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Your ref: Docket No. 52-006
Our ref: DCP/NRC2242

August 29, 2008

Subject: AP1000 Response to Request for Additional Information (SRP14.2)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 14.2. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

A revised response is provided for RAI-SRP14.2-CQVP-01 through -08 and -11, as agreed in a teleconference between Rob Sisk and Dave Jaffe on August 1, 2008. This response completes all requests received to date for SRP Section 14.2. A response for RAI-SRP14.2-CQVP-09 and -10 was provided under letter DCP/NRC2199 dated July 11, 2008. A response for RAI-SRP14.2-CQVP-01 through -08 and -11 was provided under letter DCP/NRC2162 dated June 20, 2008.

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Robert Sisk'.

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosure

1. Response to Request for Additional Information on SRP Section 14.2

cc: D. Jaffe - U.S. NRC 1E
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P. Ray - TVA 1E
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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 14.2

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Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-01
Revision: 1

Question:

As stated in Section 14.4 of the Westinghouse's AP1000 Design Certification Document (DCD), combined license information item 14.4.3 requires applicants referencing the Westinghouse AP1000 DCD to provide administrative controls for the conduct of the initial test program in the form of a Startup Administrative Manual (SAM). It specifically states: "The Combined License applicant is responsible for a startup administration manual (procedure) which contains the administration procedures and requirements that govern the activities associated with the plant initial test program, as identified in Section 14.2.3." This COL information item calls for the actual submittal of a SAM that describes the methods and practices for administering the initial test program for the AP1000. Section 1.1 of Westinghouse's TR-71B states that the purpose of that document is to close combined license (COL) item 14.4.3 for conduct of the initial test program. Technical Report -71B attempts to address COL information item 14.4.3 by outlining proposed programmatic requirements and responsibilities for the plant groups involved in the startup and testing organization for the specified licensed operational facility. Further, Westinghouse states that TR-71B provides input to the development of the AP1000 Startup Administrative Manual, which will be completed at a later date.

In order to address COL information item 14.4.3, Westinghouse needs to provide a comprehensive AP1000 SAM (i.e., a revised/updated TR-71B), describing the methodology (on a generic basis) that will be implemented by applicants referencing the AP1000 DCD in the following areas:

- Initial test program objectives,
- Organizational and staffing responsibilities,
- Conduct of the initial test program,
- Initial test program planning and scheduling,
- Review, evaluation, and approval of test results,
- Conformance with Regulatory Guides (RGs),
- Utilization of reactor operating and testing experiences in test program development, and
- Trial use of plant operating and emergency procedures.

The approach described above would subsume COL information item 14.4.1, "Organization and Staffing," and COL information item 14.4.4, "Review and Evaluation of Test Results," into COL information item 14.4.3. Although Westinghouse can address the majority of the areas described above on a generic basis using the AP1000 SAM, there are certain areas that can only be resolved in light of site-specific or licensee-specific details. In areas in which Westinghouse cannot provide detailed information because site-specific information or licensee-specific details are needed, a COL action item will be identified in the staff's Safety Evaluation Report. Specifically, the COL applicant will be responsible for providing information in the following areas:

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- A description of the site-specific organizational structure, including the identification of principal participants and the degree of participation of each organizational unit, based on the general requirements contained in the AP1000 SAM. This COL information item can be closed by COL issuance if fully addressed by the COL applicant(s).
- A site-specific schedule, relative to the fuel loading date, for conducting each major phase of the test program, and for the development of test procedures (in the form of a license condition), based on the general provisions contained in the AP1000 SAM. This activity requires a license condition that will allow the Nuclear Regulatory Commission (NRC) inspection staff to review the actual test schedule and test sequencing proposed by the COL holder.

The identification of the above COL items and license condition(s) will allow the COL applicant to address this information in each site-specific SAM. Using this approach would allow the NRC staff to adequately address COL information items 14.4.1, 14.4.3, and 14.4.4, provided that Westinghouse submits the AP1000 SAM and the COL applicant provides all relevant information to address site-specific activities.

Westinghouse Response:

The scope of Technical Report TR 71B is only to address COL Information Item 14.4-3, and no other COL Information items. It is not Westinghouse's intent to address any other COL Information Items in this Technical Report. COL information items 14.4-1, "Organization and Staffing," and 14.4-4, "Review and Evaluation of Test Results," will be addressed separately in other Technical Reports.

Nor was Westinghouse's intention to provide a complete startup site administrative manual (SAM). As stated in TR 71B (Ref. 1), the COL applicant is responsible for a SAM which contains the administration procedures and requirements that govern activities associated with the initial test program. WEC provided a SAM Program Management Description, APP-GW-GBY-600 (Ref. 2) as Appendix A to TR 71B. The technical report is intended to provide descriptions of the key processes and controls that will ensure that the SAM and associated products meet all licensing requirements for content and quality.

The following represents a summary of most of the information included in Revision 2 of TR-71B, APP-GW-GLR-038 and its attachment APP-GW-GBY-600 to respond to this RAI:

- 2.2.3 Initial Test Program Objectives are discussed in Section 14.2.1.2 and 14.2.1.3 of the AP1000 Design Control Document (DCD).

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- 2.3.4 Specific Test Objectives for the AP1000 Preoperational and Startup Test have been developed and are contained in the specific AP1000 Preoperational Test Specifications and AP1000 Startup Test Specifications and are available in the WEC Offices for Review by the applicant or the NRC at the Staff's convenience.
- 2.3.5 Additional details with respect to the purpose, prerequisites, general test methodology and acceptance criteria are also contained in the Test Specifications developed by Westinghouse as well as Sections 14.2.9 and 14.2.10 of the DCD.
- 2.3.6 Writer's Guidelines which delineate the format and content rules for the development, maintenance, and revision of the Preoperational and Startup Test Specifications and Procedures, as well as the records retention details, have been developed in collaboration with the plant operator which incorporate industry and regulatory standards for procedure development. Industry Lesson Learned have been incorporated into this procedures program, as delineated in the Writer's Guidelines. These Writer's Guidelines are available in the WEC Offices for review by the applicant or the NRC at the Staff's convenience.
- 3.1.3 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.
- 4.2.3 Interface controls provided in the Administrative Manual will include definition of the functional and physical interface controls involving the construction turnover, preoperational testing and startup testing of structures, systems and components.
- 5.1.2 Westinghouse is providing the preparation, review and approval of the Construction and Installation, Preoperational, and Startup Test Procedures for the AP1000 Combined License Holder (Licensee). Controls are provided by the following:
- 5.1.2.1 Use of Procedure Writer's Guidelines in the preparation of the Construction and Installation, Preoperational, and Startup Test Procedures. The development of these Writer's Guidelines has been coordinated between Westinghouse and the plant operator. The NOP and Two-Column format Writer's Guidelines

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have been previously submitted for NRC review. WEC is submitting the Preoperational and Startup Test Specification and Procedure Writer's Guidelines for NRC review with this Technical Report.

- 5.1.2.2 These Writer's Guidelines are part of the Standardized AP1000 design and are applicable to the COL applications referencing the AP1000 DCD.
 - 5.1.2.3 The procedures will be developed and approved under the Westinghouse QA Program via EDMS.
 - 5.1.2.4 Procedures are being reviewed by and developed with the plant operator.
 - 5.1.2.5 Procedures are being developed with the use of industry operational experience, and integrates INPO and other applicable industry Operational Experience documentation.
 - 5.1.2.6 Procedures will be provided to the NRC for review 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.
 - 5.1.2.7 Procedures will be developed and critical procedures verified with the aid of the Westinghouse AP1000 Engineering Simulator.
 - 5.1.2.8 The procedures will integrate the OSA Task Analyses as a part of their development and validation.
 - 5.1.2.9 Completed Preoperational and Startup Test Specifications and Procedures are currently available for NRC review at the WEC Offices at the Staff's convenience.
- 5.1.3 The Initial Test Plan (ITP) schedule for startup testing is documented in APP-GW-GER-040, Summary Report for Startup & Commissioning to Support AP1000 Plan of the Plan, and is the formal responsibility of the AP1000 Combined License Holder (Licensee). However, development of the ITP schedule is being coordinated between Westinghouse, the AP1000 Builder's Group and the Combined License Holder.
- 5.1.4 The AP1000 Design-Centered Working Group is developing a process to share schedule information with the NRC

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5.1.5 The AP1000 ITP and Construction and Startup Schedule provides Controls as delineated in Section 5.1.5 of APP-GW-GBY-600, which is an attachment to Technical Report 71B, APP-GW-GLR-038.

5.1.6 The ITP and the Preoperational and Startup Test procedures comply with Regulatory Guide 1.68 Rev 2 and the applicable sections of the Standard Review Plan Rev. 2 as required by the AP1000 FSER.

5.1.5.7 The Summary Report, APP-GW-GER-040, contains the recommended Site Staffing Levels to support each test and the overall ITP schedule. Staffing levels for both one and two unit sites are included.

7.0 CONFORMANCE WITH REGULATORY GUIDES:

7.1 Compliance of the AP1000 design, including the Preoperational and Startup Test Programs is specifically delineated in Section 1.9 of the AP1000 DCD.

7.2 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.

