FINAL SAFETY ANALYSIS REPORT

CHAPTER 14

VERIFICATION PROGRAMS

14.0 VERIFICATION PROGRAMS

This chapter of the U.S. EPR Final Safety Analysis Report (FSAR) is incorporated by reference with supplements as identified in the following sections.

14.1 SPECIFIC INFORMATION TO BE ADDRESSED FOR THE INITIAL PLANT TEST PROGRAM

This section of the U.S. EPR FSAR is incorporated by reference.

14.2 INITIAL PLANT TEST PROGRAM

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements and departure.

14.2.1 SUMMARY OF TEST PROGRAM AND OBJECTIVES

No departures or supplements.

14.2.1.1 {Summary of the Startup Test Program

No departures or supplements.

14.2.1.2 Construction Activities

The official turnover of systems or portions of systems from the cosntruction organization to the startup organization is controlled by site-specific adminsitrative procedures. The administrative procedures:

- Require components within the turnover boundary to be clearly designated;
- Require a review of construction activities to ensure that required construction activities with the turnover boundary are completed, or require identification of any incomplete construction activities;
- Require formal acceptance and turnover approval by the Startup Manager; and
- Establish controls to prevent unauthorized construction work activities within the turnover boundary to prevent potential safety issues.

14.2.1.3 Phase I - Preoperational Testing

No departures or supplements.

14.2.1.4 Phase II - Initial Fuel Loading and Precritical Testing

No departures or supplements.

14.2.1.5 Phase III - Initial Criticality and Low Power Physics Testing

This section of the U.S. EPR FSAR is incorporated by reference with the following supplement.

For Item 6, following “The inital criticality and low-power physics tests (LPPT) as a minimum consist of the following:”

Verification that the Technical Specification SR 3.1.2.1 requirement of 1000 pcm is met. At this point the Test Coordinator (or equivalent) should verify that intial criticality activities have been completed and transition to those activities supporting low power physics testing.

14.2.1.6 Phase IV - Power Ascension testing

No departures or supplements.}

14.2.2 ORGANIZATION AND STAFFING

The U.S. EPR FSAR includes the following COL Item in Section 14.2.2:

A COL applicant that references the U.S. EPR certified design will provide site-specific information that describes the organizational units that manage, supervise, or execute any phase of the test program. This description should address the organizational authorities and responsibilities, the degree of participation of each identified organizational unit, and the principal participants. The COL applicant should also describe how, and to what extent, the plant's operating and technical staff participates in each major test phase. This description should include information pertaining to the experience and qualification of supervisory personnel and other principal participants who are responsible for managing, developing, or conducting each test phase. In addition, the COL applicant is responsible for developing a training program for each fundamental group in the organization.

This COL Item is addressed as follows:

Startup Organization

{BBNPP will have a site-specific startup organization. As discussed in Section 13.1, the Startup Manager reports to the Vice President, Engineering.

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 satifactory performance of the system(s) or design feature(s) being tested.

The Startup Manager directs and controls Startup program technical and functional test activities, including prerequisite work and testing Phases I through IV. The Startup Manager is responsible for:

- Approving startup administrative and technical procedures.
- Planning, organizing, scheduling, directing, and controlling Startup activities.
- Managing Startup Program contracts to ensure accurate and timely compliance.
- Approving the Startup Test Schedule.
- Approving work and procedures that are prerequisite to the Startup program.
- Maintaining liaison with the project vendors to keep them informed of status, emerging problems in their respective areas, and support requirements.
- Assigning Startup Engineering Supervisor responsibilities.

The Startup Manager is supported by supervisors who function as Startup Engineering Support Supervisors. The Startup Engineering Support Supervisor supervises the work of the Startup/

Preoperational Test Engineers, and coordinates the work of System Engineers matrixed to the Startup Organization, as well as other plant personnel assigned to support the Startup Organization. Personnel functioning as the Startup Engineering Support Supervisor are responsible for:

- Supervising and directing the Startup/Preoperational Test Engineers.
- Ensuring that training and qualification of designated personnel is adequate for the tasks assigned in support of the Startup Organization.
- Coordinating support from plant organizations (e.g. instrument, chemistry, computer, radiation protection, and maintenance personnel) as required to complete the startup test program.
- Involving operations personnel in testing activities. Utilizing operations personnel to the extent practical, as test witnesses or test performers to provide the operations personnel with experience and knowledge.
- Maintaining the startup schedule.
- Developing and implementing adminstrative controls to address system and equipment configuration control.
- Identifying the need for and coordinating vendor support when required to support the startup test program.
- Managing the development and approval of procedures required to support the startup test program.

The Startup Manager's engineering organization consists of System Engineers (matrixed from the engineering organization) who are responsible for specific systems and Startup/ Preoperational Test Engineers who are responsible for testing evolutions and/or specific tests. System Engineers and Startup/Preoperational Test Engineers have the following responsibilities:

- Systems Engineer
  - Responsible for a specific system or subsystem.
  - Provides technical guidance and assistance in testing and the preparation of test procedures.
  - Recommends changes in plant design and/or construction to facilitate testing, operation, and maintenance.
- Startup/Preoperational Test Engineer
  - Assures that assigned test procedures are written and testing is conducted in accordance with the site-specific administrative procedures,
  - Supervises testing and reports current status of startup program work.

- Coordinates startup activities among involved groups.

In addition to the Startup/Preoperational Test Engineers and System Engineers, the Startup organization will utilize plant personnel, architect - engineer (A/E) personnel and other contract/vendor staff as necessary to successfully complete the startup test program.

The plant operating, maintenance, and engineering personnel are utilized to the extent practicable during the Startup Test Program. The plant staff operates permanently installed and powered equipment for Phases I through IV and subsequent system tests. Plant personnel such as instrument, chemistry, computer, radiation protection, and maintenance personnel are used to perform tests and inspections in the areas in which they will primarily work during plant operation. Utilizing plant staff, during startup in their respective operational areas, will maximize the transfer and retention of experience and knowledge gained during the startup program to the subsequent commercial operation.

The A/E will coordinate the construction schedules with startup test program requirements and provide manpower support as needed to meet the schedule, to correct deficiencies, or to make repairs. The A/E project organization provides technical advice and consultation on matters relating to the design, construction, operation, and testing of systems and equipment. Accordingly, the A/E project organization is responsible for the following:

- Providing the objectives and acceptance criteria used in developing detailed test procedures.
- Providing a designated member of the Test Review Team (TRT). TRT functions are defined in Section 14.2.5.
- Providing representatives to site administrative groups or committees as requested by the Startup Manager.
- Reviewing test procedures as requested by the Startup Manager.
- Evaluating test results as requested by the Startup Manager.
- Providing technical support and liaison with the startup organization to coordinate problem resolution.

