16.0 TECHNICAL SPECIFICATIONS

This chapter discusses the plant-specific technical specifications (PTS), as well as the design reliability assurance program and the controls for systems, structures, and components (SSCs) required for defense in depth in accordance with the program for regulatory treatment of non-safety systems (RTNSS).

16.1 Technical Specifications

16.1.1 Introduction

Section 16.1, "Technical Specifications," of Revision 1 of the Bellefonte (BLN) Combined License (COL) Part 2, "Final Safety Analysis Report (FSAR)," and the BLN COL Part 4, "Technical Specifications," provide the PTS for the BLN Nuclear Plant, Units 3 and 4 in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36, 10 CFR 52.47(a)(11), and 10 CFR 52.79(a)(30). Technical specifications (TS) impose limits, operating conditions, and other requirements upon reactor facility operation for the public health and safety. The TS are derived from the analyses and evaluations in the safety analysis report. In general, TS must contain: (1) safety limits and limiting safety system settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. The PTS are derived from the analyses and evaluations in the AP1000 Design Control Document (DCD) and the BLN COL FSAR, Revision 1.

As part of the regulatory standardization effort, the NRC staff has prepared standard technical specifications (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 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, limiting conditions for operation, and associated action and surveillance requirements. 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 generic TS (GTS) and Bases for that design. For a COL application that references a certified design, the proposed PTS and Bases may include appropriate plant-specific deviations from the referenced GTS and Bases when warranted. These deviations, if included with the COL application, need to be justified. At this time, the applicant has not identified any deviations from the GTS.

16.1.2 Summary of Application

Section 16.1 of the BLN COL FSAR incorporates by reference Sections 16.1.1 and 16.1.2 of the AP1000 DCD, Revision 17. Part 4 of the BLN COL incorporates by reference the AP1000 GTS and Bases in Section 16.1 of the DCD. In accordance with Section IV(A)(2)(c) of Appendix D to 10 CFR Part 52, the applicant's PTS consist of the AP1000 GTS and site-specific information. No departures from the AP1000 GTS were proposed by the applicant.

The AP1000 GTS includes items that a COL applicant must satisfy in order to complete a particular GTS provision. Detailed design information, equipment selection, instrumentation settings, or other information, that were not available at the time of 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 BLN COL Part 4, the applicant provided the following:

AP1000 COL Information Item

- BLN COL 16.1-1

The applicant provided additional information in BLN COL 16.1-1 to resolve COL Information Item 16.1-1 (COL Action Item 16.2-1). The applicant provided additional information to address each of the remaining brackets [ ] and reviewer's notes in the AP1000 GTS.

The following sections of the BLN PTS and Bases include information that the applicant addressed as part of COL Information Item 16.1-1:

- PTS 3.3.1, 3.3.2, and 3.6.4
- PTS 4.1, 4.1.1, and 4.1.2
- PTS 5.1.1, 5.1.2, 5.2.1.a, 5.2.1.b, 5.2.2, 5.3, 5.3.1, 5.6.1, and 5.6.2

16.1.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the Final Safety Evaluation Report (FSER) related to the DCD.

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

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 50.36, 10 CFR 52.47(a)(11), and 10 CFR 52.79(a)(30).

16.1.4 Technical Evaluation

The NRC staff reviewed Section 16.1 of the BLN COL FSAR and Part 4 of the BLN COL application, and checked the referenced DCD to ensure that the combination of the DCD and the information in the COL represent the complete scope of information relating to this review topic.[1] The NRC staff's review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to the TS. Section 16.1 of the AP1000 DCD is being reviewed by the staff under Docket Number 52-006. The NRC staff's technical evaluation of the information incorporated by reference related to the TS will be

[1] See Section 1.2.2 for a discussion on the staff's review related to verification of the scope of information to be included within a COL application that references a DC.

documented in the staff safety evaluation report (SER) on the DC application for the AP1000 design.

