

16.0 TECHNICAL SPECIFICATIONS

16.1 Introduction

The Comanche Peak Nuclear Power Plant (CPNPP), Units 3 and 4, combined license (COL) is the reference COL (RCOL) for the United States – Pressurized-Water Reactor (US-APWR) certified design. The license technical specifications (TS) given in the US-APWR Design Control Document (DCD), Tier 2, Chapter 16, “Technical Specifications,” are the generic TS (GTS) for all COL applications (COLAs) referencing the US-APWR certified design. The CPNPP, Units 3 and 4, plant-specific TS (PTS) will serve as the standard TS (STS) for all subsequent COLs that reference the US-APWR certified design.

The COL applicant for CPNPP, Units 3 and 4, is Luminant Generation Company, LLC. and the Comanche Peak Nuclear Power Company (applicant).

In this chapter of the CPNPP, Units 3 and 4, RCOL safety evaluation report (SER), the staff documents the results of its review of the PTS and bases for acceptability, correctness and completeness, with respect to the U.S. Nuclear Regulatory Commission’s (NRC) regulatory requirements, regulatory guidance, technical content, and consistency with US-APWR GTS and bases.

Chapter 16, “Technical Specifications,” of the CPNPP, Units 3 and 4, COLA, Part 2, “Final Safety Analysis Report (FSAR),” and COLA, Part 4, “Technical Specifications,” provide the PTS for CPNPP, Units 3 and 4. TS impose limits, operating conditions, and other requirements upon reactor operation for public health and safety. In general, TS must 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 PTS are derived from the analyses and evaluations in the DCD and the FSAR.

The applicant also provided, in Part 4, “Technical Specifications and Bases,” of the COLA, a “bases” document that included a summary statement of the bases or reasons for the TS. Consistent with this requirement, bases information was not provided in FSAR Chapter 16.

As part of the regulatory standardization effort, the staff has prepared STS for each of the light-water reactor nuclear steam supply systems and associated balance-of-plant equipment systems. In 1992, the NRC issued the STS to clarify the content and format of requirements necessary to ensure safe operation of nuclear power plants. The STS for Westinghouse pressurized water reactors (PWRs) are included in NUREG-1431, “Standard Technical Specifications Westinghouse Plants.” Volume 1 addresses the STS, and Volume 2 addresses the associated STS bases. The STS include bases for safety limits, limiting safety system settings, LCOs, and associated action and SRs. Major revisions to the STS were published in 1995 (Revision 1), 2001 (Revision 2), and 2004 (Revision 3).

The format and content of the PTS and Bases, for a COL, referencing a certified design should be based on the GTS and Bases for that design. For a COLA that references a certified design, the proposed PTS and Bases may include appropriate plant-specific deviations from the referenced GTS and Bases. However these deviations, if included with the COLA, need to be justified.

16.2 Summary of Application

Section 16.1, "Technical Specifications," of the CPNPP, Units 3 and 4, COL FSAR, Revision 3, incorporates by reference Section 16.1, of the US-APWR DCD, Revision 3. Part 4 of the CPNPP, Units 3 and 4, COLA, Revision 3, incorporates by reference the US-APWR GTS and Bases in Chapter 16 of DCD Revision 3.

The GTS contains items that a COL applicant must satisfy in order to complete a particular GTS provision. Detailed design information, equipment selection, instrumentation settings and other information that was not available at the time of the design certification (DC), are needed to establish the values or information to be included in the PTS. Locations for the addition of this information are signified in the GTS by square brackets [] or reviewer's notes to indicate that the COL applicant must provide plant-specific values or alternate text.

In the CPNPP, Units 3 and 4, COLA, Part 4, the PTS, the applicant provided additional information to address each of the brackets [] and reviewer's notes in the US-APWR GTS.

Combined License Information Items

The COL applicant provided additional information in FSAR, Section 16.0, "Technical Specifications," to address COL Information Items 16.1(1) through 16.1_57(1) from the US-APWR FSAR Tier 2, Table 1.8-2 as follows:

- PTS Section 3.3, "Instrumentation Systems" (Subsections 3.3.1, "Reactor Trip System (RTS) Instrumentation"; 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation"; 3.3.5, "Loss of Power (LOP) Class 1E Gas Turbine Generator (GTG) Start Instrumentation"; and 3.3.6, "Diverse Actuation System (DAS) Instrumentation."
- PTS Section 3.7, "Plant Systems" (Subsections 3.7.9, "Ultimate Heat Sink (UHS)"; and 3.7.10, "Main Control Room HVAC System (MCRVS))."
- PTS Section 3.8, "Electrical Systems" (Subsections 3.8.4, "DC Sources – Operating"; 3.8.5, "DC Sources – Shutdown"; and 3.8.6, "Battery Parameters."
- PTS Section 4.0, "Design Features" (Subsections 4.1, "Site Location"; and 4.3.1, "Criticality."
- PTS Section 5.0, "Administrative Controls" (Subsections 5.1.1 and 5.1.2, "Responsibilities"; 5.2.1, "Onsite and Offsite Organizations"; 5.2.2, "Unit Staff"; 5.3.1, 5.5.1, "Offsite Dose Calculation Manual (ODCM)"; 5.5.20, "Control Room Envelope Habitability Program"; 5.5.21, "Setpoint Control Program (SCP)"; 5.6.1, "Annual Radiological Environmental Operating Report"; 5.6.2, "Radioactive Effluent Release Report"; and 5.7.2, "High radiation Area."