8.0 USE OF REACTOR OPERATING AND TESTING EXPERIENCE IN AP1000

8.1 The methodology for the integrating reactor operating testing experiences in the AP1000 Test Program is explicitly described in Section 14.2.5 of the AP1000 DCD. In addition, the integration of Operating Experience into the AP1000 Design is further described in the following documents:

8.1.1 GW-GJR-011. Review of Operating Experience and the Application of the Design of the AP600

8.1.2 APP-GW-GLR-001, Operational Assessment for the AP1000.

8.1.3 APP-GW-G1R-007, Operating Experience to Apply to Advanced Light Water Reactor Designs

8.1.4 APP-OCS-GJR-001, Human Factors Engineering Operating Experience Review Report for the AP1000 Nuclear Power Plant

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- 8.2 The documents delineated in Section 8.1 above are also explicitly part of the training and qualification program for AP1000 Procedure Writers and Preoperational and Startup Test Engineers.
- 9.0 TRIAL USE OF PLANT OPERATING AND EMERGENCY PROCEDURES
- 9.1 The bases for using plant operating and emergency procedures are described in Section 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:
- 9.1.1 Human Factors Engineering
 - 9.1.2 Operational Task Analysis
 - 9.1.3 Training Simulator Development
 - 9.1.4 Verification and Validation of the Procedures and the Training Material
- 9.2 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.
- 9.3 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.

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Further details responding to this RAI are delineated in Revision 2 of TR-71B, previously provided to the NRC.

References:

1. APP-GW-GER-040, Summary Report for Start-up & Commissioning to Support AP1000 Plan of the Plan.
2. APP-GW-T1R-500, AP1000 ITAAC Preoperational Test Requirements Report
3. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
4. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
5. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
6. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
7. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

As described above.

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Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-02
Revision: 1

Question:

Standard Review Plan (SRP) Section 14.2, paragraph II.3.A, "Management Organizations," states that the applicant should provide organizational descriptions of the principal management positions responsible for the planning, executing, and documenting preoperational and startup testing activities. Additionally, the applicant should provide organizational descriptions of any augmenting organizations or other personnel who will manage or execute any phase of the test program, and the responsibilities, interfaces, and authorities of the principal participants.

Section 3.0 of Appendix A to TR-71B contains information regarding the organizational structure that will be responsible for the conduct of the initial test program. Subsections 3.1 through 3.4 describe the structure and functions of the Joint Test Working Group, the Site Construction Group, the Site Preoperational Test Group, and the Site Startup Test Group.

Consistent with the SRP, the NRC staff requests that Westinghouse revise TR-71B to provide a generic description of the responsibilities, authorities, and interfaces of the organizations responsible for the overall administration and technical direction of the initial test program, in addition to the organizations described in Sections 3.1 through 3.4. This includes, but is not limited to:

- Licensee's Operations Group
- Licensee's Maintenance Group
- Licensee's Corrective Action Organization
- Licensee's Health Physics/Chemistry Group
- Licensee's Quality Assurance Group
- Construction BOP Engineering
- Construction Services Group
- Construction Services Procurement Group
- Construction Services Quality Group
- Construction Services Training Group
- Westinghouse Site Engineering Group
- Westinghouse Engineering Leads
- Preoperational and Startup Test Teams (including Startup Managers/Plant Managers/Startup Engineers, as applicable)

This description should also include consideration of staffing effects that could result from overlapping initial test programs at multi-unit sites.

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Westinghouse Response:

The following represents a summary of most of the information included in Revision 2 of TR-71B, APP-GW-GLR-038 and its attachment APP-GW-GBY-600 to respond to this RAI:

3.1 JOINT TEST WORKING GROUP

- 3.1.1 The Joint Test Working Group (JTWG) will consist of an organizational group of authorized representative personnel from the Site Plant Owner's (Licensee) operations and support group functions, Westinghouse Electric Company (WEC), Architect Engineer and other test support groups as identified in this document.
- 3.1.2 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.
- 3.1.3 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.
- 3.1.4 The JTWG will provide the following administrative oversight activities associated with the Startup Test Program:
 - 3.1.4.1 Review, evaluate and approve Startup Test Program administrative and test procedures.
 - 3.1.4.2 Oversee the implementation of the Preoperational Test Program and the Startup Test Program, including planning, scheduling and performance of all Preoperational and Startup testing.
 - 3.1.4.3 Review and evaluate Construction, Preoperational and Startup test results and test turnover packages.

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3.1.5 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

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

- Licensee's Operations Group

The Licensee's 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.

- Licensee's Maintenance Group

The Licensee's 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

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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.

- Licensee's Corrective Action Organization

The Licensee's 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.

- Licensee's 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 Licensee 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 and the Licensee.

- Licensee's 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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- Licensee's 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 Section 3.3 below. Once preoperational testing is complete, this group turns systems over to the Startup Group.

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- **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 Section 3.4 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.

3.2 SITE CONSTRUCTION GROUP (ARCHITECT ENGINEER)

3.2.1 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

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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.

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- 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.

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

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

3.3 SITE PREOPERATIONAL TEST GROUP

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

- 3.3.1.1 Engineering Leads
- 3.3.1.2 Preoperational Test Teams

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

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

3.4 SITE STARTUP TEST GROUP

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

- 3.4.1.1 Engineering Leads
- 3.4.1.2 Startup Test Teams

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

- 3.4.2.1 Coordinate tagging and maintenance as required to support system and equipment acceptance testing.
- 3.4.2.2 Accept systems, structures and components from the Licensee for integrated testing.
- 3.4.2.3 Plan, scope and schedule plant systems, structures and components for testing, to support Plant Startup.
- 3.4.2.4 Manage and oversee the testing of plant systems, structures and components to support the plant power ascension test program.
- 3.4.2.5 Resolve open items and exceptions identified during implementation of the Startup Test Program.
- 3.4.2.6 Accept and turn over Startup Test Packages to the Site Licensee.
- 3.4.2.7 Coordinate other support tasks required during Startup Testing activities with responsible groups (e.g., Licensee's Organization).

5.1 INITIAL TEST PROGRAM PLANNING AND SCHEDULING INCLUDES:

- 5.1.5.7 The Summary Report, APP-GW-GER-040, contains the recommended Site Staffing Levels to support each test and the overall ITP schedule. Staffing levels for both one and two unit sites are included.

Further details responding to this RAI are delineated in Revision 2 of TR-71B, previously provided to the NRC.

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Response to Request For Additional Information (RAI)

References:

1. APP-GW-GER-040, Summary Report for Start-up & Commissioning to Support AP1000 Plan of the Plan.
2. APP-GW-T1R-500, AP1000 ITAAC Preoperational Test Requirements Report
3. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
4. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
5. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
6. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
7. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

As described above.

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Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-03
Revision: 1

Question:

SRP Section 14.2, paragraph II.3.D, "Staff Responsibilities, Authorities, and Qualifications," states that the applicant should describe the education, training, and experience criteria established for each management and operating staff member—including the NSSS vendor, architect-engineer, and other major contractors, subcontractors, and vendors, as appropriate—who will conduct preoperational and startup tests and will develop testing, operating, and emergency procedures. In addition, the SRP states that the applicant should develop a training program for each functional group of employees in the organization relative to the schedule for preoperational testing and initial startup testing to ensure that the necessary plant staff is ready to begin the test program.

Consistent with the SRP, the NRC staff requests that Westinghouse revise TR-71B to provide a general description regarding the education, training, qualification, and experience criteria for organizations responsible for the conduct of preoperational and startup tests, and for organizations that will develop testing, operating, and emergency procedures. Additionally, the NRC staff requests that Westinghouse provide a general description regarding the development of a training program that will serve as supplemental training to the plant operators, consistent with Three Mile Island (TMI) Action Plan Item I.G.1 of NUREG-0660, NUREG-0694, and NUREG-0737.

Westinghouse Response:

The following represents a summary of most of the information included in Revision 2 of TR-71B, APP-GW-GLR-038 and its attachment APP-GW-GBY-600 to respond to this RAI:

"Finally, this document will provide guidance and a framework for the training, qualification and certification of construction and testing personnel at AP1000 Sites in accordance with ANSI Standard N45.2.6. This document does not address Operator or Operations Training Programs, which are addressed by COL Information Items in Sections 13.2 and 18.8 of the AP1000 Design Control Document and the Licensee."

The following additional changes to APP-GW-GBY-600, Revision 1, which is an attachment of Technical Report 71 B, were made in response to this RAI:

- 2.3.6 Writer's Guidelines which delineate the format and content rules for the development, maintenance, and revision of the Preoperational and Startup Test Specifications and Procedures, as well as the records retention details, have been developed in collaboration with the plant operator which incorporate industry and regulatory standards for procedure development. Industry Lesson Learned have been incorporated into this procedures program, as delineated in the Writer's Guidelines. These Writer's Guidelines are available in the WEC Offices for review by the applicant or the NRC at the Staff's convenience.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

4.2.2 The Administrative Manual and its supporting procedures will define and document the responsibilities and authority for overall control of the transfer of information between organizations (and within each organization) for:

- Design data
- Test specifications
- Test procedures
- Test packages and test results control
- Correspondence
- Equipment control processes required for support of test execution
- Execution of tests
- Equipment status and capability
- Turnover of systems and equipment from one responsible group to another
- Reporting and correction of identified defects
- Training, Qualification and certification of test personnel

4.3.2.12 Training and Certification of Test Personnel

Procedures will be prepared to ensure that all test personnel have adequate training, qualification and certification. Records will be kept for extent of experience, involvement in procedure and test development, training programs, and level of qualification. Training will qualify Test Personnel as applicable, in accordance with the requirements of ANSI N45.2.6. Training will be performed as agreed upon between Westinghouse and the Licensee.