The staff reviewed the information contained in the BLN COL FSAR and the BLN COL application, Part 4:

AP1000 COL Information Item

- BLN COL 16.1-1

In Section 16.1.1 of the BLN COL FSAR, the applicant provided additional information in BLN COL 16.1-1 to resolve COL Information Item 16.1-1 (COL Action Item 16.2-1) listed under the Section 16.1.1 header, "Combined License Information," of the AP1000 DCD, Revision 17, which states:

> This set of technical specifications is intended to be used as a guide in the development of the plant-specific technical specifications. The preliminary information originally provided in brackets [ ] has been revised with the updated information APP-GW-GLR-064 and APP-GW-GLN-075. Combined License applicants referencing the AP1000 will be required to provide the final information for the remaining brackets [ ] with final plant-specific information.

In Section 16.1 of the BLN COL FSAR, the applicant noted that the GTS and Bases provided with Chapter 16 of the AP1000 DCD are incorporated by reference into the PTS provided in Part 4 of the BLN COL application.

The staff evaluated the applicant's disposition of each of the remaining bracketed information items in the respective TS sections listed below.

The staff did not review portions of the BLN PTS and Bases that were identical to the AP1000 GTS and Bases. The technical evaluation for those portions that are identical to the AP1000 GTS and Bases can be found in the NRC staff's FSER for the AP1000 DCD.

16.1.4.1 Use and Application

Section 1.0 of the BLN 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 surveillance requirements (SRs). Section 1.0 of the BLN PTS is identical to the AP1000 GTS. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.2 Safety Limits

Section 2.0 of the BLN PTS and Bases include requirements for safety limits, to ensure that the fuel design limits are not exceeded during steady state conditions, normal operational transients and anticipated operational occurrence. Section 2.0 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.3 Limiting Condition for Operation and Surveillance Requirement Applicability

Section 3.0 of the BLN PTS and Bases include general provisions regarding determination of equipment operability and performance of SRs in specific TS sections (i.e., TS 3.1 through TS 3.9). Section 3.0 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.4 Reactivity Control Systems

Section 3.1 of the BLN PTS and Bases include requirements for the reactivity control systems, which are designed to reliably control reactivity changes, and under postulated accident conditions, ensure that the capability to cool the core is maintained. Section 3.1 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.5 Power Distribution Limits

Section 3.2 of the BLN PTS and Bases include 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. Section 3.2 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.6 Instrumentation

Section 3.3 of the BLN PTS and Bases include requirements for the instrumentation systems that display information required to protect against violating the core fuel design limits and Reactor Coolant System (RCS), and to mitigate accidents.

The BLN instrumentation will be selected after COL issuance, and therefore, in accordance with COL/DC-ISG-8, “Necessary Content of Plant-Specific Technical Specifications When a Combined License is Issued,” all trip setpoints and allowable values must be established through a staff-approved administrative control TS that specifies use of an NRC-approved methodology for determining the trip setpoints and allowable values, and a document controlled by 10 CFR 50.59 for recording this information. The trip setpoints and allowable values, referred to in Tables 3.3.1-1 and 3.3.2-1, will be determined after selection of specific instrumentation.

Request for additional information (RAI) 16-1 was issued in accordance with COL/DC-ISG-8, and requested that the applicant identify the method of determining the trip setpoints and allowable values, as well as establish an associated document in which to record the site-specific values and other restrictions necessary to satisfy 10 CFR 50.36. The applicant should clarify that after selection of specific instrumentation, the trip setpoints and allowable values, referred to in Tables 3.3.1-1 and 3.3.2-1, will be calculated using the setpoint control program that specifies the approved methodology (i.e., WCAP-16361, APP-PMS-JEP-001, Revision 0, May 2006, “Westinghouse Setpoint Methodology for Protection Systems – AP1000”). In addition, the applicant should propose a setpoint control program to be added in the Administrative Control section of the TS, as stated in COL/DC-ISG-8. **This is identified as Open Item 16.1-1**.

