RULEMAKING ISSUE
(Affirmation)

December 14, 2005 SECY-05-0227

FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations

SUBJECT: FINAL RULE — AP1000 DESIGN CERTIFICATION

PURPOSE:

To obtain the Commission's approval to publish in the *Federal Register* the enclosed final rule that amends Part 52 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 52) to certify the AP1000 standard plant design. This paper does not address any new commitments or resource implications.

BACKGROUND:

Westinghouse Electric Company (Westinghouse) submitted an application for certification of its AP1000 standard plant design on March 28, 2002. The Nuclear Regulatory Commission (NRC) staff completed its technical review of the AP1000 application and issued NUREG-1793, "Final Safety Evaluation Report [FSER] related to Certification of the AP1000 Standard Design," and a final design approval (FDA) in September 2004.

DISCUSSION:

On April 18, 2005 (70 FR 20062), the NRC published a proposed design certification rule (DCR) for the AP1000 standard plant design. The *Federal Register* notice gave the public an opportunity to comment on the proposed DCR, the AP1000 design control document (DCD) (Revision 14), and the environmental assessment. The *Federal Register* notice was also sent

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to all State liaison officers and public utility commissions. The NRC received four letters in response to the *Federal Register* notice, three from private citizens and one from the Nuclear Energy Institute (NEI). The comments addressed the proposed DCR, the AP1000 DCD, and the environmental assessment. A discussion of the comments is provided in the *Federal Register* notice.

The final DCR for the AP1000 standard plant design is nearly identical to the AP600 DCR, which the NRC previously codified in Appendix C to 10 CFR Part 52 (64 FR 72015; December 23, 1999). Many of the procedural issues and their resolutions for the AP600 DCR (e.g., the two-tier structure, Tier 2*, the scope of issue resolution) were developed after extensive discussions with public stakeholders, including Westinghouse. Westinghouse also requested that policy resolutions for the AP600 design review be applied to the AP1000 design. Accordingly, the NRC staff has modeled the AP1000 DCR on the existing DCRs, with certain departures to account for differences in the AP1000 design documentation, design features, and environmental assessment (including severe accident mitigation design alternatives). In response to some of NEI's comments (see the comment analysis), the staff has amended the final DCR to make it consistent with other DCRs in the revised proposed rule to update 10 CFR Part 52 (SECY-05-0203, Revised Proposed Rule to Update 10 CFR Part 52, 'Licenses, Certifications, and Approvals for Nuclear Power Plants' ").

By letter dated September 7, 2005 (DCP/NRC 1722), Westinghouse submitted proposed changes to the AP1000 Tier 1 information. As a result of the NRC staff's review, Westinghouse submitted revised changes to the AP1000 DCD by letters dated November 1, 2005 (DCP/NRC 1723), and November 3, 2005 (DCP/NRC 1724), addressing the staff's comments. Westinghouse incorporated the changes in Revision 15 of the DCD. The proposed changes to the AP1000 DCD include editorial and minor technical changes, corrections, and clarifications to the inspections, tests, analyses, and acceptance criteria (ITAAC) in the Tier 1 information. These changes were identified by Westinghouse as a result of NEI and NuStart efforts to prepare for future combined license applications. The staff determined that most of these changes do not affect the staff's findings in the AP1000 FSER and are acceptable. For a few changes, a new evaluation is provided in a supplement to the FSER (NUREG-1793, Supplement No. 1). The FSER and Supplement No. 1 provide the bases for the Commission's approval of the AP1000 standard plant design. A new FDA, which incorporates Revision 15 to the DCD, will be issued to supersede the current FDA after issuance of this final design certification rule.

RECOMMENDATION:

That the Commission:

1. Approve the amendment to 10 CFR Part 52 (Enclosure 1) for publication in the *Federal Register*.

2. Approve the final environmental assessment in Enclosure 2.

3. Certify (to satisfy requirements of the Regulatory Flexibility Act, 5 U.S.C. 605(b)) that this rule, if promulgated, will not have a negative economic impact on a substantial number of small entities.

4. Note:

   a. This rule amends information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). This rule has been reviewed by the Office of Management and Budget, and the paperwork requirements were approved on (date to be filled in upon FRN publication).

   b. 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 VII of the *Federal Register* notice).

   c. The appropriate congressional committees will be informed.

   d. The Office of Public Affairs will issue a press release.

COORDINATION:

The Office of the General Counsel has no legal objection to this paper. The Office of the Chief Financial Officer has reviewed this Commission paper for resource implications and has no objection. The Office of the Information Services has reviewed this final rule for information technology and information management implications and concurs with the rule. A draft copy of the *Federal Register* notice was sent to the Advisory Committee on Reactor Safeguards (ACRS) for the Committee's consideration. On November 15, 2005, the ACRS issued a memo stating that the Committee decided not to review the final rule and has no objection to the staff's proposal to issue the final rule.

The NRC staff is preparing a letter to the Director, Office of the Federal Register (OFR), requesting approval of the AP1000 DCD for incorporation by reference. The letter will be sent to the OFR before we request publication of the *Federal Register* notice and will address the criteria for approval of documents for incorporation by reference.

/RA/

Luis A. Reyes
Executive Director
for Operations

Enclosures:
1. *Federal Register* notice
2. Environmental Assessment

FEDERAL REGISTER NOTICE
U.S. NUCLEAR REGULATORY COMMISSION
RELATING TO THE CERTIFICATION OF THE
AP1000 STANDARD PLANT DESIGN
DOCKET NO. 52-006

Enclosure 1

[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR PART 52

RIN 3150-AH56

AP1000 Design Certification

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Nuclear Regulatory Commission (NRC or Commission) is amending its regulations to certify the AP1000 standard plant design. This action is necessary so that applicants or licensees intending to construct and operate an AP1000 design may do so by referencing this regulation [AP1000 design certification rule (DCR)]. The applicant for certification of the AP1000 design was Westinghouse Electric Company, LLC (Westinghouse).

EFFECTIVE DATE: The effective date of this rule is **[insert 30 days after publication in the *Federal Register*]**. The incorporation by reference of certain documents listed in this regulation is approved by the Director of the Office of the *Federal Register* as of **[insert date]**.

FOR FURTHER INFORMATION CONTACT: Lauren Quinones-Navarro or Jerry N. Wilson, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; telephone (301) 415-2007 or (301) 415-3145; e-mail: lnq@nrc.gov or jnw@nrc.gov.

SUPPLEMENTARY INFORMATION:

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I. Background.

Subpart B of 10 CFR part 52 sets forth the process for obtaining standard design certifications. On March 28, 2002 (67 FR 20845), Westinghouse tendered its application for certification of the AP1000 standard plant design with the NRC. Westinghouse submitted this application in accordance with subpart B and appendix O of 10 CFR part 52. The NRC formally accepted the application as a docketed application for design certification (Docket No. 52-006) on June 25, 2002 (67 FR 43690). The pre-application information submitted before the NRC formally accepted the application can be found under Project No. 711.

The NRC staff issued a final safety evaluation report (FSER) for the AP1000 design in September 2004 (NUREG-1793). The FSER provides the bases for issuance of a final design approval (FDA) under appendix O to part 52, which is a prerequisite to a design certification. The FDA for the AP1000 design was issued on September 13, 2004, and published in the

Federal Register on September 17, 2004 (69 FR 56101). A proposed rule to certify the AP1000 was published on April 18, 2005 (70 FR 20062).

Subsequently, Westinghouse submitted editorial and minor technical changes and clarifications to the inspections, tests, analyses, and acceptance criteria (ITAAC) in revision 15 to the design control document (DCD). The NRC staff evaluated these changes in a supplement to the FSER (NUREG-1793, Supplement No. 1). Supplement No. 1 is being made available to the public as part of this rulemaking. The FSER and Supplement No. 1 provide the bases for the Commission's approval of the AP1000 standard plant design. An FDA, which incorporates the changes to the DCD, will be issued to supersede the current FDA after issuance of this final design certification rule.

II. Comment Analysis.

The period for submitting comments on the proposed DCR, AP1000 DCD, or draft environmental assessment (EA) expired on July 5, 2005. The NRC received three letters from two private citizens and one letter from the Nuclear Energy Institute (NEI). The comments addressed three categories of information: Environmental Assessment (EA), Design Control Document, and Design Certification Rule. The responses to the comments on the EA are discussed in section 7.0 of the EA (ML053250292). Responses to the comments in the second and third categories are discussed below.

A. Design Control Document (DCD).

Comment summary. There is an over-reliance on passive systems in the AP1000.

Response. The NRC disagrees with this comment. The NRC required tests of the new passive safety systems to demonstrate that they will perform as predicted in the safety analysis (see Chapter 21 of the AP1000 FSER). The NRC also required higher availability for certain active backup systems to compensate for any remaining uncertainties in the performance of the passive safety systems (see Chapter 22 of the AP1000 FSER). As a result of these reviews, the NRC concluded that the use of passive safety systems in the AP1000 design is acceptable.

Comment summary. The AP1000 is an unnecessary and unsafe variation on AP600.

Response. The NRC disagrees with the comment. The NRC has determined that the AP1000 design can be built and operated safely (see AP1000 FSER). The NRC does not determine which designs are necessary for future deployment.

Comment summary. The AP1000 DCD referenced in the proposed rule does not meet the requirement of 10 CFR part 52 that the plant design be complete except for site-specific elements and other specific exemptions.

Response. The NRC disagrees with this comment. The requirement for a complete scope of design [§ 52.47(b)(2)(i)(A)(*4*)] was met by the applicant (see discussion in section 1.2.1 of AP1000 FSER). The comment appears to be directed at the requirement for level of design information [§ 52.47(a)(2)], which was also met by the applicant (see discussion in section 1.5 of AP1000 FSER).

Comment summary. The appropriateness of the process used to derive the AP1000 design from the AP600 design has not been given sufficient attention in the NRC's review.

Response. The NRC disagrees with this comment, which appears to apply to the NRC's review of the applicant's quality assurance (QA) program. In its application for design

certification of the AP1000 plant, Westinghouse stated that a continuous QA program spanning the AP600 design and the AP1000 design has been used. Since March 31, 1996, activities affecting the quality of items and services for the AP1000 project during design, procurement, fabrication, inspection, and/or testing have been performed under the quality plan described in "Westinghouse Energy Systems Business Unit - Quality Management System." The Quality Management System (QMS) establishes design control measures for preparing, reviewing, and approving design documentation for safety-related structures, systems, and components (SSCs). As documented in an NRC evaluation letter, dated February 23, 1996, from S. Black (NRC) to N. J. Liparulo, the Westinghouse QMS was reviewed by the NRC and found to meet the requirements of 10 CFR part 50, appendix B. Subsequent revisions to the QMS have also been reviewed by the NRC and found to be acceptable. To provide additional assurance that Westinghouse implemented the measures described in the QMS, the NRC staff performed a QA implementation inspection at the Westinghouse engineering offices in Monroeville, Pennsylvania, which was documented in NRC Inspection Report No. 99900404/03-01, dated November 4, 2003 (ADAMS Accession No. ML033090510). Therefore, the NRC concludes that the applicant's QA program for the AP1000 design was acceptable.

Comment summary. The decision by the NRC not to require Westinghouse to build and test a prototype for the automatic depressurization system (ADS) 4th stage squib valve was made under pressure of the accelerated AP1000 schedule.

Response. The NRC disagrees that the AP1000 schedule affected the decision not to require Westinghouse to build and test a prototype for the ADS 4th stage squib valve. The need for a prototype test was evaluated by the NRC staff during the AP1000 design review. Also, the ability to design and build the ADS valve for AP1000 was discussed with the Advisory Committee on Reactor Safeguards (ACRS) at its future plant subcommittee meeting on

July 17-18, 2003. In addition, in a letter to ACRS dated May 18, 2004, the NRC staff stated that the ADS-4 squib valves will be designed, constructed, and tested under Section III of the Boiler and Pressure Vessel Code promulgated by the American Society of Mechanical Engineers and are actuated by redundant and diverse instrumentation and control systems. The staff also performed a sensitivity study by increasing the failure probability and the common-cause failure probability of the ADS-4 squib valves by an order of magnitude. This sensitivity study indicated that the CDF increased by only a factor of three (to 6 x 10^{-7}/year)and was not large enough to impact the probabilistic risk assessment (PRA) conclusions and insights about the AP1000 design.

Comment summary. The effect of heat of solar radiation on the performance of the AP1000 passive containment cooling system (PCS) has not been resolved, and geographical latitude ought to be a site parameter, unless it can be shown that the PCS is effective at all geographical latitudes, even when heat of solar radiation is taken into account.

Response. The NRC disagrees with these comments. The site parameters for the AP1000 design include minimum and maximum air temperatures (see DCD Table 2-1). The safety maximum temperature is 115 EF, which is based on historical site data and excludes peaks of less than 2-hour durations.

The operational limits for the AP1000 containment include a technical specification (TS) limit on the temperature of the air inside containment, TS 3.6.5, “Containment Air Temperature,” of less than or equal to 120 EF. In addition, there is a limit on the water temperature in the PCS storage tank specified in TS 3.6.6, “Passive Containment Cooling System - Operating,” of greater than or equal to -40 EF and less than or equal to 120 EF. If the water temperature is at or below 50 EF, or at or above 100 EF, the surveillance frequency to check the temperature is reduced from 7 days to 24 hours. The operational limits and the site parameters provide

reasonable assurance that the AP1000 can be operated without undue risk to the public health and safety. Conservative evaluations of the potential effect of solar radiation on the operation and performance of the AP1000 PCS show that the AP1000 TS provide reasonable assurance that off-normal conditions can be detected and appropriate actions taken to preclude operations outside the current design-base assumptions. Based on the estimated time needed to exceed the current operational temperature limits (10 days of uninterrupted extreme environmental conditions), it is reasonable to conclude that the AP1000 operational limits will not be exceeded even for sites with high solar radiation. In the unlikely event that the shield building might heat up, a containment response analysis showed the pressure increase to be small, 0.75 pounds per square inch (psi), and based on the current margin of 1.2 psi (DCD Table 6.2.1.1-1), the design pressure limit of 73.7 pounds per square inch absolute (psia) would not be exceeded. Therefore, the effect of heat of solar radiation on the performance of the PCS has been resolved.

Comment summary. The accelerated schedule for the AP1000 led to cutting regulatory corners and was further accelerated by granting the FDA before the FSER was made available to the public.

Response. The NRC disagrees with this comment. In a letter to Mr. W. E. Cummins (Westinghouse), dated July 12, 2002, the NRC provided an expected schedule for the AP1000 review, which was significantly shorter than previous design certification rulemakings. The shorter schedule was due to expected efficiencies that would be gained as a result of the similarities between the AP600 and AP1000 designs. Also, the AP1000 FSER was made available to the public on September 20, 2004, the same day that the FDA was made available to the public.