The site-specific startup organization may be augmented with staff from other contractors and vendors as deemed necessary. Possible contractors are representatives from the turbine-generator supplier and vendors of various components. Involvement may be in a direct role in the startup organization or in a consulting role.

AREVA Site Startup Organization

AREVA representatives provide technical advice and consultation on matters concerning design, operation, and testing. They report to the Startup Manager for day-to-day direction. To achieve this objective, the AREVA site personnel will:

- Provide the objectives and acceptance criteria used in developing detailed test procedures.
- Provide initial procedure drafts of startup test procedures and review proposed changes.

- Provide technical advice and consultation to the plant staff during the conduct of the test program.
- Provide a technical liaison with the AREVA design headquarters to resolve problems.
- Provide a designated member for the TRT. TRT functions are defined in Section 14.2.5.
- Provide other on-site program support as requested by the Startup Manager.

Qualification and Training

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

Education and qualification requirements for the Startup Engineering Support Supervisor position are analogous to those of Engineering Support Supervisors as described in Table 13.1-1.

Training and qualification of other plant staff (i.e. instrument, chemistry, computer, radiation protection, and maintenance personnel) assigned to support the Startup Organization continue to be managed by their organization. They perform duties inline with their normal training and qualification programs at the direction of the Startup Manager's organization and in support of the startup test program.

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

- Adminstrative 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.}

14.2.3 TEST PROCEDURES

{This section of the U. S. EPR FSAR is incorporated by reference with the following supplements.

The U. S. EPR FSAR Section 14.2.3 text is modified as follows for the BBNPP FSAR Section 14.2.3:

In general, pump shutoff head values are obtained by verifying two or more developed head versus flow points on the vendor supplied pump curve and extrapolating the shutoff head. One of the points should be just greater than the recommended minimum flow point. The Startup manager (or equivalent) shall approve the collection of any actual shutoff head test point.}

The U.S. EPR FSAR includes the following COL Item in Section 14.2.3:

> A COL applicant that references the U.S. EPR design certification will provide site-specific information for review and approval of test procedures.

This COL Item is addressed as follows:

Site-specific information regarding review and approval of test procedures is provided in the following subsections.

Sections 14.2.3.1 through 14.2.3.6 are added as a supplement to the U.S. EPR FSAR.

14.2.3.1 Test Procedure Preparation and Execution

Draft procedures, for Phases I through IV tests, are typically provided by {AREVA and the Architect Engineer}. These procedures ensure that the design bases attributes are verified by field measurements. Each test procedure is prepared using references provided by the appropriate design and vendor organizations, the U.S. EPR FSAR, the FSAR, the Technical Specifications, and the applicable Regulatory Guides.

The site approval process is as follows:

- Each draft test procedure is reviewed by the TRT to ensure that procedural requirements are met and any required changes are incorporated.

- The {Startup Manager} approves test procedures and ensures that tests are properly scheduled and performed as scheduled.

The control of procedures as it relates to distribution, version control, modifications, and revisions will meet the administrative control requirements as described In Section 13.5.

14.2.3.2 Special Test Procedures

During the Phases I through IV test program, special test procedures may become necessary for investigative purposes. The preparation, review and approval of these special procedures are governed by site-specific administrative control procedures. Special test procedures that deal with normal startup testing are processed under the same controls as those that affect nuclear safety.

14.2.3.3 Sign-Off Provisions

Test procedures contain sign-off provisions for prerequisites and for all procedural steps. The person conducting the test signs and dates each data form as the data is entered.

14.2.3.4 Acceptance Criteria

Data that is contained in startup test procedures can be categorized into three distinct categories, as described below:

Ancillary Data -	The lowest category of data recorded in startup procedures. This data may be useful to recreate the test conditions or for trending but is not used to determine component or system performance. Examples include oil temperature, weather conditions and general observations.
Test (Review) Criteria -	Test (Review) Criteria are based on differences between calculations and measurements and are not based on the Safety Analysis. Therefore, these criteria typically have two-sided tolerances. For example, the maximum safety analysis stroke time for a specific valve may be 15 seconds, but the valve vendor may have designed the valve to stroke in less than 10 seconds. In this example, the Review Criteria could be expressed as 8 to 12 seconds.
Acceptance Criteria -	Acceptance Criteria are those criteria that have a direct link to the Safety Analysis. These criteria are typically one-sided and are constructed from the safety analysis or related assumptions. It is necessary to define whether the Acceptance Criteria is a minimum or maximum limit. For example, the maximum safety analysis stroke time for a specific valve may be 15 seconds, but the valve vendor may have designed the valve to stroke in less than 10 seconds. In this example, the Acceptance Criteria could be expressed as less than 15 seconds.

14.2.3.5 Procedure Adherence Policy

The startup organization shall employ a verbatim procedure adherence program and document violations to the program in the Corrective Action Program. When a procedural step is discovered that cannot be performed as written the plant shall be placed in a safe condition in accordance with the restoration guidance in the procedure or as determined by the {a Senior Operator} and all related testing activities placed on hold by the {Startup/Preoperational Test Engineer} until the procedure is revised.

The decision to interrupt the performance of a test is the responsibility of the {Startup/Preoperational Test Engineer/Senior Operator} but in cases of personnel or equipment safety issues, any of the personnel involved with the test can interrupt a test in progress. When a test has been interrupted, the {Startup/Preoperational Test Engineer} will determine if the test can be safely resumed at the point it was interrupted or whether the test must be restarted at the beginning of the test.

14.2.3.6 Maintenance/Modification Procedures

Work authorization documents, controlled in accordance with procedures, are used to initiate maintenance and implement modifications on systems turned over by the construction organization. The work authorization document assigns an organization responsibility for the completion of the activity and specifies retest requirements. Upon completion of an activity, a copy of the executed form is returned to the responsible testing organization to ensure retest requirements are met. Results of retests due to maintenance shall be reviewed by the responsible {Startup/Preoperational Test Engineer} to ensure compliance with required acceptance criteria, including compliance with ITAAC commitments. Results of retests due to maintenance activities or modifications will be reviewed and approved in the same manner as those from the original tests.

Systems declared operational will be maintained and tested per operational procedures unless returned to startup organization control.

14.2.4 CONDUCT OF TEST PROGRAM

The U.S. EPR FSAR includes the following COL Item in Section 14.2.4:

> A COL applicant that references the U.S. EPR design certification will plan, and subsequently conduct, the plant startup test program.