Further, for Trip Setpoints and Allowable Values specified in PTS Subsections 3.3.1, 3.3.2, 3.3.5 and 3.3.6, the applicant has proposed license conditions for the COL holder to complete a plant-specific setpoint study following selection of the plant-specific instrumentation, and to confirm the validity of these setpoints. However, the interim staff guidance (ISG) document

DC/COL-ISG-8, "Necessary Content of Plant-Specific Technical Specifications When a Combined License Is Issued," dated December 9, 2008, clarifies the NRC's position regarding what constitutes an acceptable set of PTS required for a COL. The ISG specifically states that:

"...[t]o comply with the Act and the regulations applicable to PTS issued with a COL referencing a standard DC rule, present and future COL applicants shall propose PTS containing all site-specific information that is necessary to ensure plant operation within its design basis. The COL applicant shall confirm all preliminary information and provide all missing information that is denoted in the generic technical specifications by bracketed values, reviewer's notes, or any other placeholder. The PTS issued with the COL will be complete and will contain no COL action (or information) items for the COL holder to resolve (i.e., completing the PTS). The COL will contain no license condition on completing the PTS."

Technical Reports: Mitsubishi Heavy Industries, Ltd. (MHI) Technical Report MUAP-09022, "US-APWR Instrument Setpoint Methodology."

16.3 Regulatory Basis

The regulatory basis of the information, incorporated by reference, is addressed within the final SER (FSER) related to the US-APWR DCD.

In addition, the relevant requirements of the Commission's regulations for TS and Bases reviews, and the associated acceptance criteria, are given in Section 16, "Technical Specifications," of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants." Other areas of review that interface with other sections of the Standard Review Plan can also be found in Section 16 of NUREG-0800.

1. 10 CFR 50.36, which establishes requirements for TS.
2. 10 CFR 52.47(a)(11), which requires that COL applications contain TS.
3. 10 CFR 52.79(a)(30), which requires that the FSAR contain the TS.

16.4 Technical Evaluation

The staff reviewed the information in DCD, Tier 2, Chapter 16, regarding Docket No. 52-021. The results of the staff's technical evaluation of the information related to TS, incorporated by reference, in the COLA (i.e., FSAR and PTS) have been documented in the staff's SER of the DC application for the US-APWR. The SER on the US-APWR is not yet complete and this is being tracked as **Open Item (1-1)** for this chapter. The staff will update Chapter 16 of this SER to reflect the final disposition of the DC application

The staff reviewed FSAR Chapter 16 and Part 4, "Technical Specifications and Bases," of the COLA, and checked the referenced DCD to ensure that the combination of the DCD and the

information in the COLA represent the complete scope of information relating to this review topic¹.

In FSAR, Section 16.1.1, "Introduction to Technical Specifications," the applicant noted that the GTS and bases provided with DCD Chapter 16 are incorporated, by reference, into the PTS and Bases provided in COLA Part 4.

In Part 4 of the COLA, the applicant provided additional information to resolve COL Information Item listed under DCD Section 16.1.1.2 (4), "Combined License Information," which states:

"The US-APWR [Generic] Technical Specifications are intended to be used as a guide in the development of the plant-specific Technical Specifications by a Combined License (COL) Applicant. The bracketed preliminary information will be replaced with plant specific values in plant specific technical specifications."

The staff evaluated the final disposition of each of the bracketed information items in the respective PTS sections listed below.

The staff did not review portions of the PTS and Bases that were identical to the GTS and Bases. The technical evaluation for those portions that are identical to the GTS and Bases can be found in the chapter 16 of the FSER of the US-APWR DC application.

The Surveillance Frequency Control Program (SFCP) is used throughout the PTS to adjust the frequency of conducting surveillances based on an assessment of the effects of changing the plant's risk, due to the change in frequency, compared to certain risk metrics. The governing guidance document for the SFCP is Nuclear Energy Institute (NEI) Publication NEI 04-10, Revision 1 "Risk-Informed Technical Specifications Initiative 5b, Risk-Informed Method for Control of Surveillance Frequencies."

The Configuration Risk Management Program (CRMP) is used throughout the PTS to adjust completion times (CTs) based on analysis of the plant's risk with respect to its configuration with inoperable equipment. The governing guidance document for the CRMP is NEI 06-09, Revision 0 "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines, Industry Guidance Document."

16.4.1 Use and Application

Introduction:

Section 1.0, "Use and Application," of the PTS includes definitions of terms used in the context of plant TS, and examples to illustrate the applications of logical connectors, completion times for required actions, and frequencies for SRs.

¹ See Section 1.2 for a discussion on the staff's review related to verification of the scope of information to be included within a COLA that references a DC.

Evaluation:

Section 1.0 of the PTS is identical to the GTS. There is no site-specific information that the applicant needed to provide to complete this section.

Conclusion:

The Use and Application information provided in Section 1.0 is consistent with the GTS and the staff found this be to acceptable.

16.4.2 Safety Limits

Introduction:

Section 2.0, "Safety Limits," of the PTS 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.

Evaluation:

Section 2.0 of the PTS and Bases is identical to the GTS and Bases.