16.1.4.7 Reactor Coolant System

Section 3.4 of the BLN PTS and Bases include requirements for various RCS parameters (i.e., pressure, temperature, flow, etc.) and subsystems (i.e., RCS loops, pressurizer, low-temperature overpressure protection, etc.) to ensure the fuel integrity and the RCPB integrity are preserved during all modes of plant operation. Section 3.4 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.8 Emergency Core Cooling Systems

Section 3.5 of the BLN PTS and Bases include 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. Section 3.5 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.9 Containment Systems

Section 3.6 of the BLN PTS and Bases include requirements for the containment systems, which are designed to shield fission products that may be in the containment atmosphere following accident conditions. Section 3.6 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases, except for the deletion of a reviewer's note. For TS 3.6.4, the reviewer's note is not applicable to the PTS, and the applicant has appropriately removed the information. This is acceptable to the staff. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.10 Plant Systems

Section 3.7 of the BLN PTS and Bases include requirements for various systems in the secondary side of the steam generators (i.e., the main steam safety valves, the main steam isolation valves, the main feedwater isolation valves, etc.), the spent fuel pool water level and makeup systems, and the main control room habitability system. Section 3.7 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.11 Electrical Power Systems

Section 3.8 of the BLN PTS and Bases include 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 off-site power, batteries and back-up on-site diesel generators are provided to supply electrical power equipment necessary for the safe shutdown of the plant. Section 3.8 of the BLN PTS and Bases are identical to the AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.12 Refueling Operations

Section 3.9 of the BLN PTS and Bases include requirements for boron concentration, unborated water sources, nuclear instrumentation, containment penetrations, and water inventory in the refueling pool during Mode 6. Section 3.9 of the BLN PTS and Bases are identical to the

AP1000 GTS and Bases. There is no site-specific information that the applicant needed to provide to complete this section.

16.1.4.13 Design Features

Section 4.0 of the BLN PTS includes other design features not covered elsewhere in the PTS such as the site location, the site maps, and other information related to core design and fuel storage design. Section 4.0 of the BLN PTS is identical to the AP1000 GTS except for site-specific information provided by the applicant. In Section 4.1, the applicant provided the BLN site location information to replace the bracketed information in the GTS. The staff found the added information acceptable since it is consistent with related information found in FSAR Section 2.1.1.1, and in accordance with guidance provided in the GTS. In Section 4.1.1, the applicant provided the site maps, which establish its site boundary, and its exclusion area boundary. The staff found the added information acceptable since it is consistent with related information found in BLN COL FSAR Sections 2.1.1.2, and 2.1.1.3, and in accordance with guidance provided in the GTS. In Section 4.1.2, the applicant provided the site map, which establishes its low population zone. The staff found the added information acceptable since it is consistent with related information found in BLN COL FSAR Section 2.1.3.5, and is in accordance with guidance provided in the GTS.

16.1.4.14 Administrative Controls

This section of the BLN 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. As discussed in Section 16.1.4.6 above, the BLN instrumentation will be selected after COL issuance, and therefore, in accordance with COL/DC-ISG-8, all trip setpoints and allowable values must be established through a staff-approved administrative control TS that specifies use of an NRC-approved methodology for determining the trip setpoints and allowable values, and a document controlled by 10 CFR 50.59 for recording this information. The trip setpoints and allowable values, referred to in Tables 3.3.1-1 and 3.3.2-1, will be determined after selection of specific instrumentation.

The staff issued RAI 16-1 and requested that the applicant identify the method of determining the trip setpoints and allowable values, as well as establish an associated document in which to record the site-specific values and other restrictions necessary to satisfy 10 CFR 50.36. The applicant should clarify that after selection of specific instrumentation, the trip setpoints and allowable values, referred to in Tables 3.3.1-1 and 3.3.2-1, will be calculated using the setpoint control program that specifies the approved methodology (i.e., WCAP-16361, APP-PMS-JEP-001, Revision 0, May 2006, “Westinghouse Setpoint Methodology for Protection Systems – AP1000”). In addition, the applicant should propose a setpoint control program to be added in the Administrative Control section of the TS, as stipulated in COL/DC-ISG-8. **This is identified as Open Item 16.1-1**.

