START HISTORICAL

14.2 SPECIFIC INFORMATION TO BE INCLUDED IN FINAL SAFETY ANALYSIS REPORT

This section discusses the initial test programs conducted to confirm that parameters are within required ranges for safe and successful operation, and that they are consistent with data submitted in support of the request for the Susquehanna Steam Electric Station Operating License.

Subsequent test programs to confirm power uprate, modifications, and other changes are not reflected in this section. Therefore, acceptance criteria and other parameters cited in this section may not be current.

The Power Uprate Test Program is described in Section 14.3 of the FSAR.

14.2.1 SUMMARY OF TEST PROGRAM AND OBJECTIVES

As construction of systems/components is completed, the construction organization relinquishes jurisdictional control of these systems/components through a formal turnover to PP&L. Eventually all plant systems/components are turned over to PP&L.

The Initial Test Program encompasses the scope of events that commence with system/component turnover and terminate with the completion of power ascension testing. The Initial Test Program is conducted in two separate and sequential subprograms, the Preoperational Test Program and the Startup Test Program. At the conclusion of these subprograms the plant is ready for normal power operation. Testing during the Initial Test Program is accomplished in five distinct and sequential phases:

a) Phase I - Component Inspection and Testing Phase
b) Phase II - Preoperational and Acceptance Testing Phase
c) Phase III - Initial Fuel Loading Phase
d) Phase IV - Initial Heatup and Low Power Testing Phase
e) Phase V - Power Ascension Test Phase

Phase I and Phase II are sequential on a system basis while Phases III, IV and V are sequential on a plant basis.

14.2.1.1 Preoperational Test Program

The Preoperational Test Program is defined as that part of the Initial Test Program that commences with system/component turnover and terminates with commencement of nuclear fuel loading. The program is subdivided into two phases in which plant equipment and systems are prepared for a higher degree of operability. The phases are:

1) Component Inspection and Testing Phase (Phase I)
2) Preoperational and Acceptance Test Phase (Phase II)

Component inspection and testing will insure that components and equipment are calibrated and checked, construction work on a particular system has been completed to the degree

required and the system is initially operated and prepared for subsequent testing. After component inspection and testing is complete on a system, formal tests denoted as preoperational or acceptance tests are conducted during the Preoperational and Acceptance Test Phase. The Preoperational tests demonstrate, to the extent practicable, the capability of safety-related structures, systems, and components to meet their safety-related performance requirements. The completion of preoperational testing constitutes completion of Phase II of the Initial Test Program. Tests similar to preoperational tests denoted as acceptance tests (Table 14.2-2), may be conducted on additional non safety-related structures, systems, and components to demonstrate their capability to perform their nonsafety-related performance requirements.

To the extent practicable, the objectives of the Preoperational Test Program are to:

a) Verify the adequacy of plant design
b) Verify that plant construction is in accordance with design.
c) Demonstrate proper system/component response to anticipated transients and postulated accidents
d) Confirm the adequacy of plant operating and emergency procedures
e) Familiarize plant staff operating, technical, and maintenance personnel with plant systems

14.2.1.2 Startup Test Program

The Startup Test Program is defined as that part of the Initial Test Program that commences with the start of nuclear fuel loading and terminates with the completion of power ascension testing. Formal tests, denoted as startup tests, are conducted during this program. These tests confirm the design bases and demonstrate, to the extent practicable, that the plant will operate in accordance with design and is capable of responding as designed to anticipated transients and postulated accidents. Startup testing is sequenced such that the safety of the plant is never totally dependent upon the performance of untested structures, systems, or components. The completion of startup testing constitutes completion of Phases III, IV, and V of the Initial Test Program.

The objectives of the Startup Test Program are to:

a) Accomplish a controlled, orderly, and safe initial core loading
b) Accomplish a controlled, orderly, and safe initial criticality and heatup
c) Conduct low power testing sufficient to ensure that design parameters are satisfied and safety analysis assumptions are correct or conservative
d) Perform a controlled, orderly, and safe power ascension

14.2.2 ORGANIZATION AND STAFFING

The Superintendent of Plant - Susquehanna, has overall responsibility for the Initial Test Program. The Plant Staff and Integrated Startup Group (ISG) conduct the different phases of the test program. Responsibility for the ISG may be delegated to the Assistant Superintendent of Plant-Outages. In addition to these basic organizational units the Superintendent of Plant - Susquehanna is assisted by two review organizations, the Plant Operations Review Committee (PORC) and the Test Review Board (TRB). The organization, authority, responsibility, and

degree of participation of each of these organizational units during the Initial Test Program are described in the following sections.

14.2.2.1 Plant Staff

The Plant Staff consists of the permanent onsite PP&L personnel responsible for the safe operation and proper maintenance of the plant. Chapter 13 describes the Plant Staff organization. This section also establishes responsibilities, reporting relationships, and minimum qualification requirements for principal Plant Staff supervisory personnel.

The Plant Staff also includes the Startup Test Group which is a temporary group established to prepare for and implement the Startup Test Program. The Startup Test Group Supervisor reports to the Technical Supervisor and supervises the activities of the Startup Test Group. Activities include; preparation and implementation of startup tests; review and analysis of startup test results; preparation of startup test reports; and participation in test planning meetings.

The Plant Staff is utilized, to the fullest extent practicable, during the Initial Test Program. Specific responsibilities of the Plant Staff during the Initial Test Program are:

a) Performing selected preventive and corrective maintenance.
b) Operating plant equipment.
c) Calibrating instruments, meters.
d) Performing chemical and radiological inspections and tests
e) Providing required replacement and spare parts
f) Providing operator, technician, and maintenance support to the ISG
g) Ensuring that vendors, consultants, or other temporary personnel assisting the Plant Staff work in accordance with established project procedures
h) Confirming the adequacy of plant operating and emergency procedures to the extent practicable.
i) Authorizing and ensuring proper documentation, identification, and restoration of temporary modifications made during the Startup Test Program.
j) Authorizing and monitoring rework, modification, testing and maintenance during the Startup Test Program.
k) Coordinating preparation, review and approval of startup test procedures.
l) Coordinating performance of startup testing.
m) Coordinating review and approval of startup test results.
n) Planning and scheduling Startup Test Program activities.

14.2.2.2 Integrated Startup Group - Organization and Responsibilities

The Integrated Startup Group (ISG) is a temporary organizational unit established to augment the Plant Staff during the Initial Test Program. The ISG is comprised of individuals of various organizations (Bechtel, General Electric, PP&L, and others). Figure 14.2-1 shows the organizational structure of the ISG. The responsibility and qualification requirements of principal ISG supervisory personnel, the structure of the basic constituents comprising the ISG, and the responsibilities delegated to the ISG are described in the following sections.

14.2.2.2.1 ISG Supervisor

The ISG Supervisor has overall responsibility for supervising the conduct of the ISG. The ISG Supervisor reports to the Superintendent of Plant - Susquehanna, or the Assistant Superintendent of Plant-Outages, on matters pertaining to the Initial Test Program. The minimum qualifications for the ISG Supervisor are one of the following:

a) Graduate of a four-year accredited engineering or science college or university, plus five years of experience in testing or operation (or both) of power plants, nuclear facilities, or similar industrial installations. At least two years of this experience should be associated with nuclear facilities; or if not, the individual shall have training sufficient to acquaint him thoroughly with the safety aspects of a nuclear facility; or,

b) High school graduate, plus ten years of experience in testing or operation (or both) of power plants, nuclear facilities, or similar industrial installations. At least two years of this experience should be associated with nuclear facilities; or if not, the individual shall have training sufficient to acquaint him thoroughly with the safety aspects of nuclear facilities.

14.2.2.2.2 Assistant ISG Supervisor

The Assistant ISG Supervisor performs a line function and reports to the ISG Supervisor. The Assistant ISG Supervisor is specifically responsible for supervision of Systems Group Leaders and assumes the responsibilities of the ISG Supervisor in his absence.

The minimum qualifications of the Assistant ISG Supervisor are the same as the ISG Supervisor and are as described in Subsection 14.2.2.2.1.

14.2.2.2.3 Group Leaders

Group Leaders perform line functions and report to the Assistant ISG Supervisor. Group Leaders are assigned a staff of System Startup Engineers. Group Leaders have overall responsibility for assigned systems.

14.2.2.2.4 ISG Coordinator

The ISG Coordinator performs a staff function and reports to the ISG Supervisor. The ISG Coordinator is responsible for coordinating ISG interfacing activities with Plant Staff, Construction and various project support organizations involved in the Initial Test Program.

The ISG Coordinator is responsible for all ISG administrative activities, which includes tracking the development, review, approval and revision of all Preoperational and Acceptance Test Procedures. This also includes the development, review, approval and revision of all ISG Startup Administrative Manual and Startup Technical Manual Procedures.

14.2.2.2.5 ISG Specialists Supervisor

The ISG Specialist Supervisor performs a staff function and reports the ISG Supervisor.

The ISG Specialist Supervisor is responsible for the coordination and supervision of activities relating to Design Change Packages, Material Procurement Expediting, Advance Control Room/Power Generation Control Complex work coordination, Scoping, and I&C coordination.

14.2.2.2.6 ISG Schedule Supervisor

The ISG Schedule Supervisor performs a staff function and reports directly to the ISG Supervisor. He is responsible for the development and coordination of all startup schedules.

14.2.2.2.7 Record Control Group Supervisor

The Record Control Group Supervisor performs a staff function and reports to the ISG Supervisor. The Record Control Group Supervisor is responsible for the control and review of records associated with ISG System/Component testing.

14.2.2.2.8 GE ISG Representative

For Unit II the GE ISG Representative performs a staff function and reports to the Assistant ISG Supervisor. His duties include:

a) Coordinating and acting as an interface between the ISG and GE NEBG to satisfy GE NSSS related requirements.
b) Coordinating closure of FDDR's and FDI's.

14.2.2.2.9 Responsibilities

Specific responsibilities of the ISG during the Initial Test Program are:

a) Recommending acceptance or rejection of system/component turnover to PP&L
b) Coordinating initial instrument, relay, and meter calibration
c) Coordinating initial digital and analog control loop checkout
d) Coordinating initial equipment operation
e) Coordinating system cleanliness verification after turnover
f) Ensuring that assigned vendors or other consultants perform work in accordance with approved procedures
g) Authorizing and ensuring proper identification, documentation, and restoration of temporary modifications made during the Preoperational Test Program (for selected systems/components this responsibility may be assumed by the Plant Staff prior to conclusion of the Preoperational Test Program).
h) Documenting and reporting design problems identified during the Initial Test Program until PP&L permanent plant procedures are implemented to perform this function, at which time this becomes a Plant Staff responsibility. Implementation of permanent plant procedures may be on a system, unit, or plant basis.
i) Documenting and reporting construction problems identified during the Initial Test Program until PP&L permanent plant procedures are implemented to perform this function, at which time this becomes a Plant Staff responsibility. Implementation of permanent plant procedures may be on a system, unit, or plant basis.
j) Authorizing and monitoring rework, modification, and maintenance during the Preoperational Test Program (for selected systems/components this responsibility may be assumed by the Plant Staff prior to conclusion of the Preoperational Test Program).
k) Coordinating preparation, review, and approval of component and preoperational test procedures.
l) Coordinating performance of component and preoperational testing.
m) coordinating review and approval of component and preoperational test results.
n. Planning and scheduling Preoperational Test Program activities.

14.2.2.3 Plant Operations Review Committee

The Plant Operations Review Committee (PORC) consists of the individuals assigned independent review responsibility in accordance with the requirements of Chapter 13. The responsibilities, reporting relationships, and qualification requirements of PORC members are also described in Chapter 13. During the Initial Test Program additional responsibilities of PORC include reviewing and recommending approval of startup test procedures prior to testing and reviewing and recommending approval of startup test results following testing.

14.2.2.4 Test Review Board

The Test Review Board (TRB) is a temporary review organization established specifically for the Preoperational Test Program. Test Review Board members may consist of individuals of various organizations (Bechtel, General Electric, PP&L, or others). The Test Review Board is responsible for review of preoperational test procedures prior to testing and for review of preoperational test results after testing. The TRB recommends approval to the Superintendent of Plant.

The Superintendent of Plant is responsible for the assignment of individuals to the Test Review Board. These assignments may be on a permanent or temporary basis. The TRB Chairman is responsible for the conduct of the TRB and is directly responsible to the Superintendent of Plant. The minimum qualifications of the TRB Chairman are the same as identified in Subsection 14.2.2.2.1.

14.2.3 TEST PROCEDURES

The Initial Test Program is conducted in accordance with detailed component, preoperational, and startup test procedures. PP&L maintains overall responsibility for test procedure preparation, review, and approval. These activities are completed in a timely fashion to ensure that these procedures are suitable for NRC review at least 60 days prior to their intended use.