Conclusion:

The Safety Limits 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 GTS and are found acceptable by the staff.

16.4.3 Limiting Condition for Operation and Surveillance Requirement Applicability

Introduction:

Section 3.0, "Limiting Condition for Operation and Surveillance Requirement Applicability," of the PTS 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).

Evaluation:

Section 3.0 of the PTS and Bases is identical to the GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

Conclusion:

The LCO and SR applicability information provided in PTS Section 3.0 is consistent with the GTS and is found acceptable by the staff.

16.4.3.1 Reactivity Control Systems

Introduction:

Section 3.1, "Reactivity Control Systems," of the PTS and Bases includes requirements for the reactivity control systems, which are designed to reliably control reactivity changes and ensure that under postulated accident conditions the capability to cool the core is maintained.

Evaluation:

Section 3.1 of the PTS and Bases is identical to the GTS and Bases, with the election of implementing the SFCP. Deterministic values are therefore not included in the SRs and bases of this section.

Conclusion:

The information on reactivity control systems provided in PTS Section 3.1 is consistent with the GTS and is found acceptable by the staff.

16.4.3.2 Power Distribution Limits

Introduction:

Section 3.2, "Power Distribution Limits," of the PTS and Bases includes requirements for the power distribution limits, which are designed to reliably adhere to core thermal limits and achieve core power distribution consistent with the design safety analysis.

Evaluation:

Section 3.2 of the PTS and Bases is identical to the GTS and Bases, with the election of implementing the SFCP. Deterministic values are therefore not included in the SRs and bases of this section.

Conclusion:

The information regarding power distribution limits provided in PTS Section 3.2 is consistent with the GTS and is found acceptable by the staff.

16.4.3.3 Instrumentation

Introduction:

The PTS, Section 3.3, "Instrumentation," and Bases, Section B 3.3, "Instrumentation," include requirements for instrumentation systems that: (1) initiate reactor trip and engineered safety features actuations, (2) provide information relied upon by operators to evaluate plant safety status and perform manual actions specified in emergency operating procedures, (3) provide operators with the capability to place and maintain the plant in a safe shutdown condition from a location outside the control room, (4) initiate Class 1E gas turbine generator (GTG) start signals upon a loss of voltage or degraded-voltage condition in the switchyard, and (5) provide non-Class 1E diverse instrumentation for monitoring, control and actuation of safety and non-safety

systems called upon to cope with abnormal plant conditions concurrent with a common-cause failure that disables all functions of the Protection and Safety Monitoring System and Plant Control and Monitoring System.

Evaluation:

Section 3.3 of the PTS and Bases closely model Section 3.3 of the GTS and Bases in format and content. However, the staff did identify two items of significance regarding the completion of bracketed information in the PTS; one requiring resolution in accordance with DC/COL-ISG-8, and the other a technical justification beyond what was provided in Section 3.3 of the PTS and Bases. The staff requested additional information for each of the following items in order to evaluate the adequacy and completeness of the PTS, Section 3.3, and Bases, Section B 3.3. Details regarding the responses associated with **RAI 91-3315, Questions 16-12, 16-13, 16-14, 16-15, 16-16, and RAI 120-1812, Question 16-17**, are provided below.

- In **RAI 91-3315, Question 16-12**, the staff requested that the applicant revise the PTS to correct editorial and reference errors identified in LCO Table 3.3.1-1, "Reactor Trip System Instrumentation." In its November 13, 2009, response to **RAI 91-3315, Question 16-12**, the applicant provided markups of the necessary changes for items identified by the staff. The changes associated with these two items have been properly incorporated into Revision 1 of the COL Part 4 PTS. The third item, which is strictly editorial in nature, is no longer applicable regarding the basis of deletions made to the LCO Table 3.3.1-1, in accordance with the response to **RAI 91-3315, Question 16-16**. Therefore, **RAI 91-3315, Question 16-12 is resolved and closed**.
- In **RAI 91-3315, Question 16-13**, the staff requested that the applicant provide an explanation regarding the omission of specific GTS SR bases information from the PTS bases discussion associated with Trip Actuating Device Operational Test (TADOT) SR 3.3.2.4. In its November 13, 2009, response to **RAI 91-3315, Question 16-13**, the applicant acknowledged that the GTS Bases information previously omitted was relevant to the PTS Bases discussion for TADOT SR 3.3.2.4, and provided a markup of the necessary change. The staff subsequently confirmed that the change identified in the markup was properly incorporated into Revision 2 of the COL Part 4 PTS Bases. Therefore, **RAI 91-3315, Question 16-13, is resolved and closed**.
- In **RAI 91-3315, Question 16-14**, the staff requested that the applicant revise the PTS Bases to correct editorial errors identified in Bases Section B 3.3.2, "Engineered Safety Features Actuation System (ESFAS) Instrumentation." In its November 13, 2009, response to **RAI 91-3315, Question 16-14**, the applicant stated that the requested change for one of the two items identified was incorporated into Revision 0 of the COLA Part 4 Technical Specifications Update Tracking Report (TXNB-09043 dated September 16, 2009). The staff subsequently confirmed that this change had been properly incorporated into Revision 1 of the COL Part 4 PTS Bases. The applicant also provided a markup of the necessary change for the second item. The staff confirmed that the change associated with the second item was properly incorporated into Revision 2 of the COL Part 4 PTS Bases. All PTS Bases confirmations associated with this RAI have been completed. Therefore, **RAI 91-3315, Question 16-14, is resolved and closed**.

