code Edition and Addenda endorsed in a certified design or licensed by the regulatory authority may be used for systems and components constructed to ASME Code, Section III requirements. These alternative requirements are in lieu of the requirements that base the Edition and Addenda on the construction permit date. Reference to Code Case N-782 will be included in component and system design specifications and design reports to permit certification of these specifications and reports to the Code Edition and Addenda cited in the DCD. The NRC's bases for approving the use of Code Case N-782 as a proposed alternative to the requirements of Section III Subsection NCA-1140 under 10 CFR 50.55a(a)(3) for ESBWR are described in Section 5.2.1.1.3 of the FSER.

F. Issue Resolution (Section VI)

The purpose of Section VI is to identify the scope of issues that would be resolved by the Commission in this rulemaking and, therefore, are "matters resolved" within the meaning and intent of 10 CFR 52.63(a)(5). The section is divided into five parts: paragraph A identifies the Commission's safety findings in adopting this appendix, paragraph B identifies the scope and nature of issues which are resolved by this rulemaking, paragraph C identifies issues which are not resolved by this rulemaking, paragraph D identifies the backfit restrictions applicable to the Commission with respect to this appendix, and paragraph E identifies the availability of secondary references.

Paragraph VI.A would describe the nature of the Commission's findings in general terms and make the findings required by 10 CFR 52.54 for the Commission's approval of this DCR. Furthermore, paragraph VI.A would explicitly state the Commission's determination that this design provides adequate protection of the public health and safety.

Paragraph VI.B would set forth the scope of issues that may not be challenged as a matter of right in subsequent proceedings. The introductory phrase of paragraph VI.B clarifies

that issue resolution as described in the remainder of the paragraph extends to the delineated NRC proceedings referencing this appendix. The remainder of paragraph VI.B describes the categories of information for which there is issue resolution. Specifically, paragraph VI.B.1 would provide that all nuclear safety issues arising from the Atomic Energy Act of 1954, as amended, that are associated with the information in the NRC staff's FSER (NUREG-XXXX), the Tier 1 and Tier 2 information (including the availability controls in Appendix 19ACM of the generic DCD), and the rulemaking record for this appendix are resolved within the meaning of 10 CFR 52.63(a)(5). These resolved issues include the information referenced in the DCD that are requirements (i.e., "secondary references"), as well as all issues arising from proprietary information and SGI that are intended to be requirements, but does not include the HFE processes for procedure development and training program development identified in Sections 18.9 and 18.10 of the generic DCD.

Paragraph VI.B.2 would provide for issue preclusion of SUNSI (including proprietary information) and SGI. Paragraphs VI.B.3, VI.B.4, VI.B.5, and VI.B.6 would clarify that approved changes to and departures from the DCD, which are accomplished in compliance with the relevant procedures and criteria in Section VIII, continue to be matters resolved in connection with this rulemaking. Paragraphs VI.B.4, VI.B.5, and VI.B.6, which would characterize the scope of issue resolution in three situations, use the phrase "but only for that plant." Paragraph VI.B.4 would describe how issues associated with a design certification rule are resolved when an exemption has been granted for a plant referencing the design certification rule. Paragraph VI.B.5 would describe how issues are resolved when a plant referencing the DC rule obtains a license amendment for a departure from Tier 2 information. Paragraph VI.B.6 would describe how issues are resolved when the applicant or licensee departs from the Tier 2 information on the basis of paragraph VIII.B.5, which would waive the requirement for NRC approval. In all three situations, after a matter (e.g., an exemption in the case of paragraph VI.B.4) is addressed

for a specific plant referencing a design certification rule, the adequacy of that matter *for that plant* is resolved and would constitute part of the licensing basis for that plant. Therefore, that matter would not ordinarily be subject to challenge in any subsequent proceeding or action for that plant (e.g., an enforcement action) listed in the introductory portion of paragraph IV.B. By contrast, there would be no legally binding issue resolution on that subject matter *for any other plant*, or in a subsequent rulemaking amending the applicable design certification rule.

However, the NRC's consideration of the safety, regulatory or policy issues necessary to the determination of the exemption or license amendment may, in appropriate circumstances, be relied upon as part of the basis for NRC action in other licensing proceedings or rulemaking.

Paragraph VI.B.7 would provide that, for those plants located on sites whose site characteristics fall within the site parameters assumed in the GEH evaluation of SAMDAs, all issues with respect to SAMDAs arising under the National Environmental Policy Act of 1969, as amended (NEPA), associated with the information in the EA for this design and the information regarding SAMDAs in NEDO-33306, "ESBWR Severe Accident Management Design Alternatives" are also resolved within the meaning and intent of 10 CFR 52.63(a)(5). If a deviation from a site parameter is granted, the deviation applicant has the initial burden of demonstrating that the original SAMDA analysis still applies to the actual site characteristics; but, if the deviation is approved, requests for litigation at the COL stage must meet the requirements of 10 CFR 2.309 and present sufficient information to create a genuine controversy in order to obtain a hearing on the site parameter deviation.

Paragraph VI.C would reserve the right of the Commission to impose operational requirements on applicants that reference this appendix. This provision would reflect the fact that only some operational requirements, including portions of the generic TS in Chapter 16 of the DCD, and no operational programs, such as operational QA, were completely or comprehensively reviewed by the NRC in this design certification rulemaking proceeding.

Therefore, the special backfit and finality provisions of 10 CFR 52.63 would apply only to those operational requirements that either the NRC completely reviewed and approved, or formed the basis for an NRC safety finding of the adequacy of the ESBWR, as documented in the NRC's safety evaluation report for the ESBWR. This is consistent with the currently approved design certifications in 10 CFR Part 52, Appendices A through D. Although information on operational matters is included in the DCDs of each of these currently approved designs, for the most part these design certifications do not provide approval for operational information, and none provide approval for operational "programs" (e.g., emergency preparedness programs, operational quality assurance programs). Most operational information in the DCD simply serves as "contextual information" (i.e., information necessary to understand the design of certain SSCs and how they would be used in the overall context of the facility). The NRC did not use contextual information to support the NRC's safety conclusions, and such information do not constitute the underlying safety bases for the adequacy of those SSCs. Thus, contextual operational information on any particular topic would not constitute one of the "matters resolved" under paragraph VI.B.

The NRC notes that operational requirements may be imposed on licenses referencing this design certification through the inclusion of license conditions in the license, or inclusion of a description of the operational requirement in the plant-specific FSAR.² The NRC's choice of the regulatory vehicle for imposing the operational requirements will depend upon, among other things: (1) whether the development and/or implementation of these requirements must occur prior to either the issuance of the COL or the Commission finding under 10 CFR 52.103(g), and

² Certain activities, ordinarily conducted following fuel load and therefore considered "operational requirements" but which may be relied upon to support a Commission finding under 10 CFR Part 52.103(g), may themselves be the subject of ITAAC to ensure their implementation prior to the 10 CFR Part 52.103(g) finding.

(2) the nature of the change controls which the NRC believes are appropriate given the regulatory, safety, and security significance of each operational requirement.

Paragraph VI.C would allow the NRC to impose future operational requirements (distinct from design matters) on applicants who reference this design certification. Also, license conditions for portions of the plant within the scope of this design certification (e.g., start-up and power ascension testing), are not restricted by 10 CFR 52.63. The requirement to perform these testing programs is contained in Tier 1 information. However, ITAAC cannot be specified for these subjects because the matters to be addressed in these license conditions cannot be verified prior to fuel load and operation, when the ITAAC are satisfied. Therefore, another regulatory vehicle is necessary to ensure that licensees comply with the matters contained in the license conditions. License conditions for these areas cannot be developed now because this requires the type of detailed design information that will be developed during a COL review. In the absence of detailed design information to evaluate the need for and develop specific post-fuel load verifications for these matters, the Commission is reserving in this rule the right to impose, at the time of COL issuance, license conditions addressing post-fuel load verification activities for portions of the plant within the scope of this design certification.

Paragraph VI.D would reiterate the restrictions (contained in Section VIII) placed upon the Commission when ordering generic or plant-specific modifications, changes or additions to structures, systems, or components, design features, design criteria, and ITAAC (paragraph VI.D.3 would address ITAAC) within the scope of the certified design.

Paragraph VI.E would provide that the NRC will specify at an appropriate time the procedures for interested persons to obtain access to proprietary information, SUNSI and SGI information for the ESBWR design certification rule. Access to such information would be for the sole purpose of requesting or participating in certain specified hearings, such as (1) the hearing required by 10 CFR 52.85 where the underlying application references this appendix; (2)

any hearing provided under 10 CFR 52.103 where the underlying COL references this appendix; and (3) any other hearing relating to this appendix in which interested persons have the right to request an adjudicatory hearing.

For proceedings where the notice of hearing was published before [EFFECTIVE DATE OF RULE], the Commission's order governing access to SUNSI and SGI shall be used to govern access to proprietary information, SUNSI, and SGI within the scope of the rulemaking. For proceedings in which the notice of hearing or opportunity for hearing is published after [EFFECTIVE DATE OF RULE], paragraph VI.E applies and governs access to proprietary information, SUNSI, and SGI. For these proceedings, as stated in paragraph VI.E, the NRC will specify the access procedures at an appropriate time.

For both a hearing required by 10 CFR 52.85 where the underlying application references this appendix, and in any hearing on ITAAC completion under 10 CFR 52.103, the NRC expects to follow its current practice of establishing the procedures by order at the time that the notice of hearing is published in the *Federal Register*. See, for example, Florida Power and Light Co., Combined License Application for the Turkey Point Units 6 & 7, Notice of Hearing, Opportunity To Petition for Leave To Intervene and Associated Order Imposing Procedures for Access to SUNSI and Safeguards Information for Contention Preparation (75 FR 34777; June 18, 2010); Notice of Receipt of Application for License; Notice of Consideration of Issuance of License; Notice of Hearing and Commission Order and Order Imposing Procedures for Access to SUNSI and Safeguards Information for Contention Preparation; In the Matter of AREVA Enrichment Services, LLC (Eagle Rock Enrichment Facility) (74 FR 38052; July 30, 2009).

G. Duration of this Appendix (Section VII)

The purpose of Section VII would be, in part, to specify the period during which this design certification may be referenced by an applicant for a COL, under 10 CFR 52.55. This

section would also state that the design certification would remain valid for an applicant or licensee that references the design certification until the application is withdrawn or the license expires. Therefore, if an application references this design certification during the 15-year period, then the design certification would be effective until the application is withdrawn or the license issued on that application expires. Also, the design certification would be effective for the referencing licensee if the license is renewed. The Commission intends for this appendix to remain valid for the life of the plant that references the design certification to achieve the benefits of standardization and licensing stability. This means that changes to, or plant-specific departures from, information in the plant-specific DCD must be made under the change processes in Section VIII for the life of the plant.

H. Processes for Changes and Departures (Section VIII)

The purpose of Section VIII would be to set forth the processes for generic changes to, or plant-specific departures (including exemptions) from, the DCD. The Commission adopted this restrictive change process in order to achieve a more stable licensing process for applicants and licensees that reference this DCR. Section VIII is divided into three paragraphs, which correspond to Tier 1, Tier 2, and operational requirements. The language of Section VIII distinguishes between generic *changes to* the DCD versus plant-specific *departures from* the DCD. Generic *changes* must be accomplished by rulemaking because the intended subject of the change is this DCR itself, as is contemplated by 10 CFR 52.63(a)(1). Consistent with 10 CFR 52.63(a)(3), any generic rulemaking changes are applicable to all plants, absent circumstances which render the change [“modification” in the language of 10 CFR 52.63(a)(3)] “technically irrelevant.” By contrast, plant-specific *departures* could be either a Commission-issued order to one or more applicants or licensees; or an applicant or licensee-initiated departure applicable only to that applicant’s or licensee’s plant(s), similar to a 10 CFR 50.59 departure or an exemption. Because these plant-specific departures will result in

a DCD that is unique for that plant, Section X would require an applicant or licensee to maintain a plant-specific DCD. For purposes of brevity, this discussion refers to both generic changes and plant-specific departures as “change processes.”

Section VIII refers to an exemption from one or more requirements of this appendix and the criteria for granting an exemption. The Commission cautions that when the exemption involves an underlying substantive requirement (applicable regulation), then the applicant or licensee requesting the exemption must also show that an exemption from the underlying applicable requirement meets the criteria of 10 CFR 52.7.

Tier 1 information

The change processes for Tier 1 information would be covered in paragraph VIII.A. Generic changes to Tier 1 are accomplished by rulemakings that amend the generic DCD and are governed by the standards in 10 CFR 52.63(a)(1) and 10 CFR 52.63(a)(2). No matter who proposes it, a generic change under 10 CFR 52.63(a)(1) will not be made to a certified design while it is in effect unless the change: (1) is necessary for compliance with Commission regulations applicable and in effect at the time the certification was issued; (2) is necessary to provide adequate protection of the public health and safety or common defense and security; (3) reduces unnecessary regulatory burden and maintains protection to public health and safety and common defense and security; (4) provides the detailed design information necessary to resolve selected design acceptance criteria; (5) corrects material errors in the certification information; (6) substantially increases overall safety, reliability, or security of a facility and the costs of the change are justified; or (7) contributes to increased standardization of the certification information. The rulemakings must provide for notice and opportunity for public comment on the proposed change, as required by 10 CFR 52.63(a)(2). The Commission will give consideration to whether the benefits justify the costs for plants that are already licensed or for which an application for a permit or license is under consideration.

