Greg Gibson
Vice President, Regulatory Affairs

250 West Pratt Street, Suite 2000
Baltimore, Maryland 21201

UniStar
NUCLEAR ENERGY

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ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Response to Request for Additional Information for the
Calvert Cliffs Nuclear Power Plant, Unit 3,
RAI No. 28, Revision 2, Questions 14.02-14 through 14.02-24,
Initial Plant Test Program - Design Certification and New License Applicants

Reference: John Rycyna (NRC) to George Wrobel (UniStar), "RAI No 28 CQVP 667.doc," email dated November 3, 2008

The purpose of this letter is to respond to the request for additional information (RAI) identified in the NRC e-mail correspondence to UniStar Nuclear, dated November 3, 2008. This RAI addresses the Initial Plant Test Program, as discussed in Section 14.2 of the Final Safety Analysis Report, as submitted in Part 2 of the CCNPP Unit 3 Combined License Application (COLA), Revision 3.

The enclosure provides our response to RAI No. 28, Revision 2, Questions 14.02-14 through 14.02-24. RAI Questions 14.02-14, 16, 17, 18, 21, 22, 23, and 24 include revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate these changes in a future revision of the COLA. There are no new regulatory commitments in this correspondence.

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NRO

If there are any questions regarding this transmittal, please contact me at 410-470-4205, or Mr. George Wrobel at (585) 771-3535.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 22, 2008

Greg Gibson

Enclosure: Response to NRC Request for Additional Information, RAI No. 28, Revision 2, Questions 14.02-14 through 14.02-24, Initial Plant Test Program - Design Certification and New License Applicants, Calvert Cliffs Nuclear Power Plant, Unit 3

cc: U.S. NRC Region I
U.S. NRC Resident Inspector, Calvert Cliffs Nuclear Power Plant, Units 1 and 2
NRC Environmental Project Manager, U.S. EPR Combined License Application
NRC Project Manager, U.S. EPR Combined License Application
NRC Project Manager, U.S. EPR Design Certification Application (w/o enclosure)

Enclosure

Response to NRC Request for Additional Information

RAI No. 28, Revision 2, Questions 14.02-14 through 14.02-24

Initial Plant Test Program - Design Certification and New License Applicants

Calvert Cliffs Nuclear Power Plant, Unit 3

RAI No. 28

Question 14.02-14

Standard Review Plan (SRP, NUREG-0800) Section 14.2, paragraph II.3.D regarding COL applicants, "Staff Responsibilities, Authorities, and Qualifications," states that "[t]he 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 the preoperational and startup tests and will develop testing, operating, and emergency procedures." In addition, the SRP states that "[t]he 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 are ready to begin the test program."

The applicant's COL application, in Section 14.2.2, "Organization and Staffing," describes the roles and responsibilities of the start-up organization, which includes the startup manager, system engineers, startup engineers, plant personnel, architect-engineer personnel, other contract/vendor staff, and the AREVA site startup organization. Section 14.2.2 references Section 13.1, "Organizational Structure of Applicant," for further details on startup organization. Table 13.1-1 in Section 13.1 lists the projected staffing levels for the startup organization, which includes the startup manager, preoperational test engineer, and startup engineer. Table 13.1-1 also references ANS-3.1-1993 for the general description, needed education, minimum experience required, and special requirements for the preoperational test engineer and the startup engineer. 1) No specific education and experience requirements are established for the startup manager. In addition, 2) education and experience requirements are not established for the architect-engineer personnel, other contract/vendor staff, and the AREVA site startup organization. In addition, 3) training requirements are not established for any of the positions mentioned in Section 14.2.2.

Please revise Section 14.2.2 to describe the education, training, qualification, and experience requirements for organizations responsible for the conduct of preoperational and startup tests, and for organizations that will develop testing, operating, and emergency procedures; and 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, or justify an alternative.

Response

1) Table 13.1-1 will be revised to identify the Startup Manager as equivalent to the ANS-3.1-1993, Section 4.2.4 Technical Manager to establish the specific education, training, qualification, and experience requirements for the position of Startup Manager.

2) As stated in FSAR Section 14.2.2, test procedures are prepared by AREVA or the startup/preoperational test engineer and testing is conducted by the startup/preoperational test engineers. FSAR Table 13.1-1 establishes the startup and preoperational test engineer education, training, qualification, and experience requirements as those specified in ANS-3.1-

1993 Sections 4.4.11 and 4.4.12. The education and experience requirements for AREVA personnel preparing test procedures are equivalent to those specified for the startup and preoperational test engineer position. Other contract or vendor staff will meet the education, training, qualification, and experience requirements consistent with ANS-3.1-1993, Section 3.2, for Contractor and Temporary Positions.

3) Section 14.2.2 will be revised to add a discussion of training requirements applicable to the personnel responsible for conduct of preoperational and startup tests.

FSAR Impact

FSAR Section 14.2.2 will be revised as follows to add a new subsection at the end of the current section:

Qualification and Training

The education and qualification requirements for the Startup Manager, Startup Engineer, and Preoperational Test Engineer positions are consistent with the ANS-3.1-1993, Function Position, specified in Table 13.1-1.

Other contract or vendor staff will meet the education and experience requirements consistent with ANS-3.1-1993, Section 3.2, for Contractor and Temporary Positions.