- In **RAI 91-3315, Question 16-15**, the staff requested that the applicant provide a technical justification for the time delay values specified in LCO Table 3.3.2-1, “Engineered Safety Feature Actuation System Instrumentation,” and SR 3.3.5.3 of the PTS. Table 3.3.2-1, “Function 6.e,” specifies a two-second time delay for the Emergency Feedwater Actuation - Loss-of-Offsite Power (LOOP) Signal. LCO 3.3.5, “Loss of Power Class 1E GTG Start Instrumentation,” SR 3.3.5.3, specifies two-second and ten-second time delays for the loss-of-voltage and degraded-voltage conditions respectively. The selection of these time delays, which differ from the bracketed values specified in the GTS, is considered a departure, the nature of which is specifically addressed in the PTS, Section A. In its November 13, 2009, response to **RAI 91- 3315, Question 16-15**, the applicant stated that the time delay values selected are based on plant-specific transmission system performance. The purpose of the loss-of-voltage protection is to protect voltage-sensitive loads, such as motors, whenever the bus voltage drops below an acceptable value. For equipment protection, only a short time is permitted to give the grid a chance to recover. Since the transmission system for CPNPP, Units 3 and 4, will be provided by the same transmission service provider as CPNPP, Units 1 and 2, the setting for loss-of-voltage protection for CPNPP, Units 1 and 2, was duplicated. The two-second delay time is desirable since the normal supply is from a transmission line that has automatic re-closing capabilities. The applicant states that the purpose of degraded-voltage protection is to assure that plant equipment is not impacted by voltage degradation in the local grid. Degraded voltage could be caused by an electrical fault that is slow to clear or a large motor having trouble starting. Therefore, a longer time is allowed to give the grid a chance to recover. Times shorter than ten seconds could result in unnecessary transfers. The ten-second degraded-voltage protection time delay setting for CPNPP, Units 1 and 2, was duplicated for CPNPP, Units 3 and 4, on the basis of similar plant equipment and a common transmission service provider. The staff finds the applicant’s response acceptable because the time delay values for CPNPP, Units 1 and 2, which are based on plant specific transmission system performance, were determined to be appropriate for CPNPP, Units 3 and 4. Therefore, **RAI 91-3315, Question 16-15, is resolved and closed.**
- In **RAI 91-3315, Question 16-16**, the staff requested that the applicant resolve the COL licensee items identified in PTS Section 3.3, “Instrumentation,” in accordance with DC/COL-ISG-8. The ISG clarifies the NRC’s position regarding what constitutes an acceptable set of PTS required for a COL applicant to demonstrate compliance with Sections 182a and 185b of the Atomic Energy Act of 1954 and Title 10 of the *Code of Federal Regulations* (10 CFR), Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”

The ISG specifically states:

“...[t]o comply with the Act and the regulations applicable to PTS issued with a COL referencing a standard DC rule, present and future COL applicants shall propose PTS containing all site-specific information that is necessary to ensure plant operation within its design basis. The COL applicant shall confirm all preliminary information and provide all missing information that is denoted in the generic technical specifications by bracketed values, reviewer’s notes, or any

other placeholder. The PTS issued with the COL will be complete and will contain no COL action (or information) items for the COL holder to resolve (i.e., completing the PTS). The COL will contain no license condition on completing the PTS.”

The ISG also states:

“Present and future COL applicants shall resolve all generic technical specification COL action (or information) items before COL issuance. The COL applicant may propose to resolve each such item using one of the following three options, listed in order of preference:

- (1) Provide a plant-specific value.
- (2) Provide a value that bounds the plant-specific value, but which the plant may be safely operated (i.e., a usable bounding value).
- (3) Establish a PTS Section 5.5 or 5.6 administrative controls program or report.”

Such an administrative controls TS as described in Option (3) shall require: (a) use of an NRC-reviewed and -approved methodology for determining the plant-specific value, (b) establishment of an associated document, outside the PTS, in which the relocated plant-specific value shall be recorded and maintained, and (c) any other information or restrictions the NRC staff deems necessary and appropriate to satisfy 10 CFR 50.36. For example, some COL applicants have proposed an administrative controls TS for a setpoint control program to satisfy 10 CFR 50.26(c)(1)(ii)(A) in lieu of specifying explicit values for the limiting safety system settings in the PTS.

Options (2) and (3) should allow an applicant to provide the necessary information without relying on information that is impractical to obtain before the time of COL issuance (i.e., information such as design detail, equipment selection, as-built system configuration, and system test results).”