Departures from Tier 1 may occur in two ways: (1) the Commission may *order* a licensee to depart from Tier 1, as provided in paragraph VIII.A.3; or (2) an applicant or licensee may request an *exemption* from Tier 1, as provided in paragraph VIII.A.4. If the Commission seeks to order a licensee to depart from Tier 1, paragraph VIII.A.3 would require that the Commission find both that the departure is necessary for adequate protection or for compliance and that special circumstances are present. Paragraph VIII.A.4 would provide that exemptions from Tier 1 requested by an applicant or licensee are governed by the requirements of 10 CFR 52.63(b)(1) and 52.98(f), which provide an opportunity for a hearing. In addition, the Commission would not grant requests for exemptions that may result in a significant decrease in the level of safety otherwise provided by the design.

Tier 2 information

The change processes for the three different categories of Tier 2 information, namely, Tier 2, Tier 2*, and Tier 2* with a time of expiration, would be set forth in paragraph VIII.B. The change process for Tier 2 has the same elements as the Tier 1 change process, but some of the standards for plant-specific orders and exemptions would be different.

The process for generic Tier 2 changes (including changes to Tier 2* and Tier 2* with a time of expiration) tracks the process for generic Tier 1 changes. As set forth in paragraph VIII.B.1, generic Tier 2 changes would be accomplished by rulemaking amending the generic DCD and would be governed by the standards in 10 CFR 52.63(a)(1). No matter who proposes it, a generic change under 10 CFR 52.63(a)(1) will not be made to a certified design while it is in effect unless the change: (1) is necessary for compliance with Commission regulations applicable and in effect at the time the certification was issued; (2) is necessary to provide adequate protection of the public health and safety or common defense and security; (3) reduces unnecessary regulatory burden and maintains protection to public health and safety and common defense and security; (4) provides the detailed design information necessary to resolve

selected design acceptance criteria; (5) corrects material errors in the certification information; (6) substantially increases overall safety, reliability, or security of a facility and the costs of the change are justified; or (7) contributes to increased standardization of the certification information. If a generic change is made to Tier 2* information, then the category and expiration, if necessary, of the new information would also be determined in the rulemaking and the appropriate change process for that new information would apply.

Departures from Tier 2 would occur in five ways: (1) the Commission may order a plant-specific departure, as set forth in paragraph VIII.B.3; (2) an applicant or licensee may request an exemption from a Tier 2 requirement as set forth in paragraph VIII.B.4; (3) a licensee may make a departure without prior NRC approval under paragraph VIII.B.5; (4) the licensee may request NRC approval for proposed departures which do not meet the requirements in paragraph VIII.B.5 as provided in paragraph VIII.B.5.d; and (5) the licensee may request NRC approval for a departure from Tier 2* information under paragraph VIII.B.6.

Similar to Commission-ordered Tier 1 departures and generic Tier 2 changes, Commission-ordered Tier 2 departures could not be imposed except when necessary either to bring the certification into compliance with the Commission's regulations applicable and in effect at the time of approval of the design certification or to ensure adequate protection of the public health and safety or common defense and security, as set forth in paragraph VIII.B.3. However, the special circumstances for the Commission-ordered Tier 2 departures would not have to outweigh any decrease in safety that may result from the reduction in standardization caused by the plant-specific order, as required by 10 CFR 52.63(a)(4). The Commission determined that it was not necessary to impose an additional limitation similar to that imposed on Tier 1 departures by 10 CFR 52.63(a)(4) and (b)(1). This type of additional limitation for standardization would unnecessarily restrict the flexibility of applicants and licensees with respect to Tier 2 information.

An applicant or licensee would be permitted to request an exemption from Tier 2 information as set forth in paragraph VIII.B.4. The applicant or licensee would have to demonstrate that the exemption complies with one of the special circumstances in 10 CFR 50.12(a). In addition, the Commission would not grant requests for exemptions that may result in a significant decrease in the level of safety otherwise provided by the design. However, the special circumstances for the exemption do not have to outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption. If the exemption is requested by an applicant for a license, the exemption would be subject to litigation in the same manner as other issues in the license hearing, consistent with 10 CFR 52.63(b)(1). If the exemption is requested by a licensee, then the exemption would be subject to litigation in the same manner as a license amendment.

Paragraph VIII.B.5 would allow an applicant or licensee to depart from Tier 2 information, without prior NRC approval, if the proposed departure does not involve a change to, or departure from, Tier 1 or Tier 2* information, TS, or does not require a license amendment under paragraphs VIII.B.5.b or VIII.B.5.c. The TS referred to in VIII.B.5.a of this paragraph are the TS in Chapter 16 of the generic DCD, including bases, for departures made prior to issuance of the COL. After issuance of the COL, the plant-specific TS would be controlling under paragraph VIII.B.5. The bases for the plant-specific TS would be controlled by the bases control program, which is specified in the plant-specific TS administrative controls section. The requirement for a license amendment in paragraph VIII.B.5.b would be similar to the requirement in 10 CFR 50.59 and apply to all information in Tier 2 except for the information that resolves the severe accident issues.

The Commission believes that the resolution of ex-vessel severe accident design features should be preserved and maintained in the same fashion as all other safety issues that were resolved during the design certification review (refer to SRM on SECY-90-377,

“Requirements for Design Certification Under 10 CFR Part 52,” dated February 15, 1991, ADAMS Accession No. ML003707892). However, because of the increased uncertainty in ex-vessel severe accident issue resolutions, the Commission has proposed separate criteria in paragraph VIII.B.5.c for determining if a departure from information that resolves ex-vessel severe accident design features would require a license amendment. For purposes of applying the special criteria in paragraph VIII.B.5.c, ex-vessel severe accident resolutions would be limited to design features where the intended function of the design feature is relied upon to resolve postulated accidents when the reactor core has melted and exited the reactor vessel, and the containment is being challenged. These design features are identified in Sections 19.2.3, 19.3.2, 19.3.3, 19.3.4, and Appendices 19A and 19B of the DCD, with other issues, and are described in other sections of the DCD. Therefore, the location of design information in the DCD is not important to the application of this special procedure for ex-vessel severe accident design features. However, the special procedure in paragraph VIII.B.5.c would not apply to design features that resolve so-called “beyond design-basis accidents” or other low-probability events. The important aspect of this special procedure is that it would be limited to ex-vessel severe accident design features, as defined above. Some design features may have intended functions to meet “design basis” requirements and to resolve “severe accidents.” If these design features are reviewed under paragraph VIII.B.5, then the appropriate criteria from either paragraphs VIII.B.5.b or VIII.B.5.c would be selected depending upon the function being changed.

An applicant or licensee that plans to depart from Tier 2 information, under paragraph VIII.B.5, would be required to prepare an evaluation which provides the bases for the determination that the proposed change does not require a license amendment or involve a change to Tier 1 or Tier 2* information, or a change to the TS, as explained above. In order to achieve the Commission’s goals for design certification, the evaluation would need to consider

all of the matters that were resolved in the DCD, such as generic issue resolutions that are relevant to the proposed departure. The benefits of the early resolution of safety issues would be lost if departures from the DCD were made that violated these resolutions without appropriate review.

The evaluation of the relevant matters would need to consider the proposed departure over the full range of power operation from startup to shutdown, as it relates to anticipated operational occurrences, transients, design-basis accidents, and severe accidents. The evaluation would also have to include a review of all relevant secondary references from the DCD because Tier 2 information, which is intended to be treated as a requirement, would be contained in the secondary references. The evaluation should consider Tables 14.3-1a through 14.3-1c and 19.2-3 of the generic DCD to ensure that the proposed change does not impact Tier 1 information. These tables contain cross-references from the safety analyses and probabilistic risk assessment in Tier 2 to the important parameters that were included in Tier 1.

Paragraph VIII.B.5.d addresses information described in the DCD to address aircraft impacts, in accordance with 10 CFR 52.47(a)(28). Under 10 CFR 52.47(a)(28), applicants are required to include the information required by 10 CFR 50.150(b) in their DCD. Under 10 CFR 50.150(b), applications for standard design certifications are required to include:

1. A description of the design features and functional capabilities identified as a result of the aircraft impact assessment required by 10 CFR 50.150(a)(1); and
2. A description of how such design features and functional capabilities meet the assessment requirements in 10 CFR 50.150(a)(1).

An applicant or licensee who changes this information is required to consider the effect of the changed design feature or functional capability on the original aircraft impact assessment required by 10 CFR 50.150(a). The applicant or licensee is also required to describe in the plant-specific DCD how the modified design features and functional capabilities continue to meet

the assessment requirements in 10 CFR 50.150(a)(1). Submittal of this updated information is governed by the reporting requirements in Section X.B.

In an adjudicatory proceeding (e.g., for issuance of a COL) a person who believes that an applicant or licensee has not complied with paragraph VIII.B.5 when departing from Tier 2 information, would be permitted to petition to admit such a contention into the proceeding under paragraph VIII.B.5.f. This provision has been proposed because an incorrect departure from the requirements of this appendix essentially would place the departure outside of the scope of the Commission's safety finding in the design certification rulemaking. Therefore, it follows that properly founded contentions alleging such incorrectly implemented departures cannot be considered "resolved" by this rulemaking. As set forth in paragraph VIII.B.5.f, the petition would have to comply with the requirements of 10 CFR 2.309 and show that the departure does not comply with paragraph VIII.B.5. Other persons would be allowed to file a response to the petition under 10 CFR 2.309. If on the basis of the petition and any responses, the presiding officer in the proceeding determines that the required showing has been made, the matter would be certified to the Commission for its final determination. In the absence of a proceeding, petitions alleging nonconformance with paragraph VIII.B.5 requirements applicable to Tier 2 departures would be treated as petitions for enforcement action under 10 CFR 2.206.

Paragraph VIII.B.6 would provide a process for departing from Tier 2* information. The creation of and restrictions on changing Tier 2* information resulted from the development of the Tier 1 information for the ABWR design certification (Appendix A to 10 CFR Part 52) and the System 80+ design certification (Appendix B to 10 CFR Part 52). During this development process, these applicants requested that the amount of information in Tier 1 be minimized to provide additional flexibility for an applicant or licensee who references these appendices. Also, many codes, standards, and design processes, which would not be specified in Tier 1 that are acceptable for meeting ITAAC, were specified in Tier 2. The result of these departures would be

that certain significant information only exists in Tier 2 and the Commission would not want this significant information to be changed without prior NRC approval. This Tier 2* information would be identified in the generic DCD with italicized text and brackets (See Table 1D-1 in Appendix 1D of the ESBWR DCD).

Although the Tier 2* designation was originally intended to last for the lifetime of the facility, like Tier 1 information, the NRC determined that some of the Tier 2* information could expire when the plant first achieves full (100 percent) power, after the finding required by 10 CFR 52.103(g), while other Tier 2* information must remain in effect throughout the life of the facility. The factors determining whether Tier 2* information could expire after full power is first achieved (first full power) were whether the Tier 1 information would govern these areas after first full power and the NRC's determination that prior approval was required before implementation of the change due to the significance of the information. Therefore, certain Tier 2* information listed in paragraph VIII.B.6.c would cease to retain its Tier 2* designation after full-power operation is first achieved following the Commission finding under 10 CFR 52.103(g). Thereafter, that information would be deemed to be Tier 2 information that would be subject to the departure requirements in paragraph VIII.B.5. By contrast, the Tier 2* information identified in paragraph VIII.B.6.b would retain its Tier 2* designation throughout the duration of the license, including any period of license renewal.

Certain preoperational tests in paragraph VIII.B.6.c would be designated to be performed only for the first plant that references this appendix. GEH's basis for performing these "first-plant-only" preoperational tests is provided in Section 14.2.8 of the DCD. The NRC found GEH's basis for performing these tests and its justification for only performing the tests on the first plant acceptable. The NRC's decision was based on the need to verify that plant-specific manufacturing and/or construction variations do not adversely impact the predicted performance of certain passive safety systems, while recognizing that these special tests would result in

significant thermal transients being applied to critical plant components. The NRC believes that the range of manufacturing or construction variations that could adversely affect the relevant passive safety systems would be adequately disclosed after performing the designated tests on the first plant. The Tier 2* designation for these tests would expire after the first completes these tests, as indicated in paragraph VIII.B.6.c.

If Tier 2* information is changed in a generic rulemaking, the designation of the new information (Tier 1, 2*, or 2) would also be determined in the rulemaking and the appropriate process for future changes would apply. If a plant-specific departure is made from Tier 2* information, then the new designation would apply only to that plant. If an applicant who references this design certification makes a departure from Tier 2* information, the new information would be subject to litigation in the same manner as other plant-specific issues in the licensing hearing. If a licensee makes a departure from Tier 2* information, it would be treated as a license amendment under 10 CFR 50.90 and the finality would be determined under paragraph VI.B.5. Any requests for departures from Tier 2* information that affects Tier 1 would also have to comply with the requirements in paragraph VIII.A.

