16. TECHNICAL SPECIFICATIONS

16.1 Introduction

Chapter 16, "Technical Specifications," of the AP1000 design control document (DCD), provides the AP1000 generic technical specifications (GTS) in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36(a). Technical specifications (TS) impose limits, operating conditions, and other requirements on reactor facility operation to protect the public health and safety. The TS are derived from the analyses and evaluations in the DCD.

16.2 Summary

The AP1000 design employs passive safety-related systems that rely on gravity and natural processes, such as convection, evaporation, and condensation. The AP1000 GTS were modeled after Revision 2 of NUREG-1431, "Standard Technical Specifications Westinghouse Plants" (STS), issued April 2001. In some cases, the applicant developed TS beyond those in the STS to account for the advanced passive design features of the AP1000. In many instances, the AP1000 system design functions are similar to those of operating pressurized-water reactors, even though the components and systems are new. The amendment to the AP1000 design certification affected the following sections of the AP1000 GTS and bases:

- Section 1
- Section 2
- Sections 3.1 through 3.9
- Section 4
- Section 5

The applicant included STS generic changes, known as Technical Specifications Task Force (TSTF) travelers, in the GTS. The TSTF traveler included in the amended GTS was TSTF-449, Revision 4, "Steam Generator Tube Integrity."

The AP1000 GTS contain reviewer's notes stating conditions that a combined license (COL) applicant (or licensee) must satisfy in order to complete a particular GTS provision (e.g., incorporation of a methodology approved by the U.S. Nuclear Regulatory Commission (NRC) into a plant's licensing basis, or a staff determination that a licensee's probabilistic risk assessment program is of adequate quality).

In some instances, detailed design information, equipment selection, instrumentation settings, or other information needed to establish appropriate TS and bases was not provided during the review of the AP1000 design certification (DC) or amendment to the AP1000 DC. Chapter 16 of the DCD and the GTS and bases identify this information, which the COL applicant will include in the plant-specific TS (PTS). Locations for the addition of this information are signified in the GTS by square brackets to indicate that the COL applicant must provide plant-specific values or alternative text.

As parts of the amendment to the AP1000 DC, the applicant proposed to complete bracketed COL information items. The applicant submitted Revisions 0 and 1 of Technical Report (TR)-

74A (APP-GW-GLR-064), “AP1000 Generic Technical Specifications Completion,” to document these changes.

The remaining changes to the AP1000 GTS result either from modifications to the plant equipment designs or from the resolution of inconsistency between various TS requirements and their supporting information in the associated TS bases. The applicant submitted Revisions 0 and 1 to TR-74C (APP-GW-GLN-075), “AP1000 Generic Technical Specifications for Design Changes,” to document these changes.

The applicant also submitted TR-134 (APP-GW-GLR-134), “AP1000 DCD Impacts to Support COLA Standardization,” to document any supplemental changes to the AP1000 GTS that are otherwise missed to be included as parts of TR-74A or TR-74C.

This safety evaluation addresses changes to Revision 15 of the AP1000 DCD, which are identified in Revisions 16 and 17 of the AP1000 DCD.

16.3 Regulatory Basis

16.3.1 Regulatory Requirements

Section 182a of the Atomic Energy Act of 1954 requires that applicants for nuclear power plant operating licenses state the following:

> Such technical specifications, including information of the amount, kind, and source of special nuclear material required, the place of the use, the specific characteristics of the facility, and such other information as the Commission may, by rule or regulation, deem necessary in order to enable it to find that the utilization…of special nuclear material will be in accord with the common defense and security and will provide adequate protection to the health and safety of the public. Such technical specifications shall be a part of any license issued.

In 10 CFR 50.36, “Technical Specifications,” the Commission established its regulatory requirements related to the content of TS. In doing so, the Commission emphasized those matters related to the prevention of accidents and the mitigation of accident consequences. As recorded in the Statements of Consideration, “Technical Specifications for Facility Licenses; Safety Analysis Reports” (*Federal Register*, 33 FR 18610, December 17, 1968), the Commission noted that applicants were expected to incorporate into their TS “those items that are directly related to maintaining the integrity of the physical barriers designed to contain radioactivity.” The regulation in 10 CFR 50.36(c) requires TS to contain (1) safety limits and limiting safety system settings, (2) limiting conditions for operation (LCOs), (3) surveillance requirements (SRs), (4) design features, and (5) administrative controls.

The regulation in 10 CFR 50.36(c)(2)(ii) requires the TS to include an LCO for each item meeting one or more of the following four criteria:

(1) Criterion 1—installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary

(2) Criterion 2—a process variable, design feature, or operating restriction that is an initial condition of a design-basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier

(3) Criterion 3—a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design-basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier

(4) Criterion 4—a structure, system, or component shown by operating experience or a probabilistic safety assessment to be significant to public health and safety

According to Criteria 17, 21, 34, 35, 38, 41, and 44 in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," those systems need to have sufficient independence, redundancy, and testability to perform their safety function, assuming a single failure.

16.3.2 Regulatory Guidance

Section 16 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (the SRP), issued March 2007, provides the relevant requirements of the Commission regulations for TS and bases reviews and the associated acceptance criteria. These requirements are summarized below. Section 16 of NUREG-0800 also covers areas of review that interface with other SRP sections.

In 1992, the NRC issued STS to clarify the content and format of requirements necessary to ensure safe operation of nuclear power plants. The NRC developed these STS from the results of the TS improvement program, in accordance with 10 CFR 50.36, and the Commission's Interim Policy Statement on Technical Specification Improvements for Nuclear Power Reactors (52 FR 3788), dated February 6, 1987, and which subsequently became SECY-93-067, "Final Policy Statement on TS Improvements for Nuclear Power Reactors," dated July 22, 1993.

Three NRC documents contain the STS for pressurized-water reactors. For each document, Volume 1 contains the TS, and Volume 2 contains the associated TS bases. The STS include bases for safety limits, limiting safety system settings, LCOs, and associated action and SRs. The documents are listed below:

(1) NUREG-1430, "Standard Technical Specifications Babcock and Wilcox Plants"
(2) NUREG-1431, "Standard Technical Specifications Westinghouse Plants"
(3) NUREG-1432, "Standard Technical Specifications Combustion Engineering Plants"

The STS reflect the results of a detailed review of the application of the "Interim Policy Statement Criteria to Generic System Functions," which was published in a "split report" issued to the nuclear steam supply system vendor owners groups in May 1988 (e.g., the "split report" for the Westinghouse plants is an attachment to a May 9, 1988 letter to Mr. R. A. Newton, Chairman of the Westinghouse Owners Group). STS also reflect the results of extensive discussions concerning various drafts of STS so that the application of the TS criteria and the June 2005 "Writer's Guide for Plant-Specific Improved Technical Specifications," prepared by the TSTF, would consistently reflect detailed system configurations and operating characteristics for all reactor designs. As such, the generic bases presented in NUREGs

provide an abundance of information regarding the extent to which the STS present requirements that are necessary to protect public health and safety.