This COL Item is addressed as follows:

The initial test program will be planned and conducted by the startup test group and will be controlled by administrative procedures and requirements.

14.2.5 REVIEW, EVALUATION, AND APPROVAL OF TEST RESULTS

The U.S. EPR FSAR includes the following COL Item in Section 14.2.5:

> A COL applicant that references the U.S. EPR design certification will address the site-specific administration procedures for review and approval of test results.

This COL Item is addressed as follows:

Sections 14.2.5.1 through 14.2.5.3 are added as a supplement to the U.S. EPR FSAR.

14.2.5.1 Procedure Review and Evaluation

The responsible {Startup/Preoperational Test Engineer}presents to the responsible reviewer a completed test procedure and test report with remarks and recommendations. During this review, the {Startup/Preoperational Test Engineer}and/or the reviewer initiates action items in a tracking system to document failure to meet Test (Review) or Acceptance Criteria.

Individual test results are reviewed and approved by the startup organization supervision as described in the site-specific administrative procedures prior to presenting the results to the TRT. Specific acceptance criteria for determining the success or failure of a test are included as part of its procedure and are used during review to determine adequacy. If a system does not meet its acceptance criteria in its as-built configuration, an engineering evaluation is performed.

Following this review, the completed procedure and test report is submitted to the TRT for final review, evaluation and approval recommendation. The TRT review package also includes any completed engineering evaluations, if they were performed.

14.2.5.2 Test Review Team

The TRT shall advise on the technical adequacy of the testing program. The TRT functions include coordinating organizational responsibility for test procedures and for review, evaluation, and approval recommendation of test results. The TRT chairman is appointed by the {Startup Manager} and the team's minimum membership is:

- {TRT Chairman
- AREVA Project Representative
- Architect Engineer Project Representative
- Engineering Department Representative
- Operating Department Representative}

The TRT members are chosen to provide subject-matter expertise in specific testing phases. Composition of the TRT may be augmented from time to time to obtain necessary additional expertise.

The TRT performs the following startup functions:

- Evaluates adequacy of startup tests prior to test performance.
- Reviews completed startup test results and verifies that field revisions did not compromise the intent of the procedure.
- Assures that plant testing documents that the design objectives are met.
- Verify that the test results that do not meet acceptance criteria are entered into the corrective action program and the affected and responsible organizations are notified and have assumed responsibility for resolving the acceptance criteria deficiency. Implementation of corrective actions and retests are performed as required prior to proceeding to the next phase.
- Reviews and approves carryover of prerequisites and Phase I tests to Phases II through IV. Ensures that the justification for test deferral requests include a schedule for their performance.
- Reviews, evaluates, and provides approval recommendations for completed procedures, test reports, and engineering evaluations.
- Maintains records of ITAAC reviews and ensures that work is performed prior to proceeding to the next testing Phase.
- Issues a formal recommendation to proceed to the next testing Phase.

14.2.5.3 Test Expectations

Test results for each phase of the test program are reviewed and verified as 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 completed 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 the 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:

- Initial 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 {Management Position Responsible for Direction of Plant Operations, Management Position Responsible for Plant Engineering, Management Position Responsible for Operations, and Managment Position Responsible for Maintenance} to the TRT. Power ascension tests are scheduled and conducted at pre-determined power levels. The power ascension plateaus are as follows:

- 5%
- 25%
- 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 given 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 will be reviewed, evaluated and approved. This is accomplished prior to disbanding the startup organization and normal plant operation.

14.2.6 TEST RECORDS

No departures or supplements.

14.2.7 CONFORMANCE OF TEST PROGRAMS WITH REGULATORY GUIDES

No departures or supplements.

14.2.8 UTILIZATION OF REACTOR OPERATING AND TESTING EXPERIENCE IN DEVELOPMENT OF INITIAL TEST PROGRAM

No departures or supplements.

14.2.9 TRIAL USE OF PLANT OPERATING AND EMERGENCY PROCEDURES

The U.S. EPR FSAR includes the following COL Item in Section 14.2.9:

> A COL applicant that references the U.S. EPR design certification will identify the specific operator training to be conducted as part of the low-power testing program related to the resolution of TMI Action Plan Item I.G.1, as described in (1) NUREG-0660 - NRC Action Plans Developed as a Result of the TMI-2 Accident, Revision 1, August 1980, (2) NUREG-0694 - TMI-Related Requirements for New Operating Licenses, June 1980, and (3) NUREG-0737 - Clarification of TMI Action Plan Requirements.

This COL Holder Item is addressed as follows:

Specific operator training and participation, as described in the U.S. EPR FSAR Section 14.2.9 will be conducted.

14.2.10 INITIAL FUEL LOADING AND INITIAL CRITICALITY

No departures or supplements.

14.2.11 TEST PROGRAM SCHEDULE

The U.S. EPR FSAR includes the following COL Holder Item in Section 14.2.11:

> A COL applicant that references the U.S. EPR certified design will develop a test program that considers the following eight guidance components:
>
> - The applicant should allow at least nine months to conduct preoperational testing.
> - The applicant should allow at least three months to conduct startup testing, including fuel loading, low-power tests, and power-ascension tests.
> - Plant safety will not be dependent on the performance of untested SSCs during any phase of the startup test program.
> - Surveillance test requirements will be completed in accordance with plant Technical Specification requirements for SSC operability before changing plant modes.

- Overlapping test program schedules (for multiunit sites) should not result in significant divisions of responsibilities or dilutions of the staff provided to implement the test program.

- The sequential schedule for individual startup tests should establish, insofar as practicable, that test requirements should be completed prior to exceeding 25 percent power for SSC that are relied on to prevent, limit, or mitigate the consequences of postulated accidents.

- Approved test procedures should be in a form suitable for review by regulatory 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.

- Identity and cross reference each test (or portion thereof) required to be completed before initial fuel loading and that is designed to satisfy the requirements for completing ITAAC.

This COL Holder Item is addressed as follows:

A site-specific test program shall be developed that considers the components listed above and shall provide copies of approved test procedures to the NRC at least 60 days prior to their scheduled performance date.

14.2.12 INDIVIDUAL TEST DESCRIPTIONS

This section of the U.S. EPR FSAR is incorporated by reference {with the following departure and supplements}.