Operational Requirements

The change process for TS and other operational requirements in the DCD would be set forth in paragraph VIII.C. This change process has elements similar to the Tier 1 and Tier 2 change processes in paragraphs VIII.A and VIII.B, but with significantly different change standards. Because of the different finality status for TS and other operational requirements (refer to paragraph V.F of this document), the Commission designated a special category of information, consisting of the TS and other operational requirements, with its own change process in proposed paragraph VIII.C. The key to using the change processes proposed in Section VIII is to determine if the proposed change or departure would require a change to a design feature described in the generic DCD. If a design change is required, then the

appropriate change process in paragraph VIII.A or VIII.B would apply. However, if a proposed change to the TS or other operational requirements does not require a change to a design feature in the generic DCD, then paragraph VIII.C would apply. The language in paragraph VIII.C would also distinguish between generic (Chapter 16 of the DCD) and plant-specific TS to account for the different treatment and finality accorded TS before and after a license is issued.

The process in paragraph VIII.C.1 for making generic changes to the generic TS in Chapter 16 of the DCD or other operational requirements in the generic DCD would be accomplished by rulemaking and governed by the backfit standards in 10 CFR 50.109. The determination of whether the generic TS and other operational requirements were completely reviewed and approved in the design certification rulemaking would be based upon the extent to which the NRC reached a safety conclusion in the FSER on this matter. If it cannot be determined, in the absence of a specific statement, that the TS or operational requirement was comprehensively reviewed and finalized in the design certification rulemaking, then there would be no backfit restriction under 10 CFR 50.109 because no prior position, consistent with paragraph VI.B, was taken on this safety matter. Generic changes made under paragraph VIII.C.1 would be applicable to all applicants or licensees (refer to paragraph VIII.C.2), unless the change is irrelevant because of a plant-specific departure.

Some generic TS and availability controls contain values in brackets []. The brackets are placeholders indicating that the NRC's review is not complete, and represent a requirement that the applicant for a COL referencing the ESBWR DCR must replace the values in brackets with final plant-specific values (refer to guidance provided in Interim Staff Guidance DC/COL-ISG-8, "Necessary Content of Plant-Specific Technical Specifications"). The values in brackets are neither part of the design certification rule nor are they binding. Therefore, the replacement of bracketed values with final plant-specific values does not require an exemption from the generic TS or availability controls.

Plant-specific departures may occur by either a Commission order under paragraph VIII.C.3 or an applicant's exemption request under paragraph VIII.C.4. The basis for determining if the TS or operational requirement was completely reviewed and approved for these processes would be the same as for paragraph VIII.C.1 above. If the TS or operational requirement is comprehensively reviewed and finalized in the design certification rulemaking, then the Commission must demonstrate that special circumstances are present before ordering a plant-specific departure. If not, there would be no restriction on plant-specific changes to the TS or operational requirements, prior to the issuance of a license, provided a design change is not required. Although the generic TS were reviewed and approved by the NRC staff in support of the DC review, the Commission intends to consider the lessons learned from subsequent operating experience during its licensing review of the plant-specific TS. The process for petitioning to intervene on a TS or operational requirement contained in paragraph VIII.C.5 would be similar to other issues in a licensing hearing, except that the petitioner must also demonstrate why special circumstances are present pursuant to 10 CFR 2.335.

Finally, the generic TS would have no further effect on the plant-specific TS after the issuance of a license that references this appendix. The bases for the generic TS would be controlled by the change process in paragraph VIII.C. After a license is issued, the bases would be controlled by the bases change provision set forth in the administrative controls section of the plant-specific TS.

I. Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) (Section IX)

This section is reserved for future use.

J. Records and Reporting (Section X)

The purpose of Section X would be to set forth the requirements that would apply to maintaining records of changes to and departures from the generic DCD, which would be reflected in the plant-specific DCD. Section X would also set forth the requirements for

submitting reports (including updates to the plant-specific DCD) to the NRC. This section of the appendix would be similar to the requirements for records and reports in 10 CFR Part 50, except for minor differences in information collection and reporting requirements.

Paragraph X.A.1 would require that a generic DCD and the SUNSI (including proprietary information) and SGI referenced in the generic DCD be maintained by the applicant for this rule.

The generic DCD concept was developed, in part, to meet the OFR requirements for incorporation by reference, including public availability of documents incorporated by reference.

However, the SUNSI (including proprietary information) and SGI could not be included in the generic DCD because they are not publicly available. Nonetheless, the SUNSI (including proprietary information) and SGI was reviewed by the NRC and, as stated in paragraph VI.B.2, the NRC would consider the information to be resolved within the meaning of

10 CFR 52.63(a)(5). Because this information is not in the generic DCD, this information, or its equivalent, is required to be provided by an applicant for a license referencing this design certification rule. Paragraph X.A.1 would require the design certification applicant to maintain the SUNSI (including proprietary information) and SGI, which it developed and used to support its design certification application. This would ensure that the referencing applicant has direct access to this information from the design certification applicant, if it has contracted with the applicant to provide the proprietary information and SGI to support its license application. The NRC may also inspect this information if it was not submitted to the NRC (e.g., the aircraft impact assessment required by 10 CFR 50.150). Only the generic DCD would be identified and incorporated by reference into this rule. The generic DCD and the NRC-approved version of the SUNSI (including proprietary information) and SGI would be maintained for the period of time that this appendix may be referenced.

Paragraphs X.A.2 and X.A.3 would place recordkeeping requirements on the applicant or licensee that references this design certification so that its plant-specific DCD accurately reflects

both generic changes to the generic DCD and plant-specific departures made under Section VIII. The term “plant-specific” would be used in paragraph X.A.2 and other sections of this appendix to distinguish between the generic DCD that would be incorporated by reference into this appendix, and the plant-specific DCD that the applicant would be required to submit under paragraph IV.A. The requirement to maintain changes to the generic DCD would be explicitly stated to ensure that these changes are not only reflected in the generic DCD, which would be maintained by the applicant for design certification, but also in the plant-specific DCD. Therefore, records of generic changes to the DCD would be required to be maintained by both entities to ensure that both entities have up-to-date DCDs.

Paragraph X.A.4.a would require the applicant to maintain a copy of the aircraft impact assessment performed to comply with the requirements of 10 CFR 50.150(a) for the term of the certification (including any period of renewal). This proposed provision, which is consistent with 10 CFR 50.150(c)(3), will facilitate any NRC inspections of the assessment that the NRC decides to conduct. Similarly, the NRC is proposing new paragraph X.A.4.b that would require an applicant or licensee who references this appendix to maintain a copy of the aircraft impact assessment performed to comply with the requirements of 10 CFR 50.150(a) throughout the pendency of the application and for the term of the license (including any period of renewal). This provision is consistent with 10 CFR 50.150(c)(4). For all applicants and licensees, the supporting documentation retained onsite should describe the methodology used in performing the assessment, including the identification of potential design features and functional capabilities to show that the acceptance criteria in 10 CFR 50.150(a)(1) will be met.

Paragraph X.A would not place recordkeeping requirements on site-specific information that is outside the scope of this rule. As discussed in paragraph IV.D of this document, the FSAR required by 10 CFR 52.79 would contain the plant-specific DCD and the site-specific information for a facility that references this rule. The phrase “site-specific portion of the final

safety analysis report” in paragraph X.B.3.c would refer to the information that is contained in the FSAR for a facility (required by 10 CFR 52.79) but is not part of the plant-specific DCD (required by paragraph IV.A). Therefore, this rule would not require that duplicate documentation be maintained by an applicant or licensee that references this rule, because the plant-specific DCD would be part of the FSAR for the facility.

Paragraph X.B.1 would require applicants or licensees that reference this rule to submit reports, which describe departures from the DCD and include a summary of the written evaluations. The requirement for the written evaluations would be set forth in paragraph X.A.1. The frequency of the report submittals would be set forth in paragraph X.B.3. The requirement for submitting a summary of the evaluations would be similar to the requirement in 10 CFR 50.59(d)(2).

Paragraph X.B.2 would require applicants or licensees that reference this rule to submit updates to the DCD, which include both generic changes and plant-specific departures. The frequency for submitting updates would be set forth in paragraph X.B.3. The requirements in paragraph X.B.3 for submitting the reports and updates would vary according to certain time periods during a facility’s lifetime. If a potential applicant for a COL who references this rule decides to depart from the generic DCD prior to submission of the application, then paragraph X.B.3.a would require that the updated DCD be submitted as part of the initial application for a license. Under paragraph X.B.3.b, the applicant may submit any subsequent updates to its plant-specific DCD along with its amendments to the application provided that the submittals are made at least once per year. Because amendments to an application are typically made more frequently than once a year, this should not be an excessive burden on the applicant.

Paragraph X.B.3.b would also require semi-annual submission of the reports required by paragraph X.B.1 throughout the period of application review and construction. The NRC would use the information in the reports to help plan the NRC’s inspection and oversight during this

phase, when the licensee is conducting detailed design, procurement of components and equipment, construction, and preoperational testing. In addition, the NRC would use the information in making its finding on ITAAC under 10 CFR 52.103(g), as well as any finding on interim operation under Section 189.a.(1)(B)(iii) of the AEA. Once a facility begins operation (for a COL under 10 CFR Part 52, after the Commission has made a finding under 10 CFR 52.103(g)), the frequency of reporting would be governed by the requirements in paragraph X.B.3.c.

VI. Agreement State Compatibility

Under the “Policy Statement on Adequacy and Compatibility of Agreement States Programs,” approved by the Commission on June 20, 1997, and published in the *Federal Register* (62 FR 46517; September 3, 1997), this rule is classified as compatibility “NRC.” Compatibility is not required for Category “NRC” regulations. The NRC program elements in this category are those that relate directly to areas of regulation reserved to the NRC by the AEA or the provisions of this chapter. Although an Agreement State may not adopt program elements reserved to the NRC, it may wish to inform its licensees of certain requirements by a mechanism that is consistent with the particular State’s administrative procedure laws. Category “NRC” regulations do not confer regulatory authority on the State.

VII. Availability of Documents

The NRC is making the documents identified below available to interested persons through one or more of the following methods, as indicated.

Public Document Room (PDR). The NRC PDR is located at 11555 Rockville Pike, Rockville, Maryland 20852, e-mail pdr.resource@nrc.gov.

Regulations.gov (Web). These documents may be viewed and downloaded electronically through the Federal eRulemaking Portal <http://www.regulations.gov>, Docket ID NRC-2010-0135.

NRC's Electronic Reading Room (ERR). The NRC's public electronic reading room is located at <http://www.nrc.gov/reading-rm.html>.

Document	PDR	Web	ERR (ADAMS)
SECY-XX-XXXX, "Proposed Rule - ESBWR Design Certification"	x	x	ML102220172
GE-Hitachi Nuclear Energy application for design certification of the ESBWR design	x	x	ML052450245
ESBWR Design Control Document, Revision 9	x	x	ML103440266
ESBWR Final Safety Evaluation Report	x	ML103070392
ESBWR Environmental Assessment	x	x	ML102220247
NEDO-33306, "ESBWR Severe Accident Management Design Alternatives"	x		ML102990433
Regulatory History of Design Certification ³	x	ML003761550

VIII. Procedures for Access to SUNSI (Including Proprietary Information) and Safeguards Information for Preparation of Comments on the Proposed ESBWR Design Certification Rule

This section contains instructions regarding how interested persons who wish to comment on the proposed design certification may request access to documents containing SUNSI (including proprietary information⁴), and SGI, in order to prepare their comments. Requirements for access to SGI are primarily set forth in 10 CFR Parts 2 and 73. This notice of proposed rulemaking provides information specific to this rulemaking; however, nothing in this notice is intended to conflict with the SGI regulations.

³ The regulatory history of the NRC's design certification reviews is a package of documents that is available in NRC's PDR and ERR. This history spans the period during which the NRC simultaneously developed the regulatory standards for reviewing these designs and the form and content of the rules that certified the designs.

⁴ For purposes of this discussion, "proprietary information" constitutes trade secrets or commercial or financial information that are privileged or confidential, as those terms are used under the Freedom of Information Act and the NRC's implementing regulation at 10 CFR Part 9.

Interested persons who desire access to SUNSI information on the ESBWR design constituting proprietary information should first request access to that information from the design certification applicant. A request for access should be submitted to the NRC if the applicant does not either grant or deny access by the 10-day deadline described below.

Submitting a request to the NRC for access

Within 10 days after publication of this notice of proposed rulemaking, any individual or entity who, in order to submit comments on the proposed design certification, believes access to information in this rulemaking docket that the NRC has categorized as SUNSI or SGI is necessary may request access to such information. Requests for access to SUNSI or SGI submitted more than 10 days after publication of this notice will not be considered absent a showing of good cause for the late filing explaining why the request could not have been filed earlier.

The individual or entity requesting access to the information (hereinafter, the “requester”) shall submit a letter requesting permission to access SUNSI and/or SGI to the Office of the Secretary, U.S. Nuclear Regulatory Commission, Attention: Rulemakings and Adjudications Staff, Washington, DC 20555-0001. The expedited delivery or courier mail address is: Office of the Secretary, U.S. Nuclear Regulatory Commission, Attention: Rulemakings and Adjudications Staff, 11555 Rockville Pike, Rockville, Maryland 20852. The e-mail address for the Office of the Secretary is rulemaking.comments@nrc.gov. The requester must send a copy of the request to the design certification applicant at the same time as the original transmission to the NRC using the same method of transmission. Requests to the applicant must be sent to Rick E. Kingston, Vice President, ESBWR Licensing, GE-Hitachi Nuclear Energy, 3901 Castle Hayne Road, MC A65, Wilmington, NC 28401, e-mail rick.kingston@ge.com. For purposes of complying with this requirement, a “request” includes all the information required to be submitted to the NRC as set forth in this section.

