

[7590-01-P]

**NUCLEAR REGULATORY COMMISSION**

**10 CFR Part 52**

**RIN 3150-A181**

**NRC-2010-0131**

**AP1000 Design Certification Amendment**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Final rule.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC or Commission) is amending its regulations to certify an amendment to the AP1000 standard plant design. The amendment replaces the combined license (COL) information items and design acceptance criteria (DAC) with specific design information, addresses the effects of the impact of a large commercial aircraft, incorporate design improvements, and increases standardization of the 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)), and need not demonstrate in their applications the safety of the certified design as amended. The applicant for this amendment to the AP1000 design is Westinghouse Electric Company, LLC (Westinghouse).

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

**ADDRESSES:** You can access publicly available documents related to this action (see Section VI. Availability of Documents) using the following methods:

- **NRC's Public Document Room (PDR):** The public may examine and have copied, for a fee, publicly available documents at the NRC's PDR, O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.
- **NRC's Agencywide Documents Access and Management System (ADAMS):** Publicly available documents created or received at the NRC are available online in the NRC Library at <http://www.nrc.gov/reading-rm/adams.html>. From this page, the public can gain entry into ADAMS, which provides text and image files of the NRC's public documents. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC's PDR reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).
- **Federal Rulemaking Web site:** Public comments and supporting materials related to this final rule can be found at <http://www.regulations.gov> by searching on Docket ID NRC-2010-0131. Address questions and concerns regarding NRC dockets to Carol Gallagher; telephone at 301-492-3668; e-mail: [Carol.Gallagher@nrc.gov](mailto:Carol.Gallagher@nrc.gov).

**FOR FURTHER INFORMATION CONTACT:** Ms. Serita Sanders, Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; telephone at 301-415-2956; e-mail: [serita.sanders@nrc.gov](mailto:serita.sanders@nrc.gov).

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#### **I. Background**

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Subpart B, presents the process for obtaining standard design certifications. Section 52.63, "Finality of standard design certifications," provides criteria for determining when the Commission may amend the certification information for a previously certified standard design in response to a request for amendment from any person.

The NRC originally approved the AP1000 design certification in a final rule in 2006 (71 FR 4464; January 27, 2006). The final AP1000 DCR incorporates by reference Revision 15 of the design control document (DCD) (ADAMS Accession No. ML053460400), which describes the AP1000 certified design. During its initial certification of the AP1000 design, the NRC issued a final safety evaluation report (FSER) for the AP1000 as NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," in September 2004 (ADAMS Accession No. ML043570339) and Supplement No. 1 to NUREG-1793 (ADAMS Accession No. ML053410203).

From March 2006 through May 2007, NuStart Energy Development, LLC (NuStart)<sup>1</sup> and Westinghouse provided the NRC with a number of technical reports (TRs) for pre-application review of a possible amendment to the approved AP1000 certified design, in order to: 1) close specific, generically applicable COL information items (information to be supplied by COL applicants/holders) in the AP1000 certified standard design; 2) identify standard design changes resulting from the AP1000 detailed design efforts; and 3) provide specific standard design information in areas or for topics where the AP1000 DCD was focused on the design process and acceptance criteria. TRs typically addressed a topical area (e.g., redesign of a component, structure or process) and included the technical details of a proposed change, design standards, analyses and justifications as needed, proposed changes to the DCD, and Westinghouse's assessment of the applicable regulatory criteria (e.g., the assessment of the criteria in 10 CFR Part 52, Appendix D, Section VIII, "Processes for Changes and Departures"). The NRC identified issues associated with the TRs and engaged Westinghouse in requests for additional information and meetings during the pre-application phase to resolve them.

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<sup>1</sup> The NuStart member companies are: Constellation Generation Group, LLC, Duke Energy Corporation, EDF-International North America, Inc., Entergy Nuclear, Inc, Exelon Generation Company, LLC, Florida Power and Light Company, Progress Energy, and Southern Company Services, Inc.

On May 26, 2007, Westinghouse submitted, via transmittal letter (ADAMS Accession No. ML071580757), an application to amend the AP1000 DCR. The application included Revision 16 of the DCD (ADAMS Accession No. ML071580939). This application was supplemented by letters dated October 26 (ADAMS Accession No. ML073120415), November 2 (ADAMS Accession No. ML073090471), and December 12, 2007 (ADAMS Accession No. ML073610541), and January 11 (ADAMS Accession No. ML080150513) and January 14, 2008 (ADAMS Accession No. ML080220389). The application noted, in part:

1) Generic amendments to the design certification, including additional design information to resolve DAC and design-related COL information items, as well as design information to make corrections and changes, would result in further standardization and improved licensing efficiency for the multiple COL applications referencing the AP1000 DCR that were planned for submittal in late 2007 and early 2008.

2) Westinghouse, in conjunction with NuStart, has been preparing TRs since late 2005. These TRs were developed with input, review, comment, and other technical oversight provided by NuStart members, including the prospective AP1000 COL applicants. Submittal of these TRs to the NRC was initiated in March 2006. The TRs contain discussion of the technical changes and supplemental information that is used to support the detailed information contained in the DCD.

In Attachment 2 to the May 26, 2007, application, Westinghouse identified the criteria of 10 CFR 52.63(a)(1) that apply to the changes described in each TR and associated COL information items, if applicable.

On January 18, 2008, the NRC notified Westinghouse that it accepted the May 26, 2007, application, as supplemented, for docketing (Docket No. 52-006) and published a notice of acceptance (ADAMS Accession No. ML073600743) in the *Federal Register* (73 FR 4926; January 28, 2008). On September 22, 2008, Westinghouse submitted Revision 17 to the AP1000 DCD. Revision 17 contained changes to the DCD that had been previously accepted

by the NRC in the course of its review of Revision 16 of the DCD. In addition, Revision 17 proposed changes to DAC in the areas of piping design (Chapter 3), instrumentation and control (I&C) systems (Chapter 7) and human factors engineering (HFE) (Chapter 18).

The NRC issued guidance on the finalization of design changes in Interim Staff Guidance (ISG) DC/COL-ISG-011, "Finalizing Licensing-basis Information," (ADAMS Accession No. ML092890623), which describes various categories of design changes that should not be deferred and those that should be included in the DCR.

By letter dated January 20, 2010, Westinghouse submitted a list of design change packages that would be included in Revision 18 of the AP1000 DCD (ADAMS Accession No. ML100250873). A number of subsequent submittals were made by Westinghouse to narrow the focus to those design changes to the categories of changes that should not be deferred, as recommended by DC/COL-ISG-011.

Revision 18 to the AP1000 DCD (ADAMS Accession Nos. ML103480059 and ML103480572) was submitted on December 1, 2010, and contains both proposed changes previously described in the design change packages and changes already accepted by the NRC in the review process of Revision 17 to the AP1000 DCD.

In the course of its ongoing review of the amendment application, the NRC determined that changes from information in Revision 15 to the DCD were needed. In response to NRC questions, Westinghouse proposed such changes. Once the NRC was satisfied with these DCD markups, they were documented in the advance safety evaluation report (SER) as confirmatory items (CIs). The use of CIs is restricted to cases where the NRC has reviewed and approved specific DCD proposals. With the review of Revision 18, the NRC has confirmed that Westinghouse has made those changes to the DCD accepted by the NRC that were not addressed in Revision 17 to the AP1000 DCD. For the final rule, the NRC has completed the review of the CIs and prepared a FSER reflecting that action. The CIs were closed based upon

an acceptable comparison between the revised DCD text and the text required by the CI. As further discussed later, Revision 19 is the version being certified in the final rule.

In order to simplify the NRC’s review of the design change documentation, and to simplify subsequent review by the NRC’s Advisory Committee on Reactor Safeguards (ACRS), the design changes pursuant to DC/COL-ISG-011 are reviewed in a separate chapter (Chapter 23) of the FSER. This chapter indicates which areas of the DCD are affected by each design change and the letters from Westinghouse that submitted them. In some cases, the NRC’s review of the design changes reviewed in Chapter 23 may be incorporated into the chapters of the FSER where this material would normally be addressed because of the relationship between individual design changes and the review of prior DCD changes from Revisions 16 and 17 of the DCD.

The Westinghouse Revision 18 DCD includes an enclosure providing a cross-reference to the DCD changes and the applicable 10 CFR 52.63(a)(1) criteria. Revision 17 provides a similar cross-reference within the September 22, 2008, Westinghouse letter for those changes associated with the revised DCD. Revision 16, on the other hand, uses TRs to identify the DCD changes and lists the corresponding applicable 10 CFR 52.63(a)(1) criteria via Westinghouse letter, dated May 26, 2007 (Table 1). Revision 19 has a cross-reference similar to Revisions 17 and 18.

As of the date of this document, the application for amendment of the AP1000 design certification has been referenced in the following COL applications:

Vogtle, Units 3 and 4	Docket No. 05200025/6	73 FR 33118
Bellefonte Nuclear Station, Units 3 and 4	Docket Nos. 05200014/5	73 FR 4923
Levy County, Units 1 and 2	Docket Nos. 05200029/30	73 FR 60726
Shearon Harris, Units 2 and 3	Docket Nos. 05200022/3	73 FR 21995
Turkey Point, Units 6 and 7	Docket Nos. 05200040/1	74 FR 51621

Virgil C. Summer, Units 2 and 3	Docket Nos. 05200027/8	73 FR 45793
William States Lee III, Units 1 and 2	Docket Nos. 05200018/9	73 FR 11156

## II. Summary of Analysis of Public Comments on the Proposed Rule

### A. Overview of Public Comments

The NRC published the proposed rule amending the AP1000 DCR in the *Federal Register* on February 24, 2011 (76 FR 10269). The public comment period for the proposed rule closed on May 10, 2011. The NRC received a large number of comment submissions for the proposed rule (AP1000 rulemaking) from members of the public, non-governmental organizations, and the nuclear industry. A comment submission means a communication or document submitted to the NRC by an individual or entity, with one or more distinct comments addressing a subject or an issue. A comment, on the other hand, refers to statements made in the submission addressing a subject or issue.

The NRC received more than 13,500 comment submissions, which appear to be variations of two letters with largely similar content. These comment submissions also contained approximately 100 separate comments. The NRC also received 66 additional comment submissions containing over 100 comments. Finally, the NRC received four “petitions” to suspend or terminate this rulemaking, which are being treated as public comments. The petitions set forth approximately 39 comments. As stated in the proposed rule, “Comments received after May 10, 2011 will be considered if it is practical to do so, but assurance of consideration of comments received after this date cannot be given.” The NRC determined that it was practical to consider comment submissions received on or before June 30, 2011. Five of the comment submissions were received after the 75-day comment period closed, and the NRC has addressed these late-filed comment submissions as part of this final rule (the numbers above reflect those late-filed comments, which were deemed practical to consider). These late comment submissions consisted of one petition, two submissions

requesting the NRC to reconsider comments made during the initial AP1000 DC rulemaking, and two submissions with supplemental information to support suspending this rulemaking. The NRC also received several comment submissions after June 30, 2011. Although the NRC deemed that it was not practical to consider, in this rulemaking, comments received after June 30, 2011 and, therefore, does not provide responses to those comments. However, the NRC has briefly reviewed them to ensure that they contain no health and safety matters.

There were several commenters in favor of completing the AP1000 rulemaking, while some were unconditionally opposed to completing the proposed amendment to the AP1000 design. The vast majority of commenters favored delaying (in some fashion) the AP1000 amendment rulemaking until lessons are learned from the Fukushima Daiichi Nuclear Power Plant (Fukushima) accident that occurred on March 11, 2011, and the NRC applies the lessons learned to U.S. nuclear power plants, including the AP1000 design.

Before responding to specific comments based upon the Fukushima Daiichi Nuclear Power Plant Event, the NRC is providing this discussion about the ongoing actions underway in response to this event. The Commission created a Near-Term Task Force (NTTF) to conduct an analysis of the lessons that can be learned from the event. The task force was established to conduct a systematic and methodical review of NRC processes and regulations to determine whether the NRC should make additional improvements to its regulatory system. The NTTF issued a report (ADAMS Accession No. ML111861807) evaluating currently available technical and operational information from the events, and presented a set of recommendations to the Commission. The task force concluded that continued operation and continued licensing activities do not pose an imminent risk to public health and safety. Among other recommendations, the NTTF supports completing the AP1000 design certification rulemaking activity without delay (see pages 71-72 of the report).

In an August 19, 2011, Staff Requirements Memoranda (SRM) (ADAMS Accession No. ML112310021), the Commission set forth actions related to the NTTF report together with a

schedule for the conduct of those actions. Two of those actions have been completed and are documented in the following reports: "Recommended Actions to Be Taken Without Delay from the Near-Term Task Force Report," September 9, 2011 (SECY-11-0124) (ADAMS Accession No. ML11245A127) and "Prioritization of Recommended Actions to be Taken In Response to Fukushima Lessons Learned," October 3, 2011 (SECY-11-0137) (ADAMS Accession No. ML11269A204).

Inasmuch as the NTTF recommendations relevant to the AP1000 design certification are limited to: seismic and flooding protection (Recommendation 2); mitigation of prolonged station blackout (Recommendation 4); and enhanced instrumentation and makeup capability for spent fuel pools (Recommendation 7) and the task force concluded that by the nature of its passive design and inherent 72-hour coping capability, AP1000 designs have many of the design features and attributes necessary to address the Task Force recommendations, the NRC concludes that no changes to the AP1000 DCR are required at this time. Moreover, even if the Commission concludes that at a later time that some additional action is needed for the AP1000, the NRC has ample opportunity and legal authority to modify the AP1000 DCR to implement NRC-required design changes, as well as to take any necessary action to ensure that COLs, which reference the AP1000, also make the necessary design changes.

The NRC organized the comments on the AP1000 amendment into the following subject areas: Fukushima-related, shield building, containment, severe accident mitigation design alternative (SAMDA), spent fuel, environmental, other AP1000 topics and general concerns. Some comments opposed the AP1000 rulemaking until purported shield building flaws are corrected. Many comments opposed completing the AP1000 rulemaking for reasons outside the scope of this rulemaking. For example, many comments opposed the completion of the AP1000 rulemaking until there is resolution of high level radioactive waste storage issues.

Due to the large number of comments received and the length of the NRC responses provided, this section of the statement of considerations (SOC) for the final rule amending the

AP1000 design certification only provides a summary of the categories of comments with a general description of the resolution of those comments. A detailed description of comments and the NRC's response is contained in a comment response document, which is available electronically through ADAMS Accession No. ML112212319.

*B. Description of Key Structures of the AP1000 Design*

This section is provided to help readers understand the issues and the NRC's responses. The following is a brief description of the three design features and a summary of the design changes that are being approved by the AP1000 amendment.

Containment

The containment vessel is a single steel pressure vessel, inside which is located the reactor vessel with the nuclear fuel, the steam generators, the refueling water storage tank, and various equipment for power generation, refueling, and emergency response, and supporting electric power, control, and communications.

The steel containment building stands independently inside the shield building. The containment's primary purpose is to retain pressure up to the maximum "design pressure" should an accident occur in which the reactor vessel or associated equipment releases reactor coolant into the containment atmosphere. The containment also acts as the passive safety-grade interface to the ultimate heat sink.