B. Design Certification Rule.

It is the Commission's goal to maintain as much consistency as possible in the rule language for all of the DCRs. Many of the following comments from NEI appear to be applicable to all of the DCRs but some repeat comments NEI submitted previously during the 2003 proposed rule to amend 10 CFR part 52.

Comment Summary. NEI recommends that Section III.B of the Supplementary Information (70 FR 20064) be revised to delete the phrase "not just incorporate by reference."

Response. The NRC disagrees with this request. The NRC does agree that the plant-specific DCD should be part of the final safety analysis report (FSAR) for a combined license (COL) application. The NRC believes that the generic DCD should also be part of the FSAR, not just incorporated by reference, in order to facilitate the NRC staff's review of any departures or exemptions. However, any changes made to existing DCRs in the ongoing part 52 rulemaking with respect to this issue would also be made to the AP1000 DCR.

Comment Summary. NEI recommends clarification of the review status of "operational requirements" in Section III.F of the Supplementary Information (70 FR 20067).

Response. The NRC agrees that the special backfit provisions of § 52.63 do not apply to operational requirements in the DCD. However, the NRC believes that the discussion in Section III.F of the Supplementary Information section of the proposed rule document accurately states the review status of operational requirements and does not need to be revised.

Comment Summary. NEI recommends modification of the definition of generic TS in Section II.B of the AP1000 DCR.

Response. The NRC disagrees with this comment. The NRC stated in the Supplementary Information (70 FR 20063) that the values in brackets are neither part of the DCR nor are they binding. The NRC believes that amending the definition of generic TS is not necessary and also wants to maintain consistent rule language for all DCRs.

Comment Summary. NEI recommends replacement of the term "investment protection" in Section II.E of the AP1000 DCR and elsewhere in the DCD by the term "non-safety-related severe accident equipment." In addition, NEI recommends that the DCR and Supplementary Information be revised so that bracketed information in the investment protection short-term availability controls will be treated like bracketed information in generic TS.

Response. The NRC disagrees with NEI's request to change this terminology. Use of the term "investment protection short-term availability controls" was requested by the applicant (Westinghouse Electric Company, LLC) and was also used in the AP600 DCR. Furthermore, the origin of investment protection short-term availability controls comes from implementing the regulatory treatment of non-safety systems process, which typically results in requirements to achieve higher reliability for certain active, non-safety systems. These systems are not limited to severe accident design features. Therefore, even if the NRC agreed to a generic change to the term "investment protection," the proposed term "non-safety-related severe accident equipment" would not be an acceptable replacement.

The NRC agrees that the bracketed values in the investment protection short-term availability controls have the same status as the bracketed values in the generic TS. As a result, NRC amended the discussion in Section III.H of the Supplementary Information (70 FR 20069) of this *Federal Register* notice to refer to the availability controls.

Comment Summary. NEI recommends that the phrase “or licensees” be deleted from the rule language in Section VIII.C.2 of the AP1000 DCR.

Response. The NRC agrees with this comment and Section VIII.C.2 of the DCR has been amended as suggested by NEI. The Commission will consider amending the other DCRs to adopt the language recommended by NEI as part of the ongoing part 52 rulemaking.

Comment Summary. NEI recommends amending the rule language in Section VIII.C.6 of the AP1000 DCR to delete the requirement that plant-specific TS be treated as license amendments.

Response. The NRC disagrees with this request. The requirement that changes to the plant-specific TS be treated as license amendments is correct. It is unlikely that the Commission will adopt NEI’s proposed change for the other DCRs in the ongoing part 52 rulemaking. However, if the Commission decides to clarify this issue for the other DCRs in the ongoing part 52 rulemaking , the NRC will also clarify the AP1000 DCR accordingly as part of that rulemaking.

Comment Summary. NEI recommends amending the rule language in Section IX.B.1 of the AP1000 DCR to restore the phrase “based solely thereon.”

Response. The NRC agrees to amend Section IX.B.1 of the AP1000 DCR, in order to make all of the DCRs consistent. However, the NRC notes that inclusion of the phrase “based solely thereon,” does not change the meaning of Section IX.B.1. The determination of inspection, test, analysis, and acceptance criteria (ITAAC) completion will always be based on information that is material to the acceptance criteria.

Comment Summary. NEI recommends amending the rule language in Section X.A.1 of the AP1000 DCR to require the design certification applicant to include all generic changes to the generic TS and other operational requirements in the generic DCD.

Response. The NRC agrees with this comment, Section X.A.1 of the AP1000 DCR has been amended as suggested by NEI. The Commission will consider amending the other DCRs to adopt the language recommended by NEI as part of the ongoing part 52 rulemaking.

Comment Summary. NEI recommends that Sections IV.A.2 and IV.A.3 of the AP1000 DCR be amended to be consistent with respect to inclusion of information in the plant-specific DCD or explain the difference between the terms “include” and “physically include” in Section IV.A (70 FR 20076).

Response. The NRC agrees that use of the terms “include” and “physically include” in Section IV.A should be clarified. The Commission will consider amending all of the DCRs to clarify this issue as part of the ongoing part 52 rulemaking.

Comment Summary. NEI recommends amending the definition of Tier 2 in Section II.E.1 of the AP1000 DCR to exclude the design-specific PRA and the evaluation of SAMDAs.

Response. The NRC agrees with this comment, Section II.E.1 of the AP1000 DCR has been amended as suggested by NEI. The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR Part 52. The Commission will consider amending the other DCRs to adopt the language recommended by NEI as part of the ongoing part 52 rulemaking.

Comment Summary. NEI recommends amending the rule language in Section III.E of the AP1000 DCR to use the terminology for "site characteristics" consistently.

Response. The NRC agrees with this comment, Section III.E of the AP1000 DCR has been amended to be consistent with the other DCRs in the proposed part 52 rule. The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR part 52.

Comment Summary. NEI recommends clarifying the rule language in Section IV.A.2 of the AP1000 DCR regarding "same" information and "generic DCD."

Response. The NRC agrees with this comment, Section IV.A.2 of the AP1000 DCR has been amended to be consistent with the other DCRs in the proposed part 52 rule. The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR part 52.

Comment Summary. NEI recommends amending Section VIII.B.6.a of the AP1000 DCR to be consistent with Section VI.B.5 regarding plant-specific departures.

Response. The NRC disagrees with this request. It was determined during the first two design certification rulemakings that departures from Tier 2* information would not receive finality or be treated as a resolved issue within the meaning of Section VI of the DCR. The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR part 52. It is unlikely that the Commission will adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking. However, if the Commission decides to adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking, the NRC will also amend the AP1000 DCR accordingly as part of that rulemaking.

Comment Summary. NEI recommends amending Section VIII.C.3 of the AP1000 DCR to require the NRC to meet the backfit requirements of § 50.109 in addition to the special circumstances in § 2.758(b) for plant-specific departures from operational requirements.

Response. The NRC disagrees with this request. In the first two design certification rulemakings, the Commission decided on different standards for changes made under Section VIII.C (see the discussion at 62 FR 25800). The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR part 52. It is unlikely that the Commission will adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking. However, if the Commission decides to adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking, the NRC will also amend the AP1000 DCR accordingly as part of that rulemaking.

Comment Summary. NEI recommends amending Section VIII.C.4 of the AP1000 DCR to revise the standards for making changes to operational requirements.

Response. The NRC disagrees with this request. In the first two DCRs, the Commission decided on different standards for changes made under Section VIII.C (see the discussion at 62 FR 25800; May 12, 1997). In addition, the Commission determined that exemptions from operational requirements would not receive finality or be treated as a resolved issue within the meaning of Section VI of the DCR. The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR part 52. It is unlikely that the Commission will adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking. However, if the Commission decides to adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking, the NRC will also amend the AP1000 DCR accordingly as part of that rulemaking.

Comment Summary. NEI recommends amending Section IX.B.1 of the AP1000 DCR to specify the type of action to be performed by the NRC staff regarding ITAAC.

Response. The NRC disagrees with this request and has decided to maintain the original rule language for this provision because it does not believe that individual DCRs should address the scope of the NRC staff's activities with respect to ITAAC verification. This is a generic matter that, if it is to be addressed in a rulemaking, is more appropriate for inclusion in subpart C of part 52 dealing generally with combined licenses.

The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR part 52. It is unlikely that the Commission will adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking. However, if the Commission decides to adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking, the NRC will also amend the AP1000 DCR accordingly as part of that rulemaking.

Comment Summary. NEI recommends amending Section IX.B.3 of the AP1000 DCR to clarify the rule language.

Response. The NRC disagrees with this editorial request and has decided to maintain the original rule language for this provision. The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR part 52. It is unlikely that the Commission will adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking. However, if the Commission decides to adopt NEI's proposed language for the other DCRs in the ongoing part 52 rulemaking, the NRC will also amend the AP1000 DCR accordingly as part of that rulemaking.

Comment Summary. NEI recommends amending Sections X.B.1 and X.B.3 of the AP1000 DCR to clarify the rule language regarding DCDs.

Response. The NRC agrees with this comment, Section X.B of the AP1000 DCR has been amended to be consistent with the other DCRs in the proposed part 52 rule. The NRC notes that NEI submitted the same comment during the 2003 proposed rule to amend 10 CFR part 52. The Commission intends to amend existing DCRs to make them consistent with the AP1000 DCR.

III. Section-by-Section Analysis.

The following discussion sets forth the purpose and key aspects of each section and paragraph of the final AP1000 DCR. All section and paragraph references are to the provisions in appendix D to 10 CFR part 52. The final DCR for the AP1000 standard plant design is nearly identical to the AP600 DCR, which the NRC previously codified in 10 CFR part 52, appendix C (Design Certification Rule for the AP600 Design, 64 FR 72015, December 23, 1999). Many of the procedural issues and their resolutions for the AP600 DCR, as well as the initial two design certification rules for the ABWR and ABB-CE System 80+, (e.g., the two-tier structure, Tier 2*, the scope of issue resolution) were developed after extensive discussions with public stakeholders, including Westinghouse. Also, Westinghouse requested that policy resolutions for the AP600 design review be applied to the AP1000. Accordingly, the NRC has modeled the AP1000 DCR on the existing DCRs, with certain departures. These departures are necessary to account for differences in the AP1000 design documentation, design features, and environmental assessment (including severe accident mitigation design alternatives (SAMDAs).

A. Introduction.

The purpose of Section I of appendix D to 10 CFR part 52 (this appendix) is to identify the standard plant design that is 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 this information, then the COL applicant must meet the requirements in 10 CFR 52.63(c). Also, paragraph X.A.1 of this appendix requires the design certification applicant to maintain the generic DCD throughout the time this appendix may be referenced.

B. Definitions.

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 references this appendix. This distinction is necessary in order to specify the plant-specific requirements applicable to applicants and licensees referencing the appendix. The master DCDs would 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 of this appendix. The Commission also

requires each applicant and licensee referencing this appendix to submit and maintain a plant-specific DCD.

This plant-specific DCD would contain (not just 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, any 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 of this appendix. 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 licensing 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 Section 16.1 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 of this appendix, and the remaining plant-specific information needed to complete the TS. The FSAR that is required by § 52.79(b) 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 IV, Availability of Documents).

The Tier 1 portion of the design-related information contained in the DCD is certified by this appendix and, therefore, is subject to the special backfit provisions in paragraph VIII.A of this appendix. An applicant who references this appendix is required to incorporate by reference and comply with Tier 1, under paragraphs III.B and IV.A.1 of this appendix. 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. 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 of this appendix.

The Tier 1 design descriptions serve as commitments for the lifetime of a facility referencing the design certification. The ITAAC verifies that the as-built facility conforms with 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 must comply with the design descriptions in the plant-specific DCD unless changes are made under the change process in Section VIII of this appendix. 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 were submitted in response to 10 CFR 52.47(a)(1)(vii) and 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 parameters (both Tier 1 and Tier 2) are met at the proposed site (refer to paragraph III.D of this statement of consideration (SOC)).

Tier 2 is the portion of the design-related information contained in the DCD that is approved by this appendix but not certified. Tier 2 information is subject to the backfit provisions in paragraph VIII.B of this appendix. Tier 2 includes the information required by 10 CFR 52.47 (with the exception of generic TS, conceptual design information, and the evaluation of SAMDAs) 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 of this appendix require an applicant who references this appendix to incorporate Tier 2 by reference and to comply with Tier 2, except for the COL action items, including the investment protection short-term availability controls in Section 16.3 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. The appropriate criteria for departing from Tier 2 information are specified in paragraph VIII.B of this appendix. Departures from Tier 2 do not negate the requirement in paragraph III.B to reference Tier 2.

A definition of “combined license action items” (COL information), which is part of the Tier 2 information, has been 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 are not requirements for the licensee unless they are restated in the FSAR. For additional discussion, see Section D.

The investment protection short-term availability controls, which are set forth in Section 16.3 of the generic DCD, were added to the information that is part of Tier 2 to make it clear that the availability controls are not operational requirements for the purposes of paragraph VIII.C of this appendix. 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 of this appendix. For additional discussion, see Section C.

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 explanation for Section H, a plant-specific departure from Tier 2* information requires 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 of this appendix. Some Tier 2* requirements concerning special pre-operational tests are designated to be performed only for the first plant or first three plants referencing the AP1000 DCR. The Tier 2* designation for these selected tests will 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.

In an earlier rulemaking (64 FR 53582; October 4, 1999), the Commission revised 10 CFR 50.59 to incorporate new thresholds for permitting changes to a plant as described in the FSAR without NRC approval. For consistency and clarity, the Commission proposes to use these new thresholds in the proposed AP1000 DCR. Inasmuch as § 50.59 is the primary

change mechanism for operating nuclear plants, the Commission believes that future plants referencing the AP1000 DCR should utilize thresholds as close to § 50.59 as is practicable and appropriate. Because of some differences in how the change control requirements are structured in the DCRs, certain definitions contained in § 50.59 are not applicable to 10 CFR part 52 and are not being included in this rule. One definition that the Commission is including is the definition from the new § 50.59 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 of the final rule will be implemented as intended.

C. Scope and Contents.

The purpose of Section III of this DCR 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 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 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 requirements of the OFR for incorporation by reference (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 of this appendix identifies a Westinghouse representative to be contacted in order to obtain a copy of the generic DCD.

