14.0 INITIAL TEST PROGRAMS

The initial test program covers structures, systems, and components (SSCs) and design features for both the nuclear portion of the facility and the balance of plant. The information provided addresses the major phases of the test program, including preoperational tests, initial fuel loading and initial criticality, low-power tests, and power ascension tests. The scope of the initial test program as well as its general plans for accomplishing the test program is described in sufficient detail to demonstrate that due consideration has been given to matters that normally require advance planning.

The technical aspects of the initial test program are described in sufficient detail to show that: (1) the test program adequately verifies the functional requirements of plant SSCs; and (2) the sequence of testing is such that the safety of the plant does not depend on untested SSCs. In addition, measures are described to ensure that: (1) the initial test program is accomplished with adequate numbers of qualified personnel; (2) adequate administrative controls will be established to govern the initial test program; (3) the test program is used, to the extent practicable, to train and familiarize the plant's operating and technical staff in the operation of the facility; and (4) the adequacy of plant operating and emergency procedures is verified, to the extent practicable, during the period of the initial test program.

This chapter also provides information on the inspections, tests and analyses (ITAAC) that are proposed to demonstrate that, when the ITAAC are performed and the acceptance criteria met, the facility has been constructed and will operate in conformance with the COL, the Atomic Energy Act, and NRC regulations.

14.1 Specific Information to be Included in Preliminary/Final Safety Analysis Reports (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.1, "Specific Information To Be Addressed for the Initial Plant Test Program")

Section 14.1 of the Bellefonte (BLN) COL Final Safety Analysis Report (FSAR) incorporates by reference, with no departures or supplements, Section 14.1, "Specific Information to be Included in Preliminary/Final Safety Analysis Reports," of Revision 17 of the AP1000 Design Control Document (DCD). The Nuclear Regulatory Commission (NRC) staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remained for review.[1] The NRC staff's review confirmed there is no outstanding issue related to this section.

Section 14.1 of Revision 17 of the AP1000 DCD is identical to Section 14.1 of Revision 15 of the AP1000 DCD, which is incorporated by reference into Title 10 of the *Code of Federal Regulations* (CFR) 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 10 CFR Part 52, Appendix D, Section VI.B.1, all nuclear safety issues relating to specific information to be included in the FSARs have been resolved.

[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 design certification (DC).

14.2 Specific Information to be Included in Standard Safety Analysis Reports (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.2, "Initial Plant Test Program")

14.2.1 Summary of Test Program and Objectives

14.2.1.1 Introduction

This section describes the major phases of the initial test program as well as the general prerequisites and specific objectives to be achieved for each phase.

14.2.1.2 Summary of Application

Section 14.2 of the BLN COL FSAR incorporates by reference Section 14.2 of the AP1000 DCD, Revision 17. Section 14.2 of the DCD includes Section 14.2.1.

Additionally, the applicant described how the initial test program is applied to the facility. This information was provided to supplement the information incorporated by reference from the AP1000 DCD in response to RAI 14.2-12.

14.2.1.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the test program summary and objectives, and the associated acceptance criteria, are given in Section 14.2 of NUREG-0800.

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50. RG 1.68, Revision 3, "Initial Test Program for Water-Cooled Nuclear Power Plants," provides guidance on how to comply with Criterion XI of Appendix B to 10 CFR Part 50.

14.2.1.4 Technical Evaluation

The NRC staff reviewed Section 14.2.1 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 the test program summary and objectives. The NRC staff's technical evaluation of the information incorporated by reference related to the test program summary and objectives is documented in the staff SER on the DC application for the AP1000 design (NUREG-1793).

The staff reviewed Section 14.2.1 and requested that as part of RAI 14.2-12, dated December 8, 2008, the applicant describe how the BLN test program meets the objectives in Section 14.2.1 of the AP1000 DCD, Revision 17. In its January 22, 2009, response to this RAI, the applicant proposed to revise Section 14.2.1 of the BLN COL FSAR to supplement Section 14.2.1 of the AP1000 DCD, Revision 17. The applicant stated in its response that

Section 14.2 of the BLN COL FSAR describes the controls that will be implemented in the site-specific startup administrative manual (procedure). The applicant also described the testing of first-of-a-kind design features and the use of operating experience (OE) from previous first-of-a-kind tests performed on other AP1000 plants. Additionally, the applicant proposed to develop administrative controls for crediting previously performed testing of first-of-a-kind AP1000 design features.

The staff determined that the proposed changes adequately clarify the objectives of the initial test program, consistent with the guidance in RG 1.68. Therefore, the staff finds this change acceptable. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. This item is identified as **Confirmatory Item 14.2-1**, pending NRC review and approval of the revised BLN COL FSAR.

14.2.1.5 Post Combined License Activities

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

14.2.1.6 Conclusion

The NRC staff reviewed the application and checked the referenced DCD.

Section 14.2.1 of Revision 17 of the AP1000 DCD is identical to Section 14.2.1 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 10 CFR Part 52, Appendix D, Section VI.B.1, all nuclear safety issues relating to specific information to be included in the FSARs have been resolved.

However, as a result of Confirmatory Item 14.2-1, the staff is unable to finalize its conclusions related to the objectives of the initial test program in accordance with the requirements of 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50.

14.2.2 Organization, Staffing, and Responsibilities (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.2.2, "Organization and Staffing")

14.2.2.1 Introduction

The organization used to manage, supervise, or execute all phases of the initial test program is described. This description includes the organizational responsibilities and authorities, the degree of participation of each organizational unit in the implementation of the initial test program, and personnel training, experience, and qualification requirements.

14.2.2.2 Summary of Application

Section 14.2 of the BLN COL FSAR incorporates by reference Section 14.2 of the AP1000 DCD, Revision 17. Section 14.2 of the DCD includes Section 14.2.2.

BLN COL FSAR Section 14.2.2 addresses the plant test and operations organization (PT&O) and other organizations that will participate in the implementation of the initial test program.

In addition, in BLN COL FSAR Section 14.2.2, the applicant provided the following:

AP1000 COL Information Item

- STD COL 14.4-1

The applicant provided additional information in STD COL 14.4-1 to provide a description of the organization, staffing, and responsibilities related to the initial test program.

14.2.2.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the organization, staffing, and responsibilities, and the associated acceptance criteria, are given in Section 14.2 of NUREG-0800.

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50. RG 1.68 provides guidance on how to comply with Criterion XI of Appendix B to 10 CFR Part 50.

14.2.2.4 Technical Evaluation

The NRC staff reviewed Section 14.2.2 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 the organization, staffing, and responsibilities. The NRC staff's technical evaluation of the information incorporated by reference related to the organization and staffing is documented in the staff SER on the DC application for the AP1000 design (NUREG-1793).

AP1000 COL Information Item

- STD COL 14.4-1

The NRC staff reviewed STD COL 14.4-1 related to COL Information Item 14.4-1 included under Section 14.2.2 of the BLN COL FSAR. The applicant provided information to replace the existing information in AP1000 DCD Section 14.2.2 with a description of the organization, staffing, and responsibilities related to the initial test program. This information was provided to address COL Information Item 14.4-1 in the AP1000 DCD, Revision 17.
COL Information Item 14.4-1 states:

> The specific staff, staff responsibilities, authorities, and personnel qualifications for performing the AP1000 initial test program are the responsibility of the Combined License applicant. This test organization is responsible for the planning, executing, and documenting of the plant initial testing and related activities that occur between the completion of plant/system/component construction and commencement of plant commercial operation. Transfer and

> retention of experience and knowledge gained during initial testing for the subsequent commercial operation of the plant is an objective of the test program.

This commitment was also captured as COL Action Item 14.4-1 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793), which states:

> The COL applicant will establish the specific staff, staff responsibilities, authorities, and personnel qualifications for performing the AP1000 initial test program.

To address STD COL 14.4-1, the applicant described the PT&O organization in Section 14.2.2 of the BLN COL FSAR. The applicant stated that the PT&O organization will be responsible for the implementation of the initial test program, including the construction and installation, preoperational, and startup testing phases. In addition, the applicant described the responsibilities, interfaces, and authorities of the positions in the PT&O organization, including the following:

- Manager in charge of the PT&O organization, responsible for staffing the PT&O organization, developing procedures for the preoperational and startup test phases, managing the initial test program, implementing the initial test program schedule, and manage contracts associated with the initial test program.

- Functional Manager in charge of the PT&O support, responsible for the implementation of plans, schedules, and development and approval of test procedures.

- PT&O Engineers, responsible for the development of system test procedures.

- Functional manager in charge of startup, responsible for the management of preoperational and startup testing. Activities include participation in the Joint Test Working Group (JTWG), preparation of the detailed schedule for preoperational and startup test activities, coordination of vendor participation in the initial test program, supervising and directing startup engineers, and developing periodic progress reports.

- Startup Engineers, responsible for coordinating testing activities, identifying special or temporary equipment or services needed to support testing, ensuring compliance with administrative controls, and reviewing and evaluating test results.

- PT&O organization personnel qualifications and training program description.

The staff reviewed the applicant's proposed resolution to COL Information Item 14.4-1 addressing organizational and staffing responsibilities for the initial test program. In its review, the staff identified areas where additional information was needed.