6.0 USE OF REACTOR OPERATING AND TESTING EXPERIENCE IN AP1000

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 8.1 The methodology for the integrating reactor operating testing experiences in the AP1000 Test Program is explicitly described in Section 14.2.5 of the AP1000 DCD. In addition, the integration of Operating Experience into the AP1000 Design is further described in the following documents:
- 8.1.1 GW-GJR-011. Review of Operating Experience and the Application of the Design of the AP600
 - 8.1.2 APP-GW-GLR-001, Operational Assessment for the AP1000.
 - 8.1.3 APP-GW-G1R-007, Operating Experience to Apply to Advanced Light Water Reactor Designs
 - 8.1.4 APP-OCS-GJR-001, Human Factors Engineering Operating Experience Review Report for the AP1000 Nuclear Power Plant
- 8.2 The documents delineated in Section 8.1 above are also explicitly part of the training and qualification program for AP1000 Procedure Writers and Preoperational and Startup Test Engineers.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

7.0 TRIAL USE OF PLANT OPERATING AND EMERGENCY PROCEDURES

9.1 The bases for using plant operating and emergency procedures are described in Section 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:

9.1.1 Human Factors Engineering

9.1.2 Operational Task Analysis

9.1.3 Training Simulator Development

9.1.4 Verification and Validation of the Procedures and the Training Material

9.2 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.

9.3 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.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

With respect to the following portion of this RAI:

“Additionally, the NRC staff requests that Westinghouse provide a general description regarding the development of a training program that will serve as supplemental training to the plant operators, consistent with Three Mile Island (TMI) Action Plan Item I.G.1 of NUREG-0660, NUREG-0694, and NUREG-0737.”

These details are addressed by Sections 13.2 and 18.8 of the AP1000 DCD and their associated Technical Reports and are not appropriately addressed in this Technical Report 71B.

Further details responding to this RAI are delineated in Revision 2 of TR-71B, previously provided to the NRC.

References:

1. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
2. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
3. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
4. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
5. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

As described above.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-04

Revision: 1

Question:

SRP Section 14.2, paragraph II.3.C, "Test Program Schedule and Sequence," states that the applicant should develop a schedule for conducting each phase of the initial test program. Provisions should be in place to ensure that overlapping test program schedules (for multi-unit sites) do not result in significant divisions of responsibilities or dilutions of the staff implementing the test program. 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. RG 1.68, Revision 3, provides guidance regarding the general scope that the NRC staff considers acceptable for initial test programs. Specifically, the RG states, in part, that applicants should develop realistic schedules for preparing detailed testing, plant operating, and emergency procedures. Schedules should be established for conducting the major phases of the test program relative to the expected fuel loading date. Additionally, the RG states that sufficient time should be scheduled to perform orderly and comprehensive testing. Previous applicants' schedules for conducting the preoperational and initial startup phases have typically allowed a minimum time of approximately 9 months and 3 months, respectively. Significantly shorter time periods should be justified.

Consistent with the above guidance, the NRC staff requests that Westinghouse revise TR-71B to provide a general description of the methodology that will be used to develop a schedule, relative to the fuel loading date, for conducting each major phase of the test program, and for the development of test procedures. This description should consider the following:

- Test Procedure Development Schedule:

- o 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.

- o 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.

- o Controls to ensure that the COL holder provides timely notification to the NRC of changes in approved test procedures that have been made available for NRC review.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- Initial Test Program Schedule:

- o 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.

- o Controls to allow at least 9 months for conducting preoperational testing.

- o Controls to allow at least 3 months for conducting startup testing, including fuel loading, low-power tests, and power-ascension tests.

- o 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.

- o Controls to ensure that the sequential schedule for individual startup tests establish, insofar as is practicable, that testing should be 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 not be dependent on the performance of untested SSCs.

- o Controls to provide identification and cross-reference of each test (or portions thereof) required to be completed before initial fuel loading to satisfy the requirements for completing ITAAC in accordance with 10 CFR 52.99(a).

Westinghouse Response:

The following is a summary of the information added to Revision 2 of TR-71B, APP-GW-GLR-038 and its attachment, APP-GW-GBY-600, to address this RAI:

5.0 INITIAL TEST PROGRAM PLANNING AND SCHEDULING

5.1 INITIAL TEST PROGRAM PLANNING AND SCHEDULING INCLUDES:

5.1.1 INITIAL TEST PROGRAM PLANNING AND SCHEDULING will be provided by a Startup and Commissioning Plan that governs the execution of activities associated with the conduct of the initial test program, including the preparation, review and approval of Construction and Installation, Preoperational, and Startup Tests. These tests are the responsibility of the AP1000 Combined License Holder (Licensee).

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 5.1.2 Westinghouse is providing the preparation, review and approval of the Construction and Installation, Preoperational, and Startup Test Procedures for the AP1000 Combined License Holder (Licensee). Controls are provided by the following:
- 5.1.2.1 Use of Procedure Writer's Guidelines in the preparation of the Construction and Installation, Preoperational, and Startup Test Procedures. The development of these Writer's Guidelines has been coordinated between Westinghouse and the plant operator. The NOP and Two-Column format Writer's Guidelines have been previously submitted for NRC review. WEC is submitting the Preoperational and Startup Test Specification and Procedure Writer's Guidelines for NRC review with this Technical Report.
 - 5.1.2.2 These Writer's Guidelines are part of the Standardized AP1000 design and are applicable to the COL applications referencing the AP1000 DCD.
 - 5.1.2.3 The procedures will be developed and approved under the Westinghouse QA Program via EDMS.
 - 5.1.2.4 Procedures are being reviewed by and developed with the plant operator.
 - 5.1.2.5 Procedures are being developed with the use of industry operational experience, and integrates INPO and other applicable industry Operational Experience documentation.
 - 5.1.2.6 Procedures will be provided to the NRC for review 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.
 - 5.1.2.7 Procedures will be developed and critical procedures verified with the aid of the Westinghouse AP1000 Engineering Simulator.
 - 5.1.2.8 The procedures will integrate the OSA Task Analyses as a part of their development and validation.
 - 5.1.2.9 Completed Preoperational and Startup Test Specifications and Procedures are currently available for NRC review at the WEC Offices at the Staff's convenience.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 5.1.3 The Initial Test Plan (ITP) schedule for startup testing is documented in APP-GW-GER-040, Summary Report for Startup & Commissioning to Support AP1000 Plan of the Plan, and is the formal responsibility of the AP1000 Combined License Holder (Licensee). However, development of the ITP schedule is being coordinated between Westinghouse, the AP1000 Builder's Group and the Combined License Holder.
- 5.1.4 The AP1000 Design-Centered Working Group is developing a process to share schedule information with the NRC
- 5.1.5 The AP1000 ITP and Construction and Startup Schedule provides Controls that account for the following:
 - 5.1.5.1 The ITP requires the Joint Test Working Group (JTWG) oversee the implementation of the Preoperational Test Program and the Startup Test Program, including planning, scheduling and performance of all Preoperational and Startup testing.
 - 5.1.5.2 The ITP requires the test procedures to be performed in the correct sequence and scheduled to permit a minimum twelve month pre-operational test program beginning at construction turnover, followed by a minimum six month start-up test program from fuel load through warranty testing.
 - 5.1.5.3 Startup Testing Process Flow Chart with milestone chart schedules is provided and is sufficiently detailed to perform schedule analysis.
 - 5.1.5.4 A high-level Gantt Chart of the Startup Tests with enough detail to evaluate potential changes to the schedule.
 - 5.1.5.5 The Summary Report, APP-GW-GER-040, contains a list of the Startup and Preoperational Tests with high level summaries of the methodologies
 - 5.1.5.6 The Summary Report, APP-GW-GER-040, contains a list of Design Basis References to support the preoperational tests, startup tests, various supporting analyses, and the AP1000 ITAACs.
 - 5.1.5.7 The Summary Report, APP-GW-GER-040, contains the recommended Site Staffing Levels to support each test and the overall ITP schedule. Staffing levels for both one and two unit sites are included.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 5.1.5.8 Full compliance with Regulatory Guide 1.68 Rev. 2 as required by the AP1000 FSER and approved by the NRC. The ITP schedule specifies more than the minimum 9 months for preoperational testing and minimum of 3 months for startup testing (as required by RG 1.68 Rev. 2).
- 5.1.5.9 The ITP procedures will be provided to the NRC 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).
- 5.1.5.10 The ITP will be provided to the NRC at least 1 year prior to fuel load.
- 5.1.6 The ITP and the Preoperational and Startup Test procedures comply with Regulatory Guide 1.68 Rev 2 and the applicable sections of the Standard Review Plan Rev. 2 as required by the AP1000 FSER.
- 5.1.7 The ITP, Startup procedures and associated planning and scheduling documents will be available for review by the NRC at the WEC Offices.
- 5.2 The Preoperational and Startup Testing requirements are delineated in the AP1000 DCD Sections 14.2.9 and 14.2.10 respectively. Some of the high level milestones, as they are currently delineated, from APP-GW-GER-040 for the first AP1000 plants are listed below:
- 0 months – First Concrete
 - 36 months – Completion of most system turnovers, latest beginning of preoperational testing
 - 45 months – Start of pre-core hot functional testing (HFT)
 - 48 months – Completion of preoperational testing, mechanical completion, all ITAAC test and construction packages approved, all requirements met for fuel load, start of fuel load and startup testing
 - 51 months – Completion of post core HFT
 - 54 months – Completion of warranty testing, 100 hour test run and sync to grid