Training of personnel that will be responsible for the conduct of preoperational and startup tests, and for organizations that will develop the preoperational and startup tests is based on site specific training and qualification of engineering personnel. Specific topics that will be addressed include the following:

- Administrative controls for modifying procedures.
- Verbatim procedure compliance and independent verification requirements.
- Administrative controls for documenting condition reports.
- Test sequence and program administration.
- Documentation requirements, including acceptance criteria reviews.
- Policies regarding operations control of equipment manipulations (valves, breakers switches, etc.).
- Preoperational Test/Startup Engineer interface with Test Review Team.
- Requirements regarding identifying (tagging) components within the released for test boundary.
- Requirements for components within tag out boundaries.

- Component specific training by major vendors (turbine, reactor coolant pumps, etc.), as applicable.

FSAR Table 13.1-1 will be revised on page 3 of 3 of the table to show the nuclear plant position of Startup Manager to be equivalent to the function position of ANS-3.1-1993, Technical Manager (Section 4.2.4).

Question 14.02-15

Regulatory Guide (RG) 1.68, Section C.1, "Criteria for Selection of Plant Features to be Tested," provides the criteria for the selection of plant features to be tested during the conduct of the initial test program. The NRC staff requests that the applicant confirm that there are no additional site-specific structures, systems and/or design features that meet the criteria of Regulatory Position C.1 of RG 1.68 and that require testing to be addressed in Section 14.2.14, "COL Applicant Site-Specific Tests," of the COL application pursuant to 10 C.F.R. Parts 50 and 52.

Response

Review of USNRC RG 1.68 Section C.1 and COL FSAR Section 14.2.14 indicates that no additional site-specific structures, systems, and/or design features that meet the criteria of Regulatory Position C.1 of RG 1.68 need to be addressed.

FSAR Impact

No change will be made to the FSAR as a result of this NRC question.

Question 14.02-16

Regulatory Guide (RG) 1.206, Section C.I.14.2.2, "Organization and Staffing," states that "the COL applicant should implement measures to ensure that personnel formulating and conducting test activities are not the same personnel who designed or are responsible for satisfactory performance of the system(s) or design features(s) being tested." No provisions to this effect appear in Section 14.2.2 of the applicant's FSAR, "Organization and Staffing." The applicant is asked to revise its FSAR to include such provisions, or to justify an alternative.

Response

FSAR Section 14.2.2 will be revised to clarify that personnel formulating and conducting test activities are not the same personnel who designed or are responsible for satisfactory performance of the system being tested.

FSAR Impact

FSAR Section 14.2.2 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

> **Startup Organization**
>
> {CCNPP Unit 3} will have a site-specific startup organization. As discussed in Section 13.1, the {Startup Manager} reports to the {Senior Vice President, Project and Contract Management}.
>
> The {Startup Manager} is responsible for startup test programs, including the preparation of test procedures, performance of applicable initial tests, and the preparation of appropriate test related documentation. Test procedures are prepared by AREVA or the accountable {Startup/Preoperational Test Engineer} with assistance from AREVA, the architect engineer, or other vendors, as required. The {Startup Manager} will ensure that all procedures that affect startup are properly reviewed by the appropriate organizations.
>
> Organizations responsible for conducting startup tests will assure that these tests and their supporting activities are properly planned and completed as scheduled. They will also direct and coordinate execution of work activities that directly affect the startup test program. Personnel formulating and conducting test activities are not the same personnel who designed or are responsible for satisfactory performance of the system(s) or design features(s) being tested.

No other part of FSAR Section 14.2.2 is affected by the response to this RAI question and has been omitted from this response.

Question 14.02-17

Regulatory Guide (RG) 1.68, Section C.8, "Milestones and Power Hold Points," states that "[a]pplicants should establish appropriate hold points at selected milestones throughout the power-ascension test phase to ensure that relevant test results are evaluated and approved by the designated personnel or groups before proceeding with the power-ascension test phase. As a minimum, applicants should establish hold points at approximately 25%, 50%, and 75% power level test conditions for pressurized-water reactors (PWRs) . . . ."

Section 14.2.4 of the US EPR FSAR states, in part, that "[i]t is the responsibility of the COL applicant to plan, and subsequently, to conduct the plant startup test program. The initial test program is conducted by the startup test group and is controlled by administrative procedures and requirements. The administrative procedures that govern the test program receive the same level of approval as other administrative procedures. The administrative procedures describe the phases of the initial test program and establishe the requirements for progressing from one phase to the next, as well as identifies the requirements for moving beyond selected hold points or milestones within a given phase."

The COL, in Section 14.2.5.3, "Test Expectations," states, in part, that "[p]ower ascension tests are scheduled and conducted at pre-determined power levels." However, the application does not specify those levels, nor does it identify hold points and the requirements for moving beyond selected hold points or milestones within a given phase. Please revise Section 14.2.5.3 to identify the hold points for power ascension tests, and the requirements for moving beyond selected hold points or milestones within a given phase, or justify an alternative.

Response

FSAR Section 14.2.5.3 will be revised to identify the hold points for power ascension tests and the requirements for moving beyond selected hold points.

FSAR Impact

14.2.5.3 Test Expectations

Test results for each phase of the test program are reviewed and verified to be complete (as required) and satisfactory before the next phase of testing is started. Phase I testing on a system is normally not started until all applicable prerequisite tests have been completed, reviewed, and approved. Prior to initial fuel loading and commencement of initial criticality, a comprehensive review of required Phase I tests is conducted by the TRT. This review provides assurance that required plant systems and structures are capable of supporting initial fuel loading and subsequent startup testing.