On July 22, 1993, the Commission issued its Final Policy Statement (58 FR 39132), expressing the view that satisfying the guidance in the policy statement also satisfies Section 182a of the Atomic Energy Act and 10 CFR 50.36. The Final Policy Statement describes the safety benefits of the STS and encourages licensees to use the STS as the basis for PTS amendments and for complete conversions to improved TS based on the STS.

The NRC published major revisions to the STS in 1995 (Revision 1), 2001 (Revision 2), and 2004 (Revision 3). The format and content of the TS and bases for a COL referencing a certified design should be based on the GTS and bases for one of the approved certified designs.

The following pending STS generic changes, known as TSTF travelers, are considered necessary improvements or corrections that should be incorporated in some form into GTS:

- TSTF-448-A, Revision 3, "Control Room Habitability"
- TSTF-449, Revision 4, "Steam Generator Tube Integrity"
- TSTF-471-A, Revision 1, "Eliminate Use of Term Core Alterations in Actions and Notes"
- TSTF-479-A, Revision 0, "Changes to Reflect Revision of 10 CFR 50.55a"
- TSTF-482-A, Revision 0, "Correct LCO 3.0.6 Bases"
- TSTF-485-A, Revision 0, "Correct Example 1.4-1"
- TSTF-497-A, Revision 0, "Limit Inservice Testing Program SR 3.0.2 Application to Frequencies of 2 Years or Less"

16.3.3 Other Guidance

The June 2005 "Writer's Guide for Plant-Specific Improved Technical Specifications" provides specific guidance for the preparation of PTS. The purpose of the guide is to recommend the format and content of improved TS and promote consistency in content, format, and style.

The staff developed design- and plant-specific risk insights for use during the review of AP1000 applications and provided them in a risk insights report. The staff used information from the AP1000 DCD and AP1000 probabilistic risk assessment to develop these risk insights. The risk insights were used to identify areas that warranted more detailed review and to identify equipment and systems that meet Criterion 4 in 10 CFR 50.36(c)(2)(ii).

16.3.4 Applicable Generic Communication

The NRC issued the following TS-related generic communications, which require consideration in the development of TS and associated bases:

- Generic Letter (GL) 1988-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," October 3, 1988
- GL 1991-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," April 2, 1991
- GL 1996-03, "Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits," January 31, 1996
- GL 2003-01, "Control Room Habitability," June 12, 2003

- GL 2006-01, “Steam Generator Tube Integrity and Associated Technical Specifications,” January 20, 2006

The following generic safety issues (GSI) opened by the NRC are TS - related and require consideration when developing TS and associated bases:

- GSI-78, “Monitoring of Fatigue Transient Limits for Reactor Coolant System”
- GSI-120, “On-Line Testability of Protection Systems”

16.4 Technical Evaluation

16.4.0 General

The staff evaluated the changes to the AP1000 GTS to confirm that appropriate restrictions have been imposed to ensure that an operating AP1000 will operate within its design as described in the AP1000 DCD. These restrictions should ensure that the plant will be operated within the required conditions bounded by the AP1000 DCD and with operable equipment that is necessary to prevent accidents or mitigate the consequences of accidents postulated in the AP1000 DCD. Also, the staff verified that the design and operation of the AP1000 and any cited precedent (e.g., STS for Westinghouse plants) are sufficiently similar that they are applicable and appropriate.

The staff evaluated each of the changes in the TS sections listed below. The applicant has committed to making the changes in the final version of the AP1000 DCD that are identified in the AP1000 DCD, Revision 17. Therefore, to ensure that the final version of the AP1000 DCD is correct, the Revision 17 changes will require verification and are noted as confirmatory items.

The staff did not review sections of the AP1000 GTS and bases that were unaffected by the changes contained in Revisions 16 and 17 of the AP1000 DCD. The technical evaluation for the sections that were not affected by the amendment can be found in NUREG-1793, “Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design,” issued September 2004.

16.4.1 TS Sections 1.1 through 1.4, Use and Application

Section 1.0 of the AP1000 GTS includes definitions of terms used in the context of PTS and examples to illustrate the applications of logical connectors, completion times for required actions, and frequencies for SRs. Changes to the AP1000 GTS, Section 1.0, are described below.

In TS 1.1, the applicant proposed changes to the definition of “shutdown margin,” which is used in conjunction with TS 3.1.1, 3.1.4, 3.1.5, and 3.1.6, to clarify how the gray rod cluster assemblies will be accounted for in the calculation of shutdown margin. In request for additional information (RAI)-SRP16-CTSB-01, the staff asked for additional details regarding this change. In its response letter dated November 11, 2008, the applicant provided the requested information including a markup of changes to TS Section 1.1 in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-01. The staff’s evaluation of proposed changes to TS Section 3.1 is in Section 16.4.4 below.

In addition, the staff noted that an error in TS Section 1.4 had not been corrected in accordance with the NRC approved TSTF-485, which corrects Example 1.4-1, Revision 0. The staff issued RAI-SRP16-CTSB-02 to the applicant for correction of this error. In its response letter dated December 2, 2008, the applicant agreed to revise TS 1.4 in a future DCD revision. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-02.

16.4.2 TS Section 2.0, Safety Limits

Section 2.0 of the AP1000 DCD GTS and Bases includes requirements for safety limits to ensure that the fuel design limits are not exceeded during steady-state conditions, normal operational transients, and anticipated operational occurrences.

The specifications provided in Section 2.0, which include the reactor core safety limits and the reactor coolant system (RCS) pressure safety limit, are consistent with the STS, and the staff finds them acceptable.

In RAI-SRP16-CTSB-66, the staff asked the applicant to make an editorial change regarding an acronym contained in the bases of Section 2.1.1. In a letter dated December 2, 2008, the applicant acknowledged the need for the change and included a markup of the applicable section contained in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-66.

16.4.3 TS Section 3.0, Limiting Condition for Operation and Surveillance Requirement Applicability

Section 3.0 of the AP1000 GTS and Bases includes general provisions regarding determination of equipment operability and performance of SRs in specific TS Section 3 series (i.e., TS 3.1 through TS 3.9). There is no proposed change to the AP1000 GTS Section 3.0.

16.4.4 TS Section 3.1, Reactivity Control Systems

Section 3.1 of the AP1000 DCD GTS and Bases includes requirements for the reactivity control systems, which are designed to reliably control reactivity changes so that, under postulated accident conditions, the capability to cool the core is maintained.

The specifications in Section 3.1, which consists of 3.1.1 Shutdown Margin, 3.1.2 Core Reactivity, 3.1.3 Moderator Temperature Coefficient, 3.1.4 Rod Group Alignment Limits, 3.1.5 Shutdown Bank Insertion Limits, 3.1.6 Control Bank Insertion Limits, 3.1.7 Rod Position Indication, 3.1.8 Physics Tests Exceptions—Mode 2, and 3.1.9 Chemical and Volume Control System Demineralized Water Isolation Valves and Makeup Line Isolation Valves, are consistent with the STS, and the staff finds them acceptable.

