PMBeICOL PEmails

From: Manny Comar
Sent: Friday, January 09, 2009 12:48 PM
To: Joseph Sebrosky
Subject: FW: Initial Test Program - Drafts
Attachments: FSAR_CHAP14-Draft B 01-08-2009.doc; FSAR_CHAP14-Draft B 01-08-2009.pdf; ITP Draft F - 2009-01-08.doc; ITP Draft F - 2009-01-08.pdf

FYI

From: Bob Hirmanpour [mailto:bob.hirmanpour@excelservices.com]
Sent: Friday, January 09, 2009 3:49 AM
To: Manny Comar
Cc: 'Bob Hirman'; Eddie.Grant@EXCELServices.com
Subject: Initial Test Program - Drafts

Manny;

Please forward to Milton. Not that these are only draft documents and rare being provided to facilitate the review. The final approved documents will be transmitted officially via response to letter 139. Please call me if you have any questions or comments.

Milton;

I have provided proposed changes to Ch. 14 and the new Appendix 14AA (Word and Pdf formats). I have included some notes in the draft document, they will be removed prior to approval. You may enter your comments in the Word document if that is convenient for you. Please note that these are first drafts and have not gone through independent review yet. I appreciate taking the time upfront to ensure our response adequately addresses RAI Letter 139.

Sincerely;

Bob Hirmanpour, PMP
NuStart - Licensing Support
Bob.Hirmanpour@excelservices.com
Alt: Bobhirman@live.com
Cell/Office 404-422-6793

Hearing Identifier: Bellefonte_COL_Public_EX
Email Number: 1319

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Subject: FW: Initial Test Program - Drafts
Sent Date: 1/9/2009 12:48:24 PM
Received Date: 1/9/2009 12:48:26 PM
From: Manny Comar

Created By: Manny.Comar@nrc.gov

Recipients:
"Joseph Sebrosky" <Joseph.Sebrosky@nrc.gov>
Tracking Status: None

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MESSAGE	1156	1/9/2009 12:48:26 PM
FSAR_CHAP14-Draft B 01-08-2009.doc	93250	
FSAR_CHAP14-Draft B 01-08-2009.pdf	102502	
ITP Draft F - 2009-01-08.doc	110658	
ITP Draft F - 2009-01-08.pdf	90897	

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[Bob H Note – The is FSAR Ch. 14 Rev. 1 (draft), for clarity the entire chapter is shown with proposed changes for ITP]

CHAPTER 14 INITIAL TEST PROGRAM

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Section Title Page

CHAPTER 14 INITIAL TEST PROGRAM

14.1 SPECIFIC INFORMATION TO BE INCLUDED IN PRELIMINARY/FINAL SAFETY ANALYSIS REPORTS

This section of the referenced DCD is incorporated by reference with no departures or supplements.

[Bob H. Note – May need to revise DCD or take a Departure based on final wording of Appendix 14AA]

STD COL 14.4-1

14.2 SPECIFIC INFORMATION TO BE INCLUDED IN STANDARD SAFETY ANALYSIS REPORTS

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

14.2.2 ORGANIZATION, STAFFING, AND RESPONSIBILITIES

Replace the existing information in DCD Subsection 14.2.2 with the following new paragraph and subsections.

The AP1000 plant test and operations (PT&O) organization is described in Subsection 14.2.2.1. The organization for operating and maintaining the AP1000 plant is described in Section 13.1.

Table 13.4-201 provides milestones for initial test program implementation.

14.2.2.1 PT&O Organization

The Initial Test Program (ITP) is the responsibility of the PT&O Organization. The ITP includes three phases of testing:

- Construction and Installation Testing
- Preoperational Testing
- Startup Testing

14.2.2.1.1 Manager In Charge of PT&O

The manager in charge of PT&O reports directly to the plant manager. The manager in charge of PT&O manages the ITP. The manager in charge of PT&O is responsible for:

- Staffing the PT&O Organization.
- Developing, reviewing, and approving the administrative and technical procedures associated with the preoperational and startup phases.
- Managing the ITP and personnel.
- Implementing the ITP schedule.
- Managing contracts associated with the ITP.

14.2.2.1.2 Functional Manager In Charge of PT&O Support

The functional manager in charge of PT&O support reports directly to the manager in charge of PT&O. The functional manager in charge of PT&O support plans and schedules procedure development to support startup. The functional manager in charge of PT&O support verifies that the test documents conform to the approved project procedures.

The functional manager in charge of PT&O support reviews and approves test procedures. These procedures are used to demonstrate that a system and its components meet the design and performance criteria.

14.2.2.1.3 PT&O Engineers

The PT&O engineers report directly to the functional manager in charge of PT&O support. The PT&O engineers are responsible for developing system test procedures.

14.2.2.1.4 Functional Manager In Charge of Startup

The functional manager in charge of startup reports directly to the manager in charge of PT&O. The functional manager in charge of startup manages the preoperational and startup testing. The functional manager in charge of startup is responsible for:

- Participating in the Joint Test Working Group (JTWG) and ensuring that the JTWG reviews and approves administrative and test procedures. The JTWG structure and responsibilities are defined in the “AP1000 Startup Site Administrative Manual - Program Management Description” (found in Reference 201).
- Preparing a detailed preoperational and startup testing schedule.
- Coordinating construction turnover to the PT&O organization.
- Informing the functional manager in charge of PT&O when vendor support essential to preoperational and startup testing is required, and coordinating vendor participation.
- Supervising and directing the startup engineers.
- Involving operations personnel in testing activities. Utilizing operations personnel, to the extent practical, as test witnesses or test performers to provide the operations personnel with experience and knowledge.
- Developing and implementing administrative controls to address system and equipment configuration control.

STD COL 14.4-4

- Maintaining the startup schedule.
- Maintaining a daily startup log and issuing periodic progress reports that identify overall progress and potential challenges.

14.2.2.1.5 Startup Engineers

The startup engineers report directly to the functional manager in charge of startup. The startup engineers are responsible for:

- Complying with administrative controls.
- Identifying any special or temporary equipment or services needed to support testing.
- Coordinating testing with involved groups.
- Reviewing and evaluating test results.

14.2.2.2 PT&O Organization Personnel Qualifications and Training

Personnel in the PT&O organization are qualified and trained in accordance with the "AP1000 Startup Site Administrative Manual - Program Management Description" (found in Reference 201).

[Bob H Note – Sections 14.2.2.3 through 14.2.2.6 were incorporated from TR-71B.]

14.2.2.3 JOINT TEST WORKING GROUP

The Joint Test Working Group (JTWG) will consist of an organizational group of authorized representative personnel from the Plant's operations and support group functions, Westinghouse Electric Company (WEC), Architect Engineer and other test support groups as identified below.

The Westinghouse Startup Manager will have the overall responsibility and authority for technical direction of the Startup Test Program and will act as the JTWG Chairman.

The JTWG Chairman will report to the Chairman of the Plant Owner's Operations Review Committee (PORC) or qualified designee for matters of Startup test authority and acceptance.

The JTWG will provide the following administrative oversight activities associated with the Startup Test Program:

- Review, evaluate and approve Startup Test Program administrative and test procedures.
- Oversee the implementation of the Preoperational Test Program and the Startup Test Program, including planning, scheduling and performance of all Preoperational and Startup testing.
- Review and evaluate Construction, Preoperational and Startup test results and test

turnover packages.

At a minimum, the JTWG will be composed of qualified representatives provided from the following organizations:

- Licensee's Operations Group
- Licensee's Maintenance Group
- Site Preoperational Test Group
- Site Startup Test Group
- Licensee's Engineering Group
- Licensee's Corrective Action Organization
- Westinghouse Site Engineering Group
- Licensee's Health Physics/Chemistry Group
- Licensee's Quality Assurance Group

The following are additional generic details of the key responsibilities, authorities and interfaces of the Licensee Organizations delineated above:

- Operations Group

The Operations Group has the overall responsibility for Plant Operations, including administrative control and tag-outs subsequent to system turnover. Their primary interfaces are with all Licensee Engineering and Technical Support organizations as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group.

- Maintenance Group

The Maintenance Group has the overall responsibility for the Maintenance of Plant systems and components subsequent to System Turnover. They are key participants and maintainers of system maintenance control and tag-outs. Their primary interfaces are with the Licensee Operations Group and Technical Support organizations as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group.

- Corrective Action Organization

The Corrective Action Organization may be an organization specific to itself, may be a part of the Performance Assessment organization, the Quality Organization or another organization. This organization, together with every other site organization is responsible for the administration and management of the corrective action program as well as the identification of conditions adverse to quality. This organization interfaces with the site

organizations and identifies and documents conditions which need to be documented in the corrective action program.

- Engineering Group

This group has the primary responsibility for the site engineering and interfaces with the vendor engineering organization, as well as the design oversight of the plant components and systems. This organization primarily interfaces with Operations Group as well as the Westinghouse Site Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group. The responsibility for training the testing personnel in accordance with ANSI N45.2.6 will be delegated and implemented as agreed to by Westinghouse.

- Health Physics/Chemistry Group

This Technical Support organization has the responsibility and authority to maintain Health Physics and system chemistry conditions at the plant, particularly after system turnover. This organization primarily interfaces with Licensee Operations Group as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group.

- Quality Assurance Group

This group has the responsibility to verify that the applicable site Quality commitments are being met within the scope of work performed at the site. This includes meeting the Criteria of 10 CFR 50 Appendix B. The primary interfaces for this group are the Licensee Operations Group and Technical Support organizations, including Quality Control and other quality organizations, as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group

- Site Preoperational Test Group

This group has the primary responsibility for the development, maintenance and performance of the site preoperational procedures at the site. The primary interfaces for this group are the Licensee Operations Group and Technical Support organizations as well as the Westinghouse Engineering Organization, Startup Testing Teams and the Construction Services Group. Additional specific description of this organizations responsibilities and interfaces is described in Subsection 14.2.2.5. below. Once preoperational testing is complete, this group turns systems over to the Startup Group.

- Site Startup Test Group

This group has the primary responsibility for the development, maintenance and performance of the site startup procedures at the site. The primary interfaces for this group are the Licensee's Operations Group and Technical Support organizations as well as the Westinghouse Engineering Organization, Preoperational Testing Team and the

Construction Services Group. Additional specific description of this organization's responsibilities and interfaces is described in Subsection 14.2.2.6 below. The Startup Test Group turns over systems to the licensee when testing is complete.

- Westinghouse Site Engineering Group

This group has the primary responsibility for the vendor interface between the site and the vendor home offices, as well as the design authority for the primary vendor's components and systems. The various Westinghouse site leads for specific disciplines are a part of this organization. This organization primarily interfaces with Licensee Operations Group as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group. The responsibility for training the testing personnel in accordance with ANSI N45.2.6 will be delegated and implemented as agreed to by Westinghouse and the Licensee.