Phase I testing is completed prior to commencing initial fuel loading. If prerequisite or Phase I tests or portions of such tests cannot be completed prior to commencement of fuel loading, provisions for carryover testing is planned and approved in accordance with site-specific administrative procedures.

When carryover testing is required, the {Startup Manager} approves each test and identifies the portions of each test that are delayed until after fuel loading. Technical justifications for delays are documented together with a schedule (power level) for completing each carryover test. Carryover testing is approved by the TRT as described in section 14.2.5. Documentation for carryover testing is available for NRC review, as required, prior to commencing fuel loading.

Startup testing phases (Phases II, III, and IV) of the test program are subdivided into the following categories:

- nitial fuel load.
- Precritical tests.
- Initial criticality.
- Low power physics testing.
- Power ascension testing. This testing phase ends with the completion of testing at 100% power.

Each subdivision is a prerequisite which must be completed, reviewed, and approved before tests in the next category are started. The TRT membership is increased prior to beginning the low power physics testing phase by adding the Plant Manager, Engineering Manager, Operations Manager, and Maintenance Manager to the TRT. Power ascension tests are scheduled and conducted at pre-determined power levels. The power ascension plateaus are as follows:

- 5%
- 30%
- 50%
- 75%
- ≥ 98%

The TRT shall review the tests performed in the plateau and determine if it is acceptable to proceed to the next plateau. If core anomalies or plant stability issues are present the TRT shall assign a responsible organization to develop bases for proceeding to a higher power level that is reviewed, approved, and entered into the plant records by the TRT prior to increasing reactor power. Results of tests and individual parts of multiple tests conducted at a plateau are evaluated prior to proceeding to the next level. In tests involving plant transients for which a realistic transient performance analysis has been performed, test results are compared to results of the realistic analysis rather than results of a similar analysis performed using accident analysis assumptions. For those tests which result in a plant transient for which a realistic plant transient performance analysis has been performed, the test results will be compared to the results of the realistic transient analysis to determine if the model should be revised.

Following completion of testing at 100% of rated power, final test results are reviewed, evaluated, and approved. This is accomplished prior to disbanding the startup organization and normal plant operation.

Question 14.02-18

Raw Water Supply System – Desalinization Plant:
The applicant's COL, Section 9.2.9.5, "Inspection and Testing Requirements," states in part that "[p]ressure testing and functional testing are conducted during post-construction pre-commissioning and startup, as necessary to confirm system integrity and proper operation of individual components and the total system. Portions of the system are demonstrated with in-service leak testing where such method does not jeopardize other systems/equipment and is sufficient to demonstrate proper operation." Section 14.2.14.1 of the COL, "Desalinization Plant," does not identify the need for pressure testing, and leak testing in subsection 14.2.14.1.(3), "Test Method." The staff requests that the applicant address this discrepancy, or justify an alternative.

Additionally, Section 14.2.14.1(5)(a), concerning acceptance criteria, states that "[t]he desalinization plant operates as described in Section 9.2.11 [of the applicant's COL FSAR]." However, the FSAR does not contain a section 9.2.11. The desalinization plant appears to be described in Section 9.2.9 of the FSAR. Please revise Section 14.2.14.1(5)(a) accordingly.

Response

The Raw Water Supply System, which includes the desalination plant, is a nonsafety-related system which would undergo pressure and functional testing prior to startup. Functional testing of the Raw Water Supply System and components is covered in 14.2.14.1. The Raw Water Supply System is not subject to ASME Section XI or ASME OM Code requirements, so in-service inspection and testing is not performed. Section 9.2.9.5 will be revised to remove the phrase "in-service" from the referenced statement.

The Raw Water Supply System should undergo pressure testing during the post-construction period to ensure system integrity, as stated in Section 9.2.9.5. The proposed markup of Section 14.2.14.1 is provided in the attachment to this RAI response.

Reference to Section 9.2.11 for the desalination plant has been corrected in the response to NRC RAIs 14 and 15 provided previously.

FSAR Impact

FSAR Section 9.2.9.5 will be revised to read as follows:

> "Visual inspections are conducted during construction to verify that the as-built condition is in accordance with design documents. Pressure testing and functional testing are conducted during post-construction pre-commissioning and startup, as necessary to confirm system integrity and proper operation of individual components and the total system. Portions of the system are demonstrated with ~~in-service~~ leak testing where such method does not jeopardize other systems/equipment and is sufficient to demonstrate proper operation.
>
> Ongoing system operation provides continuing demonstration of the system's functionality."

FSAR Section 14.2.14.1 will be revised to read as follows: Portions of Section 14.2.14.1 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document.

14.2.14.1 Raw Water Supply System

1. OBJECTIVE

   a. To demonstrate the ability of the Raw Water system and the desalinization plant to provide a reliable supply for the demineralized water, fire protection, essential service water normal makeup and potable water systems, under normal plant operating conditions.