14.2.3.1 Procedure Preparation

Component test procedures are initially prepared by designated organizations (Bechtel, General Electric, PP&L or others). The completed drafts are reviewed by other cognizant organizations and approved by the ISG Supervisor.

Preoperational and Startup test procedure drafts are initially prepared by designated organizations (Bechtel, General Electric, PP&L, or others) in accordance with the standard format of Figures 14.2-2A & B. The completed drafts are then reviewed by cognizant design organization representatives to ensure that test procedure objectives and acceptance criteria are consistent with current design document requirements. Review comments are resolved between the writing organization and the cognizant design organization representative.

The following items are the responsibility of the ISG for component and preoperational test procedures and the Plant Staff for Startup test procedures:

a) Updating procedure references to latest revisions.
b) Verifying the procedure has been revised to incorporate
c) design changes.
d) Verifying procedure compatibility with field installation of equipment.
e) Resolving comments on procedures received from TRB, PORC or the Superintendent of Plant.
f) Evaluating reactor operating and testing experiences as supplied by the Manager-Nuclear Support in the development of the procedures.

14.2.3.2 Procedure Review and Approval

Following initial preparation the component tests are reviewed by cognizant organizations and sent back to the ISG for inclusion of comments. The ISG Supervisor then approves the component test procedures.

Following initial preparation, the Preoperational and Startup test procedures are processed through a formal review and approval cycle. The responsibility for coordinating this process and for resolving review comments lies with the ISG Supervisor or his designee for preoperational tests and with the Technical Supervisor or his designee for startup tests.

Specific review responsibilities are as follows:

a) For preoperational and acceptance test procedures the Test Review Board, under the direction of the TRB Chairman, is responsible for:

    1. Verifying procedure conformance with the FSAR, environmental technical specifications, and plant operating technical specifications.
    2. Ensuring technical adequacy of procedures.
    3. Recommending approval of test procedures.
    4. The Test Review Board is responsible for review of preoperational test procedures prior to testing and for review of preoperational test results after testing.

b) For the Startup Test Program test procedures the Plant Operations Review Committee, as described in Chapter 13 is responsible for:

    1. Verifying procedure conformance with the FSAR, environmental technical specifications, and plant operating technical specifications.
    2. Performing a nuclear safety review as required by the plant technical specifications.
    3. Ensuring technical adequacy of the procedures.
    4. Recommending approval of test procedures.

Upon completion of review and inclusion of required changes preoperational and startup test procedures are submitted for approval by the Superintendent of Plant.

14.2.4 Conduct of Test Program

The administrative controls that govern conduct of the Plant Staff and of the Integrated Startup Group during the Initial Test Program are specified by administrative procedures. These

administrative procedures are PP&L controlled and approved documents. Administrative procedures define tasks to be performed, prescribe methods, and assign responsibilities for performing them.

The administrative procedures governing conduct of the Integrated Startup Group are contained in the Startup Administrative Manual which is approved by the Superintendent of Plant. These procedures do not establish the administrative controls of other project groups or organizations except as they interface with the Integrated Startup Group. The Startup Administrative Manual is approved for use prior to start of the Initial Test Program. The administrative procedures governing conduct of the Plant Staff are as specified in Chapter 13. The schedule for preparation, review, and approval of these procedures is also described in Chapter 13. This schedule provides sufficient time for procedures to be available for use prior to the time they are required to be implemented.

14.2.4.1 Test Performance

Preoperational and Startup testing performed during the Initial Test Program is in accordance with approved test procedures. The method for preparing, reviewing, and approving these test procedures is detailed in Subsection 14.2.3. Prior to start of testing, a test director(s) is assigned to each procedure. The test director(s) is the individual designated as being responsible for coordinating test performance. Test directors for preoperational tests are assigned from the ISG or the Plant Staff by the ISG Supervisor or his designee. Test directors for startup tests are assigned by the Technical Supervisor or his designee.

Specific responsibilities of the test director include but are not limited to:

a) Verifying test prerequisites are complete and properly documented, except as provided by Subsection 14.2.4.2
b) Ensuring that required test apparatus/equipment is available and calibrated.
c) Documenting test performance on a single copy of the procedure, denoted as the official test copy
d) Ensuring that test precautions are observed during testing
e) Adhering to the detailed instructions of the approved procedure, except as provided by Subsection 14.2.4.3
f) Ensuring test personnel have been properly briefed
g) Documenting and reporting test exceptions

The plant operating staff is responsible for the safe and proper operation of equipment during testing. Should an unsafe condition arise, the plant operating staff shall take whatever action is necessary including, but not limited to, stopping the test in order to restore safe plant conditions. During startup testing, the plant operating staff is specifically responsible for compliance with operating technical specifications, and compliance with the provisions of the operating license.

14.2.4.2 Test Prerequisites

Specific test prerequisites are identified in each preoperational test procedure. The test director verifies that each prerequisite is completed and properly documented prior to signoff in the official test copy of the procedure. If a prerequisite in a preoperational test cannot be satisfied, the test director will institute a procedure modification to the Preoperational Test.

As a prerequisite to preoperational testing, proper operation of each alarm loop is verified and listed in an appendix to the test. During the preoperational test, system parameters are varied and interlocks are tested which cause alarms to actuate. Those alarms which are actuated during the course of the test will be documented in the body of the preoperational test.

14.2.4.3 Procedure Modifications

Tests are conducted in accordance with approved procedures. If necessary, these procedures may be modified to complete testing. Such procedure modifications are documented on a test change notice form. In addition to generation of a test change notice form for preoperational tests, the test director marks up the official test copy of the procedure and initials/dates the change.

Review and approval for test change notices on preoperational test procedures is provided by the TRB.

Review and approval for test change notices on startup test procedures is provided by the PORC.

Preparation, review and approval activities are accomplished before or after performance of associated testing based on the following criteria:

a) Non-Intent Changes

For procedure modifications that do not change acceptance criteria and do preserve the intent of the test, the test change notice may be approved after performance of associated testing. Non-Intent changes for startup tests shall be initialed/dated by an on-shift licensed senior operator in addition to the test director prior to performance of associated changes.

b) Intent Changes

For procedure modifications that alter the acceptance criteria or the intent of the test, the test change notice is approved before performance of associated testing.

14.2.4.4 Design Problems

In the process of checkout, initial operation, and preoperational or startup testing design problems may be encountered. Such design problems are formally documented and reported to appropriate design organization representatives for resolution. Typical design problems include:

a) Errors or discrepancies in approved project design documents
b) Items that represent a potential hazard to personnel safety
c) Proposed facility modifications to meet design objectives
d) Failure of a tested system or component to satisfy design requirements or acceptance criteria
e) Operating problems where operation is in accordance with design requirements

Design response for all such reported items is mandatory. Should the response require a facility modification, the appropriate design documents are revised and issued to the field. Subsequent control of these modifications is described in Subsection 14.2.4.5.

14.2.4.5 Control of Rework, Modifications, and Repairs

A comprehensive listing of outstanding work items is maintained for each system during the Initial Test Program. This listing is maintained to ensure that identified work is performed. Typical listed work items include:

a) Incomplete or incorrect equipment installation
b) Equipment repairs (corrective maintenance)
c) Approved facility modifications
d) New or additional construction

This work is performed by the construction organization, the plant maintenance staff or a contract organization in accordance with approved procedures. In any event, in order to maintain the required controls, formal authorization is required to perform the work. During the Preoperational Test Program, this written authorization is obtained from the ISG through implementation of the appropriate ISG or Plant Staff administrative procedure. During the Startup Test Program, this written authorization is obtained from the Plant Staff through implementation of the appropriate Plant Staff administrative procedure. These administrative procedures, in addition to authorizing performance of the work, specify any retesting required as a result of the work and document completion of both the work and associated retesting. Closure of the work list item requires completion of both the specified work and the specified retesting, if required.

14.2.4.6 Test Phase Prerequisites

Completion of Phase I is a prerequisite of Phase II for each system. The completion of Phase II on safety-related systems is a prerequisite for commencement of the Startup Test Program with the following exception: Startup Testing required to be completed prior to fuel loading as identified in Figure 14.2-5 may be implemented during Phase II.

Completion of each major phase of the Startup Test Program is a prerequisite to starting the succeeding phase. Subsection 14.2.11 identifies the specific testing scheduled to be conducted during each of these phases. A phase is considered complete only after the results of required testing are evaluated, reviewed, and approved, and test exceptions resolved per the requirements of Subsection 14.2.5.

14.2.5 REVIEW, EVALUATION , AND APPROVAL OF TEST RESULTS

PP&L has overall responsibility for review, evaluation, and approval of test results. The following sections establish the requirements for review, evaluation, and approval of individual test results, major test phase test results, and test plateau test results.

14.2.5.1 Individual Test Results

Upon completion of a component test, the System Engineer assembles the test results and submits them to the Group Leader for approval.

Upon completion of a preoperational or a startup test, the test director assembles a test package that includes the official test copy of the procedure and all related documentation. The preoperational test package is submitted to the Test Review Board Chairman who disseminates copies of the test package to TRB members responsible for performing an in-depth review and evaluation of test results. For startup test results the package is submitted to the chairman of PORC.

Test discrepancies, deficiencies, and omissions identified during testing or during review of test results are documented as test exceptions. Test exceptions occurring because of design problems are reported to appropriate design organization representatives for resolution per Subsection 14.2.4.4. Following TRB or PORC review and resolution of TRB or PORC comments, the chairmen have three options:

a) Recommend that the entire test be repeated.
b) Recommend that test results are unacceptable until all or part of the outstanding exceptions are resolved, in which case the test package is returned to the test director for further action.
c) Recommend acceptance of test results with or without exceptions, in which case the test package is submitted to the appropriate approval authority for final review and approval.

Final review and approval of preoperational test and startup test results is by the Superintendent of Plant. Final review and recommendation for approval of startup test results is by the Plant Operations Review Committee. Approval is by the Superintendent of Plant.

For test results approved with exceptions, each exception will be evaluated and assigned a required completion date relative to the different phases of the Initial Test Program. Test exceptions are resolved by processing them through the same review and approval cycle as associated test results.

14.2.5.2 Major Test Phase - Test Results

Commencement of each major test phase of the Startup Test Program, requires that outstanding work items be reviewed and the following commitments be satisfied:

a) Commencement of Initial Fuel Loading requires that the preoperational test results of Figure 14.2-4 be reviewed and approved.
b) Commencement of Initial Heatup and Low Power Testing requires that the Phase III startup test results be reviewed and approved.
c) Commencement of Power Ascension Testing requires that the Phase IV startup test results be reviewed and approved.

14.2.5.3 Power Ascension Testing - Test Results

Testing during the Power Ascension Test Phase is sequenced in distinct test plateaus. Prior to proceeding from one plateau to the next, the startup test results of the preceding plateau are required to be reviewed and approved.

14.2.6 TEST RECORDS

A single copy of each approved procedure, denoted as the official test copy, is used as the official record of the test. Because of the format of startup test procedures, there will be one official test copy of a subtest for each Test Condition or plant operating condition in which the subtest is implemented. The completed official test records are assembled into a test package at the end of testing. This test package is retained in accordance with PP&L requirements for record retention.

14.2.7 CONFORMANCE OF TEST PROGRAMS WITH REGULATORY GUIDES

The safety-related performance requirements of the safety-related structures, systems, and components identified in Chapter 3 are tested in conformance with the regulatory positions established in the following regulatory guides or justification for exceptions is provided.

Number	Title
1.20	Vibration Measurements on Reactor Internals (Revision 2, May 1976).
1.41	Preoperational Testing of Redundant On-site Electric Power Systems to Verify Proper Load Group Assignments (March 16, 1973).
1.52	Design, Testing, and Maintenance Criteria for Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Absorption Units of Light-Water-Cooled Nuclear Power Plants (Revision 1, July 1976). Testing will be performed on the Control Structure Emergency Outside Air Supply System in accordance with the exceptions taken on Regulatory Guide 1.52 in Section 3.13.
1.56	Maintenance of Water Purity in Boiling Water Reactors (June 1973).
1.68	Initial Test Programs for Water-Cooled Reactors Power Plants (Revision 1, January 1977). 1) Reference: Section C.1 of the Regulatory Guide. Testing will be conducted on safety-related structures, systems, and components identified in Table 14.2-1 as required by 10CFR50. 2) Reference: Section C.9 of the Regulatory Guide. The requirements of Preoperational Test results documentation and reporting are satisfied by the format and content of the completed test procedures; generation of additional reports is not contemplated. 3) Reference: Appendix A, Section 1.h (10) of the Regulatory Guide. Not applicable because SSES does not use containment recirculation fan for post accident containment heat removal.

4) Reference: Appendix A, Section 5.1.1 of the Regulatory Guide. The two pump trip is done at Test Condition 3 (approximately 100% core flow and 75% power).