14.2.2.4 SITE CONSTRUCTION GROUP (ARCHITECT ENGINEER)

14.2.2.4.1 The Site Construction Group will consist of the following, as necessary to support the Site Startup Test Program:

- Construction Group

The Construction group has the primary responsibility for the construction and construction testing of the Balance-of-Plant engineering systems and components. During Construction and Construction Testing, this group will have authority over administrative control and tagouts of these systems. Their main interface will be with the System Preoperational and Startup Testing Groups as well as the Licensee Operations Group. The Construction Group will be responsible for addressing open items in the system turnover punch lists to address turnover acceptability of the system.

- Construction Services Group

The Construction Services Group primarily supports the Construction Group with activities necessary to support construction of all systems and testing of the BOP systems and components including the construction of scaffolding, installation and removal of insulation and similar activities. With agreement between the necessary parties, this group may also support the Westinghouse Site Engineering Group with similar activities on the primary side. The primary interfaces of this group is the Construction Group and the organizations of the JTWG.

- Construction Services Procurement Group

The Construction Services Procurement Group is responsible for the quality procurement of components and equipment necessary to support plant construction and testing. The primary interfaces of this group include the Construction Services Group and the Construction Services Quality Group.

- Construction Services Quality Group

The Construction Services Quality Group is responsible for the oversight of the Quality Program during Construction Activities including those pertinent to 10 CFR 50 Appendix B and the disposition of Significant Construction Deficiencies, 10 CFR 50.55e reports as necessary. This group primarily interfaces with the Construction and Services groups as well as the Westinghouse Site Engineering group and the JTWG.

- Construction Services Training Group

This group is primarily responsible for the training and qualification of Site Construction Personnel in Accordance with ANSI Standard N45.2.6. Their primary interface is with the qualified Construction personnel.

14.2.2.4.2 The Site Construction Group will perform the following functions and scope of work, as necessary to support the Site Startup Test Program:

- Construction Installation and Testing, including management of construction testing documentation.
- Construction and Installation activities required to support Preoperational and Startup Test Programs.
- Vendor interface and procurement associated with supporting testing activities.
- Provide manpower and labor as needed to support all testing activities.
- Turnover of Construction and Installation tested equipment, systems and testing documentation to the Site Preoperational Test Group.

14.2.2.5 SITE PREOPERATIONAL TEST GROUP

14.2.2.5.1 The Site Preoperational Test Group will consist of the following, as necessary to support the Site Startup Test Program:

- Engineering Leads
- Preoperational Test Teams

14.2.2.5.2 The Site Preoperational Test Group will perform the following functions and scope of

work, as necessary to support the Site Startup Test Program:

- Coordinate Tagging and maintenance prior to turnover to the Licensee to support system acceptance testing.
- Accept systems for turnover from the installation organization.
- Plan, scope and schedule plant systems for test to support the plant Preoperational Test program.
- Manage and oversee the testing of plant systems to support the plant hot-functional test program.
- Resolve open items and exceptions identified during implementation of the Preoperational Test Program.
- Accept and turn over Preoperational Test Packages to the Site Licensee.
- Support completion of hot-functional testing program.
- Coordinate other support tasks required during Startup Testing activities with responsible groups (e.g., Licensee's Organization).

14.2.2.6 SITE STARTUP TEST GROUP

14.2.2.6.1 The Site Startup Test Group will consist of the following, as necessary to support the Site Startup Test Program:

- Engineering Leads
- Startup Test Teams

14.2.2.6.2 The Site Startup Test Group will perform the following functions and scope of work, as necessary to support the Site Startup Test Program:

- Coordinate tagging and maintenance as required to support system and equipment acceptance testing.
- Accept systems, structures and components from the Licensee for integrated testing.

- Plan, scope and schedule plant systems, structures and components for testing, to support Plant Startup.

- Manage and oversee the testing of plant systems, structures and components to support the plant power ascension test program.

- Resolve open items and exceptions identified during implementation of the Startup Test Program.

- Accept and turn over Startup Test Packages to the Site Licensee.

- Coordinate other support tasks required during Startup Testing activities with responsible groups (e.g., Licensee's Organization).

14.2.3.2 Review of Test Results

Add the following text at the end of DCD Subsection 14.2.3.2: Upon completion of a test, the startup engineer is responsible for:

- Reviewing the test data.
- Evaluating the test results.
- Verifying that the acceptance criteria are met.
- Verifying that the test results that do not meet acceptance criteria are entered into the corrective action program.
- Verifying that the results of retesting do not invalidate ITAAC acceptance criteria.

STD SUP 14.2-1

Test results are reviewed and approved by the JTWG. Review and approval of test results are kept current such that succeeding tests are not dependent on systems or components that have not been adequately tested. Test exceptions which do not meet acceptance criteria are identified to the affected and responsible design organizations and entered into the corrective action program. Implementation of corrective actions and retests are performed as required.

Prior to initial fuel load, the results of the preoperational test phase are comprehensively reviewed by the PT&O organization and the JTWG to verify the results indicate that the required plant structures, systems, and components are capable of supporting the initial fuel load and subsequent startup testing. The plant manager approves fuel loading.

Each area of startup testing is reviewed and evaluated by the PT&O organization and the JTWG. The test results at each power ascension testing power plateau are reviewed and evaluated by the PT&O organization and the JTWG and approved by the plant manager before proceeding to the next plateau. Startup test reports are prepared in accordance with Regulatory Guide 1.16, “Reporting of Operating Information -- Appendix A Technical Specifications.”

[Bob H Note: Section 14.2.8 was added in response to an RAI. It has been expanded to include additional scheduling requirements, I am considering moving this section to Appendix 14AA, any thoughts?]

14.2.8 TEST PROGRAM SCHEDULE
Add the following text at the end of DCD Subsection 14.2.8:

STD SUP 14.2-1 A site-specific initial test program schedule will be provided to the NRC after issuance of the COL. This schedule will address each major phase of the test program (including tests that are required to be completed before fuel load), as well as the organizational impact of any overlap of first unit initial testing with initial testing of the second unit.

[Bob H Note – New paragraphs to be added are shown below]

The sequential schedule for individual startup tests should establish that testing will be completed in accordance with plant technical specification requirements for SSC operability before changing plant modes. Additionally, the schedule should establish that the safety of the plant will not depend on the performance of untested SSCs. Guidance provided in regulatory Guide 1.68 should be used for development of the schedule-

The Site Administrative Manual shall include the following controls, guidance and requirements:

- Test Procedure Development Schedule:
  - Controls to ensure the establishment of a schedule for the development of detailed testing, plant operating, and emergency procedures. These procedures should, to the extent practical, be trial-tested and corrected during the initial test program prior to fuel loading in order to establish their adequacy.
  - Controls to ensure that approved test procedures be in a form suitable for review by NRC inspectors at least 60 days prior to their intended use or at least 60 days prior to fuel loading for fuel loading and startup test procedures.
  - Controls to ensure that the plant provides timely notification to the NRC of changes in approved test procedures that have been made available for NRC review.

- Initial Test Program Schedule:
  - Controls to ensure the establishment of a schedule to conduct the major phases of the initial test program, relative to the expected fuel loading date. This is covered in License Conditions in Part 10 of the Bellefonte COL FSAR.
  - Controls to allow at least 9 months for conducting preoperational testing.
  - Controls to allow at least 3 months for conducting startup testing, including fuel loading, low-power tests, and power-ascension tests
  - Controls to ensure that overlapping test program schedules (for multi-unit sites) do not result in significant divisions of responsibilities or dilutions of the staff provided to implement the test program.

- Controls to ensure that the sequential schedule for individual startup tests establish, insofar as is practicable, that testing is completed prior to exceeding 25 percent power for all plant Structure, Systems and Components (SSCs) that are relied upon to prevent, limit, or mitigate the consequences of postulated accidents. The schedule should establish that, insofar as is practicable, testing is accomplished as early in the test program as is feasible and that the safety of the plant will not be dependent on the performance of untested SSCs.

[Bob H Note- Did not add requirements on procedure/ITAAC cross reference since it is already added in section 14.4.2]

14.4 COMBINED LICENSE APPLICANT RESPONSIBILITIES

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

14.4.1 ORGANIZATION AND STAFFING

STD COL 14.4-1 This COL Item is addressed in Section 14.2.

[Bob H Note - Section 14.2 is being expanded to include information from TR-71B]

14.4.2 TEST SPECIFICATIONS AND PROCEDURES

STD COL 14.4-2 Preoperational and startup procedures are provided for the NRC in accordance COM-14.4-003 with the requirements of DCD Subsection 14.2.3.

A cross reference list is provided between ITAACs and test procedures and/or sections of test procedures. Appendix 14AA, Section 14AA.3 describes the controls for development of test specifications and procedures.

[Bob H Note – New subsection, a change to DCD may be needed due to addition of Appendix 14AA]

14.4.3 CONDUCT OF TEST PROGRAM

STD COL 14.4-X This COL Item is addressed in Appendix 14AA, Description of Initial Test Program Administration. Site Administrative Manual is developed based on Appendix 14AA.

14.4.4 REVIEW AND EVALUATION OF TEST RESULTS

STD COL 14.4-4 Review and evaluation of individual test results, as well as final review of overall COM-14.4-004 test results and selected milestones or hold points is addressed in Subsection 14.2.3.2. Test exceptions or results that do not meet acceptance criteria are identified to the affected and responsible design organizations, and corrective actions and retests, as required, are performed.

14.4.5 INTERFACE REQUIREMENTS

STD COL 14.4-5 This COL Item is addressed in Subsections 14.2.9.4.15, 14.2.9.4.22 through 14.2.9.4.27, 14.2.10.4.29, and in the Physical Security Plan.

14.4.6 FIRST-PLANT-ONLY AND THREE-PLANT-ONLY TESTS

STD COL 14.4-6 First-plant-only and first-three-plant-only tests either are performed in accordance COM-14.4-005 with DCD Section 14.2.5 or a justification is provided that the results of the first-plant-only and first-three-plant-only tests are applicable to a subsequent plant. If the tests are not performed, the justification is provided prior to preoperational testing.

[Bob H Note – The is FSAR Ch. 14 Rev. 1 (draft), for clarity the entire chapter is shown with proposed changes for ITP]

CHAPTER 14 INITIAL TEST PROGRAM

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STD COL 14.4-1

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Table 13.4-201 provides milestones for initial test program implementation.