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

5.2.1 The HFT testing is segregated by temperature plateaus to delineate the appropriate time for preoperational tests during the initial RCS Heatup and Cooldown sequences. These temperature plateaus are initiated for the Heatup Sequence from ambient temperature (less than 100°F) to Normal Operational Temperature/Pressure (NOT/NOP), 557° (552°-562°F), and Cooldown to less than 100°F. The HFT sequence plateaus are identified as follows:

- Prior to RCS Fill & Vent
- Ambient Plateau (less than 100°F)
- 250°F Plateau
- 350°F Plateau
- 450° Plateau
- 557°F Plateau
- Cooldown Plateau to 450°F
- Cooldown Plateau to 350°
- Cooldown Plateau to 140°F
- Cooldown Plateau to less than or equal to 100°F

5.2.2 After the core is loaded, Post Core Hot Function Tests are performed to ensure that the facility is in a final state of readiness to achieve initial criticality and to perform the low-power physics tests. The Post Core Hot Functional Tests are performed as part of the RCS heat-up from ambient conditions to NOT/NOP condition. The Post Core Hot Functional Test sequence plateaus are identified as follows:

- Ambient Plateau
- 280°F plateau
- 340°F plateau
- 450°F plateau
- NOT/NOP plateau

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 5.2.3 After the core is loaded and the Post Core Hot Functional Tests are completed the low power physics testing (LPPT) is done. After completion of the detailed evaluation of the initial criticality data, the LPPT Program is initiated. The physics testing power is determined by observation of the power at which thermal feedback impacts the measured parameter. The test plateau is set to assure LPPT is carried out below this level. Measurements of the boron endpoints, isothermal temperature coefficients and bank worths are performed.
- 5.2.4 After the data from the LPPT test program has been reviewed and found satisfactory, the power ascension program is initiated. Power ascension testing is typically performed at specified power plateaus. These tests demonstrate the facility operates in accordance with design during normal steady state operations and to the extent possible during and following anticipated transients. The specified power plateaus are listed below:
- Low power Plateau
 - 25% Power Plateau
 - 50% Power Plateau
 - 75% Power Plateau
 - 90% Power Plateau
 - 100% Power Plateau

With respect to the following bullets in this RAI:

- o Controls to allow at least 9 months for conducting preoperational testing.
- o Controls to allow at least 3 months for conducting startup testing, including fuel loading, low-power tests, and power-ascension tests.
- o 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.
- o Controls to ensure that the sequential schedule for individual startup tests establish, insofar as is practicable, that testing should be 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 not be dependent on the performance of untested SSCs."

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

The details, including the sequencing and appropriate duration, of the AP1000 Construction and Startup schedules are being finalized by the AP1000 Design-Centered Working group which includes NRC participation. The licensing constraints and requirements for the specific sequencing and durations within the AP1000 Construction and Startup schedule represented by the RAI comments above are not appropriately addressed by this Technical Report or COL Information item and are not congruent with the AP1000 Design Certification licensing basis and are not be explicitly addressed Revision 2 of TR 71B.

Additional details to address this RAI is delineated in Revision 2 of TR-71B, previously provided to the NRC.

References:

1. APP-GW-GER-040, Summary Report for Start-up & Commissioning to Support AP1000 Plan of the Plan.
2. APP-GW-T1R-500, AP1000 ITAAC Preoperational Test Requirements Report
3. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
4. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
5. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
6. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
7. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

As described above.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-05
Revision: 1

Question:

SRP Section 14.2, paragraph II.3.B, "Conduct of the Initial Test Program," states, in part, that the applicant should describe the administrative controls that govern the conduct of each major phase of the test program. This description should include the administrative controls used to ensure that necessary prerequisites are satisfied for each major phase and for individual tests. The applicant should also describe the methods to be followed in initiating plant modifications or maintenance tasks that are determined to be necessary to conduct the test program. This description should include the methods used to ensure retesting following such modifications or maintenance. In addition, the description should discuss the involvement of design organizations and the applicant in reviewing and approving proposed plant modifications. For preoperational testing, the description should also include methods and identify provisions to ensure that retesting for modifications or maintenance remains in compliance with ITAAC commitments. Finally, the applicant should describe the administrative controls pertaining to adherence to approved test procedures during the conduct of the test program as well as the methods for effecting changes to approved test procedures.

Consistent with the guidance described above, the NRC staff requests that Westinghouse revise TR-71B to provide a general description of the administrative controls to be implemented during the conduct of the initial test program. This description should include descriptions of the following activities:

- Controls to ensure that test prerequisites (such as completion of construction, construction or preliminary tests, and inspections) are satisfied for each major phase of the initial test program and individual systems and components, to ensure an orderly turnover of plant systems and components from construction forces or other preliminary checkout groups to the preoperational/startup testing groups,
- Controls for the establishment of hold points at selected milestones throughout the power ascension test phase, as appropriate,
- Controls to ensure adherence to approved test procedures during the conduct of the test program, and the methods for effecting changes to approved test procedures,
- Controls for plant modifications and repairs identified as a result of plant testing, considering retesting following such modifications or repairs, and review of any proposed facility modifications by the original design organization or other designated design organizations, as appropriate. The applicant's documentation associated with such controls should be auditable to allow the NRC to ensure proper implementation of those controls,

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- Controls to document, process, review, and disposition test deficiencies, nonconformances, and exceptions identified during the execution of the initial test program, including identification, implementation, and report of corrective actions to appropriate levels of management, and
- Controls to ensure the use of available information regarding operating experience, including reportable occurrences from other operating power reactors, to help minimize recurrence of significant problems that can be avoided by more complete testing.

Westinghouse Response:

The following is a summary of the information that was added to Revision 2 of TR-71B, APP-GW-GLR-038 and Revision 1 of APP-GW-GBY-600, to address this RAI:

- 2.3.4 Specific Test Objectives for the AP1000 Preoperational and Startup Test have been developed and are contained in the specific AP1000 Preoperational Test Specifications and AP1000 Startup Test Specifications and are available in the WEC Offices for Review by the applicant or the NRC at the Staff's convenience.
- 2.3.5 Additional details with respect to the purpose, prerequisites, general test methodology and acceptance criteria are also contained in the Test Specifications developed by Westinghouse as well as Sections 14.2.9 and 14.2.10 of the DCD.
- 2.3.6 Writer's Guidelines which delineate the format and content rules for the development, maintenance, and revision of the Preoperational and Startup Test Specifications and Procedures, as well as the records retention details, have been developed in collaboration with the plant operator which incorporate industry and regulatory standards for procedure development. Industry Lesson Learned have been incorporated into this procedures program, as delineated in the Writer's Guidelines. These Writer's Guidelines are available in the WEC Offices for review by the applicant or the NRC at the Staff's convenience.
- 3.1.6 The following are additional generic details of the key responsibilities, authorities and interfaces of the Licensee Organizations delineated above:

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Response to Request For Additional Information (RAI)

- Licensee's Operations Group

The Licensee's 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.

- Licensee's Maintenance Group

The Licensee's 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.

- Licensee's Corrective Action Organization

The Licensee's 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.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- Licensee's 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 Licensee 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 and the Licensee.
- Licensee's 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.
- Licensee's 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

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- **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 Section 3.3 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 Section 3.4 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.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

3.1 SITE CONSTRUCTION GROUP (ARCHITECT ENGINEER)

3.2.1 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.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 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.

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

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

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

5.0 INITIAL TEST PROGRAM PLANNING AND SCHEDULING

5.1 INITIAL TEST PROGRAM PLANNING AND SCHEDULING INCLUDES:

5.1.1 INITIAL TEST PROGRAM PLANNING AND SCHEDULING will be provided by a Startup and Commissioning Plan that governs the execution of activities associated with the conduct of the initial test program, including the preparation, review and approval of Construction and Installation, Preoperational, and Startup Tests. These tests are the responsibility of the AP1000 Combined License Holder (Licensee).

5.1.2 Westinghouse is providing the preparation, review and approval of the Construction and Installation, Preoperational, and Startup Test Procedures for the AP1000 Combined License Holder (Licensee). Controls are provided by the following:

5.1.2.1 Use of Procedure Writer's Guidelines in the preparation of the Construction and Installation, Preoperational, and Startup Test Procedures. The development of these Writer's Guidelines has been coordinated between Westinghouse and the plant operator. The NOP and Two-Column format Writer's Guidelines have been previously submitted for NRC review. WEC is submitting the Preoperational and Startup Test Specification and Procedure Writer's Guidelines for NRC review with this Technical Report.