In RAIs 14.2-5 and 14.2-6, dated May 15, 2008, the staff requested that the applicant supplement the information incorporated by reference from Section 14.2.2 of the AP1000 DCD, Revision 17, and provide a description of the responsibilities, authorities, interfaces, and qualifications requirements of the organizations responsible for the overall administration of the initial test program, consistent with the guidance in RG 1.206 and Section 14.2 of NUREG-0800. In its response to RAIs 14.2-5 and 14.2-6, dated June 26, 2008, the applicant stated that Section 14.4 of the BLN COL FSAR incorporated by reference Section 14.4.3 of the

AP1000 DCD and no further changes to the BLN COL FSAR were needed. However, the staff determined that the information included in BLN COL FSAR was insufficient. Therefore, the staff asked the applicant in RAI 14.2-12, dated December 8, 2008, to provide information regarding the organization(s) that will be in charge of the overall administration, technical direction, coordination, and implementation of the initial test program. Specifically, the staff requested that the applicant provide organizational descriptions of the principal management positions (including any augmenting organizations) responsible for planning, executing, and documenting preoperational and startup testing activities. RAI 14.2-12 stated that this description should include the authorities, responsibilities and interfaces, and the degree of participation of each identified organizational unit. Additionally, the staff requested that the applicant describe training and qualification requirements for organizations responsible for implementing the initial test program.

In its response to RAI 14.2-12 dated January 22, 2009, the applicant proposed to include in Section 14.2.2 of the BLN COL FSAR, a description of the following organizational groups that will participate in the implementation of the initial test program:

- The JTWG, including details of the key responsibilities, authorities, and interfaces
- The Site Construction Group (Architect-Engineer), including participating organizations, authorities, interfaces, and functional responsibilities
- The Site Preoperational Test Group, including participating organizations, authorities, interfaces, and functional responsibilities
- The Site Startup Test Group, including participating organizations, authorities, interfaces, and functional responsibilities

In addition, the applicant proposed to include information related to the education, training, experience, and qualification requirements of supervisory personnel, test personnel, and other major participating organizations responsible for implementing the initial test program and developing testing, operating, and emergency procedures. This description would include administrative provisions for the establishment of a training program consistent with the criteria described in Three Mile Island (TMI) Action Plan Item I.G.1, (NUREG-0737, “Clarification of TMI Action Plan Requirements”) and considerations for staffing effects that could result from overlapping initial test programs at multi-unit sites.

The staff reviewed the proposed organizational description provided by the applicant as part of the response to RAI 14.2-12. The applicant proposed to describe its overall responsibility for the conduct of the initial test program and also proposed to include a description of the major organizations that will be responsible for the administration and technical direction of the initial test program. To this end, the applicant proposed to include in Section 14.2.2.3 of the BLN COL FSAR the functions, responsibilities, and composition of the JTWG. Specifically, the JTWG will be composed of representatives from the plant’s operations group, Westinghouse, the Architect-Engineer, and representatives from the test support groups. The applicant proposed to include a description of the responsibilities, authorities, and interfaces of these organizations. The JTWG will provide oversight of the implementation of the initial test program, including planning, scheduling, and performance of preoperational and startup testing. Also, the JTWG will review, evaluate, and approve administrative and test procedures, and will review and evaluate construction, preoperational, and startup test results and test turnover packages.

The applicant proposed to revise the BLN COL FSAR to include the proposed organizational description.

Additionally, the applicant proposed to include a description of the responsibilities, authorities, and interfaces of supporting organizations including the Site Construction Group (Architect-Engineer), the Site Preoperational Test Group, and the Site Startup Test Group. A description of each proposed test group follows.

Section 14.2.2.4 of the BLN COL FSAR would be revised to describe the Site Construction Group (Architect-Engineer). The Site Construction Group will be composed, as necessary, of members from the construction group, the construction services group, the construction services procurement group, and the construction services quality group. The Site Construction Group will provide oversight of construction installation and testing, vendor interface and procurement associated with support testing activities, and turnover of tested equipment, systems, and testing documentation to the Site Preoperational Test Group.

Section 14.2.2.5 of the BLN COL FSAR would be revised to describe the Site Preoperational Test Group. The Site Preoperational Test Group will consist of engineering leads and preoperational test teams, and will accept turnover of systems and equipment from the construction organization, and plan, scope, schedule, and oversee testing of plant systems. Additionally, the Site Preoperational Test Group will coordinate tagging and maintenance of systems, will provide coordination with other participating organizations, and will resolve open items and exceptions identified during the implementation of the preoperational test program.

Section 14.2.2.6 of the BLN COL FSAR would be revised to describe the Site Startup Test Group. The Site Startup Test Group will include engineering leads and startup test teams, and will be responsible for the acceptance of SSCs for integrated testing. In addition, the Site Startup Test Group will manage and oversee the testing of plant SSCs to support the plant power ascension test program, and will accept and turn over startup test packages to the site licensee.

The applicant also proposed to include information in Section 14.2.2.2 of the BLN COL FSAR to address training and qualification requirements for individuals and organizations implementing the initial test program. The response stated that the training organization will develop procedures to implement a training and qualification program in accordance with the requirements of the licensee quality assurance program and in coordination with Westinghouse. This training and qualification program will be used to confirm that test personnel have adequate training, qualification, and certification. In addition, the proposed training and qualification program will confirm that experienced and qualified personnel are available to develop testing, operating, and emergency procedures. The proposed training and qualification program will also provide supplemental operator training in accordance with TMI Action Plan Item I.G.1. The response stated that the site-specific startup administrative manual will contain measures to verify that personnel formulating and conducting test activities are not the same personnel who designed or are responsible for satisfactory performance of systems or design features under test. In addition, the startup administrative manual will provide controls for the consideration of staffing effects that could result from overlapping initial test programs at multi-unit sites.

The staff determined that the proposed changes adequately define the organizations that will carry out the initial test program, describe the authorities, responsibilities, and interfaces, and delineate training and qualification requirements for organizations participating in the implementation of the initial test program, consistent with the guidance in RG 1.68. Additionally,

Section 1.0, Table 1.9-201 of the BLN COL FSAR includes a commitment to RG 1.8, Revision 3, "Qualification and Training of Personnel for Nuclear Power Plants," which provides training and qualification requirements for nuclear power plant personnel, including personnel participating in initial test program activities. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. Therefore, the staff finds this change acceptable. This is identified as **Confirmatory Item 14.2-2**, pending NRC review and approval of the revised BLN COL FSAR.

14.2.2.5 Post Combined License Activities

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

14.2.2.6 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 organization, staffing, and responsibilities, and there is no outstanding information expected to be addressed in the BLN COL FSAR related to this section.

Section 14.2.2 of Revision 17 of the AP1000 DCD is identical to Section 14.2.2 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 10 CFR Part 52, Appendix D, Section VI.B.1, all nuclear safety issues relating to specific information to be included in the FSARs have been resolved.

However, as a result of Confirmatory Item 14.2-2, the staff is unable to finalize its conclusions related to organization, staffing, and responsibilities to establish the adequacy of the applicant's plans for personnel participation during the implementation of the initial test program, in accordance with the requirements of 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50.

14.2.3 Test Specifications and Test Procedures (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.2.3, "Test Procedures," C.I.14.2.4, "Conduct of Test Program," C.I.14.2.5, "Review, Evaluation, and Approval of Test Results," and C.I.14.2.6, "Test Records")

14.2.3.1 Introduction

Test specifications and test procedures address the process used to develop, review, and approve individual test procedures, including the organizational units or personnel that are involved in performing these activities and their respective responsibilities.

Conduct of test program describes the administrative controls that govern the conduct of each major phase of the test program. This description includes the administrative controls used to ensure that the necessary prerequisites are satisfied for each major phase and for individual tests. Controls to be followed during plant modifications or maintenance tasks that are determined to be necessary to conduct the test program are also described as well as the methods used to ensure retesting following such modifications or maintenance.

Review of test results describes the specific controls to be established for the review, evaluation, and approval of test results by appropriate personnel and/or organizations. This description includes specific controls to be established to ensure notification of effected and responsible organizations or personnel when test acceptance criteria are not met, as well as the controls established to resolve such matters.

In addition, administrative controls to identify and cross-reference each test (or portion thereof) required to be completed before initial fuel loading to satisfy ITAAC in accordance with 10 CFR 52.99(a) are discussed.

14.2.3.2 Summary of Application

Section 14.2 of the BLN COL FSAR incorporates by reference Section 14.2 of the AP1000 DCD, Revision 17. Section 14.2 of the DCD includes Section 14.2.3.

In BLN COL FSAR Sections 14.2 and 14.4, the applicant provided the following:

AP1000 COL Information Items

- STD COL 14.4-2

The applicant provided additional information in STD COL 14.4-2 to address COL holder responsibility for the development of test specifications and test procedures.

- STD COL 14.4-3

The applicant provided additional information in STD COL 14.4-3 to address COL holder responsibility for the development of a site-specific startup administrative manual (procedure) that will contain the administrative procedures and requirements that will govern the activities associated with the plant initial test program.

- STD COL 14.4-4

The applicant provided additional information in STD COL 14.4-4 to address COL holder responsibility for the review and evaluation of test results.

Because these COL Information Items are relevant to the subject matter of this section, the staff evaluates them here.

In addition, in Part 10 of the BLN COL FSAR, the applicant provided the following information:

License Conditions

- Part 10, License Condition 2, Items 14.4-2, 14.4-3 and 14.4-4
- Part 10, License Condition 6, addressing the initial test program schedule
- Part 10, License Condition 8, addressing initial test program changes

14.2.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the test specifications and test procedures, conduct of test program, and review and evaluation of test results, including the associated acceptance criteria, are given in Section 14.2 of NUREG-0800.

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50. RG 1.68 provides guidance on how to comply with Criterion XI of Appendix B to 10 CFR Part 50.

14.2.3.4 Technical Evaluation

The NRC staff reviewed Section 14.2.3 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 the test specifications and procedures, conduct of test program, and review and evaluation of test results. Section 14.2.3 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 the test specifications and procedures 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:

- STD COL 14.4-2, addressing test specifications and test procedures.