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- Construction and Installation Testing
- Preoperational Testing
- Startup Testing

14.2.2.1.1 Manager In Charge of PT&O

The manager in charge of PT&O reports directly to the plant manager. The manager in charge of PT&O manages the ITP. The manager in charge of PT&O is responsible for:

- Staffing the PT&O Organization.
- Developing, reviewing, and approving the administrative and technical procedures associated with the preoperational and startup phases.
- Managing the ITP and personnel.
- Implementing the ITP schedule.
- Managing contracts associated with the ITP.

14.2.2.1.2 Functional Manager In Charge of PT&O Support

The functional manager in charge of PT&O support reports directly to the manager in charge of PT&O. The functional manager in charge of PT&O support plans and schedules procedure development to support startup. The functional manager in charge of PT&O support verifies that the test documents conform to the approved project procedures.

The functional manager in charge of PT&O support reviews and approves test procedures. These procedures are used to demonstrate that a system and its components meet the design and performance criteria.

14.2.2.1.3 PT&O Engineers

The PT&O engineers report directly to the functional manager in charge of PT&O support. The PT&O engineers are responsible for developing system test procedures.

14.2.2.1.4 Functional Manager In Charge of Startup

The functional manager in charge of startup reports directly to the manager in charge of PT&O. The functional manager in charge of startup manages the preoperational and startup testing. The functional manager in charge of startup is responsible for:

- Participating in the Joint Test Working Group (JTWG) and ensuring that the JTWG reviews and approves administrative and test procedures. The JTWG structure and responsibilities are defined in the “AP1000 Startup Site Administrative Manual - Program Management Description” (found in Reference 201).
- Preparing a detailed preoperational and startup testing schedule.
- Coordinating construction turnover to the PT&O organization.
- Informing the functional manager in charge of PT&O when vendor support essential to preoperational and startup testing is required, and coordinating vendor participation.
- Supervising and directing the startup engineers.
- Involving operations personnel in testing activities. Utilizing operations personnel, to the extent practical, as test witnesses or test performers to provide the operations personnel with experience and knowledge.
- Developing and implementing administrative controls to address system and equipment configuration control.

STD COL 14.4-4

- Maintaining the startup schedule.
- Maintaining a daily startup log and issuing periodic progress reports that identify overall progress and potential challenges.

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The startup engineers report directly to the functional manager in charge of startup. The startup engineers are responsible for:

- Complying with administrative controls.
- Identifying any special or temporary equipment or services needed to support testing.
- Coordinating testing with involved groups.
- Reviewing and evaluating test results.

14.2.2.2 PT&O Organization Personnel Qualifications and Training

Personnel in the PT&O organization are qualified and trained in accordance with the "AP1000 Startup Site Administrative Manual - Program Management Description" (found in Reference 201).

[Bob H Note – Sections 14.2.2.3 through 14.2.2.6 were incorporated from TR-71B.]

14.2.2.3 JOINT TEST WORKING GROUP

The Joint Test Working Group (JTWG) will consist of an organizational group of authorized representative personnel from the Plant's operations and support group functions, Westinghouse Electric Company (WEC), Architect Engineer and other test support groups as identified below.

The Westinghouse Startup Manager will have the overall responsibility and authority for technical direction of the Startup Test Program and will act as the JTWG Chairman.

The JTWG Chairman will report to the Chairman of the Plant Owner's Operations Review Committee (PORC) or qualified designee for matters of Startup test authority and acceptance.

The JTWG will provide the following administrative oversight activities associated with the Startup Test Program:

- Review, evaluate and approve Startup Test Program administrative and test procedures.
- Oversee the implementation of the Preoperational Test Program and the Startup Test Program, including planning, scheduling and performance of all Preoperational and Startup testing.
- Review and evaluate Construction, Preoperational and Startup test results and test

turnover packages.

At a minimum, the JTWG will be composed of qualified representatives provided from the following organizations:

- Licensee's Operations Group
- Licensee's Maintenance Group
- Site Preoperational Test Group
- Site Startup Test Group
- Licensee's Engineering Group
- Licensee's Corrective Action Organization
- Westinghouse Site Engineering Group
- Licensee's Health Physics/Chemistry Group
- Licensee's Quality Assurance Group

The following are additional generic details of the key responsibilities, authorities and interfaces of the Licensee Organizations delineated above:

- Operations Group

The Operations Group has the overall responsibility for Plant Operations, including administrative control and tag-outs subsequent to system turnover. Their primary interfaces are with all Licensee Engineering and Technical Support organizations as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group.

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The Maintenance Group has the overall responsibility for the Maintenance of Plant systems and components subsequent to System Turnover. They are key participants and maintainers of system maintenance control and tag-outs. Their primary interfaces are with the Licensee Operations Group and Technical Support organizations as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group.

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The Corrective Action Organization may be an organization specific to itself, may be a part of the Performance Assessment organization, the Quality Organization or another organization. This organization, together with every other site organization is responsible for the administration and management of the corrective action program as well as the identification of conditions adverse to quality. This organization interfaces with the site

organizations and identifies and documents conditions which need to be documented in the corrective action program.

- Engineering Group

This group has the primary responsibility for the site engineering and interfaces with the vendor engineering organization, as well as the design oversight of the plant components and systems. This organization primarily interfaces with Operations Group as well as the Westinghouse Site Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group. The responsibility for training the testing personnel in accordance with ANSI N45.2.6 will be delegated and implemented as agreed to by Westinghouse.

- Health Physics/Chemistry Group

This Technical Support organization has the responsibility and authority to maintain Health Physics and system chemistry conditions at the plant, particularly after system turnover. This organization primarily interfaces with Licensee Operations Group as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group.

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This group has the responsibility to verify that the applicable site Quality commitments are being met within the scope of work performed at the site. This includes meeting the Criteria of 10 CFR 50 Appendix B. The primary interfaces for this group are the Licensee Operations Group and Technical Support organizations, including Quality Control and other quality organizations, as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group

- Site Preoperational Test Group

This group has the primary responsibility for the development, maintenance and performance of the site preoperational procedures at the site. The primary interfaces for this group are the Licensee Operations Group and Technical Support organizations as well as the Westinghouse Engineering Organization, Startup Testing Teams and the Construction Services Group. Additional specific description of this organizations responsibilities and interfaces is described in Subsection 14.2.2.5. below. Once preoperational testing is complete, this group turns systems over to the Startup Group.

- Site Startup Test Group

This group has the primary responsibility for the development, maintenance and performance of the site startup procedures at the site. The primary interfaces for this group are the Licensee's Operations Group and Technical Support organizations as well as the Westinghouse Engineering Organization, Preoperational Testing Team and the

Construction Services Group. Additional specific description of this organization's responsibilities and interfaces is described in Subsection 14.2.2.6 below. The Startup Test Group turns over systems to the licensee when testing is complete.

- Westinghouse Site Engineering Group

This group has the primary responsibility for the vendor interface between the site and the vendor home offices, as well as the design authority for the primary vendor's components and systems. The various Westinghouse site leads for specific disciplines are a part of this organization. This organization primarily interfaces with Licensee Operations Group as well as the Westinghouse Engineering Organization, Preoperational and Startup Testing Teams and Construction Services Group. The responsibility for training the testing personnel in accordance with ANSI N45.2.6 will be delegated and implemented as agreed to by Westinghouse and the Licensee.

14.2.2.4 SITE CONSTRUCTION GROUP (ARCHITECT ENGINEER)

14.2.2.4.1 The Site Construction Group will consist of the following, as necessary to support the Site Startup Test Program:

- Construction Group

The Construction group has the primary responsibility for the construction and construction testing of the Balance-of-Plant engineering systems and components. During Construction and Construction Testing, this group will have authority over administrative control and tagouts of these systems. Their main interface will be with the System Preoperational and Startup Testing Groups as well as the Licensee Operations Group. The Construction Group will be responsible for addressing open items in the system turnover punch lists to address turnover acceptability of the system.

- Construction Services Group

The Construction Services Group primarily supports the Construction Group with activities necessary to support construction of all systems and testing of the BOP systems and components including the construction of scaffolding, installation and removal of insulation and similar activities. With agreement between the necessary parties, this group may also support the Westinghouse Site Engineering Group with similar activities on the primary side. The primary interfaces of this group is the Construction Group and the organizations of the JTWG.

- Construction Services Procurement Group

The Construction Services Procurement Group is responsible for the quality procurement of components and equipment necessary to support plant construction and testing. The primary interfaces of this group include the Construction Services Group and the Construction Services Quality Group.

- Construction Services Quality Group

The Construction Services Quality Group is responsible for the oversight of the Quality Program during Construction Activities including those pertinent to 10 CFR 50 Appendix B and the disposition of Significant Construction Deficiencies, 10 CFR 50.55e reports as necessary. This group primarily interfaces with the Construction and Services groups as well as the Westinghouse Site Engineering group and the JTWG.

- Construction Services Training Group

This group is primarily responsible for the training and qualification of Site Construction Personnel in Accordance with ANSI Standard N45.2.6. Their primary interface is with the qualified Construction personnel.

14.2.2.4.2 The Site Construction Group will perform the following functions and scope of work, as necessary to support the Site Startup Test Program:

- Construction Installation and Testing, including management of construction testing documentation.
- Construction and Installation activities required to support Preoperational and Startup Test Programs.
- Vendor interface and procurement associated with supporting testing activities.
- Provide manpower and labor as needed to support all testing activities.
- Turnover of Construction and Installation tested equipment, systems and testing documentation to the Site Preoperational Test Group.

14.2.2.5 SITE PREOPERATIONAL TEST GROUP

14.2.2.5.1 The Site Preoperational Test Group will consist of the following, as necessary to support the Site Startup Test Program:

- Engineering Leads
- Preoperational Test Teams

14.2.2.5.2 The Site Preoperational Test Group will perform the following functions and scope of

work, as necessary to support the Site Startup Test Program:

- Coordinate Tagging and maintenance prior to turnover to the Licensee to support system acceptance testing.
- Accept systems for turnover from the installation organization.
- Plan, scope and schedule plant systems for test to support the plant Preoperational Test program.
- Manage and oversee the testing of plant systems to support the plant hot-functional test program.
- Resolve open items and exceptions identified during implementation of the Preoperational Test Program.
- Accept and turn over Preoperational Test Packages to the Site Licensee.
- Support completion of hot-functional testing program.
- Coordinate other support tasks required during Startup Testing activities with responsible groups (e.g., Licensee's Organization).

14.2.2.6 SITE STARTUP TEST GROUP

14.2.2.6.1 The Site Startup Test Group will consist of the following, as necessary to support the Site Startup Test Program:

- Engineering Leads
- Startup Test Teams

14.2.2.6.2 The Site Startup Test Group will perform the following functions and scope of work, as necessary to support the Site Startup Test Program:

- Coordinate tagging and maintenance as required to support system and equipment acceptance testing.
- Accept systems, structures and components from the Licensee for integrated testing.