In Section 5.3.1 of the BLN PTS, the applicant replaced the GTS bracketed information, clarifying that each member of the unit staff shall meet or exceed minimum qualifications of RG 1.8, Revision 3 except for during cold license operator training where portions of RG 1.8, Revision 2 will apply. The staff finds this acceptable because RG 1.8, Revision 3 does not address cold license operator training. In other respects, Sections 5.0, 5.1.1, 5.1.2, 5.2.1a, 5.2.1b, 5.2.2, 5.3, 5.6.1, and 5.6.2. of the BLN PTS are identical to the AP1000 GTS, except for site-specific information provided by the applicant to replace the bracketed information in the

GTS. The site-specific information provided was administrative in nature and the staff found it acceptable.

Conformance with Regulatory Guide 1.16

In Appendix 1AA of the BLN COL FSAR, the applicant identified an exception to RG 1.16, "Reporting of Operating Information-Appendix A Technical Specifications," Revision 4. The staff agrees with the applicant's exception, as this RG has been superseded by guidance provided in the STS and NUREG-1022, "Event Reporting Guidelines, 10 CFR50.72 and 50.73."

16.1.5 Post Combined License Activities

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

16.1.6 Conclusion

The NRC staff reviewed the application and checked the referenced DCD. The NRC staff's review confirmed that the applicant addressed the required information relating to the BLN PTS and Bases, and there is no outstanding information expected to be addressed in the BLN COL FSAR related to this section.

The Westinghouse application to amend Appendix D to 10 CFR Part 52 includes changes to all sections of the AP1000 GTS and Bases, as stated in Revision 17 of the AP1000 DCD. The staff is reviewing this information on Docket Number 52-006. The results of the NRC staff's technical evaluation of the information incorporated by reference in the BLN COL FSAR and Part 4 will be documented in a supplement to NUREG-1793. The supplement to NUREG-1793 is not yet complete, and this is being tracked as Open Item 1-1. The staff will update Section 16.1 of this SER to reflect the final disposition of the DC application.

However, as a result of Open Item 16.1-1 concerning the PTS and Bases, the staff is unable to finalize its conclusion on STD COL 16.1-1.

16.2 Design Reliability Assurance Program (Related to RG 1.206, Section C.III.1, Chapter 17, C.I.17.4, "Reliability Assurance Program Guidance")

The design reliability assurance program (D-RAP), comprises the reliability assurance activities that assure that the plant is consistent with the certified design when fuel is loaded for the first time.

Section 16.2 of the BLN COL FSAR, incorporates by reference, with no departures or supplements, Section 16.2, "Design Reliability Assurance Program," of Revision 17 of the AP1000 DCD, which in turn refers to Section 17.4 for description of the program.

The NRC staff's review of the applicant's D-RAP is documented in Section 17.4 of this SER.

16.3 Investment Protection

16.3.1 Introduction

The AP1000 design includes active systems that provide defense in depth capabilities (identified as "investment protection" by the applicant) for RCS makeup and decay heat removal. These active systems are the first line of defense in reducing challenges to the passive systems in the event of transients or plant upsets. Most active systems in the AP1000 design are designated as non-safety-related. Because some active systems reduce challenges to safety-related systems to a significant degree, to provide reasonable assurance that these SSCs are operable during anticipated events, short-term availability controls are necessary.

A detailed evaluation of the regulatory treatment of non-safety systems for the AP1000 design, and the concept of investment protection, is addressed in Chapter 22 of the NRC staff's FSER related to the DCD (NUREG-1793).

16.3.2 Summary of Application

Section 16.3 of the BLN COL FSAR, incorporates by reference Section 16.3 of the AP1000 DCD, Revision 17.