In RAI-SRP16-CTSB-34, the staff asked the applicant to clarify the mode of applicability for an SR contained in the bases of Section 3.1.1. In a letter dated December 2, 2008, the applicant acknowledged the need for the change and included a markup of the applicable section contained in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-34.

In RAI-SRP16-CTSB-67, the staff asked the applicant to make a minor editorial change regarding the title of an LCO contained in the bases portions of Sections 3.1.4 and 3.1.8. In a letter dated December 2, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections contained in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-67.

In RAI-SRP16-CTSB-05, the staff asked the applicant to clarify certain notes and their corresponding applicability modes contained in the specification and bases portions of Sections 3.1.4, 3.1.5, and 3.1.6. In a letter dated November 19, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections contained in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-05.

In RAI-SRP16-CTSB-60, the staff asked the applicant to make an editorial change regarding required actions stated in the bases of Section 3.1.7. In a letter dated December 2, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections contained in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-60.

In RAI-SRP16-CTSB-43, the staff asked the applicant to make an editorial change regarding the required reactor power level stated in the specification and bases portions of Section 3.1.8. In a letter dated December 2, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections contained in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-43.

In RAI-SRP16-CTSB-20, the staff asked the applicant to make an editorial change regarding the correct revision year for a reference used in the bases portion of Section 3.1.8. In a letter dated December 9, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections contained in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-20.

The staff finds the changes made as the result of the above six RAIs for various parts of Section 3.1 acceptable and consistent with the STS.

16.4.5 TS Section 3.2, Power Distribution Limits

Section 3.2 of the AP1000 GTS and Bases includes requirements for the reactor core power distribution limits, which are designed to reliably control core thermal limits and core power distribution consistent with the design safety analysis. Changes to the AP1000 GTS, Section 3.2, are described below.

The specifications provided in Section 3.2, which consists of 3.2.1 Heat Flux Hot Channel Factor, 3.2.2 Nuclear Enthalpy Rise Hot Channel Factor, 3.2.3 Axial Flux Difference, 3.2.4 Quadrant Power Tilt Ratio, and 3.2.5 OPDMS-Monitored Parameters are consistent with the STS, and the staff finds them acceptable.

In RAI-SRP16-CTSB-68, the staff asked the applicant to make an editorial change regarding the documentation of the use of a reference in the bases portion of Section 3.2.3. In a letter dated December 2, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections in the AP1000 DCD, Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-68.

In RAI-SRP16-CTSB-23, the staff asked the applicant to clarify the mode of applicability stated in the specification and bases portions of Section 3.2.5. In a letter dated December 2, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections in the AP1000, DCD Revision 17. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-23.

The staff finds the changes made as a result of the above two RAIs for various parts of Section 3.2 acceptable and consistent with the STS.

16.4.6 TS Section 3.3, Instrumentation

Section 3.3 of the AP1000 GTS and Bases includes requirements for the instrumentation systems that display information required to protect against violating the core fuel design limits and RCS and to mitigate accidents. Changes to the AP1000 GTS, Section 3.3, are described below.

The staff approved Section 3.3, "Instrumentation," of the AP1000 DCD, Revision 15, in the certified design. In Revision 16 of the AP1000 and Revisions 0 through 5 of TR-134, the applicant made minor editorial changes and updated technical information. The applicant justified other editorial changes in TR-74C, APP-GW-GLN-075, Revision 0, dated May 2007. RAI-SRP16-CTSB-69 was issued to correct editorial errors. In the AP1000 DCD, Revision 17, the applicant corrected the editorial and typographical errors.

The applicant removed the brackets around the completion times in Sections 3.3.1 and 3.3.2 and restored the 92-day frequency to SR 3.3.1.6 and SR 3.3.2.5. The applicant documented the basis for these changes in TR-74, APP-GW-GLR-064, Revision 1, "AP1000 Generic Technical Specifications Completion Update on Open Items," dated April 13, 2007, and APP-GW-GSC-020, Revision 0, "AP1000 Protection and Safety Monitoring System Technical Specification Completion Time and Surveillance Frequency Justification," dated March 17, 2008. The applicant has incorporated these changes in the AP1000 DCD, Revision 17. The applicant revised the SR completion times to be consistent with APP-GW-GSC-020, Revision 0.

The applicant stated that *all* values specified for trip setpoints and allowable values in Tables 3.3.1-1 and 3.3.2-1 must be confirmed following the completion of the plant-specific setpoint study. After selection of specific instrumentation, the trip setpoints can be calculated using the setpoint methodology described in WCAP-16361, APP-PMS-JEP-001, Revision 0, "Westinghouse Setpoint Methodology for Protection Systems—AP1000," issued May 2006. In the AP1000, Revision 17, the applicant has removed all bracketed items for trip setpoints and allowable values in the tables.

In TS 3.3.1, Table 3.3.1-1, equations for overtemperature ΔT (Note 1) and overpower ΔT (Note 2) are provided. The staff previously requested, in RAI-SRP16-CTSB-42, that the applicant

provide the technical bases and derivation of the revised overtemperature ΔT and overpower ΔT reactor trip setpoint equations presented in Revision 16, and provide a reference to a document approved by the staff for the basis of the revised equations, or submit the basis for the revised equations to the staff for further review. The response provided for RAI-SRP16-CTSB-42 via submittal ML083290461 did not fully address the staff's request. WCAP-8745-P-A, previously reviewed and approved by the staff, provided the bases for the overtemperature ΔT and overpower ΔT setpoint equations presented in Revision 15 of the DCD. The revised equations presented in DCD Revision 16 for these reactor trip functions differ from those previously submitted in Revision 15 of DCD 7.2.1.1.3 and Technical Specification Table 3.3.1-1, Note 1.

Based on this the staff believes that the applicant should document either by submitting a revision to WCAP-8745-P-A, submitting a revision to the DCD, or by submitting an equivalent topical document to be referenced appropriately in the DCD and Technical Specifications Section 5.6.5 per Generic letter 88-16. The submittal should document the bases for the revised equations; the bases for development of the tables of allowable core thermal power as a function of core inlet temperature at various pressures for the overtemperature ΔT trip equation; the bases for the determination of the preset bias K_4 in the overpower ΔT trip equation; and the bases for the constants and bracketed values that appear in the revised equations presented in Revision 16. The NRC identified this as Open Item OI-SRP16-CTSB-42.

In RAI-SRP16-CTSB-44, the staff requested clarification and consistency of the Function 6 (overtemperature ΔT) and Function 7 (overpower ΔT) "required channel" column in Table 3.3-1, "Reactor Trip System Instrumentation." The applicant added "4 (2/loop)" in the "required channel" column for clarification. The NRC staff has reviewed and accepted this change. The applicant proposes to implement this change in Revision 18 of the DCD. Verification that these changes are correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-44.