5) Reference: Appendix A, Section 5.c.c of the Regulatory Guide.

Demonstration of the operability of liquid radioactive waste system is provided in the preoperational test program. No additional testing is necessary during the power-ascension test phase.

1.68.1 Preoperational and Initial Startup Testing of Feedwater and Condensate systems for Boiling Water Reactor Power Plants (Revision 1, January 1977).

Testing may be limited by the availability of auxiliary steam.

1.68.2 Initial Startup Test Program to Demonstrate Remote Shutdown Capability for Water-Cooled Nuclear Power Plants (January 1977).

1.70 Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (September 1975).

1.80 Preoperational Testing of Instrument Air Systems (June 1974).

The Instrument Air System is not safety related. However, the various components in the Instrument Gas System will be tested to verify that they fail as designed per the statement in Section 3.13. The movement of affected valves will be verified as part of the test associated with each respective valve's corresponding system test.

The action and flow of decay air is not an essential criteria of operation in relation to the affected valves. The valves are to fail with loss of gas to a safe position. Whether decaying pressure will hold some or all of the valves (except for those on the affected line) in normal operating positions is not of critical importance.

1.104 Overhead Crane handling Systems for Nuclear Power Plants (February, 1976).

Exceptions for testing of the cranes are outlined in Section 3.13.

1.108 Periodic Testing of Diesel Generators Used as Onsite Electric Power Systems at Nuclear Power Plants (August 1977).

The testing of diesel generators will conform to Regulatory Guide 1.108 per regulatory position 2.a.

Since sequence of events capability was not part of the design, testing will also take the same exceptions as outlined in Section 3.13.

1.140 Design, Testing and maintenance criteria for normal ventilation exhaust system air filtration and absorption units of light-water-cooled nuclear power plants (Revision 1).

Preoperational testing will comply with regulatory position C.5.

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

The Manager-Nuclear Support is responsible for ensuring that reactor operating and testing experiences of similar power plants are made known to the ISG and the Plant Staff during the Initial Test Program. The primary sources of experience information are NRC License Events and experiences of industry contacts. This information will be sorted and reported for a period of two years prior to fuel load on the first unit. The Manager-Nuclear Support is addressed in Subsection 17.2.1.

14.2.9 TRIAL USE OF PLANT OPERATING AND EMERGENCY PROCEDURES

The adequacy of Plant Operating and Emergency Procedures will be confirmed by trial-use during the Initial Test Program. Those procedures that do not require nuclear fuel are confirmed adequate to the extent practicable during the Preoperational Test Program. Those procedures that require nuclear fuel are confirmed adequate to the extent practicable during the Startup Test Program.

The plant operating staff is responsible for confirmation of operating and emergency procedures. The Superintendent of Plant is responsible for ensuring that comments/changes identified during confirmation are incorporated in finalized procedures.

It is not intended that preoperational test procedures explicitly incorporate or reference plant operating and emergency procedures. These tests are intended to stand on their own since they are not necessarily compatible with configurations and conditions required for confirmation of facility operating and emergency procedures. Startup test procedures will incorporate and reference plant operating and emergency procedures to the extent practical.

14.2.10 INITIAL FUEL LOADING AND INITIAL CRITICALITY

Initial fuel loading is accomplished in accordance with startup test procedure, ST-3 Fuel Loading. Initial criticality is accomplished in accordance with startup test procedure ST-4, Full Core Shutdown Margin. These procedures comply with the general guidelines and regulatory positions contained in Regulatory Guide 1.68 (Revision 1, January 1977). Test abstracts establishing the objectives, prerequisites, test method, and acceptance criteria for these procedures are presented in Subsection 14.2.12.

14.2.11 TEST PROGRAM SCHEDULE

The Preoperational Test Program is scheduled for 15 months duration on the Unit 1 and Common components and for 12 months duration on the remaining Unit 2 components (see Figure 14.2-4a and 14.2-4b). The subsequent Startup Test Programs are scheduled for six months on each unit.

The Preoperational Test Program sequential test schedules presented on Figures 14.2-4a and 14.2-4b offer one possible plan for an orderly and efficient progression of the program. While these sequences may be preferred, numerous alternatives exist. The schedule will be updated

periodically at the jobsite to reflect construction status, manpower availability, and the required test prerequisites.

The safety-related structures, systems, and components will be preoperationally tested. The Preoperational Test Procedures are scheduled to be developed from September 1977 to January 1979 for Unit 1 and from July 1982 to July 1983 for Unit 2. Where electrical, mechanical, physical or administrative communication exists between Unit 2 and the operating Unit 1, the Unit 2 Preoperational or Acceptance Test will be divided into 2 or more procedures to facilitate proper administrative control and scheduling. Any test procedure which involves an interplant communication will contain the suffix B on the procedure number.

The schedule of Unit 1 and Unit 2 Startup Tests is presented in Figure 14.2-5. This schedule establishes the required testing as a function of test condition. The test conditions are described on Figure 14.2-6. All testing is assigned to a specific test condition for convenience even though some testing, as identified in figure 14.2-5, is performed outside the bounds of the assigned test condition. Not all subtests of a Startup Test are performed at each assigned test condition. Startup testing will be divided into three Major Test Phases, and, within the Power Ascension Test Phase, into distinct test plateaus. The testing included in each Major Test Phase and test plateau is described in Table 14.2-4. Even though this basic order of testing is required, there is still considerable flexibility in sequencing the startup testing specified to be conducted at each plateau. Detailed startup testing schedules, commensurate with the requirements of this schedule, will be developed at the job site.

14.2.12 INDIVIDUAL TEST DESCRIPTIONS

The individual preoperational tests to be conducted on safety-related structures, systems, and components are listed in Table 14.2-1 for Unit 1 and Table 14.2-6 for Unit 2. The abstracts of these preoperational tests are contained in Subsection 14.2.12.1 in numerical order. The Startup Test Program procedures are listed in Table 14.2-3. The abstracts of Startup Test procedures are contained in Subsections 14.2.12.2 and 14.2.12.6 for Unit 1 and Unit 2, respectively in numerical order. The abstracts identify each test by title and number, describe the test objectives, specify the test prerequisites, provide a summary description of the test method, and establish the test acceptance criteria.

Unit 2 preoperational program will be scheduled and performed in a manner that will not affect the safe operation of Unit 1. Several of the Preoperational Acceptance Tests will be subdivided into A and B tests. The A portion of the test will not affect the safe operation of Unit 1, the B portion of the Preoperational Test is dependent upon an interface with Unit 1 and may require an outage on Unit 1 to perform the test. In addition to Test Review Board approval of the Preoperational Test, B designated tests will require a written Safety Evaluation submitted and test approval by the Plant Operations Review Committee. All permanent interface connections between Unit 1 and Unit 2 will be accomplished in accordance with SSES Plant Modification Procedure. Prior to performing the B designated Preoperational Test, the Work Activity Review Committee will be briefed on the impact and requirements of the test.

14.2.12.1 Unit 1 Preoperational Test Procedure Abstracts

(P2.1) 125 Volt DC System Preoperational Test

Test Objective - To demonstrate the ability of the 125 Volt dc system to perform the following:

a) The batteries can endure a complete discharge, based on their ampere hour rating, without exceeding the battery bank minimum voltage limit. (Performance Test)
b) The batteries can provide reliable stored energy to selected loads, indicated in Table 8.3-6, in the event of a design base accident. (Service Test)
c) The battery chargers can deliver their rated output.
d) The battery chargers can fully charge their associated batteries from design minimum charged state (i.e., after the service test) simultaneously providing power to the distribution panels for normal station loads.
e) That the alarms operate and annunciate at their specified abnormal condition.
f) The reliable 125V DC power is delivered to the ESF DC distribution panels.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instruments, protective devices, and breakers is verified. 480V AC Power, Resistor Load Bank, Battery Room Ventilation and Emergency Eyewash is available and/or in service.

Test Method - The Battery Performance Test is manually initiated by connecting the battery bank to the resistor load bank and discharging the batteries at a constant current for a specified period of time. The Battery Service Test is manually initiated by connecting the battery bank to the resistor load bank and simulating, as closely as possible, the load the batteries will supply during a design base accident. Then the battery charger is connected to the batteries and the distribution panels to verify that they can charge the batteries while simultaneously providing power to the normal plant loads. The battery charger is also connected to the resistor load bank and current is increased to its maximum rating with the charger isolated from its associated battery bank. Alarms are simulated and verified to be operated properly.

Acceptance Criteria - The batteries can satisfactorily deliver stored energy for the specified amount of time as required for the Performance and Service Test. The battery chargers can deliver rated output and can charge their associated battery bank from minimum voltage to a fully charged state in a specified amount of time while simultaneously supplying normal plant loads. The alarms operate at their engineered setpoints and annunciate in the Control Room.

(P4.1) 4.16 kV System Preoperational Test

Test Objective - To demonstrate the proper operation and load -carrying capability of breakers, switchgear, transformers, and cables. Also to demonstrate proper operation of protective devices, relaying and logic, transfer and trip devices, permissive and prohibit interlocks, and instrumentation and alarms.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems including 125 volt dc systems are operable.

Test Method - The 4.16 kV system is energized. Required controls are operated or simulated signals are applied to verify proper operation of protective devices, relaying and logic, transfer and trip devices, permissive and prohibit interlocks, instrumentation and alarms, breakers, switchgear, transformers and cables.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P5.1) 480 Volt System Preoperational Test

Test Objective - To demonstrate the capability of the 480 Volt Load Centers and 480 Volt Motor Control Centers systems to provide electrical power to connected 480 Volt Load Centers and Motor Control Centers by demonstrating the proper operation of breakers, transfer and trip devices, relaying and logic, permissive and prohibit interlocks, instrumentation and alarms, motor-generator sets, and automatic transfer switches.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available to energize the 480 Volt system. Required instruments and protective relays are calibrated and controls are operable.

Test Method - Feeder breakers are opened and closed by operating or simulating controls. Voltages on the bus being fed are measured to verify breaker operations, relaying and logic, permissive and prohibit interlocks and alarms. Signals are applied to verify alarms and instrumentation. Buses are de-energized and energized to verify automatic transfer, switch transfer, and re-transfer and motor-generator set operation.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P13.1) Fire Protection Water Systems

Test Objective - To demonstrate the proper operation of the Fire Protection Water System. The test will specifically demonstrate the following:

For Unit #1 testing:

1) Automatic and manual operation and reliability of the fire pumps OP511 and OP512.
2) Yard Loop Integrity and ability to provide water through any flow path to yard fire hydrants.
3) Hose Stations in Unit 1 and common are operational and water is available to the stations.
4) Automatic and manual operation of the Unit 1 and common sprinkler systems.

For Unit #2 testing:

1) Hose stations in Unit 2 are operational and water is available to the stations.
2) Automatic and manual operation of the Unit 2 sprinkler systems.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operational. The river water makeup system, instrument air system, and the required electrical power supplies are available.

Test Method - The operating modes are initiated manually and, where applicable, automatically. Fire pump performance is determined for OP511 and OP512. Automatic and manual initiation of

the individual sprinkler systems are conducted. Flow tests are conducted on end of line fire hydrants. Flow verification is established at the hose stations. Required controls are operated or simulated signals are applied to verify proper operation and proper alarm annunciation locally and remotely.

Acceptance Criteria - The system performance parameters are in accordance with applicable codes and design documents.

(P13.2) Carbon Dioxide Fire Protection System

Test Objective - To demonstrate the proper operation of the CO fire extinguishing system. The test will specifically demonstrate the following:

1) The CO_2 storage tank and refrigeration system operate automatically to maintain the concentration of CO_2 in the tank.
2) The proper operation of the CO_2 automatic flooding systems.
3) The proper operation of the manual spurt CO2 systems.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operational. The required electrical power supplies are available.

Test Method - The operating modes are initiated manually and, where applicable, automatically. Required dampers and ducts close off the hazard area. The timers for CO discharge agree with design criteria. The required controls are operated or simulated signals and are applied to verify system interlocks and alarms.

Acceptance Criteria - System performance parameters are in accordance with applicable codes and design documents.

(P13.3) Fire and Smoke Detection Systems

Test Objective - To demonstrate the proper operation of the Fire and Smoke Detection System and related alarms.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. The required instruments are calibrated and controls are operational. The required electrical power supplies are available.

Test Method - The fire and smoke detector system required controls and instruments are operated or simulated signals are applied to ensure proper operation of interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable codes and design documents.

(P13.4) Halon 1301 Extinguishing Systems

Test Objective - To demonstrate proper operation of the Halon Fire Protection system and related alarms.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supplies are available.

Test Method - The operating modes are initiated manually and automatically. The required controls are operated or simulated signals are applied to verify system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable codes and design documents.