{An evaluation of the site-specific toxic chemicals hazards in BBNPP FSAR Section 2.2.3 did not identify any credible toxic chemical accidents that exceeded the Main Control Room IDLH limits within two minutes of detection. In accordance with regulatory Guide 1.78 (NRC, 2001), human exposures to toxic chemicals can be tolerated for up to two minutes at IDLH without incapacitation. Thus, a two minute exposure to IDLH limits provides an adequate margin of safety for control room operators. It is expected that a control room operator will take protective measures within two minutes (adequate time to don a respirator and protective clothing) after the detection and, therefore, will not be subjected to prolonged exposure at the IDLH concentration levels. The only chemical hazards that result in exceeding the IDHL after two minutes from detection threshhold in the control room are natural gas/methane and ammonia and are identified in FSAR Table 2.2-10. No specific detection and automatic actuation features are necessary to protect the control room operators from an event involving release of a toxic gas. therefore, detection of toxic gases and subsequent automatic isolation of the Control Room Envelope is not required and is not part of the BBNPP site-specific design basis. This represents a Departure from the U. S. EPR FSAR}.

The U.S. EPR FSAR includes the following COL Item in Section 14.2.12.5.1:

> A COL applicant that references the U.S. EPR design certification will provide site-specific test abstract information for the raw water supply system.

The U.S. EPR FSAR includes the following COL Item in Section 14.2.12.7.11:

> A COL applicant that references the U.S. EPR design certification will provide site-specific test abstract information for the circulating water supply system.

The U.S. EPR FSAR includes the following COL Item in Section 14.2.12.11.27:

> A COL applicant that references the U.S. EPR design certification will provide site-specific test abstract information for personnel radiation monitors.

The U.S. EPR FSAR includes the following COL Item in Section 14.2.12.21.6:

> A COL applicant that references the U.S. EPR design certification will provide site-specific test abstract information for the cooling tower.

These COL Items are addressed in Section 14.2.14.

14.2.13 REFERENCES

No departures or supplements.

14.2.14 COL APPLICANT SITE-SPECIFIC TESTS

This section is added to provide a location for COL applicants to list site-specific startup tests.

14.2.14.1 {Essential Service Water Emergency Makeup System (ESWEMS)

1. OBJECTIVES

   a. To demonstrate the ability of the ESWEMS to supply makeup water as designed.

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

2. PREREQUISITES

   ESWEMS testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

   a. Construction activities on the ESWEMS, including the ESWEMS Retention Pond, Pumphouse and recirculation 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 Waste Water Retention Basin have been completed, and the lines are isolable from the ESWS and functional.

   c. Hydrostatic/leak testing of the ESWEMS, including the recirculation line, has been completed with satisfactory results.

   d. ESWEMS instrumentation is functional and has been calibrated.

   e. Support systems required for operation of the ESWEMS are complete and functional.

   f. Test instrumentation available and calibrated.

   g. Temperature controller settings and monitoring functions such as electrical circuit and temperature alarms for heat tracing systems are set in accordance with UHS Makeup water system piping design requirements.

h. To ensure proper operation, heat tracing systems shall be tested before and after installation of the piping/tubing insulation, as applicable.

3. TEST METHOD

a. Verify that each ESWEMS division can be operated from the main control room and the remote shutdown panel.

b. Verify safety-related automatic valves (MOVs, SOVs, AOVs) respond as designed to accident signal.

c. Verify valve position indication.

d. Verify position response of valves to loss of motive power.

e. Verify each discharge strainer operates as designed.

f. Verify alarms, interlocks, display instrumentation, and status lights function as designed.

g. Verify head versus flow characteristics for each ESWEMS pump at design conditions.

h. Verify valve performance data, where required.

i. Verify the temperature controller and monitoring functions for the heat tracing system operate in accordance with the design requirements.

4. DATA REQUIRED

a. Record alarm, interlocks, and control setpoints.

b. Record pump head versus flow and operating data.

c. Record valve performance parameters (e.g., stroke time, developed thrust) for baseline diagnostic testing data.

d. Record valve position upon loss of motive power and valve position indication data.

e. Record temperature controller set points and monitoring functions for proper operation of the heat tracing system operation.

5. ACCEPTANCE CRITERIA

a. Each ESWEMS division can be operated, as designed, from the main control room and the remote shutdown panel.

b. The safety-related automatic valves (MOVs, SOVs, AOVs) respond to the designated accident signal as designed.

c. The valve position indications properly indicate actual valve position.

d. The position response of valves to loss of motive power is correct.

e. The discharge strainers perform as designed.

f. The alarms, interlocks, display instrumentation, and status lights function as designed.

g. The head versus flow characteristics for each ESWEMS pump at design conditions has been met.

h. The valves meet performance data where required.

i. The ESWEMS operates per design and as described in Section 9.2.5.

j. Heat tracing operates within temperature controller set point limits, and monitoring functions operate in accordance with design requirements.

14.2.14.2 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 peroperational 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.

3. TEST METHOD

a. Verify that each ESW blowdown system division can be operated from the main control room and the remote shutdown panel.

b. Verify that each ESW blowdown system division's MOVs close automatically in response to an emergency signal.

c. Verify that the ESW blowdown system operates at the rated flow and design conditions.

d. Verify alarms, interlocks, display instrumentation, and status lights function as designed.

e. Verify valve performance data, where required.

f. Verify valve position indication.

4. DATA REQUIRED

a. Record alarm, interlocks, and control setpoints.

b. Record flow data.

c. Record MOV performance parameters (e.g., stroke time, developed thrust) for baseline diagnostic testing data.

5. ACCEPTANCE CRITERIA

a. Each ESW blowdown system division can be operated, as designed, from the main control room and the remote shutdown panel.

b. Each ESW blowdown system divison MOV's close automatically in response to an emergency signal.

c. The ESW blowdown system operates at the rated flow and design conditions.

d. The alarms, interlocks, display information and status lights function as designed.

e. The valves meet perfromance data where required.

f. The valve position indications properly indicate actual valve position.

g. The ESW blowdown system operates per design and as described in Section 9.2.5.

14.2.14.3 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 peroperational 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.

3. TEST METHOD

a. Verify that each ESW division's chemical treatment system can be operated from the main control room and/or locally, as designed.

b. Verify safety-related automatic valves (MOVs, SOVs, AOVs) respond as designed to accident signal.

c. Verify alarms, interlocks, display instrumentation, and status lights function as designed.

d. Verify valve position indication.

e. Verify position response of valves to loss of motive power.

f. Verify each ESW division's chemical treatment system provides the required chemistry conditions at the emergency makeup pump inlet, in the emergency makeup line, and in the ESW cooling tower, over the full range of operating variables.

g. Verify valve performance data, where required.