The request must include the following information:

1. The name of this design certification – ESBWR Design Certification, the rulemaking identification number RIN 3150-AI85, the rulemaking docket number NRC-2010-0135, and a citation to this *Federal Register* notice of proposed rulemaking at the top of the first page of the request;

2. The name, address, e-mail or FAX number of the requester. If the requester is an entity, the name of the individual(s) to whom access is to be provided, then the address and e-mail or FAX number for each individual, and a statement of the authority granted by the entity to each individual to review the information and to prepare comments on behalf of the entity must be provided. If the requester is relying upon another individual to evaluate the requested SUNSI and/or SGI and prepare comments, then the name, affiliation, address and e-mail or FAX number for that individual must be provided.

3.(a) If the request is for SUNSI, then the requester's need for the information in order to prepare meaningful comments on the proposed design certification must be demonstrated.

Each of the following areas must be addressed with specificity:

(i) The specific issue or subject matter on which the requester wishes to comment;

(ii) An explanation why information which is publicly available, including the publicly available versions of the application and design control document, and information on the NRC's docket for the design certification application is insufficient to provide the basis for developing meaningful comment on the proposed design certification with respect to the issue or subject matter described in paragraph 3.(a)(i) above; and

(iii) Information demonstrating that the individual to whom access is to be provided has the technical competence (demonstrable knowledge, skill, experience, education, training, or certification) to understand and use (or evaluate) the requested information for a meaningful

comment on the proposed design certification with respect to the issue or subject matter described in paragraph 3.(a)(i) above.

(b) If the request is for SUNSI constituting proprietary information, then a chronology and discussion of the requester's attempts to obtain the information from the design certification applicant, and the final communication from the requester to the applicant and the applicant's response with respect to the request for access to proprietary information must be submitted.

4.(a) If the request is for SGI, then the requester's "need to know" the SGI as required by 10 CFR 73.2 and 10 CFR 73.22(b)(1) must be demonstrated. Consistent with the definition of "need to know" as stated in 10 CFR 73.2 and 10 CFR 73.22(b)(1), each of the following areas must be addressed with specificity:

(i) The specific issue or subject matter on which the requester wishes to comment;

(ii) An explanation why information which is publicly available, including the publicly available versions of the application and design control document, and information on the NRC's docket for the design certification application is insufficient to provide the basis for developing meaningful comment on the proposed design certification with respect to the issue or subject matter described in paragraph 4.(a)(i) above, and that the SGI requested is indispensable in order to develop meaningful comments;⁵ and

(iii) Information demonstrating that the individual to whom access is to be provided has the technical competence (demonstrable knowledge, skill, experience, education, training, or certification) to understand and use (or evaluate) the requested SGI, in order to develop meaningful comments on the proposed design certification with respect to the issue or subject matter described in paragraph 4.(a)(i) above.

⁵ Broad SGI requests under these procedures are unlikely to meet the standard for need to know. Furthermore, NRC staff redaction of information from requested documents before their release may be appropriate to comport with this requirement. The procedures in this notice of proposed rulemaking do not authorize unrestricted disclosure or less scrutiny of a requester's need to know than ordinarily would be applied in connection with either adjudicatory or non-adjudicatory access to SGI.

(b) A completed Form SF-85, "Questionnaire for Non-Sensitive Positions," must be submitted for each individual who would have access to SGI. The completed Form SF-85 will be used by the NRC's Office of Administration to conduct the background check required for access to SGI, as required by 10 CFR Part 2, Subpart G, and 10 CFR 73.22(b)(2), to determine the requester's trustworthiness and reliability. For security reasons, Form SF-85 can only be submitted electronically through the electronic Questionnaire for Investigations Processing (e-QIP) Web site, a secure Web site that is owned and operated by the Office of Personnel Management. To obtain online access to the form, the requester should contact the NRC's Office of Administration at (301) 492-3524.⁶

(c) A completed Form FD-258 (fingerprint card), signed in original ink, and submitted under 10 CFR 73.57(d). Copies of Form FD-258 may be obtained by writing the Office of Information Services, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; by calling (301) 415-7232 or (301) 492-7311; or by e-mail to Forms.Resource@nrc.gov. The fingerprint card will be used to satisfy the requirements of 10 CFR Part 2, 10 CFR 73.22(b)(1), and Section 149 of the Atomic Energy Act of 1954, as amended, which mandates that all persons with access to SGI must be fingerprinted for an FBI identification and criminal history records check;

(d) A check or money order in the amount of \$200.00⁷ payable to the U.S. Nuclear Regulatory Commission for each individual for whom the request for access has been submitted; and

⁶ The requester will be asked to provide his or her full name, social security number, date and place of birth, telephone number, and e-mail address. After providing this information, the requester usually should be able to obtain access to the online form within one business day.

⁷ This fee is subject to change pursuant to the Office of Personnel Management's adjustable billing rates.

(e) If the requester or any individual who will have access to SGI believes they belong to one or more of the categories of individuals relieved from the criminal history records check and background check requirements, as stated in 10 CFR 73.59, the requester should also provide a statement specifically stating which relief the requester is invoking, and explaining the requester's basis (including supporting documentation) for believing that the relief is applicable. While processing the request, the NRC's Office of Administration, Personnel Security Branch, will make a final determination whether the stated relief applies. Alternatively, the requester may contact the Office of Administration for an evaluation of their status prior to submitting the request. Persons who are not subject to the background check are not required to complete the SF-85 or Form FD-258; however, all other requirements for access to SGI, including the need to know, are still applicable.

Copies of documents and materials required by paragraphs 4(b), (c), (d), and (e), as applicable, of this section of this notice of proposed rulemaking must be sent to the following address:

Office of Administration
U.S. Nuclear Regulatory Commission
Personnel Security Branch
Mail Stop TWB-05 B32M
Washington, DC 20555-0012

These documents and materials should not be included with the request letter to the Office of the Secretary, but the request letter should state that the forms and fees have been submitted as required above.

5. To avoid delays in processing requests for access to SGI, all forms should be reviewed for completeness and accuracy (including legibility) before submitting them to the NRC. The NRC will return incomplete or illegible packages to the sender without processing.

6. Based on an evaluation of the information submitted under paragraphs 3(a) and (b), or 4(a), (b), (c), and (e) above, as applicable, the NRC staff will determine within 10 days of

receipt of the written access request whether the requester has established a legitimate need for SUNSI access or need to know the SGI requested.

7. For SUNSI access requests, if the NRC staff determines that the requester has established a legitimate need for access to SUNSI, the NRC staff will notify the requester in writing that access to SUNSI has been granted; *provided, however*, that if the SUNSI consists of proprietary information (i.e., trade secrets or confidential or financial information), the NRC staff must first notify the applicant of the staff's determination to grant access to the requester not less than 10 days before informing the requester of the staff's decision. If the applicant wishes to challenge the NRC staff's determination, it must follow the procedures in paragraph 12 below. The NRC staff will not provide the requester access to disputed proprietary information to the requester until the procedures in paragraph 12 are completed.

The written notification to the requester will contain instructions on how the requester may obtain copies of the requested documents, and any other conditions that may apply to access to those documents. These conditions will include, but are not necessarily limited to, the signing of a protective order setting forth terms and conditions to prevent the unauthorized or inadvertent disclosure of SUNSI by each individual who will be granted access to SUNSI. Claims that the provisions of such a protective order have not been complied with may be filed by calling NRC's toll-free safety hotline at (800) 695-7403. Please note: Calls to this number are not recorded between the hours of 7:00 a.m. to 5:00 p.m. Eastern Time. However, calls received outside these hours are answered by the NRC's Incident Response Operations Center on a recorded line. Claims may also be filed via e-mail sent to NRO_Allegations@nrc.gov, or may be sent in writing to the U.S. Nuclear Regulatory Commission, ATTN: N. Rivera-Feliciano, Mail Stop T7-D24, Washington, DC 20555-0001.

8. For requests for access to SGI, if the NRC staff determines that the requester has established a need to know the SGI, the NRC's Office of Administration will then determine,

based upon completion of the background check, whether the proposed recipient is trustworthy and reliable, as required for access to SGI by 10 CFR 73.22(b). If the NRC's Office of Administration determines that the individual or individuals are trustworthy and reliable, the NRC will promptly notify the requester in writing. The notification will provide the names of approved individuals as well as the conditions under which the SGI will be provided. Those conditions will include, but are not necessarily limited to, the signing of a protective order by each individual who will be granted access to SGI. Claims that the provisions of such a protective order have not been complied with may be filed by calling NRC's toll-free safety hotline at (800) 695-7403. Please note: Calls to this number are not recorded between the hours of 7:00 a.m. to 5:00 p.m. Eastern Time. However, calls received outside these hours are answered by the NRC's Incident Response Operations Center on a recorded line. Claims may also be filed via e-mail sent to NRO_Allegations@nrc.gov, or may be sent in writing to the U.S. Nuclear Regulatory Commission, ATTN: N. Rivera-Feliciano, Mail Stop T7-D24, Washington, DC 20555-0001. Because SGI requires special handling, initial filings with the NRC should be free from such specific information. If necessary, the NRC will arrange an appropriate setting for transmitting SGI to the NRC.

9. Release and Storage of SGI. Prior to providing SGI to the requester, the NRC staff will conduct (as necessary) an inspection to confirm that the recipient's information protection system is sufficient to satisfy the requirements of 10 CFR 73.22. Alternatively, recipients may opt to view SGI at an approved SGI storage location rather than establish their own SGI protection program to meet SGI protection requirements.

10. Filing of Comments on the Proposed Design Certification. Any comments in this rulemaking proceeding that are based upon the disclosed SUNSI or SGI information must be filed by the requester no later than 25 days after receipt of (or access to) that information, or the close of the public comment period, whichever is later. The commenter must comply with all

NRC requirements regarding the submission of SUNSI and SGI to the NRC when submitting comments to the NRC (including marking and transmission requirements).

11. Review of Denials of Access.

(a) If the request for access to SUNSI or SGI is denied by the NRC staff, the NRC staff shall promptly notify the requester in writing, briefly stating the reason or reasons for the denial.

(b) Before the NRC's Office of Administration makes an adverse determination regarding the trustworthiness and reliability of the proposed recipient(s) of SGI, the NRC's Office of Administration, as specified by 10 CFR 2.705(c)(3)(iii), must provide the proposed recipient(s) any records that were considered in the trustworthiness and reliability determination, including those required to be provided under 10 CFR 73.57(e)(1), so that the proposed recipient is provided an opportunity to correct or explain information.

(c) Appeals from a denial of access must be made to the NRC's Executive Director for Operations (EDO) under 10 CFR 9.29. The decision of the EDO constitutes final agency action under 10 CFR 9.29(d).

12. Predisclosure Procedures for SUNSI Constituting Trade Secrets or Confidential Commercial or Financial Information. The NRC will follow the procedures in 10 CFR 9.28 if the NRC staff determines, under paragraph 7 above, that access to SUNSI constituting trade secrets or confidential commercial or financial information will be provided to the requester. However, any objection filed by the applicant under 10 CFR 9.28(b) must be filed within 15 days of the NRC staff notice in paragraph 7 above rather than the 30-day period provided for under that paragraph. In applying the provisions of 10 CFR 9.28, the applicant for the DCR will be treated as the "submitter."

IX. Plain Language

The Presidential memorandum "Plain Language in Government Writing" published on June 10, 1998 (63 FR 31883), directed that the Government's documents be in clear and

accessible language. The NRC requests comments on the proposed rule specifically with respect to the clarity and effectiveness of the language used. Comments should be sent to the NRC as explained in the ADDRESSES heading of this document.

X. Voluntary Consensus Standards

The National Technology and Transfer Act of 1995 (Act), Public Law 104-113, requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless using such a standard is inconsistent with applicable law or is otherwise impractical. In this proposed rule, the NRC proposes to approve the ESBWR standard plant design for use in nuclear power plant licensing under 10 CFR Part 50 or 52. Design certifications are not generic rulemakings establishing a generally applicable standard with which all 10 CFR Parts 50 and 52 nuclear power plant licensees must comply. Design certifications are Commission approvals of specific nuclear power plant designs by rulemaking. Furthermore, design certifications are initiated by an applicant for rulemaking, rather than by the NRC. For these reasons, the NRC concludes that the Act does not apply to this proposed rule.

XI. Finding of No Significant Environmental Impact: Availability

The NRC has determined under NEPA, and the NRC's regulations in Subpart A, "National Environmental Policy Act; Regulations Implementing Section 102(2)," of 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," that a proposed design certification rule, if adopted, would not be a major Federal action significantly affecting the quality of the human environment and, therefore, an environmental impact statement (EIS) is not required. The NRC's generic determination in this regard is reflected in 10 CFR 51.32(b)(1). The basis for the NRC's categorical exclusion in this regard, as discussed in the 2007 final rule amending 10 CFR Parts 51 and 52, is based upon the following considerations. A design certification rule does not authorize the siting, construction, or operation of a facility referencing any particular using design; it would only codify the ESBWR

design in a rule. The NRC will evaluate the environmental impacts and issue an EIS as appropriate under NEPA as part of the application for the construction and operation of a facility referencing any particular design certification rule.