Paragraphs A and B also identify the investment protection short-term availability controls in Section 16.3 of the generic DCD as part of the Tier 2 information. During its review of the AP1000 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, Westinghouse developed administrative controls to provide a high level of confidence that active systems having a significant safety role are available when challenged. Westinghouse named these additional controls "investment protection short-term availability controls." The Commission included this characterization in Section III to ensure that these availability controls are binding on applicants and licensees that reference this appendix and will 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 will be electronically accessible in NRC's Agencywide Documents Access and Management System (ADAMS) and at the OFR. Copies of the generic DCD will also be available at the NRC's Public Document Room (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 a generic change (rulemaking) is made to the DCD by the change process provided in Section VIII of this appendix, then at the completion of the rulemaking the NRC would request approval of the Director, OFR, for the changed incorporation by reference and change its copies of the generic DCD and notify the OFR and the design certification applicant to change their copies. The Commission is requiring that the design certification applicant

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

In addition to requiring compliance with this appendix, paragraph B clarifies that the conceptual design information and Westinghouse'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)(1)(ix), these conceptual designs are not part of this appendix and, therefore, are not applicable to an application that references this appendix. Therefore, the applicant is not 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 of Tier 2 identifies the location of the conceptual design information. Westinghouse'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 VII of this Statement of Consideration (SOC) on environmental impacts.

Paragraphs C and D set forth the way potential conflicts are to be resolved. Paragraph C establishes 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 D establishes 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 E makes it clear that design activities that are wholly outside the scope of this design certification may be performed using site-specific design parameters, provided the design activities do not affect Tier 1 or Tier 2, or conflict with the interface requirements in the DCD. This provision applies 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 of this appendix.

D. Additional Requirements and Restrictions.

Section IV of this appendix sets forth additional requirements and restrictions imposed upon an applicant who references this appendix. Paragraph IV.A sets forth the information requirements for these applicants. This appendix distinguishes 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 A.1 requires 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 is legally binding on the applicant or licensee. Paragraph A.2.a requires that a plant-specific DCD be included in the initial application. This ensures that the applicant commits to complying with the DCD. This paragraph also requires that the plant-specific DCD uses the same format as the generic DCD and reflects the applicant's proposed departures and exemptions from the generic DCD as of the time of submission of the application. The

Commission expects that the plant-specific DCD will become the plant's FSAR, by including information, i.e., site-specific information, for the portions of the plant outside the scope of the referenced design, including related ITAAC, and other matters required to be included in an FSAR by 10 CFR 50.34 and 52.79. Integration of the plant-specific DCD and remaining site-specific information into the plant's FSAR, will result in an application that is easier to use and should minimize "duplicate documentation" and the attendant possibility for confusion. Paragraph A.2.a also requires that the initial application include the reports on departures and exemptions as of the time of submission of the application.

Paragraph A.2.b requires that an application referencing this appendix include the reports required by paragraph X.B of this appendix for exemptions and departures proposed by the applicant as of the date of submission of its application. Paragraph A.2.c requires submission of plant-specific TS for the plant that consists of the generic TS from Section 16.1 of the DCD, with any changes made under paragraph VIII.C of this appendix, 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.

Paragraph A.2.d requires the applicant referencing this appendix to provide information demonstrating that the proposed site falls within the site parameters for this appendix and that the plant-specific design complies with the interface requirements, as required by 10 CFR 52.79(b). If the proposed site has a characteristic that exceeds one or more of the site parameters in the DCD, then the proposed site is unacceptable for this design unless the applicant seeks an exemption under Section VIII of this appendix and provides adequate justification for locating the certified design on the proposed site. Paragraph A.2.e requires 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 depart from or omit these items, provided that the departure or omission is identified and justified in its application (FSAR). Paragraph A.2.f requires 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, in whole or in part, by an applicant that references this rule. Paragraph A.3 requires the applicant to physically include, not simply reference, the proprietary and safeguards information referenced in the DCD, or its equivalent, to ensure that the applicant has actual notice of these requirements.

Paragraph IV.B reserves to the Commission the right to determine in what manner this DCR 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.

The purpose of Section V of this appendix is to specify the regulations that were applicable and in effect at the time this design certification was approved. These regulations

consist of the technically relevant regulations identified in paragraph A, except for the regulations in paragraph B that are not applicable to this certified design.

Paragraph A identifies the regulations in 10 CFR parts 20, 50, 73, and 100 that are applicable to the AP1000 design. After the NRC staff issued its FSER for the AP1000 design (NUREG-1793, September 2004), the Commission amended several existing regulations and adopted new regulations. The Commission reviewed these regulations to determine if they are applicable to this design and, if so, to determine if the design meets these regulations. The Commission finds that all of these new regulations are not applicable to the AP1000 design. The Commission's determination of the applicable regulations was made as of the date specified in paragraph V.A of this appendix, which is the date that this appendix was approved by the Commission and signed by the Secretary of the Commission.

In paragraph B of this appendix, the Commission identifies the regulations that do not apply to the AP1000 design. The Commission has determined that the AP1000 design should be exempt from portions of 10 CFR 50.34, 50.62, and Appendix A to part 50, as described in the FSER (NUREG-1793) and summarized below:

(1) Paragraph (f)(2)(iv) of 10 CFR 50.34 - Plant Safety Parameter Display Console.

Under 10 CFR 52.47(a)(ii), an applicant for design certification must demonstrate compliance with any technically relevant Three Mile Island (TMI) requirements in 10 CFR 50.34(f). The requirement in 10 CFR 50.34(f)(2)(iv) states that an application must provide a plant safety parameter display console that will display a minimum set of parameters defining the safety status of the plant, be capable of displaying a full range of important plant parameters and data trends on demand, and be capable of indicating when process limits are being approached or exceeded. Westinghouse addresses this requirement, in Section 18.8.2 of the DCD, with an integrated design rather than a stand-alone, add-on system, as is used at most current operating plants. Specifically, Westinghouse integrated the safety parameter

display system (SPDS) requirements into the design requirements for the alarm and display systems. The NRC staff has determined that the function of a separate SPDS may be integrated into the overall control room design. Therefore, the Commission has determined that the special circumstances for allowing an exemption as described in 10 CFR 50.12(a)(2)(ii) exist because the requirement for an SPDS console need not be applied in this particular circumstance to achieve the underlying purpose because Westinghouse has provided an acceptable alternative that accomplishes the intent of the regulation. On this basis, the Commission concludes that an exemption from the requirements of 10 CFR 50.34(f)(2)(iv) is authorized by law, will not present an undue risk to public health and safety, and is consistent with the common defense and security.

(2) Paragraph (c)(1) of 10 CFR 50.62 - Auxiliary Feedwater System.

The AP1000 design relies on the passive residual heat removal system (PRHR) in lieu of an auxiliary or emergency feedwater system as its safety-related method of removing decay heat. Westinghouse requested an exemption from a portion of 10 CFR 50.62(c)(1), which requires auxiliary or emergency feedwater as an alternate system for decay heat removal during an anticipated transient without scram (ATWS) event. The NRC staff concluded that Westinghouse met the intent of the rule by relying on the PRHR system to remove the decay heat and, thereby, met the underlying purpose of the rule. Therefore, the Commission has determined that the special circumstances for allowing an exemption described in 10 CFR 50.12(a)(2)(ii) exist because the requirement for an auxiliary or emergency feedwater system is not necessary to achieve the underlying purpose of 10 CFR 50.62(c)(1). This is because Westinghouse has adopted acceptable alternatives that accomplish the intent of this regulation, and the exemption is authorized by law, will not present an undue risk to public health and safety, and is consistent with the common defense and security.

(3) Appendix A to 10 CFR part 50, GDC 17 - Offsite Power Sources.

Westinghouse requested a partial exemption from the requirement in General Design Criteria (GDC) 17 for a second offsite power supply circuit. The AP1000 plant design supports an exemption to this requirement by providing safety-related "passive" systems. These passive safety-related systems only require electric power for valves and the related instrumentation. The onsite Class 1E batteries and associated dc and ac distribution systems can provide the power for these valves and instrumentation. In addition, if no offsite power is available, it is expected that the non-safety-related onsite diesel generators would be available for important plant functions. However, this non-safety-related ac power is not relied on to maintain core cooling or containment integrity. Therefore, the Commission has determined that the special circumstances for allowing an exemption as described in 10 CFR 50.12(a)(2)(ii) exist because the requirement need not be applied in this particular circumstance to achieve the underlying purpose of having two offsite power sources. This is because the AP1000 design includes an acceptable alternative approach to accomplish safety functions that do not rely on power from the offsite system and, therefore, accomplishes the intent of the regulation. On this basis, the Commission concludes that a partial exemption from the requirements of GDC 17 is authorized by law, will not present an undue risk to public health and safety, and is consistent with the common defense and security.

F. Issue Resolution.

The purpose of Section VI of this appendix is to identify the scope of issues that are resolved by the Commission in this rulemaking and; therefore, are "matters resolved" within the meaning and intent of 10 CFR 52.63(a)(4). The section is divided into five parts: (A) the Commission's safety findings in adopting this appendix, (B) the scope and nature of issues

which are resolved by this rulemaking, (C) issues which are not resolved by this rulemaking, (D) the backfit restrictions applicable to the Commission with respect to this appendix, and (E) the availability of secondary references.

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

Paragraph B sets forth the scope of issues that may not be challenged as a matter of right in subsequent proceedings. The introductory phrase of paragraph 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 B describes the categories of information for which there is issue resolution. Specifically, paragraph B.1 provides 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-1793) and Supplement No. 1, the Tier 1 and Tier 2 information (including the availability controls in Section 16.3 of the generic DCD), and the rulemaking record for this appendix are resolved within the meaning of § 52.63(a)(4). These issues include the information referenced in the DCD that are requirements (i.e., "secondary references"), as well as all issues arising from proprietary and safeguards information which are intended to be requirements.

Paragraph B.2 provides for issue preclusion of proprietary and safeguards information. Paragraphs B.3, B.4, B.5, and B.6 clarify that approved changes to and departures from the DCD which are accomplished in compliance with the relevant procedures and criteria in Section VIII of this appendix continue to be matters resolved in connection with this rulemaking. Paragraphs B.4, B.5, and B.6, which characterize the scope of issue resolution in three situations, use the phrase "but only for that plant" (emphasis added). Paragraph B.4 describes

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 B.5 describes how issues are resolved when a plant referencing the design certification rule obtains a license amendment for a departure from Tier 2 information.

Paragraph B.6 describes how issues are resolved when the applicant or licensee departs from the Tier 2 information on the basis of paragraph VIII.B.5, which will waive the requirement for NRC approval. In all three situations, after a matter (e.g., an exemption in the case of paragraph B.4) is addressed for a specific plant referencing a design certification rule, the adequacy of that matter *for that plant* will not ordinarily be subject to challenge in any subsequent proceeding or action for that plant (such as an enforcement action) listed in the introductory portion of paragraph IV.B. There will not, by contrast, be any issue resolution on that subject matter for any other plant.

Paragraph B.7 provides that, for those plants located on sites whose site parameters do not exceed those assumed in Westinghouse's evaluation of SAMDAs, all issues with respect to SAMDAs arising under the National Environmental Policy Act of 1969 associated with the information in the environmental assessment for this design and the information regarding SAMDAs in Appendix 1B of the generic DCD are also resolved within the meaning and intent of § 52.63(a)(4). If an exemption from a site parameter is granted, the exemption applicant has the initial burden of demonstrating that the original SAMDA analysis still applies to the actual site parameters but; if the exemption is approved, requests for litigation at the COL stage must meet the requirements of § 2.309 and present sufficient information to create a genuine controversy in order to obtain a hearing on the site parameter exemption.

Paragraph C reserves the right of the Commission to impose operational requirements on applicants that reference this appendix. This provision reflects the fact that operational requirements, including generic TS in Section 16.1 of the DCD, were not completely or

comprehensively reviewed at the design certification stage. Therefore, the special backfit provisions of § 52.63 do not apply to operational requirements. However, all design changes will be controlled by the appropriate provision in Section VIII of this appendix. Although the information in the DCD that is related to operational requirements is necessary to support the NRC's safety review of this design, the review of this information was not sufficient to conclude that the operational requirements are fully resolved and ready to be assigned finality under § 52.63. As a result, if the NRC wanted to change a temperature limit and that operational change required a consequential change to a design feature, then the temperature limit backfit would be controlled by Section VIII (paragraph A or B) of this appendix. However, changes to other operational issues, such as inservice testing and inservice inspection programs, post-fuel load verification activities, and shutdown risk that do not require a design change would not be restricted by § 52.63 (see VIII.C of this appendix).

Paragraph C allows 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 § 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 combined license 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 the right to impose

license conditions by rule for post-fuel load verification activities for portions of the plant within the scope of this design certification.

Paragraph D reiterates the restrictions (contained in Section VIII of this appendix) 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 (VI.D.3 would address ITAAC) within the scope of the certified design.

Paragraph E provides the procedure for an interested member of the public to obtain access to proprietary or safeguards information for the AP1000 design, in order to request and participate in proceedings identified in paragraph VI.B of this appendix, viz., proceedings involving licenses and applications which reference this appendix. Paragraph E, specifies that access must first be sought from the design certification applicant. If Westinghouse refuses to provide the information, the person seeking access shall request access from the Commission or the presiding officer, as applicable. Access to the proprietary or safeguards information may be ordered by the Commission, but must be subject to an appropriate non-disclosure agreement.

G. Duration of this Appendix.

The purpose of Section VII of this appendix is 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 also states that the design certification remains 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 will be effective until the application is withdrawn or the license issued on

that application expires. Also, the design certification will 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 of this appendix for the life of the plant.

H. Processes for Changes and Departures.

The purpose of Section VIII of this appendix is 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 design certification rule. 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 the design certification rule itself, as is contemplated by 10 CFR 52.63(a)(1). Consistent with 10 CFR 52.63(a)(2), any generic rulemaking changes are applicable to all plants, absent circumstances which render the change ["modification" in the language of § 52.63(a)(2)] "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 § 50.59 departure or an exemption. Because these plant-specific departures will result in a DCD that is unique for that plant, Section X of this

appendix requires 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 of this appendix and Section XI of this SOC refer 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 50.12.

Tier 1 information

The change processes for Tier 1 information are 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). This provision provides that the Commission may not modify, change, rescind, or impose new requirements by rulemaking 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. The rulemakings must provide for notice and opportunity for public comment on the proposed change, as required by 10 CFR 52.63(a)(1). 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 A.3; or (2) an applicant or licensee may request an *exemption* from Tier 1, as provided in paragraph A.4. If the Commission seeks to order a licensee to depart from Tier 1, paragraph A.3 requires that the Commission find both that the departure is necessary for adequate protection or for

compliance, and that special circumstances are present. Paragraph A.4 provides that exemptions from Tier 1 requested by an applicant or licensee are governed by the requirements of 10 CFR 52.63(b)(1) and 52.97(b), which provide an opportunity for a hearing. In addition, the Commission will 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, are 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 are different. As stated in Section III, of this preamble, it is the Commission's intent that this appendix emulates appendix C to 10 CFR part 52. However, the Commission has revised the § 50.59-like change process in paragraph VIII.B.5 of this appendix to be commensurate with the new 10 CFR 50.59 (64 FR 53613, October 4, 1994).