5.1.2.2 These Writer's Guidelines are part of the Standardized AP1000 design and are applicable to the COL applications referencing the AP1000 DCD.

5.1.2.3 The procedures will be developed and approved under the Westinghouse QA Program via EDMS.

5.1.2.4 Procedures are being reviewed by and developed with the plant operator.

5.1.2.5 Procedures are being developed with the use of industry operational experience, and integrates INPO and other applicable industry Operational Experience documentation.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 5.1.2.6 Procedures will be provided to the NRC for review 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.
 - 5.1.2.7 Procedures will be developed and critical procedures verified with the aid of the Westinghouse AP1000 Engineering Simulator.
 - 5.1.2.8 The procedures will integrate the OSA Task Analyses as a part of their development and validation.
 - 5.1.2.9 Completed Preoperational and Startup Test Specifications and Procedures are currently available for NRC review at the WEC Offices at the Staff's convenience.
- 5.2.1 After the core is loaded and the Post Core Hot Functional Tests are completed the low power physics testing (LPPT) is done. After completion of the detailed evaluation of the initial criticality data, the LPPT Program is initiated. The physics testing power is determined by observation of the power at which thermal feedback impacts the measured parameter. The test plateau is set to assure LPPT is carried out below this level. Measurements of the boron endpoints, isothermal temperature coefficients and bank worths are performed.
- 5.2.2 After the data from the LPPT test program has been reviewed and found satisfactory, the power ascension program is initiated. Power ascension testing is typically performed at specified power plateaus. These tests demonstrate the facility operates in accordance with design during normal steady state operations and to the extent possible during and following anticipated transients. The specified power plateaus are listed below:
- Low power Plateau
 - 25% Power Plateau
 - 50% Power Plateau
 - 75% Power Plateau
 - 90% Power Plateau

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Response to Request For Additional Information (RAI)

- 100% Power Plateau

6.0 TEST ACCEPTANCE AUTHORITY

6.1. TEST ACCEPTANCE AUTHORITY INCLUDES:

- 6.1.1 The AP1000 COL Licensee (Plant Site Organization) is responsible for the final review and acceptance for all applicable individual tests performed.
- 6.1.2 The Licensee is responsible for review of overall test results and for review of selected milestones or hold point within the test phases (Construction, Preoperational and Startup).
- 6.1.3 Test records will be retained in accordance with USNRC Regulatory Guide 1.28.
- 6.1.4 Further details concerning the explicit process for the review and approval of Test Results will be provided by the specific licensee

8.0 USE OF REACTOR OPERATING AND TESTING EXPERIENCE IN AP1000

8.1 The methodology for the integrating reactor operating testing experiences in the AP1000 Test Program is explicitly described in Section 14.2.5 of the AP1000 DCD. In addition, the integration of Operating Experience into the AP1000 Design is further described in the following documents:

- 8.1.1 GW-GJR-011. Review of Operating Experience and the Application of the Design of the AP600
- 8.1.2 APP-GW-GLR-001, Operational Assessment for the AP1000.
- 8.1.3 APP-GW-G1R-007, Operating Experience to Apply to Advanced Light Water Reactor Designs
- 8.1.4 APP-OCS-GJR-001, Human Factors Engineering Operating Experience Review Report for the AP1000 Nuclear Power Plant

8.2 The documents delineated in Section 8.1 above are also explicitly part of the training and qualification program for AP1000 Procedure Writers and Preoperational and Startup Test Engineers.

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9.0 TRIAL USE OF PLANT OPERATING AND EMERGENCY PROCEDURES

9.1 The bases for using plant operating and emergency procedures are described in Section 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:

9.1.1 Human Factors Engineering

9.1.2 Operational Task Analysis

9.1.3 Training Simulator Development

9.1.4 Verification and Validation of the Procedures and the Training Material

9.2 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.

Additional details responding to this RAI are also delineated in TR-71B, previously provided to the NRC.

References:

1. APP-GW-GER-040, Summary Report for Start-up & Commissioning to Support AP1000 Plan of the Plan.
2. APP-GW-T1R-500, AP1000 ITAAC Preoperational Test Requirements Report
3. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
4. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
5. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
6. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
7. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

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Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

As described above.

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Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-06
Revision: 1

Question:

SRP Section 14.2, paragraph II.3.F, "Review, Evaluation, and Approval of Test Results," states, in part, that the applicant should describe the specific controls to be established for the review, evaluation, and approval of test results for each major phase of the program by appropriate personnel and/or organizations. This description should include specific controls to be established to ensure notification of responsible organizations or personnel when test acceptance criteria are not met, as well as the controls established to resolve such matters. Additionally, the applicant should also provide a description of the controls for approval of test data that will be applied for each major test phase before the licensee proceeds to the next test phase, and the controls that will ensure the approval of test data by qualified personnel at each power test plateau (e.g., during the power-ascension testing phase) before increasing the power level.

Consistent with the above guidance, the NRC staff requests that Westinghouse revise TR-71B to provide a general description of the administrative controls to be implemented for the review, evaluation, and approval of test results. This description should include descriptions of the following activities:

- Controls relating to the methodology for the approval of test data for each major phase (e.g., preoperational and initial startup testing), and the methods used for the review of individual parts of multiple tests (e.g., hot functional testing),
- Controls to ensure the notification and participation of responsible organizations in the resolution of design-related problems that result in, or contribute to, a failure to meet test acceptance criteria,
- Controls to ensure a technical evaluation of test results by qualified personnel and approval of such results by personnel in designated management positions in the applicant's organization, and
- Controls to ensure retention of test reports, including test procedures and results, as part of the plant historical records. Startup test reports should be prepared in accordance with RG 1.16, or the applicant should provide adequate justification for its proposed alternative.

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Westinghouse Response:

The following represents a summary of most of the information included in Revision 2 of TR-71B, APP-GW-GLR-038 and its attachment APP-GW-GBY-600 to respond to this RAI:

- 2.3.4 Specific Test Objectives for the AP1000 Preoperational and Startup Test have been developed and are contained in the specific AP1000 Preoperational Test Specifications and AP1000 Startup Test Specifications and are available in the WEC Offices for Review by the applicant or the NRC at the Staff's convenience.
 - 2.3.5 Additional details with respect to the purpose, prerequisites, general test methodology and acceptance criteria are also contained in the Test Specifications developed by Westinghouse as well as Sections 14.2.9 and 14.2.10 of the DCD.
 - 2.3.6 Writer's Guidelines which delineate the format and content rules for the development, maintenance, and revision of the Preoperational and Startup Test Specifications and Procedures, as well as the records retention details, have been developed in collaboration with the plant operator which incorporate industry and regulatory standards for procedure development. Industry Lesson Learned have been incorporated into this procedures program, as delineated in the Writer's Guidelines. These Writer's Guidelines are available in the WEC Offices for review by the applicant or the NRC at the Staff's convenience.
- 4.1.3 Preoperational Tests
- 4.1.3.1 Preoperational tests are performed after installation and construction tests, and any component testing, prior to initial fuel loading, and demonstrate that equipment and systems perform in accordance with design criteria.
 - 4.1.3.2 These tests demonstrate the capability of plant systems to meet performance criteria so that initial fuel loading, initial criticality and subsequent power operation can be safely undertaken.

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4.1.4 Startup Tests

4.1.4.1 Startup tests begin with initial fuel loading after the Preoperational Testing has been successfully completed and are performed to demonstrate the capability of individual systems, as well as the integrated plant, to meet performance requirements during initial plant power ascension.

4.1.4.2 Startup Tests are grouped into four broad categories:

- Initial Fuel Loading and Precritical Tests.
- Initial Criticality Tests.
- Low Power Tests.
- Power Ascension Tests.

4.2.2 The Administrative Manual and its supporting procedures will define and document the responsibilities and authority for overall control of the transfer of information between organizations (and within each organization) for:

- Design data
- Test specifications
- Test procedures
- Test packages and test results control
- Correspondence
- Equipment control processes required for support of test execution
- Execution of tests
- Equipment status and capability
- Turnover of systems and equipment from one responsible group to another
- Reporting and correction of identified defects
- Training, Qualification and certification of test personnel

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- 4.2.3 Interface controls provided in the Administrative Manual will include definition of the functional and physical interface controls involving the construction turnover, preoperational testing and startup testing of structures, systems and components.
- 4.2.4 Interface controls also assure that the scope and depth of Startup Test Program will provide clear, well-documented objective evidence that the tests have satisfied the requirements of the:
- Validity of analytical design bases
 - Compatibility with technical specifications
 - Compatibility with specified sequence for implementation
 - Plant equipment capability and reliability
- 4.2.5 Information associated with the Startup Test Program will be transmitted across interfaces in a controlled manner, which will identify the status of the information or document provided and will further identify any incomplete items which require further evaluation, review or approval.
- 4.2.6 Where it is necessary to initially transmit information orally or by other informal means, the transmittal will be confirmed promptly by a controlled document.
- 4.3.2.5 Process controls for turnover of systems from construction tests to the JTWG for additional testing, operation and maintenance
- Procedures will be established to assure proper review of the post construction and installation prerequisite testing of all components prior to the turnover to the startup organization for subsequent preoperational testing. The test results are reviewed not only by the responsible staff organization, but also by the JTWG.
- 4.3.2.7 Reporting and elimination of defects during startup
- Procedures that delineate the reporting, tracking and methods used to assure elimination of defects will be established. The details of these procedures are dependent on the systems, type, and level of the defect.