In RAI-SRP16-CTSB-45, the staff requested clarification and consistency of the Function 12 (reactor coolant pump (RCP) speed-low) "required channel" column in Table 3.3-1. The applicant added "4 (1/pump)" in the "required channel" column for clarification. The NRC staff has reviewed and accepted this change. The applicant proposes to implement this change in Revision 18 of the DCD. Verification that these changes are correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-45.

In RAI-SRP16-CTSB-52, the staff requested resolution of conflicting information for the required minimum number of core exit thermocouples per core quadrant. The conflict was between Note (b) in Table 3.3.3-1 ("Post Accident Monitoring") and DCD Table 7.5-1, Sheet 2 ("Instrumentation and Controls"). The applicant changed the number of instruments required from "2 quadrants" to "2 quadrants per Division" in Table 7.5-1, Sheet 2. The NRC staff has reviewed and accepted this change. The applicant proposes to implement this change in Revision 18 of the DCD. Verification that these changes are correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-52.

16.4.7 TS Section 3.4, Reactor Coolant System

Section 3.4 of the AP1000 GTS and Bases includes requirements for various RCS parameters (i.e., pressure, temperature, flow) and subsystems (i.e., RCS loops, pressurizer, low-temperature overpressure protection) to ensure that the fuel integrity and the reactor coolant

pressure boundary integrity are preserved during all modes of plant operation. Changes to the AP1000 GTS, Section 3.4, are described below.

In TS 3.4.1, the applicant proposed to use the preliminary bracketed value of 1.41E6 (Lpm) (301,670 gallons per minute (gpm)), specified in LCO 3.4.1.c for the minimum RCS total flow rate, as a final value based on latest system design specifications, approved engineering calculation notes, and/or verified analysis input assumptions. The staff finds this final value acceptable since it is consistent with supporting information provided in the TS bases B 3.4.1 and relevant information described in the AP1000 DCD Sections 4.4 (Table 4.4-1) and 15.0 (Table 15.0-3).

The applicant also proposed to change requirements specified in SR 3.4.1.4 for monitoring RCS flow, to reflect an alternate testing method to the precision heat balance (an NRC-accepted method). In RAI-SRP16-CTSB-25, the staff asked Westinghouse to provide justification for the change. In the December 2, 2008, response letter, Westinghouse provided additional details about the basis for the alternate method and also stated the following:

> The intent of the proposed Section 3.4.1 is to permit either method, whichever is demonstrated to provide less measurement uncertainty....The total uncertainty in measuring flow will depend upon analysis of the baseline flow measurements and the accuracy of the devices used to periodically measure dP caused by RCS flow. If the total uncertainty is not shown to be less than for the precision heat balance plus Delta-T method, then the alternate method would not be used.

Westinghouse also indicated that no change to the AP1000 DCD or the TS 3.4.1 and associated bases is required.

In reviewing this response, the staff noted that the alternate testing method using elbow tabs had been approved for use at the South Texas Project Electric Generating Station. A review of the current South Texas Project TS found the following descriptions for the affected SRs:

> SR 4.2.5.2 The RCS flow rate indicators shall be subjected to a channel calibration at least once per 18 months.
>
> SR 4.2.5.3 The RCS total flow rate shall be determined by precision heat balance or elbow tab dP measurements at least once per 18 months.

Based on the above, the staff believes a revision to the SR 3.4.1.4 and TS Bases 3.4.1 is needed to incorporate additional details regarding the choice of a testing method that produces better uncertainty analysis results, including a new SR for a channel calibration of the RCS flow rate indicators. The NRC staff identified this as Open Item OI-SRP16-CTSB-25.

In TS 3.4.2, the applicant proposed to use the preliminary bracketed value of 288 Degrees Celsius (C) (551 degrees Fahrenheit (F)), for the minimum RCS cold-leg temperature for criticality, as a final value based on historical relationships between the no-load operating temperature (292 Degrees C, 557 degrees F), the minimum temperature for criticality (288 Degrees C, 551 degrees F), and the limit for Mode 2 physics testing (283 Degrees C, 541 degrees F). The staff finds this final value acceptable since it is consistent with supporting information provided in the TS Bases B 3.4.2 and relevant information described in the AP1000 DCD, Sections 5.4 and 15.0.3.

In TS 3.4.4, the applicant proposed to replace the preliminary bracketed values of 135 Degrees C (275 degrees F) with a new final value of 93 Degrees C (200 degrees F) and to use the preliminary bracketed value of 10 Degrees C (50 degrees F) as a final value, regarding temperature requirements for the primary coolant and the secondary-side water as listed in Note 2 of LCO 3.4.4. In addition, the applicant proposed to add an extra precautionary note regarding restrictive plant conditions before starting an RCP for the reactor vessel low-temperature overpressure protection. In RAI-SRP16-CTSB-55, the applicant was asked to provide clarification of the selected value of 93 Degrees C (200 degrees F). The staff has received the response, but has not yet evaluated its acceptability. The NRC staff identified this as Open Item OI-SRP16-CTSB-55.

Although no change was proposed to TS 3.4.6 as part of the AP1000 DC amendment application, the staff noted inconsistencies between SR 3.4.6.1 requirements and supporting information in the bases B 3.4.6, regarding lift setpoints for pressurizer safety valves. In RAI-SRP16-CTSB-08, the NRC staff asked the applicant to address these inconsistencies. In its response dated December 17, 2008, the applicant proposed to revise the bases for SR 3.4.6.1 to indicate +/- 1 percent OPERABLE range for the valve lift settings, to be consistent with SR 3.4.6.1 and with the tolerance established in the Westinghouse topical report WCAP-16779, "AP1000 Overpressure Protection Report.", April 2007. The staff finds this change acceptable; however, verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-08.

In TS 3.4.7, the applicant proposed to delete LCO 3.4.7.d for the total primary-to-secondary leakage through both steam generators because it is redundant to LCO 3.4.7.e for primary to secondary leakage through any one steam generator. In addition, changes were proposed to SR 3.4.7.2 to reflect the implementation of a new steam generator program to maintain the steam generator tube integrity. The staff agreed with Westinghouse's position on deleting LCO 3.4.7.d and finds the proposed changes to SR 3.4.7.2 acceptable since they are consistent with other requirements within the AP1000 GTS (GTS 3.4.18, GTS 5.5.4, and GTS 5.6.8).

In TS 3.4.8, the applicant proposed to add a missing clarifier to the applicability statement that allows stopping all RCPs without having to enter an action statement. The staff finds this change acceptable since the added special plant condition is consistent with remaining TS 3.4.8 requirements.