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 B.1, generic Tier 2 changes are accomplished by rulemaking amending the generic DCD and are governed by the standards in 10 CFR 52.63(a)(1). This provision provides that the Commission may not modify, change, rescind, or impose new requirements by rulemaking 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. 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 may occur in five ways: (1) the Commission may order a plant-specific departure, as set forth in paragraph B.3; (2) an applicant or licensee may request an exemption from a Tier 2 requirement as set forth in paragraph B.4; (3) a licensee may make a departure without prior NRC approval under paragraph B.5 [the "§ 50.59-like" process]; (4) the licensee may request NRC approval for proposed departures which do not meet the requirements in paragraph B.5 as provided in paragraph B.5.d; and (5) the licensee may request NRC approval for a departure from Tier 2* information under paragraph B.6.

Similar to Commission-ordered Tier 1 departures and generic Tier 2 changes, Commission-ordered Tier 2 departures cannot 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 B.3. However, the special circumstances for the Commission-ordered Tier 2 departures do 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)(3). 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)(3) 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 may request an exemption from Tier 2 information as set forth in paragraph B.4. The applicant or licensee must demonstrate that the exemption complies with one of the special circumstances in 10 CFR 50.12(a). In addition, the Commission will 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 is 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 is subject to litigation in the same manner as a license amendment.

Paragraph B.5 allows 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 B.5.b or B.5.c. The TS referred to in B.5.a of this paragraph are the TS in Section 16.1 of the generic DCD, including bases, for departures made prior to issuance of the COL. After issuance of the COL, the plant-specific TS are controlling under paragraph B.5. The bases for the plant-specific TS will be controlled by the bases control procedures for the plant-specific TS (analogous to the bases control provision in the Improved Standard Technical Specifications). The requirement for a license amendment in paragraph B.5.b will be similar to the definition in the new 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 severe accident issues 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). However, because of the increased uncertainty in severe accident issue resolutions, the Commission has adopted separate criteria in paragraph B.5.c for determining if a departure from information that resolves severe accident issues would require a license amendment. For purposes of applying the special criteria in paragraph B.5.c, severe accident resolutions are limited to design features when 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 Section 1.9.5 and Appendix 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 severe accident issues. However, the special procedure in paragraph B.5.c does 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 is limited to 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 B.5.b or B.5.c are selected depending upon the function being changed.

An applicant or licensee that plans to depart from Tier 2 information, under paragraph VIII.B.5, is 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 needs 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 needs 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 must also include a review of all relevant secondary references from the DCD because Tier 2 information, which is intended to be treated as a requirement, is contained in the secondary references. The evaluation should consider Tables 14.3-1 through 14.3-8 and

19.59-18 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.

A party to an adjudicatory proceeding (e.g., for issuance of a COL) who believes that an applicant or licensee has not complied with paragraph VIII.B.5 when departing from Tier 2 information, is permitted to petition to admit such a contention into the proceeding under paragraph B.5.f. This provision was included because an incorrect departure from the requirements of this appendix essentially places 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 B.5.f, the petition must comply with the requirements of 10 CFR 2.309 and show that the departure does not comply with paragraph B.5. Any other party may file a response to the petition. 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 shall be certified to the Commission for its final determination. In the absence of a proceeding, petitions alleging nonconformance with paragraph B.5 requirements applicable to Tier 2 departures will be treated as petitions for enforcement action under 10 CFR 2.206.

Paragraph B.6 provides 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 ABWR design certification (appendix A to part 52) and the ABB-CE System 80+ design certification (appendix B to 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 were not specified in Tier 1 that are acceptable for meeting

ITAAC, were specified in Tier 2. The result of these actions is that certain significant information only exists in Tier 2 and the Commission does not want this significant information to be changed without prior NRC approval. This Tier 2* information is identified in the generic DCD with italicized text and brackets (See Table 1-1 of AP1000 DCD Introduction).

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 the first full power was achieved 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 B.6.c ceases 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 is deemed to be Tier 2 information that is subject to the departure requirements in paragraph B.5. By contrast, the Tier 2* information identified in paragraph B.6.b retains its Tier 2* designation throughout the duration of the license, including any period of license renewal.

Certain preoperational tests in paragraph B.6.c are designated to be performed only for the first plant or first three plants that reference this appendix. Westinghouse's basis for performing these "first-plant-only" and "first-three-plants-only" preoperational tests is provided in Section 14.2.5 of the DCD. The NRC found Westinghouse's basis for performing these tests and its justification for only performing the tests on the first plant or first three plants 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 will 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, or the first three plants, as applicable. The COL action item in Section 14.4.6 of the DCD states that subsequent plants shall either perform these preoperational tests or justify that the results of the first-plant-only or first-three-plant-only tests are applicable to the subsequent plant. The Tier 2* designation for these tests will expire after the first plant or first three plants complete these tests, as indicated in paragraph 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 is 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 will be treated as a license amendment under 10 CFR 50.90 and the finality will be determined under paragraph VI.B.5 of this appendix. Any requests for departures from Tier 2* information that affects Tier 1 must also comply with the requirements in paragraph VIII.A of this appendix.

Operational Requirements

The change process for TS and other operational requirements in the DCD is set forth in paragraph VIII.C. This change process has elements similar to the Tier 1 and Tier 2 change process 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 III.F of this SOC), 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 requires 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 applies. 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 applies. The language in paragraph VIII.C also distinguishes between generic (Section 16.1 of 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 C.1 for making generic changes to the generic TS in Section 16.1 of the DCD or other operational requirements in the generic DCD is 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 is based upon the extent to which an NRC safety conclusion in the FSER is being modified or changed. If it cannot be determined that the TS or operational requirement was comprehensively reviewed and finalized in the design certification rulemaking, then there is no backfit restriction under 10 CFR 50.109 because no prior position was taken on this safety matter. Generic changes made under proposed paragraph VIII.C.1 are 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 investment protection short-term 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 combined license referencing

the AP1000 DCR must replace the values in brackets with final plant-specific values. 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 investment protection short-term 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 is 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 is 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 by the NRC staff to facilitate the design certification 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 is similar to other issues in a licensing hearing, except that the petitioner must also demonstrate why special circumstances are present (paragraph VIII.C.5).

Finally, the generic TS will 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 will be controlled by the change process in paragraph VIII.C of this appendix. After a license is issued, the bases will 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).

The purpose of Section IX of this appendix is to set forth how the ITAAC in Tier 1 of this design certification rule are to be treated in a license proceeding. Paragraph A restates the responsibilities of an applicant or licensee for performing and successfully completing ITAAC, and notifying the NRC of such completion. Paragraph A.1 clarifies that an applicant may proceed at its own risk with design and procurement activities subject to ITAAC, and that a licensee may proceed at its own risk with design, procurement, construction, and preoperational testing activities subject to an ITAAC, even though the NRC may not have found that any particular ITAAC has been successfully completed. Paragraph A.2 requires the licensee to notify the NRC that the required inspections, tests, and analyses in the ITAAC have been completed and that the acceptance criteria have been met.

Paragraphs B.1 and B.2 reiterate the NRC's responsibilities with respect to ITAAC as set forth in 10 CFR 52.99 and 52.103(g)[1]. Finally, paragraph B.3 d states that ITAAC do not, by virtue of their inclusion in the DCD, constitute regulatory requirements after the licensee has received authorization to load fuel or has been granted a renewal of its license. However, subsequent modifications to the terms of the COL must comply with the design descriptions in the DCD unless the applicable requirements in 10 CFR 52.97 and Section VIII of this appendix have been met. As discussed in paragraph III.D of this SOC, the Commission will defer a determination of the applicability of ITAAC and its effect in terms of issue resolution in 10 CFR part 50 licensing proceedings until a part 50 applicant decides to reference this appendix.

[1] For discussion of the verification of ITAAC, see SECY-00-0092, "Combined License Review Process," dated April 20, 2000.

J. Records and Reporting.

The purpose of Section X of this appendix is to set forth the requirements that will apply to maintaining records of changes to and departures from the generic DCD, which are to be reflected in the plant-specific DCD. Section X also sets forth the requirements for submitting reports (including updates to the plant-specific DCD) to the NRC. This section of the appendix is 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 of this appendix requires that a generic DCD and the proprietary and safeguards information referenced in the generic DCD be maintained by the applicant for this rule. The generic DCD was developed, in part, to meet the requirements for incorporation by reference, including availability requirements. Therefore, the proprietary and safeguards information could not be included in the generic DCD because they are not publicly available. However, the proprietary and safeguards information was reviewed by the NRC and, as stated in paragraph VI.B.2 of this appendix, the Commission considers the information resolved within the meaning of 10 CFR 52.63(a)(4). Because this information is not in the generic DCD, the proprietary and safeguards information, or its equivalent, is required to be provided by an applicant for a license. Therefore, to ensure that this information will be available, a requirement for the design certification applicant to maintain the proprietary and safeguards information was added to proposed paragraph X.A.1 of this appendix. The acceptable version of the proprietary and safeguards information is identified (referenced) in the version of the DCD that is incorporated into this rule. The generic DCD and the acceptable version of the proprietary and safeguards information must be maintained for the period of time that this appendix may be referenced.

Paragraphs A.2 and A.3 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 of this appendix. The term "plant-specific" was added to paragraph A.2 and other sections of this appendix to distinguish between the generic DCD that is incorporated by reference into this appendix, and the plant-specific DCD that the applicant is required to submit under paragraph IV.A of this appendix. The requirement to maintain changes to the generic DCD is explicitly stated to ensure that these changes are not only reflected in the generic DCD, which will be maintained by the applicant for design certification, but also in the plant-specific DCD. Therefore, records of generic changes to the DCD will be required to be maintained by both entities to ensure that both entities have up-to-date DCDs.

Paragraph X.A of this appendix does not place recordkeeping requirements on site-specific information that is outside the scope of this rule. As discussed in paragraph III.D of this SOC, the FSAR required by 10 CFR 52.79 will 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 of this appendix refers 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 of this appendix). Therefore, this rule does not require that duplicate documentation be maintained by an applicant or licensee that references this rule, because the plant-specific DCD is part of the FSAR for the facility.

Paragraph X.B.1 requires 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 are set forth in paragraph X.A.1. The frequency of the report submittals is set forth in paragraph X.B.3. The requirement for submitting a summary of the evaluations is similar to the requirement in 10 CFR 50.59(d)(2).

Paragraph X.B.2 requires 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 is set forth in paragraph X.B.3. The requirements in paragraph X.B.3 for submitting the reports and updates will vary according to certain time periods during a facility's lifetime. If a potential applicant for a combined license who references this rule decides to depart from the generic DCD prior to submission of the application, then paragraph B.3.a will require that the updated DCD be submitted as part of the initial application for a license. Under paragraph 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 B.3.b also requires that the reports required by paragraph X.B.1 be submitted semi-annually. This increase in reporting frequency during the period of construction and application review is consistent with Commission guidance. Also, more frequent reporting of design changes during the period of detailed design and construction is necessary to closely monitor the status and progress of the facility. In order to make the finding under 10 CFR 52.103(g), the NRC must monitor the design changes made under proposed Section VIII of this appendix. Frequent reporting of design changes would be particularly important when the number of design changes could be significant, such as during the procurement of components and equipment, detailed design of the plant before and during construction, and during preoperational testing. After the facility begins operation, the frequency of reporting will revert to the requirement in paragraph B.3.c, which is consistent with the requirements for plants licensed under 10 CFR 50.57.

IV. Availability of Documents.

The NRC is making the documents identified below available to interested persons through one or more of the following:

Public Document Room (PDR). The NRC's Public Document Room is located at 11555 Rockville Pike, Public File Area O-1 F21, Rockville, Maryland 20082. Copies of publicly available documents related to this rulemaking can be viewed electronically on public computers in the PDR. The PDR reproduction contractor will make copies of documents for a fee.

Rulemaking Web site (Web). The NRC's interactive rulemaking Web site is located at http://ruleforum.llnl.gov. Selected documents may be viewed and downloaded electronically via this Web site.

Public Electronic Reading Room (ADAMS). The NRC's Public Electronic Reading Room (PERR) is located at http://www.nrc.gov/reading-rm/adams.html. Through this site, the public can gain access to ADAMS, which provides text and image files of NRC's public documents.

Document	PDR	Web	ADAMS
AP1000 Design Certification Final Rule SECY paper	x	x	ML053250288
AP1000 Environmental Assessment	x	x	ML053250292
AP1000 Design Control Document	x	.....	ML053460400
NUREG-1793, "AP1000 Final Safety Evaluation Report"	x	.....	ML043570339
Supplement 1, NUREG-1793, "AP1000 Final Safety Evaluation Report"	x	.....	ML053410203
Regulatory History of Design Certification[2]	x	.....	ML003761550

[2] The regulatory history of the NRC's design certification reviews is a package of 100 documents that is available in NRC's PERR and in the PDR. This history spans a 15-year 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.

V. Plain Language.

The Presidential memorandum entitled “Plain Language in Government Writing” (63 FR 31883; June 10, 1998), directed that the Government’s writing be in plain language. The NRC requests comments on the proposed rule specifically with respect to the clarity and effectiveness of the language used. Comments should be submitted using one of the methods detailed under the ADDRESSES heading of the preamble to this proposed rule.

VI. Voluntary Consensus Standards.

The National Technology Transfer and Advancement 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 final rule, the NRC is approving the AP1000 standard plant design for use in nuclear power plant licensing under 10 CFR parts 50 or 52. Design certifications are not generic rulemakings establishing a generally applicable standard with which all 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 final rule.

VII. Finding of No Significant Environmental Impact: Availability.

The Commission has determined under the National Environmental Policy Act of 1969, as amended (NEPA), and the Commission's regulations in 10 CFR part 51, subpart A, that this design certification rule is not a major Federal action significantly affecting the quality of the human environment and, therefore, an environmental impact statement (EIS) is not required. The basis for this determination, as documented in the environmental assessment, is that this amendment to 10 CFR part 52 does not authorize the siting, construction, or operation of a facility using the AP1000 design; it only codifies the AP1000 design in a rule. The NRC will evaluate the environmental impacts and issue an EIS as appropriate under NEPA as part of the application(s) for the construction and operation of a facility referencing the AP1000 design certification rule.

In addition, as part of the environmental assessment for the AP1000 design, the NRC reviewed Westinghouse's evaluation of various design alternatives to prevent and mitigate severe accidents in appendix 1B of the AP1000 DCD Tier 2. Based upon review of Westinghouse's evaluation, the Commission finds that: (1) Westinghouse identified a reasonably complete set of potential design alternatives to prevent and mitigate severe accidents for the AP1000 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 in the future on the basis of cost-benefit considerations, because the estimated core damage frequencies for the AP1000 are very low on an absolute scale. These issues are considered resolved for the AP1000 design.