In its November 13, 2009, response to **RAI 91-3315, Question 16-16**, the applicant stated that CPNPP, Units 3 and 4, would use Option (3) of the ISG, with the reference to Technical Report MUAP-09022, “US-APWR Instrument Setpoint Methodology.” The decision to use Option (3) resulted in the establishment of a setpoint control program (SCP) administrative controls TS in the DCD to resolve the COL licensee Items. In its letter to the NRC dated October 30, 2009, the US-APWR DC applicant, MHI, transmitted proposed updates to the DCD to support incorporation of the SCP specification. The staff confirmed that the SCP administrative controls TS and all associated LCO and bases changes were properly incorporated into Revision 2 of the COL Part 4 PTS and Bases. Therefore, **RAI 91-3315, Question 16-16, is resolved and closed.**

- **RAI 120-1812, Question 16-17**, on setpoint control program was submitted to provide the model SCP specification that the applicant initially included as part of RAI 91 -3315, Question 16-16. The model SCP specification was inadvertently omitted from the staff’s

RAI Letter 91 to the applicant. The applicant's response to this RAI was provided in its response to RAI 91-3315, Question 16-16. **Therefore, RAI 120-1812, Question 16-17, is resolved and closed.**

Conclusion:

The PTS, Section 3.3, and its corresponding Bases were found to closely model the GTS, Section 3.3, in content and format such that they were determined to be acceptable to the staff.

16.4.3.4 Reactor Coolant System

Introduction:

Section 3.4, "Reactor Coolant System," of the PTS and Bases includes requirements for various RCS parameters (e.g., pressure, temperature, flow, etc.) and subsystems (e.g., RCS loops, pressurizer, low-temperature overpressure protection, etc.) to ensure the fuel integrity and the RCS pressure boundary integrity are preserved during all modes of plant operation.

Evaluation:

Section 3.4 of the PTS and Bases is identical to the GTS and Bases with the election of implementing the SFCP. Deterministic values are therefore not included in the SRs and bases of this section.

Conclusion:

The information regarding the RCS provided in PTS Section 3.4 is consistent with the GTS and is found acceptable by the staff.

16.4.3.5 Emergency Core Cooling Systems (ECCSs)

Introduction:

Section 3.5, "Emergency Core Cooling Systems (ECCS)," of the PTS and Bases includes requirements for the safety-related equipment designed for emergency core safety injection, decay heat removal, and RCS emergency makeup source.

Evaluation

Section 3.5 of the PTS and Bases is identical to the GTS and Bases with the election of implementing the SFCP. Deterministic values are therefore not included in several SRs and bases of this section.

Conclusion:

The information regarding ECCSs provided in PTS Section 3.5 is consistent with the GTS and is found acceptable by the staff.

16.4.3.6 Containment Systems

Introduction:

Section 3.6, "Containment Systems," of the PTS 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.

Evaluation:

Section 3.6 of the PTS and Bases is identical to the GTS and Bases with the election of implementing the SFCP. Deterministic values are therefore not included in several SRs and bases of this section.

Conclusion:

The information regarding containment systems provided in PTS Section 3.6 is consistent with the GTS and is found acceptable by the staff.

16.4.3.7 Plant Systems

Introduction:

Section 3.7, "Plant Systems," of the PTS and Bases includes requirements for other plant systems and components on the secondary side of the steam generators (e.g., the main steam safety valves, the main steam isolation valves, the main feedwater valves, the main steam depressurization valves, etc.), cooling water systems (e.g., the component cooling water system, the essential service water system, etc.), heating, ventilation, and air conditioning systems (HVAC) (e.g., the main control room HVAC system, etc.), and requirements for controlling parameters in the secondary side fluid, such as specific activity, or boron concentration and water level in the spent fuel storage pit.

Evaluation:

Except for the COL information discussed in the RAI 90-3113 questions below, the remaining portions of Section 3.7 of the PTS and Bases are identical to the GTS and Bases.

In PTS 3.7.9, "Ultimate Heat Sink," and its associated bases, the applicant provided TS requirements for the plant ultimate heat sink (UHS) that were not included as part of the GTS scope. In general, PTS 3.7.9 is modeled after Westinghouse STS 3.7.9, Ultimate Heat Sink for operability requirements for the plant UHS equipment. During its review, however, the staff noted the following differences that warranted technical justification and clarification beyond what is given in PTS 3.7.9 and its associated bases:

- In **RAI 90-3113, Question 16-1**, the staff requested that the applicant clarify discussions in the bases regarding starting of UHS transfer pumps in an accident event. In its response letter, dated November 11, 2009, the applicant proposed to revise SR 3.7.9.5 and the related discussion in the bases to clearly indicate a manual actuation of the

pump instead of an automatic actuation in an accident event. The staff finds this response acceptable since the revised PTS and its associated bases reflect the UHS system design and operating requirements described in the FSAR. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the COL Part 4 PTS and the Bases. Therefore, **RAI 90-3113, Question 16-1, is resolved and closed.**