4. DATA REQUIRED

a. Record alarm, interlocks, and control setpoints.

b. Record chemical flows and ESW chemistry data.

c. Record valve performance parameters (e.g., stroke time, developed thrust) for baseline diagnostic testing data.

d. Record valve position upon loss of motive power and valve position indication data.

5. ACCEPTANCE CRITERIA

a. Each ESW division's chemical treatment system can be operated, as designed, from the main control room and or locally as designed.

b. The safety-related automatic valves (MOVs, SOVs, AOVs) respond to designated accident signal, as designed.

c. The alarms, interlocks, display instrumentation, and status lights function as designed.

d. The valve position indications properly indicate actual valve position.

e. The position response of valves to loss of motive power is per design.

f. Each ESW division's chemical treatment system provides the required chemistry conditions at the emergency makeup pump inlet, in the emergency makeup line, and in the ESW cooling tower, over the full range of operating variables.

g. The valves meet performance data where required.

h. The ESW chemical treatment system operates per design and as described in Section 9.2.5.

14.2.14.4 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.

3. TEST METHOD

a. Verify manual control of Fire Water Supply system components from all locations as designed.

b. Verify Fire Water Supply system pump and system flow meet design specifications.

c. Verify the head and flow characteristics of the fire water pumps, and the operation of all auxiliaries.

d. Verify control logic.

e. Verify automatic operation of pre-action valves.

f. Verify the Fire Water Supply system provides design rated flow to all discharge points.

g. Verify Fire Water Supply system jockey pump starts on low (lower setpoint) discharge header pressure.

h. Verify Fire Water Supply system jockey pump stops on normal (upper setpoint) discharge header pressure.

i. Verify Fire Water Supply system electric motor driven pump starts on low discharge header pressure.

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.

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.

l. Verify alarms, indicating instruments, and status lights function as designed.

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 is as designed.

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

c. The head and flow characteristics of the fire water pumps, and the operation of all auxiliaries are per design.

d. The system control logic funcions per design.

e. The automatic operation of pre-action valves is per system design.

f. The Fire Water Supply system provides design rated flow to all discharge points.

g. The Fire Water Supply system jockey pump starts on low (lower setpoint) discharge header pressure.

h. The Fire Water Supply system jockey pump stops on normal (upper setpoint) discharge header pressure.

i. The Fire Water Supply system electric motor driven pump starts on low discharge header pressure.

j. The Standby Fire Water Supply system diesel engine pump 1 starts on dischrage header low pressure, or trip or failure to start of the running pump.

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.

l. The alarms, indicating instruments, and status lights function as designed.

14.2.14.5 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 cooling towers, 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 cooling towers 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 cooling towers, 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.

3. TEST METHOD

a. Verify Circulating Water System component manual control from all locations.

b. Verify automatic controls function at design setpoints.

c. Verify MOV operation and performance.

d. Verify standby circulating water makeup pump starts on low circulating water makeup header pressure.

e. Verify circulating water pumps' discharge head and system flow meet design requirements.

f. Verify auxiliary cooling water pumps' discharge head and auxiliary cooling water flow (with circulating water pumps off) meet design requirements.

g. Verify circulating water makeup pumps' discharge head and makeup flow meet design requirements.

h. Verify circulating water blowdown operates at rated flow and design conditions.

i. Verify chemical treatment provides required circulating water chemistry conditions in cooling tower piping and tower basin.

4. DATA REQUIRED

a. Record of start, trip and alarm setpoints.

b. Record of circulating water pumps' head versus flow and operating data.

c. Record of auxiliary cooling pumps' head versus flow and operating data.

d. Record of circulating water makeup pumps' head versus flow and operating data.

e. Valve performance data, where required.

f. Flow data to basins of the cooling towers.

5. ACCEPTANCE CRITERIA

a. The ability to manually control the Circulating Water System from various locations is as per the design.

b. The automatic controls function such that system performance meets or exceeds the design requirements.

c. The MOV operation and performance is per design requirements.

d. The standby circulating water makeup pump starts on low circulating water header pressure.

e. The circulating water makeup pumps' discharge head and system flow meets or exceeds design requirements.

f. The auxiliary cooling water pumps' discharge head and auxilliary cooling water flow (with circulating water pumps off) meets or exceeds design requirements.

g. The circulating water pumps' discharge head and makeup flow meets or exceeds design requirements.

h. The circulating water blowdown operates at rated flow and design conditions.

i. Chemical treatment provides circulating water chemistry conditions in cooling tower piping and tower basin per the design.

j. The Circulating Water System operates as described in Section 10.4.5.

14.2.14.6 ESWEMS Pumphouse HVAC System

1. OBJECTIVES

a. To demonstrate the ability of the ESWEMS Pumphouse HVAC System to provide cooling and heating sufficient to maintain necessary operating environment for the ESWEMS pumps and related equipment.

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

2. PREREQUISITES

ESWEMS Pumphouse HVAC System testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

a. Construction activities on the ESWEMS Pumphouse HVAC System have been completed.

b. ESWEMS Pumphouse HVAC System instrumentation is complete and functional and has been calibrated.

c. Support systems required for operation of the ESWEMS Pumphouse HVAC System are complete and functional.

d. The ESWEMS Pumphouse 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 ESWEMS Pumphouse HVAC 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.

d. Verify operation of the fan units and dampers per design requirements.

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.

d. The operation of the fan units and dampers are as per the design requirements.

e. Each division's air flow (both heating and cooling) meet design specifications.

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

g. The ESWEMS Pumphouse HVAC System operates per design requirements and as described in Section 9.4.15.}

14.2.14.7 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 Phase IV power ascension testing. The test shall be performed at >98 percent reactor power.

   a. Construction activities are complete.

   b. Circulating Water System flow balance has been performed.

   c. Permanently installed instrumentation is functional and calibrated. Test intrumentation is available and calibrated..

   d. Plant output is at approximately rated power.

3. TEST METHOD

   a. Perform a measurement of the cooling tower performance using Cooling Tower Institute (CTI) standards.

4. DATA REQUIRED

   a. Cooling water temperature and flows.

5. ACCEPTANCE CRITERIA

   a. The cooling tower performance meets manufacturer's design as described in Section 10.4.5.

14.2.14.8 Raw Water Supply System

1. OBJECTIVES

   a. To demonstrate the ability of the Raw Water Supply System (RWSS) to provide a reliable supply of raw water drawn from the Susquehanna River for the floor wash header, plant demineralized water, essential service water, and fire protection 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 at the water level specified in the design documents.

e. The RWSS flow balance has been performed.

f. Test instrumentation is available and calibrated.