- Plan, scope and schedule plant systems, structures and components for testing, to support Plant Startup.

- Manage and oversee the testing of plant systems, structures and components to support the plant power ascension test program.

- Resolve open items and exceptions identified during implementation of the Startup Test Program.

- Accept and turn over Startup Test Packages to the Site Licensee.

- Coordinate other support tasks required during Startup Testing activities with responsible groups (e.g., Licensee's Organization).

14.2.3.2 Review of Test Results

Add the following text at the end of DCD Subsection 14.2.3.2: Upon completion of a test, the startup engineer is responsible for:

- Reviewing the test data.
- Evaluating the test results.
- Verifying that the acceptance criteria are met.
- Verifying that the test results that do not meet acceptance criteria are entered into the corrective action program.
- Verifying that the results of retesting do not invalidate ITAAC acceptance criteria.

STD SUP 14.2-1

Test results are reviewed and approved by the JTWG. Review and approval of test results are kept current such that succeeding tests are not dependent on systems or components that have not been adequately tested. Test exceptions which do not meet acceptance criteria are identified to the affected and responsible design organizations and entered into the corrective action program. Implementation of corrective actions and retests are performed as required.

Prior to initial fuel load, the results of the preoperational test phase are comprehensively reviewed by the PT&O organization and the JTWG to verify the results indicate that the required plant structures, systems, and components are capable of supporting the initial fuel load and subsequent startup testing. The plant manager approves fuel loading.

Each area of startup testing is reviewed and evaluated by the PT&O organization and the JTWG. The test results at each power ascension testing power plateau are reviewed and evaluated by the PT&O organization and the JTWG and approved by the plant manager before proceeding to the next plateau. Startup test reports are prepared in accordance with Regulatory Guide 1.16, “Reporting of Operating Information -- Appendix A Technical Specifications.”

[Bob H Note: Section 14.2.8 was added in response to an RAI. It has been expanded to include additional scheduling requirements, I am considering moving this section to Appendix 14AA, any thoughts?]

14.2.8 TEST PROGRAM SCHEDULE
Add the following text at the end of DCD Subsection 14.2.8:

STD SUP 14.2-1 A site-specific initial test program schedule will be provided to the NRC after issuance of the COL. This schedule will address each major phase of the test program (including tests that are required to be completed before fuel load), as well as the organizational impact of any overlap of first unit initial testing with initial testing of the second unit.

[Bob H Note – New paragraphs to be added are shown below]

The sequential schedule for individual startup tests should establish that testing will be completed in accordance with plant technical specification requirements for SSC operability before changing plant modes. Additionally, the schedule should establish that the safety of the plant will not depend on the performance of untested SSCs. Guidance provided in regulatory Guide 1.68 should be used for development of the schedule-

The Site Administrative Manual shall include the following controls, guidance and requirements:

- Test Procedure Development Schedule:
  - Controls to ensure the establishment of a schedule for the development of detailed testing, plant operating, and emergency procedures. These procedures should, to the extent practical, be trial-tested and corrected during the initial test program prior to fuel loading in order to establish their adequacy.
  - Controls to ensure that approved test procedures be in a form suitable for review by NRC inspectors at least 60 days prior to their intended use or at least 60 days prior to fuel loading for fuel loading and startup test procedures.
  - Controls to ensure that the plant provides timely notification to the NRC of changes in approved test procedures that have been made available for NRC review.

- Initial Test Program Schedule:
  - Controls to ensure the establishment of a schedule to conduct the major phases of the initial test program, relative to the expected fuel loading date. This is covered in License Conditions in Part 10 of the Bellefonte COL FSAR.
  - Controls to allow at least 9 months for conducting preoperational testing.
  - Controls to allow at least 3 months for conducting startup testing, including fuel loading, low-power tests, and power-ascension tests
  - Controls to ensure that overlapping test program schedules (for multi-unit sites) do not result in significant divisions of responsibilities or dilutions of the staff provided to implement the test program.

- Controls to ensure that the sequential schedule for individual startup tests establish, insofar as is practicable, that testing is completed prior to exceeding 25 percent power for all plant Structure, Systems and Components (SSCs) that are relied upon to prevent, limit, or mitigate the consequences of postulated accidents. The schedule should establish that, insofar as is practicable, testing is accomplished as early in the test program as is feasible and that the safety of the plant will not be dependent on the performance of untested SSCs.

[Bob H Note- Did not add requirements on procedure/ITAAC cross reference since it is already added in section 14.4.2]

14.4 COMBINED LICENSE APPLICANT RESPONSIBILITIES

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

14.4.1 ORGANIZATION AND STAFFING

STD COL 14.4-1 This COL Item is addressed in Section 14.2.

[Bob H Note - Section 14.2 is being expanded to include information from TR-71B]

14.4.2 TEST SPECIFICATIONS AND PROCEDURES

STD COL 14.4-2 Preoperational and startup procedures are provided for the NRC in accordance COM-14.4-003 with the requirements of DCD Subsection 14.2.3.

A cross reference list is provided between ITAACs and test procedures and/or sections of test procedures. Appendix 14AA, Section 14AA.3 describes the controls for development of test specifications and procedures.

[Bob H Note – New subsection, a change to DCD may be needed due to addition of Appendix 14AA]

14.4.3 CONDUCT OF TEST PROGRAM

STD COL 14.4-X This COL Item is addressed in Appendix 14AA, Description of Initial Test Program Administration. Site Administrative Manual is developed based on Appendix 14AA.

14.4.4 REVIEW AND EVALUATION OF TEST RESULTS

STD COL 14.4-4 Review and evaluation of individual test results, as well as final review of overall COM-14.4-004 test results and selected milestones or hold points is addressed in Subsection 14.2.3.2. Test exceptions or results that do not meet acceptance criteria are identified to the affected and responsible design organizations, and corrective actions and retests, as required, are performed.

14.4.5 INTERFACE REQUIREMENTS

STD COL 14.4-5 This COL Item is addressed in Subsections 14.2.9.4.15, 14.2.9.4.22 through 14.2.9.4.27, 14.2.10.4.29, and in the Physical Security Plan.

14.4.6 FIRST-PLANT-ONLY AND THREE-PLANT-ONLY TESTS

STD COL 14.4-6 First-plant-only and first-three-plant-only tests either are performed in accordance COM-14.4-005 with DCD Section 14.2.5 or a justification is provided that the results of the first-plant-only and first-three-plant-only tests are applicable to a subsequent plant. If the tests are not performed, the justification is provided prior to preoperational testing.

Appendix 14AA Description of Initial Test Program Administration

14AA.1 Summary of Test Program and Objectives

14AA.1.1 Applicability

This appendix provides the requirements to be included in the Startup Administrative Manual (SAM), as discussed in DCD Subsection 14.4.3. The information referenced in this appendix meets the ITP criteria of NUREG-0800 and is formatted to follow Regulatory Guide 1.206, Part I, Section C.1.14.2.

The ITP is applied to structures, systems, and components that perform the functions described in the Regulatory Guide 1.68 evaluation in FSAR Section 1.9. The ITP is also applied to other structures, systems and components that meet any of the following criteria, even if not included in RG 1.68, Appendix A:

- Will be used for shutdown and cool down of the reactor under normal plant conditions, and for maintaining the reactor in a safe condition for an extended shutdown period.
- Will be used for shutdown and cool down of the reactor under transient (infrequent or moderately frequent events) conditions and postulated accident conditions, and for maintaining the reactor in a safe condition for an extended shutdown period following such conditions.
- Will be used to establish conformance with safety limits or limiting conditions for operation that will be included in the facility's Technical Specifications.
- Are classified as engineered safety features or will be relied on to support or ensure the operation of engineered safety features within design limits.
- Are assumed to function, or for which credit is taken, in the accident analysis of the facility, as described in the FSAR.
- Will be used to process, store, control, or limit the release of radioactive materials.
- The SAM includes a list of the AP1000 structures, systems and components to which the ITP is applied.

14AA.1.2 Phases of the Initial Test Program

Phases of startup test program are described in DCD Subsection 14.2.1.3.

14AA.1.3 Objectives of Preoperational and Startup Testing

Objectives of Preoperational Testing are described in DCD Subsection 14.2.1.2. Objectives of Startup Testing are in DCD Section 14.2.1.3.

14AA.1.4 Testing of First of a Kind Design Features

First of a kind (FOAK) testing may occur in any of the phases depending on the nature of the testing and required sequencing of the tests. When testing FOAK design features, applicable operating experience from previous test performance on other AP1000 plants is reviewed, where available, and the ITP modified as needed based on those lessons learned.

14AA.1.5 Credit for Previously Performed Testing of First of a Kind Design Features

In some cases, FOAK testing is required only for the first of a new design or for the first few plants of a standard design. In such cases, credit may be taken for the previously performed tests. A discussion is included in the startup test reports of the results of those tests that are credited.

14AA.2 Organization, Staffing, and Responsibilities

Organization and staffing is described in FSAR Subsection 14.2.2.

14AA.3 Test Specifications and Test Procedures

Test specifications and test procedures are described in FSAR Subsection 14.2.3.

[Bob H Note – the following bullets were added from RAI]

The Site Administrative Manual shall include the following controls, guidance and requirements:

- Controls to ensure that test procedures include appropriate prerequisites, objectives, safety precautions, initial test conditions, methods to direct and control test performance, and acceptance criteria by which the test will be evaluated.
- Controls for the format of individual test procedures to ensure consistency with the guidance contained in RG 1.68; or provide justifications for any exceptions.
- Controls to ensure participation of the principal design organizations in establishing test objectives, test acceptance criteria, and related performance requirements during the development of detailed test procedures. Each test procedure should include acceptance criteria that account for the uncertainties used in transient and accident analyses. The participating system designers should include the nuclear steam supply system vendor, architect-engineer, and other major contractors, subcontractors, and vendors, as applicable.
- Controls to ensure that personnel with appropriate technical backgrounds and experience develop and review test procedures. Persons filling designated management positions should perform final procedure review and approval.
- Controls to ensure that approved test procedures for satisfying FSAR testing commitments are made available to the NRC inspectors approximately 60 days prior to their intended use.

14AA.4 Conduct of the Initial Test Program

14AA.4.1 Administrative Controls

ITP conduct is described in FSAR Subsection 14.2.3.1. The Site Administrative Manual (procedure) governs the initial testing and will be issued no later than 60 days prior to the beginning of the pre-operational phase. Testing during all phases of the test program is conducted using approved test procedures.