The applicant also proposed to replace the preliminary bracketed value of 37,785 Lpm (10,000 gpm) for the minimum RCS flow with a final value of 11,356 Lpm (3,000 gpm). Conforming changes were proposed in SR 3.4.8.1 and related information in the TS bases to match the new minimum flow value (e.g., the minimum pump speed setting of 25 percent was replaced with new value of 10 percent). Westinghouse cited the NRC-accepted response to RAI 440.106 during the Revision 14 AP1000 DC review as justification for the proposed flow reduction. In RAI-SRP16-CTSB-62, the NRC staff asked the applicant to provide additional details to support these changes. In its response dated December 17, 2008, the applicant reiterated information that was provided in the response to RAI 440.106 but also stated the following:

> AP1000 RCS flow calculations show that the expected RCS flow with a single reactor coolant pump (RCP) operating at its lowest allowable operating speed is approximately 17,000 gpm. The associated reactor vessel flow is approximately

> 11,000 gpm. This is well above the 3,000 gpm flow mixing requirement from the LOFT testing, and also above the preliminary bracketed value of 10,000 gpm...

The staff noted that the new proposed value of 10 percent for the pump minimum speed setting in SR 3.4.8.1, corresponding approximately to a calculated flow of 29,810 Lpm (7,875 gpm), appears to be inconsistent with the lowest allowable operating speed stated above. The NRC staff identified this as Open Item OI-SRP16-CTSB-62.

Although no change was proposed to TS 3.4.11/12 as part of the AP1000 DC amendment application, the staff noted that the scope of Condition A was not clearly defined. In RAI-SRP16-CTSB-07, the staff asked Westinghouse to explain the difference in scope of inoperable equipment involved between TS 3.4.11/3.4.12 Condition A, which states "One required flow path inoperable," and Condition B, which states, "One required stage 1 ADS flow path inoperable AND Either one required stage 2 or stage 3 ADS flow path inoperable."

In its October 27, 2008, response letter, Westinghouse stated the following:

> As described in the 3.4.11 and 3.4.12 Bases, Conditions A and B cover two different combinations of ADS flow path inoperabilities....Separate Conditions are specified, since both Conditions A and B may be entered at the same time. The inoperabilities covered by the two Conditions are permissible at the same time, since the safety function can be accomplished by the remaining seven ADS flow paths without a single failure. The loss of capacity while in Conditions A and B is equivalent to a single failure of the power to the valves in one division, as considered in the accident analyses.

Westinghouse further stated "the LCO 3.4.11 and LCO 3.4.12 and associated Bases are technically correct, as-is. However, to clarify the system status while in both Conditions A and B the following statement is added in each of the Bases at the beginning of the Actions sections:

> The loss of automatic depressurization system (ADS) capacity, if both Conditions A and B are entered at the same time, is equivalent to a single failure of the power to the valves in one division, as considered in the accident analyses."

Based on this response and considering the four-stage ADS design, the staff believes that additional changes are required for Condition A to explicitly list Stage 4 ADS flow path in its scope and to clearly indicate the difference between Conditions A and B. The NRC staff identified this as Open Item OI-SRP16-CTSB-07.

In TS 3.4.14, the applicant proposed to replace the preliminary bracketed value of 152.4 square cm (9.3 square inches) for the minimum RCS vent area with a final value of 68 square cm (4.15 square inches). In RAI-SRP16-CTSB-35, the NRC staff asked the applicant to provide a justification for the change. In its response dated December 12, 2008, the applicant stated that the change is a result of the final design of the normal residual heat removal system (RNS) suction relief valve with its inlet changed from 10.16 cm (4 inches) to 7.62 cm (3 inches). The staff finds the stated justification acceptable since either the RNS suction relief valve or a depressurized RCS with a vent area is considered an acceptable means for providing low-temperature overpressure protection. The staff considers RAI-SRP16-CTSB-35 closed. In addition, in RAI-SRP16-CTSB-54, the staff asked the applicant to address inconsistencies in the

TS bases B 3.4.14. The NRC staff recently received response and has not yet evaluated its acceptability. The NRC staff identified this as Open Item OI-SRP16-CTSB-54.

In TS 3.4.15, the applicant proposed to use the preliminary bracketed value of 15,272 kPa (2,215 pounds per square inch gauge (psig)) and 15,549 kPa (2,255 psig), for the range of RCS pressure during performance of SR 3.4.15.1 to verify leakage through each RCS pressure isolation valve, as final values based on the nominal RCS pressure design of AP1000 and the requirements for test pressures identified in American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code ISTC-3630(b). The staff finds the stated reason for the final selected values acceptable.

At the end of TS Section 3.4, the applicant proposed to add a new TS 3.4.18, "Steam Generator Tube Integrity," to reflect implementation of the NRC-approved TSTF-449, Revision 3. The staff finds the proposed addition of TS 3.4.18 acceptable since implementing TSTF-449 is one acceptable option for addressing the safety issues identified in GL 06-001.

16.4.8 TS Section 3.5, Emergency Core Cooling Systems

Section 3.5 of the PTS and Bases includes requirements for the safety-related passive core cooling system, which is designed to perform emergency core decay heat removal, RCS emergency makeup and boration, and safety injection. Changes to the AP1000 GTS, Section 3.5, are described below.

In TS Section 3.5.2, the applicant proposed to use the preliminary bracketed value of 0.0057 cubic meters (0.2 cubic feet), for the maximum allowable volume of noncondensable gases in each of the core makeup tanks' inlet piping, as a final value based on latest system design specifications, approved engineering calculation notes, and/or verified analysis input assumptions. The staff finds this final value acceptable since it is consistent with related information described in the AP1000 DCD, Section 6.3.

In TS Section 3.5.4, the applicant proposed to replace the preliminary bracketed value of 0.011 cubic meters (0.4 cubic feet), for the maximum allowable volume of noncondensable gases in the passive residual heat removal heat exchanger inlet piping, with a new final value of 0.025 cubic meters (0.9 cubic feet). In RAI-SRP16-CTSB-36, the NRC staff asked the applicant to provide justification for the change. In its response dated December 12, 2008, the applicant stated that the value of 0.025 cubic meters (0.9 cubic feet) reflects the correct design value based on the final location for the alarm limit switch installed in the high-point pipe stub section. The staff finds this final value acceptable based on verification that a physical change was made in the AP1000 DCD, Section 6.3, regarding an increase in pipe size at the level switch location from 0.305 meters to 0.355 meters (12 inches to 14 inches). Therefore, the staff considers RAI-SRP16-CTSB-36 closed.

In TS Sections 3.5.6 and 3.5.8, the applicant proposed to replace the preliminary bracketed value of 2091 cubic meters (73,900 cubic feet), for the minimum volume of borated water in the in-containment refueling water storage tank (IRWST), with a new final value of 2069 cubic meters (73,100 cubic feet). In RAI-SRP16-CTSB-37, the NRC staff asked the applicant to provide justification for the change. In its response dated December 12, 2008, the applicant stated the following:

The bracketed volume of 73,900 ft^3 represented a preliminary estimate of the minimum design basis IRWST water volume.

The un-bracketed value of 73,100 ft^3 was updated based on evolving IRWST design details, is consistent with the updated IRWST volume provided in DCD Table 6.3-2 (Sheet 2), and reflects a more conservative water volume that was appropriately used in safety analyses."

The staff finds the stated reason acceptable and considers RAI-SRP16-CTSB-36 closed.