In addition, in BLN COL FSAR Section 16.3, the applicant provided the following:

AP1000 COL Information Item

- STD COL 16.3-1

The applicant provided additional information in STD COL 16.3-1 to address COL Information Item 16.3.2-1. This item is related to the development of a procedure to control the operability of investment protection SSCs.

16.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference and the additional information presented in this application is addressed within the FSER related to the DCD.

16.3.4 Technical Evaluation

The staff reviewed Section 16.3 of the BLN COL FSAR and checked the referenced DCD to ensure that the combination of the DCD and the information in the COL represent the complete scope of information relating to this review topic.[1] The NRC staff's review confirmed that the information contained in the application and incorporated by reference addresses the required information relating to SSCs required for defense in depth. Section 16.3 of the AP1000 DCD is being reviewed by the staff under Docket Number 52-006. The NRC staff's technical evaluation of the information incorporated by reference related to these SSCs will be documented in the staff SER on the DC application for the AP1000 design.

The staff reviewed the information contained in the BLN COL FSAR:

AP1000 COL Information Item

- STD COL 16.3-1

The applicant provided supplemental information by adding the following statement to DCD Section 16.3-1:

> Station procedures govern and control the operability of investment protection systems, structures, and components in accordance with Table 16.3-2 of the DCD, and provide the operating staff with instruction for implementing required actions when operability requirements are not met. Procedure development is addressed in FSAR Section 13.5.

Section 22.5.9 of the NRC staff's FSER related to the DCD (NUREG-1793) evaluated the short-term availability controls proposed by Westinghouse for important non-safety-related SSCs. The NRC staff concluded that the administrative controls for the SSCs required for defense in depth, listed in Table 16.3-2 of the AP1000 DCD, were acceptable. COL applicants referencing the AP1000 are responsible for developing a procedure to control the operability of these SSCs in accordance with DCD Table 16.3-2 (COL Information Item 16.3.2-1).

The applicant's response to STD COL 16.3-1 is acceptable because there were no exceptions taken to the list of SSCs required for defense in depth nor to the administrative procedures included in AP1000 DCD Table 16.3-2. The applicant also committed to place this information in station procedures. The information in DCD Table 16.3-2 also provides the operating staff with instruction for implementing required actions when operability requirements are not met.

16.3.5 Post Combined License Activities

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

16.3.6 Conclusion

The NRC staff reviewed the application and checked the referenced DCD. The NRC staff's review confirmed that the applicant addressed the required information related to defense in depth using non-safety-related SSCs, and there is no outstanding information expected to be addressed in the COL FSAR related to this section.

Section 16.3 of Revision 17 of the AP1000 DCD is identical to Section 16.3 of Revision 15 of the AP1000 DCD, which is incorporated by reference into 10 CFR Part 52, Appendix D. This section is not affected by the changes that Westinghouse proposed in Revision 17 to the AP1000 DCD. Pursuant to 10 CFR 52.63(a)(5) and Part 52, Appendix D, Section VI.B.1, all nuclear safety issues relating to defense in depth that were incorporated by reference have been resolved.

In addition, the staff concludes that the relevant information presented within the BLN COL FSAR is acceptable based on the regulatory basis addressed in the NRC staff's FSER (NUREG-1793). The staff based its conclusion on the following:

- STD COL 16.3-1, as related to SSCs required for defense in depth, is acceptable because it states that station procedures will govern and control the operability of these SSCs, in accordance with Table 16.3-2 of the AP1000 DCD, without exceptions. The information in DCD Table 16.3-2 also provides the operating staff with guidance for taking required actions when operability requirements are not met.

- STD COL 16.3-1, as related to SSCs required for defense in depth, is acceptable because it states that station procedures will govern and control the operability of these SSCs, in accordance with Table 16.3-2 of the AP1000 DCD, without exceptions. The information in DCD Table 16.3-2 also provides the operating staff with guidance for taking required actions when operability requirements are not met.

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