14AA.4.2 Procedure Verification

Because procedures may be approved for implementation weeks or months in advance of the scheduled test date, a review of the approved test procedure is required before commencement of testing. The test engineer is responsible for ensuring:

- Drawing and document revision numbers listed in the reference section of the test procedure agree with the latest revisions.
- The procedure text reflects any design changers) made since the procedure was originally approved for implementation in the areas of acceptance criteria, FSAR, Technical Specifications, piping changes, etc.
- Any new Operating Experience lessons learned (since preparation of the procedure) are incorporated into individual test procedures.

  Procedures require signoff of verification for prerequisites and instruction steps. This signoff includes identification of the person doing the signoff and the date and time of completion.

Test engineers maintain chronological logs of test status to facilitate turnover and aid in maintaining operational configuration control. These logs become part of the test documentation.

There is a documented turnover process to ensure that test status and equipment configuration are known when personnel transfer responsibilities, such as during a shift change.

Test briefings are conducted for each test in accordance with administrative procedures. When a shift change occurs before test completion, another briefing occurs before resumption or continuation of the test.

Data collected is marked or identified with test, date, and person collecting data. This data becomes part of the test documentation.

The plant corrective action program is used to document all deficiencies, discrepancies, exceptions,

nonconformances and failures (collectively known as test exceptions) identified in the ITP. The corrective action documentation becomes part of the test documentation. WEC and/or other design organizations participate in the resolution of design-related problems that result in, or contribute to, a failure to meet test acceptance criteria.

The plant manager approves proceeding from one test phase to the next during the ITP. Approvals are documented in an overall ITP governance document.

Administrative procedures detail the test documentation review and approval. Review and approval of test documentation includes the test engineer, testing supervisor, Startup Group manager, WEC site representative or appropriate vendor, and JTWG. Final approval is by the plant manager.

Plant readiness reviews are conducted to assure that the plant staff and equipment are ready to proceed to the next test phase or plateau.

14AA.4.3 Work Control

The Startup Group is responsible for preparing work requests when Construction organization assistance is required. Work requests are issued in accordance with a site-specific procedure governing the work management process. The plant staff, upon identifying a need for Construction organization assistance, coordinates their requirements through the appropriate Startup Test Engineer.

Activities requiring Construction organization work efforts are performed under the plant tagging procedures. Tagging requests are governed by a site-specific procedure for equipment clearance. Tagging procedures shall be used for protection of personnel and equipment and for jurisdictional or custodial conditions that have been turned over in accordance with the turnover procedure.

The Startup Group is responsible for supervising minor repairs and modifications, changing equipment settings, and disconnecting and reconnecting electrical terminations as stipulated in a specific test procedure. Startup Test Engineers may perform independent verification of changes made in accordance with approved test procedures.

14AA.4.4 Measuring and Test Equipment (M&TE)

During the preoperational test program, as well as the startup test program, most activities that lead to plant commercial operation involve design value verifications. M& TE used during these activities are properly controlled, calibrated, and adjusted at specified intervals to maintain accuracy within necessary limits. M&TE is governed by a site-specific procedure for control of M&TE. M&TE includes portable tools, gauges, instruments, and other measuring and testing devices not permanently installed,

for example, startup test instruments prepared by the Preoperational Test Group as well as those provided by the Construction organization or by vendors.

A calibration program is implemented. For standard M&TE equipment, calibration procedures are prepared for each type of M& TE calibrated onsite. Calibration intervals are established for each item of M& TE. However, if the calibration requirement of a particular piece of M& TE is beyond the capabilities or resources of the plant staff, this M& TE is sent to an offsite certified calibration or testing agency. If special test equipment is necessary only for the ITP, the responsible vendor provides this equipment with the appropriate calibration documentation.

14AA.4.5 System Turnover

During the construction phase, systems, subsystems, and equipment are completed and turned over in an orderly and well-coordinated manner. Guidelines are established to define the boundary and interface between related system/subsystem and are used to generate boundary scope documents; for example, marked-up piping and instrument diagrams (P&IDs), electrical schematic diagrams, for scheduling and subsequent development of component and system turnover packages. The system turnover process 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 of 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.

14AA.4.6 Preoperational Testing

During preoperational testing, it may be necessary to return system control to Construction organization to repair or modify the system or to correct new problems. Administrative procedures include direction for:

- Means of releasing control of systems and or components to construction.
- Methods used for documenting actual work performed and determining impact on testing.
- Identification of required testing to restore the system to operability/functionality/availability status, and to identify tests to be re-performed based on the impact of the work performed.

- Authorizing and tracking operability and unavailability determinations.
- Verifying retests stay in compliance with ITAAC.

14AA.4.7 Startup Testing

The startup testing program is based on increasing power in discrete steps. Major testing is performed at discrete power levels as described in DCD Subsection 14.2.7. The first tests during power ascension testing that verify movements and expansion of equipment are in accordance with design, and are conducted at a power level as low as practical (approximately 5 percent).

The governing power ascension test plan requires the following operations to be performed at appropriate steps in the power-ascension test phase:

- Conduct any tests that are scheduled at the test condition or power plateau.
- Confirm core performance parameters (core power distribution) are within expectations.
- Determine reactor power by heat balance, calibrate nuclear instruments accordingly, and confirm the existence of adequate instrumentation overlap between the startup range and power range detectors.
- Reset high-flux trips, just prior to ascending to the next level, to a value no greater than 20 percent beyond the power of the next level unless Technical Specification limits are more restrictive.
- Perform general surveys of plant systems and equipment to confirm that they are operating within expected values.
- Check for unexpected radioactivity in process systems and effluents.
- Perform reactor coolant leak checks.
- Review the completed testing program at each plateau; perform preliminary evaluations, including extrapolation core performance parameters for the next power level; and obtain the required management approvals before ascending to the next power level or test condition.

Upon completion of a given test, a preliminary evaluation is performed that confirms acceptability for continued testing. Smaller transient changes are performed initially, gradually increasing to larger transient changes. Test results at lower powers are extrapolated to higher power levels to determine acceptability of performing the test at higher powers. This extrapolation is included in the analysis section of the lower power procedure.

Surveillance test procedures may be used to document portions of tests, and ITP tests or portions of

tests may be used to satisfy Technical Specifications surveillance requirements in accordance with administrative procedures. At Startup Test Program completion, a plant capacity warranty test is performed to satisfy the contract warranty and to confirm safe and stable plant operation.

14AA.4.8 Conduct of Modifications during the Initial Test Program

Temporary modifications may be required to conduct certain tests. These modifications are documented in the test procedure. The test procedures contain restoration steps and retesting required to confirm satisfactory restoration to required configuration. Modifications may be performed by the Construction organization or the plant staff processes prior to NRC issuance of the 10 CFR 52.1 03g finding. If the modification invalidates a previously completed ITAAC, then that ITAAC is re-performed. Each modification is reviewed to determine the scope of post-modification testing that is to be performed. Testing is conducted and documented to ensure that preoperational testing and ITAAC remain valid. Modifications made following NRC issuance of the 10 CFR 52.103g finding are in accordance with plant staff processes and meet license conditions. Modifications that require change of ITAAC require NRC approval of the ITAAC change.

14AA.4.9 Conduct of Maintenance during the Initial Test Program

All corrective or preventive maintenance activities are reviewed to determine the scope of post-maintenance testing to be performed. Prior to NRC issuance of the 10 CFR 52.1 03g finding, post-maintenance testing is conducted and documented to ensure that associated preoperational testing and ITAAC remain valid. Maintenance performed following NRC issuance of the 10 CFR 52.1 03g finding is in accordance with plant staff processes and meets license conditions.

14AA.4.10 Audits

A comprehensive system of planned and periodic audits is carried out to verify compliance with the ITP in accordance with the Quality Assurance Program Description. Follow-up actions, including re-audit of deficient areas, are taken where indicated.

14AA.5 Review, Evaluation and Approval of Test Results

14AA.5.1 Review and Approval Responsibilities

The reactor vendor is responsible for reviewing and approving the results of all tests of supplied equipment. Architect Engineer representatives review and approve the results of all tests of supplied equipment. Other vendors' representatives review and approve the results of all tests of supplied equipment. Plant staff review and approval responsibilities are in Subsection 14AA.2. Final approval of individual test completion is by the plant manager after approval by the Joint Test Working Group (JTWG).

14AA.5.2 Technical Evaluation

Each completed test package is reviewed by technically qualified personnel to confirm satisfactory demonstration of plant, system or component performance and compliance with design and license criteria.

14AA.6 Test Records

Records retention requirements are in DCD Subsection 14.2.3.3 and in the Quality Assurance Program Description.

14AA.6.1 Startup Test Reports

Startup test reports are generated describing and summarizing the completion of tests performed during the ITP. A startup report is required per RG 1.16 at the earliest of:

1) 9 months following initial criticality,

2) 90 days after completion of the ITP, or

3) 90 days after start of commercial operations. If one report does not cover all three events, then supplemental reports are submitted every three months until all three events are completed. These reports:

- Address each ITP test described in the FSAR.
- Provide a general description of measured values of operating conditions or characteristics obtained from the ITP as compared to design or specification values.
- Describe any corrective actions that were required to achieve satisfactory operation.
- Include any other information required to be reported by license conditions due to regulatory guide commitments.

14AA.7 Test Program Conformance with Regulatory Guides

- Compliance of the AP1000 design, including the Preoperational and Startup Test Programs is specifically delineated in Section 1.9 of the AP1000 DCD.
- With respect to the Standard Review Plan, Revision 2, the specifics of the compliance of the AP1000 Preoperational and Startup Test Program are delineated in WCAP-15799, also known as APP-GW-GL-001, which has been previously provided to the NRC.

14AA.8 Utilization of Operating Experience

Administrative procedures provide methodologies for evaluating and initiating action for operating experience information (OE). DCD Subsection 14.2.5 describes the general use of operating

experience by WEC in the development of the test program.