2. PREREQUISITES

   Raw Water Supply System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the Raw Water Supply System (RWSS) have been completed.

   b. RWSS instrumentation has been calibrated and is functional for performance of the following test.

   c. Support system required for operation of the RWSS is complete and functional.

   d. The RWSS intake is being maintained at the water level specified in the design documents.

   e. The RWSS flow balance has been performed.

   f. Construction activities on the desalinization plant have been completed.

   g. Desalinization plant instrumentation is complete and functional and has been calibrated.

   h. Support systems required for operation of the desalinization plant are complete and functional.

   i. Test instrumentation is available and calibrated.

   j. The desalinization plant flow balance has been completed.

No other part of FSAR Section 14.2.14.1 is affected by the response to this RAI question and has been omitted from this response.

Question 14.02-19

Section 14.2.14.3(5)(a) of the applicant's FSAR, "Essential Service Water [ESW] Blowdown Systems, states that "[t]he ESW blowdown system operates per design and as described in Section 9.2.1 [of the applicant's FSAR]." The ESW Blowdown Systems appear to be described in the applicant's FSAR in Section 9.2.5. The NRC staff requests that the applicant correct this discrepancy.

Response

This discrepancy has been corrected in the Section 14.2.14 markup provided for the response to NRC RAIs 14 and 15. No further action is required.

FSAR Impact

No change will be made to the FSAR as a result of this RAI Question.

Question 14.02-20

Section 14.2.14.4 of the applicant's FSAR describes the Essential Service Water (ESW) Chemical Treatment System. Section 14.2.14.4(5)(a) states that "[t]he ESW chemical treatment system operates per design and as described in Section 9.2.1 [of the applicant's FSAR]." The ESW Chemical Treatment Systems appears to be described in Section 9.2.5. The NRC staff requests that the applicant correct this discrepancy.

Response

This discrepancy has been corrected in the Section 14.2.14 markup provided for the response to NRC RAIs 14 and 15. No further action is required.

FSAR Impact

No change will be made to the FSAR as a result of this RAI Question.

Question 14.02-21

Section 14.2.14.8(5) of the applicant's FSAR, "UHS [Ultimate Heat Sink] Makeup Water Intake Structure Ventilation System," concerning acceptance criteria, states that "[t]he UHS Makeup Water Intake Structure Ventilation System operates per design requirements and as described in Section 9.4.11 [of the applicant's FSAR]." Section 9.4.11.4, "Inspection and Testing Requirements," incorporates by reference Section 9.4.11.4 of the US EPR FSAR. Section 9.4.11.4 of the US EPR FSAR states that "[i]nitial in place acceptance testing of ESWPBVS [essential service water pump building ventilation system] components is performed in accordance with [ASME AG-1-2003] and ASME N510-1989 (R1995)." The test abstract for the UHS Makeup Water Intake Structure Ventilation System in Section 14.2.14.8 of the applicant's FSAR does not include ASME AG-1-2003 and ASME N510-1989 (R1995). Please revise Section 14.2.14.8 to include the requisite acceptance criteria that correspond with the specified test objectives, or justify an alternative.

Response

The intent of the wording of Section 14.2.14.8(5) is to incorporate ASME AG-1-2003 acceptance testing, including related acceptance criteria, by reference to FSAR section 9.4.11, which in turn incorporates 9.4.11.4 of the US EPR FSAR by reference, thereby reducing repetition of requirements and Code references and avoiding the introduction of details inconsistent with the nature of a test abstract. Nevertheless, Section 14.2.14.8 will be revised as needed to include references to the requisite acceptance criteria.

ASME N510-1989 (R1995) covers in-service testing of installed air treatment systems in nuclear power plants, and references ASME AG-1 standard as the applicable standard for acceptance testing. ASME N510 is not applicable during initial plant testing, so it is not referenced in Section 14.2.14.8(5).

FSAR Impact

FSAR Section 14.2.14.8 will be revised to read as follows:

14.2.14.8 UHS Makeup Water Intake Structure Ventilation System

1. OBJECTIVES

   a. To demonstrate the ability of the UHS Makeup Water Intake Structure Ventilation System to provide cooling and heating sufficient to maintain necessary operating environment for the UHS makeup water pumps and related equipment.

   b. To establish baseline operating data for future equipment surveillance and ISI.

2. PREREQUISITES

   UHS Makeup Water Intake Structure Ventilation System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

a. Construction activities on the UHS Makeup Water Intake Structure Ventilation System have been completed.

b. UHS Makeup Water Intake Structure Ventilation System instrumentation is complete and functional and has been calibrated.

c. Support systems required for operation of the UHS Makeup Water Intake Structure Ventilation System are complete and functional.

d. The UHS Makeup Water Intake Structure is in its final configuration (doors and access points installed and wall, ceiling, and floor penetrations in their design condition).

e. Test instrumentation available and calibrated.

f. The UHS Makeup Water Intake Structure Ventilation System flow balance has been completed.

3. TEST METHOD

a. Verify control logic and interlock functions for each division.

b. Verify alarms, displays, indications and status lights both locally and in the main control room for each division.

c. Verify operation of dampers and damper controls per design requirements. Acceptance testing of dampers shall be performed in accordance with ASME AG-1-2003 Section TA- 4200.

d. Verify operation of the fan units per design requirements. Acceptance testing of fans shall be performed in accordance with ASME AG-1-2003 Section TA-4100.

e. Verify each division's air flow (both heating and cooling) meets design specifications.

f. Verify that room temperatures in the pump room in each division can be maintained within the design range under design ambient (heating load and cooling load) conditions.