The primary containment vessel prevents the uncontrolled release of radioactivity to the environment. The AP1000 primary containment consists of a cylindrical steel shell with ellipsoidal upper and lower heads. The steel thickness is increased in the transition region where the cylindrical shell enters the foundation concrete to provide additional margin in consideration of corrosion.

Safety-related coatings are applied to both the interior and exterior surfaces of the containment vessel. These coatings have several functions. For the exterior surface, the corrosion-resistant paint or coating for the containment vessel is specified to enhance surface

wet-ability and film formation, as well as for corrosion protection. Wet-ability and film formation are important to the passive cooling function. For the inside containment surfaces, the coatings are designed to remain intact within the zone-of-influence of any postulated pipe break (or to result in settling of any resultant debris), to facilitate heat transfer to the containment vessel and for corrosion protection. Periodic inspections are required of the containment internal and external surfaces and of the coatings on those surfaces.

As the interface to the ultimate heat sink (the surrounding atmosphere), the primary containment is an integral component of the passive containment cooling system. The exterior of the containment vessel provides a surface for evaporative film cooling and works in conjunction with the natural draft airflow created by the shield building baffle and chimney arrangement to reduce the pressure and temperature of the containment atmosphere following a design-basis accident (DBA). The source of water for the evaporative cooling is the passive containment cooling water storage tank, located at the top of the shield building.

Design changes within the scope of the amendment with respect to the containment vessel are certain details about coatings with respect to long-term core cooling capability and the calculated peak accident pressure (from correction of errors). Other changes included addition of a vacuum relief system to provide protection for external pressure events.

### Shield Building

The shield building performs multiple functions (e.g., to provide a biological shield to high-energy radiation, to support the primary containment cooling water storage tank on the roof, to shield the steel containment from high velocity debris that may be generated by tornadoes or other natural phenomena, to protect the containment from aircraft impact, and to function as a “chimney” to enhance airflow over the primary steel containment to remove heat from the containment and reduce containment pressure in the event that post accident cooling of the containment would be necessary). While other designs have included shield buildings of reinforced concrete, with the exception of the AP600 design, they did not perform cooling

functions. The shield building is not intended to be a pressure retaining structure or to mitigate the effects of a containment failure. The shield building construction is primarily a steel-concrete composite module wall, with a reinforced concrete roof and reinforced concrete where the wall meets the foundation. The wall is appropriately reinforced and sized where the composite wall module joins the reinforced concrete sections and as appropriate to accommodate seismic loads and aircraft loads. This design is new to the amendment; previously the structure was all reinforced concrete.

The shield building and the containment are designed with a gap, or annulus, that ensures that both the shield building and steel containment are physically separate, excluding their foundation, and are considered to be “freestanding.” In the shield building, air flows from the environment through openings in the shield building wall. The air then flows down along an interior baffle, turns toward the steel containment vessel, and then rises alongside the steel containment vessel where it absorbs heat. This heated air naturally rises and is then exhausted through the chimney located in the center of the primary containment cooling storage water tank.

Design changes to the passive containment cooling system and shield building principally involve the redesign of the shield building to a steel-composite design, with related changes to air inlet sizing, height of the building and gratings above the chimney opening. Revised safety analyses were performed to confirm adequate containment pressure control, capability of the shield building to withstand external events (tornado, seismic), as well as aircraft impact assessment. The shield building functions to protect the containment and facilitate passive containment cooling were not changed in the current amendment.

#### Spent Fuel Pool

The spent fuel pool (SFP) is a safety-related structure, housed in the auxiliary building that provides protection from aircraft impact or other external hazards.

For the first 72 hours, the spent fuel pool including response to a station blackout (SBO) event relies upon the natural heat capacity of the water in the pool to absorb the heat from spent

fuel elements, and boil the water in the pool. Thus, the safety-related means of heat removal for 72 hours is by heat-up of the volume of water in the pool and in safety-related water sources such as the cask washdown pit. The AP1000 design (as initially certified) included safety-related water level indication with readout and alarm in the main control room. A nonsafety-related spent fuel pool cooling system is also installed. Onsite, protected sources of water are available for up to 7 days, controlled from areas away from the pool. In modes with high heat load in the pool, two sources of ac power are specified in the availability controls. Water can be sprayed into the pool from two nozzle headers on opposite sides of the pool. A cross-connection also exists to the residual heat removal system. Those design features needed to provide make-up water after 72 hours and up to 7 days, such as the passive containment cooling water ancillary storage tank, and ancillary diesel generators, are protected from external hazards including the safe-shutdown earthquake (SSE), tornado, and flooding.

Design changes within the scope of the current amendment are the number of fuel assemblies stored, the rack designs for new and spent fuel storage, the criticality analysis for spent fuel in the pool (including use of boron material attached to the storage cells), installation of spray headers, and credit for additional water sources for pool makeup.

### C. Significant Public Comments and Overall NRC Responses

*Comment:* Many comments noted the NRC staff nonconcurrency on the shield building design and requested that the NRC should reconsider the views expressed in the nonconcurrency.

*NRC Response:* The NRC disagrees with these comments. Professional opinions may vary, and the NRC has in place mechanisms for making differing views known.

NRC employees can choose to exercise the nonconcurrency process as a way of communicating their views and ensuring their opinions are heard by NRC management. The NRC staff individual who authored the nonconcurrency used this open process to express concerns regarding the safety of the AP1000 shield building design. The specific concerns and

staff response to the nonconcurrency are publically available (ADAMS Accession No. ML103370648).

The NRC concluded that the AP1000 shield building design is safe, meets the Commission's regulations, and provides reasonable assurance that the building will remain functional under design-basis loads. The comments did not offer new information on the matters related to the nonconcurrency nor did they include rationale showing the NRC's resolution of the technical matters raised in the nonconcurrency to be incorrect. No change was made to the final rule, DCD, or environmental assessment (EA) as a result of these comments.

*Comment:* One comment noted that the spent fuel racks' design in Revision 18 increased the density. The higher density fuel pools require boron shields between stored assemblies to reduce the risk of criticality. The comment stated that such re-racking introduces potential partial loss of cooling water, possible fire of spent fuel assemblies, and release of large inventories of cesium-137 and other radionuclides.

*NRC Response:* The NRC agrees that, under the proposed amendment of the AP1000 DCR, the capacity of the spent fuel pool racks would be increased from 619 to 889 (rather than 884 as asserted by the comment) fuel assemblies, and that the increased density of fuel assemblies being stored in the spent fuel pool requires the use of boron shields as part of the amendment.

However, the NRC disagrees with this comment's assertion that the increased capacity and density would introduce potential lost of cooling water, resulting in a possible fire of spent fuel assemblies and large releases of radionuclides. The comment did not explain how increased fuel capacity and concomitant increase in density of the spent fuel pool would "introduce" potential loss of cooling water as compared with the capacity and density described in DCD Revision 15. The NRC does not believe that the increased capacity and density leads to a new (previously un-described or unconsidered) way of losing spent fuel pool cooling water.

The NRC evaluated the proposed increase in fuel assembly capacity and density, and the effectiveness of the Westinghouse-proposed boron shields to ensure against re-criticality of the spent fuel stored in the spent fuel pool. The AP1000 DCD Revision 18 SFP criticality analysis was reviewed following the guidance found in NUREG-0800 Section 9.1.1, Revision 3, "Criticality Safety of Fresh and Spent Fuel Storage and Handling," to ensure that the applicant is in compliance with the applicable regulations (General Design Criterion 62, "Prevention of Criticality in Fuel Storage and Handling," and 10 CFR 50.68, "Criticality Accident Requirements"). These requirements are generally performance-based with limitations on the reactivity values, and as such, there are no specific physical design requirements such as minimum geometric spacing which must be met. The AP1000 SFP criticality analysis demonstrates that, with the proposed storage arrangement of the SFP, the reactivity requirements are met, and no regulations are violated. Therefore, the NRC determined that the AP1000 spent fuel pool storage arrangement is acceptable. No change was made to the rule, the DCD, or the EA as a result of this comment.

*Comment:* Several comments stated that given the recent event at the Fukushima plant in Japan, the 75-day comment period is not adequate and should be extended.

*NRC Response:* The NRC disagrees with this comment, and believes that the 75-day public comment period, which is consistent with most other NRC technical rulemakings, is adequate. The Commission established a NTTF to review relevant NRC regulatory requirements, programs, and processes, and their implementation, and to recommend whether the agency should make near-term improvements to its regulatory system. The public comment period for the proposed rule on the AP1000 design certification amendment closed on May 10, 2011, and the NTTF issued its report (ML111861807) on July 12, 2011. The NTTF considered the AP1000 design certification amendment in its report and noted that it has passive safety systems. By nature of their passive designs and inherent 72-hour coping capability for core, containment, and spent fuel pool cooling, the AP1000 designs have many of the design features

and attributes necessary to address the NTTF recommendations. The NTTF supports completing the AP1000 design certification rulemaking activities without delay.

The NRC believes that the AP1000 final rulemaking can and should proceed without extending the public comment period because: (i) the NRC has determined that the AP1000 design certification amendment meets current regulations; (ii) the NRC will provide an opportunity for the public to provide input on NTTF recommendations, and (iii) if the NRC imposes additional requirements on the AP1000 design, existing regulations already define the process for doing so. No change was made to the rule, the DCD, or the EA as a result of this comment.

*Comment:* One comment questioned whether the NRC endorsed NQA-1-1994 for work performed for the AP1000 project, where the NRC documented that NQA-1-1994 adequately meets the NRC requirements in the *Code of Federal Regulations*, and whether the Westinghouse's AP1000 design meets the requirements of 10 CFR Part 50, Appendix B.

*NRC Response:* The NRC disagrees with this comment. The NRC has, in application-specific requests for NRC approval of quality assurance programs, approved the use of NQA-1-1994 as an acceptable method to meet the requirements of Appendix B to 10 CFR Part 50. The NRC's approvals of NQA-1-1994 have been documented in NRC SERs on those requests.

The NRC believes that the AP1000 design meets the requirements of 10 CFR Part 50, Appendix B. By letter dated February 23, 1996 (available in ADAMS legacy library), the NRC issued a safety evaluation report approving Revision 1 of the Westinghouse Quality Systems Manual (Westinghouse Quality Assurance (QA) Manual). The Westinghouse QA Manual is based upon the guidance in NQA-1-1994. The NRC found that the Westinghouse QA Manual meets all the requirements of Appendix B. In addition, the NRC concluded in its FSER for the amendment that Revision 5 of the Westinghouse Quality Systems Manual, as described in the AP1000 Design Control Document, Revision 17, meets the criteria of Appendix B with respect to

AP1000 quality assurance. No change was made to the final rule, the DCD, or the EA as a result of this comment.

*Comment:* Several comments claimed the containment design was flawed because the containment cooling method includes convective air flow and because the steel containment could be subject to corrosion. As a result, they state that Westinghouse has not satisfactorily proved that the thin steel containment shell over the reactor would be effective during severe accidents.

*NRC Response:* The NRC considers these comments to be outside the scope of the rulemaking amending the AP1000 DCR. These features of the AP1000 design that demonstrate that the containment shell would be effective during severe accident conditions, as well as resistant to corrosion have already been certified with Revision 15. The proposed amendment to the AP1000 design does not propose any modification to these features and, therefore, the comment is outside the scope of for this rulemaking.

The NRC considers a single metal containment vessel to be acceptable if it meets the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, Subsection NE. This part of the ASME Code contains requirements for the material, design, fabrication, examination, inspection, testing, and overpressure protection of metal containment vessels. Many such vessels are in use at operating nuclear power plants. The AP1000 containment is designed to meet ASME requirements for a pressure of 6.9 kPa (59 psi) and a temperature of 149 degrees C (300 degrees F). Its thickness includes an allowance for corrosion that may occur over the 60-year design life of the plant.

The AP1000 containment building has an additional function – transferring heat from containment to the atmosphere. The staff has reviewed the applicant’s analysis, which shows that the containment building and the shield building, working as a system, would transfer heat to the atmosphere during severe accidents as well as design-basis earthquakes. Experiments

were conducted to demonstrate that these predictions are based upon physical phenomena that can be relied upon to work even when there is no ac power. In short, Westinghouse has demonstrated that the containment building is robust and will perform its safety functions effectively if a severe accident occurs at an AP1000 plant.

The commenters did not offer any basis for Westinghouse to revise its design or for the NRC to revise its evaluation. No change was made to the final rule, the DCD, or the EA as a result of these comments.

*Comment:* Many comments stated that Westinghouse has not proven that the reactor could be properly cooled in conditions similar to those at Fukushima.

*NRC Response:* The NRC considers these comments to be outside the scope of the rulemaking amending the AP1000 DCR. The Fukushima event involved an extended SBO (loss of offsite and onsite ac power). Westinghouse has shown that the AP1000 includes design features that keep the reactor properly cooled under these conditions. The features of the AP1000 design ensuring that the reactor can be properly cooled in conditions similar to those at Fukushima are already part of the certified design for the AP1000, and are not being changed or modified by this final rule amending the AP1000 design. Therefore, these comments are out of scope for this rulemaking.

In addition, even if these comments are assumed to be within the scope of the rulemaking, the NRC disagrees with the comment. If a severe accident occurs, seriously damaging the core, the AP1000 containment can be adequately cooled for 3 days – even if a loss-of-coolant accident (LOCA) occurred and without any ac power – because the AP1000 containment is cooled by gravity-fed water from a tank located at the top of the containment. After 3 days with no ac power, only a small “ancillary” generator is needed. This generator is used to power a small pump that re-fills the tank that supplies water to the outside surface of the containment. The generator could be brought to the site; however, in an AP1000 design, two such generators are installed in a seismically qualified structure (along with fuel and supporting

equipment). After 1 week, the containment can be cooled indefinitely as long as fuel for at least one ancillary generator is provided and there is water to replenish the water tank above the shield building, as discussed in the DCD.

These comments did not present any basis that would support an NRC determination that the AP1000 design is deficient in this regard. No change was made to the final rule, the DCD, or the EA as a result of these comments.

*Comment:* Some comments stated that there are significant unresolved technical issues related to Revision 19 changes and that the NRC has not fully disclosed its analysis of these weaknesses, and the existence of such weaknesses is evidenced by the concerns identified by Dr. Susan Sterrett, Mr. Arnie Gundersen of Fairewinds Associates, and Dr. John Ma.

*NRC Response:* The NRC disagrees with this comment. As discussed in more detail in the comment response document, the NRC concludes these issues were either resolved as part of the initial AP1000 rulemaking, or are resolved as part of this rulemaking. Elsewhere in this notice, NRC discusses the Revision 19 changes and summarizes the response to the other technical issues.

*Comment:* Many comments expressed views that nuclear power plants are too expensive or too dangerous, or that alternative energy sources should be pursued.

*NRC Response:* The NRC considers these comments to be outside the scope of the rulemaking amending the AP1000 DCR. The NRC has concluded that the AP1000 design meets its regulatory requirements, and the comments do not offer any basis that this is not supported. Other issues about expense or alternative energy sources are outside the scope of the rulemaking amending the AP1000 DCR. A design certification rule is not an NRC license or authorization for construction or operation. No change was made to the final rule, the DCD, or the EA as a result of these comments.