- In **RAI 90-3113, Question 16-2**, the staff requested the that applicant explain how the UHS basin minimum volume specified in SR 3.7.9.1 satisfies the required net positive suction head (NPSH) for the essential service water (ESW) pump for the 30-day duration following a design-basis accident without makeup. In its response letter, dated November 11, 2009, the applicant referenced FSAR Figure 16-2-1, "UHS Basin Water Levels at Normal and Accident Conditions," for an elevation view of the ESW Pump intake basin and the UHS basin. This figure shows the bottom of the pump intake basin at 12 feet (3.65 meters) below the bottom of the UHS basin. The applicant stated that following the design-basis loss-of-coolant accident without makeup water for 30 days, the water level in the pump intake basin drops to approximately 12 feet (3.65 meters) and this minimum level is used in the calculation of the ESW Pump available NPSH. The applicant also proposed changes to the bases to include these clarifying details. The staff finds this response acceptable since the revised information in the bases reflects the UHS system design as described in the FSAR. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the PTS and the Bases. Therefore, **RAI 90-3113, Question 16-2, is resolved and closed.**
- In **RAI 90-3113, Question 16-3**, the staff requested that the applicant provide justification for the CT of seven days specified for restoring the UHS system to operable status when in Condition C of the TS 3.7.9 LCO with one or more of the required UHS transfer pumps is inoperable. Condition C appears to indicate a potential loss of the system safety function, and guidance in the Westinghouse STS recommends a CT of one hour for such a condition. In its response letter, dated November 11, 2009, the applicant explained that during the worst design-basis accident conditions, at least two UHS cooling towers and their associated fans must be available for heat removal. If all of the required transfer pumps are assumed inoperable, only two cooling tower basin inventories can be used for cooling, which thus gives the UHS an approximate 20-day design heat removal capacity without makeup. This 20-day emergency cooling period bounds and justifies the 7-day CT for restoring the transfer pumps to operable status. The applicant also proposed to revise the PTS Bases to include these clarifying details. The staff finds this response acceptable since the revised PTS bases provide sufficient information to justify the selected completion time. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the COL Part 4 PTS and the Bases. Therefore, **RAI 90-3113, Question 16-3, is resolved and closed.**
- In **RAI 90-3113, Question 16-4**, the staff requested that the applicant provide justifications for the CT of 72 hours specified for restoring the UHS water parameters to operable status when in Condition B with one or more UHS basins having water temperature and/or water level not within limits. This 72-hour CT is not consistent with guidance in the Westinghouse STS for a similar situation. In its response letter, dated November 11, 2009, the applicant proposed to split Condition B into two separate Conditions, B and C, to address basin temperature and water level respectively. For temperatures not within specified limits, the applicant adopted the recommended action

and completion time as shown in the Westinghouse STS, e.g., verifying once every hour that the average temperature for the previous 24 hours is within limits. For water level not within the specified limits, a 72-hour CT is proposed for restoring the water level to within limits in the respective independent UHS basin to be consistent with that in

Condition A with one required cooling tower inoperable. The staff finds this response acceptable since the revised PTS and Bases conform to guidance in the Westinghouse STS and reflect the UHS system design as described in the FSAR. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the COL Part 4 PTS and the Bases. Therefore, **RAI 90-3113, Question 16-4, is resolved and closed.**

- In **RAI 90-3113, Question 16-5**, the staff requested that the applicant that justify not including an SR to verify operability of various UHS motor-operated valves and control valves. In its response letter, dated November 11, 2009, the applicant proposed to add SR 3.7.9.6 for a monthly verification of all UHS valves in its correct positions and SR 3.7.9.7 for a biannual verification of all UHS valve responses to demand signals. The staff finds this response acceptable since the added SRs conform to guidance in the Westinghouse STS. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the COL Part 4 PTS and the Bases. Therefore, **RAI 90-3113, Question 16-5, is resolved and closed.**
- In **RAI 90-3113, Question 16-6**, the staff requested that the applicant clarify various discussions in the bases regarding system operating requirements during normal operation or in an accident. In its response letter, dated November 11, 2009, the applicant provided the requested information, including revising the PTS, its associated bases, and FSAR Subsection 9.2.5, "Design Basis and System Description," to include these clarifying details. The staff finds this response acceptable since the revised PTS and Bases conform to guidance in the Westinghouse STS. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the COL Part 4 PTS and the Bases. Therefore, **RAI 90-3113, Question 16-6, is resolved and closed.**
- In **RAI 90-3113, Question 16-7**, the staff requested that applicant correct editorial errors found in the PTS Bases B 3.7.9, "Ultimate Heat Sink." In its response letters, dated November 11, 2009, and April 5, 2010, the applicant proposed to revise the affected information in the Bases to reflect these corrections. The staff finds this response acceptable. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the COL Part 4 PTS and the Bases. Therefore, **RAI 90-3113, Question 16-7, is resolved and closed.**
- In **RAI 90-3113, Question 16-8**, the staff requested that the applicant provide justifications for the CT of seven days specified for restoring the UHS system to operable status when in Condition A with one required cooling tower inoperable. At the CPNPP site, operation of each of the four independent cooling towers is in direct support of its respective ESW pump train operation which is covered in LCO 3.7.8, "Essential Service Water System." The proposed seven day CT is not consistent with the 72-hour CT specified for a similar situation in the supported system. In its response letter, dated November 11, 2009, the applicant proposed to revise this CT to 72 hours to be in line with LCO 3.7.8 requirements. The staff finds this response acceptable since the revised CT conforms to guidance in the Westinghouse STS. The staff confirmed that the stated

changes were properly incorporated into Revision 2 of the COL Part 4 PTS and the Bases. Therefore, **RAI 90-3113, Question 16-8, is resolved and closed.**

CPNPP elected to implement the SFCP in their PTS. Deterministic values are therefore not included in several SRs and bases of this section.

Conclusion:

The information on Plant Systems provided in PTS Section 3.7 is consistent with the GTS and is found acceptable by the staff.

16.4.3.8 Electrical Power Systems

Introduction:

Section 3.8, "Electrical Powers Systems," of the PTS 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 LOOP, onsite GTGs and batteries are provided to supply electrical power to equipment necessary for the safe shutdown of the plant.