The NRC staff reviewed STD COL 14.4-2 related to COL Information Item 14.4-2 included in the BLN COL FSAR. The applicant provided information to address COL Information Item 14.4-2 and to supplement the information addressed in the AP1000 DCD, Revision 17.
COL Information Item 14.4-2 states:

> The Combined License holder will provide the Preoperational and Startup Procedures to the NRC prior to each planned test in accordance with the requirements of DCD Subsection 14.2.3.
>
> The following words represent the original Combined License Information Item commitment:
>
>> The Combined License applicant is responsible for providing test specifications and test procedures for the preoperational and startup tests, as identified in Subsection 14.2.3, for review by the NRC.

The commitment was also captured as COL Action Item 14.4-2 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793), which states:

> The COL applicant will develop test specifications and procedures for the preoperational and startup tests for review by the NRC.

The staff reviewed the applicant's proposed resolution of COL Information Item 14.4-2.

In reviewing Section 14.2 of the BLN COL FSAR, Revision 0, the applicant did not provide a description of the methodology used to develop test specifications and procedures; did not provide a description of the controls to ensure the participation of the design organization(s), the COL applicant, architect-engineer(s), and other major contractors, subcontractors, and vendors, as applicable; and did not discuss the qualification or experience requirements for personnel participating in the development of test specifications and test procedures. In RAI 14.2-8, the staff requested that the applicant provide information regarding the methodology that will be used for the generation, review, and approval of preoperational and startup test procedures. Additionally, the staff requested that the applicant explain which provisions in the application ensure the availability of approved test procedures for review by NRC inspectors at least 60 days before their intended use, and ensure timely notification to the NRC of changes in approved test procedures that have been made available for NRC review.

In its response to RAI 14.2-8 dated June 26, 2008, the applicant stated that Section 14.2.3 of the AP1000 DCD provided administrative controls to ensure that approved test procedures will be provided to the NRC about 60 days prior to the scheduled performance of preoperational tests, such as test for systems and components that perform safety-related functions, and tests of systems and components that are non-safety-related but perform defense-in-depth functions. The staff found this response acceptable. However, the applicant did not provide a description of the administrative controls to be used to develop, review, and approve preoperational and startup test procedures. In RAI 14.2-12, dated December 8, 2008, the staff requested that the applicant provide such a description in the BLN COL FSAR.

In its response to RAI 14.2-12 dated January 22, 2009, the applicant proposed to include in Section 14.2.3 of the BLN COL FSAR the following administrative controls that will be prescribed in the site-specific startup administrative manual for the development, review, and approval of test specifications and test procedures:

- Provisions to ensure that the appropriate technical information required for the preparation of test procedures is included, including prerequisites, format and content, objectives, test conditions, and acceptance criteria

- Provisions to ensure the participation of the design organization in the development of detailed test procedures

- Provisions to ensure that personnel developing and reviewing test procedures have the appropriate technical background and experience

- Provisions to ensure the availability of test procedures to the NRC onsite inspectors approximately 60 days prior to their intended use

The staff reviewed the applicant's response to this RAI and determined that the proposed changes provide the general methods and administrative provisions to control procedure development, review, and approval, including the responsibilities of the various organizations participating in this process, consistent with the guidance in RG 1.68. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. Therefore, the staff finds

the proposed change acceptable. This is identified as **Confirmatory Item 14.2-3**, pending NRC review and approval of the revised BLN COL FSAR.

The applicant identified COL Information Item 14.4-2 as an activity that cannot be fully resolved prior to issuance of the COL. In BLN COL FSAR, Part 10, "License Conditions and ITAAC," License Condition 2, "COL Holder Items," the applicant proposed Item 14.4-2 to address the development of test specifications and test procedures. Additionally, the applicant proposed License Condition 6, "Operational Program Readiness," addressing implementation schedules to support planning for and conduct of NRC staff inspections of operational programs. Because the initial test program is identified as an operational program, the applicant provided implementation milestones consistent with the guidance contained in RG 1.206. To address the availability of test specifications and test procedures, Item d. of License Condition 6 requires a submittal schedule for preoperational and startup test procedures.

Since development of test specifications and test procedures will require detailed plant-specific design information and close coordination with design organizations, the staff determined that it is acceptable to develop detailed preoperational and startup test specifications and test procedures during the post-COL phase (See Section 14.2.3.5). Therefore, the staff finds acceptable proposed License Condition 2, Item 14.4-2. Concerns remain regarding the adequacy of administrative controls in License Condition 6, Item d., for the development of test specifications and test procedures. This is identified as **Open Item 14.2-1.**

In RAI 14.2-11, the NRC staff requested that the applicant provide additional information regarding the provisions that will identify and cross-reference all or part of each test that is required to be completed before initial fuel loading and that is designed to satisfy ITAAC. The staff requested that the applicant revise Section 14.2 of the BLN COL FSAR to address this issue. In its September 3, 2008, response to RAI 14.2-11, the applicant stated that test procedures (or sections thereof) will be cross-referenced to ITAACs. In addition, activities related to ITAAC closure will include references to test procedures in order to facilitate NRC review and acceptance. The applicant stated that Chapter 14 of the BLN COL FSAR would be revised to include development of a cross-reference list between ITAACs and test procedures and/or sections of procedures. The staff confirmed that this change was incorporated in Revision 1 of the BLN COL FSAR. Section 14.4.2 of the BLN COL FSAR states that a cross-reference list will be developed between ITAACs and test procedures and/or sections of test procedures. The staff finds this change acceptable. This resolves RAI 14.2-11.

- STD COL 14.4-3, addressing the conduct of test program

The NRC staff reviewed STD COL 14.4-3 related to COL Information Item 14.4-3 included in the BLN COL FSAR. The applicant provided additional information to address COL Information Item 14.4-3 and to supplement the information addressed in the AP1000 DCD, Revision 17. COL Information Item 14.4-3 states:

> The Combined License holder is responsible for a site-specific startup administration manual (procedure), which contains the administration procedures and requirements that govern the activities associated with the plant initial test program, as identified in Subsection 14.2.3.
>
> The following words represent the original COL information item commitment:

> The Combined License applicant is responsible for a startup administration manual (procedure), which contains the administration procedures and requirements that govern the activities associated with the plant initial test program, as identified in Subsection 14.2.3.

This commitment was also captured as COL Action Item 14.4-3 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793), which states:

> The COL applicant is responsible for preparing a startup administrative manual which contains the administrative procedures and standards that govern the activities associated with the plant initial test program.

In Section 14.4 of the BLN COL FSAR, the applicant incorporated by reference Section 14.4.3 of the AP1000 DCD, Revision 17. This section provided a summary overview of the administrative process and program controls to be utilized in the conduct of the AP1000 Startup Test Program at a licensed AP1000 operational plant site. It also provided a general description of responsibilities and activities related to the testing of plant equipment in the period between system turnover until plant acceptance.

The staff reviewed the information provided to address COL Information Item 14.4-3 related to the conduct of the initial test program in the BLN COL FSAR. In its review, the staff identified areas where additional information was needed. A description of the specific issues follows.

In RAI 14.2-4, the staff requested that the applicant supplement the information incorporated by reference from Section 14.4.3 of the AP1000 DCD, Revision 17, and to provide a description of the administrative controls that will be implemented during the conduct of the initial test program, consistent with the guidance in RG 1.206 and Section 14.2 of NUREG-0800. In its response to RAI 14.2-4 dated June 26, 2008, the applicant stated that Section 14.4 of the BLN COL FSAR incorporated by reference Section 14.4.3 of the AP1000 DCD and no further changes to the BLN COL FSAR were needed. However, the staff determined that the information included in BLN COL FSAR was insufficient. Therefore, in RAI 14.2-12 dated December 8, 2009, the staff requested the applicant include a set of administrative controls for the conduct of the initial test program in Section 14.2 of the BLN COL FSAR.

In its response to RAI 14.2-12 dated January 22, 2009, the applicant proposed to include in Section 14.2.3.1 of the BLN COL FSAR a description of the administrative controls for the control of testing activities. The proposed controls will include measures for procedure verification, work control, system turnover, conduct of modifications, and conduct of maintenance activities during the initial test program.

Section 14.2.3.1.1 would be revised to provide administrative controls for the verification of approved test procedures. The response stated that this section will include measures to consider design and licensing changes made after the development of test procedures to ensure that these changes are incorporated in approved test procedures. In addition, the applicant stated that available information regarding operating experience (OE) will be factored in the development of individual test procedures. Test deficiencies, nonconformances, exceptions, and failures will be tracked using the applicant's corrective action program. The applicant also proposed controls to involve design organizations in the resolution of design-related problems that result in, or contribute to, a failure to meet test acceptance criteria. In its description, the applicant assigned responsibilities for the review of test procedures, test

execution, data collection and recording, and for the review and evaluation of test results prior to commencing each major phase of the initial test program.

Section 14.2.3.1.2 would be revised to provide administrative measures for the control of work requests and controls for the control of tagging requests. Specifically, the response stated that the applicant will be responsible for the preparation of work requests and for supervising minor repairs and modifications, changes to equipment settings, and disconnecting and reconnecting of electrical terminations. Additionally, the Startup Group will provide for the coordination of construction-related work requests. The applicant also stated that the Startup Test Engineers may perform independent verification of work requests. These activities will be controlled by administrative procedures.