*Comment:* Many comments expressed concerns about nuclear waste.

*NRC Response:* These comments address matters that are outside the scope of the rulemaking amending the AP1000 DCR. These comments do not address whether the AP1000 design changes, as reflected in the amendment application and evaluated in the NRC's SER and EA, meet the applicable NRC requirements. No change was made to the final rule, the DCD, or the EA as a result of these comments.

### **III. Discussion**

#### *A. Technical Evaluation of Westinghouse Amendment to the AP1000 Design*

Westinghouse's request to amend the AP1000 design contained several classes of changes. Each class is discussed below:

##### Editorial Changes

Westinghouse requested changes to the AP1000 DCD to correct spelling, punctuation, grammar, designations, and references. None of these changes make substantive changes to the certified design, and NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," Supplement 2 (SER) does not address these changes.

##### Changes to Address Consistency and Uniformity

Westinghouse requested changes to the currently-approved AP1000 DCD (Revision 15) to achieve consistency and uniformity in the description of the certified design throughout the DCD. For example, a change to the type of reactor coolant pump (RCP) motor is evaluated in Chapter 5 of the SER on the application for the AP1000 amendment; Westinghouse requested that wherever this RCP motor is described in the DCD, the new description of the changed motor be used. The NRC reviewed the proposed change (to be used consistently throughout the DCD) to ensure that the proposed changes needed for uniformity and consistency are technically acceptable and do not adversely affect the previously approved design description. The NRC's bases for approval of these changes are set forth in the SER for the AP1000 amendment.

Substantive Technical Changes to the AP1000 Design (other than those needed for compliance with the AIA rule)

Among the many technical changes to the currently-approved DCD Revision 15 that are proposed by Westinghouse for inclusion in Revision 19 of the AP1000 DCD, the NRC selected 15 substantive changes for specific discussion in this final rule document, based on their safety significance:

- Removal of HFE DAC from the DCD
- Change to I&C DAC and Inspection, Test, Analysis, and Acceptance Criteria (ITAAC)
- Minimization of Contamination
- Extension of Seismic Spectra to Soil Sites and Changes to Stability and Uniformity of Subsurface Materials and Foundations
- Long-Term Cooling
- Control Room Emergency Habitability System
- Changes to the Component Cooling Water System (CCWS)
- Changes to I&C Systems
- Changes to the Passive Core Cooling System (PCCS) – Gas Intrusion
- Integrated Head Package (IHP) – Use of the QuickLoc Mechanism
- Reactor Coolant Pump Design
- Reactor Pressure Vessel (RPV) Support System
- SFP Decay Heat Analysis and Associated Design Changes
- Spent Fuel Rack Design and Criticality Analysis
- Vacuum Relief System

The NRC evaluated each of the proposed changes and concluded that they are acceptable. The NRC's bases for approval of these changes are set forth in the FSER for the

AP1000 amendment and are summarized in Section XII, "Backfitting and Issue Finality,," of this document, as part of the discussion as to how each of the 15 changes satisfy the criteria in e10 CFR 52.63(a).

#### Changes to Address Compliance with the AIA Rule

Westinghouse requested changes to the AP1000 design in order to comply with the requirements of the AIA rule, 10 CFR 50.150. The NRC confirmed that Westinghouse has adequately described key AIA design features and functional capabilities in accordance with the AIA rule and conducted an assessment reasonably formulated to identify design features and functional capabilities to show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact. In addition, the NRC determined that there will be no adverse impacts from complying with the requirements for consideration of aircraft impacts on conclusions reached by the NRC in its review of the original AP1000 design certification. The NRC's bases for approval of these changes are set forth in the FSER for the AP1000 amendment. As a result of these changes, the AP1000 design will achieve the Commission's objectives of enhanced public health and safety and enhanced common defense and security through improvement of the facility's inherent robustness to the impact of a large commercial aircraft at the design stage.

#### AP1000 Design Control Document Changes Since Revision 18

##### Introduction

The NRC staff's (staff's) review of DCD Revision 18 (ADAMS Accession No. ML103260072) identified a few areas where the DCD wording should be revised for clarity, to resolve internal inconsistencies, or to provide updated versions of referenced technical reports. In addition, three technical issues were noted: a load combination for the shield building, the method used to evaluate tank sloshing, and containment peak pressure analysis error correction. As a result of these activities, Westinghouse submitted Revision 19 of the DCD on June 13, 2011 (ADAMS Accession No. ML11171A315), and is the version of the DCD that is

being certified by this final rule. The NRC has determined that none of the changes from Revision 18 to Revision 19 of the DCD require an additional opportunity for public comment. These changes, which are organized into five subject areas, are discussed below.

The NRC has also determined, in its review of Revision 19, that three of the five subject areas must be identified as Tier 2\* matters in the Section VIII of the final rule. The NRC has determined that none of the three new Tier 2\* designations in Section VIII.B.6 of the rule require an additional opportunity for public comment. The bases for the NRC's determinations are set forth below.

#### *DCD Structural Design Information and Shield Building Tier 2\* Information*

Revision 18 of the DCD moved some design details regarding structures, including the shield building, from supporting Westinghouse documents into the DCD itself. Some of the details were marked as Tier 2\*, based upon initial NRC staff comments. For example, information about penetrations was brought out of TR-9 into the DCD, and the shield building structural description was added to Section 3.8.4 in Revision 18.

The advanced final safety evaluation report (AFSER) included a confirmatory item to verify that the DCD appropriately reflected all necessary details regarding the structural design and shield building, and clearly showed which design details were to be Tier 2\* (see AFSER Section 3.8.4 under ADAMS Accession No. ML103430502). The staff was able to close the confirmatory item after Westinghouse submitted Revision 19 of the DCD, by verifying the appropriate structural details were in the DCD and the design details were identified as Tier 2\*. These DCD revisions enhanced the description of the design and were not a result of changes to the design itself. Westinghouse report GLR-603, submitted on March 28, 2011 (ADAMS Accession No. ML110910541), was the nonproprietary version of the report that presented shield building information to be made Tier 2\* (those aspects that were also proprietary), in addition to the DCD information added to Section 3.8 and Appendix 3H. The scope of the report was materials, connection details, and tie bar spacing.

Use of steel composite modules was the heart of the revised shield building design, including the NRC's determination that existing consensus standards are not technically applicable in all respects to the analysis for such modules. This was a key factor in the NRC conclusion that design details about the shield building are Tier 2\* so that any future changes to that information by the COL would receive prior staff review and approval. The staff considered the existing rule language as it relates to Tier 2\* designation for structural information. For example, the existing rule includes use of ACI-349, definition of critical locations and thicknesses, nuclear island structural dimensions, and design summary of critical sections. Some of the critical sections are within the shield building, and ACI-349 was part of the design criteria. However, the staff concluded, during the course of final rule preparation, that the rule would be more clear if the use of steel composite module details that are designated in the DCD as Tier 2\* was explicitly stated in the final rule (at Section VIII.B.6.c) and requested that Westinghouse designate this information at Tier 2\* in Revision 19 of the DCD. Westinghouse included this change in Revision 19. As a result of the Tier 2\* markings, a conforming change is being made to the final rule language to Section VIII.B.6.c about the categories of Tier 2\* information that would expire at fuel load.

The NRC does not believe that the DCD changes or the designation of this information as Tier 2\* in the final rule require re-noticing. The material was publicly available in referenced reports, the staff's intention that the composite steel module design be designated Tier 2\* was clear at the time of the public comment period, and there were no comments regarding the extent of Tier 2\* inclusion in Revision 18.

#### *Implementation of Revision 18 Commitments for the Shield Building*

##### Load Combinations for Shield Building

In the NRC staff's follow-up to an apparent editorial error in a table in the Westinghouse shield building report, the staff determined that Westinghouse had not documented in its calculations the numerical combination of the loads for external temperature conditions (minus

40 degrees F) and a safe-shutdown earthquake (SSE). On April 12, 2011, the staff requested Westinghouse to document in the shield building report the numerical combination of loads for extreme ambient thermal loads and SSE loads, as specified in DCD Table 3.8.4-1 for steel structures and Table 3.8.4-2 for concrete structures. See meeting summary dated May 17, 2011 (ADAMS Accession No. ML111440298). By letter dated June 15, 2011, Westinghouse responded to this request (ADAMS Accession No. ML111950098), and concluded that the current design is acceptable when the load combinations are explicitly analyzed. The analysis results are discussed in detail in Revision 4 of the shield building report. Changes were made to the DCD to reflect the results of this load combination analysis, but the changes did not involve any changes to the methodology or the design of the shield building. The specific DCD changes were the addition of Section 3.8.4.5.5 to discuss the load combination analysis, and updating of tables of results in Appendix 3H. No change to the language of the AP1000 DCR in 10 CFR Part 52, Appendix D was made as a result of the DCD changes.

The NRC does not believe these DCD changes require re-noticing because Revision 18 of the DCD stated that the design would be verified using the required load combinations, and these load combinations had previously been approved by the NRC for use in AP1000 analyses similar to those for the shield building elements requiring reanalysis. There was no change to the methodology or the actual design of the shield building was needed, and there was no change to the language of the AP1000 DCR. The also NRC notes that the June 16, 2011 “petition” (filed by John Runkle) that requested the NRC terminate the rulemaking specifically raised the three technical issues in Revision 19, including the load combination topic.

#### Passive Containment Cooling Water Storage Tank

During the analysis of the thermal plus earthquake load combination for the passive containment cooling water storage tank (located on top of the shield building), Westinghouse determined that it had not performed an analysis of hydrodynamic loads using an equivalent static analysis as stated in Westinghouse’s response (ADAMS Accession No. ML102650098) to

an action item from the NRC's shield building report review (documented in AFSER Chapter 3, ADAMS Accession No. ML103430502). Instead, the analysis had been done by response spectrum analysis. Both the equivalent static method and the response spectrum method had previously been approved by the NRC for use in the AP1000 design for structural analyses as described in Revision 18 of the DCD. This issue was discussed in a May 17, 2011, public meeting (see meeting summary dated May 26, 2011 (ADAM Accession No. ML111430775)). In response, Westinghouse performed the analysis with this method and presented the results in the revised shield building report and in DCD Revision 19 as follows. The use of the equivalent static method for the tank is discussed in Section 3.7 and Appendix 3G, and a table and figure were added to Appendix 3H. The revised shield building report included the results of the load combination for the containment cooling water storage tank using the equivalent static analytical method, which demonstrated that the design remained adequate when evaluated using the equivalent static analytical method. No change to the language of the AP1000 DCR in 10 CFR Part 52, Appendix D was made as a result of the DCD changes.

The NRC does not believe these DCD changes require renoticing. Revision 18 of the DCD stated that the design would be verified through the use of the equivalent static method, and that method had been previously approved by the NRC for AP1000 analyses equivalent to that performed for the containment cooling water tank. No change to the actual design of the tank was needed, and there was no change to the language of the AP1000 DCR. The NRC also notes that one of the petitions (dated June 16, 2011) that the NRC is responding to in the comment response document specifically raised this issue and the NRC has provided an answer similar to that described above.

#### *Debris Limits*

In its December 20, 2010, letter on long-term core cooling (ADAMS Accession No. ML103410348), the ACRS concluded that the regulatory requirements for long-term core cooling for design-basis accidents have been adequately met, based on cleanliness requirements

specified in the amendment. In particular, the amount of latent debris that might be present in the containment is an important parameter. The ACRS further stated that any future proposed relaxation of the cleanliness requirements will require substantial additional data and analysis. In their January 24, 2011, (ADAMS Accession No. ML110170006) report on the Vogtle COL application, which references the AP1000 design, the ACRS recommended that the containment interior cleanliness limits on latent debris should be included in the Technical Specifications (TSs) for the Vogtle plant.

In a letter dated February 23, 2011 (ADAMS Accession No. ML110590455), Westinghouse proposed DCD markups to designate information in Section 6.3 including debris sources such as latent debris (and the amount of fiber) as Tier 2\*. Revision 19 of the DCD includes changes to mark selected information as Tier 2\*.

The NRC made a conforming change to the final rule language to provide a new item as Section VIII.B.6.b.(7) screen design criteria for this new type of Tier 2\* information. The NRC believes that inclusion of debris limits in the AP1000 DCD as Tier 2\* information, rather than including such limits in each plant referencing the AP1000, represents a better regulatory approach for achieving the intent of the ACRS. Inclusion of debris limits in the AP1000 and its designation as Tier 2\* would ensure that there is consistency across all referencing plants with respect to debris control, and ensures NRC regulatory control of any future relaxations of the limits, as discussed in the staff's March 3, 2011, response to the ACRS (ADAMS Accession No. ML110350198).

The NRC does not believe that this change to the DCD marking or to the final rule language requires renoticing because the ACRS letter, staff response and Westinghouse letter, were all publicly available during the comment period and the public had a fair opportunity to comment on this matter. In this regard, the staff notes that the April 6, 2011, "petition" (filed by John Runkle) that requested the NRC to suspend the AP1000 amendment rulemaking, included discussion about this topic with specific reference to the ACRS letter (ADAMS Accession No.

ML11108A077). Numerous other comment submissions pointed to this petition as part of their comments. This lends support to the NRC's view that the public had adequate notice and an opportunity to comment on this matter. In addition, the inclusion of debris limits as Tier 2\* represents a new limitation, not present in the prior revisions of the AP1000 DCD, which will require a referencing COL holder to use debris limits as specified in the AP1000 DCD. Given that the designation of the debris limits as Tier 2\* represents a new restriction agreed to by Westinghouse, a matter on which the NRC received public comment, the staff does not believe that an additional opportunity for public comment need be provided on the inclusion of debris limits in Revision 19 of the DCD and the designation of those limits as Tier 2\*.

#### *Heat Sinks and Containment Pressure Analysis*

In its December 13, 2010, letter on the AP1000 design certification, the ACRS identified an error in the previously certified Revision 15 of the DCD (ADAMS Accession No. ML103410351) concerning the containment cooling analysis. The error affected the time at which steady-state film coverage is achieved on the exterior of the containment vessel. In a February 5, 2011, letter, the NRC staff agreed with the ACRS, and indicated that Westinghouse agreed that the error existed and should be corrected. The letter also indicated that the NRC staff would monitor Westinghouse's corrective actions and review any needed revisions to the DCD (ADAMS Accession No. ML103560411).

In the course of correcting the steady-state film coverage error, after the proposed rule was published Westinghouse identified other errors and modeling updates in supporting analyses that affected the calculated post-accident peak containment pressure (the highest peak pressure in the event of a large break loss-of-coolant accident). The net impact of correcting the steady-state film error and the subsequent Westinghouse-identified errors and modeling updates was an increase in calculated peak containment pressure from 57.8 psig to 59.2 psig, which would have exceeded the 59 psig post-accident peak containment pressure acceptance criterion in the existing AP1000 DCR.