16.4.9 TS Section 3.6, Containment Systems

Section 3.6 of the AP1000 DCD GTS and Bases includes requirements for the containment systems, which are designed to contain fission products that may exist in the containment atmosphere following accident conditions.

The specifications provided in Section 3.6, which includes 3.6.1 Containment, 3.6.2 Containment Air Locks, 3.6.3 Containment Isolation Valves, 3.6.4 Containment Pressure, 3.6.5 Containment Air Temperature, 3.6.6 Passive Containment Cooling System (PCS)—Operating, 3.6.7 PCS Shutdown, 3.6.8 Containment Penetrations, and 3.6.9 pH Adjustment, are consistent with the STS, and the staff finds them acceptable.

In RAI-SRP16-CTSB-15, the staff asked the applicant to correct Bases B 3.6.6 to accurately reflect the action statements in TS 3.6.6. In a letter dated October 17, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections contained in AP1000 DCD, Revision 17. The staff finds this change acceptable; however, verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-15.

In RAI-SRP16-CTSB-16, the staff asked the applicant to correct Bases B 3.6.7 to accurately reflect the action statements in TS 3.6.7. In a letter dated October 17, 2008, the applicant acknowledged the need for the change and included a markup of the applicable sections contained in AP1000 DCD, Revision 17. The staff finds this change acceptable; however, verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-16.

In RAI-SRP16-CTSB-13, the staff asked the applicant to clarify the Bases B 3.6.4 regarding maximum peak containment pressure. In a letter dated December 2, 2008, the applicant acknowledged the need for clarification and included a markup of the changes that will be incorporated. The staff finds this change acceptable; however, verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-13.
The following issues are open items:

(1) Provide a calculation that shows the equipment hatch can be safely carried by four bolts. In RAI-SRP16.1.1-SEB1-01, the NRC staff asked the applicant to provide details on the equipment hatch and bolt design to ensure that the equipment hatch can be safely installed with four bolts to meet the containment closure requirements during modes 5 and 6. In its response dated August 15, 2008, Westinghouse stated that design specification document APP-MV50-Z0-002, Equipment Hatch Design Certification

Document, will provide final design information for the equipment hatch installation. According to the technical staff in SEB1, an audit of the design specification document is needed to close RAI-SRP16.1.1-SEB1-01. The NRC staff identified this as Open Item OI-SRP16.1.1-SEB1-01.

(2) Revise the reference sections in TS Bases B 3.6.1, B 3.6.2, and B 3.6.3 to list specific sections of DCD Chapter 15 that support the specific accidents discussed in the body of the bases. In RAI-SRP16-CTSB-61, the staff asked Westinghouse to specify the sections of DCD Chapter 15 that support the specific accident discussed in the "Applicable Safety Analyses" section of TS Bases B 3.6.1, 3.6.2, and 3.6.3.

In its November 19, 2008, response letter, Westinghouse stated, "the level of detail provided by the 3.6.1, 3.6.2, and 3.6.3 Bases references to Chapter 15 is consistent with the STS," and made no further change to the bases. The staff found this reason unacceptable. The staff's concern is that DCD Chapter 15 is voluminous as it contains more than 600 pages. Without references to specific sections, validation of the information discussed in the affected TS bases would require significant effort and time from the plant operators who implement TS requirements and often refer to the TS bases for clarifications needed quickly. The NRC staff identified this as Open Item OI-SRP16-CTSB-61.

(3) Provide the minimum trisodium phosphate (TSP) manufactured density, including a discussion of how this minimum value is determined given that different levels of impurity exist in commercial products. In RAI-SRP16-CTSB-33, the staff asked Westinghouse to provide the value of the minimum TSP manufactured density that is used to convert the required TSP amount from a mass number to a volume number. In the December 12, 2008, response letter, Westinghouse did not provide the requested information so that the staff can verify the accuracy and completeness of supporting information provided in the TS Bases B 3.6.9. The NRC staff identified this as Open Item OI-SRP16-CTSB-33.

16.4.10 TS Section 3.7, Plant Systems

Section 3.7 of the PTS and Bases includes requirements for various systems in the secondary side of the steam generators (e.g., the main steam safety valves (MSSVs), the main steam isolation valves, the main feedwater isolation valves), the spent fuel pool water level and makeup systems, and the main control room habitability system. Changes to the AP1000 GTS, Section 3.7, are described below.

In TS Section 3.7.1, "Main Steam Safety Valves (MSSVs)," the applicant proposed a slight increase in the relief capacity and the resulting relief setpoint for all but the first-to-open MSSV based on a minor change to the valve inlet piping to conform to ASME Code requirements. Also, the applicant replaced the bracketed values for the restriction on maximum allowable thermal power with inoperable MSSVs in Table 3.7.1-1 with new final values. The staff finds the final data in Table 3.7.1-1 acceptable since they were derived using methodology referenced in the Westinghouse STS, Revision 3.

In addition, the applicant proposed to change the tolerance for the as-found relief setting for MSSVs in Table 3.7.1-2 from 1 percent to 3 percent. In RAI-SRP16-CTSB-11, the staff asked the applicant to provide justification for the change in Table 3.7.1-2. In its response dated December 17, 2008, the applicant proposed to change this tolerance back to the original value

of 1 percent. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-11.

In TS Section 3.7.6, "Main Control Room Habitability System," the applicant proposed to use the preliminary bracketed value of 23,443 kPa (3,400 psig) for the required minimum pressure specified in SR 3.7.6.2, as a final value based on latest system design specifications, approved engineering calculation notes, and/or verified analysis input assumptions. The staff found the proposed final value acceptable since it is consistent with relevant information described in the AP1000 DCD, Section 6.4.2.

In addition, the staff noted that the AP1000 GTS did not incorporate the NRC-approved TSTF-448, which was issued to address safety issues identified in GL 2003-001. In RAI-SRP16-CTSB-32, the staff asked the applicant to address these issues. In its response dated November 11, 2008, the applicant stated that it had added a new DCD Section 6.4.5.4, "Main Control Room Envelope Habitability," under Revision 16 to address GL 2003-01. This DCD section describes the periodic testing of the main control room envelope habitability during main control room emergency habitability system operation (pressurization mode) to measure the air in-leakage in accordance with American Society for Testing and Materials E741. Westinghouse concluded that this periodic testing commitment in DCD Section 6.4.5.4, combined with the existing LCO 3.7.6 requirements, adequately addresses the GL 2003-01 issues and provides requirements equivalent to those approved in TSTF-448. The applicant proposed no further changes to the AP1000 DCD or the AP1000 GTS. The staff disagreed with this conclusion. The NRC staff identified this as Open Item OI-SRP16-CTSB-32.

In TS Section 3.7.9, "Fuel Storage Pool Makeup Water Source," the applicant provided additional information to the precautionary Note 1 in LCO 3.7.9 for clarification. The staff finds the added text acceptable since it is consistent with relevant information described in the AP1000 DCD, Section 9.1.3.