In addition, consistent with 10 CFR 51.30(d) and 10 CFR 51.32(b), the NRC has prepared a draft EA for the ESBWR design addressing various design alternatives to prevent and mitigate severe accidents. The EA is based, in part, upon the NRC's review of GEH's evaluation of various design alternatives to prevent and mitigate severe accidents in NEDO-33306, "ESBWR Severe Accident Management Design Alternatives." Based upon review of GEH's evaluation, the Commission concludes that: (1) GEH identified a reasonably complete set of potential design alternatives to prevent and mitigate severe accidents for the ESBWR design; (2) none of the potential design alternatives are justified on the basis of cost-benefit considerations; and (3) it is unlikely that other design changes would be identified and justified during the term of the design certification on the basis of cost-benefit considerations, because the estimated core damage frequencies for the ESBWR are very low on an absolute scale. These issues are considered resolved for the ESBWR design.

The Commission is requesting comment on the draft EA. As provided in 10 CFR 51.31(b), comments on the draft EA will be limited to the consideration of SAMDAs as required by 10 CFR 51.30(d). The Commission will prepare a final EA following the close of the comment period for the proposed standard design certification. If a final rule is issued, all environmental issues concerning SAMDAs associated with the information in the final EA and NEDO-33306 will be considered resolved for facility applications referencing the ESBWR design if the site characteristics at the site proposed in the facility application fall within the site parameters specified in NEDO-33306.

The draft EA, upon which the Commission's finding of no significant impact is based, and the ESBWR DCD are available for examination and copying at the NRC's Public Document Room, One White Flint North, Room O-1 F21, 11555 Rockville Pike, Rockville, Maryland.

XII. Paperwork Reduction Act Statement

This proposed rule contains new or amended information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501, *et seq.*). This rule has been submitted to the Office of Management and Budget (OMB) for approval of the information collection requirements.

Type of submission, new or revision: Revision.

The title of the information collection: Appendix E to 10 CFR Part 52, ESBWR Design Certification, Proposed Rule.

Current OMB Approval Number: 3150-0151.

The form number if applicable: Not applicable.

How often the collection is required: Semi-annually.

Who will be required or asked to report: Applicant for a combined license or a design certification amendment.

An estimate of the number of annual responses: 3 (1 response plus 2 recordkeepers).

The estimated number of annual respondents: 1

An estimate of the total number of hours needed annually to complete the requirement or request: Approximately 45 additional burden hours (5 hours reporting plus 40 hours recordkeeping).

Abstract: The NRC proposes to amend its regulations to certify the ESBWR standard plant design under Subpart B of 10 CFR Part 52. This action is necessary so that applicants or

licensees intending to construct and operate an ESBWR design may do so by referencing this DCR. The applicant for certification of the ESBWR design is GE-Hitachi Nuclear Energy.

The NRC is seeking public comment on the potential impact of the information collections contained in this proposed rule and on the following issues:

1. Is the proposed information collection necessary for the proper performance of the functions of the NRC, including whether the information will have practical utility?
2. Is the estimate of burden accurate?
3. Is there a way to enhance the quality, utility, and clarity of the information to be collected?
4. How can the burden of the information collection be minimized, including the use of automated collection techniques?

A copy of the OMB clearance package may be viewed free of charge at the NRC's Public Document Room, One White Flint North, 11555 Rockville Pike, Room O-1 F21, Rockville, MD 20852. The OMB clearance package and rule are available at the NRC worldwide Web site: <http://www.nrc.gov/public-involve/doc-comment/omb/index.html> for 60 days after the signature date of this notice.

Send comments on any aspect of these proposed information collections, including suggestions for reducing the burden and on the above issues, by **[INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]** to the Records and FOIA/Privacy Services Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to INFOCOLLECTS.RESOURCE@NRC.GOV; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0151), Office of Management and Budget, Washington, DC 20503. Comments on the proposed information collections may also be submitted via the Federal Rulemaking Web Site <http://www.regulations.gov>, Docket ID

NRC-2010-0135. Comments received after this date will be considered if it is practical to do so, but assurance of consideration cannot be given to comments received after this date.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

XIII. Regulatory Analysis

The NRC has not prepared a regulatory analysis for this proposed rule. The NRC prepares regulatory analyses for rulemakings that establish generic regulatory requirements applicable to all licensees. Design certifications are not generic rulemakings in the sense that design certifications do not establish standards or requirements with which all licensees must comply. Rather, design certifications are Commission approvals of specific nuclear power plant designs by rulemaking, which then may be voluntarily referenced by applicants for COLs. Furthermore, design certification rulemakings are initiated by an applicant for a design certification, rather than the NRC. Preparation of a regulatory analysis in this circumstance would not be useful because the design to be certified is proposed by the applicant rather than the NRC. For these reasons, the Commission concludes that preparation of a regulatory analysis is neither required nor appropriate.

XIV. Regulatory Flexibility Certification

Under the Regulatory Flexibility Act (5 U.S.C. 605(b)), the Commission certifies that this rule would not, if promulgated, have a significant economic impact on a substantial number of small entities. This proposed rule provides for certification of a nuclear power plant design. Neither the design certification applicant, nor prospective nuclear power plant licensees who reference this design certification rule, fall within the scope of the definition of "small entities" set

forth in the Regulatory Flexibility Act, or the size standards set established by the NRC (10 CFR 2.810). Thus, this rule does not fall within the purview of the Regulatory Flexibility Act.

XV. Backfitting

The Commission has determined that this proposed rule does not constitute a backfit as defined in the backfit rule (10 CFR 50.109) because this design certification does not impose new or changed requirements on existing 10 CFR Part 50 licensees, nor does it impose new or changed requirements on existing DCRs in Appendices A through D to 10 CFR Part 52.

Therefore, a backfit analysis was not prepared for this rule.

List of Subjects in 10 CFR Part 52

Administrative practice and procedure, Antitrust, Backfitting, Combined license, Early site permit, Emergency planning, Fees, Inspection, Limited work authorization, Nuclear power plants and reactors, Probabilistic risk assessment, Prototype, Reactor siting criteria, Redress of site, Reporting and recordkeeping requirements, Standard design, Standard design certification, Incorporation by reference.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 553; the NRC is proposing to adopt the following amendments to 10 CFR Part 52.

PART 52 – LICENSES, CERTIFICATIONS, AND APPROVALS FOR NUCLEAR POWER PLANTS

1. The authority citation for 10 CFR Part 52 continues to read as follows:

AUTHORITY: Secs. 103, 104, 161, 182, 183, 186, 189, 68 Stat. 936, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2133, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, 202, 206, 88 Stat. 1242, 1244, 1246, as amended (42 U.S.C. 5841, 5842, 5846); sec. 1704, 112 Stat. 2750 (44 U.S.C. 3504 note); Energy Policy Act of 2005, Pub. L. No. 109–58, 119 Stat. 594 (2005), secs. 147 and 149 of the Atomic Energy Act.

2. In 10 CFR 52.11, paragraph (b) is revised to read as follows:

§ 52.11 Information collection requirements: OMB approval.

* * * * *

(b) The approved information collection requirements contained in this part appear in 10 CFR Part 52.11, 10 CFR Part 52.7, 52.15, 52.16, 52.17, 52.29, 52.35, 52.39, 52.45, 52.46, 52.47, 52.57, 52.63, 52.75, 52.77, 52.79, 52.80, 52.93, 52.99, 52.110, 52.135, 52.136, 52.137, 52.155, 52.156, 52.157, 52.158, 52.171, 52.177, and appendices A, B, C, D, E, and N to this part.

3. A new Appendix E to 10 CFR Part 52 is added to read as follows:

Appendix E to Part 52—Design Certification Rule for the ESBWR Design

I. Introduction

Appendix E constitutes the standard design certification for the ESBWR design, in accordance with 10 CFR Part 52, Subpart B. The applicant for certification of the ESBWR design is GE-Hitachi Nuclear Energy.

II. Definitions

A. *Generic design control document (generic DCD)* means the document containing the Tier 1 and Tier 2 information and generic technical specifications that is incorporated by reference into this appendix.

B. *Generic technical specifications (generic TS)* means the information required by 10 CFR 50.36 and 50.36a for the portion of the plant that is within the scope of this appendix.

C. *Plant-specific DCD* means that portion of the combined license (COL) final safety analysis report (FSAR) that sets forth both the generic DCD information and any plant-specific changes to generic DCD information.

D. *Tier 1* means the portion of the design-related information contained in the generic DCD that is approved and certified by this appendix (Tier 1 information). The design

descriptions, interface requirements, and site parameters are derived from Tier 2 information.

Tier 1 information includes:

1. Definitions and general provisions;
2. Design descriptions;
3. Inspections, tests, analyses, and acceptance criteria (ITAAC);
4. Significant site parameters; and
5. Significant interface requirements.

E. *Tier 2* means the portion of the design-related information contained in the generic DCD that is approved but not certified by this appendix (Tier 2 information). Compliance with Tier 2 is required, but generic changes to and plant-specific departures from Tier 2 are governed by Section VIII of this appendix. Compliance with Tier 2 provides a sufficient, but not the only acceptable, method for complying with Tier 1. Compliance methods differing from Tier 2 must satisfy the change process in Section VIII of this appendix. Regardless of these differences, an applicant or licensee must meet the requirement in paragraph III.B to reference Tier 2 when referencing Tier 1. Tier 2 information includes:

1. Information required by 10 CFR 52.47(a) and 52.47(c), with the exception of generic TS and conceptual design information;
2. Supporting information on the inspections, tests, and analyses that will be performed to demonstrate that the acceptance criteria in the ITAAC have been met;
3. COL action items (COL license information), which identify certain matters that must be addressed in the site-specific portion of the final safety analysis report (FSAR) by an applicant who references this appendix. These items constitute information requirements but are not the only acceptable set of information in the FSAR. An applicant may depart from or omit these items, provided that the departure or omission is identified and justified in the FSAR.

After issuance of a construction permit or COL, these items are not requirements for the licensee unless such items are restated in the FSAR; and

4. The availability controls in Appendix 19ACM of the DCD.

F. *Tier 2** means the portion of the Tier 2 information, designated as such in the generic DCD, which is subject to the change process in paragraph VIII.B.6 of this appendix. This designation expires for some Tier 2* information under paragraph VIII.B.6 of this appendix.

G. *Departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses* means:

1. Changing any of the elements of the method described in the plant-specific DCD unless the results of the analysis are conservative or essentially the same; or

2. Changing from a method described in the plant-specific DCD to another method unless that method has been approved by the NRC for the intended application.

H. All other terms in this appendix have the meaning set out in 10 CFR 50.2, 10 CFR 52.1, or Section 11 of the Atomic Energy Act of 1954, as amended, as applicable.

III. Scope and Contents

A. All Tier 1, Tier 2 (including the availability controls in Appendix 19ACM), and the generic TS in the ESBWR DCD, Revision 9, dated December 2010, are approved for incorporation by reference by the Director of the Office of the Federal Register under 5 U.S.C. 552(a) and 1 CFR Part 51. You may obtain copies of the generic DCD from Rick E. Kingston, Vice President, ESBWR Licensing, GE-Hitachi Nuclear Energy, 3901 Castle Hayne Road, MC A65, Wilmington, NC 28401. Publicly available documents created or received at the NRC are available electronically at the NRC's Electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. From this page, the public can gain entry into the NRC's Agencywide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents. To view the generic DCD in ADAMS, search under

ADAMS Accession No. ML103440266. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, then contact the NRC's Public Document Room (PDR) reference staff at (800) 397-4209, (301) 415-4737, or by e-mail to pdr.resource@nrc.gov. A copy of the generic DCD is also available for examination and copying at the NRC PDR, Room O-1F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852. Copies are also available for examination at the NRC Library, Two White Flint North, 11545 Rockville Pike, Rockville, Maryland, 20852, telephone (301) 415-5610, e-mail library.resource@nrc.gov. All approved material is available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030 or go to <http://www.archives.gov/federal-register/cfr/ibr-locations.html>. The generic DCD can also be viewed at the Federal Rulemaking Web site, <http://www.regulations.gov>, by searching for documents filed under Docket ID NRC-2010-0135.

B. An applicant or licensee referencing this appendix, in accordance with Section IV of this appendix, shall incorporate by reference and comply with the requirements of this appendix, including Tier 1, Tier 2 (including the availability controls in Appendix 19ACM of the DCD), and the generic TS except as otherwise provided in this appendix. Conceptual design information in the generic DCD and the evaluation of severe accident mitigation design alternatives in NEDO-33306, "ESBWR Severe Accident Management Design Alternatives" are not part of this appendix.

C. If there is a conflict between Tier 1 and Tier 2 of the DCD, then Tier 1 controls.

D. If there is a conflict between the generic DCD and either the application for design certification of the ESBWR design or NUREG-XXXX, "Final Safety Evaluation Report Related to Certification of the ESBWR Standard Design," (FSER), then the generic DCD controls.

E. Design activities for structures, systems, and components that are wholly outside the scope of this appendix may be performed using site characteristics, provided the design activities do not affect the DCD or conflict with the interface requirements.