Evaluation:

Section 3.8 of the PTS and Bases is identical to the GTS and Bases with the election of implementing the SFCP. Deterministic values are therefore not included in several SRs and bases of this section.

Conclusion:

The information on Electrical Systems provided in PTS Section 3.8 is consistent with the GTS and is found acceptable by the staff.

16.4.3.9 Refueling Operations

Introduction:

Section 3.9, "Refueling Operations," of the PTS and Bases includes requirements for boron concentration, unborated water sources, nuclear instrumentation, containment penetrations, water inventory in the refueling pool during Mode 6 operations, and decay time for irradiated fuel assemblies.

Evaluation:

Section 3.9 of the PTS and Bases is identical to the US-APWR GTS and Bases with the election of implementing the SFCP. Deterministic values are therefore not included in several SRs and bases of this section.

Conclusion:

The information on Refueling Operations provided in PTS Section 3.9 is consistent with the GTS and is found acceptable by the staff.

16.4.4 Design Features

Introduction:

Section 4.0, "Design Features," of the PTS includes other design features not covered elsewhere in the PTS such as the site location and other information related to core design and fuel storage design.

Evaluation:

Except for the COL information discussed below, Section 4.0 of the PTS is identical to the GTS.

- In Section 4.1 "Site Location," the applicant provided the CPNPP site location information to replace the bracketed information in the GTS. In **RAI 90-3113, Question 16-9**, the staff requested that the applicant clarify various details, which are not described in FSAR Subsection 2.1.1.1, "Specification of Location." In its response letter, dated November 11, 2009, the applicant proposed to revise the PTS to reflect the site location information in FSAR Subsection 2.1.1.1. The staff finds this response acceptable since the revised information in the PTS is now consistent with the FSAR. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the PTS and the Bases. Therefore, **RAI 90-3113, Question 16-9, is resolved and closed.**

Conclusion:

The information regarding the Design Features provided in PTS Section 4.0 is consistent with the GTS and is found acceptable by the staff.

16.4.5 Administrative Controls

Introduction:

Section 5.0, "Administrative Controls," of the PTS includes provisions, which address various administrative controls related to plant key personnel responsibilities, plant procedures, special programs and reports, etc., to ensure the plant is safely operated.

Evaluation:

Except for the COL information discussed below, the remaining portions of Section 5.0 of the PTS are identical to the GTS.

- In PTS 5.1.1 and 5.1.2, 5.2.1, "Onsite and Offsite Locations," 5.2.2, "Unit Staff," and 5.5.1, "Offsite Dose Calculation Manual," the applicant replaced the bracketed information with site-specific information regarding key plant position titles to be consistent with the plant organization structure described in FSAR Chapter 13, "Conduct of Operations." The staff found the provided information acceptable since is of in administrative nature and is consistent with relevant information provided in FSAR Section 13.1, "Organizational Structure."

- In PTS 5.3.1, "Unit Staff Qualifications," the applicant replaced the bracketed information with site-specific information regarding qualifications of unit staff members. The staff found the provided information acceptable since they are consistent with relevant information provided in FSAR Sections 1.9, "Conformance with Regulatory Criteria,"

13.1, "Organizational Structure of Applicant," 13.2, "Training," 14AA, "Comparison of RG 1.68 Appendix Versus US-APWR Test Abstracts," and the plant quality assurance program description regarding training and qualification of plant staff personnel.

- In PTS 5.5.18, "Configuration Risk Management Program," and 5.5.19, "Surveillance frequency Control Program," the applicant proposes adopting the CRMP and the SFCP as described in the GTS. NEI 06-09, Revision 0, and NEI 04-10, Revision 1, are referenced as NRC-approved processes for determining risk-informed completion times in the CRMP and for evaluating surveillance frequency changes in the SFCP, respectively. NRC guidance as provided in Regulatory Guide (RG) 1.174 (An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis), Revision 2, is used in both NEI 06-09 and NEI 04-10 processes.

A global issue existed regarding implementation of the CRMP and the SFCP in the PTS. The risk metrics issues related to the use of existing guidance for current operating reactors to for the new generation reactors has been resolved by the Commission, supporting no change necessary except on an application-specific basis. Both NEI documents, NEI 04-10 for SFCP and NEI 06-09 for CRMP, are acceptable except as supplemented by the "Comanche Peak Nuclear Power Plant, Units 3 and 4, Technical Specifications Methodology for Risk-Managed Technical Specifications and Surveillance Frequency Control Program," referenced in TS 5.5.18, "Configuration Risk Management Program" and TS 5.5.19, "Surveillance frequency Control Program."

In addition, in **RAI 90-3113, Question 16-10**, the staff requested the applicant to provide the full list of all SRs and its original frequency assignments that are affected by the SFCP to support the program development by the COL licensee. In its response letter, dated November 11, 2009, the applicant explained that except for the UHS, which is a site-specific system, the deterministic values of the frequencies to be used by the applicant for the US-APWR systems, structures, and components (SSCs) and SSCs can be found in Chapter 16, "Technical Specifications," of the DCD. Therefore, only frequencies for those SRs associated with PTS 3.7.9, "Ultimate Heat Sink," were provided with this response. **RAI 90-3113, Question 16-10 will remain open until the applicant confirms that the SFCP numerical values will be placed in the FSAR. This is identified as Open Item 16-1.**