At the end of TS Section 3.7, the applicant proposed to add TS 3.7.11, "Fuel Storage Pool Boron Concentration," and TS 3.7.12, "Spent Fuel Pool Storage," to reflect the final design of the spent fuel storage racks. The staff finds the added TS requirements and associated information in the TS bases acceptable since they were formulated in accordance with guidance provided in the Westinghouse STS 3.7.16 and 3.7.17, respectively, and are consistent with relevant information in the AP1000 DCD, Section 9.1. Section 9.1 of this safety evaluation report (SER) presents a separate evaluation of the final design of the spent fuel storage racks.

16.4.11 TS Section 3.8, Electrical Power Systems

Section 3.8 of the AP1000 GTS and Bases includes requirements for the plant electrical systems that provide redundant, diverse, and dependable power sources for all plant operating conditions. In the event of a total loss of offsite power, onsite diesel generators and batteries are available to supply electrical power to the equipment necessary for the safe shutdown of the plant. Changes to the AP1000 GTS, Section 3.8, are described below.

The staff approved Section 3.8, "Electrical Power Systems", of the AP1000 DCD, Revision 15, in the certified design. In the AP1000, Revision 16, and TR-134, Revisions 0 through 5, the applicant made minor editorial changes and updated technical information.

In the AP1000 DCD, Revision 17, the applicant replaced all preliminary information contained in the brackets with the final information. The applicant documented the basis for these changes in TR-74, APP-GW-GLR-064, Revision 1.

The applicant proposed retaining brackets around all preliminary AP1000 DCD values associated with the battery float current. COL applicants referencing the AP1000 will replace the preliminary information provided in brackets with final plant-specific values. In the AP1000 DCD, Revision 17, the applicant replaced all preliminary information contained in the brackets with the final information.

The applicant inadvertently omitted the "7 days" completion time in TS Section 3.8.1 B.3 and has added it in Revision 17 of the AP1000 DCD and in Revision 4 of TR-134.

There are no open items in Section 3.8 of the AP1000 DCD, Revision 17.

16.4.12 TS Section 3.9, Refueling Operations

Section 3.9 of the AP1000 GTS and Bases includes requirements for boron concentration, unborated water sources, nuclear instrumentation, containment penetrations, and water inventory in the refueling pool during Mode 6. Changes to the AP1000 GTS, Section 3.9, are described below.

In TS Section 3.9.5, "Containment Penetrations," the applicant proposed to use the preliminary bracketed information as a final value for the required number of bolts (four) to keep the equipment hatch in place to meet the containment closure requirements during movement of irradiated fuel assemblies within the containment, based on latest system design specifications, approved engineering calculation notes, and/or verified analysis input assumptions. In RAI-SRP16.1.1-SEB1-01, the staff asked the applicant to provide additional details on the bolt design to ensure the safe installation of the equipment hatch with only four bolts. In its response dated August 15, 2008, the applicant stated that design specification document APP-MV50-Z0-002 will provide final design information for the equipment hatch installation. According to the technical staff, an audit of the design specification document is needed to close RAI-SRP16.1.1-SEB1-01. The NRC staff identified this as Open Item OI-SRP16.1.1-SEB1-01.

Also, in TS Sections 3.9.5, "Containment Penetrations," and 3.9.6, "Containment Air Filtration System (VFS)," the applicant proposed to use the preliminary bracketed value of -0.0311 kPa (-0.125 inches water gauge) relative to outside atmospheric pressure for VFS subsystem testing in SR 3.9.5.3 and SR 3.9.6.3. The applicant proposed using the preliminary value as a final value based on latest system design specifications, approved engineering calculation notes, and/or verified analysis input assumptions. In RAI-SRP16-CTSB-59, the staff asked the applicant to explain the basis for the selected value. In its response dated August 15, 2008, the applicant stated the following:

> This pressure was chosen based on ASHRAE Applications, which recommends at least 0.0124 kPa to 0.0149 kPa (0.05 to 0.06 inches of water) across boundaries when exfiltration or infiltration is minimized. Conservatively, Westinghouse chose a higher pressure difference of 0.0311 kPa (0.125 inches of water).

The staff finds the stated reason acceptable since the selected value is more conservative than the value used in normal industry practices. Therefore, the staff considers RAI-SRP16-CTSB-59 closed.

In TS Section 3.9.7, "Decay Time," the applicant proposed to change the minimum decay time of 100 hours to 48 hours to make it consistent with the analysis of the fuel handling accident as described in the AP1000 DCD, Section 15.7.4. The staff finds this change acceptable for the stated reason.

16.4.13 TS Section 4.0, Design Features

Section 4.0 of the AP1000 GTS includes other design features not covered in the TS Section 3 series, such as the site location, the site maps, and other information related to core design and fuel storage design. Changes to the AP1000 GTS, Section 4.0. are described below.

In TS Section 4.3, "Fuel Storage," the applicant proposed various changes to the description of the fuel storage area to reflect the final design for new and spent fuel storage racks and an increase of the maximum capacity of the spent fuel storage racks from 616 to 889 fuel assemblies. Section 9.1 of this SER provides a separate evaluation of the final design modification. Furthermore, in RAI-SRP16-CTSB-38 and 39, the applicant was asked to address inconsistencies between information provided in TS 4.3 and DCD Section 9.1. In its response dated December 2, 2008, the applicant proposed revisions to TS Section 4.3 and DCD Section 9.1 to revolve these inconsistencies. Verification that changes are correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-38 and -39.

16.4.14 TS Section 5.0, Administrative Controls

Section 5.0 of the AP1000 GTS includes provisions that address various administrative controls related to plant key personnel responsibilities, plant procedures, special programs and reports, and other measures to ensure that the plant is safely operated. Changes to the AP1000 GTS, Section 5.0, are described below.

In TS Section 5.4, "Procedures," the applicant proposed to adopt GL 1982-33, "Supplement 1 to NUREG-0737—Emergency Response Capabilities," dated December 17, 1982, as guidance to be used in the development of the plant emergency operating procedures. This is consistent with the STS and acceptable to the staff.

In TS 5.5, "Programs and Manuals," and in TS 5.6, "Reporting Requirements," the applicant proposed changes to TS 5.5.4, "Steam Generator Program," and to TS 5.6.8, "Steam Generator Tube Inspection Report," to reflect the implementation of the NRC-approved TSTF-449, Revision 4. The staff finds these changes acceptable since implementing TSTF-449 is one acceptable option for addressing safety issues identified in GL 2006-001. However, since TSTF-449 was prepared to address issues involving steam generator replacements at current operating plants, in RAI-SRP16-CTSB-76, the staff asked the applicant to make one minor adjustment to its proposed changes in TS 5.5.4 to also accommodate steam generator initial installations at new nuclear power plants regarding the 100-percent tube inspection during the first refueling outage. In its response dated December 2, 2008, the applicant agreed to make the suggested adjustment in a future DCD revision. Verification that the change is correctly incorporated in the final revision of the AP1000 DCD is Confirmatory Item CI-SRP16-CTSB-76.