Section 14.2.3.1.3 would be revised to provide controls for system turnover during the conduct of the test program. The response proposed guidelines that will be used to define the boundary and interfaces between related systems/subsystems and to generate boundary scope documents. The response also proposed a systematic turnover process that includes requirements for the following:

- Documenting inspections performed by the construction organization (e.g., highlighted drawings showing areas inspected)
- Documenting results of construction testing
- Determining the construction related inspections and tests that need to be completed before preoperational testing begins. Any open items are evaluated for acceptability before commencing preoperational testing.
- Developing and implementing plans for correcting adverse conditions and open items, and means for tracking such conditions and items
- Verifying completeness of construction and documentation of incomplete items

Section 14.2.3.1.4 would be revised to include controls for modifications during the conduct of the test program. The response also proposed measures for retesting activities following such modifications. In its description, the applicant stated that modifications will be documented in test procedures and will contain restoration steps to confirm satisfactory restoration to the required configuration. Additionally, modifications will be reviewed to determine the scope of post-modification testing activities. Finally, the response stated that retesting for modifications will be documented and verified to ensure the validity of preoperational testing and ITAAC.

Section 14.2.3.1.5 would be revised to include controls for corrective or preventive maintenance during the conduct of the initial test program. The response proposed that the applicant will review maintenance activities to determine post-maintenance testing to be performed. Additionally, post-maintenance testing will be conducted and documented, and its results verified to maintain the validity of preoperational testing and ITAAC.

The staff reviewed the applicant's response to this RAI and determined that this change provides an adequate set of administrative measures to control the conduct of the initial test program, consistent with the guidance in RG 1.68, RG 1.206, and Section 14.2 of NUREG-0800. The applicant will revise the BLN COL FSAR to include the proposed

administrative controls. Therefore, the staff finds this change acceptable. This is identified as **Confirmatory Item 14.2-4**, pending NRC review and approval of the revised BLN COL FSAR.

In addition to the administrative controls for the conduct of the initial test program, the applicant identified COL Information Item 14.4-3 as an activity that cannot be fully resolved prior to issuance of the COL. In BLN COL FSAR, Part 10, "License Conditions and ITAAC," License Condition 2, "COL Holder Items," the applicant proposed Item 14.4-3 to address the development of a site-specific startup administrative manual. This site-specific startup administrative manual will contain the administration procedures and requirements that govern the activities associated with the plant initial test program, as described in Section 14.2 of the BLN COL FSAR. The applicant stated that the startup administrative manual will be provided to the NRC prior to initiating the initial test program. Additionally, in Part 10 of the BLN COL FSAR, proposed License Condition 8, "Startup Testing," the applicant discussed the process for making changes to the initial test program described in Chapter 14 of the Bellefonte COL FSAR. The applicant stated that any changes to the initial startup test program made in accordance with the provisions of 10 CFR 50.59 or Section VIII of Appendix D to 10 CFR Part 52 shall be reported in accordance with 50.59(d) within one month of such change.

The staff determined that it is acceptable to develop a site-specific startup administrative manual, which will contain the administrative procedures and standards that govern the activities associated with the plant initial test program, during the post-COL phase (see Section 14.2.3.5). Therefore, the staff finds acceptable proposed License Condition 2, Item 14.4-3. Concerns remain regarding the adequacy of administrative controls for changing the test program as described in License Condition 8. This is identified as **Open Item 14.2-2.**

- STD COL 14.4-4, addressing the review and evaluation of test results

The NRC staff reviewed STD COL 14.4-4 related to COL Information Item 14.4-4 included under Section 14.2.3.2 of the BLN COL FSAR. The applicant provided additional information to address COL Information Item 14.4-4 as described in the AP1000 DCD, Revision 17. COL Information Item 14.4-4 states:

> The combined license holder is responsible for review and evaluation of individual test results as well as final review of overall test results and for review of selected milestones or hold points within the test phases. Test exceptions or results which do not meet acceptance criteria are identified to the affected and responsible design organizations, and corrective actions and retests, as required, are performed.

The commitment was also captured as COL Action Item 14.4-4 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793), which states:

> The COL applicant or holder is responsible for review and evaluation of individual test results.

In Section 14.2.3.2 of the BLN COL FSAR, the applicant provided specific administrative controls for the review and evaluation of test results. The applicant stated that the startup engineer is responsible for reviewing and evaluating the test data, test results, and verifying that the acceptance criteria have been met. The applicant also stated that test results will be reviewed and approved by the JTWG. The applicant included provisions to identify and notify the responsible design organizations when test exceptions or results do not meet acceptance

criteria. The applicant also discussed the utilization of the corrective action program for tracking test results that do not meet the acceptance criteria, and for providing corrective action and retests, as required. Additionally, the applicant provided controls for the review of preoperational and startup test results, and for the retention of test reports.

While reviewing Section 14.2.3.2, the staff was unable to find provisions to ensure that retesting required for modification or maintenance remains in compliance with ITAAC. In RAI 14.2-10, the staff requested that the applicant provide additional information regarding the provisions to ensure that retesting remains in compliance with ITAAC. The staff requested that the applicant revise Section 14.2.3.2 of the BLN COL FSAR to include such provisions. In its September 8, 2008, response to the staff's RAI, the applicant stated that normal maintenance, repairs, and design changes are controlled by the configuration control process in conjunction with the quality assurance and corrective action programs. These processes will provide for the review of changes that could have an impact on ITAAC. The staff confirmed that Section 14.2.3.2 of the BLN COL FSAR, Revision 1, was amended to include provisions to verify that the results of retesting do not invalidate ITAAC. The staff finds this change acceptable. This resolves RAI 14.2-10.

In RAI 14.2-12, dated December 8, 2008, the staff requested that the applicant supplement Section 14.2.3.2 of the BLN COL FSAR by adding additional administrative controls to be implemented for the review, evaluation, and approval of test results, consistent with the guidance in RG 1.206. In its January 22, 2009, response to the staff's RAI, the applicant proposed controls and assigned responsibilities for the review of each major phase of the initial test program. Specifically, the applicant proposed to develop controls to assure that results of the preoperational and startup test phases will be reviewed and evaluated by qualified personnel from the PT&O and the JTWG organizations and approved by the plant manager. Also, the review of test results will include participation from design and construction organizations. Following each major phase of the initial test program, and before proceeding to the next stage of testing, the applicant will review test results to ensure that all required tests have been completed and that testing for the next major phase will be conducted in a safe manner. Additionally, the applicant proposed to develop controls to prepare startup test results in accordance with RG 1.16, "Reporting of Operating Information – Appendix A Technical Specifications."

The staff reviewed the applicant's response to RAI 14.2-12 and determined that the proposed changes provide administrative provisions to control the review, evaluation, and approval of test results, consistent with the guidance in RG 1.68, RG 1.206, and Section 14.2 of NUREG-0800. Therefore, the staff finds this change acceptable. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. This is identified as **Confirmatory Item 14.2-5**, pending NRC review and approval of the revised BLN COL FSAR.

In addition to the administrative controls for the review, evaluation, and approval of test results, the applicant identified COL Information Item 14.4-4 as an activity that cannot be fully resolved prior to issuance of the COL. In BLN COL FSAR, Part 10, "License Conditions and ITAAC," proposed License Condition 2, "COL Holder Items," the applicant proposed Item 14.4-4 to address the review and evaluation of test results. The applicant stated that the COL holder will be responsible for the review and evaluation of test results, as well as the final review of overall test results and for the review of selected milestones or hold points within the test phases. In addition, the applicant stated that test exceptions or results which do not meet acceptance criteria will be identified to the affected and responsible design organizations, and corrective actions and retests, as required, will be performed.

Since test results will not be available until a facility is built, the staff determined that it is appropriate and acceptable for the COL holder to review and evaluate individual test results during the post-COL phase (see Section 14.2.3.5). The staff reviewed the proposed license condition and determined that the applicant provided sufficient administrative controls for the review and evaluation of test results, consistent with the guidance contained in RG 1.68, RG 1.206, and Section 14.2 of NUREG-0800.

Test Records

In its response to RAI 14.2-12, the applicant proposed to supplement the information incorporated by reference from Section 14.2.3.3 of the AP1000 DCD, Revision 17. The applicant stated that startup test reports will be generated and will describe and summarize the completion of tests during the initial test program. These proposed reports will address each test described in the BLN COL FSAR, describe measured values of operating conditions or characteristics from the initial test program as compared to design or specification values, and describe corrective actions and information required by license conditions. The applicant also described the frequency of such reports. Specifically, these proposed reports will be submitted 9 months following initial criticality, 90 days after completion of the test program, or 90 days after the start of commercial operations. The applicant also stated that in the event that one report does not cover these three events (i.e., initial criticality, completion of the test program, and start of commercial operations), supplemental reports will be submitted every three months until all three events are completed.

The staff reviewed the applicant's response to RAI 14.2-12 and determined that the proposed changes provide a set of administrative provisions to generate test reports, consistent with the guidance in RG 1.68, RG 1.206, and Section 14.2 of NUREG-0800. Therefore, the staff finds this change acceptable. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. This is identified as **Confirmatory Item 14.2-6**, pending NRC review and approval of the revised BLN COL FSAR.

The staff determined that the supplemental information provided by the applicant described an acceptable method for activities related to test specifications and test procedures, conduct of the initial test program, and review, evaluation, and approval of test results, consistent with the guidance in RG 1.68 and RG 1.206. Therefore, the staff finds this change to be acceptable.

14.2.3.5 Post Combined License Activities

The following items were identified as the responsibility of the COL holder:

- License Condition 2 , Item 14.4-2, related to the COL holder responsibility for the development of test specifications and test procedures

- License Condition 2 ,Item 14.4-3, related to the COL holder responsibility for the development of a site-specific startup administrative manual (procedure) that will contain the administrative procedures and requirements that will govern the activities associated with the plant initial test program.