Therefore, as part of the revised analysis to account for all the identified errors, Westinghouse relied upon a limited number of existing structural elements (gratings) within the containment as heat sinks, in order to remain within the 59 psig post-accident peak containment pressure acceptance criterion. Westinghouse's revised analysis used the NRC-approved methodology in the existing AP1000 DCR containment pressure calculation, and the method for crediting heat sink capacity as described in Westinghouse documents WCAP-15846 (proprietary) and WCAP-15862 (nonproprietary) "WGOthic Application to AP600 and AP1000," Revision 1, March 2004, which are incorporated by reference in the previously certified Revision 15 of the DCD. In addition, the Westinghouse-revised analysis used the NRC-approved 59 psig post-accident peak containment pressure acceptance criterion in the existing AP1000 DCD, Revision 15.

The staff safety evaluation of the Westinghouse revised analysis is included in Sections 23.X and 23.Y of the FSER (ADAMS Accession No. ML112061231). Table 6.2.1.1-10 of Revision 19 of the DCD includes the credited elements. The ACRS reviewed the Westinghouse corrections, and agreed that Westinghouse's revised analysis continues to demonstrate that the containment will be able to withstand the post-accident peak containment pressure (ADAMS Accession No. ML11256A180), and that the reevaluated pressure is based on a sufficiently conservative methodology. The final AP1000 rule language designates this "heat sink data for containment analysis" by adding it as a new Tier 2\* item in Section VIII.B.6.b(8). The NRC decided to control any future changes to the credited elements by designating the material as Tier 2\* because the geometry and location of the heat sinks could impact their effectiveness.

The NRC does not believe that the revisions to Table 6.2.1.1-10 of Revision 19 of the DCD require renoticing for several reasons. The gratings to be credited as heat sinks were already part of the approved AP1000 design and were not part of the proposed amendment to the AP1000 DCR described design. Thus, the actual DCD did not involve any new design

elements being added. The use of heat sinks as part of the containment pressure calculation, and the method for crediting heat sink capacity were described in the DCD Revision 15. The criterion for evaluating the acceptability of the change continues to be the calculated post-accident peak containment pressure of 59 psig. Therefore, the revised Westinghouse analysis did not involve the use of any previously unapproved design methodologies or acceptance criteria; the methodology used and the acceptance criterion (59 psig post-accident peak containment pressure) is in the already-approved AP1000 DCR. Finally, crediting of the gratings as heat sinks in the revised analysis did not introduce any new safety issues not previously addressed. Therefore, the NRC does not believe that opportunity for public comment need be provided on the rule language change.

The NRC does not believe that the designation of the heat sink as Tier 2\* requires renoticing. As discussed above, the Tier 2\* change is a direct result of the Westinghouse revised analysis that does not warrant an additional opportunity for public comment. The designation of this information as Tier 2\* adds a new limitation, not present in the prior revisions of the AP1000 DCD, which limits a referencing combined license applicant/holder to alter the heat sink information for the grating and all other heat sinks credited in the containment peak pressure analysis. Given that the designation of the heat sink information as Tier 2\* represents a new restriction agreed to by Westinghouse, the staff does not believe that opportunity for public comment need be provided on the Westinghouse revised analysis and the designation of the heat sink information as Tier 2\*.

#### *B. Changes to Appendix D*

##### 1. Scope and Contents (Section III).

The purpose of Section III is to describe and define the scope and contents of this design certification and to set forth how documentation discrepancies or inconsistencies are to be resolved. Paragraph 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 TSs into this

appendix. The NRC is updating the revision number of the DCD that is incorporated by reference to the revision Westinghouse provided to the NRC in its application for amendment to this DCR. In this final rule, the revision of the DCD that is incorporated by reference is Revision 19.

The effect of this incorporation by reference is that the incorporated material has the same legal status as if it were published in the *Federal Register* and in NRC's regulations at 10 CFR Part 52. This material, like any other properly issued regulation, has the force and effect of law. The AP1000 DCD was prepared to meet the technical information contents of application requirements for design certifications under 10 CFR 52.47(a) and the requirements of the OFR for incorporation by reference under 1 CFR Part 51. One requirement of the OFR for incorporation by reference is that the applicant for the design certification (or amendment to the design certification) makes the generic DCD available upon request after the final rule becomes effective. Therefore, paragraph A identifies a Westinghouse representative to be contacted to obtain a copy of the AP1000 DCD.

The AP1000 DCD is electronically accessible under ADAMS Accession No. ML11171A500, at the OFR, and at [www.regulations.gov](http://www.regulations.gov) by searching under Docket ID NRC-2010-0131. Copies of the generic DCD are also available at the NRC's PDR. Questions concerning the accuracy of information in an application that references Appendix D 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 revision process provided in Section VIII of Appendix D, then at the completion of the rulemaking process the NRC would request approval of the Director, OFR, for the revised incorporation by reference and revise its copies of the generic DCD, provide a revised copy to the OFR, and notify the design certification applicant to change its copy. The Commission requires that the design certification applicant maintain an up-to-date copy of the master DCD under Section X.A.1 of Appendix D 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 Appendix D in a plant-specific DCD under Section X.A.2 of Appendix D.

The NRC is also making a change to paragraph D. Paragraph D establishes the generic DCD as the controlling document in the event of an inconsistency between the DCD and the design certification application or the FSER for the certified standard design. The revision renumbers paragraph D as paragraph D.1, clarifies this requirement as applying to the initial design certification, and adds a similar paragraph D.2 to indicate that this is also the case for an inconsistency between the generic DCD and the amendment application and the NRC's associated FSER for the amendment.

## 2. Additional Requirements and Restrictions (Section IV).

Section IV of this appendix sets forth additional requirements and restrictions imposed upon an applicant who references this appendix. Paragraph A sets forth the information requirements for these applicants. Paragraph A.3 requires the applicant to physically include, not simply reference, the proprietary information (PI) and safeguards information (SGI) referenced in the AP1000 DCD, or its equivalent, to ensure that the applicant has actual notice of these requirements. The NRC revised paragraph A.3 to indicate that a COL applicant must include, in the plant-specific DCD, the sensitive unclassified non-safeguards information (SUNSI) (including PI) and SGI referenced in AP1000 DCD. This revision addresses a wider class of information (SUNSI) to be included in the plant-specific DCD, rather than limiting the required information to PI. The requirement to include SGI in the plant-specific DCD would not change.

The NRC also added a new paragraph A.4 to indicate requirements that must be met in cases where the COL applicant is not using the entity that was the original applicant for the design certification (or amendment) to supply the design for the applicant's use. Paragraph A.4 requires that a COL applicant referencing Appendix D to 10 CFR Part 52 include, as part of its

application, a demonstration that an entity other than Westinghouse is qualified to supply the AP1000 certified design unless Westinghouse supplies the design for the applicant's use. In cases where a COL applicant is not using Westinghouse to supply the AP1000 certified design, this information is necessary to support any NRC finding under 10 CFR 52.73(a) that the entity is qualified to supply the certified design.

### 3. Applicable Regulations (Section V).

The purpose of Section V is to specify the regulations applicable and in effect when the design certification is approved (i.e., as of the date specified in paragraph A, which is 30 days after the publication of this rule in the *Federal Register*). The NRC is redesignating paragraph A as paragraph A.1 to indicate that this paragraph applies to that portion of the design that was certified under the initial design certification. The NRC is further adding a new paragraph A.2, similar to paragraph A.1, to indicate the regulations that would apply to that portion of the design within the scope of this amendment, as approved by the Commission and signed by the Secretary of the Commission.

### 4. Issue Resolution (Section VI).

The purpose of Section VI is to identify the scope of issues that were resolved by the Commission in the original certification rulemaking and, therefore, are "matters resolved" within the meaning and intent of 10 CFR 52.63(a)(5).

Paragraph B presents the scope of issues that may not be challenged as a matter of right in subsequent proceedings and describes the categories of information for which there is issue resolution. Paragraph B.1 provides that all nuclear safety issues arising from the Atomic Energy Act of 1954 (the Act), as amended, that are associated with the information in the NRC's AFSER related to certification of the AP1000 standard design (ADAMS Accession No. ML103260072) and the Tier 1 and Tier 2 information and the rulemaking record for Appendix D to 10 CFR Part 52, are resolved within the meaning of 10 CFR 52.63(a)(5). These issues include the information referenced in the DCD that are requirements (i.e., "secondary

references”), as well as all issues arising from PI and SGI, which are intended to be requirements. Paragraph B.2 provides for issue preclusion of PI and SGI.

The NRC revised paragraph B.1 to extend issue resolution to the information contained in the NRC’s FSEER, Appendix 1B of Revision 19 (Supplement No. 2) and the rulemaking record for this amendment. In addition, the NRC revised paragraph B.2 to extend issue resolution to the broader category of SUNSI, including PI, referenced in the generic DCD.

The NRC also revised paragraph B.7, which identifies as resolved all environmental issues concerning severe accident mitigation design alternative (SAMDA) arising under the National Environmental Policy Act of 1969 (NEPA) associated with the information in the NRC’s final EA for the AP1000 design and Appendix 1B of the generic DCD (Revision 15) for plants referencing Appendix D to 10 CFR Part 52 whose site parameters are within those specified in the SAMDA evaluation. The NRC revised this paragraph to identify all resolved environmental issues concerning SAMDA associated with the information in the NRC’s final EA for this amendment and Appendix 1B of Revision 19 of the generic DCD for plants referencing Appendix D to 10 CFR Part 52 whose site parameters are within those specified in the SAMDA evaluation.

Finally, the NRC is revising paragraph E, which provides the procedure for an interested member of the public to obtain access to SUNSI (including PI) and SGI for the AP1000 design in order to request and participate in proceedings, as identified in paragraph B, involving licenses and applications that reference Appendix D to 10 CFR Part 52. The NRC is replacing the current information in this paragraph with a statement that the NRC will specify at an appropriate time the procedure for interested persons to review SGI or SUNSI (including PI) for the purpose of participating in the hearing required by 10 CFR 52.85, the hearing provided under 10 CFR 52.103, or in any other proceeding relating to Appendix D to 10 CFR Part 52 in which interested persons have a right to request an adjudicatory hearing. The NRC will follow its current practice of establishing the procedures by order when the notice of hearing is published in the *Federal Register* (e.g., Florida Power and Light Co, Combined License Application for the Turkey Point

Units 6 and 7, Notice of Hearing, Opportunity To Petition for Leave To Intervene and Associated Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information and Safeguards Information for Contention Preparation (75 FR 34777; June 18, 2010); Notice of Receipt of Application for License; Notice of Consideration of Issuance of License; Notice of Hearing and Commission Order and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information and Safeguards Information for Contention Preparation; In the Matter of AREVA Enrichment Services, LLC (Eagle Rock Enrichment Facility) (74 FR 38052; July 30, 2009)).

In the four currently approved design certifications (10 CFR Part 52, Appendices A through D), paragraph E presents specific directions on how to obtain access to PI and SGI on the design certification in connection with a license application proceeding referencing that DCR. The NRC is changing this because these provisions were developed before the terrorist events of September 11, 2001. After September 11, 2001, Congress changed the statutory requirements governing access to SGI, and the NRC revised its rules, procedures, and practices governing control and access to SUNSI and SGI. The NRC now believes that generic direction on obtaining access to SUNSI and SGI is no longer appropriate for newly approved DCRs. Accordingly, the specific requirements governing access to SUNSI and SGI contained in paragraph E of the four currently approved DCRs will not be included in the DCR for the AP1000. Instead, the NRC will specify the procedures to be used for obtaining access at an appropriate time in the COL proceeding referencing the AP1000 DCR. The NRC will include the new rule language in any future amendments or renewals of the currently existing DCRs, as well as in new (i.e., initial) DCRs. However, the NRC will not initiate rulemaking to change paragraph E of the existing DCRs, in an effort to minimize unnecessary resource expenditures by both the original DCR applicant and the NRC.

## 5. Processes for Changes and Departures (Section VIII).

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 DCR. 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 presented in paragraph B.

Departures from Tier 2 that a licensee may make without prior NRC approval are addressed under paragraph B.5 (similar to the process in 10 CFR 50.59). The NRC is modifying Section VIII to address the change control process specific to departures from the information required by 10 CFR 52.47(a)(28) to address the NRC's AIA requirements in 10 CFR 50.150. Specifically, the NRC revised paragraph B.5.b to indicate that the criteria in this paragraph for determining if a proposed departure from Tier 2 requires a license amendment do not apply to a proposed departure affecting information required by 10 CFR 52.47(a)(28) to address 10 CFR 50.150. In addition, the NRC redesignated paragraphs B.5.d, B.5.e, and B.5.f as paragraphs B.5.e, B.5.f, and B.5.g, respectively, and added a new paragraph B.5.d. Paragraph B.5.d requires an applicant or licensee who proposed to depart from the information required by 10 CFR 52.47(a)(28) included in the final safety analysis report (FSAR) for the standard design certification to consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a). The FSAR information required by the AIA rule, which is subject to this change control requirement, includes the descriptions of the design features and functional capabilities incorporated into the final design of the nuclear power facility and the description of how the identified design features and functional capabilities meet the assessment requirements in 10 CFR 50.150(a)(1). The objective of the change controls is to determine whether the design of the facility, as changed or modified, is shown to withstand the effects of the aircraft impact with reduced use of operator actions. In other words, the applicant

or licensee must continue to show, with the modified design, that the acceptance criteria in 10 CFR 50.150(a)(1) are met with reduced use of operator actions. The AIA rule does not require an applicant or a licensee implementing a design change to redo the complete AIA to evaluate the effects of the change. The NRC believes it may be possible to demonstrate that a design change is bounded by the original design or that the change provides an equivalent level of protection, without redoing the original assessment.

Consistent with the NRC's intent when it issued the AIA rule, under this section, plant-specific departures from the AIA information in the FSAR would not require a license amendment, but may be made by the licensee upon compliance with the substantive requirements of the AIA rule (i.e., the AIA rule acceptance criteria). The applicant or licensee is required to document, in the plant-specific departure, how the modified design features and functional capabilities continue to meet the assessment requirements in 10 CFR 50.150(a)(1), in accordance with Section X of Appendix D to 10 CFR Part 52. Applicants and licensees making changes to design features or capabilities included in the certified design may also need to develop alternate means to cope with the loss of large areas of the plant from explosions or fires to comply with the requirements in 10 CFR 50.54(hh). The addition of these provisions to Appendix D to 10 CFR Part 52 is consistent with the NRC's intent when it issued the AIA rule in 2009, as noted in the SOC for that rule (74 FR 28112; June 12, 2009).

Paragraph B.6 of Appendix D to 10 CFR Part 52 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 the ABWR design certification (Appendix A to 10 CFR Part 52) and the ABB-CE [ASEA Brown Boveri - Combustion Engineering] System 80+ design certification (Appendix B to 10 CFR Part 52). During this development process, these applicants requested that the amount of information in Tier 1 be minimized to provide additional flexibility for an applicant or licensee who references these appendices. Also, many codes, standards, and design processes that would not be specified in Tier 1, but were acceptable for

meeting ITAAC, were specified in Tier 2. The result of these actions was that certain significant information only exists in Tier 2 and the Commission did not want this significant information to be changed without prior NRC approval. This Tier 2\* information was identified in the generic DCD with italicized text and brackets (see Table 1-1 of the AP1000 DCD Introduction for a list of the Tier 2\* items). 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-power (100 percent), 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 would cease to retain its Tier 2\* designation after full-power operation is first achieved following the NRC finding under 10 CFR 52.103(g). Thereafter, that information would be deemed to be Tier 2 information that would be subject to the departure requirements in paragraph B.5. By contrast, the Tier 2\* information identified in paragraph B.6.b would retain its Tier 2\* designation throughout the duration of the license, including any period of license renewal.

