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.

14.2.1 SUMMARY OF TEST PROGRAM AND OBJECTIVES

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

{Callaway Plant Unit 2 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 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.

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 and System Engineer responsibilities.

The Startup Manager's engineering organization consists of System Engineers who are responsible for specific systems and Startup Engineers who are responsible for testing evolutions and/or specific tests. System Engineers and Startup 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 or construction to facilitate testing, operation, and maintenance.
- Startup 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 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}.

14.2.3 TEST PROCEDURES

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. 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.

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 and all related testing activities placed on hold until the procedure is revised.

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 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 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 Engineer} presents to the responsible reviewer a completed test procedure and test report with remarks and recommendations. During this review, the {Startup 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.
- 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 that must be completed, reviewed and approved before tests in the next category are started. Power ascension tests are scheduled and conducted at pre-determined power levels.

Results of 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.

14.2.8.1 First-of-a-Kind Testing

The U.S. EPR FSAR includes the following COL Item in Section 14.2.8.1:

The first COL applicant that references the U.S. EPR certified design will commit to review results from European predecessors concerning the new, unique, or novel EPR features such as those previously noted and propose supplemental testing if necessary.

This COL Item is addressed as follows:

{Calvert Cliffs Nuclear Power Plant Unit 3 was the first COL applicant that referenced the U.S. EPR certified design. This COL Item is not applicable to Callaway Plant Unit 2.}

14.2.9 TRIAL USE OF PLANT OPERATING AND EMERGENCY PROCEDURES

The emergency operating procedures will be performed on the plant simulator for procedure validation and operator training.

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 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 five 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.
- 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.

This COL Item is addressed as follows:

A site-specific test program shall be developed that considers the five guidance components 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

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 information for the circulating water supply system.

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 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 ISI.

2. PREREQUISITES

   a. Construction activities on the ESWEMS, including the ESWEMS pond, Pumphouse and test bypass line, have been completed and the system is functional.

   b. ESWEMS instrumentation is functional and has been calibrated.

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

   d. Test instrumentation available and calibrated.

3. TEST METHOD

   a. Verify that each ESWEMS division can be operated from the ESWEMS Pumphouse.

   b. Verify safety-related motor operated valves respond as designed to input signals.

   c. Verify valve position indication.

   d. Verify each ESWEMS pump discharge strainer operates as designed.

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

   f. Verify head versus flow characteristics for each ESWEMS pump.

   g. Verify valve performance data, where required.

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.

5. ACCEPTANCE CRITERIA

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

14.2.14.2 Essential Service Water Blowdown System

1. 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

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. a. 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

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

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

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

d. Test instrumentation available and calibrated.

3. TEST METHOD

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

b. Verify safety-related automatic valves respond as designed.

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

d. Verify valve position indication.

e. Verify the ESW chemical treatment system provides the required chemistry conditions in the emergency makeup line, and in the ESW cooling tower, over the full range of operating variables.

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

14.2.14.4 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

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 installed, 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.

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. Cooling tower performance testing requirements comply with Cooling Tower Institute (CTI) standards.

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 pump starts on low circulating water makeup header pressure.

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

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

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

h. Verify cooling tower performance using CTI's ATC-105, "Acceptance Test Code for Water-Cooling Towers", or equal.

4. DATA REQUIRED

a. Record of start, trip and alarm setpoints.

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

c. Valve performance data, where required.

d. Makeup flow data to the cooling towers.

5. ACCEPTANCE CRITERIA

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

14.2.14.5 ESWEMS Pumphouse Ventilation System

1. OBJECTIVES

a. To demonstrate the ability of the ESWEMS Pumphouse Ventilation System to maintain necessary operating environment for the ESWEMS pumps and related equipment.

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

2. PREREQUISITES

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

b. ESWEMS Pumphouse Ventilation System instrumentation is installed, functional and calibrated.

c. Support systems required for operation of the ESWEMS Pumphouse Ventilation System are installed 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 Ventilation System flow balance has been completed.

3. TEST METHOD

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

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

c. Verify operation of dampers and damper controls per design requirements.