- License Condition 2, Item 14.4-4 related to the COL holder responsibility for the review and evaluation of test results

- License Condition 6, related to the implementation schedule for operational programs, as described in Table 13.4-201 of the BLN COL FSAR.

- License Condition 8, related to the process for making changes to the initial startup test program described in Chapter 14 of the BLN COL FSAR.

14.2.3.6 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 relating to the test specifications and procedures, 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 Section 14.2.3 of the AP1000 DCD, 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 will be documented in a supplement to NUREG-1793. The supplement to NUREG-1793 is not yet complete, and this is being tracked as part of Open Item 1-1. The staff will update Section 14.2.3 of this SER to reflect the final disposition of the DC application.

However, as a result of Open Items 14.2-1 and 14.2-2, and Confirmatory Items 14.2-3, 14.2-4, 14.2-5, and 14.2-6, the staff is unable to finalize its conclusions related to an acceptable method for activities related to test specifications and test procedures, conduct of the initial test program, and review, evaluation, and approval of test results, in accordance with the requirements of 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50.

14.2.4 Compliance of Test Program with Regulatory Guides

Section 14.2 of the BLN COL FSAR incorporates by reference, with no departures or supplements, Section 14.2.4, "Compliance of Test Program with Regulatory Guides," of Revision 17 of the AP1000 DCD. The NRC staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remained for review.[1] The NRC staff's review confirmed there is no outstanding issue related to this section.

Section 14.2.4 of Revision 17 of the AP1000 DCD is identical to Section 14.2.4 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 10 CFR Part 52, Appendix D, Section VI.B.1, all nuclear safety issues relating to compliance of the test program with regulatory guides have been resolved.

14.2.5 Utilization of Operating Experience (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.2.8, "Utilization of Reactor Operating and Testing Experiences in Development of Test Program")

14.2.5.1 Introduction

The design, testing, startup, and OE from previous pressurized water reactor plants is utilized in the development of the initial preoperational and startup test program for the AP1000 plant. It is

also the responsibility of the COL applicant to utilize the reactor operating and testing experience in different aspects of the testing program.

14.2.5.2 Summary of Application

Section 14.2 of the BLN COL FSAR incorporates by reference Section 14.2 of the AP1000 DCD, Revision 17. Section 14.2 of the DCD includes Section 14.2.5.

In addition, the applicant provided information to supplement the information incorporated by reference from the AP1000 DCD. In Part 10 of the BLN COL FSAR, the applicant provided the following information:

License Condition

- Part 10, License Condition 2, Item 14.4-6, addressing first-plant-only and three-plant-only tests

14.2.5.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the utilization of operating and testing experience, and the associated acceptance criteria, are given in Section 14.2 of NUREG-0800.

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50. RG 1.68 provides guidance on how to comply with Criterion XI of Appendix B to 10 CFR Part 50.

14.2.5.4 Technical Evaluation

The NRC staff reviewed Section 14.2.5 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 the utilization of operating and testing experience.
Section 14.2.5 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 utilization of operating and testing experience will be documented in the staff SER on the DC application for the AP1000 design.

Section 14.2.5 of the AP1000 DCD provided a summary overview of the administrative controls to be utilized for the development of preoperational and startup test programs for the AP1000 plant. As part of RAI 14.2-12, dated December 8, 2008, the NRC staff requested that the applicant supplement the BLN COL FSAR to describe how OE information will be used in developing and executing test procedures. In its January 22, 2009, response to the staff's RAI, the applicant proposed to revise the information in Section 14.2.5 of the BLN COL FSAR. The response stated that administrative procedures will be used for the control and evaluation of OE information. Specifically, the response proposed the use of OE during test procedure preparation, including the sources and types of information reviewed. Sources of OE reported

and described include NRC reports, Institute of Nuclear Power Operations reports, and Significant Operating Event Reports. The response stated that Section 14.2.5 of the BLN COL FSAR would include a summary of the principal conclusions from a review of operating and testing experiences at other reactor facilities and their effect on the applicant's test program.

The staff determined that the information proposed by the applicant describes an acceptable method for the consideration of reactor operating and testing experience, and discussed the principal conclusions from a review of operating and testing experience and its inclusion into the initial test program description, consistent with the guidance in RG 1.68 and RG 1.206. Therefore, the staff finds this change acceptable. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. This is identified as **Confirmatory Item 14.2-7**, pending NRC review and approval of the revised BLN COL FSAR.

In BLN COL FSAR, Part 10, "License Conditions and ITAAC," proposed License Condition 2, "COL Holder Items," the applicant proposed Item 14.4-6 to address first-plant-only and three-plant-only tests. The applicant stated that the COL holder for the first plant and the first three plants will perform the tests listed in Section 14.2.5 of the BLN COL FSAR. For subsequent plants, the COL applicant shall provide a justification that the results of the first-plant only tests or first-three-plant tests are applicable to the subsequent plant. In addition, COL holders referencing the results of the tests will provide the report prior to preoperational testing.

The staff reviewed the proposed license condition and determined that the applicant provided sufficient administrative controls for the performance of first-plant-only and three-plant-only tests, consistent with the guidance contained in RG 1.68, RG 1.206, and Section 14.2 of NUREG-0800. In addition, since test activities will not start until a facility is built, the staff determined that it is appropriate and acceptable for the COL holder to conduct these first-plant-only and three-plant-only tests during the post-COL phase (see Section 14.2.5.5).

14.2.5.5 Post Combined License Activities

The following items were identified as the responsibility of the COL holder:

- License Condition 2, Item 14.4-6 related to first-plant-only and three-plant-only tests

14.2.5.6 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 utilization of operating and testing experience, 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 Section 14.2.5 of the AP1000 DCD, 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 will be documented in a supplement to NUREG-1793. The supplement to NUREG-1793 is not yet complete, and this is being tracked as part of Open Item 1-1. The staff will update Section 14.2.5 of this SER to reflect the final disposition of the DC application.

However, as a result of **Confirmatory Item 14.2-7**, the staff is unable to finalize its conclusions related to an acceptable method for the consideration of reactor operating and testing experience, in accordance with the requirements of 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50.

14.2.6 Use of Plant Operating and Emergency Procedures (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.2.9, "Trial Use of Plant Operating and Emergency Procedures")

14.2.6.1 Introduction

To the extent practicable throughout the preoperational and initial startup test program, test procedures utilize operating, emergency, and abnormal procedures where applicable in the performance of tests. The use of these procedures is intended to do the following:

(1) Prove the specific procedure or illustrate changes, which may be required.
(2) Provide training of plant personnel in the use of these procedures.
(3) Increase the level of knowledge of plant personnel on the systems being tested.

A testing procedure utilizing an operating, emergency, or abnormal procedure references the procedure directly, or extracts a series of steps from the procedure in a way that is optimum to accomplishing the above goals while efficiently performing the specified testing.

14.2.6.2 Summary of Application

Section 14.2 of the BLN COL FSAR incorporates by reference Section 14.2 of the AP1000 DCD, Revision 17. Section 14.2 of the DCD includes Section 14.2.6.

14.2.6.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the use of plant operating and emergency procedures, and the associated acceptance criteria, are given in Section 14.2 of NUREG-0800.

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50. RG 1.68 provides guidance on how to comply with Criterion XI of Appendix B to 10 CFR Part 50.

14.2.6.4 Technical Evaluation

The NRC staff reviewed Section 14.2.6 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 technical evaluation of the information incorporated by reference related to the use of plant operating and emergency procedures is documented in the staff SER on the DC application for the AP1000 design (NUREG-1793).

Section 14.2.6 of the AP1000 DCD stated that plant normal, abnormal, and emergency operating procedures will be used when performing preoperational and startup tests. As part of RAI 14.2-12, dated December 8, 2008, the staff requested that the applicant supplement the information incorporated by reference and describe how, and to what extent, the plant operating, emergency, and surveillance procedures will be trial-tested during the initial test program. In its January 22, 2009, response to the staff's RAI, the applicant proposed a method to develop, trial-test, and correct plant operating and emergency procedures during the initial test program. The response stated that preoperational and start up test procedures, normal, abnormal, and emergency procedures, and alarm response procedures, will be verified, validated, and implemented. The response proposed to describe administrative measures for the trial use of procedures in human machine interface testing as part of the control room design finalization. The response also proposed that controls would include the development of operating and emergency procedures to support human factors engineering, operational task analysis, training simulator development, and verification and validation of procedures and training material.

The response also proposed to include Section 14.2.6.1, "Operator Training and Participation during Certain Initial Tests," in the BLN COL FSAR. The response proposed administrative controls that will provide for the participation of plant operators and shift crews in plant changes, off-normal events, test program schedule, and selected startup tests. The response also proposed measures to ensure that unexpected plant or system responses will be reviewed, evaluated, and their results factored into the operator training program. The response stated that the operator training program will satisfy the criteria described in TMI Action Plan Item I.G.1 of NUREG-0737.

The staff determined that the information proposed by the applicant describe an acceptable method for the trial use of plant operating, emergency, and surveillance procedures, consistent with the guidance in RG 1.68 and RG 1.206. Therefore, the staff finds this change acceptable. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. This is identified as **Confirmatory Item 14.2-8**, pending NRC review and approval of the revised BLN COL FSAR.

14.2.6.5 Post Combined License Activities

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

14.2.6.6 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 use of plant operating and emergency procedures, and there is no outstanding information expected to be addressed in the BLN COL FSAR related to this section.

Section 14.2.6 of Revision 17 of the AP1000 DCD is identical to Section 14.2.6 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 10 CFR Part 52, Appendix D, Section VI.B.1, all nuclear safety issues relating to specific information to be included in the FSARs have been resolved.