In TS 5.5.8, the applicant proposed to use the preliminary bracketed numerical values as final values for acceptance criteria used in various tests on the containment air locks. The staff finds these final selected values acceptable since they are consistent with recommendations provided in the Westinghouse STS.

In connection to TS 3.7.6 regarding implementation of TSTF-448, Revision 3, to address safety issues identified in GL 2003-01, in a followup RAI, the staff asked the applicant to add the description of the Control Room Habitability Program into the AP1000 GTS, Section 5.5. This is part of an open item, OI-SRP16-CTSB-32, in TS Section 3.7 of paragraph 16.4.10 above.

Also, in TS 5.5.11, "Battery Monitoring and Maintenance Program," the applicant proposed to adopt the preliminary bracketed texts that are applicable to "vented lead-acid" batteries, as the final texts based on latest system design specifications. The staff finds this acceptable since it is consistent with recommendations provided in the Westinghouse STS.

16.5 Conclusion

The NRC staff concludes that the changes to the AP1000 GTS and Bases contain design-specific parameters and additional TS requirements considered appropriate by the staff. In addition, the staff has compared the additional TS requirements to the relevant NRC regulations, acceptance criteria defined in Section 16.0 of NUREG-0800, and other guidance and concludes that the applicant is in compliance with NRC regulations. However, because of the unresolved open items and pending verification of the confirmatory items, the staff's conclusion on the acceptability of the changes to the AP1000 GTS and Bases is not final

The open items in the following specifications need to be resolved:

TS 3.3.1 Table 3.3.1-1, OI-SRP16-CTSB-42
TS 3.4.1, OI-SRP16-CTSB-25
TS 3.4.4, OI-SRP16-CTSB-55
SR 3.4.8.1, OI-SRP16-CTSB-62
TS 3.4.11/12, OI-SRP16-CTSB-07
TS 3.6/3.9.5, OI-SRP16.1.1-SEB1-01
TS Bases B 3.6.1/2/3/Generic, OI-SRP16-CTSB-61
TS Bases B 3.6.9, OI-SRP16-CTSB-33
TS 3.7.6/5.5, OI-SRP16-CTSB-32
TS 3.4.14, OI-SRP16-CTSB-54

The confirmatory items in the following specifications need to be verified:

TS 1.1, CI-SRP16-CTSB-01
TS 1.4, CI-SRP16-CTSB-02
TS 2.1.1, CI-SRP16-CTSB-66
TS 3.1.1, CI-SRP16-CTSB-34
TS 3.1.4/8, CI-SRP16-CTSB-67
TS 3.1.4/5/6, CI-SRP16-CTSB-05
TS 3.1.7, CI-SRP16-CTSB-60
TS 3.1.8, CI-SRP16-CTSB-43
TS Bases B 3.1.8, CI-SRP16-CTSB-20

TS Bases B 3.2.3, CI-SRP16-CTSB-68
TS 3.2.5 and Bases B 3.2.5, CI-SRP16-CTSB-23
TS Table 3.3.1-1, CI-SRP16-CTSB-44
TS Table 3.3.1-1, CI-SRP16-CTSB-45
TS Table 3.3.3-1/DCD Table 7.5-1, CI-SRP16-CTSB-52
TS 3.4.6, CI-SRP16-CTSB-08
TS Bases B 3.6.4, CI-SRP16-CTSB-13
TS Bases B 3.6.6, CI-SRP16-CTSB-15
TS Bases B 3.6.7, CI-SRP16-CTSB-16
TS Table 3.7.1-2, RAI-SRP16-CTSB-11
TS 4.3, CI-SRP16-CTSB-38 & CI-SRP16-CTSB-39
TS 5.5.4, CI-SRP16-CTSB-76

The staff concludes that following resolution of the above open and confirmatory items, the proposed AP1000 TS will be consistent with the regulatory guidance contained in the STS, will comply with 10 CFR 50.36 and are therefore acceptable. The proposed TS contain design-specific parameters and additional TS requirements considered acceptable by the staff.

REFERENCES

1. Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36

2. NUREG-1430, "Standard Technical Specifications Babcock and Wilcox Plants"

3. NUREG-1431, "Standard Technical Specifications Westinghouse Plants"

4. NUREG-1432, "Standard Technical Specifications Combustion Engineering Plants"

5. Technical Report (TR)-74A (APP-GW-GLR-064), "AP1000 Generic Technical Specifications Completion,"

6. TR-74C (APP-GW-GLN-075), "AP1000 Generic Technical Specifications for Design Changes,"

7. TR-74, APP-GW-GLR-064, Revision 1, "AP1000 Generic Technical Specifications Completion Update on Open Items," dated April 13, 2007

8. TR-134 (APP-GW-GLR-134), "AP1000 DCD Impacts to Support COLA Standardization,"

9. APP-GW-GSC-020, Revision 0, "AP1000 Protection and Safety Monitoring System Technical Specification Completion Time and Surveillance Frequency Justification," dated March 17, 2008

10. APP-MV50-Z0-002, Equipment Hatch Design Specification Document

11. Section 182a of the Atomic Energy Act of 1954

12. Statements of Consideration, "Technical Specifications for Facility Licenses; Safety Analysis Reports" (*Federal Register*, 33 FR 18610, December 17, 1968)

13. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (the SRP), issued March 2007

14. Commission's Interim Policy Statement on Technical Specification Improvements for Nuclear Power Reactors (52 FR 3788), dated February 6, 1987

15. SECY-93-067, "Final Policy Statement on TS Improvements for Nuclear Power Reactors," dated July 22, 1993

16 Thomas E. Murley, Director Office of Nuclear Reactor Regulation, May 9, 1988 letter to Mr. R. A. Newton, Chairman of the Westinghouse Owners Group, (Split Report)

17. June 2005 "Writer's Guide for Plant-Specific Improved Technical Specifications,"

18. Generic Letter (GL) 1988-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," October 3, 1988

19. GL 1991-04, “Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle,” April 2, 1991

20. GL 1982-33, “Supplement 1 to NUREG-0737—Emergency Response Capabilities,” dated December 17, 1982

21. GL 1996-03, “Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits,” January 31, 1996

22. GL 2003-01, “Control Room Habitability,” June 12, 2003

23. GL 2006-01, “Steam Generator Tube Integrity and Associated Technical Specifications,” January 20, 2006

24. GSI-78, “Monitoring of Fatigue Transient Limits for Reactor Coolant System”

25. GSI-120, “On-Line Testability of Protection Systems”

26. NUREG-1793, “Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design,” issued September 2004

27. WCAP-16361, APP-PMS-JEP-001, Revision 0, “Westinghouse Setpoint Methodology for Protection Systems—AP1000,” issued May 2006

28. WCAP-8745-P-A, Design Basis for the Thermal Overpower ΔT and Thermal Overtemperature ΔT Trip Functions

29. WCAP-16779, “AP1000 Overpressure Protection Report.”, April 2007