IV. Additional Requirements and Restrictions

A. An applicant for a COL that wishes to reference this appendix shall, in addition to complying with the requirements of 10 CFR 52.77, 52.79, and 52.80, comply with the following requirements:

1. Incorporate by reference, as part of its application, this appendix.
2. Include, as part of its application:
 - a. A plant-specific DCD containing the same type of information and using the same organization and numbering as the generic DCD for the ESBWR design, either by including or incorporating by reference the generic DCD information, and as modified and supplemented by the applicant's exemptions and departures;
 - b. The reports on departures from and updates to the plant-specific DCD required by paragraph X.B of this appendix;
 - c. Plant-specific TS, consisting of the generic and site-specific TS that are required by 10 CFR 50.36 and 50.36a;
 - d. Information demonstrating that the site characteristics fall within the site parameters and that the interface requirements have been met;
 - e. Information that addresses the COL action items; and
 - f. Information required by 10 CFR 52.47(a) that is not within the scope of this appendix.
3. Include, in the plant-specific DCD, the SUNSI (including proprietary information) and safeguards information referenced in the ESBWR generic DCD.

4. Include, as part of its application, a demonstration that an entity other than GE-Hitachi Nuclear Energy is qualified to supply the ESBWR design unless GE-Hitachi Nuclear Energy supplies the design for the applicant's use.

B. The Commission reserves the right to determine in what manner this appendix may be referenced by an applicant for a construction permit or operating license under 10 CFR Part 50.

V. Applicable Regulations

A. Except as indicated in paragraph B of this section, the regulations that apply to the ESBWR design are in 10 CFR Parts 20, 50, 73, and 100, codified as of **[insert date final rule was signed]**, that are applicable and technically relevant, as described in the FSER (NUREG-XXXX).

B. The ESBWR design is exempt from portions of the following regulations:

1. Paragraph (f)(2)(iv) of 10 CFR 50.34 – Contents of Applications: Technical Information.

VI. Issue Resolution

A. The Commission has determined that the structures, systems, components, and design features of the ESBWR design comply with the provisions of the Atomic Energy Act of 1954, as amended, and the applicable regulations identified in Section V of this appendix; and therefore, provide adequate protection to the health and safety of the public. A conclusion that a matter is resolved includes the finding that additional or alternative structures, systems, components, design features, design criteria, testing, analyses, acceptance criteria, or justifications are not necessary for the ESBWR design.

B. The Commission considers the following matters resolved within the meaning of 10 CFR 52.63(a)(5) in subsequent proceedings for issuance of a COL, amendment of a COL, or renewal of a COL, proceedings held under 10 CFR 52.103, and enforcement proceedings involving plants referencing this appendix:

1. All nuclear safety issues, except for the generic TS and other operational requirements such as human factors engineering procedure development and training program development in Chapters 18.9 and 18.10 of the generic DCD, associated with the information in the FSER, Tier 1, Tier 2 (including referenced information, which the context indicates is intended as requirements, and the availability controls in Appendix 19ACM of the DCD), and the rulemaking record for certification of the ESBWR design;

2. All nuclear safety and safeguards issues associated with the referenced information in SUNSI (including proprietary information) and safeguards information which, in context, are intended as requirements in the generic DCD for the ESBWR design, with the exception of human factors engineering procedure development and training program development in Chapters 18.9 and 18.10 of the generic DCD;

3. All generic changes to the DCD under and in compliance with the change processes in paragraphs VIII.A.1 and VIII.B.1 of this appendix;

4. All exemptions from the DCD under and in compliance with the change processes in paragraphs VIII.A.4 and VIII.B.4 of this appendix, but only for that plant;

5. All departures from the DCD that are approved by license amendment, but only for that plant;

6. Except as provided in paragraph VIII.B.5.f of this appendix, all departures from Tier 2 under and in compliance with the change processes in paragraph VIII.B.5 of this appendix that do not require prior NRC approval, but only for that plant;

7. All environmental issues concerning severe accident mitigation design alternatives associated with the information in the NRC's EA for the ESBWR design (ADAMS Accession No. ML102220247) and NEDO-33306, "ESBWR Severe Accident Management Design Alternatives," (ADAMS Accession No. ML102990433) for plants referencing this appendix whose site characteristics fall within those site parameters specified in NEDO-33306.

C. The Commission does not consider operational requirements for an applicant or licensee who references this appendix to be matters resolved within the meaning of 10 CFR 52.63(a)(5). The Commission reserves the right to require operational requirements for an applicant or licensee who references this appendix by rule, regulation, order, or license condition.

D. Except under the change processes in Section VIII of this appendix, the Commission may not require an applicant or licensee who references this appendix to:

1. Modify structures, systems, components, or design features as described in the generic DCD;
2. Provide additional or alternative structures, systems, components, or design features not discussed in the generic DCD; or
3. Provide additional or alternative design criteria, testing, analyses, acceptance criteria, or justification for structures, systems, components, or design features discussed in the generic DCD.

E. The NRC will specify at an appropriate time the procedures to be used by an interested person who wishes to review portions of the design certification or references containing Safeguards Information (SGI) or sensitive, unclassified, non-safeguards information (SUNSI) (including proprietary information⁸), for the purpose of participating in the hearing required by 10 CFR 52.85, the hearing provided under 10 CFR 52.103, or in any other proceeding relating to this appendix in which interested persons have a right to request an adjudicatory hearing.

VII. Duration of this Appendix

⁸ Proprietary information includes trade secrets and commercial or financial information obtained from a person that are privileged or confidential. 10 CFR 2.390 and 10 CFR Part 9.

This appendix may be referenced for a period of 15 years from **[30 days after date of publication of the final rule in the *Federal Register*]**, except as provided for in 10 CFR 52.55(b) and 52.57(b). This appendix remains valid for an applicant or licensee who references this appendix until the application is withdrawn or the license expires, including any period of extended operation under a renewed license.

VIII. Processes for Changes and Departures

A. Tier 1 information.

1. Generic changes to Tier 1 information are governed by the requirements in 10 CFR 52.63(a)(1).

2. Generic changes to Tier 1 information are applicable to all applicants or licensees who reference this appendix, except those for which the change has been rendered technically irrelevant by action taken under paragraphs A.3 or A.4 of this section.

3. Departures from Tier 1 information that are required by the Commission through plant-specific orders are governed by the requirements in 10 CFR 52.63(a)(4).

4. Exemptions from Tier 1 information are governed by the requirements in 10 CFR 52.63(b)(1) and 52.98(f). The Commission will deny a request for an exemption from Tier 1, if it finds that the design change will result in a significant decrease in the level of safety otherwise provided by the design.

B. Tier 2 information.

1. Generic changes to Tier 2 information are governed by the requirements in 10 CFR 52.63(a)(1).

2. Generic changes to Tier 2 information are applicable to all applicants or licensees who reference this appendix, except those for which the change has been rendered technically irrelevant by action taken under paragraphs B.3, B.4, B.5, or B.6 of this section.

3. The Commission may not require new requirements on Tier 2 information by plant-specific order while this appendix is in effect under 10 CFR 52.55 or 52.61, unless:

a. A modification is necessary to secure compliance with the Commission's regulations applicable and in effect at the time this appendix was approved, as set forth in Section V of this appendix, or to ensure adequate protection of the public health and safety or the common defense and security; and

b. Special circumstances as defined in 10 CFR 50.12(a) are present.

4. An applicant or licensee who references this appendix may request an exemption from Tier 2 information. The Commission may grant such a request only if it determines that the exemption will comply with the requirements of 10 CFR 50.12(a). The Commission will deny a request for an exemption from Tier 2, if it finds that the design change will result in a significant decrease in the level of safety otherwise provided by the design. The grant of an exemption to an applicant must be subject to litigation in the same manner as other issues material to the license hearing. The grant of an exemption to a licensee must be subject to an opportunity for a hearing in the same manner as license amendments.

5.a. An applicant or licensee who references this appendix may depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the TS, or requires a license amendment under paragraph B.5.b or B.5.c of this section. When evaluating the proposed departure, an applicant or licensee shall consider all matters described in the plant-specific DCD.

b. A proposed departure from Tier 2, other than one affecting resolution of a severe accident issue identified in the plant-specific DCD or one affecting information required by 10 CFR 52.47(a)(28) to address aircraft impacts, requires a license amendment if it would:

(1) Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific DCD;

(2) Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific DCD;

(3) Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific DCD;

(4) Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific DCD;

(5) Create a possibility for an accident of a different type than any evaluated previously in the plant-specific DCD;

(6) Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific DCD;

(7) Result in a design basis limit for a fission product barrier as described in the plant-specific DCD being exceeded or altered; or

(8) Result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses.

c. A proposed departure from Tier 2 affecting resolution of an ex-vessel severe accident design feature identified in the plant-specific DCD, requires a license amendment if:

(1) There is a substantial increase in the probability of an ex-vessel severe accident such that a particular ex-vessel severe accident previously reviewed and determined to be not credible could become credible; or

(2) There is a substantial increase in the consequences to the public of a particular ex-vessel severe accident previously reviewed.

d. A proposed departure from Tier 2 information required by 10 CFR 52.47(a)(28) to address aircraft impacts shall consider the effect of the changed design feature or functional capability on the original aircraft impact assessment required by 10 CFR 50.150(a). The applicant or licensee shall describe in the plant-specific DCD how the modified design features and functional capabilities continue to meet the aircraft impact assessment requirements in 10 CFR 50.150(a)(1).

e. If a departure requires a license amendment under paragraph B.5.b or B.5.c of this section, it is governed by 10 CFR 50.90.

f. A departure from Tier 2 information that is made under paragraph B.5 of this section does not require an exemption from this appendix.

g. A party to an adjudicatory proceeding for either the issuance, amendment, or renewal of a license or for operation under 10 CFR 52.103(a), who believes that an applicant or licensee who references this appendix has not complied with paragraph VIII.B.5 of this appendix when departing from Tier 2 information, may petition to admit into the proceeding such a contention. In addition to compliance with the general requirements of 10 CFR 2.309, the petition must demonstrate that the departure does not comply with paragraph VIII.B.5 of this appendix. Further, the petition must demonstrate that the change bears on an asserted noncompliance with an ITAAC acceptance criterion in the case of a 10 CFR 52.103 preoperational hearing, or that the change bears directly on the amendment request in the case of a hearing on a license amendment. Any other party may file a response. If, on the basis of the petition and any response, the presiding officer determines that a sufficient showing has been made, the presiding officer shall certify the matter directly to the Commission for determination of the admissibility of the contention. The Commission may admit such a contention if it determines the petition raises a genuine issue of material fact regarding compliance with paragraph VIII.B.5 of this appendix.

6.a. An applicant who references this appendix may not depart from Tier 2* information, which is designated with italicized text or brackets and an asterisk in the generic DCD, without NRC approval. The departure will not be considered a resolved issue, within the meaning of Section VI of this appendix and 10 CFR 52.63(a)(5).

b. A licensee who references this appendix may not depart from the following Tier 2* matters without prior NRC approval. A request for a departure will be treated as a request for a license amendment under 10 CFR 50.90.

- (1) Fuel mechanical and thermal-mechanical design evaluation reports, including fuel burnup limits.
- (2) Control rod mechanical and nuclear design reports.
- (3) Fuel nuclear design report.
- (4) Critical power correlation.
- (5) Fuel licensing acceptance criteria.
- (6) Control rod licensing acceptance criteria.
- (7) Mechanical and structural design of spent fuel storage racks.

c. A licensee who references this appendix may not, before the plant first achieves full power following the finding required by 10 CFR 52.103(g), depart from the following Tier 2* matters except under paragraph B.6.b of this section. After the plant first achieves full power, the following Tier 2* matters revert to Tier 2 status and are subject to the departure provisions in paragraph B.5 of this section.

- (1) ASME Boiler & Pressure Vessel Code, Section III.
- (2) ACI 349 and ANSI/ASC-N690.
- (3) Motor-operated valves.
- (4) Equipment seismic qualification methods.
- (5) Piping design acceptance criteria.

(6) Instrument setpoint methodology.

(7) Safety-Related Distribution Control and Information System (Q-DCIS) performance specification and architecture.

(8) Safety System Logic and Control (SSLC) hardware and software.

(9) Human factors engineering design and implementation.

(10) First of a kind testing for reactor stability (first plant only).

(11) Reactor precritical heatup with RWCU/SDC (first plant only).

(12) Isolation condenser system heatup and steady state operation (first plant only).

(13) Power maneuvering in the feedwater temperature operating domain (first plant only).

(14) Load maneuvering capability (first plant only).

(15) Defense-in-depth stability solution evaluation test (first plant only).

d. Departures from Tier 2* information that are made under paragraph B.6 of this section do not require an exemption from this appendix.

C. Operational requirements.

1. Generic changes to generic TS and other operational requirements that were completely reviewed and approved in the design certification rulemaking and do not require a change to a design feature in the generic DCD are governed by the requirements in 10 CFR 50.109. Generic changes that require a change to a design feature in the generic DCD are governed by the requirements in paragraphs A or B of this section.

2. Generic changes to generic TS and other operational requirements are applicable to all applicants who reference this appendix, except those for which the change has been rendered technically irrelevant by action taken under paragraphs C.3 or C.4 of this section.