The environmental assessment (EA), upon which the Commission's finding of no significant impact is based, and the AP1000 DCD are available for examination and copying at

the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The NRC sent a copy of the EA and proposed rule to every State Liaison Officer and no comments were received. Single copies of the EA are also available from Lauren M. Quinones-Navarro, Mailstop O-4D9A, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

VIII. Paperwork Reduction Act Statement.

This final 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.). These requirements were approved by the Office of Management and Budget, approval number 3150-0151.

The burden to the public for these information collections is estimated to average 8 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments on any aspect of these information collections, including suggestions for reducing the burden, to the Records and FOIA/Privacy Services Branch (T5 F52), U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, or by Internet electronic mail to INFOCOLLECTS@NRC.GOV; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0151), Office of Management and Budget, Washington, D.C. 20503.

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.

IX. Regulatory Analysis.

The NRC has not prepared a regulatory analysis for this final 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.

X. Regulatory Flexibility Certification.

Under the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this final rule will not have a significant economic impact upon a substantial number of small entities. The final 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 Small Business Size Standards set out in regulations issued by the Small Business Administration in 13 CFR part 121. Thus, this rule does not fall within the purview of the Act.

XI. Backfit Analysis.

The Commission has determined that this final 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 change requirements on existing DCRs in appendices A-C of part 52. Therefore, a backfit analysis was not prepared for this rule.

XII. Congressional Review Act.

In accordance with the Congressional Review Act of 1996, the NRC has determined that this action is not a major rule and has verified this determination with the Office of Information and Regulatory Affairs of OMB.

List of Subjects in 10 CFR Part 52

Administrative practice and procedure, Antitrust, Backfitting, Combined license, Early site permit, Emergency planning, Fees, Incorporation by reference, 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.

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. 552 and 553; the NRC is adopting the following amendments to 10 CFR part 52.

PART 52 - EARLY SITE PERMITS; STANDARD DESIGN CERTIFICATIONS; AND COMBINED LICENSES 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).

2. In § 52.8, paragraph (b) is revised to read as follows:

§ 52.8 Information collection requirements: OMB approval.

* * * * *

(b) The approved information collection requirements contained in this part appear in §§ 52.15, 52.17, 52.29, 52.35, 52.45, 52.47, 52.51, 52.57, 52.63, 52.75, 52.77, 52.78, 52.79, 52.89, 52.91, 52.99, and appendices A, B, C, and D.

3. A new appendix D to 10 CFR part 52 is added to read as follows:

Appendix D To Part 52 - Design Certification Rule for the AP1000 Design

I. Introduction

Appendix D constitutes the standard design certification for the AP1000[3] design, in accordance with 10 CFR part 52, subpart B. The applicant for certification of the AP1000 design is Westinghouse Electric Company LLC.

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* 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 the document maintained by an applicant or licensee who references this appendix consisting of the information in the generic DCD as modified and supplemented by the plant-specific departures and exemptions made under Section VIII of this appendix.

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;

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[3]AP1000 is a trademark of Westinghouse Electric Company LLC.

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, with the exception of generic TS, the design-specific PRA, the evaluation of SAMDAs, and conceptual design information;

2. Information required for a final safety analysis report under 10 CFR 50.34;

3. Supporting information on the inspections, tests, and analyses that will be performed to demonstrate that the acceptance criteria in the ITAAC have been met; and

4. COL action items (COL information), which identify certain matters that shall be addressed in the site-specific portion of the 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.

5. The investment protection short-term availability controls in Section 16.3 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.

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 52.3, or Section 11 of the Atomic Energy Act of 1954, as amended, as applicable.

III. Scope and Contents

A. Tier 1, Tier 2 (including the investment protection short-term availability controls in Section 16.3), and the generic TS in the AP1000 DCD (Revision 15) are approved for incorporation by reference by the Director of the Office of the *Federal Register* on **[date of approval]** under 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the generic DCD may be obtained from Ronald P. Vijuk, Manager, Passive Plant Engineering, Westinghouse Electric Company, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355. A copy of the generic DCD is also available for examination and copying at the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. Copies are available for examination at the NRC Library, Two White Flint North, 11545 Rockville Pike, Rockville, Maryland, telephone (301) 415-5610, e-mail LIBRARY@NRC.GOV or 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/code_of_federal_regulations/ibr_locations.html.

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 investment protection short-term availability controls in Section 16.3 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 SAMDAs in appendix 1B of the generic DCD 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 AP1000 design or NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 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 license that wishes to reference this appendix shall, in addition to complying with the requirements of 10 CFR 52.77, 52.78, and 52.79, 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 AP1000 design, 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 compliance with the site parameters and interface requirements;

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. Physically include, in the plant-specific DCD, the proprietary and safeguards information referenced in the AP1000 DCD.

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 Part 50.

V. Applicable Regulations

A. Except as indicated in paragraph B of this section, the regulations that apply to the AP1000 design are in 10 CFR parts 20, 50, 73, and 100, codified as of **[date final rule signed]**, that are applicable and technically relevant, as described in the FSER (NUREG-1793) and Supplement No. 1.

B. The AP1000 design is exempt from portions of the following regulations:

1. Paragraph (f)(2)(iv) of 10 CFR 50.34 - Plant Safety Parameter Display Console;

2. Paragraph (c)(1) of 10 CFR 50.62 - Auxiliary (or emergency) feedwater system; and

3. Appendix A to 10 CFR Part 50, GDC 17 - Offsite Power Sources.

VI. Issue Resolution

A. The Commission has determined that the structures, systems, components, and design features of the AP1000 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 AP1000 design.

B. The Commission considers the following matters resolved within the meaning of 10 CFR 52.63(a)(4) in subsequent proceedings for issuance of a COL, amendment of a COL, or renewal of a COL, proceedings held under to 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, associated with the information in the FSER, Tier 1, Tier 2 (including referenced information, which the context indicates is intended as requirements, and the investment protection short-term availability controls in Section 16.3 of the DCD), and the rulemaking record for certification of the AP1000 design;

2. All nuclear safety and safeguards issues associated with the information in proprietary and safeguards documents, referenced and in context, are intended as requirements in the generic DCD for the AP1000 design;

3. All generic changes to the DCD under and in compliance with the change processes in Sections 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 Sections 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 SAMDAs associated with the information in the NRC's EA for the AP1000 design and appendix 1B of the generic DCD, for plants referencing this appendix whose site parameters are within those specified in the SAMDA evaluation.

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)(4). 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.1. Persons who wish to review proprietary and safeguards information or other secondary references in the AP1000 DCD, in order to request or participate in the hearing required by 10 CFR 52.85 or the hearing provided under 10 CFR 52.103, or to request or participate in any other hearing relating to this appendix in which interested persons have adjudicatory hearing rights, shall first request access to such information from Westinghouse. The request must state with particularity:

a. The nature of the proprietary or other information sought;

b. The reason why the information currently available to the public in the NRC's public document room is insufficient;

c. The relevance of the requested information to the hearing issue(s) which the person proposes to raise; and

d. A showing that the requesting person has the capability to understand and utilize the requested information.

2. If a person claims that the information is necessary to prepare a request for hearing, the request must be filed no later than 15 days after publication in the *Federal Register* of the notice required either by 10 CFR 52.85 or 10 CFR 52.103. If Westinghouse declines to provide the information sought, Westinghouse shall send a written response within ten (10) days of receiving the request to the requesting person setting forth with particularity the reasons for its refusal. The person may then request the Commission (or presiding officer, if a proceeding has been established) to order disclosure. The person shall include copies of the original request (and any subsequent clarifying information provided by the requesting party to the applicant) and the applicant's response. The Commission and presiding officer shall base their decisions

solely on the person's original request (including any clarifying information provided by the requesting person to Westinghouse), and Westinghouse's response. The Commission and presiding officer may order Westinghouse to provide access to some or all of the requested information, subject to an appropriate non-disclosure agreement.

VII. Duration of this Appendix

This appendix may be referenced for a period of 15 years from **[date 30 days after 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)(3).

4. Exemptions from Tier 1 information are governed by the requirements in 10 CFR 52.63(b)(1) and § 52.97(b). 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 §§ 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 paragraphs 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, 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 a severe accident issue identified in the plant-specific DCD, requires a license amendment if:

(1) There is a substantial increase in the probability of a severe accident such that a particular 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 severe accident previously reviewed.

d. 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.

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

f. 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)(4).

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) Maximum fuel rod average burn-up.

(2) Fuel principal design requirements.

(3) Fuel criteria evaluation process.

(4) Fire areas.

(5) Human factors engineering.

(6) Small-break loss-of-coolant accident (LOCA) analysis methodology.

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) Nuclear Island structural dimensions.

(2) American Society of Mechanical Engineers Boiler & Pressure Vessel Code (ASME Code), Section III, and Code Case–284.

(3) Design Summary of Critical Sections.

(4) American Concrete Institute (ACI) 318, ACI 349, American National Standards Institute/American Institute of Steel Construction (ANSI/AISC)–690, and American Iron and Steel Institute (AISI), “Specification for the Design of Cold Formed Steel Structural Members, Part 1 and 2,” 1996 Edition and 2000 Supplement.

(5) Definition of critical locations and thicknesses.

(6) Seismic qualification methods and standards.

(7) Nuclear design of fuel and reactivity control system, except burn-up limit.

(8) Motor-operated and power-operated valves.

(9) Instrumentation and control system design processes, methods, and standards.

(10) Passive residual heat removal (PRHR) natural circulation test (first plant only).

(11) Automatic depressurization system (ADS) and core make-up tank (CMT) verification tests (first three plants only).

(12) Polar crane parked orientation.

(13) Piping design acceptance criteria.

(14) Containment vessel design parameters.

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 50.12(a). 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 either 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)

A.1 An applicant or licensee who references this appendix shall perform and demonstrate conformance with the ITAAC before fuel load. With respect to activities subject to an ITAAC, an applicant for a license may proceed at its own risk with design and procurement activities. A licensee may also proceed at its own risk with design, procurement, construction, and preoperational activities, even though the NRC may not have found that any particular ITAAC has been satisfied.

2. The licensee who references this appendix shall notify the NRC that the required inspections, tests, and analyses in the ITAAC have been successfully completed and that the corresponding acceptance criteria have been met.

3. If an activity is subject to an ITAAC and the applicant or licensee who references this appendix has not demonstrated that the ITAAC has been satisfied, the applicant or licensee may either take corrective actions to successfully complete that ITAAC, request an exemption from the ITAAC under Section VIII of this appendix and 10 CFR 52.97(b), or petition for rulemaking to amend this appendix by changing the requirements of the ITAAC, under 10 CFR 2.802 and 52.97(b). Such rulemaking changes to the ITAAC must meet the requirements of paragraph VIII.A.1 of this appendix.

B.1 The NRC shall ensure that the required inspections, tests, and analyses in the ITAAC are performed. The NRC shall verify that the inspections, tests, and analyses referenced by the licensee have been successfully completed and, based solely thereon, find that the prescribed acceptance criteria have been met. At appropriate intervals during construction, the NRC shall publish notices of the successful completion of ITAAC in the *Federal Register*.

2. Under 10 CFR 52.99 and 52.103(g), the Commission shall find that the acceptance criteria in the ITAAC for the license are met before fuel load.

3. After the Commission has made the finding required by 10 CFR 52.103(g), the ITAAC do not, by virtue of their inclusion within the DCD, constitute regulatory requirements either for licensees or for renewal of the license; except for specific ITAAC, which are the subject of a Section 103(a) hearing, their expiration will occur upon final Commission action in such a proceeding. However, subsequent modifications must comply with the Tier 1 and Tier 2 design descriptions in the plant-specific DCD unless the licensee has complied with the applicable requirements of 10 CFR 52.97 and Section VIII of this appendix.

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 to Tier 1, Tier 2, and the generic TS and other operational requirements. The applicant shall maintain the proprietary 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).

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 50.4.

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 50.4 and 50.71(e).

3. The reports and updates required by paragraphs X.B.1 and X.B.2 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 findings under 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 has made its finding under 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

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.

ENVIRONMENTAL ASSESSMENT BY THE
U.S. NUCLEAR REGULATORY COMMISSION
RELATING TO THE CERTIFICATION OF THE
AP1000 STANDARD PLANT DESIGN
DOCKET NO. 52-006

Enclosure 2

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UNITED STATES NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL ASSESSMENT AND FINDING OF

NO SIGNIFICANT IMPACT

RELATING TO THE CERTIFICATION OF THE

AP1000 STANDARD PLANT DESIGN

DOCKET NO. 52-006

The U.S. Nuclear Regulatory Commission (NRC) has issued a design certification for the Advanced Passive 1000 (AP1000) design in response to an application submitted on March 28, 2002, by Westinghouse Electric Company, LLC (hereinafter referred to as Westinghouse). A design certification is a rulemaking; the Commission 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 an environmental assessment (EA) of the environmental impacts of the proposed new rule and has documented its findings of no significant impact in accordance with the requirements of 10 CFR 51.21 and the National Environmental Policy Act of 1969 (NEPA), as amended. This EA also addresses the severe accident mitigation design alternatives (SAMDAs), that the NRC has considered as part of this EA for the AP1000 design. This EA does not address the site-specific environmental impacts of constructing and operating a facility, which references the AP1000 design certification at a particular site; such impacts will be evaluated as part of any application or applications for the siting, construction, or operation of a facility.

As discussed in detail in Section 4.0 of this EA, the NRC determined that issuing this design certification does not constitute a major Federal action significantly affecting the quality of the human environment. The basis for this finding of no significant impact is that the design

certification would not authorize the siting, construction, or operation of a facility of an AP1000 reactor design. Rather, the certification would merely codify the AP1000 design in a rule that could be referenced in a construction permit (CP), combined license (COL), or operating license (OL) application. Further, because the certification is just a rule, it does not involve any resources that have alternative uses. Therefore, the NRC has not prepared an environmental impact statement (EIS) in connection with this action.

The NRC also reviewed Westinghouse's evaluation of SAMDAs that generically apply to the AP1000 design. On that basis, the NRC found that the evaluation provides reasonable assurance that there are no additional SAMDAs beyond those currently incorporated into the AP1000 design which are cost-beneficial, whether considered at the time of the approval of the AP1000 design certification or in connection with the licensing of a future facility referencing the AP1000 design certification, where the plant referencing this appendix is located on a site whose site parameters are within those specified in Appendix 1B of the AP1000 design control document (DCD). These issues are considered resolved for the AP1000 design.

ENVIRONMENTAL ASSESSMENT

1.0 IDENTIFICATION OF THE PROPOSED ACTION

The proposed action would certify the AP1000 design under Appendix D to 10 CFR Part 52. The new rule would allow prospective licensees to reference the certified AP1000 design as part of a combined license (COL) application under 10 CFR Part 52 or may allow for a construction permit (CP) application under 10 CFR Part 50.