14AA.8.1 Sources and Types of Information Reviewed for ITP Development

Multiple sources of operating experience were reviewed to develop this description of the ITP administration program. These included:

- INPO Operating Experience Reports.
- INPO 06-001, "Operating Experience."
- INPO 06-001 Addendum.
- INPO 07-003, "INPO Utility Benchmarking for New Plant Deployment."
- INPO 07-003 Addendum.
- INPO 86-023, "Guidelines for Nuclear Power Construction Projects."
- INPO 94-005, "Standard Operation Support of Nuclear Plants."
- INPO 94-03, "Review of Commercial Nuclear Power Industry Standardization Experience."
- INPO Document AP-909, "Construction of Standard Nuclear Plants."
- INPO NX-1067, "Browns Ferry Nuclear Plant Unit I Restart
- Operational Readiness Lessons Learned."
- NRC RG 1.68, "Initial Test Programs For Water-Cooled Nuclear Power Plants."
- SER 24-85, "Xenon Tilt Oscillation Following Control Rod Insertion Test (05-24-1985)."
- SER 29-86. "Inadvertent Rapid Cooldown and Depressurization During a Remote Shutdown Test (08-12-1986)."
- SOER 87-01. "Core Damaging Accident Following an Improperly Conducted Test (03-06-1987)."
- SOER 91-01. "Conduct of Infrequently Performed Tests or Evolutions. "

14AA.8.2 Conclusions from Review

The following conclusions are a result of the OE review conducted to develop this ITP administration program description:

- The test procedures should provide guidance as to the expected plant response and instructions concerning what conditions warrant aborting the test. Errors and problems with the procedures should be anticipated. A means for prompt but controlled approval of changes to test procedures is needed. Critical test procedures should provide specific criteria for test termination and specific steps to ensure termination is conducted in a safe and orderly manner. Providing procedural guidance for aborting the test could prevent delays in plant restoration. Conservative guidance for actions to be taken should be included in the procedures.
- Plant simulators may prove useful in preparing for special tests and verifying procedures.
- Appropriate component/system operability should be verified prior to critical tests.
- The need to perform physics tests that can produce severe power tilts should be evaluated. particularly if tests at other similar reactors have provided sufficient data to verify the adequacy of the nuclear physics analysis.
- Implement compensatory measures in accordance with guidance for infrequently performed tests or evolutions where appropriate.

14AA.8.3 Summary of Test Program Features Influenced by the Review

The conclusions from the preceding section were incorporated in Sections 14AA.3.1 and 14AA.3.2.

14AA.8.4 Use of OE during Test Procedure Preparation

Administrative procedures require review of recent internal and external operating experience when preparing test procedures.

14AA.8.5 Use of OE during Conduct of ITP

Administrative procedures require discussion of operating experience when performing pre-job briefs immediately prior to the conduct of a test.

14AA.9 Trial Use of Plant Operating Procedures and Emergency Procedures

14AA.9.1 Use of Plant Procedures during Initial Test Program

The bases for using plant operating and emergency procedures are described in Subsection 14.2.6 of the AP1000 DCD. These procedures are being used extensively in the Man-Machine Interface Testing which is integrated as a part of the Control Room Design finalization. Additionally, the AP1000 plant operating and emergency procedures are being developed to support the following design finalization activities:

- Human Factors Engineering

- Operational Task Analysis
- Training Simulator Development
- Verification and Validation of the Procedures and the Training Material

The AP1000 emergency, abnormal and some normal operating procedures, along with some Alarm Response Procedures and surveillance procedure will be exercised and verified in the processes delineated above and in the Control Room design finalization process.

In addition, the AP1000 Preoperational Testing and Startup Test procedures will be verified and validated during the design finalization process, which will help prevent human factors issues with the development of these procedures. In addition, the plant operators will be using the NOPs while preoperational and startup tests are being performed, which will add to their validity and the plant operators training.

14AA.9.2 Operator Training and Participation during Certain Initial Tests (TMI Action Plan Item I.G.1, NUREG-0737)

The objectives of operator participation are to increase the capability of shift crews to operate facilities in a safe and competent manner by assuring that training for plant changes and off-normal events is conducted.

Operators are trained on the specifics of the ITP schedule, administrative requirements and tests. Specific JIT training is conducted for selected startup tests.

The ITP may result in discovery of acceptable plant or system response differing from expected response. Test results are reviewed to identify these differences and the training for operators is changed to reflect them. Training is conducted as soon as is practicable in accordance with training procedures.

14AA.10 Initial Fuel Loading and Initial Criticality

14AA.10.1 Prerequisites for Fuel Loading

- Preoperational tests are completed or justification is documented and approved for test exceptions and tests that have not been performed.
- AII ITAAC are complete and the NRC has issued 10 CFR 52.103g declaration.

Technical Specifications required for fuel load are met.

- License Conditions are met to allow fuel load.
- Licensed operators are stationed in the control room and for supervision of core alterations.
- Composition, duties, and emergency procedure responsibilities of the fuel handling crew are specified.
- Persons are technically qualified in accordance with plant procedures.
- Radiation monitors, nuclear instrumentation, manual initiation, and other devices are tested and verified to be operable to actuate the building evacuation alarm and ventilation control.
- Status of each system required for fuel loading is specified.
- Inspections of fuel and control rods are complete and all identified issues with installed fuel and control rods are resolved.
- Nuclear instruments are calibrated, operable and properly located (source-fuel-detector geometry). One operating channel has audible indication or annunciation in the control room.
- A response check of nuclear instruments to a neutron source consistent with the Technical Specifications surveillance frequency for
- source range nuclear instruments **in** the refueling mode is complete.
- Required status of containment is specified and met. = Required status of the reactor vessel is specified and met.
- Components are either in place or out of the vessel, as specified, to be capable of receiving fuel.
- Vessel water level is established, and the minimum level for fuel loading and unloading is specified.
- The standby liquid control system is operable.
- Fuel handling equipment is confirmed functional and operable through surveillance and other tests, including dry runs.

- The status of protection systems, interlocks, mode switches, alarms, and radiation protection equipment is prescribed and verified.
- Water quality is established within prescribed limits.

14AA.10.2 Fuel Loading Procedure Details

The fuel loading procedure includes instructions or information for the following areas:

- Loading sequence and pattern for fuel, control rods, and other components, with guidance regarding fuel addition increments so that the reactivity worth of added individual fuel assemblies becomes less as the core is assembled.
- Maintenance of a display for indicating the status of the core and fuel pool, as well as appropriate records of core loading.
- Proper seating and orientation of fuel and components (the procedure specifies a visual check of each assembly in each core position).
- Functional testing of each control rod immediately following fuel loading.
- Nuclear instrumentation and neutron source requirements for monitoring subcritical multiplication, including source or detector relocation and normalization of count rate after relocation.
- Flux monitoring, including counting times and frequencies and rules for plotting inverse multiplication and interpreting plots (the counting period for count rates is specified, and an inverse multiplication plot is maintained).
- The expected subcritical multiplication behavior.
- The minimum shutdown margin is proved periodically during loading and at the completion of loading. Shutdown margin verifications do not involve planned approach to criticality using nonstandard rod patterns or with operational interlocks bypassed.
- Actions (especially those pertaining to flux monitoring) for periods when fuel loading is interrupted.
- Maintenance of continuous voice communication between the control room and loading station.
- Minimum crew required to load fuel (the procedure requires the presence of at least two persons at

any location where fuel handling is taking place, and a senior reactor operator with no other concurrent duties be in charge).

- Crew work time limits per 10 CFR 26 are in effect.
- Approvals required for changing the procedure.

14AA.10.3 Fuel Loading Procedure Limitations and Actions

The fuel loading procedure includes the following limits and instructions:

- Established criteria for stopping fuel loading. Some circumstances that might warrant this are unexpected subcritical multiplication behavior, loss of communications between the control room and fuel loading station, inoperable source-range detector, and inoperability of the emergency boration system.
- Established criteria for emergency boron injection .
- Established criteria for containment evacuation.
- Actions to be performed in the event of fuel damage.
- Actions to be performed and/or approvals to be obtained before routine loading may resume after one of the above limitations has been reached or invoked.

14AA.10.4 Initial Criticality Procedure Requirements

The format and content requirements for preoperational tests apply to the initial criticality procedure. Plant operations are in accordance with plant operating procedures to the maximum extent possible. This procedure includes steps to ensure that the startup proceeds in a deliberate and orderly manner, changes in reactivity are continuously monitored, and inverse multiplication plots are maintained and interpreted.

The initial criticality procedure includes the following requirements:

- A critical rod position is predicted so that any anomalies may be noted and evaluated.
- All systems needed for startup are aligned and in proper operation.
- The standby liquid control system is operable.

- Procedural, license and Technical Specification requirements are met for initial criticality.
- Nuclear instruments are calibrated. A neutron count rate (of at least one-half count per second) should register on neutron monitoring channels before the startup begins, and the signal-to-noise ratio should be known to be greater than two. A conservative startup rate limit (no shorter than approximately a 30-second period) is established.

14AA.11 Plant Procedure Development Schedule

The milestone schedule for developing plant operating procedures is presented in Table 13.4-201 and discussed in FSAR Subsection 13.5.2.1. The operating and emergency procedures are available prior to start of licensed operator training and, therefore, are available for use during the ITP. Required or desired procedure changes may be identified during their use. Administrative procedures describe the process for revising plant operating procedures.

FSAR Subsection 14.2.8 provides test program schedule including milestones for test procedure development.

14AA.12 Individual Test Descriptions

Individual test descriptions can be found in AP1000 DCD Subsection 14.2.9 and in FSAR Subsection 14.2.9.

Appendix 14AA Description of Initial Test Program Administration

14AA.1 Summary of Test Program and Objectives

14AA.1.1 Applicability

This appendix provides the requirements to be included in the Startup Administrative Manual (SAM), as discussed in DCD Subsection 14.4.3. The information referenced in this appendix meets the ITP criteria of NUREG-0800 and is formatted to follow Regulatory Guide 1.206, Part I, Section C.1.14.2.

The ITP is applied to structures, systems, and components that perform the functions described in the Regulatory Guide 1.68 evaluation in FSAR Section 1.9. The ITP is also applied to other structures, systems and components that meet any of the following criteria, even if not included in RG 1.68, Appendix A:

- Will be used for shutdown and cool down of the reactor under normal plant conditions, and for maintaining the reactor in a safe condition for an extended shutdown period.
- Will be used for shutdown and cool down of the reactor under transient (infrequent or moderately frequent events) conditions and postulated accident conditions, and for maintaining the reactor in a safe condition for an extended shutdown period following such conditions.
- Will be used to establish conformance with safety limits or limiting conditions for operation that will be included in the facility's Technical Specifications.
- Are classified as engineered safety features or will be relied on to support or ensure the operation of engineered safety features within design limits.
- Are assumed to function, or for which credit is taken, in the accident analysis of the facility, as described in the FSAR.
- Will be used to process, store, control, or limit the release of radioactive materials.
- The SAM includes a list of the AP1000 structures, systems and components to which the ITP is applied.

14AA.1.2 Phases of the Initial Test Program

Phases of startup test program are described in DCD Subsection 14.2.1.3.

14AA.1.3 Objectives of Preoperational and Startup Testing

Objectives of Preoperational Testing are described in DCD Subsection 14.2.1.2. Objectives of Startup Testing are in DCD Section 14.2.1.3.