3. The Commission may require plant-specific departures on generic TS and other operational requirements that were completely reviewed and approved, provided a change to a design feature in the generic DCD is not required and special circumstances as defined in

10 CFR 2.335 are present. The Commission may modify or supplement generic TS and other operational requirements that were not completely reviewed and approved or require additional TS and other operational requirements on a plant-specific basis, provided a change to a design feature in the generic DCD is not required.

4. An applicant who references this appendix may request an exemption from the generic TS or other operational requirements. The Commission may grant such a request only if it determines that the exemption will comply with the requirements of 10 CFR 52.7. The grant of an exemption must be subject to litigation in the same manner as other issues material to the license hearing.

5. A party to an adjudicatory proceeding for the issuance, amendment, or renewal of a license, or for operation under 10 CFR 52.103(a), who believes that an operational requirement approved in the DCD or a TS derived from the generic TS must be changed may petition to admit such a contention into the proceeding. The petition must comply with the general requirements of 10 CFR 2.309 and must demonstrate why special circumstances as defined in 10 CFR 2.335 are present, or demonstrate compliance with the Commission's regulations in effect at the time this appendix was approved, as set forth in Section V of this appendix. Any other party may file a response to the petition. If, on the basis of the petition and any response, the presiding officer determines that a sufficient showing has been made, the presiding officer shall certify the matter directly to the Commission for determination of the admissibility of the contention. All other issues with respect to the plant-specific TS or other operational requirements are subject to a hearing as part of the license proceeding.

6. After issuance of a license, the generic TS have no further effect on the plant-specific TS. Changes to the plant-specific TS will be treated as license amendments under 10 CFR 50.90.

IX. Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)

[Reserved]

X. Records and Reporting

A. Records

1. The applicant for this appendix shall maintain a copy of the generic DCD that includes all generic changes it makes to Tier 1 and Tier 2, and the generic TS and other operational requirements. The applicant shall maintain the SUNSI (including proprietary information) and safeguards information referenced in the generic DCD for the period that this appendix may be referenced, as specified in Section VII of this appendix.

2. An applicant or licensee who references this appendix shall maintain the plant-specific DCD to accurately reflect both generic changes to the generic DCD and plant-specific departures made under Section VIII of this appendix throughout the period of application and for the term of the license (including any period of renewal).

3. An applicant or licensee who references this appendix shall prepare and maintain written evaluations which provide the bases for the determinations required by Section VIII of this appendix. These evaluations must be retained throughout the period of application and for the term of the license (including any period of renewal).

4.a. The applicant for the ESBWR design shall maintain a copy of the aircraft impact assessment performed to comply with the requirements of 10 CFR 50.150(a) for the term of the certification (including any period of renewal).

b. An applicant or licensee who references this appendix shall maintain a copy of the aircraft impact assessment performed to comply with the requirements of 10 CFR 50.150(a) throughout the pendency of the application and for the term of the license (including any period of renewal).

B. Reporting

1. An applicant or licensee who references this appendix shall submit a report to the

NRC containing a brief description of any plant-specific departures from the DCD, including a summary of the evaluation of each. This report must be filed in accordance with the filing requirements applicable to reports in 10 CFR 52.3.

2. An applicant or licensee who references this appendix shall submit updates to its DCD, which reflect the generic changes to and plant-specific departures from the generic DCD made under Section VIII of this appendix. These updates shall be filed under the filing requirements applicable to final safety analysis report updates in 10 CFR 52.3 and 50.71(e).

3. The reports and updates required by paragraphs X.B.1 and X.B.2 of this appendix must be submitted as follows:

a. On the date that an application for a license referencing this appendix is submitted, the application must include the report and any updates to the generic DCD.

b. During the interval from the date of application for a license to the date the Commission makes its finding required by 10 CFR 52.103(g), the report must be submitted semi-annually. Updates to the plant-specific DCD must be submitted annually and may be submitted along with amendments to the application.

c. After the Commission makes the finding required by 10 CFR 52.103(g), the reports and updates to the plant-specific DCD must be submitted, along with updates to the site-specific portion of the final safety analysis report for the facility, at the intervals required by 10 CFR 50.59(d)(2) and 50.71(e)(4), respectively, or at shorter intervals as specified in the license.

Dated at Rockville, Maryland, this _____ day of _____ 2010.

For the Nuclear Regulatory Commission.

Annette Vietti-Cook,
Secretary of the Commission.

DRAFT ENVIRONMENTAL ASSESSMENT BY THE
U.S. NUCLEAR REGULATORY COMMISSION
RELATING TO THE CERTIFICATION OF THE
ESBWR STANDARD PLANT DESIGN
DOCKET NO. 52-010

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UNITED STATES NUCLEAR REGULATORY COMMISSION
DRAFT ENVIRONMENTAL ASSESSMENT AND FINDING OF
NO SIGNIFICANT IMPACT
RELATING TO THE CERTIFICATION OF THE
ESBWR STANDARD PLANT DESIGN
DOCKET NO. 52-010

The U.S. Nuclear Regulatory Commission (NRC) is proposing a design certification for the Economic Simplified Boiling-Water Reactor (ESBWR) design in response to an application submitted on August 24, 2005, by GE-Hitachi Nuclear Energy (GEH). A design certification is a rulemaking; the NRC has decided to adopt design certification rules as appendices to Part 52 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 52).

The NRC has performed the following draft environmental assessment (EA) of the environmental impacts of the proposed new rule and has documented its finding of no significant impact in accordance with the requirements of 10 CFR 51.21 and the National Environmental Policy Act of 1969, as amended (NEPA). This EA addresses the severe accident mitigation design alternatives (SAMDA) that the NRC has considered as part of this EA for the ESBWR design. This EA does not address the site-specific environmental impacts of constructing and operating any facility that references the ESBWR design certification at a particular site; those impacts will be evaluated as part of any application or applications for the siting, construction, or operation of such a facility.

As discussed in Section 4.0 of this EA, the NRC has determined that issuing this design certification does not constitute a major Federal action significantly affecting the quality of the human environment. This finding is based on the generic finding made in 10 CFR 51.32(b)(1) that there is no significant environmental impact associated with certification of a standard

design under 10 CFR Part 52, Subpart B. The action would not authorize the siting, construction, or operation of a facility using the ESBWR design. Rather, it would merely codify the ESBWR design in a rule that could be referenced in a future combined license (COL) application. Furthermore, because the certification is a rule rather than a physical action, it does not involve commitment of any resources that have alternative uses. As explained in the statements of consideration for “Licenses, Certifications, and Approvals for Nuclear Power Plants; Final Rule,” (72 FR 49352, 49427; August 28, 2007), the 10 CFR 51.32(b)(1) generic finding of no significant impact is legally equivalent to a categorical exclusion. Therefore, the NRC has not prepared an environmental impact statement (EIS) for the action.

Under 10 CFR 51.30(d), an EA for a design certification must identify the proposed action and is otherwise limited to consideration of the costs and benefits of SAMDAs and the bases for not incorporating SAMDAs in the design certification. As discussed in Section 4.0 of this EA, the NRC also reviewed GEH’s assessment of SAMDAs that generically apply to the ESBWR design and finds the GEH assessment considered a reasonable set of SAMDAs, and no additional SAMDAs beyond those currently incorporated into the ESBWR design are cost-beneficial. This finding applies whether SAMDAs are considered at the time of the certification of the ESBWR standard design or in connection with the licensing of a future facility referencing the ESBWR design certification rule, 10 CFR Part 52, Appendix E, provided that the plant referencing the ESBWR design certification rule is located on a site whose site characteristics fall within the postulated site parameters in NEDO-33306, Revision 4, Licensing Topical Report, “ESBWR Severe Accident Mitigation Design Alternatives,” issued October 2010. These issues are considered resolved for the ESBWR design.

In addition, this draft EA is being issued in connection with a proposed rule published in the *Federal Register* [PROPOSED RULE FR CITATION; PUBLICATION DATE]. As provided in

10 CFR 51.31(b)(1)(ii), comments on this EA will be limited to the consideration of SAMDAs as required by 10 CFR 51.30(d).

ENVIRONMENTAL ASSESSMENT

1.0 Identification Of The Proposed Action

The proposed action is to issue a rule to certify the ESBWR design in Appendix E to 10 CFR Part 52. The new rule would allow applicants to reference the certified ESBWR design as part of a COL application under 10 CFR Part 52.

2.0 The Need For The Proposed Action

The proposed action is to issue a rule amending 10 CFR Part 52 to certify the ESBWR design. The amendment would allow an applicant to reference the certified ESBWR design as part of a COL application under 10 CFR Part 52. Those portions of the ESBWR design included in the scope of the certification rulemaking would not be subject to further safety review or approval in a COL proceeding. In addition, the design certification rule could eliminate the need to consider SAMDAs in connection with any future applications for facilities that reference the certified ESBWR design, in accordance with 10 CFR 51.50(c)(2).

3.0 The Environmental Impact Of The Proposed Action

The proposed action constitutes issuance of an amendment to 10 CFR Part 52 to certify the ESBWR standard plant design. As stated in 10 CFR 51.32(b)(2), the NRC has determined that there is no significant environmental impact associated with issuance of a design certification. The amendment would merely codify the NRC's approval of the ESBWR design through its final safety evaluation report (FSER) on the design and any FSER supplement issued during rulemaking (refer to Agencywide Documents Access and Management System (ADAMS) Accession No. ML103070392). Furthermore, because the certification of the design constitutes

only a rule rather than a physical action, it would not involve the commitment of any resources that have alternative uses.

As described in Section 4.0 of this EA, the NRC reviewed alternative design features for preventing and mitigating severe accidents. NEPA requires consideration of alternatives to show that the design certification rule is the appropriate course of action. NRC regulations at 10 CFR 51.55(a) ensure that the design referenced in rulemaking does not exclude any cost beneficial design changes related to the prevention and mitigation of severe accidents.

Through its own independent analysis, the NRC concludes that GEH adequately considered an appropriate set of SAMDAs and that none were cost beneficial. Although GEH made no design changes as a result of considering SAMDAs, GEH had already incorporated certain features in the ESBWR design on the basis of PRA results. Section 4.2 of this EA gives examples of these features. These design features relate to severe accident prevention and mitigation, but were not considered in the SAMDA evaluation because they were already part of the ESBWR design (refer to Sections 19.3.1 and 19.3.2 of the DCD, "Severe Accident Preventative Features" and "Severe Accident Mitigative Features," respectively).

Finally, the design certification rule by itself would not authorize the siting, construction, or operation of a nuclear power plant. An applicant for an early site permit or COL that references the ESBWR design will be required to address the environmental impacts of construction and operation at a specific site. The NRC will then evaluate the environmental impacts and issue an EIS in accordance with 10 CFR Part 51. However, the SAMDA analysis that has been completed as part of this EA can be incorporated by reference into an EIS related to an application for siting, construction, or operation of a nuclear plant that references the ESBWR design.

4.0 Severe Accident Mitigation Design Alternatives

The proposed action provides finality in licensing proceedings on an application referencing the ESBWR design certification rule and proposing a plant located on a site whose site characteristics fall within the postulated site parameters in NEDO-33306.

4.1 Severe Accident Mitigation Design Alternatives

Consistent with the objectives of standardization and early resolution of design issues, the Commission decided to evaluate SAMDAs as part of the design certification for the ESBWR design. In a 1985 policy statement (50 FR 32138; August 8, 1985), the Commission defined the term "severe accident" as an event that is "beyond the substantial coverage of design-basis events," including events where there is substantial damage to the reactor core (whether or not there are serious offsite consequences). Design-basis events are events analyzed in accordance with the NRC's Standard Review Plan (NUREG-0800) and documented in Chapter 15 of the DCD.

As part of its design certification application, GEH performed a probabilistic risk assessment (PRA) for the ESBWR design to achieve the following objectives:

- Identify the dominant severe accident sequences, which are those that account for most of the core damage frequency (CDF) and associated source terms for the design.
- Modify the design, on the basis of PRA insights, to prevent severe accidents or mitigate their consequences and thereby reduce the risk of such accidents.
- Provide a basis for concluding that all reasonable steps have been taken to reduce the chances of occurrence, and mitigate the consequences, of severe accidents.

GEH's PRA analysis is described in Chapter 19 of the ESBWR DCD.

In addition to these safety considerations, applicants for reactor design certification or COLs must also consider alternative design features for severe accidents in the context of the NRC's environmental review. These requirements can be summarized as follows:

- 10 CFR 52.79 requires a COL applicant to perform a plant/site-specific PRA, the aim of which is to seek such improvements in the reliability of core and containment heat removal systems as are significant and practical and do not impact excessively on the plant.
- 10 CFR 51.30(d) requires consideration of SAMDAs in an EA for a design certification, while 10 CFR 51.50(c) sets forth the general requirements for an environmental report accompanying a COL application, which include the requirement to evaluate SAMDAs.

Although these requirements are not directly related, they share common purposes, which are to consider alternatives to the proposed design, to evaluate whether potential alternative improvements in the plant design might enhance safety performance during severe accidents, and to prevent reasonable alternatives from being foreclosed.