3. TEST METHOD

a. Verify RWSS component manual control from all locations is per design requirements.

b. Verify automatic controls function at design setpoints.

c. Verify RWSS pumps and components meet individual design requirements.

d. Verify system flow meets design specifications.

4. DATA REQUIRED

a. Pump operating data.

b. Setpoints at which alarms and interlocks occur.

5. ACCEPTANCE CRITERIA

a. The automatic controls function such that system performance meets or exceeds the design requirements.

b. The individual design requirements for the RWSS have been met.

c. The RWSS design specifications for system flow have been met.

d. The RWSS operates as described in Section 9.2.9.

14.2.14.9 Plant Laboratory Equipment

1. OBJECTIVES

a. To demonstrate proper operation of laboratory equipment used to analyze or measure radiation levels.

b. To ensure proper operation of laboratory equipment used to analyze or measure isotopic concentrations (such as a mass spectrometer) of radioactive samples.

2. PREREQUISITES

Plant Laboratory Equipment testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

a. Construction activities on laboratory equipment support systems used to analyze or measure radiation levels are complete.

b. Construction activities on laboratory equipment support systems used to analyze or measure isotopic concentrations of radioactive samples are complete.

c. Construction activities related to the installation of vendor supplied laboratory equipment used to analyze or measure radiation levels are complete. The laboratory equipment has been installed per manufacturer recommendations.

d. Construction activities related to the installation of vendor supplied laboratory equipment used to analyze or measure isotopic concentrations of radioactive samples are complete. The laboratory equipment has been installed per manufacturer recommendations.

e. The laboratory equipment area radiological controls (such as postings, shielding, radioactive work permits) have been implemented or are capable of being implemented.

3. TEST METHOD

a. Ensure that drains from laboratory equipment that analyze or measure radiation levels are routed correctly and verifying that drains discharge as designed. This could be performed by pouring a liquid down the drain colored with food dye or by some other suitable means and ensure the presence of the food dye in the receiving tank.

b. Ensure that drains from laboratory equipment that analyze or measure isotopic concentrations of radioactive samples are routed correctly and verifying that drains discharge as designed. This could be performed by pouring a liquid down the drain colored with food dye or by some other suitable means and ensure the presence of the food dye in the receiving tank.

c. Ensure that ventilation hoods and other engineered radioactive containment devices are vented as designed. This could be accompished by a tracer gas or some other suitable means.

d. Measure discharge flow rates for the ventilation hoods and other engineered radioactive containment devices.

e. Perform vendor supplied startup checks and calibrations for laboratory equipment that analyze or measure radiation levels.

f. Perform vendor supplied startup checks and calibrations for laboratory equipment that analyze or measure isotopic concentrations of radioactive samples.

4. DATA REQUIRED

a. Inspection report from verification of laboratory equipment drains.

b. Inspection report from verification of ventilation hood flow and routing.

c. Completed vendor specified laboratory equipment startup procedures..

5. ACCEPTANCE CRITERIA

a. The laboratory equipment drain interface with the plant systems performs as designed.

b. The laboratory equipment ventilation hood interface with the plant system performs as designed.

c. The results of the vendor supplied startup checks and calibration procedures verify tested laboratory equipment meets design requirements.

14.2.14.10 Portable Personnel Monitors and Radiation Survey Instruments

1. OBJECTIVES

a. To demonstrate the ability of the Portable Personnel Monitors and Radiation Survey Instruments to monitor radiation levels.

b. Provide local and remote indications, if applicable, to alert personnel of potential releases.

2. PREREQUISITES

Portable Personnel Monitor and Radiation Survey Instrument testing shall be completed during the preoperational testing phase. The following prerequisites shall be met:

a. Construction activities on the Portable Personnel Monitors and Radiation Survey Instruments have been completed.

b. Area ventilation systems in the area where the Portable Personnel Monitors and Radiation Survey Instruments are installed are functional.

c. Plant ventilation systems in the areas where plant personnel are working are complete and functional.

d. The plant access control has been established (doors and access points installed and wall, ceiling, and floor penetrations in their design condition). This prerequisite ensures that personnel exit routes that do not pass through the Portable Personnel Monitors and Radiation Survey Instruments have been eliminated.

e. Test instrumentation available and calibrated.

f. Support systems (120 volt AC, purge gas, etc.) are available.

3. TEST METHOD

a. Verfiy alarms, displays, indications and status lights both locally and in the plant access control area are functional.

b. Verify that backround levels have been established.

c. Verify that alarms and displays are capable of detecting activity levels that are above the acceptance levels.

4. DATA REQUIRED

a. Background level settings.

b. Setpoints at which alarms and status light displays occur.

5. ACCEPTANCE CRITERIA

a. Alarms, displays, and status lights indicate locally and in the plant access control area.

b. The background radiation level from radon and other sources doesn't reduce the ability to detect radiation releases.

c. The Portable Personnel Monitors and Radiation Survey Instruments are capable of detecting test sources.}

14.3 INSPECTION, TEST, ANALYSIS, AND ACCEPTANCE CRITERIA

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

The U.S. EPR FSAR includes the following COL Item in Section 14.3:

> A COL applicant that references the U.S. EPR design certification will provide ITAAC for emergency planning, physical security, and site-specific portions of the facility that are not included in the Tier 1 ITAAC associated with the certified design (10 CFR 52.80(a)).

This COL Item is addressed as follows:

The entire set of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) for {BBNPP}, including Design Certification ITAAC (DC-ITAAC), Site-Specific ITAAC (SS-ITAAC), Emergency Planning ITAAC (EP-ITAAC), and Physical Security ITAAC (PS-ITAAC) are included in Part 10 of the COL application.

The U.S. EPR FSAR includes the following COL Item in Section 14.3:

> Additionally, a COL applicant that references the U.S. EPR design certification will describe the selection methodology for site-specific SSC to be included in ITAAC, if the selection methodology is different from the methodology described within the FSAR, and will also provide the selection methodology associated with emergency planning and physical security hardware.

This COL Item is addressed in Section 14.3.2.

14.3.1 TIER 1, CHAPTER 1, INTRODUCTION

No departures or supplements.

14.3.2 TIER 1, CHAPTER 2, SYSTEM BASED DESIGN DESCRIPTIONS AND ITAAC

The site-specific analyses were reviewed to identify safety-significant features. The results are provided in Table 14.3-1.

The site-specific structures, systems, and components that were considered to be addressed by ITAAC are provided in Table 14.3-2.

The interface requirements contained in Section 4, Tier 1 of the U.S. EPR FSAR are identified in Table 14.3-3, along with the method for addressing them (ITAAC or design information incorporated into the FSAR).