(P14.1) Reactor Building Closed Cooling Water System Preoperational Test

Test Objective - To demonstrate the Reactor Building Closed Cooling Water System functions as designed.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The Service Water System, Instrument Air System and a makeup water source for the RBCCW System are available.

Test Method - The system operation is initiated manually and the performance of the pumps is determined. Required controls are operated or simulated signals are applied to verify; automatic change of Service Water flow from RBCCW System with changes in the closed cycle water temperature; and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P16.1) RHR Service Water System Preoperational Test

Test Objective - To demonstrate the capability of RHR Service Water System to provide cooling water to connected components/systems and the ability of the system controls to alarm when abnormalities occur in the system and to operate in accordance with design intent.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The spray pond and a make-up water source to it are available. RHR Emergency Service Water is required to conduct the flow balancing test.

Test Method - System operation is initiated manually and where applicable automatically. The system is operated in the system design modes and RHR service water pump performance is determined. Required controls are operated or simulated signals are applied to verify automatic loop/valve alignments, system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P17.1) Instrument ac Power System Preoperational Test

Test Objectives - To demonstrate the ability of the 120V Instrument AC Power System to perform the following:

a) That full load power is delivered to the four class 1E electrically independent ESF load groups.
b) That full load power is delivered to the two non-class 1E distribution panels and that their automatic transfer switches shift load to their emergency sources upon loss of their normal sources, and back to normal power when it is restored.
c) That the alarms operate and annunciate upon loss of power.
d) That the four class 1E ESF distribution systems are electrically isolated from each other.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. The alarms operate properly, and 480V AC power and resistor load bank are available.

Test Method - The four class 1E ESF distribution panels are energized by manually closing their respective feeder breakers. A resistor load bank is connected to each distribution panel and current is increased to full load while maintaining required voltage of the three other distribution panels still energized. The remaining panel is de-energized to show that it does not affect the operation of the other three distribution panels. (This is performed for all four distribution panels.) Also, the undervoltage alarms are checked when each panel is de-energized. The two non-class 1E distribution panels are also energized by manually closing their respective feeder breakers. A resistor load bank is connected to each distribution panel and current is increased to full load. The automatic transfer switch normal supply breaker is manually opened to simulate a loss of normal power and the output voltage of the distribution panel is monitored to verify that the supply voltage switched from normal to emergency in a specified time period. The emergency supply breaker is opened and the output voltage of the distribution panel is monitored to verify that output voltage is not present. The emergency supply breaker is closed and the normal supply breaker is closed to restore normal power. Output voltage is monitored to verify that supply voltage switched from emergency to normal in the specified period of time. The non-class 1E distribution panel undervoltage alarms are verified when both normal and emergency supply breakers in the automatic transfer switches are opened.

Acceptance Criteria - That reliable 120V AC Power, at design load, is supplied to all instrument buses. That loss of normal supply to the automatic transfer switches causes a shift, in a specified time period, to the emergency supply and vice-versa when normal supply voltage is restored. That the four class 1E distribution panels are electrically isolated from each other and that loss of power alarms operate and annunciate in the Control Room.

(P23.1) Diesel Fuel Oil System Preoperational Test

Test Objective - To demonstrate that the diesel fuel oil system is capable of supplying fuel oil to connected plant equipment.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply systems are available. The diesel oil storage tank is at its normal operating level.

Test Method - System operation is initiated manually. The performance of the diesel transfer pumps is determined and the diesel day tank capacity is verified. Simulated signals are applied to verify system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P24.1) Diesel Generator System Preoperational Test

Test Objective - To demonstrate system reliability, proper voltage and frequency regulation under transient and steady-state conditions, proper logic correct setpoints for trip devices, and proper operation of initiating devices and permissive and prohibit interlocks.

Starting, cooling, heating, ventilating, lubricating and fueling auxiliary systems will also be tested to demonstrate that their performance is in accordance with design.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Emergency service water, Diesel Building H&V, 125 Volt dc Power, and Instrument Air are available. The diesel oil day tank is filled and a make-up source is available.

Test Method - System operation is initiated manually and diesel generator capability to start and attain rated voltage within the specified time are verified. Diesel generators are loaded to the rated load and the performance is determined. Required controls are operated or simulated signals are applied to verify automatic start, sequential loading, D-G protection, load rejection capability and other system interlocks and alarms. Reliability is demonstrated through 69 consecutive valid start tests of station diesel generators, with a minimum of 23 valid start tests per individual diesel generator.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P25.1) Primary Containment Instrument Gas System Preoperational Test

Test Objectives - To demonstrate that the Containment Instrument Gas system functions as designed.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems, the Reactor Building Closed Cooling Water System and Instrument Air System are available.

Test Method - System operation is initiated manually to determine the performance of compressors, moisture separators, dryers and filters. Required controls are operated or simulated signals are applied to verify; instrument gas system backup, isolation on primary containment isolation signal, and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P28.1) ESSW Pumphouse H&V System Preoperational Test

Test Objective - To demonstrate the capability of ESSW Pumphouse Heating and Ventilating System to maintain the required ambient temperature inside the ESSW Pumphouse.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems and the Instrument Air System are available.

Test Method - System operation is initiated manually and the fan air flow, damper operation, heater operation and ambient conditions inside the pumphouse are determined. Required controls are operated or simulated signals are applied to verify fan(s) automatic starts with associated pump starts and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P28.3) Diesel Generator Building Heating and Ventilation System Preoperational Test

Test Objective - To demonstrate the capability of the system to maintain the required ambient temperatures inside the diesel generator building.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems, the Instrument Air System and Control Structure Chilled Water System are available.

Test Method - System operation is initiated manually and fan air flow, damper operation, heater operation and ambient temperatures inside the diesel generator building are determined. Required controls are operated or simulated signals are applied to verify fan automatic starts with associated D-G starts and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P30.1) Control Structure H&V System Preoperational Test

Test Objective - To demonstrate the operability of the Control Structure H&V System and its interlocks inside the control structure building to demonstrate this system's ability to maintain a positive pressure above atmospheric during normal operation and high radiation signal when the emergency outside air supply mode is running. To demonstrate the ability of the Control Structure H&V to isolate before chlorine reaches the isolation dampers when chlorine is detected in the outside air intake.

Prerequisite - Construction is complete and the system is turned over to the ISG. Required instruments are calibrated and controls are operable.

The Control Structure Chilled Water System, Instrument Air System and turbine building vent are available. Required electrical power supply systems are available.

Test Method - The system operation is initiated manually and fan performance, damper operations and heating element operation are determined. The differential pressures with respect to outside atmosphere are measured. Required controls are operated or simulated signals are applied to verify the emergency filter operation on high radiation signal, automatic recirculation on high chlorine signal, system manual isolation and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P30.2) Control Structure Chilled Water System Preoperational Test

Test Objective - To demonstrate the ability of the Control Structure Chilled Water System to provide chilled water flow to Control Structure Heating/Ventilating Units and Control room floor and computer room floor cooling units.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The Service Water System, Emergency Service Water System, and Instrument Air System are available. Required electrical power supply systems are available.

Test Method - The system is operated to demonstrate chiller operation and chilled water pump performance. Required controls are operated or simulated signals are applied to verify automatic alignment of the system under emergency conditions (start of emergency condenser water recirculation pump) and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P34.1) Reactor Building H&V System Preoperational Test

Test Objective - To demonstrate the capability of the Reactor Building H&V System to maintain the required thermal environment inside the reactor building.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments and controls are operable. The Instrument Air System is available. Required electrical power supply systems and Reactor Building Vent are available. The Reactor Building ventilation flow balancing, High Efficiency Particulate Air (HEPA) filter and charcoal absorber efficiency, and in-place leak tests are completed.

Test Method - The system is operated to measure the fan performance and determine the capability to maintain the Reactor Building at negative pressure within the required thermal environment and areas of greater potential contamination at a lower pressure than the rest of the building.

Required controls are operated or simulated signals are applied to verify the system isolation on LOCA and/or high radiation signal, and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P34.2) Reactor Building Chilled Water System Preoperational Test

Test Objective - To demonstrate that the Reactor Building Chilled Water System provides the required cooling water to connected coolers under normal and emergency conditions.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The Reactor Building Closed Cooling Water System, Service Water System, Instrument Air System, Make-up Demineralizer Water System and required electrical power supply systems are available.

Test Method - The system is operated to demonstrate the chiller and chilled water pump operation. Required controls are operated or simulated signals are applied to verify system isolation, automatic valve alignment, equipment operation under emergency condition and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P45.1) Feedwater System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate proper operation of the Feedwater System. This will be accomplished to the extent possible utilizing the Auxiliary Boilers as a steam supply. The test will specifically demonstrate:

1) All RFP and RFPT instruments have been calibrated in accordance with the vendor's instruction manuals and instrument data sheets.
2) All RFP and RFPT alarm and trip points have been set properly.
3) All recorders, indicators, annunciators, and computer inputs function correctly.

Prerequisites

1) Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG.
2) The Service Water System is operational.
3) The Main Turbine Lube-Oil System is filled and operational.
4) The Instrument Air System is operational.
5) The Computer is operational to the extent necessary to verify inputs from the feedwater system.
6) The 480 volt motor control centers necessary for this test are operational.
7) The 250 volt DC control centers necessary for this test are operational.
8) RFPT A, B, and C Lube-Oil reservoirs are filled.

Test Method - Normal and emergency responses of the lube oil and turbine trip systems are verified following simulation or process manipulation of the controlling variable.

Acceptance Criteria -

1) Interlocks of the reactor feed pump turbine (RFPT) and of the alternate and emergency lube oil pumps and their corresponding alarms function as designed.
2) All abnormal conditions providing trip signals to the RFPTs function as designed.

(P45.2) Feedwater Control System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate proper operation of the Feedwater Control System. This will be accomplished to the extent possible without actually pumping water with the feed pump turbines. The test will specifically demonstrate:

1) All feedwater control instruments have been calibrated over their full range in accordance with the vendor's instruction manuals and instrument data sheets.
2) All feedwater alarm and trip points have been set properly.
3) All recorders, indicators, annunciators, and computer inputs function correctly.
4) Interlocks to the main turbine, recirculation system, and feed pumps function correctly.
5) Feedwater control signals to the start-up regulating valve and turbine-driven feed pumps function correctly with simulated inputs and step commands originating from their respective control stations.

Prerequisites - The prerequisites for this test are as follows:

1) Construction of the system is complete to the extent required to conduct this test and the system is turned over to the ISG.
2) The 125 Volt DC system is operational.
3) The Instrument AC system is operational.
4) The 24 Volt DC system is operational.
5) Panel 1C651 annunciator is energized.

Test Method - Various level, flow, pressure, and speed signals will be simulated and the proper responses will be verified.

Acceptance Criteria -

1) The reactor, main steam, and feedwater pressure and flow indicators, recorders, computer inputs, and trip points respond within designed tolerances.
2) Speed regulation response of each RFP Turbine is within design limits.
3) The response of the startup regulating valve is within design tolerances.
4) Changes in the control mode, selection of control channels, or integrity of incoming signal do not produce adverse changes in the controlled variables.

(P49.1) Residual Heat Removal System Preoperational Test

Test Objective - To demonstrate that the Residual Heat Removal System (RHRS) delivers cooling water as designed for each of the following system modes of operation: shutdown cooling, suppression pool spray, low pressure coolant injection (LPCI), suppression pool cooling, and fuel pool cooling.

Demonstrate operability of interlocks and isolation valves provided for overpressure protection from the reactor coolant system.

Testing will include demonstrations of proper operation of initiating devices, correct logic, proper operation of bypasses, proper operation of prohibit and permissive interlocks, and proper operation of equipment protective devices that could shut down or defeat the operation or functioning of such features.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems and the Instrument Air Systems are available. Reactor pressure vessel, suppression pool, fuel pool, and fuel pool skimmer surge tank are filled up to required level to provide enough suction head to the RHR pumps. Makeup water sources are available.

Test Method - The operating modes of the system are initiated manually and where applicable, automatically. RHR pump performance is determined for each operating mode. Control devices are operated or simulated signals are applied to verify valve alignment, LPCI mode operation for low reactor water level and high drywell pressure, and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

(P50.1) Reactor Core Isolation Cooling System Preoperational Test

Test Objective - To demonstrate the capability of the Reactor Core Isolation Cooling (RCIC) System to deliver water to the reactor pressure vessel.

Prerequisites - Construction is complete to the extent necessary to perform these tests and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems and the Instrument Air System are available. Suppression pool and condensate storage tank are filled to provide enough suction head to RCIC pump and reactor pressure vessel is available to receive water. Auxiliary steam is available for RCIC turbine operation. Part of the RHR system will also be available to provide a suction flow path for RCIC pump.