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4.3.2.8 JTWG document control

Procedures will be developed to assure proper recording, documenting and control of the Startup related documents. This includes the transfer of information between organizations and within each organization associated with Startup activities (i.e., interface controls).

5.2.1 After the core is loaded and the Post Core Hot Functional Tests are completed the low power physics testing (LPPT) is done. After completion of the detailed evaluation of the initial criticality data, the LPPT Program is initiated. The physics testing power is determined by observation of the power at which thermal feedback impacts the measured parameter. The test plateau is set to assure LPPT is carried out below this level. Measurements of the boron endpoints, isothermal temperature coefficients and bank worths are performed.

5.2.2 After the data from the LPPT test program has been reviewed and found satisfactory, the power ascension program is initiated. Power ascension testing is typically performed at specified power plateaus. These tests demonstrate the facility operates in accordance with design during normal steady state operations and to the extent possible during and following anticipated transients.

6.0 TEST ACCEPTANCE AUTHORITY

6.1. TEST ACCEPTANCE AUTHORITY INCLUDES:

6.1.1 The AP1000 COL Licensee (Plant Site Organization) is responsible for the final review and acceptance for all applicable individual tests performed.

6.1.2 The Licensee is responsible for review of overall test results and for review of selected milestones or hold point within the test phases (Construction, Preoperational and Startup).

6.1.3 Test records will be retained in accordance with USNRC Regulatory Guide 1.28.

6.1.4 Further details concerning the explicit process for the review and approval of Test Results will be provided by the specific licensee.

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7.0 CONFORMANCE WITH REGULATORY GUIDES

- 7.1 Compliance of the AP1000 design, including the Preoperational and Startup Test Programs is specifically delineated in Section 1.9 of the AP1000 DCD.
- 7.2 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.

With respect to the following statement in the RAI:

“Startup test reports should be prepared in accordance with RG 1.16, or the applicant should provide adequate justification for its proposed alternative.”

As delineated in Section 1.9 of the AP1000 DCD, Regulatory Guide 1.16 is not part of the AP1000 design and licensing basis as approved by the NRC, and is not part of the Certified Design of the AP1000. Alternate methods and requirements for test reports are delineated in the summary information provided above and in Revision 2 of TR-71B previously provided to the NRC.

Further details responding to this RAI are delineated in Revision 2 of TR-71B, previously provided to the NRC.

References:

1. APP-GW-GER-040, Summary Report for Start-up & Commissioning to Support AP1000 Plan of the Plan.
2. APP-GW-T1R-500, AP1000 ITAAC Preoperational Test Requirements Report
3. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
4. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
5. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
6. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
7. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

Design Control Document (DCD) Revision:

None

PRA Revision:

None

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Technical Report (TR) Revision:
As described above.

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Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-07
Revision: 1

Question:

Section 4.2 of Westinghouse's TR-71B, "Interface Control," provides an overview of the relationship among organizations responsible for the execution of the initial test program. This section briefly describes processes for the control of information among organizations, functional and physical interface controls, and documentation needs as part of the information that will be provided in the AP1000 SAM.

The NRC staff requests that Westinghouse revise TR-71B to expand, define, and clarify this information consistent with the guidance contained in RG 1.68 and SRP Section 14.2. Specifically, provide a general description of the methodology that will be used for the following activities:

- The control of internal and external transfer of information, design data, test results, documents, etc., from one AP1000 operating site organization to another, as proposed in Subsection 4.2.1 of TR-71B,
- The responsibilities and authority for overall control of the transfer of information among organizations, as proposed in Subsection 4.2.2 of TR-71B,
- The functional and physical interface controls involving SSCs, as proposed in Subsection 4.2.3 of TR-71B,
- The controls to assure that the scope and depth of the startup test program will provide clear, well documented, objective evidence that the tests have satisfied the criteria for validity of analytical bases, compatibility with technical specifications, compatibility with specified sequence for implementation, and plant equipment capability and reliability, as proposed in Subsection 4.2.4 of TR-71B, and
- The controls for the transmission of information associated with the startup test program among organizations, as proposed in Subsection 4.2.5 of TR-71B.

Additionally, these activities need to be integrated into the organizational structure described in Section 3.0 of TR-71B.

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Westinghouse Response:

The following represents a summary of most of the information included in Revision 2 of TR-71B, APP-GW-GLR-038 and its attachment APP-GW-GBY-600 to respond to this RAI.

3.0 ORGANIZATIONAL STRUCTURE

3.1 JOINT TEST WORKING GROUP

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

3.1.2 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.

3.1.3 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.

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

3.1.4.1 Review, evaluate and approve Startup Test Program administrative and test procedures.

3.1.4.2 Oversee the implementation of the Preoperational Test Program and the Startup Test Program, including planning, scheduling and performance of all Preoperational and Startup testing.

3.1.4.3 Review and evaluate Construction, Preoperational and Startup test results and test turnover packages.

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3.1.5 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

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

- Licensee's Operations Group
The Licensee's 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.
- Licensee's Maintenance Group
The Licensee's 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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- Licensee's Corrective Action Organization

The Licensee's 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.

- Licensee's 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 Licensee 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 and the Licensee.

- Licensee's 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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- Licensee's 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 Section 3.3 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 Section 3.4 below. The Startup Test Group turns over systems to the licensee when testing is complete.

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- 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.

3.2 SITE CONSTRUCTION GROUP (ARCHITECT ENGINEER)

3.2.1 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.

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- 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.

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- 3.2.2 The Site Construction Group will perform the following functions and scope of work, as necessary to support the Site Startup Test Program:
- 3.2.2.1 Construction Installation and Testing, including management of construction testing documentation.
 - 3.2.2.2 Construction and Installation activities required to support Preoperational and Startup Test Programs.
 - 3.2.2.3 Vendor interface and procurement associated with supporting testing activities.
 - 3.2.2.4 Provide manpower and labor as needed to support all testing activities.
 - 3.2.2.5 Turnover of Construction and Installation tested equipment, systems and testing documentation to the Site Preoperational Test Group.

4.0 FUNCTIONAL RESPONSIBILITIES and INTERFACES

4.1 FUNCTIONAL RESPONSIBILITIES ASSOCIATED WITH THE TEST PROGRAM TO BE PERFORMED DURING INITIAL STARTUP OF AN AP1000 PLANT.

4.1.1 Initial Plant Test Program

- 4.1.1.1 The initial plant test program consists of a series of tests categorized as Construction and Installation, Preoperational, and Startup Tests. These tests are the responsibility of the AP1000 Combined License Holder (Licensee).
- 4.1.1.2 The overall objective of this test program is to demonstrate that the plant has been constructed as designed, the systems perform consistent with the plant design, and activities culminating in operation at full licensed power are performed in a controlled and safe manner.
- 4.1.1.3 As identified in Section 3.0 above, the Licensee will delegate the implementation and technical direction of this program to

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the Joint Test Working Group and its Chairman (Westinghouse Startup Manager).

4.1.2 Construction and Installation Tests

4.1.2.1 Construction and Installation tests are performed to determine that plant systems, structures and components have been constructed or installed correctly and are functional.

4.1.2.2 On a system basis, successful completion of this testing program, in addition to any component testing, demonstrates the system is ready for Preoperational testing.

4.1.2.3 The scope of this testing includes the following, at a minimum:

- Cleaning and flushing
- Hydrostatic testing
- Checks of electrical wiring and equipment
- Valve testing
- Energization and operation of equipment
- Calibration of instrumentation and test equipment

4.1.3 Preoperational Tests

4.1.3.1 Preoperational tests are performed after installation and construction tests, and any component testing, prior to initial fuel loading, and demonstrate that equipment and systems perform in accordance with design criteria.

4.1.3.2 These tests demonstrate the capability of plant systems to meet performance criteria so that initial fuel loading, initial criticality and subsequent power operation can be safely undertaken.

4.1.3.3 Preoperational Tests at elevated pressure and temperature are also referred to as pre-core hot functional tests .

4.1.3.4 The scope of this testing includes the following, at a minimum:

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- Demonstrate that essential plant components and systems, including alarms and indications, meet appropriate design criteria.
- Provide documentation of the performance and condition of equipment and systems.
- Provide baseline test and operating data on equipment and systems for future use and reference.
- Operate equipment for a sufficient period to demonstrate performance.
- Demonstrate that plant systems operate on an integrated basis.

4.1.4 Startup Tests

4.1.4.1 Startup tests begin with initial fuel loading after the Preoperational Testing has been successfully completed and are performed to demonstrate the capability of individual systems, as well as the integrated plant, to meet performance requirements during initial plant power ascension.

4.1.4.2 Startup Tests are grouped into four broad categories:

- Initial Fuel Loading and Precritical Tests.
- Initial Criticality Tests.
- Low Power Tests.
- Power Ascension Tests.

4.1.4.3 The scope of this testing includes the following, at a minimum:

- Install nuclear fuel into the reactor vessel in a controlled and safe manner.
- Verify the reactor core and components, equipment and systems required for control and shutdown have been assembled according to design and meet specified performance attributes.