The NRC is revising certain items designated as Tier 2\*. As discussed in the proposed rule, the Commission is adding an item to Section VIII.B.6.b for reactor coolant pump type. In addition, a new item was added to paragraph B.5.b for RCP type. The NRC determined that certain specific characteristics of the RCP were significant to the safety review and that prior approval of changes affecting those characteristics would be required. This Tier 2\* designation does not expire.

In the final rule, two additional items are being added to Section VIII.B.6.b. First, in its December 20, 2010, letter on long-term core cooling, the ACRS concluded that the regulatory

requirements for long-term core cooling for designbasis accidents have been adequately met, based on cleanliness requirements specified in the amendment. In particular, the amount of latent debris that might be present in the containment is an important parameter. The ACRS further stated that any future proposed relaxation of the cleanliness requirements will require substantial additional data and analysis. In their January 24, 2011, report on the Vogtle COL application, which references the AP1000 design, the ACRS recommended that the containment interior cleanliness limits on latent debris should be included in the TSs. In a letter dated February 23, 2011, Westinghouse proposed DCD markups to designate information in Section 6.3 including debris sources such as latent debris (and the amount of fiber) as Tier 2\*. The NRC believes this is a better approach to achieving the intent of the ACRS for regulatory control of any future relaxations of the limits and would thus require prior NRC approval, as discussed in the staff's March 3, 2011, response to the ACRS. Revision 19 includes DCD changes to mark selected information as Tier 2\*. No changes to the content itself were made. The NRC made a conforming change to the final rule language to provide a new item as Section VIII.B.6.b(7) entitled general screen design criteria for this new type of Tier 2\* information.

The second change, which was also discussed in the December 13, 2010, ACRS letter report on the DC amendment, concerned an error ACRS identified in the previously certified Revision 15, concerning the containment cooling analysis. The error affected the time at which steady-state film coverage is achieved on the exterior of the containment vessel. In the corrected analysis, the calculated peak containment pressure for a LOCA increases somewhat, but remains below the design pressure. In the course of reviewing the correction of the error for the peak containment pressure, after the proposed rule was published, Westinghouse identified other errors in supporting analyses that affect the calculated post-accident peak containment pressure. The net impact is an increase in calculated peak containment pressure in the event of a large break LOCA (the highest peak pressure) of about 0.3 psi. As part of the revised analysis for all of the changes, Westinghouse relied upon a limited number of structural

elements within the containment as heat sinks for the peak pressure analysis in order to maintain margin to the design limit. The NRC's safety evaluation is included in the FSER. Table 6.2.1.1-10 of Revision 19 of the DCD includes the credited elements. The final rule language designates this "heat sink data for containment analysis" by adding it as new Tier 2\* in Section VIII.B.6.b(8). Because the geometry and location of the heat sinks could impact their effectiveness, the staff decided to control any future changes to the credited elements by designating the material as Tier 2\*.

As discussed in the proposed rule, the NRC is clarifying some of the Tier 2\* designations for structural requirements, with respect to Tier 2\* information that expires at first full-power operation. The item on human factors engineering (HFE) moved from paragraph B.5.b to paragraph B.5.c, with the effect that the Tier 2\* designation on that information expires after full-power operation is achieved rather than never expiring. In the final rule, an additional item (paragraph B.6.c(16)) is added to provide Tier 2\* designation for certain details about the steel composite modules (as identified within the DCD); the designation expires at first full-power operation. The NRC concludes that the details are the key elements of this unique design, and therefore warrant Tier 2\* regulatory control.

The NRC also concluded that the Tier 2\* designation is not necessary for the specific Code edition and addenda for the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), as listed in item VIII.B.6.c(2). At the time of the initial certification, the NRC determined that this information should be Tier 2\*. Subsequently, 10 CFR Part 50 was modified to include provisions in 10 CFR 50.55a(b)(1)(iii) to provide restrictions in the use of certain editions/addenda to the ASME Code, Section III, that the NRC found unacceptable. In addition, 10 CFR 50.55a(c)(3), (d)(2) and (e)(2), for reactor coolant pressure boundary, Quality Group B Components, and Quality Group C Components, respectively, provide regulatory controls on the use of later edition/addenda to the ASME Code, Section III, through the conditions NRC established on use of paragraph NCA-1140 of the Code.

As a result, these rule requirements adequately control the ability of a licensee to use a later edition of the ASME Code and addenda such that Tier 2\* designation is not necessary. Thus, the Tier 2\* item in paragraph B.6.c(2) for ASME Code was modified to be limited to ASME Code piping design restrictions as identified in Section 5.2.1.1 of the AP1000 DCD and to include certain Code cases, including Code Case N-284-1, as discussed in Section 3.8.2.2 and other Code cases as designated in Table 5.2-3 of the DCD (Code Case N-284-1 is the only case currently specified in Appendix D to 10 CFR Part 52). The NRC retained the Tier 2\* designation for applying ASME Code, Section III, Subsection NE to containment design, by moving this provision to the end of Section VIII.B.6.c(14). Section 3.8.2.2 of the DCD identifies the specific edition and addenda for containment design (2001 Edition of ASME Code, Section III, including 2002 Addenda) with the Tier 2\* markings.

#### 6. Records and Reporting (Section X).

The purpose of Section X is to set forth the requirements that apply to maintaining records of changes to and departures from the generic DCD, which would 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. Paragraph A.1 requires that a generic DCD and the PI and SGI referenced in the generic DCD be maintained by the applicant for this rule. The NRC revised paragraph A.1 to replace the term "proprietary information," or PI, with the broader term "sensitive unclassified non-safeguards information," or SUNSI. Information categorized as SUNSI is information that is generally not publicly available and encompasses a wide variety of categories. These categories include information about a licensee's or applicant's physical protection or material control and accounting program for special nuclear material not otherwise designated as SGI or classified as National Security Information or Restricted Data (security-related information), which is required by 10 CFR 2.390 to be protected in the same manner as commercial or financial information (i.e., they are exempt from public disclosure). This change is necessary because the NRC is approving PI and security-related information.

This change also ensures that Westinghouse (as well as any future applicants for amendments to the AP1000 DCR who intend to supply the certified design) are required to maintain a copy of the applicable generic DCD, and maintain the applicable SUNSI (including PI) and SGI – developed by that applicant – that were approved as part of the relevant design certification rulemakings.

The NRC notes that the generic DCD concept was developed, in part, to meet OFR requirements for incorporation by reference, including public availability of documents incorporated by reference. However, the PI and SGI were not included in the public version of the DCD. Only the public version of the generic DCD are identified and incorporated by reference into this rule. Nonetheless, the SUNSI for this amendment was reviewed by the NRC and, as stated in paragraph B.2, the NRC considers the information to be resolved within the meaning of 10 CFR 52.63(a)(5). Because this information is in the nonpublic version of the DCD, this SUNSI (including PI) and SGI, or its equivalent, is required to be provided by an applicant for a license referencing this DCR.

In addition, the NRC is adding a new paragraph A.4.a that requires the applicant for the AP1000 design to maintain a copy of the AIA performed to comply with the requirements of 10 CFR 50.150(a) for the term of the certification (including any period of renewal). The NRC added a new paragraph A.4.b that requires an applicant or licensee who references this appendix to maintain a copy of the AIA performed to comply with the requirements of 10 CFR 50.150(a) throughout the pendency of the application and for the term of the license (including any period of renewal). The addition of paragraphs A.4.a and A.4.b is consistent with the NRC's intent when it issued the AIA rule in 2009 (74 FR 28112; June 12, 2009).

#### **IV. Section-by-Section Analysis**

The following discussion sets forth each amendment to the AP1000 DCR being made in this final rule. All section and paragraph references are to the provisions in the amendment to Appendix D to 10 CFR Part 52, unless otherwise noted.

A. Scope and Contents (Section III).

The NRC is amending Section III, Scope and Contents, to revise paragraph A to update the revision number of the DCD, from Revision 15 to Revision 19, approved for incorporation by reference by the Office of the Federal Register; update the contact information of the Westinghouse representative to be contacted should a member of the public request a copy of the generic DCD; and update other locations (e.g., the NRC's PDR) where a member of the public could request a copy of or otherwise view the generic DCD.

The NRC is revising paragraph D to establish the generic DCD as the controlling document in the event of an inconsistency between the DCD and either the application or the FSER for the certified standard design. This clarification further distinguishes between the conflict scenarios presented in paragraphs D.1 (for the initial certification of the design) and D.2 (for Amendment 1 to the design).

B. Additional Requirements and Restrictions (Section IV).

The NRC is amending Section IV, Additional Requirements and Restrictions, to set forth additional requirements and restrictions imposed upon an applicant who references Appendix D to 10 CFR Part 52. Paragraph A sets forth the information requirements for these applicants. The NRC is revising paragraph A.3 to replace the term "proprietary information" with the broader term "sensitive unclassified non-safeguards information."

The NRC is also adding a new paragraph A.4 to indicate requirements that must be met in cases where the COL applicant is not using the entity that was the original applicant for the design certification (or amendment) to supply the design for the applicant's use.

C. Applicable Regulations (Section V).

The NRC is revising paragraph A to distinguish between the regulations that were applicable and in effect at the time the initial design certification was approved (paragraph A.1) and the regulations that are applicable and in effect as of the effective date of the final rule (paragraph A.2).

D. Issue Resolution (Section VI).

The NRC is amending Section VI, Issue Resolution, by revising paragraph B.1 to provide that all nuclear safety issues arising from the Act that are associated with the information in the NRC's FSER (NUREG-1793), the Tier 1 and Tier 2 information (including the availability controls in Section 16.3 of the generic DCD), and the rulemaking record for Appendix D to 10 CFR Part 52 are resolved within the meaning of 10 CFR 52.63(a)(5). These issues include the information referenced in the DCD that are requirements (i.e., secondary references), as well as all issues arising from SUNSI (including PI) and SGI, which are intended to be requirements. This paragraph is revised to extend issue resolution beyond that of the previously certified design to also include the information in Supplement No. 2 of the 2011 FSER (Supplement 1 supported the initial certification) and the rulemaking record associated with Amendment 1 to the AP1000 design.

The NRC is revising paragraph B.2 to replace the term "proprietary information" with the broader term "sensitive unclassified non-safeguards information."

Paragraph B.7 is revised to extend environmental issue resolution beyond that of the previously certified design to also include the information in Amendment 1 to the AP1000 design and Appendix 1B of Revision 19 of the generic DCD.

A new paragraph E is added to allow the NRC to specify at the appropriate time the procedures for interested persons to obtain access to PI, SUNSI, and SGI for the AP1000 DCR.

Access to such information is for the sole purpose of requesting or participating in certain specified hearings, such as 1) the hearing required by 10 CFR 52.85 where the underlying application references Appendix D to 10 CFR Part 52; 2) any hearing provided under 10 CFR 52.103 where the underlying COL references Appendix D to 10 CFR Part 52; and 3) any other hearing relating to Appendix D to 10 CFR Part 52 in which interested persons have the right to request an adjudicatory hearing.

E. Processes for Changes and Departures (Section VIII).

The NRC is revising Section VIII to address the change control process specific to departures from the information required by 10 CFR 52.47(a)(28) to address the NRC's AIA requirements in 10 CFR 50.150. Specifically, the NRC is revising the introductory text of paragraph B.5.b to indicate that the criteria in this paragraph for determining if a proposed departure from Tier 2 requires a license amendment do not apply to a proposed departure affecting information required by 10 CFR 52.47(a)(28) to address aircraft impacts.

In addition, the NRC is redesignating paragraphs B.5.d, B.5.e, and B.5.f as paragraphs B.5.e, B.5.f, and B.5.g, respectively, and adding a new paragraph B.5.d. Paragraph B.5.d requires an applicant referencing the AP1000 DCR, who proposes to depart from the information required by 10 CFR 52.47(a)(28) to be included in the FSAR for the standard design certification, to consider the effect of the changed feature or capability on the original 10 CFR 50.150(a) assessment.

The NRC is revising certain items designated as Tier 2\*. As discussed in the proposed rule, the NRC is adding an item to Section VIII.B.6.b for RCP type. In addition, a new item is added to paragraph B.5.b for RCP type. The NRC determined that certain specific characteristics of the RCP were significant to the safety review and that prior approval of changes affecting those characteristics would be required. This Tier 2\* designation does not expire.

In the final rule, two additional items are added to Section VIII.B.6.b. Section VIII.B.6.b(7) provides Tier 2\* designation for certain analysis assumptions related to latent debris and the effects on screens and fuel assemblies in post-LOCA conditions where debris is transported to the recirculation sump and into the in-containment refueling water storage tank. Finally, new paragraph VIII.B.6.b(8) is added to include the containment heat sinks credited in the peak pressure analysis. The Tier 2\* designation for the requirements in this section of the rule does not expire.

As discussed in the proposed rule, the NRC is clarifying some of the Tier 2\* designations for structural requirements, with respect to Tier 2\* information that expires at first full-power operation. The item on HFE moved from paragraph B.5.b to paragraph B.5.c, with the effect that the Tier 2\* designation on that information expires after full-power operation is achieved rather than never expiring. In the final rule, an additional item (paragraph B.6.c(16)) is added to provide Tier 2\* designation for certain details about the steel composite modules (as identified within the DCD); the designation expires at first full-power operation.

Finally, the NRC also concluded that the Tier 2\* designation was not necessary for the specific Code edition and addenda for the ASME Code as listed in paragraph VIII.B.6.c(2). Thus, the item in paragraph VIII.B.6.c(2) for ASME Code was modified to be limited to piping and welding restrictions identified in Section 5.2.1.1, and to include certain Code cases, N-284-1 is discussed in Section 3.8.2.2 and other code cases designated as Tier 2\* are listed in Table 5.2-3. The NRC retained the Tier 2\* designation for applying ASME Code Section III to containment design, by moving this provision to the end of Section VIII.B.6.c(14). Section 3.8.2.2 identifies the specific edition and addenda for containment design (2001 Edition of ASME Code, Section III, including 2002 Addenda).

#### F. Records and Reporting (Section X).

The NRC is amending Section X, Records and Reporting, to revise paragraph A.1 to replace the term “proprietary information” with the broader term “sensitive unclassified non-safeguards information.” Paragraph A.1 is revised to require the design certification amendment applicant to maintain the SUNSI, which it developed and used to support its design certification amendment application. This would ensure that the referencing applicant has direct access to this information from the design certification amendment applicant, if it has contracted with the applicant to provide the SUNSI to support its license application. The AP1000 generic DCD and the NRC-approved version of the SUNSI would be required to be maintained for the period that Appendix D to 10 CFR Part 52 may be referenced.