Test Method - The system operation is initiated manually and automatically. The system is operated to determine the performance parameters for the RCIC turbine and pump and the barometric condensate pump. Control devices are operated or simulated signals are applied to verify automatic valve alignment (system isolation), turbine trip and start modes, and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

(P51.1) Core Spray System Preoperational Test

Test Objectives - To demonstrate the ability of the Core Spray System to accept water from both the suppression pool (normal) and the condensate storage tank (backup) and deliver flow at adequate pressure to the reactor pressure vessel in an acceptable spray pattern.

Prerequisites - Construction is complete to the extent necessary to perform these tests and the system is turned over to the ISG. Power and control voltage is available for the motors, valves and instruments associated with this system. Required instruments are calibrated and controls are operable. The suppression pool and condensate storage tanks are filled to the required level. The reactor pressure vessel head is removed and the vessel can accept water. The condensate transfer system is available.

Test Method - The normal system operation is initiated automatically by simulating a Design Base Accident. The pumps are started and the appropriate valves and instruments are operated to ensure that water flow is established to the reactor pressure vessel. System logic, interlocks, and alarms are verified to be in accordance with design intent and system flows and pressures are verified to ensure that they are adequate to inject water into the reactor pressure vessel via the core spray spargers. The system is operated manually through the test line back to the suppression pool. Also, the system is manually lined up to accept water from the condensate storage tank and deliver core cooling water to the reactor pressure vessel.

Acceptance Criteria - That the core spray system can deliver cooling water at design flow and pressure to the reactor pressure vessel within a specified period of time for various simulated operating conditions.

(P51.1A) Core Spray System Pattern Preoperational Test

Test Objective - To demonstrate the ability of the Core Spray System to deliver a proper spray pattern at rated and runout conditions. This procedure shall also verify satisfactory physical response of system components within the reactor pressure vessel. The system discharge line restriction flow orifices shall be verified as being properly sized such that runout flow does not exceed system design values.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Power and control voltage is available for the motors, valves and instruments associated with this system. Required instruments are calibrated and controls are operable. The suppression pool is filled to the required level. The reactor pressure vessel head is removed and the vessel can accept water. The condensate transfer system is available.

Test Method - System operation shall be manually initiated, monitored and controlled such that vessel injection is achieved in accordance with test objectives.

Acceptance Criteria - The Core Spray System can deliver cooling water at design flow with an acceptable spray pattern to the reactor pressure vessel. During this test photographic records shall be made, no system abnormalities shall be observed, restriction flow orifices shall be properly sized, and free route from the core spray junction box vent holes shall be verified.

(P52.1) High Pressure Coolant Injection System Preoperational Test

Test Objective - To demonstrate that the High Pressure Coolant Injection System (HPCIS) delivers coolant water to the reactor.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. The suppression pool and condensate storage tank are filled to provide the required suction head to the HPCI pump. The reactor pressure vessel head is off and the vessel is ready to receive water from the HPCI system. Required electrical power supply systems, Standby Gas Treatment, required ventilation systems and Instrument Air System are available. The Auxiliary Boiler or another source of steam supply is available to run the HPCI turbine.

Test Method - System operation is initiated manually and where applicable automatically. Reactor water low level and drywell high pressure signals are simulated to verify HPCI turbine

automatic functions. System isolation is verified by operating required controls and or simulated signals. Steamline high differential pressure signals are simulated to verify automatic functions. Limited turbine and pump operation (depending upon auxiliary steam conditions) and automatic valve alignment are demonstrated. Containment isolation valves are functionally tested. Required controls are operated or simulated signals are applied to verify interlocks, trips and alarms.

Acceptance Criteria - The system performance characteristics are in accordance with applicable design documents.

(P53.1) Standby Liquid Control System Preoperational Test

Test Objective - To demonstrate the operation of the system with demineralized water. Demonstrate operability of instrumentation, controls, interlocks, and alarms. Verify operability of heaters, air spargers, and heat tracing. Conduct test firings of squib-actuated valves, and demonstrate design injection capability. Tests should be conducted as appropriate to verify redundancy and electrical independence.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The reactor vessel is available to receive water injected from the Standby Liquid Control System. Required electrical power supply systems and a source of demineralized makeup water are available.

Test Method - System operation is initiated manually. Demineralized water is used for testing the system. The pumps are run taking suction from the standby liquid storage tank and the test tank. Squib valves are fired and the rate of demineralized water injection into the reactor vessel from each pump is measured. Required controls are operated or simulated signals are applied to verify interlocks and alarms.

Acceptance Criteria - The system performance characteristics are in accordance with the applicable design documents.

(P54.1) Emergency Service Water System Preoperational Test

Test Objective - To demonstrate that the Emergency Service Water System provides a supply of cooling water to the plant emergency equipment, to demonstrate the ability to start the ESW pumps from the remote shutdown panel, to demonstrate the ability of an ESW pump to start automatically when the associated diesel-generator unit starts, to demonstrate the proper operation of system automatic valve transfer schemes, and to demonstrate the proper operation of spray pond components.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The spray pond is filled to provide enough suction head for the ESW pumps, and a makeup source to the spray pond is available. The RHR service water system is in operation.

Test Method - The system is started manually and automatically through the associated diesel generator start signal. Pump flow paths are established and pump flows are measured for each loop. Flow balancing of the RHR Service Water System and Emergency Service Water System

is performed. Proper operation of the line break detection system is verified. Required controls are operated and simulated signals are applied to verify interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P55.1) Control Rod Drive System Preoperational Test

Test Objective - To demonstrate the operation of the Control Rod Drive System including control rod drive hydraulic system and CRD mechanisms.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The condensate storage tank is filled to provide enough suction head to the CRD pump. The TBCCW System and Instrument Air System are available. The Reactor Manual Control System is operational to the point required for continuing with this test. Initial coupling and venting is completed.

Test Method - System operation is initiated manually and the system flow and pressure control stations are adjusted. CRD pump performance parameters are measured. Control rod drives are exercised to verify, position indication and insert/withdraw speeds. Scram tests are conducted and scram times are measured for each control rod drive. Required controls are operated or simulated signals are applied to verify system interlocks and alarms. Rod buffer performance is also tested.

Acceptance Criteria - System performance parameters are in accordance with the applicable design documents.

(P56.1A) Reactor Manual Control System Preoperational Test

Test Objectives - To verify the operation of the Reactor Manual Control System, including relays, control circuitry, switches, rod blocks, indicating lights and control valves.

Prerequisites - Construction is complete to the extent necessary to perform this test and system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - System integrated operation is initiated manually. Controls are operated and simulated signals are applied to verify: rod blocks, alarms and interlocks of the reactor mode switch; proper operation of the rod position information system; and rod drift alarm circuit directional control valve time sequence for insert and withdraw commands.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P56.1B) Rod Sequence Control System Preoperational Test

Test Objectives - To demonstrate and verify the operation of the Rod Sequence Control System, including the Rod Pattern Controller and its associated external test circuitry.

Prerequisites - Construction is complete to the extent necessary to perform this test and system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - The Rod Pattern Controller will be tested and verified to operate correctly in the "Self Test" mode. All RSCS operator display functions and controls as well as the ability of the RSCS to substitute rod position data will be demonstrated and verified. Systems operations of all control rod withdraw and insert blocks and forced single match rod motion will be verified by conducting rod movements under the control of both sequence "A" and "B."

Acceptance Criteria - The System performance parameters are in accordance with the applicable design documents.

(P56.1C) Rod Worth Minimizer System Preoperational Test

Test Objectives - To demonstrate and verify the operation of the Rod Worth Minimizer System, including the ability of the system to provide insert and withdraw blocks below low power setpoint, when the control rod insert/withdraw sequences are not within pre-set sequences, and the ability to provide visual displays and alarms between low power setpoint and low power alarm point.

Prerequisites - Construction is complete to the extent necessary to perform this test and system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - The Rod Worth Minimizer will be tested and verified to operate under various acceptable and non-acceptable rod position modes, while demonstrating rod blocks and alarms for low power interlocks.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P57.1) Uninterruptable AC Power System Preoperational Test

Test Objective - To demonstrate the ability of the Uninterruptable AC Power System to perform the following:

1) That full load power is supplied to the distribution panel
2) That the static transfer switch will automatically shift load from the preferred to the alternate source upon loss of the preferred source
3) That the static transfer switch will automatically shift load from the preferred source to the alternate source when the preferred source becomes overloaded and shift back to the preferred source when the overload condition is cleared
4) That loads can manually be switched from preferred to alternate source and vice-versa
5) That alarms operate and annunciate at their specified abnormal condition

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instrument, protective devices and breakers is verified. 480 V AC Power, 250 V DC Power, and Resistor Load Bank are available.

Test Method - The Uninterruptable Power Supply is energized by manually closing the 250 V DC preferred breaker (inverter) and the 480 V AC Alternate Breaker (Voltage Regulating Transformer). With the static transfer switch in normal mode, the load is increased by use of the Resistor Load Bank while the voltage and current is monitored. The current is gradually increased above normal rating until the automatic transfer switch shifts the overload to the alternate source. Then the load is slowly decreased to clear the overload and to verify that the automatic transfer switch shifts the load back to the preferred source. A loss of the preferred source is simulated to verify that the automatic transfer switch will shift the load to the alternate source. Then with both sources available the transfer switch is manually switched from the preferred to alternate source and vice versa by means of the bypass mode and normal mode pushbuttons. Alarms are either simulated or functionally checked throughout the above procedure.

Acceptance Criteria - That reliable 120 V AC Power, at design load is supplied to the distribution panel. That the automatic transfer switch will shift loads from the preferred to the alternate source with negligible power interruption upon loss of preferred source. That the automatic transfer switch will shift load from the preferred to the alternate source in an overloaded condition and back to the preferred source when the overload condition is cleared and, that the load can manually be shifted from the preferred to the alternate source and vice-versa that alarms operate at their engineered set points and annunciate in the control room.

(P58.1) Reactor Protection System Preoperational Test

Test Objective - To demonstrate the proper operation of the Reactor Protection System (RPS) in all combinations of logic and to demonstrate redundancy, electrical independence, mode switch operation, and safe failure on loss of power.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The Control Rod Drive System preoperational test is completed to the extent necessary to perform this test.

Test Method - Integrated system operation is initiated manually to verify M-G set performance and electrical independence. Required controls are operated or simulated signals are applied to verify: sensor relay-to-scram trip actuator response time, the ability to scram CRDs in conjunction with the CRD hydraulic system, scram reset delay time, mode switch operation, and system interlocks and alarms.

Acceptance Criteria - System performance is in accordance with the applicable design documents.

(P59.1) Primary Containment System Preoperational Test

Test Objective - To demonstrate the operability and isolation capability of the Primary Containment System. Containment isolation valve functional tests will be performed.

To test the vacuum breakers and show proper operation of the controls and actuators, which will demonstrate the ability to limit the drywell and suppression pool internal and differential pressures.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The suppression pool is filled with demineralized water to the required level and the hotwell is available. The Containment Instrument Gas System, Instrument Air System and required electrical power supply systems are available. All primary containment isolation valves are operable.

Test Method - The suppression pool cleanup system will be tested for proper operation; the primary containment isolation system will have signals simulated with the valves in the non-isolation position, to verify the primary containment isolates when an isolation signal is received. Valve closure times are verified for those valves specified in the FSAR in the various system preoperational tests. The test method is described in the General Test Statement. Vacuum breakers will be actuated to show proper directional movement when permissives are available to control circuitry.

Acceptance Criteria - The Suppression Pool Cleanup System functions are as designed.

The Primary Containment isolation functions are designed when appropriate isolation signals are present.

TP 2.14 Nuclear Boiler System Level Instrumentation Verification Test

Test Objective - To demonstrate that the nuclear boiler level instruments function as desired.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required Electrical Power Supply Systems are available. A method to raise and lower the reactor vessel water level is available.

Test Method - The actual reactor vessel water level will be changed to verify level switch trip points, indicating functions and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P59.2) Containment Integrated Leak Rate Test

Test Objective - To demonstrate that the total leakage from the containment does not exceed the maximum allowable leakage rate (La) at the calculated peak containment internal pressure (Pa), as defined in l0 CFR50, Appendix J.

Prerequisities - Construction of the primary containment, including installation of all portions of mechanical, fluid, electrical, and instrumentation systems penetrating containment is complete. Type B and Type C local leakage rate is satisfactorily complete. Required test equipment instruments and data acquisition systems are operable. Systems required to support the ILRT are operational.

Test Method - The test shall be conducted in accordance with the requirements of Subsection 6.2.6 of the FSAR.

Acceptance Criteria - Acceptance criteria for this test are in accordance with the requirements of Chapter 16 of the FSAR.

(P59.3) Primary Containment Isolation Valve Timing

Test Objective - To demonstrate that containment isolation valves receiving an automatic isolation signal meet the closing time requirements as stated in Table 6.2-12.