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- Achieve initial criticality and operation at power in a controlled and safe manner.
- Verify the operating characteristics of the reactor core and associated control and protection equipment are consistent with design requirements and accident analysis assumptions.
- Obtain the required data and calibrate equipment used to control and protect the plant.
- Verify the plant is operating within the limits imposed by the Technical Specifications.
- Provide the plant operating staff the opportunity to obtain practical experience in the use of normal and abnormal operating procedures while the plant progresses through heatup, criticality and power operations.

4.2 INTERFACE CONTROL

4.2.1 The AP1000 Startup Program Site Administrative Manual will provide direction for interface control of internal and external transfer of information, design data, test results, documents, etc., from one AP1000 operating site organization to another.

4.2.2 The Administrative Manual and its supporting procedures will define and document the responsibilities and authority for overall control of the transfer of information between organizations (and within each organization) for:

- Design data
- Test specifications
- Test procedures
- Test packages and test results control
- Correspondence
- Equipment control processes required for support of test execution
- Execution of tests

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- Equipment status and capability
 - Turnover of systems and equipment from one responsible group to another
 - Reporting and correction of identified defects
 - Training, Qualification and certification of test personnel
- 4.2.3 Interface controls provided in the Administrative Manual will include definition of the functional and physical interface controls involving the construction turnover, preoperational testing and startup testing of structures, systems and components.
- 4.2.4 Interface controls also assure that the scope and depth of Startup Test Program will provide clear, well-documented objective evidence that the tests have satisfied the requirements of the:
- Validity of analytical design bases
 - Compatibility with technical specifications
 - Compatibility with specified sequence for implementation
 - Plant equipment capability and reliability
- 4.2.5 Information associated with the Startup Test Program will be transmitted across interfaces in a controlled manner, which will identify the status of the information or document provided and will further identify any incomplete items which require further evaluation, review or approval.
- 4.2.6 Where it is necessary to initially transmit information orally or by other informal means, the transmittal will be confirmed promptly by a controlled document.

5.0 INITIAL TEST PROGRAM PLANNING AND SCHEDULING

5.1 INITIAL TEST PROGRAM PLANNING AND SCHEDULING INCLUDES:

- 5.1.1 INITIAL TEST PROGRAM PLANNING AND SCHEDULING will be provided by a Startup and Commissioning Plan that governs the execution of activities associated with the conduct of the initial test program, including the preparation, review and approval of Construction and Installation, Preoperational, and Startup Tests. These tests are the responsibility of the AP1000 Combined License Holder (Licensee).

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- 5.1.2 Westinghouse is providing the preparation, review and approval of the Construction and Installation, Preoperational, and Startup Test Procedures for the AP1000 Combined License Holder (Licensee). Controls are provided by the following:
- 5.1.2.1 Use of Procedure Writer's Guidelines in the preparation of the Construction and Installation, Preoperational, and Startup Test Procedures. The development of these Writer's Guidelines has been coordinated between Westinghouse and the plant operator. The NOP and Two-Column format Writer's Guidelines have been previously submitted for NRC review. WEC is submitting the Preoperational and Startup Test Specification and Procedure Writer's Guidelines for NRC review with this Technical Report.
 - 5.1.2.2 These Writer's Guidelines are part of the Standardized AP1000 design and are applicable to the COL applications referencing the AP1000 DCD.
 - 5.1.2.3 The procedures will be developed and approved under the Westinghouse QA Program via EDMS.
 - 5.1.2.4 Procedures are being reviewed by and developed with the plant operator.
 - 5.1.2.5 Procedures are being developed with the use of industry operational experience, and integrates INPO and other applicable industry Operational Experience documentation.
 - 5.1.2.6 Procedures will be provided to the NRC for review 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.
 - 5.1.2.7 Procedures will be developed and critical procedures verified with the aid of the Westinghouse AP1000 Engineering Simulator.
 - 5.1.2.8 The procedures will integrate the OSA Task Analyses as a part of their development and validation.
 - 5.1.2.9 Completed Preoperational and Startup Test Specifications and Procedures are currently available for NRC review at the WEC Offices at the Staff's convenience.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

Further details responding to this RAI are delineated in Revision 2 of TR-71B, previously provided to the NRC.

References:

1. APP-GW-GER-040, Summary Report for Start-up & Commissioning to Support AP1000 Plan of the Plan.
2. APP-GW-T1R-500, AP1000 ITAAC Preoperational Test Requirements Report
3. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
4. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
5. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
6. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
7. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

As described above.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-08

Revision: 1

Question:

Section 4.3 of Westinghouse's TR-71B, "Startup Administrative Manual and Procedures used for Program Control," provides an outline of the standards that will govern the execution of activities associated with the conduct of the initial test program. The NRC staff requests that Westinghouse revise TR-71B to expand, define, and clarify this information consistent with the guidance contained in RG 1.68 and SRP Section 14.2. Specifically, provide a general description of the sections proposed for the SAM that are contained in Subsections 4.3.2.a through 4.3.2.l of TR-71B; and clarify how these activities relate to the organizational structure described in Section 3.0 of TR-71B.

Westinghouse Response:

The following represents a summary of most of the information included in Revision 2 of TR-71B, APP-GW-GLR-038 and its attachment APP-GW-GBY-600 to respond to this RAI.

3.0 ORGANIZATIONAL STRUCTURE

3.1 JOINT TEST WORKING GROUP

- 3.1.1 The Joint Test Working Group (JTWG) will consist of an organizational group of authorized representative personnel from the Site Plant Owner's (Licensee) operations and support group functions, Westinghouse Electric Company (WEC), Architect Engineer and other test support groups as identified in this document.
- 3.1.2 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.
- 3.1.3 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.
- 3.1.4 The JTWG will provide the following administrative oversight activities associated with the Startup Test Program:

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Response to Request For Additional Information (RAI)

- 3.1.4.1 Review, evaluate and approve Startup Test Program administrative and test procedures.
 - 3.1.4.2 Oversee the implementation of the Preoperational Test Program and the Startup Test Program, including planning, scheduling and performance of all Preoperational and Startup testing.
 - 3.1.4.3 Review and evaluate Construction, Preoperational and Startup test results and test turnover packages.
- 3.1.5 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
- 3.1.6 The following are additional generic details of the key responsibilities, authorities and interfaces of the Licensee Organizations delineated above:

- Licensee's Operations Group

The Licensee's 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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- Licensee's Maintenance Group

The Licensee's 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.

- Licensee's Corrective Action Organization

The Licensee's 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.

- Licensee's 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 Licensee 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 and the Licensee.

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- Licensee's 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.

- Licensee's 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 Section 3.3 below. Once preoperational testing is complete, this group turns systems over to the Startup Group.

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Response to Request For Additional Information (RAI)

- **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 Section 3.4 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.

3.2 SITE CONSTRUCTION GROUP (ARCHITECT ENGINEER)

3.2.1 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.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 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.

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Response to Request For Additional Information (RAI)

- 3.2.2 The Site Construction Group will perform the following functions and scope of work, as necessary to support the Site Startup Test Program:
- 3.2.2.1 Construction Installation and Testing, including management of construction testing documentation.
 - 3.2.2.2 Construction and Installation activities required to support Preoperational and Startup Test Programs.
 - 3.2.2.3 Vendor interface and procurement associated with supporting testing activities.
 - 3.2.2.4 Provide manpower and labor as needed to support all testing activities.
 - 3.2.2.5 Turnover of Construction and Installation tested equipment, systems and testing documentation to the Site Preoperational Test Group.

3.3 SITE PREOPERATIONAL TEST GROUP

- 3.3.1 The Site Preoperational Test Group will consist of the following, as necessary to support the Site Startup Test Program:
- 3.3.1.1 Engineering Leads
 - 3.3.1.2 Preoperational Test Teams
- 3.3.2 The Site Preoperational Test Group will perform the following functions and scope of work, as necessary to support the Site Startup Test Program:
- 3.3.2.1 Coordinate Tagging and maintenance prior to turnover to the Licensee to support system acceptance testing.
 - 3.3.2.2 Accept systems for turnover from the installation organization.
 - 3.3.2.3 Plan, scope and schedule plant systems for test to support the plant Preoperational Test program.
 - 3.3.2.4 Manage and oversee the testing of plant systems to support the plant hot-functional test program.
 - 3.3.2.5 Resolve open items and exceptions identified during implementation of the Preoperational Test Program.
 - 3.3.2.6 Accept and turn over Preoperational Test Packages to the Site Licensee.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

- 3.3.2.7 Support completion of hot-functional testing program.
 - 3.3.2.8 Coordinate other support tasks required during Startup Testing activities with responsible groups (e.g., Licensee's Organization).
- 3.4 SITE STARTUP TEST GROUP
- 3.4.1 The Site Startup Test Group will consist of the following, as necessary to support the Site Startup Test Program:
 - 3.4.1.1 Engineering Leads
 - 3.4.1.2 Startup Test Teams
 - 3.4.2 The Site Startup Test Group will perform the following functions and scope of work, as necessary to support the Site Startup Test Program:
 - 3.4.2.1 Coordinate tagging and maintenance as required to support system and equipment acceptance testing.
 - 3.4.2.2 Accept systems, structures and components from the Licensee for integrated testing.
 - 3.4.2.3 Plan, scope and schedule plant systems, structures and components for testing, to support Plant Startup.
 - 3.4.2.4 Manage and oversee the testing of plant systems, structures and components to support the plant power ascension test program.
 - 3.4.2.5 Resolve open items and exceptions identified during implementation of the Startup Test Program.
 - 3.4.2.6 Accept and turn over Startup Test Packages to the Site Licensee.
 - 3.4.2.7 Coordinate other support tasks required during Startup Testing activities with responsible groups (e.g., Licensee's Organization).
- 4.1 STARTUP ADMINISTRATIVE MANUAL AND PROCEDURES USED FOR PROGRAM CONTROL
- 4.3.1 Startup Administrative Manual and administrative procedures will provide detailed requirements that govern the execution of activities associated with the conduct of the initial test program, including the organization, structure and functional relations of the Joint Test Working Group and the Startup Organization.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

4.3.2 The Startup Administrative Manual will, at a minimum, include sections addressing the following:

4.3.2.1 Organization and functional relations of the JTWG (Joint Test Working Group)

Procedures will be established for the JTWG and its make up. Use and responsibilities of personnel from the utilities operation and maintenance groups supplemented with vendor and construction personnel will be defined.