The NRC is also adding a new paragraph A.4.a, which requires Westinghouse to maintain a copy of the AIA performed to comply with the requirements of 10 CFR 50.150(a) for the term of the certification (including any period of renewal). This provision, which is consistent with 10 CFR 50.150(c)(3), would facilitate any NRC inspections of the assessment that the NRC decides to conduct.

Similarly, the NRC is adding a new paragraph A.4.b, which requires an applicant or licensee who references Appendix D to 10 CFR Part 52 to maintain a copy of the AIA performed to comply with the requirements of 10 CFR 50.150(a) throughout the pendency of the application and for the term of the license (including any period of renewal).

#### **V. Agreement State Compatibility**

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

#### **VI. Availability of Documents**

The NRC is making the documents identified below available to interested persons through one or more of the following methods, as indicated. To access documents related to this action, see the ADDRESSES section of this document.

Document	PDR	Web	ADAMS
SECY-11-XXXX, “Final Rule – AP1000 Design Certification Amendment”	x	x	ML112380823

Document	PDR	Web	ADAMS
AP1000 Final Rule Environmental Assessment	x	x	ML112380827
AP1000 Final Rule Public Comment Response Document	x	x	ML112212319
SECY-11-0002, "Proposed Rule – AP1000 Design Certification Amendment"	x	x	ML103000397
AP1000 Proposed Rule <i>Federal Register</i> Notice	x	x	ML103000412
AP1000 Proposed Rule Environmental Assessment	x	x	ML103000415
NUREG-1793, Supplement 2 to Final Safety Evaluation Report for Revision 19 to the AP1000 Standard Design Certification (publicly available)	x	x	ML112061231
NUREG-1793, Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design, September 2004	x	x	ML043570339
NUREG-1793, Supplement 1 to Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design	x	x	ML053410203
Emergency Petition to Suspend All Pending Reactor Licensing Decisions And Related Rulemaking Decisions Pending Investigation Of Lessons Learned From Fukushima Daiichi Nuclear Power Station Accident, April 14 - 18, 2011	x	x	ML111040355 ML111110862
AP1000 Design Control Document (DCD), Revision 19, Transmittal Letter	x	x	ML11171A315
AP1000 DCD, Revision 19 (Public Version)	x	x	ML11171A500
Redacted Version of Dissenting View on AP1000 Shield Building Safety Evaluation Report With Respect to the Acceptance of Brittle Structural Model to be Used for the Cylindrical Shield Building Wall, December 3, 2010	x	x	ML103370648
AP1000 Containment Cleanliness – DCD Markup for Revision 19, February 23, 2011	x	x	ML110590455
Interim Staff Guidance DC/COL-ISG-011, "Finalizing Licensing-basis Information"	x	x	ML092890623
Design Changes Submitted by Westinghouse, Revision 18	x	x	ML100250873
AP1000 Technical Reports (Appendix)	x	x	ML103350501
TR-3, AP1000 Standard COL Technical Report Submittal of APP-GW-S2R-010, "Extension of Nuclear Island Seismic Analysis to Soil Sites," Revision 5, February 28, 2011	x	x	ML110691050
TR-26, "AP1000 Verification of Water Sources for Long-Term Recirculation Cooling Following a LOCA," Revision 8	x	x	ML102170123
TR-34, APP-GW-GLN-016, "AP1000 Licensing	x	x	ML063250306

Document	PDR	Web	ADAMS
Design Change Document for Generic Reactor Coolant Pump," Revision 0, November 17, 2006			
TR-54, "Spent Fuel Storage Racks Structure and Seismic Analysis," Revision 4	x	x	ML101580475
TR-65, "Spent Fuel Storage Racks Criticality Analysis," Revision 2	x	x	ML100082093
TR-97, "Evaluation of the Effect of the AP1000 Enhanced Shield Building Design on the Containment Response and Safety Analysis," Revision 3	x	x	ML11168A041
TR-98, AP1000 COL Standard Technical Report Submittal of APP-GW-GLN-098, "Compliance with 10CFR20.1406," (Technical Report Number 98), Revision 0, April 10, 2007	x	x	ML071010536
TR-103, "Fluid System Changes," Revision 2	x	x	ML072830060
TR-108, AP1000 Standard COL Technical Report Submittal of APP-GW-GLN-108, "AP1000 Site Interface Temperature Limits," Revision 2, September 28, 2007	x	x	ML072750137
TR-111, AP1000 Standard COL Technical Report Submittal of APP-GW-GLN-111, "Component Cooling System and Service Water System Changes Required for Increased Heat Loads," Revision 0, May 25, 2007	x	x	ML071500563
TR-134, AP1000 Standard COL Technical Report Submittal of APP-GW-GLR-134, "AP1000 DCD Impacts to Support COLA Standardization," Revision 0, October 26, 2007	x	x	ML073120415
AP1000 Standard COL Technical Report Submittal of APP-GW-GLR-134, "AP1000 DCD Impacts to Support COLA Standardization," Revision 1, December 12, 2007	x	x	ML073610541
AP1000 Standard COL Technical Report, APP-GW-GLR-134, "AP1000 DCD Impacts to Support COLA Standardization," Revision 3, January 14, 2008	x	x	ML080220389
NRC Acceptance Review of AP1000 Design Certification Amendment Application, November 2, 2007	x	x	ML073090471
AP1000 Piping DAC/Component COL Information Item 3.9-2 Acceptance Issue, Revision 16, January 11, 2008	x	x	ML080150513
AP1000 License Report APP-GW-GLR-603, Revision 0, "AP1000 Shield Building Design Details for Select Wall and RC/SC Connections"	x	x	ML110910541

Document	PDR	Web	ADAMS
AP1000 Design Control Document (DCD), Revision 18, Transmittal Letter	x	x	ML103480059
Westinghouse AP1000 DCD, Revision 18 (public version)	x	.x	ML103480572
Advanced Final Safety Evaluation Report for Revision 18 to the AP1000 Standard Design Certification (publicly available)	x	x	ML103260072
AP1000 DCD Transmittal Letter, Revision 17	x	x	ML083220482
AP1000 DCD, Revision 17	x	x	ML083230868
AP1000 DCD Transmittal Letter, Revision 16	x	x	ML071580757
AP1000 DCD, Revision 16	x	x	ML071580939
NRC Notice of Acceptance, Revision 16	x	x	ML073600743
AP1000 DCD, Revision 15	x	x	ML053460400
December 13, 2010, ACRS Letter to Chairman (Report on FSER to AP1000 DCD)	x	x	ML103410351
December 20, 2010, ACRS Letter to Chairman (Long-Term Core Cooling)	x	x	ML103410348
January 19, 2011, ACRS Letter to EDO (Aircraft Impact)	x	x	ML110210462

Document	PDR	Web	ADAMS
January 24, 2011, ACRS Letter to EDO (Containment interior cleanliness limits on latent debris in Technical Specifications)	x	x	ML110350282
EDO response to January 24, 2011 ACRS Letter	x	x	ML110480429
May 17, 2011, ACRS Letter to EDO	x	x	ML11144A188
Regulatory History of Design Certification	x	x	ML003761550
Commission Memorandum and Order , , CLI-11-05, September 9, 2011	x	x	ML11252B074
Commission Memo and Order on Petitions to Suspend adjudicatory, licensing, and rulemaking activities	x	x	ML112521039
ABWR Final Rule	x	x	ML111040636
ABWR Proposed Rule	x	x	ML102100129
Request for ACRS to Waive review of the AP1000 DCR final rule	x	x	ML112420188
ACRS Waiver of review of AP1000 DCR final rule	x	x	ML11266A070
Design Report for the AP1000 Enhanced Shield Building	x	x	ML111950098
SER Approving Rev. 1 of the Westinghouse Quality Systems Manual	x	x	ML11280A309
ACRS Letter on AP1000 Long-Term Cooling	x	x	ML103410348
ACRS Letter on Staff's review of Vogtle, including discussion of containment interior cleanliness	x	x	ML110170006
Staff's response to ACRS' January 24, 2011, Letter	x	x	ML110350198
Petition to Suspend AP1000 DCR Rulemaking	x	x	ML110970673
Green Ticket for Runkle Petition	x	x	ML11108A077
ACRS letter on AP1000 DCD Revision 19 and Staff's Review	x	x	ML11256A180
Petition to Suspend AP1000 DCR Rulemaking	x	x	ML111110851
Emergency Petition	x	x	ML111110862
Petition to Terminate the Rulemaking on Design Certification of the AP1000	x	x	ML11171A014
AP1000 Proposed Rule Package (Rule, FRN, and EA)	x	x	ML103000394
ISG-01, "Seismic Issues Associated with High Frequency Ground Motion	x	x	ML081400293
Green Ticket Containing Letter from Congressman Markey	x	x	ML110680273
Cover letter for Response to Congressman Markey, August 15, 2011	x	x	ML11080A015
Near-Term Task Force Review of Fukushima	x	x	ML111861807
SRM responding to Near-Term Task Force Report and Recommendations	x	x	ML112310021
Crystal River Unit 3 Special Inspection report	x	x	ML102861026

Document	PDR	Web	ADAMS
Crystal River Unit 3 Steam Generator Replacement Inspection	x	x	ML111330350
Response to Congressman Markey Letter	x	x	ML112450407
Revision 19 to the AP1000 Design Control Document and the AP1000 Final Safety Evaluation Report	x	x	ML11256A180
Advanced Final Safety Evaluation Report, Section 3.8.4	x	x	ML103430502
Presentation Slides "AP1000 Shield Building Design," Meeting with NRC Staff, May 17, 2011 (Proprietary and Non-Proprietary)	x	x	ML111440298
Summary of a Category 1 Meeting With Westinghouse Electric Company Regarding AP1000 Shield Building Design Methodology, May 17, 2011	x	x	ML111430775
G20100734/LTR-10-0528/EDATS: SECY-2010-0595 - Ltr. Said Abdel-Khalik re: Report on the Final Safety Evaluation Report Associated with the Amendment to the AP1000 Design Control Document	x	x	ML103560411
Transmittal of WEC Shield Building Action Item 21	x	x	ML102650098

## VII. Voluntary Consensus Standards

The National Technology and Transfer Act of 1995, 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 an amendment to the AP1000 standard plant design for use in nuclear power plant licensing under 10 CFR Parts 50 or 52. Design certifications (and amendments thereto) are not generic rulemakings establishing a generally applicable standard with which all Parts 50 and 52 nuclear power plant licensees must comply. Design certifications (and amendments thereto) are NRC approvals of specific nuclear power plant designs by rulemaking. Furthermore, design certifications (and amendments thereto) are initiated by an applicant for rulemaking, rather than by the NRC. For these reasons, the NRC concludes that the National Technology and Transfer Act of 1995 do not apply to this final rule.

### **VIII. Finding of No Significant Environmental Impact: Availability**

The Commission has determined under NEPA, and the Commission's regulations in subpart A, "National Environmental Policy Act; Regulations Implementing Section 102(2)," of 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," that this DCR, 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 final EA, is that the Commission has made a generic determination under 10 CFR 51.32(b)(2) that there is no significant environmental impact associated with the issuance of an amendment to a design certification. This amendment to 10 CFR Part 52 does not authorize the siting, construction, or operation of a facility using the amended AP1000 design; it only codifies the amended 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 for the construction and operation of a facility referencing this amendment to the AP1000 DCR. In addition, as part of the final EA for the amendment to 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. According to 10 CFR 51.30(d), an EA for a design certification amendment is limited to the consideration of whether the design change, which is the subject of the proposed amendment renders a SAMDA previously rejected in the earlier EA to become cost beneficial, or results in the identification of new SAMDAs, in which case the costs and benefits of new SAMDAs and the bases for not incorporating new SAMDAs in the design certification must be addressed. Based upon review of Westinghouse's evaluation, the NRC concludes that the proposed design changes: 1) do not cause a SAMDA previously rejected in the EA for the initial AP1000 design certification to become cost-beneficial; and 2) do not result in the identification of any new SAMDAs that could become cost beneficial.

The NRC prepared a final EA following the close of the comment period for the proposed standard design certification. With the issuance of this final rule, all environmental issues concerning SAMDAs associated with the information in the final EA and Appendix 1B of the AP1000 DCD Tier 2 will be considered resolved for plants referencing Amendment 1 to the AP1000 design whose site parameters are within those specified in SAMDA evaluation. The existing site parameters specified in the SAMDA evaluation are not affected by this design certification amendment.

The final EA, upon which the NRC's finding of no significant impact is based, and Revision 19 of the AP1000 DCD are available as discussed in Section IV. Availability of Documents. The NRC sent a copy of the EA and final rule to every State Liaison Officer and no comments were received.

#### **IX. 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 3 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 Information Services Branch (T-5F53), U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, or by Internet electronic mail to [INFOCOLLECTS.RESOURCE@NRC.gov](mailto:INFOCOLLECTS.RESOURCE@NRC.gov); and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0151), Office of Management and Budget, Washington, D.C. 20503.

## **X. 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.

## **XI. Regulatory Flexibility Act 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 an amendment to a nuclear power plant design. Neither the design certification amendment applicant, nor prospective nuclear power plant licensees who reference this DCR, fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act, or the size standards established by the NRC (10 CFR 2.810). Thus, this rule does not fall within the purview of the Regulatory Flexibility Act.

## **XII. Backfitting and Issue Finality**

The NRC has determined that this final rule meets the requirements of the backfit rule, 10 CFR 50.109, and the requirements governing changes to DCRs in 10 CFR 52.63(a)(1).

The final rule does not constitute backfitting as defined in the backfit rule (10 CFR 50.109) with respect to operating licenses under 10 CFR Part 50 because there are no operating licenses referencing this DCR.

Westinghouse requested many changes to the currently approved AP1000 DCD Revision 15 to correct spelling, punctuation, or similar errors, which result in text that has the same essential meaning. The NRC concludes that these Westinghouse-requested changes, which are editorial in nature, neither constitute backfitting as defined in 10 CFR 50.109(a)(1), nor are these changes inconsistent with the issue finality provisions of 10 CFR 52.63 or 10 CFR 52.83. The backfitting and issue finality provisions were not meant to apply to such editorial changes in as much as such changes would have insubstantial impact on licensees with respect to their design and operation, and are not the kind of changes falling within the policy considerations that underlie the backfit rule and the issue finality provisions of 10 CFR 52.63 and 10 CFR 52.83.

Westinghouse also made proposed changes to Revision 15 of the AP1000 DCD, which the NRC understands were the result of requests to Westinghouse from COL applicants referencing the AP1000 design, to achieve consistency in description and approach in different portions of the DCD. In the absence of a generic change to the AP1000, the referencing COL applicants stated to Westinghouse and the NRC that each would likely take plant-specific departures to address the inconsistency. While this could result in more consistency within any given COL application, it would result in inconsistencies among the different referencing COLs, which is inconsistent with the overall standardization goal of 10 CFR Part 52. Accordingly, the NRC concludes that the Westinghouse-requested changes to the AP1000 to address consistency do not constitute backfitting under the backfit rule (in as much as they are voluntary) and are not otherwise inconsistent with the issue finality provisions of 10 CFR 52.63 and 52.83.