14AA.1.4 Testing of First of a Kind Design Features

First of a kind (FOAK) testing may occur in any of the phases depending on the nature of the testing and required sequencing of the tests. When testing FOAK design features, applicable operating experience from previous test performance on other AP1000 plants is reviewed, where available, and the ITP modified as needed based on those lessons learned.

14AA.1.5 Credit for Previously Performed Testing of First of a Kind Design Features

In some cases, FOAK testing is required only for the first of a new design or for the first few plants of a standard design. In such cases, credit may be taken for the previously performed tests. A discussion is included in the startup test reports of the results of those tests that are credited.

14AA.2 Organization, Staffing, and Responsibilities

Organization and staffing is described in FSAR Subsection 14.2.2.

14AA.3 Test Specifications and Test Procedures

Test specifications and test procedures are described in FSAR Subsection 14.2.3.

[Bob H Note – the following bullets were added from RAI]

The Site Administrative Manual shall include the following controls, guidance and requirements:

- Controls to ensure that test procedures include appropriate prerequisites, objectives, safety precautions, initial test conditions, methods to direct and control test performance, and acceptance criteria by which the test will be evaluated.
- Controls for the format of individual test procedures to ensure consistency with the guidance contained in RG 1.68; or provide justifications for any exceptions.
- Controls to ensure participation of the principal design organizations in establishing test objectives, test acceptance criteria, and related performance requirements during the development of detailed test procedures. Each test procedure should include acceptance criteria that account for the uncertainties used in transient and accident analyses. The participating system designers should include the nuclear steam supply system vendor, architect-engineer, and other major contractors, subcontractors, and vendors, as applicable.
- Controls to ensure that personnel with appropriate technical backgrounds and experience develop and review test procedures. Persons filling designated management positions should perform final procedure review and approval.
- Controls to ensure that approved test procedures for satisfying FSAR testing commitments are made available to the NRC inspectors approximately 60 days prior to their intended use.

14AA.4 Conduct of the Initial Test Program

14AA.4.1 Administrative Controls

ITP conduct is described in FSAR Subsection 14.2.3.1. The Site Administrative Manual (procedure) governs the initial testing and will be issued no later than 60 days prior to the beginning of the pre-operational phase. Testing during all phases of the test program is conducted using approved test procedures.

14AA.4.2 Procedure Verification

Because procedures may be approved for implementation weeks or months in advance of the scheduled test date, a review of the approved test procedure is required before commencement of testing. The test engineer is responsible for ensuring:

- Drawing and document revision numbers listed in the reference section of the test procedure agree with the latest revisions.
- The procedure text reflects any design changers) made since the procedure was originally approved for implementation in the areas of acceptance criteria, FSAR, Technical Specifications, piping changes, etc.
- Any new Operating Experience lessons learned (since preparation of the procedure) are incorporated into individual test procedures.

  Procedures require signoff of verification for prerequisites and instruction steps. This signoff includes identification of the person doing the signoff and the date and time of completion.

Test engineers maintain chronological logs of test status to facilitate turnover and aid in maintaining operational configuration control. These logs become part of the test documentation.

There is a documented turnover process to ensure that test status and equipment configuration are known when personnel transfer responsibilities, such as during a shift change.

Test briefings are conducted for each test in accordance with administrative procedures. When a shift change occurs before test completion, another briefing occurs before resumption or continuation of the test.

Data collected is marked or identified with test, date, and person collecting data. This data becomes part of the test documentation.

The plant corrective action program is used to document all deficiencies, discrepancies, exceptions,

nonconformances and failures (collectively known as test exceptions) identified in the ITP. The corrective action documentation becomes part of the test documentation. WEC and/or other design organizations participate in the resolution of design-related problems that result in, or contribute to, a failure to meet test acceptance criteria.

The plant manager approves proceeding from one test phase to the next during the ITP. Approvals are documented in an overall ITP governance document.

Administrative procedures detail the test documentation review and approval. Review and approval of test documentation includes the test engineer, testing supervisor, Startup Group manager, WEC site representative or appropriate vendor, and JTWG. Final approval is by the plant manager.

Plant readiness reviews are conducted to assure that the plant staff and equipment are ready to proceed to the next test phase or plateau.

14AA.4.3 Work Control

The Startup Group is responsible for preparing work requests when Construction organization assistance is required. Work requests are issued in accordance with a site-specific procedure governing the work management process. The plant staff, upon identifying a need for Construction organization assistance, coordinates their requirements through the appropriate Startup Test Engineer.

Activities requiring Construction organization work efforts are performed under the plant tagging procedures. Tagging requests are governed by a site-specific procedure for equipment clearance. Tagging procedures shall be used for protection of personnel and equipment and for jurisdictional or custodial conditions that have been turned over in accordance with the turnover procedure.

The Startup Group is responsible for supervising minor repairs and modifications, changing equipment settings, and disconnecting and reconnecting electrical terminations as stipulated in a specific test procedure. Startup Test Engineers may perform independent verification of changes made in accordance with approved test procedures.

14AA.4.4 Measuring and Test Equipment (M&TE)

During the preoperational test program, as well as the startup test program, most activities that lead to plant commercial operation involve design value verifications. M& TE used during these activities are properly controlled, calibrated, and adjusted at specified intervals to maintain accuracy within necessary limits. M&TE is governed by a site-specific procedure for control of M&TE. M&TE includes portable tools, gauges, instruments, and other measuring and testing devices not permanently installed,

for example, startup test instruments prepared by the Preoperational Test Group as well as those provided by the Construction organization or by vendors.

A calibration program is implemented. For standard M&TE equipment, calibration procedures are prepared for each type of M& TE calibrated onsite. Calibration intervals are established for each item of M& TE. However, if the calibration requirement of a particular piece of M& TE is beyond the capabilities or resources of the plant staff, this M& TE is sent to an offsite certified calibration or testing agency. If special test equipment is necessary only for the ITP, the responsible vendor provides this equipment with the appropriate calibration documentation.

14AA.4.5 System Turnover

During the construction phase, systems, subsystems, and equipment are completed and turned over in an orderly and well-coordinated manner. Guidelines are established to define the boundary and interface between related system/subsystem and are used to generate boundary scope documents; for example, marked-up piping and instrument diagrams (P&IDs), electrical schematic diagrams, for scheduling and subsequent development of component and system turnover packages. The system turnover process 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 of 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.

14AA.4.6 Preoperational Testing

During preoperational testing, it may be necessary to return system control to Construction organization to repair or modify the system or to correct new problems. Administrative procedures include direction for:

- Means of releasing control of systems and or components to construction.
- Methods used for documenting actual work performed and determining impact on testing.
- Identification of required testing to restore the system to operability/functionality/availability status, and to identify tests to be re-performed based on the impact of the work performed.

- Authorizing and tracking operability and unavailability determinations.
- Verifying retests stay in compliance with ITAAC.

14AA.4.7 Startup Testing

The startup testing program is based on increasing power in discrete steps. Major testing is performed at discrete power levels as described in DCD Subsection 14.2.7. The first tests during power ascension testing that verify movements and expansion of equipment are in accordance with design, and are conducted at a power level as low as practical (approximately 5 percent).

The governing power ascension test plan requires the following operations to be performed at appropriate steps in the power-ascension test phase:

- Conduct any tests that are scheduled at the test condition or power plateau.
- Confirm core performance parameters (core power distribution) are within expectations.
- Determine reactor power by heat balance, calibrate nuclear instruments accordingly, and confirm the existence of adequate instrumentation overlap between the startup range and power range detectors.
- Reset high-flux trips, just prior to ascending to the next level, to a value no greater than 20 percent beyond the power of the next level unless Technical Specification limits are more restrictive.
- Perform general surveys of plant systems and equipment to confirm that they are operating within expected values.
- Check for unexpected radioactivity in process systems and effluents.
- Perform reactor coolant leak checks.
- Review the completed testing program at each plateau; perform preliminary evaluations, including extrapolation core performance parameters for the next power level; and obtain the required management approvals before ascending to the next power level or test condition.

Upon completion of a given test, a preliminary evaluation is performed that confirms acceptability for continued testing. Smaller transient changes are performed initially, gradually increasing to larger transient changes. Test results at lower powers are extrapolated to higher power levels to determine acceptability of performing the test at higher powers. This extrapolation is included in the analysis section of the lower power procedure.

Surveillance test procedures may be used to document portions of tests, and ITP tests or portions of

tests may be used to satisfy Technical Specifications surveillance requirements in accordance with administrative procedures. At Startup Test Program completion, a plant capacity warranty test is performed to satisfy the contract warranty and to confirm safe and stable plant operation.

14AA.4.8 Conduct of Modifications during the Initial Test Program

Temporary modifications may be required to conduct certain tests. These modifications are documented in the test procedure. The test procedures contain restoration steps and retesting required to confirm satisfactory restoration to required configuration. Modifications may be performed by the Construction organization or the plant staff processes prior to NRC issuance of the 10 CFR 52.1 03g finding. If the modification invalidates a previously completed ITAAC, then that ITAAC is re-performed. Each modification is reviewed to determine the scope of post-modification testing that is to be performed. Testing is conducted and documented to ensure that preoperational testing and ITAAC remain valid. Modifications made following NRC issuance of the 10 CFR 52.103g finding are in accordance with plant staff processes and meet license conditions. Modifications that require change of ITAAC require NRC approval of the ITAAC change.

14AA.4.9 Conduct of Maintenance during the Initial Test Program

All corrective or preventive maintenance activities are reviewed to determine the scope of post-maintenance testing to be performed. Prior to NRC issuance of the 10 CFR 52.1 03g finding, post-maintenance testing is conducted and documented to ensure that associated preoperational testing and ITAAC remain valid. Maintenance performed following NRC issuance of the 10 CFR 52.1 03g finding is in accordance with plant staff processes and meets license conditions.

14AA.4.10 Audits

A comprehensive system of planned and periodic audits is carried out to verify compliance with the ITP in accordance with the Quality Assurance Program Description. Follow-up actions, including re-audit of deficient areas, are taken where indicated.

14AA.5 Review, Evaluation and Approval of Test Results

14AA.5.1 Review and Approval Responsibilities

The reactor vendor is responsible for reviewing and approving the results of all tests of supplied equipment. Architect Engineer representatives review and approve the results of all tests of supplied equipment. Other vendors' representatives review and approve the results of all tests of supplied equipment. Plant staff review and approval responsibilities are in Subsection 14AA.2. Final approval of individual test completion is by the plant manager after approval by the Joint Test Working Group (JTWG).

14AA.5.2 Technical Evaluation

Each completed test package is reviewed by technically qualified personnel to confirm satisfactory demonstration of plant, system or component performance and compliance with design and license criteria.

14AA.6 Test Records

Records retention requirements are in DCD Subsection 14.2.3.3 and in the Quality Assurance Program Description.