However, as a result of **Confirmatory Item 14.2-8**, the staff is unable to finalize its conclusions related to an acceptable method for the trial use of plant operating, emergency, and surveillance procedures, in accordance with the requirements of 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50.

14.2.7 Initial Fuel Loading and Initial Criticality

Section 14.2 of the BLN) COL FSAR incorporates by reference, with no departures or supplements, Section 14.2.7, "Initial Fuel Loading and Initial Criticality," of Revision 17 of the AP1000 DCD. The NRC staff reviewed the application and checked the referenced DCD to ensure that no issue relating to this section remained for review.[1] The NRC staff's review confirmed there is no outstanding issue related to this subsection.

The Westinghouse application to amend Appendix D to 10 CFR Part 52 includes changes to Section 14.2.7 of the AP1000 DCD, 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 related to initial fuel loading and initial criticality incorporated by reference in the BLN COL FSAR will be documented in a supplement to NUREG-1793. The supplement to NUREG-1793 is not yet complete, and this is being tracked as part of Open Item 1-1. The staff will update Section 14.2.7 of this SER to reflect the final disposition of the DC application.

14.2.8 Test Program Schedule (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.2.11, "Test Program Schedule")

14.2.8.1 Introduction

This section describes administrative controls for the development of a schedule, relative to the fuel loading date, for conducting each major phase of the test program. Each test required to be completed before initial fuel loading is identified.

14.2.8.2 Summary of Application

Section 14.2 of the BLN COL FSAR incorporates by reference Section 14.2 of the AP1000 DCD. Section 14.2 of the DCD includes Section 14.2.8.

Supplemental Information

- STD SUP14.2-1, addressing the site-specific initial test program schedule

In addition, in Part 10 of the BLN COL FSAR, the applicant provided the following:

License Conditions

- License Condition 3, addressing the initial test program implementation milestones
- License Condition 6, addressing the initial test program schedule

14.2.8.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the test program schedule, and the associated acceptance criteria, are given in Section 14.2 of NUREG-0800.

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50. RG 1.68 provides guidance on how to comply with Criterion XI of Appendix B to 10 CFR Part 50.

14.2.8.4 Technical Evaluation

The NRC staff reviewed Section 14.2.8 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 technical evaluation of the information incorporated by reference related to the test program schedule is documented in the staff SER on the DC application for the AP1000 design (NUREG-1793).

Test Program Schedule

As part of RAI 14.2-12, dated December 8, 2008, the staff requested that the applicant supplement the information incorporated by reference and describe the methodology that will be used to develop a schedule for conducting each major phase of the initial test program and for the development of test procedures. In its January 22, 2009, response to the staff's RAI, the applicant proposed to include information that further describes the administrative controls that will be used to develop a test program schedule. The applicant proposed controls for the development of a site-specific schedule that will address each major phase of the test program and will consider the organizational impact on overlapping test program schedules for multi-unit sites. The applicant also discussed the administrative measures in the startup administrative manual related to the test procedure development schedule and the initial test program schedule. The applicant proposed specific controls for the development of detailed plant operating and emergency procedures, the availability of approved test procedures for review by NRC inspectors, and for the notification to the NRC of changes to approved test procedures. The response also stated that schedule milestones for the development of plant operating procedures are presented in Table 13.4-201 of the BLN COL FSAR. Finally, the response stated that operating and emergency procedures will be available for use both prior to the start of licensed operator training as well as during the initial test program implementation.

The staff determined that the information proposed by the applicant described the methodology that will be used to develop a schedule, relative to the fuel loading date, for conducting each major phase of the test program, and for the development of test procedures, consistent with the guidance in RG 1.68 and RG 1.206. Therefore, the staff finds this change acceptable. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. This is identified as **Confirmatory Item 14.2-9**, pending NRC review and approval of the revised BLN COL FSAR.

Operational Programs Required by the Regulations

In Section 13.4, Table 13.4-201, of the BLN COL FSAR, the applicant provided information to address the implementation of operational programs. The applicant identified the initial test program as an operational program and provided implementation milestones for each major phase of the test program. Additionally, the applicant stated that the initial test program will be implemented in three phases, namely the construction test program phase, the preoperational test program phase, and the startup test program phase. The construction test program phase will start prior to the first construction test being conducted. It will be followed by the preoperational test phase, which will start prior to the first preoperational test. Finally, the startup test phase is identified, and the applicant stated that it will start prior to initial fuel load. The staff reviewed the proposed milestones and determined that they adequately describe the implementation of each major phase of the initial test program and are, therefore, acceptable.

In Part 10 of the BLN COL FSAR, License Condition 3, "Operational Program Implementation," the applicant proposed a license condition for the implementation of operational programs as described in Table 13.4-201 of the FSAR. This license condition included implementation milestones for the initial test program, namely E.1, F.1, and H.1. Specifically:

- Milestone E.1 states that for construction testing, the licensee will implement the construction testing phase of the initial test program prior to the first construction test being conducted.

- Milestone F.1 states that for preoperational testing, the licensee will implement the preoperational testing phase of the initial test program prior to the first preoperational test being conducted.

- Milestone H.1 states that for startup testing, the licensee will implement the startup testing phase prior to initial fuel load.

In Part 10 of the BLN COL FSAR, proposed License Condition 6, "Operational Program Readiness," the applicant states:

> The licensee shall submit to the appropriate Director of the NRC, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of the NRC inspection of the operational programs listed in the operation program FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operation programs in the FSAR table have been fully implemented or the plant has been placed in commercial service.

The staff reviewed the BLN COL FSAR Table 13.4-201, and notes that the initial test program is listed as an operational program.

The staff determined that the proposed license conditions adequately describe the implementation of each major phase of the initial test program, consistent with the guidance contained in RG 1.68, RG 1.206, and Section 14.2 of NUREG-0800. In addition, since test activities will not start until a facility is built; the staff determined that it is appropriate and acceptable for the COL holder to submit a schedule, which will contain implementation details of operational programs, during the post-COL phase (see Section 14.2.8.5).

14.2.8.5 Post Combined License Activities

The following items were identified as the responsibility of the COL holder:

- License Condition 3, related to implementation milestones for operational programs
- License Condition 6, related to the submittal of a schedule that supports planning for and conducts of NRC inspections of operational programs

14.2.8.6 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 test program schedule, and there is no outstanding information expected to be addressed in the BLN COL FSAR related to this section.

Section 14.2.8 of Revision 17 of the AP1000 DCD is identical to Section 14.2.8 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 10 CFR Part 52, Appendix D, Section VI.B.1, all nuclear safety issues relating to specific information to be included in the FSARs have been resolved.

However, as a result of Confirmatory Item 14.2-9, the staff is unable to finalize its conclusions related to an acceptable method for the development of the initial test program schedule, in accordance with the requirements of 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50.

14.2.9 Preoperational Test Descriptions (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.2.12, "Individual Test Descriptions")

14.2.9.1 Introduction

This section includes test abstracts for each individual test conducted during the initial test program. The abstracts: (1) identify each test by title; (2) specify the prerequisites and major plant operating conditions necessary for each test (such as power level and mode of operation of major control systems); (3) provide a summary description of the test objectives and method, significant parameters, and plant performance characteristics to be monitored; and (4) provide a summary of the acceptance criteria established for each test to ensure that the test verifies the functional adequacy of the SSCs involved in the test. The abstracts also contain sufficient information to justify the specified test method if such method does not subject the SSC under test to representative design operating conditions. In addition, the abstracts identify pertinent precautions for individual tests, as necessary (e.g., minimum flow requirements or reactor power level that must be maintained).

14.2.9.2 Summary of Application

Section 14.2 of the BLN COL FSAR incorporates by reference Section 14.2 of the AP1000 DCD. Section 14.2 of the DCD includes Section 14.2.9.

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

AP1000 COL Information Item

- STD COL 14.4-5

The applicant provided additional information in STD COL 14.4-5 to address interface requirements.

14.2.9.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the preoperational test descriptions, and the associated acceptance criteria, are given in Section 14.2 of NUREG-0800.

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50. RG 1.68 provides guidance on how to comply with Criterion XI of Appendix B to 10 CFR Part 50.

14.2.9.4 Technical Evaluation

The NRC staff reviewed Section 14.2.9 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 the preoperational test descriptions. Section 14.2.9 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 preoperational test descriptions 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 14.4-5

The NRC staff reviewed STD COL 14.4-5 related to COL Information Item 14.4-5, which addresses interface requirements. The applicant provided additional information in Section 14.2.9 of the BLN COL FSAR to address COL Information Item 14.4-5.
COL Information Item 14.4-5 states:

> The Combined License applicant is responsible for testing that may be required of structures and systems which are outside the scope of this design certification. Test specifications and acceptance criteria are provided by the responsible design organizations as identified in Subsection 14.2.3 (of the AP1000 DCD Revision 17). The interfacing systems to be considered for testing are taken from Table 1.8-1 (of the AP1000 DCD Revision 17) and include as a minimum, the following:
>
> - Storm drains
> - Site specific seismic sensors
> - Offsite [alternating current] ac power systems
> - Circulating water heat sink
> - Raw and sanitary water systems
> - Individual equipment associated with the fire brigade
> - Portable personnel monitors and radiation survey instruments
> - Equipment associated with the physical security plan

The commitment was also captured as COL Action Item 14.4-5 in Appendix F of the NRC staff's FSER for the AP1000 DCD (NUREG-1793), which states:

> The COL applicant is responsible for testing that may be required of structures and systems that are outside the scope of the design certification.