2.0 THE NEED FOR THE PROPOSED ACTION

The NRC has long sought the safety benefits of commercial nuclear power plant standardization and early final resolution of design issues. The NRC plans to achieve these benefits by certifying nuclear plant designs. Subpart B to 10 CFR Part 52 allows for certification in the form of rulemaking of an essentially complete nuclear plant design.

The proposed action would amend 10 CFR Part 52 to certify the AP1000 design. The amendment would allow prospective licensees to reference the certified AP1000 design as part of a COL application under 10 CFR Part 52 or may allow for a CP application under 10 CFR Part 50. Those portions of the AP1000 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 would eliminate the need to consider SAMDAs for any future facilities that reference the certified AP1000 design.

3.0 THE ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

Issuing an amendment to 10 CFR Part 52 to certify the AP1000 standard plant design would not constitute a significant environmental impact. The amendment would merely codify the NRC's approval of the AP1000 design (refer to NUREG-1793). Furthermore, because the amendment is a rule, it involves no resources that have alternative uses.

As described in Section 4.0 of this EA, the NRC reviewed alternatives to the design certification rulemaking and 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 and to ensure that the design referenced in the rulemaking does not exclude any cost-beneficial design changes related to the prevention and mitigation of

severe accidents. The NRC concludes that, unlike the proposed design certification rule, the alternatives to certification do not provide for resolution of issues.

Design certification is in keeping with the Commission's intent to make future plants safer than the current generation of plants, to achieve early resolution of licensing issues, and to achieve the safety benefits of standardization (refer to the Advanced Reactor (51 FR 24643), Standardization (52 FR 348803), and Severe Accident Policy Statements (50 FR 32138), and to 10 CFR Part 52). Through its own independent analysis, the NRC also concludes that Westinghouse adequately considered an appropriate set of SAMDAs and that none were cost-beneficial. Although Westinghouse made no design changes as a result of reviewing the SAMDAs, Westinghouse had already incorporated certain features in the AP1000 design on the basis of the probabilistic risk assessment (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 AP1000 design (refer to Section 19.1.6.2 of NUREG-1793, "AP1000 Design Improvement as a Result of Probabilistic Risk Assessment Studies").

Finally, the design certification rule by itself would not authorize the siting, construction, or operation of a nuclear power plant. The issuance of a CP, early site permit (ESP), COL, or OL which references the AP1000 design will require a prospective applicant 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 has been completed as part of this EA and can be incorporated by reference into an EIS related to siting, construction, or operation of a nuclear plant that references the AP1000 design.

4.0 ALTERNATIVES TO THE PROPOSED ACTION

The NRC has identified two alternatives to certifying the AP1000 design. The first alternative would be to take no action to approve the design under Subpart B of 10 CFR Part 52. As with the proposed action, this alternative would not have a significant impact on the quality of the human environment because it would not authorize the siting, construction, or operation of a facility.

In the second alternative, the NRC would approve the design, but would not certify the AP1000 design in a rulemaking. The NRC issued a final design approval for AP1000 under Appendix O to 10 CFR Part 52 on September 13, 2004. Therefore, although the NRC has approved the design, the design would not have finality in proceedings under 10 CFR Part 50 or 10 CFR Part 52, Subpart C and could be modified. As a result, the design could require re-evaluation as part of each application to construct and operate a facility of an AP1000 design at a particular site. This alternative would provide for early internal NRC resolution of design issues to the extent that the design would remain unchanged at the facility application stage, but may not obtain all of the benefits of standardization nor permit overall finality for the resolved design issues.

The NRC sees no advantage in these alternatives compared to the design certification rulemaking proposed for the AP1000 design. Although neither the alternative nor the proposed action (design certification rulemaking) would significantly affect the quality of the human environment, the proposed action achieves the benefits of standardization, permits early resolution of design issues, and provides finality in licensing proceedings for the resolved design issues (including SAMDAs) that are within the scope of the design certification. Therefore, the NRC concludes that neither of the alternatives to rulemaking would achieve the

objectives that the Commission intends by certifying the AP1000 design pursuant to 10 CFR Part 52, Subpart B.

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 AP1000 design. In a 1985 policy statement, 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, Westinghouse performed a PRA for the AP1000 design to achieve the following objectives:

- Identify the dominant severe accident sequences and associated source terms for the design.
- Modify the design, on the basis of PRA insights, to prevent or mitigate and reduce the risk of severe 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.

Westinghouse’s PRA analysis is described in Chapter 19 of the AP1000 DCD.

In addition to considering alternatives to the rulemaking process discussed in Section 3.0, applicants for reactor design certification, COLs, or CPs must also consider alternative design features for severe accidents consistent with the requirements of 10 CFR

Part 50, and with a court ruling related to NEPA. These requirements can be summarized as follows:

- 10 CFR 52.79 and 10 CFR 50.34(f)(1)(I)[1] requires the 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.
- The U.S. Court of Appeals decision, in *Limerick Ecology Action v. NRC*, 869 F.2d 719 (3rd Cir. 1989), effectively requires the NRC to consider certain SAMDAs in the environmental impact review performed under Section 102(2)(c) of NEPA with respect to the licensing for operation of nuclear power plants.

Although these requirements are not directly related, they share a common purpose to consider alternatives to the proposed design, to evaluate whether potential alternative improvements in the plant design might increase safety performance during severe accidents, and to prevent reasonable alternatives from being foreclosed. It should be noted that the Commission is not required to consider alternatives to the design in this EA. However, as a matter of discretion, the Commission has determined that considering SAMDAs concomitant with the rulemaking is consistent with the intent of 10 CFR Part 52 for early resolution of issues, finality for resolved design issues, and achieving the benefits of standardization.

In its decision in *Limerick Ecology Action v. NRC*, the Court of Appeals for the Third Circuit expressed its opinion that it would likely be difficult to evaluate SAMDAs for NEPA purposes on a generic basis for all nuclear power plants then licensed by the NRC. However, the NRC has determined that generic evaluation of SAMDAs for the AP1000 standard design is both practical and warranted for two significant reasons. First, the design and construction of

[1]Although 10 CFR 50.34(f)(1)(I) by its terms does not apply to new construction permits (CP), the Commission's policy is that a CP applicant will be required to comply with 50.34(f)(1)(I).

all plants referencing the certified AP1000 design will be governed by the rule certifying a single design. Second, the site parameters specified in the rule and the AP1000 DCD establish the consequences for a reasonable enveloping set of SAMDAs for the AP1000 design. The low residual risk of the AP1000 design and the limited potential for further risk reductions provides high confidence that additional cost-beneficial SAMDAs would not be found for sites within the site parameter envelope assumed for the AP1000 EA of SAMDAs. If the actual parameters for a particular site exceed those assumed in the rule and the DCD, then SAMDAs must be re-evaluated in the site-specific environmental report and the EIS. If the actual parameters for a postulated site are bounded by those assumed in the rule and the DCD, then the SAMDA analysis can be incorporated by reference in the site-specific EIS.

4.2 Potential SAMDAs Identified by Westinghouse

To identify candidate design alternatives, Westinghouse reviewed the design alternatives for other plants including the CE System 80+. Westinghouse also reviewed the results of the AP1000 PRA and design alternatives suggested by AP1000 design personnel.

Westinghouse eliminated the following SAMDAs from further consideration because they are already incorporated in the AP1000 design:

- hydrogen ignition system
- reactor cavity flooding system
- reactor coolant pump seal cooling (AP1000 has canned motor pumps)
- reactor coolant system (RCS) depressurization
- external reactor vessel cooling
- non-safety-grade containment sprays

Several risk-significant enhancements to the AP600 design have also been incorporated in the AP1000 design and were therefore not further considered. These modifications are summarized below and discussed further in DCD Tier 2, Section 1B.1.5, "Summary of Risk Significant Enhancement."

- a change in the normal position of the two containment motor-operated recirculation valves (in series with squib valves) from closed to open to improve the reliability of opening these flowpaths
- a change in the emergency operating procedures (EOPs) to call for in-containment refueling water storage tank (IRWST) draining earlier in an event to improve the probability of successful operator action
- a change in the design of the IRWST vents to preferentially direct hydrogen releases to the IRWST pipe vents, where diffusion flames will not adversely impact the containment
- incorporation of a low-boron core to reduce the potential contribution of anticipated transient without scram (ATWS) events to plant risk
- addition of a third passive containment cooling system (PCS) drainline with a motor-operated valve (MOV) that is diverse from the air-operated valves (AOVs) used in the other two drainlines, to improve PCS reliability
- specification that two of the four squib valves in the recirculation lines be low-pressure-type valves, and the remaining two squib valves be high-pressure-type valves to reduce the contribution to core damage frequency (CDF) from common-cause failures (CCFs) of recirculation squib valves

On the basis of the screening, Westinghouse retained 14 potential SAMDAs for further consideration. This set of SAMDAs is the same as that considered for the AP600 design. DCD Tier 2, Section 1B.1.3, "Selection and Description of SAMDAs," describes the 14 design improvements as follows:

(1) Upgrade the chemical and volume control system (CVCS) for small loss-of-coolant accidents (LOCAs): The CVCS is currently capable of maintaining the RCS inventory for LOCAs for effective break sizes up to 0.97 cm (3/8 in.) in diameter. A design alternative involving the upgrade of the CVCS for small LOCAs would increase the capability of the CVCS, enabling it to maintain RCS inventory during small- and intermediate-size LOCAs (up to an effective break size of 15.2 cm (6 in.) in diameter). Implementation of this design alternative would require installation of IRWST and containment recirculation connections to the CVCS, as well as the addition of a second line from the CVCS pumps to the RCS.

(2) Filtered vent: This design alternative would involve the installation of a filtered containment vent, including all associated piping and penetrations. This modification would provide a means to vent containment to prevent catastrophic overpressure failures and would also provide a filtering capability for source term release. The filtered vent would reduce the risk of late containment failures that might occur after failure of the PCS. Note, however, that even if the PCS fails, it is expected that air cooling will limit the containment pressure to less than the ultimate pressure capacity of the containment under most environmental conditions.

(3) Self-actuating containment isolation valves (CIVs): Self-actuation of CIVs could be used to increase the likelihood of successful containment isolation during a severe accident. This design alternative would involve the addition of a self-actuating valve or the enhancement of the existing CIVs on normally open containment penetrations (i.e., penetrations that provide normally open pathways to the environment during power and normal shutdown conditions). The design alternative would provide for self-actuation in the event that containment conditions are indicative of a severe accident. Closed systems inside and outside containment, such as the normal residual

heat removal system (RNS) and component cooling, would be excluded from this design alternative. The actuation of CIVs would be automatically initiated in the event that containment conditions are indicative of a severe accident.

(4) Passive containment sprays: This SAMDA involves adding a passive safety-related spray system and all associated piping and support systems to the AP1000 design (in lieu of the non-safety-related active containment spray capability currently incorporated in the AP1000 design). Installation of the safety-grade containment spray system could result in an increase in the following three risk benefits:

- scrubbing of fission products, primarily for containment isolation failure
- alternative means for flooding the reactor vessel (in-vessel retention)
- control of containment pressure if the PCS fails

(5) Active high-pressure safety injection (HPSI) system: A safety-related active HPSI system could be added that would be capable of preventing a core melt for all events except the large-break LOCA and ATWS. Note, however, that this design alternative is not consistent with the AP1000 design objectives. The AP1000 would change from a plant with passive systems to a plant with passive and active systems.

(6) Steam generator (SG) shell-side heat removal system: This design alternative would involve the installation of a passive safety-related heat removal system to the secondary side of the SGs. This enhancement would provide closed-loop secondary-system cooling by means of natural circulation and stored water cooling, thereby preventing the loss of the primary heat sink given the loss of startup feedwater (SFW) and the passive residual heat removal (RHR) heat exchanger (HX).

(7) Direct SG relief flow to the IRWST: To prevent fission product release from bypassing containment during a steam generator tube rupture (SGTR) event (or to reduce the amount released), flow from the SG safety and relief valves could be directed to the

IRWST. An alternative, lower cost option would be to redirect flow only from the first-stage safety valve to the IRWST.

(8) Increased SG pressure capability: As an alternative to design alternative (7) above, another method could be used to prevent fission product release from bypassing containment during an SGTR event (or to reduce the amount). This alternative method would involve an increase of the SG secondary-side pressure capability and safety valve pressure setpoint to a level high enough to not allow an SGTR to cause the secondary-system safety valve to open. Although detailed analyses have not been performed, it is estimated that the secondary-side design pressure would have to be increased by several hundred pounds per square inch (psi).

(9) Secondary containment filtered ventilation: This design alternative involves the installation of a passive charcoal and high-efficiency particulate air filter system for the middle- and lower-annulus region of the secondary concrete containment (below elevation 135'-3"). Drawing a partial vacuum on the middle annulus via an eductor with motive power from compressed gas tanks would operate the filter system. This design alternative would reduce particulate fission product release from any failed containment penetrations.

(10) Diverse IRWST injection valves: In the current design, a squib valve in series with a check valve (CV) isolates each of the four IRWST injection paths. To provide diversity, a modification could be made to allow a different vendor to provide the valves in two of the lines. Such diverse IRWST injection valves would reduce the likelihood of CCFs of the four IRWST injection paths.

(11) Diverse containment recirculation valves: In both the AP600 and AP1000 designs, two of the four recirculation lines have a squib valve in series with a CV, and the remaining two recirculation lines have a squib valve in series with an MOV. This SAMDA involves

changing the recirculation valve specification to enable two of the four lines to use diverse squib valves. To provide diversity, a modification could be made to allow a different vendor to provide the squib valves in two lines. Alternatively, in the AP1000 design, Westinghouse has specified that two of the four recirculation squib valves be designated as the low-pressure type and the remaining two squib valves as the high-pressure type. The diverse containment recirculation valves incorporated in the AP1000 design are responsive to the intent of this SAMDA and will reduce the frequency of core melt due to CCF of the four containment recirculation lines.

(12) Ex-vessel core catcher: This design alternative would inhibit core concrete interaction (CCI), even if the debris bed dries out. The enhancement would involve the design of a structure in the containment cavity or the use of a special concrete or coating. The current AP1000 design incorporates a wet cavity design in which ex-vessel cooling is used to keep core debris within the vessel. In cases where reactor vessel flooding has failed, the PRA assumes that containment failure occurs from an ex-vessel steam explosion or CCI.

(13) High-pressure containment design: A high-pressure containment design would prevent containment failures from severe accident phenomena such as steam explosions and hydrogen detonation. This proposed containment design would have a design pressure of approximately 2.17 mPa (300 psig) and would include a passive cooling feature similar to the one in the existing containment design. Although the high-pressure containment would not reduce the frequency or magnitude of releases from an unisolated containment, it would reduce the likelihood of containment failures.