4. DATA REQUIRED

a. Fan operating data.

b. Setpoints at which alarms and interlocks occur.

c. Unit heater operating data.

d. Powered damper operating data.

e. Air flow measurements in ducts.

f. Air flow measurements in inlets and outlets.

g. Temperatures of each division's pump room.

5. ACCEPTANCE CRITERIA

a. The control logic and interlocks function per design.

b. The alarms, displays, indications and status lights, both locally and in the main control room, for each division operate as designed.

c. The operation of dampers and damper controls are as per design requirements. Test results shall be verified to be within the acceptance limits of the design specification, the applicable portions of ASME AG-1-2003 Section DA, and as required in ASME AG-1-2003 Section TA-3600. These test results shall be documented in accordance with ASME AG-1-2003 Section TA-6300 and shall be retained as reference values for comparison to periodic in-service test results.

d. The operation of the fan units are as per the design requirements. Fan acceptance test results shall satisfy the acceptance criteria set forth in ASME AG-1-2003 Sections TA-4160 and TA-3600.

e. Each division's air flow (both heating and cooling) meet design specifications and shall be in accordance with ASME AG-1-2003 Section TA-4161.

f. The room temperatures in the pump room in each division can be maintained within the design range of 41 °F and < 104 °F under design ambient (heating load and cooling load) conditions.

g. The UHS Makeup Water Intake Structure Ventilation System operates per design requirements and as described in Section 9.4.15.

Question 14.02-22

Section 14.2.14.9(5) of the applicant's FSAR, "UHS Electrical Building Ventilation System," concerning acceptance criteria, states that "[t]he UHS Makeup Water Intake Structure Ventilation System operates per design requirements and as described in Section 9.4.11 [of the applicant's FSAR]." Section 9.4.11.4, "Inspection and Testing Requirements," incorporates by reference Section 9.4.11.4 of the US EPR FSAR. Section 9.4.11.4 of the US EPR FSAR states that "[i]nitial in place acceptance testing of ESWPBVS [essential service water pump building ventilation system] components is performed in accordance with [ASME AG-1-2003] and ASME N510-1989 (R1995)." The test abstract for the UHS Makeup Water Intake Structure Ventilation System in Section 14.2.14.9 does not include ASME AG-1-2003 and ASME N510-1989 (R1995). Please revise Section 14.2.14.9 to include the requisite acceptance criteria that correspond with the specified test objectives, or justify an alternative.

Response

The intent of the wording of Section 14.2.14.9(5) is to incorporate ASME AG-1-2003 acceptance testing, including related acceptance criteria, by reference to FSAR section 9.4.11, which in turn incorporates 9.4.11.4 of the US EPR FSAR by reference, thereby reducing repetition of requirements and Code references and avoiding the introduction of details inconsistent with the nature of a test abstract. Nevertheless, Section 14.2.14.9 will be revised as needed to include references to the requisite acceptance criteria.

ASME N510-1989 (R1995) covers in-service testing of installed air treatment systems in nuclear power plants, and references ASME AG-1 standard as the applicable standard for acceptance testing. ASME N510 is not applicable during initial plant testing, so it is not referenced in Section 14.2.14.9(5).

FSAR Impact

FSAR Section 14.2.14.9 will be revised to read as follows:

14.2.14.9 UHS Electrical Building Ventilation System

1. OBJECTIVES

   a. To demonstrate the ability of the UHS Electrical Building Ventilation System to provide cooling and heating sufficient to maintain necessary operating environment for the electrical divisions supporting the UHS Makeup Water System.

   b. To establish baseline operating data for future equipment surveillance and ISI.

2. PREREQUISITES

   UHS Electrical Building Ventilation System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

a. Construction activities on the UHS Electrical Building Ventilation System have been completed.

b. UHS Electrical Building Ventilation System instrumentation is complete and functional and has been calibrated.

c. Support systems required for operation of the UHS Electrical Building Ventilation System are complete and functional.

d. The UHS Electrical Building is in its final configuration (doors and access points installed and wall, ceiling, and floor penetrations in their design condition).

e. Test instrumentation available and calibrated.

f. The UHS Electrical Building Ventilation System flow balance has been completed.

3. TEST METHOD

a. Verify control logic and interlock functions for each division.

b. Verify alarms, displays, indications and status lights both locally and in the main control room for each division.

c. Verify operation of dampers and damper controls per design requirements. Acceptance testing of dampers shall be performed in accordance with ASME AG-1-2003 Section TA-4200.

d. Verify operation of the fan units per design requirements. Acceptance testing of fans shall be performed in accordance with ASME AG-1-2003 Section TA-4100.

e. Verify each division's air flow (both heating and cooling) meets design specifications.

f. Verify that room temperatures in the electrical equipment room in each division can be maintained within the design range under design ambient (heating load and cooling load) conditions.

4. DATA REQUIRED

a. Fan operating data.

b. Setpoints at which alarms and interlocks occur.

c. Unit heater operating data.

d. Powered damper operating data.

e. Air flow measurements in ducts.

f. Air flow measurements in inlets and outlets.

g. Temperatures of each division's electrical equipment room.