Prerequisites - Construction is complete to the extent necessary and the various systems are turned over to the ISG. Required instruments are calibrated and control schemes have been checked and are operable. The required electrical power supply systems are available.

Test Method - Each valve receiving an automatic isolation signal will be closed (opened) by simulating the isolation signal of the interlock relay contacts. Upon initiation of the simulated signals, the valve(s) will be timed from their pre-isolation to their post-isolation position.

Acceptance Criteria - Valve receiving automatic isolation signals close (open) within the required time noted in FSAR Table 6.2-12.

(P60.1) Containment Atmosphere Circulation System Preoperational Test

Test Objective - To demonstrate the capability of the Containment Atmosphere Circulation System to cool and circulate air inside the Containment.
Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The Reactor Building Chilled Water System or an alternate cooling water supply is available.

Test Method - The system operation is initiated manually, and flow for each fan is determined. Required controls are operated or simulated signals are applied to verify; automatic start of standby units and other system interlocks and alarms. No heat loads are simulated during the test.

Acceptance Criteria - The system performance is in accordance with the applicable design documents.

(P61.1) Reactor Water Cleanup System Preoperational Test

Test Objectives - To demonstrate the operability of the Reactor Water Cleanup and Filter Demineralizer System. In particular the following items are to be demonstrated:

1) The ability of individual components, instrumentations, alarms and interlocks to function properly.
2) Verify proper system performance by verifying all flow paths, flow rates and component performances to be in accordance with design specifications.
3) The ability of the system and filter to isolate by simulating each sensor to its trip point.
4) Verify the RWCU system containment isolation valves will respond properly to all control signals and closing times are within required specifications.
5) The ability of the filter/demineralizer valve and pump operating sequence to operate properly.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. The Reactor vessel is filled to provide enough suction head to the Reactor Water Cleanup Recirculation Pumps. The Reactor Building Closed Cooling Water System, Instrument Air System, condenser hotwell or Liquid Radwaste Collection System, and the RWCU Precoat System are available. Required electrical power supply systems are available.

Test Method - System operation is initiated manually. Pump flow and filter and demineralizer differential pressures are determined. Precoat and backwash cycles are tried. Controls are operated or simulated signals are applied to verify system isolation upon initiation of the respective NSSS isolation relay, other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P64.1) Reactor Recirculation System Preoperational Test

Test Objectives - To demonstrate the operability of the Reactor Recirculation components and the system.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The Reactor Building Closed Cooling Water System, is available. The reactor vessel is filled with demineralized water to the required level.

Test Method - System operation is initiated manually. The system is tested by individual and integrated operation of M-G sets, pumps, and valves. Performance of the M-G sets, recirculation pumps, and jet pumps are determined to the extent possible during this test. Required controls are operated or simulated signals are applied to verify interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

TP 2.16 Reactor Internals Vibration and Inspection

Test Objective - The test objective is to detect damage, excessive wear, loose parts, or other evidence of unacceptable vibration which could result from assembly errors or undesirable deviations from the previously qualified prototype plant construction.

This test is a quality assurance measure which experimentally confirms the absence of excessive vibration of core support structures, jet pumps, lower plenum components, and other major internal structures. The test is conducted without fuel and is not intended to be a test of fuel or incore instrument vibration. However, the specified test conditions, without fuel present, provide a level of vibration excitation of major internal structures which is at least as high as that measured in normal power operation.

Prerequisites - To the extent necessary to perform this test all reactor internals components are installed except as follows.

1) The core matrix is empty; there are no fuel assemblies, incore instrumentation tubes, or neutron source rods. Control blades are withdrawn or not installed. Fuel support castings are installed.
2) The dryer assembly need not be installed.
3) One or both of the access hole covers on the shroud support plate must remain unwelded until after the test to provide access for inspection. Temporary closures must be provided.

The reactor vessel is closed, filled, and ready for pressurization. The recirculation pumps are operable. The RHR system pumps are operable to provide necessary temperature rise. Clean-up system heat exchangers are operable for temperature control.

Test Method - A visual inspection is made before and after the required maximum allowable speed pump runs. These flow runs include 35 hours of two-loop operation and 14 hours each for loops A and B. These hours may not be sequential, but they must be between the initial and final inspections.

Acceptance Criteria - Initial and final inspection results are acceptable.

(P69.1) Liquid Radwaste Collection System Preoperational Test

Test Objective - To demonstrate the capability of the Liquid Radwaste Collection System to collect liquid waste.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. Liquid Radwaste Collection System and storage tanks are available.

Test Method - Sump pumps are operated and performance characteristics are determined. Level controls are operated to verify pump starts and alarms. Liquid radwaste discharge valves from primary containment are verified to close upon containment isolation signal .

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P70.1) Standby Gas Treatment System And Secondary Containment Isolation Preoperational Test

Test Objective - To demonstrate the capability of the Standby Gas Treatment System (SGTS) to function as designed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The Reactor Building Heating and Ventilation System, SGTS vent, and Instrument Air System are available.

Test Method - System operation is initiated manually and where applicable automatically. Required controls are operated or simulated signals are applied to verify secondary containment isolation and start of SGTS. SGTS performance is determined by measuring secondary

containment pressures, system pressures and fan flow rates. System interlocks and alarms are verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P73.1) Containment Atmospheric Control System Preoperational Test

Test Objective - To demonstrate the operability of the purge supply and exhaust systems, and to show the valves work according to the designed permissives and interlocks.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instrumentation are calibrated and controls are operable. Required electrical power supply system are available.

Test Method - The system valves will be operated to demonstrate proper operation. Simulated signals are applied to verify interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P73.2) Containment Hydrogen Recombiner Preoperational Test

Test Objective - To demonstrate the operability of the hydrogen recombiners (actual process is not demonstrated at this time).

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply system is available.

Test Method - The Hydrogen Recombiner System will be operated to the extent practical.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P73.3) Containment Oxygen-Hydrogen Analyzer Preoperational Test

Test Objective - To demonstrate the Containment Oxygen-Hydrogen Analyzer System to analyze containment hydrogen and oxygen content.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply system is available.

Test Method - The oxygen and hydrogen analyzers are utilized to determine the containment atmospheric analysis.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P75.1) 24 Volt DC System Preoperational Test

Test Objective - To demonstrate the ability of the ± 24 Volt DC System to perform the following:

1) That the batteries can ensure a complete discharge, based on their ampere-hour rating, without exceeding the battery bank minimum voltage limit. (Performance Test)
2) That the batteries can provide reliable stored energy to their design loads as indicated in Table 8.3-8 in the event of a Design Base Accident.
3) That the battery chargers can deliver their rated output.
4) That the battery chargers can fully charge their associated batteries from design minimum discharge (i.e., after the service test) while simultaneously providing power to the distributed panel for normal station loads.
5) That alarms operate and annunciate at their specified abnormal condition.
6) That reliable ± 24 Volt DC is delivered to the distribution panels.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instrument protective devices and breakers is verified. 120 V AC, Resistor Load Bank, Battery Room Ventilation and Emergency Eyewash is available and/or in service.

Test Method - The battery performance test is manually initiated by connecting the battery bank to the Resistor Load Bank and discharging the batteries at a constant current for a specified period of time.

The Battery Service Test is manually initiated by connecting the battery bank to the Resistor Load Bank and simulating, as closely as possible, the load the batteries will supply during a Design Base Accident.

Then the battery charger is connected to the batteries and the distribution panels to verify that they can equalize charge the batteries while simultaneously providing power to the normal plant loads. The battery charger is also connected to the Resistor Load Bank and current is increased to its maximum rating with the charger isolated from its associated battery bank.

Alarms are simulated and verified to operate properly.

Acceptance Criteria - The batteries can satisfactorily deliver stored energy for the specified amount of time as required for the performance and service tests. The battery chargers can deliver rated output, and can charge their associated battery bank from minimum voltage to a fully charged state in a specified amount of time while simultaneously supplying normal plant loads. The alarms operate at their engineered setpoints and annunciate in the control room.

(P76.1) Plant Leak Detection System Preoperational Test

Test Objective - To demonstrate the operability, of the Plant Leak Detection System.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Sump levels will be varied (if practicable) or simulated signals are applied to level sensors to verify the leak detection system alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P76.3) Post Accident Sampling System

Test Objective - To demonstrate the capability of the Post Accident Sampling System (PASS) to function as designed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Control switches will be manipulated and proper relay and indicating light operation will be verified. Response of valves will be checked functionally (i.e. voltage used as an indication that the valve is open or closed.) The system will then be operational checked by taking actual samples.

Acceptance Criteria - Control switches and associated interlocks function properly and the system shall be capable of obtaining a sample in less than one hour from initiating the sampling operation.

(P78.1) Source Range Monitoring System Preoperational Test

Test Objective - To demonstrate the operability of the Source Range Monitoring (SRM) System.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required reactor internals are installed, instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Source Range Monitor Detector insert/retract drive mechanisms are operated to verify proper operation. Required simulated signals are applied to verify SRM channel trips, indicating lights and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P78.2) Intermediate Range Monitoring System Preoperational Test

Test Objective - To demonstrate the operability of the Intermediate Range Monitoring (IRM) System.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required reactor internals are installed, instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Intermediate Range Monitors detector insert/retract drive mechanisms are operated. Required simulated signals are applied to verify IRM channel trips, rod blocks, indicating lights and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P78.3) Average Power Range Neutron Monitoring System Preoperational Test

Test Objective - To demonstrate the operability of the Average Power Range Neutron Monitoring (APRM System) including LPRM's, Recirc. Flow bias signals and Rod Block Monitor.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required reactor internals are installed. Instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Each LPRM is checked from detector to its end function. Required input signals are simulated to verify LPRM channel trip lamps, remote meters and alarms. Required signals from the LPRM System are simulated to each APRM channel to verify trip functions, indicating meters, lights and alarms. Each flow transmitter is checked from flow element to its end function. Signals are simulated to verify flow inducted trips, remote meters and alarms. Required signals from the LPRM and flow bias systems are simulated to each RBM channel to verify trip functions, indicating lights, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P78.4) Traversing Incore Probe System Preoperational Test

Test Objective - To demonstrate the proper operation of the Traversing In-Core Probe System. Specific objectives are to demonstrate the following:

1) Manual and automatic Operation.
2) Proper operation of all interlocks, overrides and automatic functions.
3) Proper operation of all indications and alarms.
4) Simulated operation of the shear valves.
5) Proper interface between the TIP system and process computer.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. LPRMs are installed inside the reactor vessel and required instruments are calibrated and controls are operable. TIP tracing X-Y recorder and purge system are available.

Test Method - System operation is initiated manually. The indexer interlock, shear valve control and monitoring, ball valve control and monitoring, squib circuits and purging operations are verified. Required controls are operated or simulated signals are applied to verify interlocks external to the system and system alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P79.1 & P79.2I) Area Radiation Monitoring System Preoperational Test

Test Objective - To demonstrate the operability of the Area Radiation Monitoring System.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical

power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify area radiation monitor channel trips, indicating lights, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P79.2A-H) Process Radiation Monitoring System Preoperational Test

Test Objective - To demonstrate the operability of the Process Radiation Monitoring System.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify process radiation monitor channel trips, locating lights, interlocks, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P80.1) Reactor Non-nuclear Instrumentation System Preoperational Test

Test Objective - To demonstrate that the Reactor Non-nuclear Instrumentation System functions as designed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and the controls are operable. All relays that are initiated from reactor vessel level and pressure sensors are placed in the untripped condition.

Test Method - Simulated signals are applied to instrument loops and trip functions, indicating functions and alarms are verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P81.1) Fuel Handling System Preoperational Test

Test Objective - To demonstrate that the refueling platform, refueling grapple and the reactor servicing tools function as designed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The fuel pool or reactor cavity are available to test the fuel grapple. The Reactor Manual Control System is available to test the refueling platform interlocks.

Test Method - The refueling platform travel speed and interlocks with the Reactor Manual Control System are verified. All servicing tools are tried for proper operation. Load tests for the fuel grapple are performed and the fuel grapple is operated at designated speeds. System alarms are verified by operating the controls or simulating the required signals.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P83.1A) Main Steam - Nuclear Steam Supply Shutoff System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate the proper operation of the Nuclear Steam Supply Shutoff System. Specific objectives are to demonstrate the following:

1) The ability of the Main Steam Isolation Valves (MSIV's) to close on receipt of the appropriate signals.
2) The ability of the Main Steam drip leg drains to function properly.
3) The ability of the valve isolation logic to function properly.
4) The ability of the steam jet air ejector steam supply valves to function properly.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems, Instrument Air System, and the Containment Instrument Gas System are available.