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

e. Verify each division's air flow 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 ESWEMS Pumphouse Ventilation System operates per design requirements and as described in Section 9.4.15.}

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 {Callaway Plant Unit 2}, 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.

{The guidance in Regulatory Guide 1.206 (NRC, 2007) allows a shorter set of ITAAC if the application contains information that fully addresses EP requirements associated with any of the generic ITAAC. This discusses differences between generic Emergency Plan ITAAC contained in SRM-SECY-05-0197 and the Callaway Plant Unit 2 Emergency Plan ITAAC.

Callaway Plant Unit 2 will use the existing Callaway Plant Unit 1 Joint Public Information Center (JPIC). Since the only Program Element, ITAAC and Acceptance Criteria addressed involve space requirements associated with the JPIC, the entire section was eliminated.

Callaway Plant Unit 2 will use the existing Callaway Plant Unit 1 EOF combined TSC/OSC and existing HPN communications equipment. Since these Acceptance Criteria only address physical aspects of existing facilities, Acceptance Criteria 3.2.2, 5.1.1, 5.1.2, 5.1.3, 5.1.6, 5.2.1 and 5.2.2 were eliminated.}

14.3.2.2.3 Physical Security ITAAC

PS-ITAAC are provided in the U.S. EPR FSAR, Tier 1, Section 3.1.2 for the U.S. EPR. These ITAAC are incorporated by reference in Part 10 of the COL Application.

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

{**NRC, 2007.** Combined License Applications for Nuclear Power Plants (LWR EDITION), Regulatory Guide 1.206, U.S. Nuclear Regulatory Commission, June 2007.}

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

Item #	Safety Significant Design Feature	Part 10 ITAAC Table
1	For the Essential Service Water Emergency Make-up System (ESWEMS) Pumphouse, fire barriers are provided that protect and separate the ESWEMS makeup pumps and each associated electrical division.	Table 2.4-2 Table 2.4-15
2	For the Switchgear Building, fire barriers are provided that protect the 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 seismic design basis for the sources of fire protection water supply for safe plant shutdown in the event of a SSE.	Table 2.4-5
4	The ESWEMS Pumphouse is divisionally separated by interior flood-protection measures.	Table 2.4-2
5	An on-site Operational Support Center (OSC) is provided.	Table 2.3-1
6	The elevation of the ESWEMS makeup pump suction is sufficiently low to cope with ice formation.	Table 2.4-15
7	Structural fill for seismic Category I structures.	Table 2.4-1
8	Backfill for seismic Category I structures.	Table 2.4-1
9	There are at least two preferred power circuits that are physically independent.	Table 2.4-20

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 Pond and Pumphouse	Yes	Yes
Warehouse Building	Yes	No
Central Gas Supply Building	Yes	Yes
Switchyard Control House	Yes	Yes
Circulating Water System Cooling Tower Structure	Yes	Yes
Circulating Water System Pump Building	Yes	Yes
Circulating Water System Makeup Water Intake Structure	Yes	Yes
Circulating Water System Retention Basin	No	No
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
ESW Blowdown System	No	No
ESW Makeup System Chemical Treatment System	No	No
Normal ESW Makeup System	No	No
ESW Makeup Water System	Yes	Yes
Potable Water System, including Potable Water Tank	No	No
Sanitary Waste Water System	No	No
Raw Water System	Yes	Yes
Circulating Water System, including support systems (i.e., Cooling Tower Makeup System, Cooling Tower Blowdown System, Chemical Treatment System, Circulating Water System Seal Well, and Circulating Water System Outfall)	No	No
ESW Pump House Ventilation 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 ESW Pump House 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}

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U.S. EPR FSAR Tier 1 Section #	Interface Requirement	Selected for ITAAC
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.
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.

Table 14.3-3—{Interface Requirements Screening Summary}

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U.S. EPR FSAR Tier 1 Section #	Interface Requirement	Selected for ITAAC
4.6	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.
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

Table 14.3-3—{Interface Requirements Screening Summary}

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U.S. EPR FSAR Tier 1 Section #	Interface Requirement	Selected for ITAAC
4.11	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