(14) Increase reliability of diverse actuation system (DAS): The DAS is a non-safety system that can automatically trip the reactor and turbine and actuate certain engineered safety feature (ESF) equipment if the protection and safety monitoring system (PMS) is unable

to perform these functions. The DAS provides diverse monitoring of selected plant parameters to guide manual operation and to confirm reactor trip and ESF actuations. Increasing the reliability of the DAS involves adding a third instrumentation and control (I&C) cabinet and a third set of DAS instruments to allow the use of two-out-of-three logic instead of two-out-of-two logic.

Westinghouse considered an additional SAMDA that would involve relocating the entire normal residual heat removal system (RNS) and piping inside the containment pressure boundary. This would prevent containment bypass due to intersystem loss-of-coolant accidents (ISLOCAs) in the RNS. However, in the AP1000, the RNS has a higher design pressure than the systems in current pressurized-water reactors (PWRs), and an additional isolation valve is provided. As a result, ISLOCAs do not contribute significantly to the CDF in the AP1000 PRA. Accordingly, Westinghouse did not further investigate this change. The NRC has reviewed the Westinghouse analyses and agrees that further consideration of this change is not warranted because the change would provide virtually no risk reduction.

4.3 NRC Evaluation

The set of potential design improvements considered for the AP1000 is the same as those considered for the AP600. As part of the review for the AP600, the NRC reviewed the set of potential design improvements identified by Westinghouse and found it to be reasonably complete. The activity was accomplished by reviewing design alternatives associated with the following plants: Limerick, Comanche Peak, CE System 80+, Watts Bar, and the advanced boiling water reactor (ABWR). The NRC also reviewed accident management strategies described in (NUREG/CR-5474) and alternatives identified through the Containment Performance Improvement (CPI) Program (NUREG/CR-5567, -5575, -5630, and -5562). The

results of this assessment are summarized in Appendix A to "Review of Severe Accident Mitigation Design Alternatives (SAMDAs) for the Westinghouse AP600 Design," Science and Engineering Associates, Inc., (SEA 97-2708-010-A;1, August 29, 1997). Given the similarity between the AP1000 and the AP600 design features and risk profile, the NRC considers this prior evaluation for the AP600 to be applicable to the AP1000 as well.

The NRC notes that the AP1000 design is less tolerant of equipment failures than the AP600 because the large LOCA success criterion for the AP1000 requires operation of two of two accumulators whereas only one of two accumulators is required for the AP600, and because the LOCA success criterion for the AP1000 requires operation of three of four automatic depressurization system (ADS) Stage 4 valves whereas only two of four ADS Stage 4 valves are required for the AP600. At the NRC's request, Westinghouse performed an evaluation of the two additional design alternatives:

(1) Larger accumulators: An increase in the size of the accumulators sufficient to change the large LOCA success criterion from two of two accumulators to one of two accumulators. Westinghouse estimates that the accumulator tanks would have to increase in size from 56.6 m^3 to 113.2 m^3 (2000 ft^3 to 4000 ft^3). This increase would likely require a change to the design of the direct vessel injection (DVI) piping subsystem and significant reanalysis of the DVI piping.

(2) Larger ADS Stage 4 valves: Increasing the size of the ADS Stage 4 (ADS-4) valves sufficient to change the LOCA success criterion from three of four valves to two of four valves. Westinghouse estimates that the valves would have to increase in size from 35.6 cm to 45.7 cm (14 in. to 18 in.) and that common fourth stage piping that connects to the hot leg would have to increase in size from 45.7 cm to 50.8 cm (18 in. to at least 20 in.). This increase would require a significant redesign of the squib valve and the ADS-4 piping, which in turn would impact the design of the reactor coolant loop piping.

Such a redesign would necessitate additional confirmatory testing to verify that the behavior of the passive safety systems was not adversely impacted.

For both of these alternatives, Westinghouse estimated that the redesign and reanalysis cost of the changes would be significantly greater than the benefits of completely eliminating all severe accident risk for the AP1000. Therefore, these design changes were not pursued further.

Although Westinghouse's analysis omitted several design alternatives, in most instances these design alternatives are either already included in the AP1000 design or bounded in terms of risk reduction by one or more of the design alternatives that were included in Westinghouse's analysis. In some other cases, design alternatives were pertinent only to boiling-water reactors (BWRs). The NRC's review did not reveal any obvious additional design alternatives that should have been considered by Westinghouse. Westinghouse considered some of the potential design alternatives identified in the above references as appropriate for accident management strategies, rather than as design alternatives. The NRC notes that the set of design improvements is not all inclusive in that additional, perhaps less expensive design improvements could be postulated. However, the benefits of any additional modifications would not likely exceed the costs of the modifications evaluated. Also, the costs of alternative improvements are not expected to be less than the costs of the least expensive improvements evaluated, when the subsidiary costs associated with maintenance, procedures, and training are considered.

The discussions in DCD Tier 2, Appendix 1B, do not provide Westinghouse's basis or process for screening the many possible design alternatives to arrive at the final list of 14. Although the information provided does not demonstrate that the search for design alternatives was comprehensive, the NRC's review of the more than 120 candidate design alternatives considered for the AP600 did not identify any new alternatives more likely to be cost-beneficial

than those included in the AP1000 design alternative evaluations. The NRC notes that Westinghouse has incorporated several risk significant enhancements within the AP1000 design, as discussed in Section 19.4.3.1 of NUREG-1793, "Final Safety Evaluation Report [FSER] Related to Certification of the AP1000 Standard Design," (AP1000 FSER), and has considered potential design changes to improve the AP1000 success criteria. On this basis, the NRC concludes that the set of potential design improvements evaluated by Westinghouse is acceptable.

4.4 Risk Reduction Potential of SAMDAs

4.4.1 Westinghouse Evaluation

In its evaluation, Westinghouse assumed that each design alternative would work perfectly to completely eliminate all severe accident risk from evaluated internal, external, and shutdown events. This assumption is conservative, since it maximizes the benefit of each design alternative. The design alternative benefits were estimated on the basis of the reduction of risk expressed in terms of whole body person-rem per year received by the total population within a 80.5-km (50-mile) radius of the AP1000 plant site, as discussed in Section 19.4.2 of the AP1000 FSER.

Westinghouse used the cost-benefit methodology of NUREG/BR-0184 to calculate the maximum attainable benefit of completely eliminating all risk for the AP1000. This methodology includes consideration of replacement power costs. The applicant estimated the present worth of eliminating all risk to be $21,000. Even if the AP1000 CDF and large release frequency (LRF) were a factor of 10 higher, this value would only increase to about $200,000.

4.4.2 NRC Evaluation

NRC reviewed Westinghouse's bases for estimating the risk reduction for the various SAMDAs, and concluded that Westinghouse used bounding and conservative assumptions as the bases for the risk reduction estimates for each design alternative.

Westinghouse's risk reduction estimates are based on point-estimate (mean) values, and do not consider uncertainties in CDF or offsite consequences. Although this is consistent with the approach taken 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 AP1000, the NRC 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. This assessment is discussed further in Section 19.4.6 of the AP1000 FSER and in Section 4.6 of this EA.

4.5 Cost Impacts of Candidate SAMDAs

4.5.1 Westinghouse Evaluation

DCD Tier 2, Section 1B.1.8, "Evaluation of Potential Improvements," discusses capital cost estimates for the design alternatives evaluated by Westinghouse for the AP1000. DCD Tier 2, Table 1B-5, presents the results of the cost evaluations. The cost evaluations did not account for the costs of design engineering, testing, and maintenance for each design alternative. Including these costs would increase the overall costs and decrease the benefits of each alternative. Thus, the Westinghouse approach is conservative.

4.5.2 NRC Evaluation

As mentioned previously, the set of SAMDAs considered for the AP1000 is the same as the set considered for the AP600. As part of the AP600 review, the NRC compared the capital costs for the AP600 design alternatives with those evaluated for the ABWR and CE System 80+ designs. The purpose of this comparison was to determine the reasonableness of the cost estimates presented by the applicant. The design alternatives among the reactor designs, did not exactly match, so only rough comparisons were possible. Based on these comparisons, the NRC concluded that the cost estimates for the AP600 design alternatives are in reasonable agreement with the costs for roughly similar design alternatives evaluated for other plants. Given the similarity between the AP1000 and the AP600 design features and risk profile, the NRC considers this prior evaluation for the AP600 to be applicable to the AP1000 as well. This is reasonable, considering uncertainties in the cost estimates, and the level of precision necessary, given the greater uncertainty inherent on the benefit side with which these costs were compared.

4.6 Cost-Benefit Comparison

4.6.1 Westinghouse Evaluation

After considering the risk reduction potential and cost impact of the various SAMDAs, Westinghouse did a cost-benefit comparison to determine whether any of the potential severe accident design features would be justified. To do so, Westinghouse evaluated the benefits of each design alternative in terms of potential risk reduction, which was defined as the reduction

in whole body person-rem per year received by the total population within a 80.5-km (50-mile) radius of the AP1000 plant site. Westinghouse used the cost-benefit methodology of NUREG/BR-0184 to calculate the maximum attainable benefit of completely eliminating all risk for the AP1000. This methodology includes consideration of replacement power costs. Westinghouse estimated the present worth of eliminating all risk to be $21,000. This value is an upper bound because in practice no design alternative, if implemented, would reduce the plant CDF to zero. Westinghouse also provided additional sensitivity analyses of the impacts of the following:

- a 3-percent discount rate rather than the 7-percent discount rate assumed in the base case
- a factor of 10 increase in the population dose used in the base case
- a more realistic reduction in CDF (i.e., each SAMDA reduces CDF by 50 percent rather than 100 percent, as assumed in the base case)
- a factor of 2 increase in the base case CDF
- a factor of 10 increase in the maximum attainable benefit

DCD Tier 2, Table 1B-4, summarizes the results for these cases. With the exception of the last sensitivity case, the calculated maximum attainable benefit was no more than $43,000. Even when the AP1000 CDF and LRF were increased by a factor of 10, the maximum attainable benefit of eliminating all risk for the AP1000 would only increased to about $200,000.

The applicant found that none of the 14 design alternatives and neither of the two additional alternatives related to the PRA success criteria would be cost beneficial. Only one alternative has an implementation cost close to $21,000, namely, SAMDA 3, self-actuating CIVs, which has an estimated cost of $33,000. All of the remaining alternatives have estimated implementation costs at least a factor of 20 greater than the maximum attainable benefit of

$21,000. On this basis, the applicant concluded that only SAMDA 3 warranted further evaluation.

SAMDA 3 consists of improved containment isolation provisions on all normally open containment penetrations. The design alternative would involve either adding a self-actuating valve or enhancing the existing inside CIV to provide for self-actuation in the event that containment conditions are indicative of a severe accident. Westinghouse noted that even if this SAMDA completely eliminated all releases associated with containment isolation failures (i.e., release category containment isolation (CI)) and reduced the CDF to zero, the benefit of the SAMDA would be on the order of $1000. More realistically, the CDF would not be impacted, and elimination of all containment isolation failures would only have a benefit on the order of $100. Thus, even the lowest cost SAMDA would not be cost beneficial.

On the basis of the cost-benefit comparison, the applicant concluded that no additional modifications to the AP1000 design were warranted.

4.6.2 NRC Evaluation

The applicant's estimates of risk do not account for uncertainties either in the CDF or in the 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 AP1000 design are unique and their reliability has been evaluated through analysis and testing programs rather than operating experience. In addition, the estimates of CDF and offsite exposures do not account for the added risk from earthquakes.

As part of the AP600 review, the NRC did detailed analyses to assess design alternative benefits, taking into account the uncertainties in estimated CDF, offsite releases of radioactive materials from a severe accident, and the effects of external events. Given the similarities

between the AP1000 and AP600 design features and risk profiles and the sets of SAMDAs relevant to each design, the NRC considers this prior evaluation for the AP600, summarized below, to be applicable to the AP1000 as well.

The staff estimated the maximum benefits that could be achieved with the AP600 design alternatives, assuming that a design alternative can either completely eliminate all core damage events or completely eliminate offsite releases of radioactive materials in the event of a severe accident. The estimates of benefits were calculated using the NRC-developed FORECAST code (NUREG/CR-5595, Revision 1, "FORECAST: Regulatory Effects Cost Analysis Software Manual, Version 4.1," Science and Engineering Associates, Inc., July 1996). FORECAST allows the use of uncertainty ranges for all key parameters and provides a means for combining uncertainties in these parameters. For the purposes of estimating the maximum potential benefit from the AP600 design alternatives, the staff assumed that external events and accident sequences not yet accounted for in the PRA increased the reference CDF by two orders of magnitude (i.e., a factor of 100).

The results of the analysis indicated that design alternatives which prevent accidents (i.e., reduce the accident frequency to zero) are much more cost effective than design alternatives which reduce or eliminate offsite releases, but which have no effect on accident frequency. This is because of the fairly large benefits of averting onsite cleanup and decontamination costs and avoiding replacement energy costs. Neither of these costs are assumed to be impacted by design alternatives which do not reduce accident frequency. The staff divided the design alternatives into two groups: those that impact the CDF and those that impact containment performance, but not CDF. Benefits were estimated by taking the fractional reduction in risk for each design alternative (compared to the AP600 baseline risk as defined by the applicant) and applying that fraction to the mean benefits.

Design alternatives that were within a decade of meeting a benefit-cost criterion of $5000/person-rem were subjected to further probabilistic and deterministic considerations. None of the design alternatives had a cost-benefit ratio of less than $5000/person-rem. The only design alternatives which came within a decade of the $5000/person-rem criterion were SAMDA 10, diverse IRWST injection valves, and SAMDA 3, self-actuating CIVs. The NRC concludes, on the basis of further probabilistic and deterministic evaluations, that these design alternatives are not cost beneficial and need not be further pursued.

Given the similarities between the AP1000 and the AP600 design features and risk profiles and the sets of SAMDAs relevant to each design, the NRC considers the results of this prior evaluation for the AP600 to be applicable to the AP1000 as well. Accordingly, the NRC further evaluated these two SAMDAs for the AP1000, as discussed below.

4.7 Further Considerations

4.7.1 Self-Actuating Containment Isolation Valves

This design alternative would reduce the likelihood of containment isolation failure by adding self-actuating valves or enhancing the existing CIVs for automatic closure when containment conditions indicate a severe accident has occurred. Conceptually, the design would either be an independent valve or an appendage to an existing fail-closed valve that would respond to post-accident containment conditions. For example, a fusible link would melt in response to elevated ambient temperatures, venting the air operator of a fail-closed valve, thus providing the self-actuating function. This design alternative is estimated to impact releases from containment by less than 10 percent.

This improvement to the containment isolation capability would appear to be effective in reducing offsite releases for accidents involving external and internal events. The addition of this design alternative would impose minor operational disadvantages to the plant because the operations and maintenance staff would require some additional training. These automatic features would also require periodic testing to assure that they were functioning properly.