Test Method - The Main Steam Isolation Valves are exercised and functionally checked for closure by their logic circuit trips, loss of control power and loss of normal air supply using their charged accumulator. The Nuclear Steam Supply Shutoff System isolation logic is tested by verifying it sends appropriate signals to isolate the RHR System, the RWCU System and the Main Steam drains. The Main Steam Line Drip Leg Drain Valves and the Main Steam Line branch valves are functionally checked for proper operation.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P83.1B) Main Steam Relief Valves/Automatic Depressurization System Preoperational Test

Test Objectives - To demonstrate the proper operation of the Main Steam Safety Relief Valves to operate correctly in the safety and automatic depressurization modes.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical supplies are available and the Containment Instrument Gas System is available.

Test Method - The Automatic Depressurization System is functionally checked for proper in automatic and manual modes. Each Safety/Relief valve is verified operational when any one of its control solenoids is energized. The Remote Shutdown Panel operation is also demonstrated. Valves are also checked for the following: fail close on loss of air, loss of power,

and full stroke operation. The acoustic Monitor System is functionally tested to verify proper operation.

Acceptance Criteria - The system performance parameters are in accordance with the applicable documents.

(P83.1C) Main Steam Leakage Control System Preoperational Test

Test Objectives - To demonstrate the proper operation of the Main Steam Isolation Valve Leakage Control System to collect steam lines by operation of its air blowers, heaters, and motor operated valves.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. The required electrical power supply systems are also available.

Test Method - The Main Steam Isolation Valve Leakage Control System interlocks are verified, and the system is initiated manually and checked for proper operation.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P83.1D) Main Steam Leak Detection System Preoperational Test

Test Objectives - To demonstrate the proper operation of the Steam Leak Detection System to monitor area temperatures and give isolation signals to the Nuclear Steam Supply Shutoff system isolation logic.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated, controls are operable, and electrical power supplies are available.

Test Method - The Main Steam Leak Detection System is functionally tested to verify the ability of the area temperature monitors to monitor changes in temperature and to give isolation signals into the Nuclear Steam Supply Shutoff System logic.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P88.1) 250 Volt DC System Preoperational Test

Test Objective - To demonstrate the capability of the 250 volt dc system to provide dc power to connected buses.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems and a load resistor bank are available. The Battery Room Ventilation system is also available.

Test Method - The system is operated and a load capacity test is conducted for the battery with the battery charger disconnected. Required controls are operated or simulated signals are applied to verify battery charger performance, system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P99.1) Reactor Building Crane Preoperational Test

Test Objective - The general objectives of this test are to demonstrate the following:

1) The performance of the reactor building crane's components.
2) Establishment of baseline data for all functional components.
3) That all warning signals are working per design intent.
4) The capability of the crane to operate in a designated area in accordance with design requirements.

Prerequisites - Construction is complete and the system is turned over to the ISG. Required electrical power supply systems are available and controls are operable. Required loads are available to perform load testing of this crane. Construction phase static load testing (125% of rated load) is completed.

Test Method - The lighting system for the crane is energized and observed for proper operation. The bridge and the trolley are speed-tested in both directions. Current and voltage readings are taken in both directions. The proximity switches are tested for both the bridge and the trolley including trolley movement restriction switches in zones A, B, and C.

The main hoist and the auxiliary hoist are speed-tested traveling up and traveling down. Current and voltage readings are taken in both directions. All limit switches are tested. A loss of power situation is created for both hoists to check the brakes ability to hold without power. An overspeed test is simulated for the main hoist. The main hoist load limit switch is also tested.

The above listed tests are run from the pendant pushbutton control system. Operability of the crane is also demonstrated from the cab and by radio control. The crane power source is verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

TP2.23 REACTOR BUILDING CRANE TESTING

Objective:

To supplement load testing of the reactor building overhead crane.

Prerequisites:

Construction is complete to the extent required to perform the test, and the crane is available for service.

Test Method:

1) Braking capability of the main and auxiliary hoist under rated load is verified (all brakes operational).
2) The ability of each individual main and auxiliary hoist brake to stop and hold rated load while lowering at rated speed is tested.
3) The capability of limiting movement of the main hook to 1/32" and the auxiliary hook to 1/16" in both raise and lower direction at rated load is tested from a complete standstill over an average of ten successive movements.
4) Voltage and current of all crane motors is recorded while running at rated load and rated speed.
5) The capability of the main hoist to limit an uncontrolled drop at rated load and rated speed to less than 1/2" hook movement is verified.
6) Simultaneously bridge and trolley movement at rated load and the ability of the zone proximity switches to restrict crane movement within sage limits is also verified.

Acceptance Criteria - All crane parameters are within design limits.

(P100.1) Cold Functional Test

Test Objective - To demonstrate that the plant systems are capable of operating on an integrated basis in normal and emergency modes, to demonstrate that adequate power supplies for the class 1E equipment will exist, and to assure that optimum tap settings have been selected for transformers supplying power from offsite sources to class 1E busses.

Prerequisites - Required system preoperational tests have been completed, and plant systems are ready for operation on an integrated basis.

Test Method - Emergency Core Cooling Systems (RHR & Core Spray) are lined up in their normal standby mode. The plant electrical system is lined up per normal electrical system lineup (For Unit 1 this lineup may be different than the lineup for two unit operation.) Loss of coolant accident signals are initiated with and without a loss of offsite power. Voltages and loads are adjusted, as practical, to simulate the anticipated ranges of variations. Proper response of the electrical distribution system, diesel generators, and ECCS pumps will be verified.

Acceptance Criteria - Systems performance parameters are in accordance with the applicable design documents.

14.2.12.2 Unit 1 Startup Test Program Procedure Abstracts

All those tests comprising the Unit 1 Startup Test Program (Table 14.2-3) are discussed in this section. For each test a description is provided for test purpose, test prerequisites, test description and statement of test acceptance criteria, where applicable. Additions, deletions, and changes to these discussions are expected to occur as the test program progresses. Such modification to these discussions of the initial startup test program will be reflected in amendments to the FSAR.

In describing the purpose of a test, an attempt is made to identify those operating and safety-oriented characteristics of the plant which are being explored.

Where applicable, a definition of the relevant acceptance criteria for the test is given and is designated either Level 1 or Level 2. A Level 1 criterion normally relates to the value of a process variable assigned in the design of the plant, component systems or associated equipment. If a Level 1 criterion is not satisfied, the plant will be placed in a suitable hold-condition until resolution is obtained. Tests compatible with this hold-condition may be continued. Following resolution, applicable tests must be repeated to verify that the requirements of the Level 1 criterion are now satisfied.

A Level 2 criterion is associated with expectations relating to the performance of systems. If a Level 2 criterion is not satisfied, operating and testing plans would not necessarily be altered. Investigations of the measurements and of the analytical techniques used for the predictions would be started.

For transients involving oscillatory response, the criteria are specified in terms of decay ratio (defined as the ratio of successive maximum amplitudes of the same polarity). The decay ratio must be less than unity to meet a Level 1 criterion and less than 0.25 to meet Level 2.

(ST-1) Chemical and Radiochemical

Test Objectives - The principal objectives of this test are a) to secure information on the chemistry and radiochemistry of the reactor coolant, and b) to determine that the sampling equipment, procedures and analytic techniques are adequate to supply the data required to demonstrate that the chemistry of all parts of the entire reactor system meet specifications and process requirements.

Specific objectives of the test program include documentation of radwaste liquid discharge, documentation of baseline piping radiation levels, determination of steam quality, evaluation of the Condensate Polishing system, and evaluation of the Reactor Water Cleanup system. Data for these purposes is secured from a variety of sources: plant operating records, regular routine coolant analysis, radiochemical measurements of specific nuclides, and special chemical tests.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - Prior to fuel loading, chemical samples are taken to ensure that reactor coolant and Fuel Pool Cooling and Cleanup System sample stations are functioning properly and to determine initial concentrations. Additionally, subsequent to fuel loading, during reactor heatup, and at each major power level change, a complete set of samples are taken to verify that all plant sample stations are functioning properly and to determine the chemical and radiochemical quality of reactor water and reactor feedwater, and performance of filters and demineralizers.

Acceptance Criteria - Level 1 - Chemical factors defined in the Technical Specifications and Fuel Warranty must be maintained within the limits specified. The activity of liquid effluents must conform to license limitations. Water quality must be known at all times and should remain within the guidelines of the Water Quality Specifications.

Level 2 - Not applicable.

(ST-2) Radiation Measurements

Test Objectives The objectives of this test are (a) to determine the background radiation levels in the plant environs prior to operation for base data on activity buildup and (b) to monitor radiation at selected power levels to assure the protection of personnel during plant operation.

Prerequisites - The required preoperational tests have been completed; the Superintendent of Plant has reviewed and approved the test procedures and initiation of testing. Instrumentation has been checked or calibrated as appropriate.

Test Method - A survey of natural background radiation at selected locations throughout the plant will be made prior to fuel loading. Subsequent to fuel loading, during reactor heatup and at power levels of approximately 25%, 60% and 100% of rated power, gamma radiation level measurements and, where appropriate, thermal and fast neutron measurements will be made at selected locations throughout the plant.

Acceptance Criteria - Level 1 - The radiation doses of plant origin and the occupancy times of personnel in radiation zones shall be controlled consistent with the guidelines of the standards for protection against radiation outlined in 10CFR20.

Level 2 - The radiation doses of plant origin shall meet the following limits depending upon which Radiations Zone the radiation base survey point is located:

Radiation Zone	Limit
I	0.5 mRem/hr.
II	2.5 mRem/hr.
III	15 mRem/hr.
IV	100 mRem/hr.

Note: All areas designated Radiation Zone V have potential radiation doses of 100 mRem/hr. Readings taken in Zone V during the Startup Test Program may be less than 100 mRem/hr; however, since Zone V is defined in terms of potential levels, there are no Acceptance Criteria for Zone V base survey points.

(ST-3) Fuel Loading

Test Objective - The objective of this test is to achieve the full and proper core complement of nuclear fuel assemblies through a safe and efficient fuel loading evolution.

Prerequisites - The required Preoperational Tests have been completed. In addition, prior to starting this test procedure, the following prerequisites will be met:

a) Fuel and Control Rod inspections will be complete.
b) Control Rods will be installed and tested.
c) Reactor vessel water level will be established and minimum level prescribed.
d) The standby liquid control system will be operable and in readiness.
e) Fuel handling equipment will have been checked and dry runs completed.
f) The status of protection systems, interlocks, mode switches, alarms, and radiation protection equipment will be prescribed and verified.
g) Water quality must meet required specifications.

The following prerequisites will be met prior to commencing actual fuel loading to assure that this operation is performed in a safe manner:

a) The status of all systems required for fuel loading will be specified and will be in the status required.
b) At least three movable neutron detectors will be calibrated and operable. At least three neutron detectors will be connected to the high flux scram trips. They will be located so as to provide acceptable signals during fuel loading.
c) Source range monitoring Nuclear instruments will be checked with a neutron source prior to fuel loading or resumption of fuel loading if sufficient delays are incurred.
d) The status of secondary containment will be specified and established.
e) Reactor vessel status will be specified relative to internal component placement and this placement established to make the vessel ready to receive fuel.
f) The high flux trip points will be set for a relatively low power level.
g) Neutron sources will be installed near the center of the core and at other specified locations.

Test Method - Before the first fuel assembly is taken from the fuel pool and inserted into the reactor, core components (fuel support castings, blade guides, control rod drives, etc.) will be installed, tested and/or verified. This procedure begins with the steps required to assemble and load neutron sources, includes the activities necessary to monitor neutron population using specially constructed fuel loading chambers (FLCs), and culminates with the insertion of fuel assemblies into the reactor core. Fuel loading continues until the core is fully loaded, verified and ready to perform subsequent Startup Tests.

Control rod functional tests, subcriticality checks, and shutdown margin demonstrations will be performed periodically during the loading.

Acceptance Criteria - Level 1 - The partially loaded core must be subcritical by at least 0.38% delta k/k with the analytically determined, highest worth rod fully withdrawn.

(ST-4) Full Core Shutdown Margin

Test Objective - The purpose of this test is to demonstrate that the reactor will be subcritical throughout the first fuel cycle with any single control rod fully withdrawn.

Prerequisites - The following prerequisites will be complete prior to performing the full core shutdown margin test:

a) The predicted critical rod position is available
b) The Standby Liquid Control System is available
c) Nuclear instrumentation is available with neutron count rate at least three counts per second and signal to noise ratio greater than two to one
d) High-flux scram trips are set conservatively low
e) Instrumentation has been checked or calibrated as appropriate

Test Method - This test will be performed in the fully loaded core in the xenon-free condition. The shutdown margin test will be performed by withdrawing the control rods from the all-rods-in configuration until criticality is reached. If the highest worth rod will not be withdrawn in sequence, other rods may be withdrawn providing that the reactivity worth is equivalent. The

difference between the measured Keff and the calculated Keff or the in-sequence critical will be applied to the calculated value to obtain the true shutdown margin.