Westinghouse also proposed numerous substantive changes to the AP1000 design described in Revision 15 of the DCD, including, but not limited to, minor component design details, replacement of a design feature with another having similar performance (e.g., turbine manufacturer, power for the auxiliary boiler), and changes allowing additional capability for operational flexibility (e.g., liquid waste holdup tanks, unit reserve transformer). Westinghouse

included within its application a detailed list of each DCD content change and the basis for concluding that one or more of the criteria in 10 CFR 52.63(a)(1) are satisfied for each change.

In the course of the NRC review of the technical changes proposed by Westinghouse, the NRC considered the basis offered by Westinghouse and made conclusions about whether the criteria of 10 CFR 52.63(a) were satisfied. These conclusions are included in the chapters of the FSER under ADAMS Accession No. ML112061231. The NRC concluded that all of these changes met at least one of the criteria in 10 CFR 52.63(a) and are not otherwise inconsistent with the issue finality provisions of 10 CFR 52.63 and 52.83. Fifteen of the most significant changes are discussed below, to show that each of the 15 substantive changes to the AP1000 certified design meet at least one of the criteria in 10 CFR 52.63(a)(1)(i) through (a)(1)(vii) and, therefore, do not constitute a violation of the finality provisions in that section.

**I. 10 CFR 52.63 Criterion (a)(1)(iv): Provides the Detailed Design Information to be Verified under those ITAAC, which are Directed at Certification Information (i.e., DAC).**

**Title: Removal of Human Factors Engineering Design Acceptance Criteria from the Design Control Document**

**Item:** 1 of 15

**Significant Description of Change:** The ITAAC Design Commitments for HFE is in Tier 1, Table 3.2-1. In Revision 17 of the AP1000 DCD, Westinghouse proposed deletion of the Human Factors DAC (Design Commitments 1 through 4) and provided sufficient supporting documentation to meet the requirements of these ITAAC. Design Commitment 1 pertains to the integration of human reliability analysis with HFE design. Design Commitment 2 pertains to the HFE task analysis. Design Commitment 3 pertains to the human-system interface. Design Commitment 4 pertains to the HFE program verification and validation implementation. The information developed by Westinghouse to satisfy these ITAAC is included in Chapter 19 of the DCD.

**Location within the Safety Evaluation (SER) where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with the HFE DAC are in Sections 18.7.6 (Design Commitment 1), 18.5.9 (Design Commitment 2), 18.2.8 (Design Commitment 3), and 18.11 (Design Commitment 4) of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

The additional information included in Tier 2 provides detailed design information on human factors design that would otherwise have to be addressed through verification of implementation of the human factors DAC. Therefore, the changes to the DCD eliminate the need for DAC on human factors and meet the finality criteria in 10 CFR 52.63(a)(1)(iv).

**Title: Change to Instrumentation and Control DAC and Associated ITAAC**

**Item:** 2 of 15

**Description of Change:** In the proposed revision to DCD Chapter 7, Westinghouse chose the Common Q platform to implement the Protection and Safety Monitoring System (PMS) and removed all references to the Eagle 21 platform. This design change, coupled with the development of other information about the PMS system definition design phase, was the basis for Westinghouse's proposed removal of its Tier 1, Chapter 2, Section 2.5.2, Design Commitment 11(a) Design Requirements phase from Table 2.5.2-8, "Inspections, Tests, Analyses, and Acceptance Criteria," for the PMS.

In its proposed revision to the DCD in Chapter 7, Westinghouse altered its design for the Diverse Actuation System (DAS) by implementing it with Field Programmable Gate Array (FPGA) technology instead of microprocessor-based technology. Additional information about the design process for the DAS was added as the basis for Westinghouse's proposed completion of its Tier 1, Chapter 2, Section 2.5.1, Design Commitments 4(a) and 4(b) Design Requirements and System Definition phases from Table 2.5.1-4 "Inspections, Tests, Analyses, and Acceptance Criteria" for the DAS.

**Location within the Safety Evaluation (SER) where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with I&C DAC and ITAAC are in Sections 7.2.2.3.14, 7.2.5, 7.8.2, 7.9.2, and 7.9.3 of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Westinghouse provided additional information that incorporates the results of the design process implementation for the PMS and DAS (which both support completion of Design Commitment 11(a) from Table 2.5.2-8 and 4a and 4b from Table 2.5.1-4, respectively) into the DCD. The additional information included in Tier 2 provides detailed design information on I&C design that would otherwise have to be addressed through verification of implementation of the I&C DAC. Therefore, the changes to the DCD eliminate the need for DAC on I&Cs and meet the finality criteria in 10 CFR 52.63(a)(1)(iv).

**II. 10 CFR 52.63 Criterion (a)(1)(vii): Contributes to Increased Standardization of the Certification Information**

The changes in the AP1000 amendment generally fall into one of two categories: (1) changes that provide additional information or a greater level of detail not previously available in the currently-approved version of the AP1000 DCD (Revision 15); or (2) changes requested by COL applicants referencing the AP1000 who would plan to include these changes in their application as departures if they were not approved in the AP1000 DCR amendment. The Commission concludes that both categories of changes meet the 10 CFR 52.63 criterion of "contributes to increased standardization." The bases for the Commission's conclusions, including each category of change, are discussed below.

Additional and more detailed information

Westinghouse proposes that the DCD be changed by adding new, more detailed design information that expands upon the design information already included in the DCD. This information would be used by every COL referencing the AP1000 DCR. Incorporating these

proposed changes into the AP1000 DCR as part of this amendment contributes to the increased standardization of the certification information by eliminating the possibility of multiple departures. Therefore, these changes enhance standardization, and meet the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

Changes for which COL applicants would otherwise request departures

Westinghouse proposes several changes to its DCD with the stated purpose of contributing to increased standardization. Westinghouse represents that these changes were requested by the lead COL applicants currently referencing the AP1000. The NRC, in meetings with these applicants as part of the “Design-Centered Working Group” process for jointly resolving licensing issues, confirmed that these applicants requested these changes and committed to pursue of plant-specific departures from the AP1000 if Westinghouse did not initiate such changes to the AP1000 DCR. Such departures may be pursued by individual COL applicants (and licensees) as described in Part VIII, “Processes for Changes and Departures” of the AP1000 DCR (Appendix D to 10 CFR Part 52). Incorporating these proposed changes into the AP1000 DCR as part of this amendment contributes to the increased standardization of the certification information by eliminating the possibility of multiple departures. Therefore, all Westinghouse-initiated changes for the purpose of eliminating plant-specific departures enhance standardization, and meet the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Minimization of Contamination (10 CFR 20.1406 (b))**

**Item: 3 of 15**

**Description of Change:** In DCD Section 12.1.2.4, Westinghouse discussed features incorporated into the amended design certification to demonstrate compliance with 10 CFR 52.47(a)(6), which requires that a design certification application include the information required by 10 CFR 20.1406 (b), which was adopted in 2007 as part of the general revisions to 10 CFR Part 52. This regulation requires design certification applicants whose applications are submitted after August 20, 1997, to describe how the design will minimize, to the extent

practicable, contamination of the facility and the environment, facilitate decommissioning and minimize the generation of radioactive waste. The DCD changes are documented in Westinghouse Technical Report 98, "Compliance with 10 CFR 20.1406" (APP-GW-GLN-098), Revision 0 (ADAMS Accession No. ML071010536). Westinghouse evaluated contaminated piping, the SFP air handling systems, and the radioactive waste drain system to show that piping and components utilize design features that will prevent or mitigate the spread of contamination within the facility or the environment. Westinghouse has incorporated modifications and features such as elimination of underground radioactive tanks, RCPs without mechanical seals, fewer embedded pipes, less radioactive piping in the auxiliary building and containment vessel, and monitoring the radwaste discharge pipeline to demonstrate that the AP1000 design certification, as amended, will be in compliance with the subject regulation and Regulatory Guidance (RG) 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning" (June 2008).

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features are in Section 12.2 of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1)(vii):**

Inclusion in the DCD of the more detailed information about the features for minimization of contamination provides additional information to be included in the DCD for the AP1000 that increases standardization of the AP1000 design. Thus, the changes meet the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Extension of Seismic Spectra to Soil Sites and Changes to Stability and Uniformity of Subsurface Materials and Foundations**

**Item:** 4 of 15

**Description of Change:** In AP1000 DCD Tier 2, Sections 2.5.2 and 3.7, Westinghouse extended the AP1000 design to sites with five soil profiles, ranging from hard rock to soft soil, for

Category I structures, systems, and components. The certified design included only hard rock conditions. To support the technical basis for the extension, Westinghouse provided: seismic analysis methods, procedures for analytical modeling, soil-structure interaction analysis with three components of earthquake motion, and interaction of non-seismic Category I structures with seismic Category I structures. Also, in DCD Section 2.5.4, Westinghouse extended the AP1000 design with “Stability and Uniformity of Subsurface Materials and Foundations,” where the DCD presents the requirements related to subsurface materials and foundations for COL applicants referencing AP1000 standard design. The site-specific information includes excavation, bearing capacity, settlement, and liquefaction potential. On February 28, 2011, Westinghouse submitted Revision 5 to TR-03, “Extension of Nuclear Island Seismic Analysis to Soil Sites,” and summarized the report in DCD Appendix 3G, to provide more detail about its analyses.

**Location within the SER where the changes are principally described:**

The details of the NRC’s evaluation of Westinghouse’s design features associated with extension of seismic spectra to soil sites are in Section 3.7 of the FSER. The details of the NRC’s evaluation of Westinghouse’s design features associated with stability and uniformity of subsurface materials and foundations are in Sections 2.5.2 and 2.5.4 of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Westinghouse submitted a change to the DCD that provides the seismic design and supporting analysis for a range of soil conditions representative of expected applicants for a COL referencing the AP1000 design. As a result, the certified design can be used at more sites without the need for departures to provide site-specific analyses or design changes, thus leading to a more uniform analysis and seismic design for all the AP1000 plants. Including in the DCD the information demonstrating adequacy of the design for seismic events for a wider range of soil conditions is a change that provides additional information leading to increased standardization of this aspect of the design. In addition, the change reduces the need for COL

applicants to seek departures from the current AP1000 design in as much as most sites do not conform to the currently approved hard rock sites. Therefore, the change increases standardization and meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Long-Term Cooling**

**Item:** 5 of 15

**Description of Change:** DCD Tier 2, Section 6.3.8, describes the changes to COL information items related to containment cleanliness and verification of water sources for long-term recirculation cooling following a LOCA. The COL information item related to verification of water sources for long-term recirculation cooling following a LOCA was closed based on Westinghouse TR-26, "AP1000 Verification of Water Sources for Long-Term Recirculation Cooling Following a LOCA," APP-GW-GLR-079 (ADAMS Accession No. ML102170123) and other information contained in DCD Chapter 6. Section 6.3.2.2.7 describes the evaluation of the water sources for long-term recirculation cooling following a LOCA, including the design and operation of the AP1000 PCCS debris screens. DCD Tier 1, Section 2.2.3, includes the associated design descriptions and ITAAC.

The COL information item requires a cleanliness program to limit the amount of latent debris in containment consistent with the analysis and testing assumptions.

**Location within the SE where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with long-term cooling in the presence of LOCA-generated and latent debris and General Design Criteria 35 and 38 are in Subsection 6.2.1.8 of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the design and analysis information that demonstrates adequacy of long-term core cooling provides additional information leading to increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Control Room Emergency Habitability System**

**Item:** 6 of 15

**Description of Change:** DCD Tier 2, Section 6.4, has undergone significant revision. Westinghouse redesigned its main control room emergency habitability system to meet control room radiation dose requirements using the standard assumed in-leakage of 5 cubic feet per minute in the event of a release of radiation. The changes include the addition of a single-failure proof passive filter train. The flow through the filter train is provided by an eductor downstream of a bottled air supply. These changes were prompted by Westinghouse's proposal to revise the atmospheric dispersion factors from those certified in Revision 15 to larger values to better accommodate COL sites. As a result, other design changes were needed to maintain doses in the control room within acceptable limits.

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with radiation dose to personnel under accident conditions are in Section 6.4 of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Incorporation of design changes to the main control room ventilation systems would contribute to increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Changes to the Component Cooling Water System**

**Item:** 7 of 15

**Description of Change:** In Revision 18 to AP1000 DCD Tier 2, Westinghouse proposed changes to the design of the component cooling water system (CCWS) to modify the closure logic for system motor-operated containment isolation valves and install safety-class relief valves on system supply and return lines. The closure logic would close the isolation valves upon a high RCP bearing water temperature signal, which might be indicative of a RCP heat exchanger tube rupture. This change would automatically isolate this potential leak to

eliminate the possibility of reactor coolant from a faulted heat exchanger discharging to portions of the CCWS outside containment.

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with the CCWS are in Chapter 23, Section V, of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Westinghouse included changes to the component cooling water in the DCD. These changes will contribute to increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Changes to Instrumentation and Control Systems**

**Item:** 8 of 15

**Description of Change:** In AP1000 DCD Tier 2, Sections 7.1 through 7.3, Westinghouse completed planning activities related to the architecture of its safety related I&C protection system, referred to as the PMS. Westinghouse also proposed changes to the DCD to reflect resolution of PMS interdivisional data communications protocols and methods utilized to ensure a secure development and operational environment. A secure development and operational environment in this context refers to a set of protective actions taken against a predictable set of non-malicious acts (e.g., inadvertent operator actions, undesirable behavior of connected systems) that could challenge the integrity, reliability, or functionality of a digital safety system. The establishment of a secure development and operational environment for digital safety systems involves: (i) measures and controls taken to establish a secure environment for development of the digital safety system against undocumented, unneeded and unwanted modifications and (ii) protective actions taken against a predictable set of undesirable acts (e.g., inadvertent operator actions or the undesirable behavior of connected systems) that could challenge the integrity, reliability, or functionality of a digital safety system during operations.

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with I&C systems are in Sections 7.1 through 7.3, and 7.9 of NRC's Chapter 7 FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the more detailed information about the I&C architecture and communications provides additional information leading to increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Changes to the Passive Core Cooling System – Gas Intrusion**

**Item:** 9 of 15

**Description of Change:** In AP1000 DCD Tier 1 and Tier 2, Westinghouse proposed changes to the design of the PCCS to add manual maintenance vent valves and manual maintenance drain valves, and to reroute accumulator discharge line connections in order to address concerns related to gas intrusion. In addition, Westinghouse provided descriptions of surveillance and venting procedures to verify gas void elimination during plant startup and operations. These proposed changes are responsive to the actions requested by Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

The passive core cooling system (PCCS) provides rapid injection of borated water, which provides negative reactivity to reduce reactor power to residual levels and ensures sufficient core cooling flow. Noncondensable gas accumulation in the PCCS has the potential to delay injection of borated water, which would impact the moderating and heat removal capabilities, thus providing a challenge to the primary fission product barrier and maintenance of a coolable core geometry. As part of its review, the NRC determined that the proposed changes in the design of the PCCS were acceptable for providing protection for DBEs, such as LOCAs.