The most important question regarding this design alternative is whether it can be implemented for a cost of only $33,000. The cost estimate appears not to include the first-time engineering and qualification testing that would be required to demonstrate that the valve would perform its intended function in a timely and reliable manner. The costs of periodic testing and maintenance appear not to have been included. The NRC believes that the actual costs of this design alternative would be substantially higher than the applicant's estimate (by a factor of 10 or more) when all related costs are realistically considered. On the basis of the unfavorable cost-benefit ratio and the expectation that actual costs would be even higher than the applicant estimated, the NRC concludes that this design alternative is not cost beneficial and need not be further evaluated.

4.7.2 Diverse IRWST Injection Valves

In the current AP1000 design, a squib valve in series with a CV isolates each of four IRWST injection paths. This design alternative would reduce the likelihood of CCFs of IRWST injection to the reactor by utilizing diverse valves in two of the four lines. The complete elimination of the CCFs of IRWST injection squib valves would lead to a moderate (up to 10 percent) reduction of the at-power internal events CDF. In the absence of a comprehensive external events PRA for the AP1000 plant, it is difficult to estimate the effectiveness of this design alternative in reducing the risk from external events such as seismic events. However, it

appears likely that failure to inject coolant to the reactor would remain a contributor to the CDF from external events, in which case diversity in the IRWST injection valves should help to reduce the risk from both external and internal events.

Alternate vendors are available for the CVs. However, it is questionable if CVs of different vendors would be sufficiently varied to be considered diverse unless the type of CV was changed from the current swing-disk check valve type to another type. The swing-disk type is preferred for this application and other types are considered less reliable.

Adding diversity to the injection line squib valves would require additional spares at the plant and some additional training for plant operations and maintenance staff, but would not appear to add significantly to the operational aspects of the AP1000. However, a greater issue concerns the availability and costs of acquiring diverse valves from a second vendor. Squib valves are specialized valve designs for which there are few vendors. The applicant claimed that a vendor might not be willing to design, qualify, and build a reasonable squib valve design for this application, considering that the vendor would only supply two valves per plant. The cost estimate for this design alternative assumes that a second squib valve vendor exists and that the vendor only provides the two diverse IRWST squib valves per plant. The cost estimate does not include the additional first-time engineering and qualification testing costs that will be incurred by the second vendor. The applicant estimated that those costs could be more than $1 million dollars. As a result, the applicant concluded that this design alternative would not be practicable because of the uncertainty in the availability of a second squib valve design/vendor and the uncertainty about the reliability of another type of CV. The NRC considers the rationale set forth by the applicant regarding the potential reductions in reliability and high costs associated with obtaining diverse valves to be reasonable. On the bases of these arguments, the NRC concludes that this design alternative need not be further pursued.

4.8 Conclusions on SAMDAs

As discussed in Section 19.1 of the AP1000 FSER, Westinghouse used the PRA results extensively to arrive at the final AP1000 design. As a result, the estimated CDF and risk calculated for the AP1000 design are very low, both relative to existing operating plants and in absolute terms. Moreover, the low CDF and risk for the AP1000 plant reflect Westinghouse's efforts to systematically minimize the effect of initiators/sequences that have been important contributors to CDF in previous PWR PRAs. This minimization has been done largely through the incorporation of a number of design improvements. Section 19.1 of the AP1000 FSER discusses these improvements and the additional AP1000 design features which contribute to low CDF and risk for the AP1000.

Because the AP1000 design already has numerous plant features designed to reduce 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 AP1000 design, the ability to estimate CDF and risk approaches the limitations of probabilistic techniques. Specifically, when CDFs are estimated to be on the order of 1 in 1,000,000 years, it is possible that the areas of the PRA where modeling is least complete, or supporting data are sparse or even nonexistent, may actually be the more important contributors to risk. Areas not modeled or incompletely modeled include human reliability, sabotage, rare initiating events, construction and design errors, and systems interactions. Although improvements in the modeling of these areas may introduce additional contributors to CDF and risk, the NRC does not expect that additional contributions would change the conclusions in absolute terms.

The NRC concludes that none of the potential design modifications evaluated are 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 ALTERNATIVE USE OF RESOURCES

No resources, such as land, water, or physical materials, will be affected by the promulgation of this proposed rule. This proposed rule would codify the AP1000 design in the *Code of Federal Regulations* but would not authorize the siting, construction, or operation of any nuclear power plant.

6.0 STATES CONSULTED AND SOURCES USED

The NRC sent a copy of the proposed rule and draft EA to the State Liaison Officers and specifically requested their comments on the EA. In addition, the draft EA was issued for public comment; comments and responses are discussed in Section 7.

The Commission has determined under the NEPA of 1969, as amended, and the NRC's regulations in 10 CFR Part 51, Subpart A, that this rule is not a major Federal action significantly affecting the quality of the human environment. Therefore, the NRC has determined that preparation of an environmental impact statement for this rulemaking is not required. The basis for this determination, as documented in this EA, is that the amendment to 10 CFR Part 52 would not authorize the siting, construction, or operation of a facility referencing the AP1000 design; it would only codify the AP1000 design in a rule. Therefore, the NRC staff did not issue the EA for comment specifically by Federal, other State, and local agencies. The NRC's finding of no significant environmental impact was published in the *Federal Register* on April 18, 2005 (70 FR 20062), with the proposed design certification rule and draft EA for the

AP1000 design. The NRC will evaluate the environmental impacts and issue an EIS, as appropriate, in accordance with NEPA as part of any application(s) for the siting, construction, or operation of a facility that would reference the AP1000 design..

7.0 PUBLIC COMMENTS AND NRC RESPONSES

On April 18, 2005 (70 FR 20062), the Commission issued the draft EA for public comment. The comment period expired on July 5, 2005. The comments are summarized below and responses are provided; the comments did not result in a change in the technical analyses, findings, or conclusions in the EA.

Comment summary. Three severe accident mitigation design alternatives (SAMDAs) were inappropriately dismissed in the EA on the basis that they do not affect the likelihood of an accident. These SAMDAs involve filtered containment vents and self-actuating containment isolation valves.

Response. The NRC disagrees that these three SAMDAs were inappropriately dismissed. The noted SAMDAs were assessed in terms of their respective benefits and implementation costs, and dismissed on the basis that they would not be cost-beneficial. In assessing benefits, SAMDAs were divided into two groups—those that impact core damage frequency (CDF), and those that impact containment performance but not CDF (including the SAMDAs in question). Although containment-related SAMDAs do not offer any benefits associated with reducing CDF (such as averted replacement power costs), the applicant conservatively assumed that all SAMDAs would completely eliminate all severe accident risk. More realistically, the CDF would not be impacted and the benefits would be much lower. Accordingly, these SAMDAs would not be cost-beneficial.

Comment summary. One SAMDA was inappropriately dismissed in the EA on the basis that it is not consistent with the AP1000 design objective of relying on passive systems. This SAMDA involves an active high-pressure safety injection system that would be capable of preventing a core melt for all but two types of events.

Response. The NRC disagrees that the SAMDA was inappropriately dismissed. Although the noted SAMDA was screened out on the basis that it is inconsistent with AP1000 design objectives, it would also have been eliminated on cost-benefit considerations. Specifically, even if this SAMDA were to eliminate all severe accident risk, the estimated costs of the SAMDA (at least $1 million, given the significant hardware and ongoing maintenance costs) would exceed the estimated benefits by several orders of magnitude.

Comment summary. The EA contains no assessment of the impact of an accidental or deliberate external rupture of the AP1000's unreinforced containment structure.

Response. For the reasons the Commission stated in detail in *Private Fuel Storage* (CLI-02-25, 12/18/2002), the NRC has no obligation under the National Environmental Policy Act (NEPA) to consider intentional malevolent acts, such as those directed against the United States on September 11, 2001, in conjunction with a licensing action. In short, the Commission recognizes that it cannot rule out the possibility of a terrorist threat to nuclear facilities, but finds that the possibility of a terrorist attack is speculative and simply too far removed from the natural or expected consequences of agency action to require a study under NEPA. As a practical matter, attempts to evaluate that threat even in qualitative terms are likely to be meaningless and consequently of no use in the agency's decision making. Moreover, although one of the purposes of NEPA is to inform the public of the environmental impacts of a regulatory action, the results of any attempted analysis of terrorism could not be made available to the public, for reasons associated with safeguards and physical security.

The Commission is devoting substantial time and agency resources to combating the potential for terrorism involving nuclear facilities and materials. In response to the September 11 attacks, the NRC staff is conducting a comprehensive review of its security and safeguards measures, and have instituted interim upgrades in security requirements for its licensees. The Commission is also working with numerous other government agencies to meet and minimize the threat of terrorism. Thus, although the Commission declines to consider terrorism in the context of NEPA, it is devoting significant attention to terrorism-related matters.

Comment summary. How can anyone do an "Environmental Assessment" or an FSER on a plant design that exists only on paper and has never been constructed completely to scale and operated anywhere in the world?

Response. The logical outgrowth of this argument is that no plant of new design could ever be built; the argument is circular. The purpose of an FSER and EA is to assess a nuclear plant design before it is constructed. The FSER is based on an evaluation of design information and the safety analyses of postulated accidents for that particular plant design. The SAMDA portion of the EA considers alternatives to the plant design that was evaluated in the FSER. The NRC's FSER and EA for the AP1000 standard plant design were used as the basis for this rulemaking.

Comment summary. The applicant's estimates of risk do not account for uncertainties in core damage frequency or in offsite radiation exposures resulting from a core damage event.

Response. The NRC disagrees with this comment. Although the NRC acknowledges that uncertainties are large and that several areas are incompletely modeled, as stated in the EA, even if the CDF and large release frequency were a factor of 10 higher, none of the SAMDAs would be cost-beneficial.

Comment summary. The Department of Energy (DOE) is going to subsidize "first of a kind" engineering costs for the first plants constructed of each of the new NRC-approved designs. Therefore, the applicant is not going to have to bear all costs considered in the analysis.

Response. The cost evaluations do not include the costs of design engineering or testing and maintenance for each design alternative. Including all or a portion of these costs would increase the overall implementation costs and decrease the cost-effectiveness of each SAMDA. Moreover, the possibility that DOE may pay for the "first of a kind" engineering costs for the first plants is not relevant, since that only addresses who is going to pay for such costs; the SAMDA analysis focuses on the overall cost to society.

Comment summary. There seems to be no inclusion in the cost-benefit analysis of the "benefit" to the applicant of a plant which has little or no severe accident risk. Westinghouse stands to gain significantly if the AP1000 is as safe as the AP600 is supposed to be.

Response. The comment appears to be based on the incorrect assumption that the SAMDA analysis and/or Regulatory Analysis should include benefits to an applicant utilizing the AP1000 design. The low level of risk estimated for the AP1000 design may be a benefit to the applicant with regard to marketability and public acceptance of the design. However, this is not a recognized or readily quantifiable attribute in the NRC methodology for value-impact analysis (NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook") and there is no precedent for its inclusion in regulatory analyses. Accordingly, this factor has not been included in the SAMDA evaluation.

Comment summary. The cost-benefit methodology overstates the costs and understates the benefits by including replacement power costs as part of the SAMDA implementation cost rather than as a benefit.

Response. The comment reflects a misunderstanding of how replacement power costs were treated in the assessment. Replacement power costs (more correctly, "averted replacement power costs") were included as a benefit for the various SAMDAs, and were not assumed to contribute to the SAMDA implementation costs.

Comment summary. The comment questions how one can estimate populations that are totally hypothetical, and why the entire population within a 50-mile radius of the plant is used in the analysis. The comment implies that use of the entire population would have the effect of diluting (reducing) the hypothetical exposure from an accident.

Response. Offsite consequences for the AP1000 design were evaluated using reference site information developed by the Electric Power Research Institute (EPRI) to represent potential sites where an AP1000 plant might be built. The reference site data was developed to represent or bound the consequences at approximately 80 percent of the reactor sites in the United States (see Section 19.4.2 of the AP1000 FSER). Exposure and offsite property impacts were estimated over a 50-mile radius from the plant site as prescribed in NUREG/BR-0058, Revision 4, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission." The population dose estimates represent the cumulative dose received by the entire population within the 50-mile radius. Consideration of the entire population increases rather than dilutes the hypothetical exposure from an accident.

Comment summary. The NRC accepts the applicant's assessment when the estimated implementation costs are higher than the estimated benefits, yet rejects the applicant's cost

estimates for SAMDAs whose implementation costs are within the range of the estimated benefits. One of the SAMDAs handled in this manner was self-actuating containment isolation valves.

Response. The NRC disagrees with the comment. The methodology for evaluating potential SAMDAs involves a multi-step screening process. SAMDAs whose implementation costs clearly exceed the conservatively-estimated benefits are screened from further consideration. Those SAMDAs whose implementation costs are within range of the estimated benefits are further assessed using more realistic assumptions regarding implementation costs and/or benefits. The SAMDA assessment for self-actuating containment isolation valves is an example of a SAMDA that survived the initial screening, but was subsequently judged not cost-beneficial under more realistic assumptions.

Comment summary. The SAMDA cost-benefit analysis is based on construction of a single unit, even though this design, once certified could be referenced for many plants. Thus, the costs of any re-engineering and re-analysis involved in the incorporation of any of the SAMDAs would effectively be spread over many plants.

Response. The staff agrees that the costs of any re-engineering and re-analyzing can be spread over many plants. However, this would not affect the measures of the SAMDA analysis because the applicant's cost estimates did not account for the costs of design engineering. Thus, most of the SAMDA implementation cost (e.g., the cost of installed hardware) would still be incurred at each unit regardless of whether additional units are constructed. In addition, even if all SAMDA implementation costs were assumed to be reduced by a factor of 10, to represent spreading all costs over 10 new units, none of the potential SAMDAs would become cost-beneficial when SAMDA benefits and implementation costs are estimated based on realistic assumptions.

Comment summary. The comment questions how cost considerations are allowed to influence the safety review and design certification process.

Response. The NRC disagrees that cost considerations have influenced the safety review. It is important to recognize the difference between the safety evaluation and the EA. The review of the AP1000 design with regard to the overall level of safety and its compliance with NRC's regulations is described in the AP1000 FSER. Costs are not an ordinary consideration in the NRC's safety evaluation, i.e., the design is required to meet all regulations regardless of cost unless an exemption is requested and costs are defined as a legitimate factor to be considered under one or more of the criteria in 10 CFR 50.12. In contrast, the scope and focus of the SAMDA review within the EA is on potential means by which plant risk can be further reduced. Costs are a legitimate consideration in this assessment, since the objective is to identify significant and practical improvements in plant design that do not impact excessively on the plant cost.

8.0 FINDING OF NO SIGNIFICANT IMPACT:

On the basis of the environmental assessment, the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has decided not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the design certification rule and the documents referenced in the statement of consideration for the final 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. Publicly available records will be accessible electronically from the Agencywide Documents Access and

Management System (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 pdr@nrc.gov.