14.3.2.1 Content of Tier 1 System Design Descriptions

No departures or supplements.

14.3.2.2 Selection Criteria for ITAAC

Sections 14.3.2.2.1 through 14.3.2.2.3 are added as a supplement to the U.S. EPR FSAR.

14.3.2.2.1 Site-Specific ITAAC

A table of ITAAC entries is provided for each site-specific structure, system, or component described in the FSAR that meets the selection criteria, and that is not included in the certified design. The intent of these ITAAC is to define activities that are undertaken to verify the as-built system conforms to the design features and characteristics defined in the system design description.

The selection criteria and methodology defined in the U.S. EPR FSAR, Section 14.3.2 were utilized to define the site-specific features to be addressed by SS-ITAAC. In addition, ITAAC are provided to address interface requirements contained in Section 4, Tier 1 of the U.S. EPR FSAR as specified in Table 14.3-3.

14.3.2.2.2 Emergency Planning ITAAC

EP-ITAAC were developed to address implementation of elements of the Emergency Plan. Site-specific EP-ITAAC are based on the generic ITAAC provided in SRM-SECY-05-0197. These ITAAC were tailored, principally the acceptance criteria, to the specific reactor design and emergency planning program requirements.

14.3.2.2.3 Physical Security ITAAC

PS-ITAAC are provided in the U.S. EPR FSAR, Tier 1, Section 3.1.2. These ITAAC are incorporated by reference in Part 10 of the COL Application. Supplemental site specific physical security ITAAC can be found in Part 10, Section 2.2, Table 2.2-1, Site Specific Physical Security ITAAC.

14.3.2.3 Content of ITAAC

No departures or supplements.

14.3.3 TIER 1, CHAPTER 3, NON-SYSTEM BASED DESIGN DESCRIPTIONS AND ITAAC

No departures or supplements.

14.3.4 TIER 1, CHAPTER 4, INTERFACE REQUIREMENTS

No departures or supplements.

14.3.5 TIER 1, CHAPTER 5, SITE PARAMETERS

No departures or supplements.

14.3.6 REFERENCES

{No departures or supplements.}

Table 14.3-1—{Site Specific Analyses (Safety Significant Features)}

Item #	Safety Significant Design Feature	Part 10 ITAAC Table
1	For the ESWEMS Pumphouse, fire barriers are provided that separate each division of the ESWEMS.	Table 2.4-2
2	For the Switchgear Building, fire barriers are provided that protect the Station Blackout (SBO) Diesel Generators and their fuel supplies and that separate the SBO Diesel Generators from the normal power supplies.	Table 2.4-7
3	The ESWEMS Pumphouse is divisionally separated by interior flood-protection measures.	Table 2.4-2
4	Sources of fire protection water are available to support safe plant shutdown in the event of a safe shutdown earthquake.	Table 2.4-21
5	An on-site Operational Support Center is provided.	Table 2.3-1
6	The elevation of the ESWEMS makeup pump suction is sufficiently low.	Table 2.4-19
7	The ESWEMS Retention Pond is able to withstand the effect of water surge and wave forces.	Table 2.4-3
8	The pump well of the ESWEMS Pumphouse is able to withstand the effect of water surge and wave forces.	Table 2.4-2
9	Seismic Category I structures are bounded on bedrock, concrete fill, or structural fill.	Table 2.4-1
10	Backfill for Seismic Category I structures.	Table 2.4-1
11	Cohesive fill for the ESWEMS Retention Pond.	Table 2.4-1
12	There are at least two preferred power circuits that are physically independent.	Table 2.4-24

Table 14.3-2—{Site Specific SSC ITAAC Screening Summary}

Site-Specific Structure, System, or Component	U.S. EPR Interface	Selected for ITAAC
Structure		
Fire Protection Building	Yes	Yes
Switchgear Building	Yes	Yes
Turbine Building	Yes	Yes
Access Building	Yes	Yes
ESWEMS Pumphouse	Yes	Yes
Warehouse Building	Yes	Yes
Central Gas Supply Building	Yes	Yes
Grid Systems Control Building (i.e., Control House)	Yes	Yes
Circulating Water System Cooling Tower Structures	Yes	Yes
Circulating Water System Pumphouse	Yes	Yes
Circulating Water System Makeup Water Intake Structure	Yes	Yes
Waste Water Retention Basin	No	No
Meteorological Tower	Yes	Yes
Water Treatment Building	Yes	Yes
Component		
Buried Ductbanks	Yes	Yes
Buried Pipe	Yes	Yes
New and Spent Fuel Storage Racks	Yes	Yes
System		
Offsite Power System	Yes	Yes
Power Transmission System (Main Generator, Main Transformer, Protection & Synchronization)	Yes	Yes
Essential Service Water Blowdown System	No	No
Essential Service Water Makeup System Chemical Treatment System	No	No
Normal Essential Service Water Makeup System	No	No
Essential Service Water Emergency Makeup Water System	Yes	Yes
Potable Water System	No	No
Sanitary Waste Water System	No	No
Water Treatment System	No	No
Raw Water System	Yes	Yes
Circulating Water System, including support systems (i.e., CWS Makeup System, Cooling Tower Blowdown System, Chemical Treatment System, and Circulating Water System Outfall)	No	No
ESWEMS Pumphouse HVAC System	No	Yes
Fire Protection Building Ventilation System	No	Yes
Central Gas Distribution System	No	No
Fire Detection and Alarm Systems for Balance of Plant	No	No
Fire Water Distribution System, including Fire Protection Storage Tanks	Yes	Yes
Fire Suppression Systems for ESWEMS Pumphouse and Fire Protection Building)	No	Yes
Fire Suppression Systems for Balance of Plant	No	No
Standpipes and Hose Stations for Balance of Plant	No	No

Table 14.3-3—{Interface Requirements Screening Summary}
(Page 1 of 3)