5. ACCEPTANCE CRITERIA

a. The control logic and interlock functions for each division are as per designed.

b. The alarms, displays, indications and status lights both locally and in the main control room for each division operate as designed.

c. The operation of dampers and damper controls are as per design requirements. Test results shall be verified to be within the acceptance limits of the design specification, the applicable portions of ASME AG-1-2003 Section DA, and as required in ASME AG-1-2003 Section TA-3600. These test results shall be documented in accordance with ASME AG-1-2003 Section TA-6300 and shall be retained as reference values for comparison to periodic in-service test results.

d. The operation of the fan units and dampers are as per the design requirements. Fan acceptance test results shall satisfy the acceptance criteria set forth in ASME AG-1-2003 Sections TA-4160 and TA-3600.

e. Each division's air flow (both heating and cooling) meet design specifications and shall be in accordance with ASME AG-1-2003 Section TA-4161.

f. The room temperatures in the electrical equipment room in each division can be maintained within the design range of >41 °F and < 104 °F under design ambient (heating load and cooling load) conditions.

g. The UHS Electrical Building Ventilation System operates per design requirements and as described in Section 9.4.15.

Question 14.02-23

Section 14.2.14.6(5) of the applicant's FSAR, "Fire Water Supply," concerning acceptance criteria, states that "[t]he Fire Water Supply system operates per design requirements and as described in Section 9.5.1." Section 9.5.1.4 of the applicant's FSAR states that "[a]ll fire protection features and systems will be surveilled, inspected, tested, and maintained in accordance with applicable codes and standards of the NFPA [National Fire Protection Association] including start-up and acceptance tests."

Please revise Section 14.2.14.6 to include those requisite acceptance criteria that correspond with specified test objectives.

Response

The intent of referring to the FSAR section is to avoid repetition of information and introduction of a level of detail inconsistent with a test abstract. Nevertheless, Section 14.2.14.6 will be revised to include references to requisite acceptance criteria.

FSAR Impact

FSAR Section 14.2.14.6 will be revised to read as follows:

14.2.14.6 Fire Water Supply

1. OBJECTIVES

   a. To demonstrate the ability of the Fire Water Supply system to provide reliable supply of fire water to hydrants, hose stations and sprinkler systems throughout the plant.

   b. To establish baseline performance of the Fire Water Supply System.

2. PREREQUISITES

   Fire Water Supply System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the Fire Water Supply system have been completed.

   b. Fire Water Supply system instrumentation is complete and functional and has been calibrated.

   c. Support systems required for operation of the Fire Water Supply system are complete and functional.

   d. Test instrumentation available and calibrated.

   e. Fuel has not yet been brought onsite.

3. TEST METHOD

   a. Verify manual control of Fire Water Supply system components from all locations as designed in accordance with NFPA 13 and NFPA 24.

   b. Verify Fire Water Supply system pump and system flow meet design specifications and are in accordance with NFPA 20.

   c. Verify the head and flow characteristics of the fire water pumps, and the operation of all auxiliaries in accordance with the design specifications and NFPA 20 .

   d. Verify control logic in accordance with the design specifications and NFPA 72 .

   e. Verify automatic operation of pre-action valves in accordance with NFPA 13.

   f. Verify the Fire Water Supply system provides design rated flow to all discharge points in accordance with the design specifications and NFPA 13, 14, and 20.

   g. Verify Fire Water Supply system jockey pump starts on low (lower setpoint) discharge header pressure in accordance with NFPA 20.

   h. Verify Fire Water Supply system jockey pump stops on normal (upper setpoint) discharge header pressure in accordance with NFPA 20.

   i. Verify Fire Water Supply system electric motor driven pump starts on low discharge header pressure in accordance with NFPA 20.

   j. Verify standby Fire Water Supply system diesel engine driven pump 1 starts on discharge header low pressure, or trip or failure to start of the running pump in accordance with NFPA 20.

   k. Verify standby Fire Water Supply system diesel engine driven pump 2 starts on discharge header low pressure, or trip or failure to start of the running pump in accordance with NFPA 20.

   l. Verify alarms, indicating instruments, and status lights function as designed in accordance with NFPA 13, NFPA 20, NFPA 22 and NFPA 72.

4. DATA REQUIRED

   a. Pump operating data.

   b. Setpoints at which alarms and interlocks occur.

   c. Flow rates at discharge points/points of supply.

5. ACCEPTANCE CRITERIA

a. The ability to manually control Fire Water Supply system components from various locations, as designed in accordance with NFPA 13 and NFPA 24.

b. The Fire Water Supply system pump and system flow meet design specifications and NFPA 20.

c. The head and flow characteristics of the fire water pumps, and the operation of all auxiliaries are per design in accordance with NFPA 20.

d. The system control logic functions per design in accordance with NFPA 72.

e. The automatic operation of pre-action valves is per system design and NFPA 13 and NFPA 72.

f. The Fire Water Supply system provides design rated flow to all discharge points in accordance with the design specifications, NFPA 13, NFPA 14 and NFPA 20.

g. The Fire Water Supply system jockey pump starts on low (lower setpoint) discharge header pressure in accordance with NFPA 20.

h. The Fire Water Supply system jockey pump stops on normal (upper setpoint) discharge header pressure in accordance with NFPA 20.

i. The Fire Water Supply system electric motor driven pump starts on low discharge header pressure in accordance with NFPA 20.

j. The Standby Fire Water Supply system diesel engine pump 1 starts on discharge header low pressure, or trip or failure to start of the running pump in accordance with NFPA 20.

k. The Standby Fire Water Supply system diesel engine pump 2 starts on discharge header low pressure, or trip or failure to start of the running pump in accordance with NFPA 20.

l. The alarms, indicating instruments, and status lights function as designed in accordance with NFPA 13, NFPA 20, NFPA 22 and NFPA 72.

m. The Fire Water Supply system operates per design requirements and as described in Section 9.5.1.