The NRC has determined that generic evaluation of SAMDAs for the ESBWR standard design is both practical and warranted for two significant reasons. First, the design and construction of all plants referencing the certified ESBWR design will be governed by the rule certifying a single design. Second, the site parameters in NEDO-33306 establish the consequences for a reasonable enveloping set of SAMDAs for the ESBWR design. The low residual risk of the ESBWR design and the limited potential for further risk reduction provides high confidence that additional cost-beneficial SAMDAs would not be found for sites within the site parameter envelope. If an actual characteristic for a particular site does not fall within the postulated site parameters, then SAMDAs that could be materially affected by the value of the site characteristic must be re-evaluated in the site-specific environmental report and the EIS

prepared in connection with the application. If the actual characteristics of a proposed site fall within the postulated site parameters, then the SAMDA analysis can be incorporated by reference in the site-specific EIS and SAMDAs need not be re-evaluated in the EIS.

4.2 Potential Design Improvements Identified by GEH

In NEDO-33306, Revision 4, Licensing Topical Report, "ESBWR Severe Accident Mitigation Design Alternatives," issued October 2010, the applicant identified 177 candidate design alternatives based on a review of design alternatives for other plant designs, including the license renewal environmental reports and the GEH Advanced Boiling-Water Reactor (ABWR) SAMDA study. The applicant eliminated certain design improvements from further consideration on the basis that the ESBWR design already incorporates them. The following are examples of design enhancement features currently included in the design:

- improved isolation condenser design
- automatic depressurization valves
- ac-independent fire water pumps for makeup and injection
- passive containment cooling system
- basemat internal melt arrest and coolability device and gravity-driven cooling system deluge function
- improved dc power reliability
- improved actuation logic reliability
- motor-driven feedwater pumps
- water pool above drywell head
- high containment ultimate strength and maximum design pressure
- incorporation of flood mitigation into design
- reactor water clean-up heat exchanger sized for decay heat removal
- 72-hour coping period for station blackout
- upgraded low-pressure piping for the reactor coolant pressure boundary
- digital instrumentation and controls

The applicant's screening process eliminated 39 potential alternatives as being inapplicable, 71 design alternatives were considered to be similar to those already included in the ESBWR design, 28 items were marked as procedural or administrative as opposed to design features (whose benefits were considered to be unlikely to exceed those of alternatives evaluated relative to their potentially high costs), and 37 items were ruled out for cases where other design features already perform the proposed function or obviate its need. The applicant assessed the remaining two items and determined them to have very low benefit because their insignificant contribution to reducing risk did not outweigh their excessive implementation costs.

4.3 NRC Evaluation of Potential Design Improvements

The set of potential design improvements considered for the ESBWR includes those from generic boiling-water reactor (BWR) severe accident mitigation alternatives reports and from the ABWR design. The ESBWR design already incorporates several design enhancements relative to severe accident mitigation. These design improvements have resulted in a CDF that is about an order of magnitude less than that of the ABWR design. For example, the ESBWR design can cope with a station blackout for 72 hours (i.e., no reliance on ac power for the first 72 hours), eliminating CDF sequences that contributed more than 40 percent of CDF in the ABWR design.

The staff considers the applicant's assessment of the potential SAMDAs and their impacts on the ESBWR design acceptable. The staff's review did not reveal any additional design alternatives that the applicant should have considered.

4.4 Risk Reduction Potential of SAMDAs

4.4.1 GEH Evaluation

The applicant assumed that each design alternative would work perfectly to completely eliminate all severe accident risk from evaluated internal events. This assumption is

conservative as it maximizes the benefit of each design alternative. In NEDO-33306, the applicant reported results from the ESBWR Level 3 PRA, namely, an annual offsite population dose risk (W_{pha}) of 0.035 sievert per year and a maximum averted public exposure cost of \$194,740. The applicant estimated the public exposure design alternative benefits on the basis of the reduction of risk expressed in terms of whole body person-rem per year received by the total population within an 80-kilometer (50-mile) radius of an ESBWR plant site.

The applicant used the cost-benefit methodology found in NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook," issued in 1997, to calculate the maximum attainable benefit associated with completely eliminating all risk for the ESBWR. This methodology considers averted onsite and replacement power costs. The applicant estimated the present worth of eliminating all severe accident risk to be approximately \$397,863.

The applicant's risk reduction estimates are based on mean values of release frequencies and best-estimate parameter values, without consideration of uncertainties in CDF or offsite consequences. Even though this approach is consistent with that used in previous design alternative evaluations, further consideration of these factors could lead to significantly higher risk reduction values, given the extremely small CDF and risk estimates in the baseline PRA. In assessing the risk reduction potential of design improvements for the ESBWR, the NRC staff has based its evaluation on the applicant's risk reduction estimates for the various design alternatives, in conjunction with an assessment of the potential impact of uncertainties on the results. Section 4.4.2 discusses this assessment further.

4.4.2 NRC Evaluation

The applicant's estimates of risk do not account for uncertainties either in CDF or in offsite radiation exposures resulting from a core damage event. The uncertainties in both of these key elements are fairly large because key safety features of the ESBWR design are

unique, and with the features already incorporated in the ESBWR design, the ability to estimate CDF and risk approaches the limitations of probabilistic techniques. In view of the limits of PRA techniques, and because site-specific factors do not affect the uncertainties in CDF values and CDF is very low on an absolute scale as compared to currently operating plants, further evaluation of such uncertainties is not warranted.

For external events, GEH's analysis only includes high winds; however, the contribution to the CDF from external events not yet accounted for in the SAMDA analysis is not likely to be significant enough to cause a SAMDA that has previously been considered to become cost beneficial. While external events and accident sequences not yet accounted for in the SAMDA analysis may increase the total CDF in the plant-specific PRAs, the CDF for the design is very low, and the costs and benefits of SAMDAs that relate to the risk from external events are comparable to those of the SAMDAs related to internal risk evaluated in this EA. Any increase in CDF in a plant-specific PRA would not likely alter these facts. Accordingly, and in view of the features already incorporated in the ESBWR design and the margin between the cost of SAMDAs evaluated and their potential benefits, as described below, SAMDAs that relate to the risk from external events are not cost-beneficial now, and are not likely to become cost beneficial based on a plant-specific PRA.

4.5 Cost Impacts of Candidate SAMDAs

4.5.1 GEH Evaluation

NEDO-33306 assessed the capital cost associated with two design alternatives evaluated by the applicant for the ESBWR. For both design alternatives, the implementation cost would be over \$1 million, which is much greater than the maximum averted benefit, making any additional design modifications costly as compared to any potential benefits.

4.5.2 NRC Evaluation

On the basis of the analyses performed by GEH, the NRC staff views the applicant's assertion of potential costs for the ESBWR as acceptable because it is reasonable to conclude that the cost of implementing (design, procurement, installation, testing, etc.) the design alternatives that were considered, such as constructing a building connected to the containment building or installing limit switches on all containment isolation valves, would far exceed GEH's \$1 million minimum cost estimate.

4.6 Cost-Benefit Comparison

4.6.1 GEH Evaluation

The methodology used by GEH was based primarily on the NRC's guidance for performing cost-benefit analysis outlined in NUREG/BR-0184. The guidance involves determining the net value for each SAMDA according to the following formula:

$$\text{Net Value} = (\text{APE} + \text{AOC} + \text{AOE} + \text{AOSC}) - \text{COE}$$

Where:

APE	= present value of averted public exposure (\$)
AOC	= present value of averted offsite property damage costs (\$)
AOE	= present value of averted occupational exposure costs (\$)
AOSC	= present value of averted onsite costs (\$). This includes cleanup and decontamination and long-term replacement power costs.
COE	= cost of enhancement (\$)

If the net value of a SAMDA is negative, the cost of implementing the SAMDA is larger than the benefit associated with the SAMDA and it is not considered to be cost beneficial. Table 4.6-1 summarizes the applicant's and NRC staff's estimates of each of the associated cost elements.

The NRC issued Revision 4 of NUREG/BR-0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," in August 2004, to reflect the agency's policy on discount

rates. NUREG/BR-0058, Revision 4, states that two sets of estimates should be developed—one at 3 percent and one at 7 percent. The applicant provided estimates using a 3-percent discount rate, since it represented a more conservative estimate.

Table 4.6-1 Summary of Estimated Averted Costs

Quantitative Attributes		Present Value Estimate (\$)		
		NRC Staff Best Estimate ^a	GEH Maximum ^b	NRC Staff Maximum ^c
Health	Public	100,000 ^d	194,740	197,720 ^d
	Occupational	56	249	250
Property	Offsite	27,200 ^d	53,720 ^d	53,770 ^d
	Onsite	NA ^e	NA ^e	NA ^e
Cleanup and Decontamination	Onsite	1,710	4,674	4,060
Replacement Power		4,520	144,480	148,020
Total		133,486	397,863	403,820

^a “Best estimate” is based on mean release frequency and “best estimate” parameter values.

^b Maximum estimate is based on mean release frequency (from Revision 5 of the PRA), high estimate parameter values, and a 3-percent discount rate.

^c NRC staff maximum is based on parameter values used in b, release frequency (from Revision 5 of the PRA), and a 3-percent discount rate.

^d Estimated using the applicant-provided Electric Power Research Institute Advanced Light-Water Reactor Utilities Requirement Document, property damage, and the new release category frequencies.

^e Not Analyzed.

It is important to note that the monetary present value estimate for each risk attribute does not represent the expected reduction in risk resulting from a single accident. Rather, it is the present value of a stream of potential losses extending over the projected lifetime (in this case, 60 years) of the facility. Therefore, it reflects the expected annual loss resulting from a

single accident, the possibility that such an accident could occur at any time over the licensed life, and the effect of discounting these potential future losses to present value.

As indicated above, the applicant estimated the total present dollar value equivalent associated with complete elimination of severe accidents at a single ESBWR unit site to be \$397,863. The estimated averted health exposure has the largest effect on the averted cost. For any SAMDA to be cost beneficial, the enhancement cost must be less than \$397,863. Based on this, the applicant concluded that none of the SAMDA candidates are cost beneficial.

4.6.2 NRC Evaluation

The staff's analyses of the total present value using the mean CDF and release frequencies from Revision 5 of the PRA and a 3-percent discount rate indicate a maximum value of about \$403,820. This compares well to the GEH estimate of the maximum benefit from the elimination of all CDF of \$397,863. Accordingly, the staff concludes that the GEH estimate of maximum benefit from any SAMDA is reasonable.

The estimated averted health exposure is a major contributor to the estimated benefits. This arises from relatively high release frequencies for internal and high-wind events during shutdown. The high releases are assumed because the containment would be open during most of the shutdown period. Additionally, if one were to adjust annual replacement power cost for future energy cost increase, the total present dollar value would be even higher. Nonetheless, CDF is very low on an absolute scale as compared to currently operating plants. Moreover, in view of the features already incorporated in the ESBWR design and the margin between the cost of SAMDAs evaluated and their potential benefits, any increase in benefits due to increased replacement power costs would not be significant enough to render any SAMDAs evaluated in this EA cost-beneficial. Therefore, further evaluation of future energy cost increases is not warranted.

GEH indicated that any of the potential design modifications considered would cost a minimum of \$1 million to implement, as indicated above. As described in section 4.5.2 of this EA, the NRC staff concluded that the GEH estimate of \$1 million per modification is conservative. The minimum cost of \$1 million is approximately 2.5 times the maximum benefit of \$397,863, and therefore the NRC staff concurs with the applicant's conclusion that none of the potential design modifications evaluated could be justified on the basis of cost-benefit considerations. The NRC further concludes that it is unlikely that any other design changes would be justified at any particular site on the basis of person-rem exposure considerations because the estimated CDF would remain very low on an absolute scale.

4.7 Conclusions on SAMDAs

As discussed in Section 19.1 of the ESBWR FSER, the applicant made extensive use of the results of the PRA to arrive at a final ESBWR design. As a result, the estimated CDF and risk calculated for the ESBWR design are very low. The low CDF and risk for the ESBWR design are a reflection of the applicant's efforts to systematically minimize the effect of initiators/sequences that have been important contributors to CDF in previous BWR PRAs. This minimization has been done largely through the incorporation of a number of hardware improvements in the ESBWR design. Section 19.1 of the ESBWR FSER discusses these improvements and the additional ESBWR design features that contribute to low CDF and risk for the ESBWR.

Because the ESBWR design already contains numerous plant features directed toward reducing CDF and risk, the benefits and risk reduction potential of additional plant improvements is significantly reduced. This reduction is true for both internally and externally initiated events. Moreover, with the features already incorporated in the ESBWR design, the ability to estimate CDF and risk approaches the limitations of probabilistic techniques.

The NRC concludes that none of the potential design modifications evaluated is justified on the basis of cost-benefit considerations. The NRC further concludes that it is unlikely that any other design changes would be justified in the future on the basis of person-rem exposure because the estimated CDFs are very low on an absolute scale.

5.0 Public Comments And NRC Responses

(RESERVED FOR FUTURE USE)

6.0 Finding Of No Significant Impact

On the basis of the EA, the NRC concludes that the proposed action would not have a significant effect on the quality of the human environment. Accordingly, the NRC has decided not to prepare an EIS for the proposed action.

For further details with respect to the proposed action, see the proposed design certification rule and the documents referenced in the statement of considerations for the proposed rule. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, 20852. Publicly available records will be accessible electronically from the ADAMS Public Electronic Reading Room on the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents in ADAMS should contact the NRC PDR reference staff at 1-800-397-4209 or 301-415-4737 or send an e-mail to pdrc@nrc.gov.