**Location within the SER where the changes are principally described:**

The NRC's evaluation of proposed changes to the DCD associated with changes to the PCCS is in Chapter 23, Section L, of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the design and analysis information that provides for venting of non-condensable gases provides additional information leading to increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Integrated Head Package – Use of the QuickLoc Mechanism**

**Item:** 10 of 15

**Description of Change:** In DCD Tier 2, Section 5.3.1.2, Westinghouse describes a revised integrated head package (IHP) design. The inclusion of eight QuickLoc penetrations in lieu of the forty-two individual in-core instrument thimble-tube-assembly penetrations on the reactor vessel head is a significant decrease in the number of reactor pressure vessel (RPV) closure head penetrations for access to in-core and core exit instrumentation. The QuickLoc mechanism allows the removal of the RPV closure head without removal of in-core and core exit instrumentation and, thus, decreases refueling outage time and overall occupational exposure. This head package design has been installed on a number of operating plants and, as noted, has several operational and safety advantages.

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with the (1) IHP and QuickLoc mechanism are in Section 5.2.3 of the FSER and (2) radiation protection pertaining to the addition of the integrated reactor head package and QuickLoc connectors are in Subsection 12.4.2.3 of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the changes to the IHP would contribute to the increased

standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Reactor Coolant Pump Design**

**Item:** 11 of 15

**Description of Change:** In AP1000 DCD Tier 2, Subsection 5.4.1, Westinghouse proposed changes related to the RCP design. These changes include: change to a single-stage, hermetically sealed, high inertia, centrifugal sealless RCP of canned motor design; use of an externally mounted heat exchanger; and change of the RCP flywheel to bimetallic construction. These DCD changes are documented in: TR-34, "AP1000 Licensing Design Change Document for Generic Reactor Coolant Pump," APP-GW-GLN-016, November 2006 and in other documentation in response to NRC inquiries. The supporting documentation includes an analysis demonstrating that failure of the flywheel would not generate a missile capable of penetrating the surrounding casing, and, therefore, that such failure would not damage the reactor coolant pressure boundary.

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with the RCP design are in Section 5.4.1 of the NRC's Chapter 5 FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the changes to the RCP would reduce the possibility of plant-specific departure requests by COL applicants referencing the AP1000 DCR. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Reactor Pressure Vessel Support System**

**Item:** 12 of 15

**Description of Change:** The RPV structural support system of the AP1000 standard design is designed to provide the necessary support for the heavy RPV in the AP1000 standard design. The original anchorage design was bolting into embedded plates of the CA04 structural

module. Subsection 3.8.3.1.1 of the AP1000 DCD Tier 2 would be changed to reflect modifications to the RPV support design. In the revised design, there are four support “boxes” or “legs” located at the bottom of RPV’s cold leg nozzles. The support boxes are anchored directly to the primary shield wall concrete base via steel embedment plates. This CA04 structural module is no longer used in the new design. The four RV support boxes are safety-related and the design of the RPV associated support structures is consistent with the safe shutdown earthquake design of Seismic Category I equipment. Subsections 3.8.3.5.1 and 5.4.10.2.1 of the DCD are modified.

**Location within the SER where the changes are principally described:**

The details of the NRC’s evaluation of Westinghouse’s design features associated with RPV supports are in Chapter 23, Section R, of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the changes to the RPV supports contributes to the increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii)

**Title: Spent Fuel Pool Decay Heat Analysis and Associated Design Changes**

**Item:** 13 of 15

**Description of Change:** In AP1000 DCD Tier 2, Section 9.1.3, Westinghouse proposed changes to the SFP cooling system. Westinghouse proposed to increase the number of spent fuel storage locations from 619 to 889 fuel assemblies and implement the following associated design changes: (1) increase in component cooling system (CCS) pump design capacity, (2) increase in the CCS supply temperature to plant components, and (3) changes in the CCS parameters related to the RCPs. The increase in the number of assemblies affects the decay heat removal/SFP heatup analyses. The supporting bases for these DCD changes are documented in: TR-111, “Component Cooling System and Service Water System Changes Required for Increased Heat Loads,” APP-GW-GLN-111, Revision 2, dated May 2007 (ADAMS

Accession No. ML071500563); TR-103, "Fluid System Changes," APP-GW-GLN-019, Revision 2, dated October 2007 (ADAMS Accession No. ML072830060); TR-108, "AP1000 Site Interface Temperature Limits," APP-GW-GLN-108, Revision 2, dated September 2007 (ADAMS Accession No. ML072750137), and TR-APP-GW-GLR-097, "Evaluation of the Effect of the AP1000 Enhanced Shield Building on the Containment Response and Safety Analysis," Revision 3, dated June 2011 (ADAMS Accession No. ML11168A041).

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with the SFP decay heat analysis are in Section 9.2.2 of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the changes to the SFP decay heat analysis would contribute to the increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Spent Fuel Rack Design and Criticality Analysis**

**Item:** 14 of 15

**Description of Change:** In DCD Tier 2, Section 9.1.2, Westinghouse proposed changes to the spent fuel racks: (1) to increase the storage capacity by 270 additional fuel assemblies, and (2) to integrate a new neutron poison into the rack design. These changes included a different rack design and associated structural analysis and a revised criticality analysis. These DCD changes are documented in TR-54, "Spent Fuel Storage Racks Structure and Seismic Analysis," APP-GW-GLR-033, Revision 4, dated June 2, 2010 (ADAMS Accession No. ML101580475); and TR-65, "Spent Fuel Storage Racks Criticality Analysis," APP-GW-GLR-029, Revision 2, dated January 5, 2010 (ADAMS Accession No. ML100082093).

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with the spent fuel rack design and criticality analysis are in Section 9.1.2 of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the changes to the spent fuel rack design and criticality analysis would contribute to the increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

**Title: Vacuum Relief System**

**Item:** 15 of 15

**Description of Change:** In Revision 18 to AP1000 DCD Tier 2, Chapters 3, 6, 7, 9, and 16, Westinghouse proposed a change to the design of the containment, which adds a vacuum relief system to the existing containment air filtration system vent line penetration. The proposed vacuum relief system consists of redundant vacuum relief devices inside and outside containment sized to prevent differential pressure between containment and the shield building from exceeding the design value of 1.7 psig, which could occur under extreme temperature conditions.

Each relief flow path consists of a check valve inside containment and a motor operated butterfly valve outside of containment. The redundant relief devices outside containment share a common inlet line with redundant outside air flow entry points. The outlet lines downstream of the outside containment relief devices are routed to a common header connected to the vent line penetration. The redundant relief devices inside containment share a common inlet line from the vent line penetration and have independent discharge lines into containment.

**Location within the SER where the changes are principally described:**

The details of the NRC's evaluation of Westinghouse's design features associated with the addition of the vacuum relief system are in Chapter 23, Section W, of the FSER.

**Evaluation of the Criteria in 10 CFR 52.63(a)(1):**

Inclusion in the DCD of the introduction of a containment vacuum relief system would contribute to the increased standardization of this aspect of the design. Therefore, the change meets the finality criterion for changes in 10 CFR 52.63(a)(1)(vii).

## **Other Technical Changes**

The above discussion on selected technical changes is illustrative of the NRC's consideration of applicability of the finality provisions to other technical changes proposed from Revision 15 of the DCD, which are reflected in Revision 19. As noted earlier, Westinghouse provided its proposed basis for each change as part of the application. The NRC concludes that the other technical changes meet one or more of the finality criteria and thus do not constitute a violation of the finality provisions of 10 CFR 52.63.

## **Changes Addressing Compliance with Aircraft Impact Assessment Rule (10 CFR 50.150)**

The final rule amends the existing AP1000 DCR, in part, to address the requirements of the AIA rule. The AIA rule itself mandated that a DCR be revised, if not during the DCR's current term, then no later than its renewal to address the requirements of the AIA rule. In addition, the AIA rule provided that any COL issued after the effective date of the final AIA rule must reference a DCR complying with the AIA rule, or itself demonstrate compliance with the AIA rule. The AIA rule may therefore be regarded as inconsistent with the finality provisions in 10 CFR 52.63(a) and Section VI of the AP1000 DCR. However, the NRC provided an administrative exemption from these finality requirements when the final AIA rule was issued (74 FR 28112; June 12, 2009). Accordingly, the NRC has already addressed the backfitting implications of applying the AIA rule to the AP1000 with respect to the AP1000 and referencing COL applicants.

## Conclusion

The amended AP1000 DCR does not constitute backfitting and is consistent with the finality provisions in 10 CFR Part 52. Accordingly, the NRC has not prepared a backfit analysis or documented evaluation for this rule.

### **XIII. 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 the Office of Management and Budget.

#### **List of Subjects in 10 CFR Part 52**

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

For the reasons set out in this standard operating procedure 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 – LICENSES, CERTIFICATIONS, AND APPROVALS FOR NUCLEAR POWER PLANTS**

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

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

2. In Appendix D to 10 CFR Part 52:
  - a. In Section III, revise paragraphs A and D;
  - b. In Section IV, revise paragraph A.3 and add paragraph A.4;

- c. In Section V, redesignate paragraph A as paragraph A.1 and add a new paragraph A.2;
- d. In Section VI, revise paragraphs B.1, B.2, B.7, and E;
- e. In Section VIII, revise the introductory text of paragraph B.5.b, redesignate paragraphs B.5.d, B.5.e, and B.5.f as paragraphs B.5.e, B.5.f, and B.5.g, respectively, and add a new paragraph B.5.d, and revise paragraphs B.6.b and B.6.c; and
- f. In Section X, revise paragraph A.1 and add a new paragraph A.4.

The revisions and additions read as follows:

**Appendix D to Part 52—Design Certification Rule for the AP1000 Design**

\* \* \* \* \*

**III. Scope and Contents**

A. Tier 1, Tier 2 (including the investment protection short-term availability controls in Section 16.3), and the generic TSs in the AP1000 Design Control Document, Revision 19, (Public Version) (AP1000 DCD), dated June 13, 2011, are approved for incorporation by reference by the Director of the Office of the Federal Register under 5 U.S.C. 552(a) and 10 CFR Part 51. Copies of the generic DCD may be obtained from Stanley E. Ritterbusch, Manager, AP1000 Design Certification, Westinghouse Electric Company, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066, telephone 412-374-3037. A copy of the generic DCD is also available for examination and copied for a fee, publicly available documents at the NRC’s PDR, Room O-1F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852. Copies are available for examination at the NRC Library, Two White Flint North, 11545 Rockville Pike, Rockville, Maryland 20852, telephone 301-415-5610, e-mail [LIBRARY.RESOURCE@NRC.GOV](mailto:LIBRARY.RESOURCE@NRC.GOV). The DCD can also be viewed online in the NRC Library at <http://www.nrc.gov/reading-rm/adams.html> by searching under ADAMS Accession No. ML11171A500. All approved material is available for inspection at the National Archives and

Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

\* \* \* \* \*

D. 1. If there is a conflict between the generic DCD and either the application for the initial design certification of the AP1000 design or NUREG-1793, "Final Safety Evaluation Report Related to Certification of the Westinghouse Standard Design," and Supplement No. 1, then the generic DCD controls.

2. If there is a conflict between the generic DCD and either the application for Amendment 1 to the design certification of the AP1000 design or NUREG-1793, "Final Safety Evaluation Report Related to Certification of the Westinghouse Standard Design," Supplement No. 2, then the generic DCD controls.

\* \* \* \* \*

#### **IV. Additional Requirements and Restrictions**

A. \* \* \*

3. Include, in the plant-specific DCD, the SUNSI (including PI) and SGI referenced in the AP1000 DCD.

4. Include, as part of its application, a demonstration that an entity other than Westinghouse is qualified to supply the AP1000 design, unless Westinghouse supplies the design for the applicant's use.

\* \* \* \* \*

#### **V. Applicable Regulations**

A. \* \* \*

2. The regulations that apply to those portions of the AP1000 design approved by Amendment 1 are in 10 CFR Parts 20, 50, 73, and 100, codified as of [INSERT DATE THAT IS 30 DAYS AFTER THE DATE OF PUBLICATION IN THE *FEDERAL REGISTER*], that are

applicable and technically relevant, as described in the Supplement No. 2 of the FSER (NUREG-1793).

\* \* \* \* \*

## VI. Issue Resolution

\* \* \* \* \*

B. \* \* \*

1. All nuclear safety issues, except for the generic TS and other operational requirements, associated with the information in the FSER and Supplement Nos. 1 and 2, 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 records for initial certification and Amendment 1 of the AP1000 design;

2. All nuclear safety and safeguards issues associated with the referenced SUNSI (including PI) and SGI which, in context, are intended as requirements in the generic DCD for the AP1000 design;

\* \* \* \* \*

7. All environmental issues concerning severe accident mitigation design alternatives associated with the information in the NRC's EA for the AP1000 design, Appendix 1B of Revision 15 of the generic DCD, the NRC's final EA for Amendment 1 to the AP1000 design, and Appendix 1B of Revision 19 of the generic DCD, for plants referencing this appendix whose site parameters are within those specified in the severe accident mitigation design alternatives evaluation.

\* \* \* \* \*

E. The NRC will specify at an appropriate time the procedures to be used by an interested person who wishes to review SUNSI (including PI, such as trade secrets or financial information obtained from a person that are privileged or confidential (10 CFR 2.390 and 10

CFR Part 9)) or SGI for the AP1000 certified design, for the purpose of participating in the hearing required by 10 CFR 52.85, the hearing provided under 10 CFR 52.103, or in any other proceeding relating to this appendix in which interested persons have a right to request an adjudicatory hearing.

\* \* \* \* \*

### **VIII. Processes for Changes and Departures**

\* \* \* \* \*

B.\*\*\*

5.\*\*\*

b. A proposed departure from Tier 2, other than one affecting resolution of a severe accident issue identified in the plant-specific DCD or one affecting information required by 10 CFR 52.47(a)(28) to address 10 CFR 50.150, requires a license amendment if it would:

\* \* \* \* \*

d. If an applicant or licensee proposes to depart from the information required by 10 CFR 52.47(a)(28) to be included in the FSAR for the standard design certification, then the applicant or licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a). The applicant or licensee must also document how the modified design features and functional capabilities continue to meet the assessment requirements in 10 CFR 50.150(a)(1) in accordance with Section X of this appendix.

\* \* \* \* \*

6.\*\*\*

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) Reactor coolant pump type.
- (6) Small-break loss-of-coolant accident (LOCA) analysis methodology.
- (7) Screen design criteria.
- (8) Heat sink data for containment pressure analysis.

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) piping design and welding restrictions, and ASME Code Cases.
- (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, including ASME Code, Section III, Subsection NE.

(15) Human factors engineering.

(16) Steel composite structural module details.

\* \* \* \* \*

## **X. Records and Reporting**

A. \* \* \*

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

\* \* \* \* \*

4.a. The applicant for the AP1000 design shall maintain a copy of the AIA performed to comply with the requirements of 10 CFR 50.150(a) for the term of the certification (including any period of renewal).

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

\* \* \* \* \*

Dated at Rockville, Maryland, this      day of              2011.

For the Nuclear Regulatory Commission.

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