Question 14.02-24

Regulatory Guide 1.68, Appendix A discusses the five phases of the initial test program: (1) preoperational testing, (2) initial fuel loading and pre-criticality testing, (3) initial criticality testing, (4) low-power testing, and (5) power ascension testing. Each phase has distinct objectives and prerequisites. The test abstracts provided in Section 14.2.14 of the applicant's FSAR do not indicate in which phase they will be performed. The NRC staff requests that the applicant revise the test abstracts in Section 14.2.14 to identify the phase in which each test will be performed, or to justify an alternative.

Response

Tests described in Section 14.2.14 will be revised to indicate the applicable phase(s) in which testing will occur.

FSAR Impact

FSAR Section 14.2.14.1 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.1 Raw Water Supply System

1. OBJECTIVE

   a. To demonstrate the ability of the Raw Water system and the desalinization plant to provide a reliable supply for the demineralized water, fire protection, essential service water normal makeup and potable water systems, under normal plant operating conditions.

2. PREREQUISITES

   Raw Water Supply System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   k. Construction activities on the Raw Water Supply System (RWSS) have been completed.

   l. RWSS instrumentation has been calibrated and is functional for performance of the following test.

   m. Support system required for operation of the RWSS is complete and functional.

   n. The RWSS intake is being maintained at the water level specified in the design documents.

   o. The RWSS flow balance has been performed.

p. Construction activities on the desalinization plant have been completed.

q. Desalinization plant instrumentation is complete and functional and has been calibrated.

r. Support systems required for operation of the desalinization plant are complete and functional.

s. Test instrumentation is available and calibrated.

t. The desalinization plant flow balance has been completed.

No other part of FSAR Section 14.2.14.1 is affected by the response to this RAI question and has been omitted from this response.

FSAR Section 14.2.14.2 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.2 Ultimate Heat Sink (UHS) Makeup Water System

1. OBJECTIVES

   a. To demonstrate the ability of the UHS Makeup Water System to supply makeup water as designed.

   b. To establish baseline performance data for future equipment surveillance and ISI.

2. PREREQUISITES

   Ultimate Heat Sink (UHS) Makeup Water System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the UHS Makeup Water System, including the test bypass line, have been completed and the system is functional.

   b. Construction activities on the ESW blowdown lines from the safety-related blowdown isolation MOVs to the retention basin have been completed, and the lines are isolable from the ESWS and functional.

   c. Hydrostatic/leak testing of the UHS Makeup Water System, including the test bypass line, has been completed with satisfactory results.

   d. UHS Makeup Water System instrumentation is functional and has been calibrated.

   e. Support systems required for operation of the UHS Makeup Water System are complete and functional.

f. Test instrumentation available and calibrated.

No other part of FSAR Section 14.2.14.2 is affected by the response to this RAI question and has been omitted from this response.

FSAR Section 14.2.14.3 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.3 Essential Service Water Blowdown System

1. OBJECTIVES

   a. To demonstrate the ability of the essential service water (ESW) blowdown system, including the alternate blowdown path, to provide blowdown flow for control of ESW chemistry as designed.

   b. To establish baseline performance data for future equipment surveillance and ISI.

2. PREREQUISITES

   Essential Service Water Blowdown System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the ESW blowdown system have been completed and the system is functional.

   b. Hydrostatic/leak testing of the ESW blowdown system has been completed with satisfactory results.

   c. Construction activities on and initial testing of the main ESW system have been completed.

   d. ESW blowdown system instrumentation is functional and has been calibrated.

   e. Support systems required for operation of the ESW blowdown system are complete and functional.

   f. ESW system is operating in its normal configuration.

   g. Test instrumentation available and calibrated.

No other part of FSAR Section 14.2.14.3 is affected by the response to this RAI question and has been omitted from this response.
FSAR Section 14.2.14.4 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.4 Essential Service Water Chemical Treatment System

1. OBJECTIVES

   a. To demonstrate the ability of the ESW chemical treatment system to provide treatment of ESW as designed.

   b. To establish baseline performance data for future equipment surveillance.

2. PREREQUISITES

   Essential Service Water Chemical Treatment System shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the ESW chemical treatment system have been completed and the system is functional.

   b. Hydrostatic/leak testing of the ESW chemical treatment system has been completed with satisfactory results.

   c. ESW chemical treatment system instrumentation is functional and has been calibrated.

   d. Support systems required for operation of the ESW chemical treatment system are complete and functional.

   e. Test instrumentation available and calibrated.

No other part of FSAR Section 14.2.14.4 is affected by the response to this RAI question and has been omitted from this response.

FSAR Section 14.2.14.5 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.5 Waste Water Treatment Plant

1. OBJECTIVE

   a. To demonstrate the Waste Water Treatment Plant's ability to discharge treated liquid effluent safely to the environment and to process dewatered solids for offsite disposal, as designed and in accordance with local and state requirements.