14AA.6.1 Startup Test Reports

Startup test reports are generated describing and summarizing the completion of tests performed during the ITP. A startup report is required per RG 1.16 at the earliest of:

1) 9 months following initial criticality,

2) 90 days after completion of the ITP, or

3) 90 days after start of commercial operations. If one report does not cover all three events, then supplemental reports are submitted every three months until all three events are completed. These reports:

- Address each ITP test described in the FSAR.
- Provide a general description of measured values of operating conditions or characteristics obtained from the ITP as compared to design or specification values.
- Describe any corrective actions that were required to achieve satisfactory operation.
- Include any other information required to be reported by license conditions due to regulatory guide commitments.

14AA.7 Test Program Conformance with Regulatory Guides

- Compliance of the AP1000 design, including the Preoperational and Startup Test Programs is specifically delineated in Section 1.9 of the AP1000 DCD.
- With respect to the Standard Review Plan, Revision 2, the specifics of the compliance of the AP1000 Preoperational and Startup Test Program are delineated in WCAP-15799, also known as APP-GW-GL-001, which has been previously provided to the NRC.

14AA.8 Utilization of Operating Experience

Administrative procedures provide methodologies for evaluating and initiating action for operating experience information (OE). DCD Subsection 14.2.5 describes the general use of operating

experience by WEC in the development of the test program.

14AA.8.1 Sources and Types of Information Reviewed for ITP Development

Multiple sources of operating experience were reviewed to develop this description of the ITP administration program. These included:

- INPO Operating Experience Reports.
- INPO 06-001, "Operating Experience."
- INPO 06-001 Addendum.
- INPO 07-003, "INPO Utility Benchmarking for New Plant Deployment."
- INPO 07-003 Addendum.
- INPO 86-023, "Guidelines for Nuclear Power Construction Projects."
- INPO 94-005, "Standard Operation Support of Nuclear Plants."
- INPO 94-03, "Review of Commercial Nuclear Power Industry Standardization Experience."
- INPO Document AP-909, "Construction of Standard Nuclear Plants."
- INPO NX-1067, "Browns Ferry Nuclear Plant Unit I Restart
- Operational Readiness Lessons Learned."
- NRC RG 1.68, "Initial Test Programs For Water-Cooled Nuclear Power Plants."
- SER 24-85, "Xenon Tilt Oscillation Following Control Rod Insertion Test (05-24-1985)."
- SER 29-86. "Inadvertent Rapid Cooldown and Depressurization During a Remote Shutdown Test (08-12-1986)."
- SOER 87-01. "Core Damaging Accident Following an Improperly Conducted Test (03-06-1987)."
- SOER 91-01. "Conduct of Infrequently Performed Tests or Evolutions. "

14AA.8.2 Conclusions from Review

The following conclusions are a result of the OE review conducted to develop this ITP administration program description:

- The test procedures should provide guidance as to the expected plant response and instructions concerning what conditions warrant aborting the test. Errors and problems with the procedures should be anticipated. A means for prompt but controlled approval of changes to test procedures is needed. Critical test procedures should provide specific criteria for test termination and specific steps to ensure termination is conducted in a safe and orderly manner. Providing procedural guidance for aborting the test could prevent delays in plant restoration. Conservative guidance for actions to be taken should be included in the procedures.
- Plant simulators may prove useful in preparing for special tests and verifying procedures.
- Appropriate component/system operability should be verified prior to critical tests.
- The need to perform physics tests that can produce severe power tilts should be evaluated. particularly if tests at other similar reactors have provided sufficient data to verify the adequacy of the nuclear physics analysis.
- Implement compensatory measures in accordance with guidance for infrequently performed tests or evolutions where appropriate.

14AA.8.3 Summary of Test Program Features Influenced by the Review

The conclusions from the preceding section were incorporated in Sections 14AA.3.1 and 14AA.3.2.

14AA.8.4 Use of OE during Test Procedure Preparation

Administrative procedures require review of recent internal and external operating experience when preparing test procedures.

14AA.8.5 Use of OE during Conduct of ITP

Administrative procedures require discussion of operating experience when performing pre-job briefs immediately prior to the conduct of a test.

14AA.9 Trial Use of Plant Operating Procedures and Emergency Procedures

14AA.9.1 Use of Plant Procedures during Initial Test Program

The bases for using plant operating and emergency procedures are described in Subsection 14.2.6 of the AP1000 DCD. These procedures are being used extensively in the Man-Machine Interface Testing which is integrated as a part of the Control Room Design finalization. Additionally, the AP1000 plant operating and emergency procedures are being developed to support the following design finalization activities:

- Human Factors Engineering

- Operational Task Analysis
- Training Simulator Development
- Verification and Validation of the Procedures and the Training Material

The AP1000 emergency, abnormal and some normal operating procedures, along with some Alarm Response Procedures and surveillance procedure will be exercised and verified in the processes delineated above and in the Control Room design finalization process.

In addition, the AP1000 Preoperational Testing and Startup Test procedures will be verified and validated during the design finalization process, which will help prevent human factors issues with the development of these procedures. In addition, the plant operators will be using the NOPs while preoperational and startup tests are being performed, which will add to their validity and the plant operators training.

14AA.9.2 Operator Training and Participation during Certain Initial Tests (TMI Action Plan Item I.G.1, NUREG-0737)

The objectives of operator participation are to increase the capability of shift crews to operate facilities in a safe and competent manner by assuring that training for plant changes and off-normal events is conducted.

Operators are trained on the specifics of the ITP schedule, administrative requirements and tests. Specific JIT training is conducted for selected startup tests.

The ITP may result in discovery of acceptable plant or system response differing from expected response. Test results are reviewed to identify these differences and the training for operators is changed to reflect them. Training is conducted as soon as is practicable in accordance with training procedures.

14AA.10 Initial Fuel Loading and Initial Criticality

14AA.10.1 Prerequisites for Fuel Loading

- Preoperational tests are completed or justification is documented and approved for test exceptions and tests that have not been performed.
- AII ITAAC are complete and the NRC has issued 10 CFR 52.103g declaration.

Technical Specifications required for fuel load are met.

- License Conditions are met to allow fuel load.
- Licensed operators are stationed in the control room and for supervision of core alterations.
- Composition, duties, and emergency procedure responsibilities of the fuel handling crew are specified.
- Persons are technically qualified in accordance with plant procedures.
- Radiation monitors, nuclear instrumentation, manual initiation, and other devices are tested and verified to be operable to actuate the building evacuation alarm and ventilation control.
- Status of each system required for fuel loading is specified.
- Inspections of fuel and control rods are complete and all identified issues with installed fuel and control rods are resolved.
- Nuclear instruments are calibrated, operable and properly located (source-fuel-detector geometry). One operating channel has audible indication or annunciation in the control room.
- A response check of nuclear instruments to a neutron source consistent with the Technical Specifications surveillance frequency for
- source range nuclear instruments **in** the refueling mode is complete.
- Required status of containment is specified and met. = Required status of the reactor vessel is specified and met.
- Components are either in place or out of the vessel, as specified, to be capable of receiving fuel.
- Vessel water level is established, and the minimum level for fuel loading and unloading is specified.
- The standby liquid control system is operable.
- Fuel handling equipment is confirmed functional and operable through surveillance and other tests, including dry runs.

- The status of protection systems, interlocks, mode switches, alarms, and radiation protection equipment is prescribed and verified.
- Water quality is established within prescribed limits.

14AA.10.2 Fuel Loading Procedure Details

The fuel loading procedure includes instructions or information for the following areas:

- Loading sequence and pattern for fuel, control rods, and other components, with guidance regarding fuel addition increments so that the reactivity worth of added individual fuel assemblies becomes less as the core is assembled.
- Maintenance of a display for indicating the status of the core and fuel pool, as well as appropriate records of core loading.
- Proper seating and orientation of fuel and components (the procedure specifies a visual check of each assembly in each core position).
- Functional testing of each control rod immediately following fuel loading.
- Nuclear instrumentation and neutron source requirements for monitoring subcritical multiplication, including source or detector relocation and normalization of count rate after relocation.
- Flux monitoring, including counting times and frequencies and rules for plotting inverse multiplication and interpreting plots (the counting period for count rates is specified, and an inverse multiplication plot is maintained).
- The expected subcritical multiplication behavior.
- The minimum shutdown margin is proved periodically during loading and at the completion of loading. Shutdown margin verifications do not involve planned approach to criticality using nonstandard rod patterns or with operational interlocks bypassed.
- Actions (especially those pertaining to flux monitoring) for periods when fuel loading is interrupted.
- Maintenance of continuous voice communication between the control room and loading station.
- Minimum crew required to load fuel (the procedure requires the presence of at least two persons at

any location where fuel handling is taking place, and a senior reactor operator with no other concurrent duties be in charge).

- Crew work time limits per 10 CFR 26 are in effect.
- Approvals required for changing the procedure.

14AA.10.3 Fuel Loading Procedure Limitations and Actions

The fuel loading procedure includes the following limits and instructions:

- Established criteria for stopping fuel loading. Some circumstances that might warrant this are unexpected subcritical multiplication behavior, loss of communications between the control room and fuel loading station, inoperable source-range detector, and inoperability of the emergency boration system.
- Established criteria for emergency boron injection .
- Established criteria for containment evacuation.
- Actions to be performed in the event of fuel damage.
- Actions to be performed and/or approvals to be obtained before routine loading may resume after one of the above limitations has been reached or invoked.

14AA.10.4 Initial Criticality Procedure Requirements

The format and content requirements for preoperational tests apply to the initial criticality procedure. Plant operations are in accordance with plant operating procedures to the maximum extent possible. This procedure includes steps to ensure that the startup proceeds in a deliberate and orderly manner, changes in reactivity are continuously monitored, and inverse multiplication plots are maintained and interpreted.

The initial criticality procedure includes the following requirements:

- A critical rod position is predicted so that any anomalies may be noted and evaluated.
- All systems needed for startup are aligned and in proper operation.
- The standby liquid control system is operable.

- Procedural, license and Technical Specification requirements are met for initial criticality.
- Nuclear instruments are calibrated. A neutron count rate (of at least one-half count per second) should register on neutron monitoring channels before the startup begins, and the signal-to-noise ratio should be known to be greater than two. A conservative startup rate limit (no shorter than approximately a 30-second period) is established.

14AA.11 Plant Procedure Development Schedule

The milestone schedule for developing plant operating procedures is presented in Table 13.4-201 and discussed in FSAR Subsection 13.5.2.1. The operating and emergency procedures are available prior to start of licensed operator training and, therefore, are available for use during the ITP. Required or desired procedure changes may be identified during their use. Administrative procedures describe the process for revising plant operating procedures.

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