4.3.2.2 Startup administrative and test procedures preparation, review, approval, revision and change

Detailed procedures will be established for preparation of the administration and test procedures, including their review, approval, revision and change.

4.3.2.3 Planning, preparation and performance of startup tests

Detailed procedures will be established for planning and timely performance of the startup tests.

4.3.2.4 Startup test evaluation and approval

Procedures will be established for the startup test evaluation and approval. Such procedures will address the responsibility for preparation, conduct, and on-shift evaluation and subsequent review by the JTWG.

4.3.2.5 Process controls for turnover of systems from construction tests to the JTWG for additional testing, operation and maintenance

Procedures will be established to assure proper review of the post construction and installation prerequisite testing of all components prior to the turnover to the startup organization for subsequent preoperational testing. The test results are reviewed not only by the responsible staff organization, but also by the JTWG.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

4.3.2.6 Work permits and system tagging

Procedures will be prepared to assure that proper work permits are established and tracked to ensure work completion and system and component condition and status are documented at all times.

4.3.2.7 Reporting and elimination of defects during startup

Procedures that delineate the reporting, tracking and methods used to assure elimination of defects will be established. The details of these procedures are dependent on the systems, type, and level of the defect.

4.3.2.8 JTWG document control

Procedures will be developed to assure proper recording, documenting and control of the Startup related documents. This includes the transfer of information between organizations and within each organization associated with Startup activities (i.e., interface controls).

4.3.2.9 Control of keys/electrical jumper/lifted lead/mechanical jumper and blind flange

Procedures will be established to assure proper control of keys/electrical jumpers/lifted leads/mechanical jumpers and blind flanges. These procedures include sign in and out and summary of system conditions with requirements regarding tagging and removal of tags.

4.3.2.10 On-site short term startup test scheduling and authorization

Procedures will be established which deal with the process of establishing personnel responsibility for short-term scheduling and authorization. The scope of this responsibility will depend upon the nature of the test schedule and its impact. Requirements and authority for moving beyond selected milestones within a given test phase will be established.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

4.3.2.11 Test configuration control

Procedures will be established for implementation of methods used to monitor the as-tested status of each system and any modifications, including retest requirements deemed necessary for systems undergoing testing or that have already been completed tested.

4.3.2.12 Training and Certification of Test Personnel

Procedures will be prepared to ensure that all test personnel have adequate training, qualification and certification. Records will be kept for extent of experience, involvement in procedure and test development, training programs, and level of qualification. Training will qualify Test Personnel as applicable, in accordance with the requirements of ANSI N45.2.6. Training will be performed as agreed upon between Westinghouse and the Licensee.

4.3.3 Controls for the format, generation, approval, issuance and use of specific Test Specifications and Test Procedures will, at a minimum, include the following for each phase of Startup test procedures and/or test specifications:

- Objectives for performing the test.
- Test prerequisites.
- Initial test conditions.
- Precautions required for personnel and equipment safety.
- Test performance directions.
- Data requirements including documentation.
- Criteria for test results evaluation.
- Reconciliation methods and analysis as required.
- Test approval and distribution to affected groups.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

Further details responding to this RAI are delineated in Revision 2 of TR-71B, previously provided to the NRC.

References:

1. APP-GW-GER-040, Summary Report for Start-up & Commissioning to Support AP1000 Plan of the Plan.
2. APP-GW-T1R-500, AP1000 ITAAC Preoperational Test Requirements Report
3. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
4. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
5. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
6. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
7. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

As described above.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP14.2-CQVP-11
Revision: 1

Question:

Staff Responsibilities, Authorities, and Qualifications

SRP Section 14.2, paragraph II.3.D, "Staff Responsibilities, Authorities, and Qualifications," states that the COL applicant should describe the education, training, and experience requirements established for each management and operating staff member—including the NSSS vendor, architect-engineer, and other major contractors, subcontractors, and vendors, as appropriate—who will conduct preoperational and startup tests and will develop testing, operating, and emergency procedures. In addition, the SRP states that the applicant should develop a training program for each functional group of employees in the organization relative to the schedule for preoperational testing and initial startup testing to ensure that the necessary plant staff is ready to begin the test program.

Consistent with the SRP, the NRC staff requests that Westinghouse revise TR-71B to include a general description regarding the development of a training program for each functional group of employees in the organization relative to the schedule for preoperational testing and initial startup testing to ensure that the necessary plant staff is ready to begin the test program.

Westinghouse Response:

The following represents a summary of most of the information included in Revision 2 of TR-71B, APP-GW-GLR-038 and its attachment APP-GW-GBY-600 to respond to this RAI.

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

- Licensee's 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 Licensee 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 and the Licensee.

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Response to Request For Additional Information (RAI)

- 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.

3.1 SITE CONSTRUCTION GROUP (ARCHITECT ENGINEER)

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

- 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.

4.2.2 The Administrative Manual and its supporting procedures will define and document the responsibilities and authority for overall control of the transfer of information between organizations (and within each organization) for:

- Design data
- Test specifications
- Test procedures
- Test packages and test results control
- Correspondence

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Response to Request For Additional Information (RAI)

- Equipment control processes required for support of test execution
- Execution of tests
- Equipment status and capability
- Turnover of systems and equipment from one responsible group to another
- Reporting and correction of identified defects
- Training, Qualification and certification of test personnel

4.3.2.12 Training and Certification of Test Personnel

Procedures will be prepared to ensure that all test personnel have adequate training, qualification and certification. Records will be kept for extent of experience, involvement in procedure and test development, training programs, and level of qualification. Training will qualify Test Personnel as applicable, in accordance with the requirements of ANSI N45.2.6. Training will be performed as agreed upon between Westinghouse and the Licensee.

8.0 USE OF REACTOR OPERATING AND TESTING EXPERIENCE IN AP1000

8.1 The methodology for the integrating reactor operating testing experiences in the AP1000 Test Program is explicitly described in Section 14.2.5 of the AP1000 DCD. In addition, the integration of Operating Experience into the AP1000 Design is further described in the following documents:

- 8.1.1 GW-GJR-011. Review of Operating Experience and the Application of the Design of the AP600
- 8.1.2 APP-GW-GLR-001, Operational Assessment for the AP1000.
- 8.1.3 APP-GW-G1R-007, Operating Experience to Apply to Advanced Light Water Reactor Designs

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Response to Request For Additional Information (RAI)

8.1.4 APP-OCS-GJR-001, Human Factors Engineering Operating Experience Review Report for the AP1000 Nuclear Power Plant

8.2 The documents delineated in Section 8.1 above are also explicitly part of the training and qualification program for AP1000 Procedure Writers and Preoperational and Startup Test Engineers.

9.0 TRIAL USE OF PLANT OPERATING AND EMERGENCY PROCEDURES

9.1 The bases for using plant operating and emergency procedures are described in Section 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:

9.1.1 Human Factors Engineering

9.1.2 Operational Task Analysis

9.1.3 Training Simulator Development

9.1.4 Verification and Validation of the Procedures and the Training Material

9.2 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.

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Response to Request For Additional Information (RAI)

9.3 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.

Further details responding to this RAI are delineated in Revision 2 of TR-71B, previously provided to the NRC.

References:

1. APP-GW-GER-040, Summary Report for Start-up & Commissioning to Support AP1000 Plan of the Plan.
2. APP-GW-T1R-500, AP1000 ITAAC Preoperational Test Requirements Report
3. APP-GW-T1P-500, AP1000 Plant Procedure Program Administrative Procedure
4. APP-GW-T1-500, Writers Guideline for AP1000 Preoperational Test Procedures and Test Specifications
5. APP-GW-T1-600, AP1000 Writer's Guideline for Startup Test Procedures and Test Specifications
6. APP-GW-GJP-100, AP1000 Normal Operating Procedures (NOP) Writers Guideline
7. APP-GW-GJP-200, AP1000 Writers Guideline for Two Column Procedures

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

See TR-71B Revision 2.