In its review of the information provided by the applicant to address COL Information Item 14.4-5, the staff noted that the seismic monitoring system testing described in Section 14.2.9.4.15 of the AP1000 DCD also applies to the site-specific seismic sensors.

The applicant also provided information regarding the following systems:

- storm drains (Section 14.2.9.4.22)
- offsite ac power systems (Section 14.2.9.4.23)
- raw water systems (Section 14.2.9.4.24)
- sanitary drainage system (Section 14.2.9.4.25)
- fire brigade support equipment (Section 14.2.9.4.26)
- portable personnel monitors and radiation survey instruments (Section 14.2.9.4.27)
- cooling tower(s) (Section 14.2.10.4.29)

The staff notes that information provided relative to equipment associated with the Physical Security Plan will be reviewed in Chapter 13 of this SER.

As part of the response to RAI 14.2-12, the applicant proposed to supplement Section 14.2.9 of the AP1000 DCD, Revision 17, with additional administrative controls that will be implemented during preoperational testing activities. The response stated that the control of systems that need to be returned to the construction organization for modifications, repairs, or to correct a new problem will be through administrative procedures. These procedures will also provide directions for the following activities:

- Release control of systems and/or components to construction

- Documentation of the actual work performed and the impact on testing
- Identification of required testing to restore the system to an identified status (operability, functionality, availability), as well as the identification of re-performance tests based on the impact of the work performed
- Authorizations and tracking of operability and unavailability determinations
- Verification activities to ensure that retests stay in compliance with ITAAC commitments

The staff reviewed this supplemental information related to preoperational test descriptions and determined that it provided adequate administrative controls for an orderly turnover of plant systems when these have to be returned to the construction organization. Therefore, the staff finds this information acceptable. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. This is identified as **Confirmatory Item 14.2-10**, pending NRC review and approval of the revised BLN COL FSAR.

As part of RAI 14.2-1, the staff requested that the applicant provide additional information in the test abstract related to the offsite ac power systems. Specifically, Section 14.2.9.4.23 of the BLN COL FSAR states that the offsite ac power system components undergo a series of individual component and integrated system preoperational tests to verify that the offsite ac power system performs in accordance with the associated component design specifications. The individual component and integrated tests include:

a. Availability of ac and direct current (dc) power to the switchyard equipment is verified.

b. Operation of high voltage (HV) circuit breakers is verified.

c. Operation of HV disconnect switches and ground switches is verified.

d. Operation of substation transformers is verified.

e. Operation of current transformers, voltage transformers, and protective relays is verified.

f. Operation of switchyard equipment controls, metering, interlocks, and alarms that affect plant offsite ac power system performance is verified.

g. Design limits of switchyard voltages and stability are verified.

h. Under simulated fault conditions, proper function of alarms and protective relaying circuits is verified.

The staff asked in its RAI that the above list should include the following items:

- Operation of instrumentation and control alarms used to monitor switchyard equipment status
- Proper operation and load carrying capability of breakers, switchgear, transformers, and cables

- Proper operation of the automatic transfer capability of the preferred power supply to the maintenance power supply through the reserve auxiliary transformer

- Operation of main generator in islanding mode is verified to ensure that the onsite power system equipment including the Class 1E battery chargers and uninterruptible power supplies can withstand the voltage spike from the generator following isolation from the grid.

- Switchyard interface agreement and protocols are verified.

The staff requested that the applicant revise Section 14.2.9.4.23 to include the above items, or justify their exclusion.

In its June 26, 2008, response to RAI 14.2-1, the applicant agreed to add the above tests to BLN COL FSAR Section 14.2.9.4.23, except for verifying the proper operation of the generator in islanding mode. The applicant stated that this islanding mode test does not belong to this BLN COL FSAR section. This test is specified by Westinghouse as a load rejection test from 100 percent power in AP1000 DCD Section 14.2.10.4.21. That section will verify proper operation of equipment utilized in the generator islanding mode by a combination of the purchase specifications for the equipment and verification of satisfactory performance after the load reject test from 100 percent power. The applicant proposed to revise BLN COL FSAR Chapter 14, Section 14.2.9.4.23 by adding the following to the end of the existing Section 14.2.9.4.23 in the sequence indicated:

i. Operation of instrumentation and control alarms used to monitor switchyard equipment status.

j. Proper operation and load carrying capability of breakers, switchgear, transformers, and cables, and verification of these items by a non-testing means such as a [quality control] QC nameplate check of as-built equipment where testing would not be practical or feasible.

k. Verification of proper operation of the automatic transfer capability of the preferred power supply to the maintenance power supply through the reserve auxiliary transformer.

l. Switchyard interface agreement and protocols are verified.

With the addition of above offsite ac power system tests to the existing Section 14.2.9.4.23, the staff finds that the offsite ac power system testing performed under BLN COL FSAR Chapter 14, Section 14.2.9.4.23 will demonstrate the energization and proper operation of the as-installed switchyard components. In addition, the staff concurs with the applicant that verification of proper operation of the generator in islanding mode is part of AP1000 DCD Section 14.2.10.4.21, “100 Percent Load Rejection.” Therefore, the staff finds the applicant’s response acceptable. This is **Confirmatory Item 14.2-11**, pending NRC review and approval of the revised BLN COL FSAR.

As part of RAI 14.2-2, the staff also requested that the applicant provide additional information to the test abstract related to the offsite ac power systems. The staff stated that the AP1000 DCD provides interface requirements for the transmission switchyard and onsite power

system in accordance with 10 CFR 52.79(b). Specifically, Summary Table 1.8-1, "Plant Interfaces with the Remainder of Plant," requires the COL applicant to address offsite ac requirements (Item 8.2) for steady-state load, inrush kVA for motors, nominal voltage, allowable voltage regulation, nominal allowable frequency fluctuation, maximum frequency decay rate, and limiting under-frequency value for the reactor coolant pump (RCP). It further requires the offsite transmission system analysis (Item 8.3) for loss of the AP1000 unit or the largest unit, for voltage operating range, for maintaining transient stability, and for the RCP bus voltage to remain above the voltage required to maintain the flow assumed in Chapter 15 analyses for a minimum of three seconds following a turbine trip. The staff requested that the applicant discuss how the preoperational test performed under Section 14.2.9.4.23 (General Test Methods and Acceptance Criteria) for BLN verifies all requirements cited in Sections 8.2 and 8.3 of the AP1000 DCD.

In its June 26, 2008, response to RAI 14.2-2, the applicant stated that site interface requirements in AP1000 DCD Table 1.8-1, Items 8.2 (offsite ac requirements) and 8.3 (offsite transmission system and stability analyses) are verified not just by BLN COL FSAR Section 14.2.9.4.23 (preoperational test for offsite ac power systems) alone, but a combination of analyses and testing as described below:

- The site interface parameters identified in AP1000 DCD Table 1.8-1, Items 8.2 and 8.3, as provided by Westinghouse, are used as input parameters or acceptance criteria in the Grid Stability Analysis performed.

- The Offsite AC Power Systems tests detailed in BLN COL FSAR Section 14.2.9.4.23, as modified by the applicant's response to RAI 14.2-1, require specific preoperational testing of as-installed switchyard components as described in BLN COL FSAR Section 8.2 to demonstrate proper operation of the design capabilities and protective features of those components.

- The tests detailed in AP1000 DCD Section 14.2.9.4.21, Main, Unit Auxiliary and Reserve Auxiliary Transformer Test, demonstrate the energization of the transformers and the proper operation of associated protective relaying, alarms, and control devices.

- The tests detailed in AP1000 DCD Section 14.2.9.2.15, Main AC Power System Testing, verify power availability to support proper operation of required electrical loads.

- The 100 percent load reject test described in AP1000 DCD Section 14.2.10.4.21 provides for an integrated plant response and verification of the demands placed on the electrical distribution system when the plant is separated from the grid.

The staff has reviewed BLN COL FSAR Section 14.2.9.4.23 and AP1000 DCD Sections 14.2.9.4.21, 14.2.9.2.15, and 14.2.10.4.21 cited by the applicant for proper operation of components and the interface parameters required for the grid stability and offsite transmission system analyses. The staff concurs with the applicant that the site interface requirements in AP1000 DCD Table 1.8-1, Items 8.2 and 8.3 can be verified by the combination of analyses and testing described above. Therefore, the NRC staff finds the applicant's response to be acceptable. This resolves RAI 14.2-2.

In RAI 14.2-9, the staff requested that the applicant provide additional information in the test abstract related to the fire brigade support equipment test abstract in Section 14.2.9.4.26 of the

BLN COL FSAR. Specifically, RG 1.189, Regulatory Position 3.4.2, Hydrants and Hose Houses, states that "threads compatible with those used by local fire departments should be provided on all hydrants, hose couplings, and standpipe risers. Alternatively, a sufficient number of hose thread adapters may be provided." The importance of ensuring that installed plant fire equipment be compatible with the equipment used by local fire departments warrants the inclusion of installed plant fire equipment (hydrants, hoses, couplings, and standpipe risers) in the initial test program to verify either the compatibility of threads or the provision of an adequate supply of hose thread adaptors that will be readily available in the event of a fire. The staff requested that the applicant revise Section 14.2.9.4.26 to address this issue. In addition, with respect to BLN COL FSAR Section 14.2.9.4.26(c), the staff requested that the applicant specifically identify any portable "communication equipment" that is credited for fire brigade use. In a letter dated June 30, 2008, the applicant proposed to add the requirement to verify fire equipment hose thread compatibility in Section 14.2 in a future revision of the BLN COL FSAR. The staff confirmed that the applicant addressed the relevant information in Revision 1 of the BLN COL FSAR, and there is no outstanding information expected to be addressed related to this section. This resolves RAI 14.2-9.