2. PREREQUISITES

   Waste Water Treatment System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the Waste Water Treatment Plant have been completed.

   b. Sanitary waste water treatment system instrumentation is complete and functional and has been calibrated.

   c. Support systems required for operation of the Waste Water Treatment Plant are complete and functional.

   d. Test instrumentation available and calibrated.

No other part of FSAR Section 14.2.14.5 is affected by the response to this RAI question and has been omitted from this response.

FSAR Section 14.2.14.6 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.6 Fire Water Supply

1. OBJECTIVES

   a. To demonstrate the ability of the Fire Water Supply system to provide reliable supply of fire water to hydrants, hose stations and sprinkler systems throughout the plant.

   b. To establish baseline performance of the Fire Water Supply System.

2. PREREQUISITES

   Fire Water Supply System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the Fire Water Supply system have been completed.

   b. Fire Water Supply system instrumentation is complete and functional and has been calibrated.

   c. Support systems required for operation of the Fire Water Supply system are complete and functional.

   d. Test instrumentation available and calibrated.

No other part of FSAR Section 14.2.14.6 is affected by the response to this RAI question and has been omitted from this response.

FSAR Section 14.2.14.7 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.7 Circulating Water Supply System

1. OBJECTIVES

   a. To demonstrate the ability of the Circulating Water System, including circulating water makeup, blowdown, chemical treatment, and the {main cooling tower}, to provide continuous cooling to the main condensers as designed.

   b. To provide baseline operating data.

2. PREREQUISITES

   Circulating Water Supply System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the Circulating Water System have been completed.

   b. Construction activities on the {main cooling tower} have been completed.

   c. Construction activities on circulating water makeup have been completed.

   d. Construction activities on circulating water chemical treatment have been completed.

   e. Construction activities on circulating water blowdown have been completed.

   f. Circulating Water System, including makeup, chemical treatment and {main cooling tower}, is complete and functional.

   g. Circulating Water System instrumentation is complete and functional and has been calibrated.

   h. Support systems required for operation of the Circulating Water System are complete and functional.

   i. Test instrumentation available and calibrated.

   j. Alarm functions verified for operability and limits.

   k. The Circulating Water System flow balance has been completed.

l. The Circulating Water Supply System has been pressure tested to confirm system integrity.

m. Relief valve (if any) setpoints have been verified.

n. ~~Test shall be performed before power ascension.~~

No other part of FSAR Section 14.2.14.7 is affected by the response to this RAI question and has been omitted from this response.

FSAR Section 14.2.14.8 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.8 UHS Makeup Water Intake Structure Ventilation System

1. OBJECTIVES

   a. To demonstrate the ability of the UHS Makeup Water Intake Structure Ventilation System to provide cooling and heating sufficient to maintain necessary operating environment for the UHS makeup water pumps and related equipment.

   b. To establish baseline operating data for future equipment surveillance and ISI.

2. PREREQUISITES

   <u>UHS Makeup Water Intake Structure Ventilation System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:</u>

   a. Construction activities on the UHS Makeup Water Intake Structure Ventilation System have been completed.

   b. UHS Makeup Water Intake Structure Ventilation System instrumentation is complete and functional and has been calibrated.

   c. Support systems required for operation of the UHS Makeup Water Intake Structure Ventilation System are complete and functional.

   d. The UHS Makeup Water Intake Structure is in its final configuration (doors and access points installed and wall, ceiling, and floor penetrations in their design condition).

   e. Test instrumentation available and calibrated.

   f. The UHS Makeup Water Intake Structure Ventilation System flow balance has been completed.

No other part of FSAR Section 14.2.14.8 is affected by the response to this RAI question and has been omitted from this response.

FSAR Section 14.2.14.9 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.9 UHS Electrical Building Ventilation System

1. OBJECTIVES

   a. To demonstrate the ability of the UHS Electrical Building Ventilation System to provide cooling and heating sufficient to maintain necessary operating environment for the electrical divisions supporting the UHS Makeup Water System.

   b. To establish baseline operating data for future equipment surveillance and ISI.

2. PREREQUISITES

   UHS Electrical Building Ventilation System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the UHS Electrical Building Ventilation System have been completed.

   b. UHS Electrical Building Ventilation System instrumentation is complete and functional and has been calibrated.

   c. Support systems required for operation of the UHS Electrical Building Ventilation System are complete and functional.

   d. The UHS Electrical Building is in its final configuration (doors and access points installed and wall, ceiling, and floor penetrations in their design condition).

   e. Test instrumentation available and calibrated.

   f. The UHS Electrical Building Ventilation System flow balance has been completed.

No other part of FSAR Section 14.2.14.9 is affected by the response to this RAI question and has been omitted from this response.

FSAR Section 14.2.14.10 will be revised to read as follows: Portions of Section 14.2.2 that are not affected by this RAI question are omitted from the markup to minimize the size of this response document:

14.2.14.10 Cooling Tower Acceptance

1. OBJECTIVES

   a. To demonstrate the Cooling Tower is capable of rejecting the design heat load.

2. PREREQUISITES

   Cooling Tower acceptance testing shall be performed during the power ascension phase. The following prerequisites shall be met:

   a. Construction activities are complete.

   b. Circulating Water System flow balance has been performed.

   e. Permanently installed instrumentation is functional and calibrated. Test instrumentation available and calibrated.

   f. Plant output is at approximately rated power.

No other part of FSAR Section 14.2.14.10 is affected by the response to this RAI question and has been omitted from this response.