During the review of this response, the staff noted the 24-month frequency assigned to SR 3.7.9.5 for testing of the transfer pumps is not consistent with the test frequencies listed in FSAR Table 3.9-202, "Site-Specific Pump Inservice Testing (IST) Requirements," which calls for both a quarterly test and a biennial test. In followup **RAI 149-4406, Question 16-19**, the staff requested the applicant to address this inconsistency. In its response letter, dated April 5, 2010, the applicant proposed to revise SR 3.7.9.5 and its discussion in Bases B 3.7.9 to reflect conformance to the in-

service testing requirements. The staff finds that these two responses together justify the correction to SR 3.7.9.5 and are acceptable. The staff confirmed that the stated changes were properly incorporated into Revision 2 of the COL Part 4 PTS and the Bases. Therefore, **RAI 149-4406, Question 16-19, is resolved and closed.**

- An adequate Probabilistic Risk Assessment (PRA) will be necessary to support risk-informed programs, such as Risk Management Technical Specifications (RMTS). According to DC/COL-ISG-08, the complete plant-specific TS are required for a COLA. Therefore, in compliance with the one-step licensing approach of 10 CFR Part 52, there are three options that can be taken for determining the completeness of plant-specific TS with respect to value and limit requirements: (1) use of the plant-specific value; (2) use of a value that bounds the plant-specific value; and (3) use an NRC-approved TS methodology for assessing the plant-specific value. Due to the nature of risk-informed TS programs (e.g., RMTS), and because some criteria addressed in application-specific guidance (e.g., availability of a plant-specific Capability Category 2 PRA) cannot be met at the time of COL issuance, the applicant chose Option (3) (i.e., an NRC-approved “TS methodology”) to meet the TS completeness requirement for a COLA. In addition, since the NRC approval is for an implementable RMTS at the COLA stage (i.e., before a well-developed, plant-specific PRA model is available and all applicable guidance requirements are met), it is necessary to develop a well-defined roadmap/methodology that would be used to ensure that all requirements in the applicable guidance will be met on time for plant operation. In **RAI 26-3287, Question 19-3**, the staff requested that the applicant provide a roadmap/methodology with specific steps and supporting information for developing an acceptable PRA. The proposed TS methodology, “Comanche Peak Nuclear Power Units 3 and 4 Technical Specifications Methodology for Risk-Managed Technical Specifications and Surveillance Frequency Control Program,” has been approved by the NRC staff in Section 19.1.4.1, “Uses and Applications of PRA,” of the SER, with some agreed upon changes that are to be verified properly incorporated in the PTS. Proper incorporation of the changes is being tracked as **Confirmatory item 16.4-1**.
- In PTS 5.5.20, “Control Room Envelope Habitability Program,” the applicant replaced the bracketed information with site-specific information regarding exceptions to RG 1.197, “Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors,” requirements on assessment of the plant Control Room Envelope Habitability Program based on current practices used in CPNPP, Units 1 and 2. The staff found this to be acceptable since these exceptions were approved by the NRC for use in current operating plants.
- In PTS 5.5.21, “Setpoint Control Program,” the applicant proposed new administrative controls for the plant Technical Requirements Manual (TRM) based on current practices used in CPNPP, Units 1 and 2. The staff found this to be acceptable since the TRM was a result of adoption of STS at current operating plants, by which about 40 percent of previous TS requirements were allowed to be relocated to a licensee-controlled document.
- In PTS 5.6.1, “Annual Radiological Environmental Operating Report,” and 5.6.2, “Radioactive Effluent Release Report,” the applicant added a note regarding submittal of a single annual report for a multi-unit station. The staff found these notes to be

acceptable since they are of administrative nature and conform to guidance in the Westinghouse STS.

- In PTS 5.7.2, "High Radiation Areas," the applicant made minor changes to capture site-specific information which is based on current practices used in CPNPP, Units 1 and 2.

The staff found these changes acceptable since they are of administrative nature and serve to enhance understanding of PTS 5.7.2 requirements.

Conclusion:

The information regarding administrative controls provided in PTS Section 5.0, "Administrative Controls," is consistent with the GTS and is found acceptable by the staff, except as discussed above.

16.5 Post Combined License Activities

There are no post-COL activities related to this section.

16.6 Conclusion

The staff reviewed the CPNPP, Units 3 and 4, COLA and checked the referenced DCD. The staff's review confirmed that the information pertaining to the PTS and Bases adequately incorporate the GTS and Bases.

The US-APWR DC application is being reviewed by the staff under Docket Number 52-021. The results of the staff's technical evaluation of the information, incorporated by reference, in the FSAR and COLA Part 4 will be documented in the FSER of the US-APWR DC application. The FSER for the DC application is not yet complete, and this is being tracked as Open Item [1-1]. The staff will update Chapter 16 of this SER to reflect the final disposition of the DC application. This is identified as Open Item 16-1.

In addition, the staff reviewed the additional COL information in the application against the relevant NRC regulations (i.e., 10 CFR 50.36, 10 CFR 52.47(a)(11), and 10 CFR 52.79(a)(30)), acceptance criteria defined in NUREG-0800, Section 16.0, and other guidance and concludes that the applicant is in compliance with applicable NRC regulations with regard to TS. For the reasons set forth above, with the exception of open and confirmatory items, the staff finds FSAR Chapter 16 and Part 4 of the COLA to be acceptable.