14.2.9.5 Post Combined License Activities

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

14.2.9.6 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 preoperational test descriptions, 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 Section 14.2.9 of the AP1000 DCD, 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 will be documented in a supplement to NUREG-1793. The supplement to NUREG-1793 is not yet complete, and this is being tracked as part of Open Item 1-1. The staff will update Section 14.2.9 of this SER to reflect the final disposition of the DC application.

However, as a result of Confirmatory Items, 14.2-10 and 14.2-11, the staff is unable to finalize its conclusions related to preoperational test descriptions and test abstracts, in accordance with the requirements of 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50.

14.2.10 Startup Test Procedures (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.2.12, "Individual Test Descriptions")

14.2.10.1 Introduction

Startup test procedures address the tests that comprise the startup phase of the test program. For each test a general description is provided for test objective, test prerequisites, test description, and test performance criteria, where applicable. In describing a test, the operating and safety-related characteristics of the plant to be tested and evaluated are identified. Where applicable, the relevant performance criteria for the test are discussed. Some of the criteria relate to the value of process variables assigned in the design or analysis of the plant,

component systems, and associated equipment. Other criteria may be associated with expectations relating to the performance of systems.

14.2.10.2 Summary of Application

Section 14.2 of the BLN COL FSAR incorporates by reference Section 14.2 of the AP1000 DCD, Revision 17. Section 14.2 of the DCD includes Section 14.2.10.

14.2.10.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the startup test procedures, and the associated acceptance criteria, are given in Section 14.2 of NUREG-0800.

The applicable regulatory requirements for the information being reviewed in this section are 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50. RG 1.68 provides guidance on how to comply with Criterion XI of Appendix B to 10 CFR Part 50.

14.2.10.4 Technical Evaluation

The NRC staff reviewed Section 14.2.10 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 technical evaluation of the information incorporated by reference related to the startup test procedures is documented in the staff SER on the DC application for the AP1000 design (NUREG-1793).

As part of the response to RAI 14.2-12, the applicant proposed supplemental information in Section 14.2.10 of the BLN COL FSAR, with additional administrative controls that will be implemented during power ascension testing activities consistent with the guidance in RG 1.68 and NUREG-0800. The applicant proposed to discuss a power ascension test plan that will provide controls for operations during the power ascension test phase, including the following:

- Verification of core performance parameters
- Verification of adequate calibration of nuclear instrumentation
- Controls for high flux trips consistent with TS requirements
- Conduct of surveys of plant systems and equipment
- Checks for unexpected radioactivity in process systems and effluents
- Perform reactor coolant leak checks
- Controls for reviews of testing at each power plateau

Additionally, the applicant proposed to provide controls for the extrapolation of tests at lower power levels in order to determine the acceptability of performing the test at higher power levels. The applicant proposed to describe measures for the use of surveillance test procedures to document portions of tests, and the use of initial test program tests to satisfy TS surveillance requirements.

The staff reviewed this proposed supplemental information related to the power ascension test phase and determined that it provided adequate administrative controls for activities during

power ascension testing. Therefore, the staff finds this information acceptable. The applicant will revise the BLN COL FSAR to include the proposed administrative controls. This is identified as **Confirmatory Item 14.2-12**, pending NRC review and approval of the revised BLN COL FSAR.

14.2.10.5 Post Combined License Activities

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

14.2.10.6 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 startup test procedures, and there is no outstanding information expected to be addressed in the BLN COL FSAR related to this section.

Section 14.1 of Revision 17 of the AP1000 DCD is identical to Section 14.1 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 10 CFR Part 52, Appendix D, Section VI.B.1, all nuclear safety issues relating to specific information to be included in the FSARs have been resolved.

However, as a result of Confirmatory Item 14.2-12, the staff is unable to finalize its conclusions related to power ascension activities in accordance with the requirements of 10 CFR 52.79(a)(28) and Criterion XI of Appendix B to 10 CFR Part 50.

14.3 Certified Design Material (Related to RG 1.206, Section C.III.1, Chapter 14, C.I.14.3, "Inspections, Tests, Analyses, and Acceptance Criteria")

14.3.1 Introduction

This section addresses the selection criteria and processes used to develop the BLN Certified Design Materials (CDMs). It specifically addresses the site-specific inspections, tests, analyses, and acceptance criteria (SS-ITAAC). The COL applicant provides its proposed selection methodology and criteria for establishing the ITAAC that are necessary and sufficient to provide that reasonable assurance.

The applicant proposes, in addition to the ITAAC incorporated by reference from the AP1000 DCD, SS-ITAAC to provide reasonable assurance that the facility has been constructed and will operate in conformance with the applicable regulations.

14.3.2 Summary of Application

Section 14.3 of the BLN COL FSAR, Revision 1 incorporates by reference Section 14.3 of the AP1000 DCD, Revision 17.

In addition, in BLN COL FSAR Section 14.3, the applicant provided the following:

Supplemental information

- STD SUP 14.3-1

The applicant provided supplemental information in STD Supplement (SUP) 14.3-1 in BLN COL FSAR Section 14.3.2.3, "SS-ITAAC." This section describes the SS-ITAACs.

- BLN SUP 14.3-2

The applicant provided supplemental information in BLN SUP 14.3-2 in BLN COL FSAR Section 14.3.2.3.3, "Other Site–Specific Systems," discussing the ITAAC screening summary for site-specific systems.

14.3.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed within the FSER related to the DCD.

In addition, the relevant requirements of the Commission regulations for the CDM and the associated acceptance criteria are given in Section 14.3 of NUREG-0800.

The applicable regulatory requirement for SS-ITAAC is 10 CFR 52.80(a).

14.3.4 Technical Evaluation

The NRC staff reviewed Section 14.3 of the BLN COL FSAR, Revision 1, 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 CDMs. Section 14.3 of 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 CDM 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:

Supplemental information

- STD SUP 14.3-1, addressing SS-ITAACs

- BLN SUP 14.3-2, addressing ITAAC screening summary for additional site-specific systems

As part of STD SUP 14.3-1 and BLN SUP 14.3-2, the applicant provided:

- Site-specific ITAAC selection criteria
- Site-specific ITAAC selection methodology
- Site-specific ITAAC screening summary

A table of ITAAC entries was provided for each site-specific system described in the BLN COL FSAR that meets the selection criteria, and that is not included in the certified design. The COL applicant adopted the same selection criteria and methodology as the AP1000 DCD

for establishing the SS-ITAAC. The selection criteria and methodology contained in the AP1000 DCD was accepted by the NRC as described in NUREG-1793. Therefore, the staff finds the applicant's use of this criteria and methodology appropriate and acceptable. The ITAAC are provided in tables with information for the following three columns: design commitment; inspection, tests, analyses; and acceptance criteria.

Emergency Planning-ITAAC (EP-ITAAC) are discussed in the application as required for inclusion in accordance with 10 CFR 52.80(a). The site-specific EP-ITAAC are based on the generic ITAAC provided in Appendix C.II.1-B of RG 1.206. The staff's review of the current set of EP-ITAAC and the information related to this ITAAC is contained in Chapter 13.6 of the SER.

Physical Security-ITAAC (PS-ITAAC) are discussed in the application as required for inclusion in accordance with 10 CFR 52.80(a). The site-specific PS-ITAAC are based on the generic ITAAC provided in Appendix C.II.1-C of RG 1.206. The NRC staff's review of the current set of PS-ITAAC and the information related to this ITAAC is contained in Chapter 13.4 of the SER.

The NRC staff reviewed the supplemental information relating to ITAACs included under Section 14.3.2 of the BLN COL. The applicant identified no additional site-specific systems meeting the ITAAC selection criteria. With the exception of the Transmission Switchyard and Offsite Power System, the staff agrees no additional site-specific ITAAC are required in accordance with 10 CFR 52.80(a).

In RAI-14.3-1, the staff asked the applicant to justify the omission of site-specific ITAAC for transmission switchyard and the offsite power system. Subsequently, in a letter dated May 11, 2009, the applicant agreed to include an ITAAC in the BLN COL FSAR for transmission switchyard and the offsite power system. The information related to this ITAAC is evaluated in Chapter 8 of the SER. This is Confirmatory Item 14.3-1, pending NRC review and approval of the revised BLN COL FSAR.

14.3.5 Post Combined License Activities

The SS-ITAAC in the previous section of this SER are considered post-COL activities and discussed in the individual SER sections as stated above.

14.3.6 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 relating to SS-ITAAC, 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 Section 14.3 of the AP1000 DCD, 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 will be documented in a supplement to NUREG-1793. The supplement to NUREG-1793 is not yet complete, and this is being tracked as part of Open Item 1-1. The staff will update Section 14.3 of this SER to reflect the final disposition of the DC application.

However, as a result of Confirmatory Item 14.3-1, the staff is unable to finalize its conclusions related to SS-ITAAC, in accordance with the requirements of 10 CFR 52.80(a).

However, as a result of Confirmatory Item 14.3-1, the staff is unable to finalize its conclusions related to SS-ITAAC, in accordance with the requirements of 10 CFR 52.80(a).

PKG No.: ML091620503
Acession No.: ML0901120120

NAME	**DNRL/NWE1/ LA**	**DNRL/NWE1/ PM**	**DCIP/CQVP /PM**	**DCIP/CQVP/ BC**	**DE:EEB**	**OGC**	**DNRL/NWE1 /BC**
Office	KGoldstein	MComar	MConcepcion	JPeralta	PKang	JMartin	SCoffin
DATE	6/15/09	6/15/09	6/15/09	6/15/09	6/15/09	6/16/09	6/17/09

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