U.S. EPR FSAR Tier 1 Section #	Interface Requirement	Selected for ITAAC
3.1	The physical security system provides physical features to detect, delay, assist response to, and defend against the design basis threat (DBT) for radiological sabotage.	Yes
4.1	Failure of any of the site specific structures not within the scope of the certified design shall not cause any of the Category 1 structures within the scope of the certified design to fail.	Yes
4.2	The COL Applicant will provide the design of the fire protection storage tanks and building.	No. The design of the fire water storage tanks and Fire Protection Building is discussed in Section 3.7.2.3.3 and Section 3.7.2.8.
4.2	The Fire Protection Building will house the fire protection system and fire pump with the storage tanks in close proximity to the pump building.	Yes
4.3	The COL Applicant will provide the design of the Switchgear Building.	No. The design requirements for the Switchgear Building are stated in Table 3.2-1.
4.3	The Switchgear Building contains the power supply, the instrumentation and controls (I&C) for the Turbine Island and the balance of plant, and the SBO diesel generators; it is located adjacent to and contiguous with the Turbine Building and is physically separate from the NI.	Yes
4.4	The COL Applicant will provide the design of the Turbine Building.	No. The design requirements for the Turbine Building are stated in Table 3.2-1.
4.4	The Turbine Building houses the components of the steam condensate main feedwater cycle, including the turbine-generator.	Yes
4.4	The Turbine Building is located in a radial position with respect to the Reactor Building, but is independent from the NI.	Yes
4.4	The Turbine Building is oriented to minimize the effects of any potential turbine generated missiles.	Yes
4.5	The COL Applicant will provide the design of the new fuel storage racks and the spent fuel storage racks.	No. The design of the new and spent fuel storage racks is discussed in Section 9.1.
4.5	These racks identified as Seismic Category I and are designed, constructed and tested to ASME Code Section III, Division 1, Subsection NF.	Yes
4.5	Materials for fuel storage racks shall satisfy their intended safety functional requirements with regards to fuel subcriticality.	Yes
4.5	Spent fuel rack materials will be compatible with the pool storage environment.	Yes
4.5	Spent fuel rack structural materials must be corrosion-resistant and compatible with the expected water chemistry of the spent fuel pool.	Yes
4.5	The new fuel and spent fuel storage racks are located in the Fuel Building.	Yes
4.5	The COL Applicant will also demonstrate that the design satisfies the criticality analysis requirements for the new and spent fuel storage racks, and describe the results of the analyses for normal and credible abnormal conditions, including a description of the methods used, approximations and assumptions made, and handling of design tolerances and uncertainties.	No. The design of the new and spent fuel storage racks is discussed in Section 9.1.
4.5	The COL Applicant will also describe the new fuel storage racks, including a description of confirmatory structural dynamic and stress analyses and the spent fuel storage racks, including a description of confirmatory structural dynamic and stress analyses and thermal-hydraulic cooling analyses.	No. The design of the new and spent fuel racks is discussed in Section 9.1.

Table 14.3-3—{Interface Requirements Screening Summary}
(Page 2 of 3)

U.S. EPR FSAR Tier 1 Section #	Interface Requirement	Selected for ITAAC
4.6	The design of buried conduit and duct banks, and buried pipe and pipe ducts is site-specific. Buried Seismic Category I conduit, electrical duct banks, pipe, and pipe ducts will be analyzed and designed in accordance with the specific requirements of the systems.	No. The design of the buried conduit and duct banks, and buried pipe and pipe ducts is discussed in Section 3.7.3.12 and Section 3.8.4.
4.6	The buried conduit and duct banks, and buried pipe and pipe ducts will be designed for the effects of soil overburden, surcharge, groundwater, flood, seismic soil interaction, and other effects of burial.	Yes
4.6	Concrete components of buried items will be designed in accordance with ACI 349-2001, including the exceptions specified in RG 1.142.	Yes
4.6	Steel components of buried items will be designed in accordance with ANSI/AISC N690-1994 (R2004), including Supplement 2.	Yes
4.7 and 2.7.11	Interface requirements for the Buried Piping and Pipe Ducts for the Service Water System are provided in Section 2.7.11 of Tier 1 of the U.S. EPR FSAR. The site-specific emergency makeup water system provides makeup water in order to maintain the minimum water level in the ESW cooling tower basins.	Yes
4.8 and 2.7.5	Interface requirements for the fire water distribution system are provided in Section 2.7.5 of Tier 1 of the U.S. EPR FSAR. The raw water supply system (RWSS) delivers makeup water to the Fire Water Distribution System's fire water storage tanks.	Yes
4.9	Interface requirements for the lightning protection and grounding system are provided in Section 2.5.8 of Tier 1 of the U.S. EPR FSAR. Section 2.5.8 of Tier 1 of the U.S. EPR FSAR does not contain any interface requirements for the lightning protection and grounding system.	Table 2.5.8 of Tier 1 of the U.S. EPR FSAR provides the ITAAC for the lightning protection and grounding system Section 8.3 incorporates the U.S. EPR FSAR lightning protection and grounding system by reference.
4.10 and 2.5.5	Interface requirements for the offsite power system, including the switchyard, are provided in Section 2.5.5 of Tier 1 of the U.S. EPR FSAR. At least two independent circuits shall be supplied to the station switchyard by the offsite power transmission system.	Yes
4.10 and 2.5.5	Interface requirements for the offsite power system, including the switchyard, are provided in Section 2.5.5 of Tier 1 of the U.S. EPR FSAR. Each offsite power circuit shall be sized to supply the station safety-related and non-safety-related loads during normal and off normal operation.	Yes
4.10 and 2.5.5	Interface requirements for the offsite power system, including the switchyard, are provided in Section 2.5.5 of Tier 1 of the U.S. EPR FSAR. Each Emergency Auxiliary Transformer shall be connected to the switchyard via an independent circuit, sized to supply the four Emergency Power Supply System divisions.	Yes
4.10 and 2.5.5	Interface requirements for the offsite power system, including the switchyard, are provided in Section 2.5.5 of Tier 1 of the U.S. EPR FSAR. The transmission system will not subject the reactor coolant pumps to a sustained frequency decay of greater than 3.5 Hz/second.	No. The frequency decay analysis is provided in Section 8.2.2.4.

Table 14.3-3—{Interface Requirements Screening Summary}
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U.S. EPR FSAR Tier 1 Section #	Interface Requirement	Selected for ITAAC
4.10 and 2.5.5	Interface requirements for the offsite power system, including the switchyard, are provided in Section 2.5.5 of Tier 1 of the U.S. EPR FSAR. The Emergency Auxiliary Transformers and Normal Auxiliary Transformers shall be sized to supply their load requirements.	Yes
4.11	Interface requirements for the power transmission system, including the main transformer, protection & synchronization, are provided in Section 2.5.6 of Tier 1 of the U.S. EPR FSAR. The GEN switchyard circuit breakers shall be sized to supply the load requirements.	Yes
4.12	The COL Applicant will provide the design of the Access Building.	No. The design requirements for the Security Access Building are stated in Table 3.2-1.
4.12	The Access Building controls access to the plant's controlled areas and is independent from the NI.	Yes