Acceptance Criteria - Level 1 - The shutdown margin of the fully loaded, cold (68°F), xenon-free core occurring at the most reactive time during the cycle must be at least 0.38% delta k/k with the analytically strongest rod (or its reactivity equivalent) withdrawn. If the shutdown margin is measured at some time during the cycle other than the most reactive time, compliance with the above criterion is shown by demonstrating that the shutdown margin is 0.38% delta k/k plus an exposure dependent correction factor which corrects the shutdown margin at that time to the minimum shutdown margin.

Level 2 - Criticality should occur within ± 1.0% delta k/k of the predicted critical.

(ST-5) Control Rod Drive System

Test Objective - The objectives of the Control Rod Drive System test are; a) to demonstrate that the Control Rod Drive (CRD) System operates properly over the full range of primary coolant temperatures and pressures from ambient to operating, and b) to determine the initial operating characteristics of the entire CRD System.

Prerequisites - The required preoperational tests have been completed.

Test Method - The CRD tests performed during the startup test program are designed as an extension of the tests performed during the preoperational CRD system tests. Thus, after it is verified that all control rod drives operate properly when installed, they are tested periodically during heatup to assure that there is no significant binding caused by thermal expansion of the core components. A list of all control rod drive tests to be performed during startup testing is given in Table 14.2-5.

Acceptance Criteria - Level 1 - Each CRD must have a normal withdraw time greater than or equal to 40 seconds.

The mean scram time of all operable CRDs must not exceed the values specified in the plant technical specifications. (Scram time is measured from the time the pilot scram valve solenoids are deenergized.)

The mean scram time of the three fastest CRDs in a two by two array must not exceed the values specified in the plant technical specifications. (Scram time is measured from the time the pilot scram solenoids are deenergized)

Level 2 - Each CRD must have a normal insert speed of 3.0 ± 0.6 inches per second, indicated by a full 12-foot stroke in 40 to 60 seconds. With respect to the control rod drive friction tests, if the differential pressure variation exceeds 15 psid for a continuous drive in, a settling test must be performed, in which case, the differential settling pressure should not be less than 30 psid nor should it vary by more than 10 psid over a full stroke.

(ST-6) SRM Performance and Control Rod Sequence

Test Objectives - The objective of this test is to demonstrate that the operational sources, SRM instrumentation, and rod withdrawal sequences provide adequate information to achieve

criticality and increase power in a safe and efficient manner for each of the specified rod withdrawal sequences.

Prerequisites - The required preoperational tests have been completed.

Test Method - The operational neutron sources will be installed and source range monitor count-rate data will be taken during rod withdrawals to critical and compared with stated criteria on signal and signal count-to-noise count ratio.

A withdrawal sequence has been calculated which completely specifies control rod withdrawals from the all-rods-in condition to the rated power configuration. Each sequence will be used to attain cold criticality.

Movement of rods in a prescribed sequence is monitored by the Rod Worth Minimizer and rod sequence control system, which will prevent out of sequence withdrawal.

Acceptance Criteria - Level 1 - There must be a neutron signal count-to-noise count ratio of at least 2 to 1 on the required operable SRMs. There must be a minimum count rate of 3 counts/second on the required operable SRMs.

The IRMs must be on scale before the SRMs exceed the rod block set point.

(ST-7) Reactor Water Cleanup System

Test Objectives - The objective of this test is to demonstrate specific aspects of the mechanical operability of the Reactor Water Cleanup System. (This test, performed at rated reactor pressure and temperature, is actually the completion of the preoperational testing that could not be done without nuclear heating.)

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.
Test Method - With the reactor at rated temperature and pressure, process variables will be recorded during steady state operation in three modes as defined by the System Process Diagram: Blowdown, Hot Standby, and Normal. Additional system configurations will also be aligned to verify proper performance of the bottom head flow and temperature indicators.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - The temperature at the tube side outlet of the non-regenerative heat exchangers (NRHX) shall not exceed 130°F in the blowdown mode and 120°F in the normal mode.

The pump available NPSH will be 13 feet or greater during the hot standby mode defined in the process diagrams.

The cooling water flow to the NRHX's shall be limited to 6% above the flow corresponding to the heat exchanger capacity (as determined from the process diagram) and the existing temperature differential across the heat exchangers. The cooling water outlet temperature shall not exceed 180°F.

During two pump operations at rated core flow, the bottom head temperature as measured by the bottom drain line thermocouple should be within 30°F of the recirculation loop temperatures.

Bottom head flow indicator FI-1R610 shall indicate within 25 gpm of RWCU flow indicator FI-R609 when total system flow is through the bottom head drain.

(ST-8) Residual Heat Removal System

Test Objectives - The objectives of this test are to demonstrate the ability of the Residual Heat Removal (RHR) System to: 1) remove heat from the reactor system so that the refueling and nuclear system servicing can be performed and 2) condense steam while the reactor is isolated from the main condenser.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - The suppression pool cooling mode and shutdown cooling mode will be used to measure the RHR heat exchanger capacity. Data will be obtained to determine the heat transfer rate with rated flow on both sides of the heat exchanger. For the suppression pool cooling mode test, attempts will be made to establish a large temperature differential between the service and suppression pool water by extended RCIC or relief valve operations. (An ideal demonstration of the RHR heat exchanger capacity would consist of measuring the heat transfer rate in the shutdown cooling mode with the reactor at 50 psig or less. Unfortunately, the decay heat load is insignificant during the startup test period. Use of this mode with low core exposure results in exceeding the 100°F/hr cooldown rate of the vessel.) The shutdown cooling mode will be demonstrated after a trip or a cooldown from Test Condition 6.

The RHR system steam condensing mode is used to condense steam while the reactor is isolated from the main condenser and reactor vessel water level is being maintained by RCIC. This test will demonstrate system operability and stability.

Acceptance Criteria - Level 1 - The transient response of any system-related variable to any test input must not diverge.

Level 2 - The RHR system shall be capable of operating in the steam condensing, suppression pool cooling and shutdown cooling modes at the heat exchanger capacities indicated on the process diagrams. Both simultaneous operation of RHR loops and single loop operation shall be tested in the steam condensing and shutdown cooling modes. Each RHR loop shall be tested independently in the suppression pool cooling mode. System-related variables may contain oscillatory modes of response. In these cases, the decay ratio for each controlled mode of response must be less than or equal to 0.25.

The time to place the RHR heat exchangers in the steam condensing mode with the RCIC using the heat exchanger condensate flow for suction shall average one half hour or less.

(ST-9) Water Level Measurement

Test Objectives - The objectives of this test are to determine actual reference leg temperature and recalibrate instruments if necessary and to verify consistent response of the upset range, narrow range and wide range level instrumentation.

Prerequisites - The required preoperational tests have been completed. All system instrumentation is installed and calibrated.

Test Method - At rated temperature and pressure under steady state conditions, the reference leg temperature will be measured and compared to the value assumed during initial calibration. If the difference of the two temperatures exceed the Acceptance Criteria, then the instruments will be recalibrated using the measured value. Data will be recorded at rated temperature and pressure and at steady state conditions to verify consistency and proper calibration of reactor vessel level instrumentation.

Acceptance Criteria - Level l - Not applicable.

Level 2 - The difference between the actual reference leg temperature(s) and the value(s) assumed during calibration shall be less than that amount which will result in a scale end point error of 1% of the instrument span for each range.

The Narrow Range Level indicators should agree within ±1.5 inches of their average reading.

The Wide and Upset Range Level indicators should agree within ± 6 inches of their average reading.

(ST-10) IRM Performance

Test Objectives - The objective of this test is to adjust the Intermediate Range Monitor System to obtain the desired overlap with the SRM and APRM systems.

Prerequisites - The required preoperational tests have been completed.

Test Method - Initially the IRM system is set during the Preoperational Test Program. SRM-IRM and IRM-APRM overlap is verified the first time sufficient neutron flux conditions arise. After the APRM calibration, the IRM gains will be adjusted as necessary to optimize the IRM overlap with the SRMs and APRMs.

Acceptance Criteria - Level 1 - Each IRM channel must be adjusted so that overlap with the SRMs and APRMs is assured.

(ST-11) LPRM Calibration

Test Objectives - The objective of this test is to calibrate the Local Power Range Monitoring System.

Prerequisites - The required preoperational tests have been completed. Instrumentation for calibration has been checked.

Test Method - The LPRM channels will be calibrated to make the LPRM readings proportional to the neutron flux in the water gap at the chamber elevation. Prior to this calibration, LPRM response to control rod movement is verified. Calibration factors will be obtained through the use of either an off-line or a process computer calculation that relates the LPRM reading to average fuel assembly power at the chamber height.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - Each LPRM will be within 10% of its calculated value.

(ST-12) APRM Calibration

Test Objective - The objective of this test is to calibrate the Average Power Range Monitoring (APRM) system.

Prerequisites - The required preoperational tests have been completed. Instrumentation for calibration has been checked.

Test Method - A heat balance will be made after initially achieving power level associated with each test plateau. Each APRM channel reading will be adjusted to be consistent with the core thermal power as determined from the heat balance. During heatup a preliminary calibration will be made by adjusting the APRM amplifier gains so that the APRM readings agree with the results of a constant heatup rate heat balance. The APRMs should be recalibrated in the power range by a heat balance as soon as adequate feedwater indication is available.

Acceptance Criteria - Level 1 - The APRM channels must be calibrated to read equal to or greater than the actual core thermal power.

Level 2 - Not applicable.

(ST-13) NSSS Process Computer

Test Objective - The objective of this test is to verify the NSSS performance of the process computer under plant operating conditions.

Prerequisites - The required preoperational tests have been completed.

Test Method - The Dynamic System Test Case will be run to verify that the results of NSSS performance calculations are correct.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 -

1) The MCPR calculated by an independent method and the process computer either:

   a) Are in the same fuel assembly and do not differ in value by more than 2% or,
   b) For the case in which the MCPR calculated by the process computer is in a different assembly than that calculated by the independent method, for both assemblies, the MCPR and CPR calculated by the two methods shall agree within 2% for the same assembly.

2) The maximum LHGR calculated by the independent method and the process computer either:

   a) Are in the same fuel assembly and do not differ in value by more than 2%, or
   b) For the case in which the maximum LHGR calculated by the process computer is in a different assembly than that calculated by the independent method, for both assemblies, the maximum LHGR and LHGR calculated by the two methods shall agree within 2% for the same assembly.

3) The MAPLHGR calculated by the independent method and the process computer either:

   a) Are in the same fuel assembly and do not differ in value by more than 2%, or
   b) For the case in which the MAPLHGR calculated by the process computer is in a different assembly than that calculated by the independent method for both assemblies, the MAPLHGR and APLHGR calculated by the two methods shall agree within 2% for the same assembly.

4) The LPRM calibration factors calculated by the independent method and the process computer agree to within 2%.

(ST-14) RCIC System

Test Objective - The objectives of this test are to verify the proper operation of the Reactor Core Isolation Cooling (RCIC) system at the minimum and rated operating pressures and flow ranges, and to demonstrate reliability in automatic mode starting from cold standby when the reactor is at power conditions.

Prerequisites - The required preoperational tests have been completed. Initial turbine operation (uncoupled) must have been performed to verify satisfactory operation and over-speed trip. Instrumentation has been installed and calibrated.

Test Method - The RCIC System is designed to be tested in two ways: (1) by flow injection into a test line leading to the Condensate Storage Tank (CST), and (2) by flow injection directly into the reactor vessel.

The earlier set of CST injection tests consist of manual and automatic mode starts at approximately 150 psig and near rated reactor pressure conditions. The pump discharge pressure during these tests is throttled to be approximately 100 psi above the reactor pressure to simulate the largest expected pipeline pressure drop. This CST testing is done to demonstrate general system operability and stability.

Reactor vessel injection tests are also done which consist of manual and automatic mode starts near rated reactor pressure and automatic mode start at approximately 150 psig reactor pressure conditions to demonstrate operability and stability.

After all final controller and system adjustments have been determined, a defined set of demonstration tests must be performed with that one set of adjustments. Two consecutive reactor vessel injections starting from cold conditions in the automatic mode must satisfactorily be performed to demonstrate system reliability. Following these tests, a set of CST injections starting from cold conditions in the automatic mode are done to provide a benchmark for comparison with future surveillance tests. ("Cold" is defined as a minimum three days without any kind of RCIC operation.)

After the manual start portion of certain of the above tests is completed, and while the system is still operating, small step disturbances in speed and flow command are input (in manual and automatic mode respectively) in order to demonstrate satisfactory stability. This is to be done at both low (above minimum turbine speed) and near rated flow initial conditions to span the RCIC operating range. During testing at 150 psig, this is done only near rated flow initial conditions.

A demonstration of extended operation of up to 2 hours (or until pump and turbine oil temperature is stabilized) of continuous running at rated flow conditions is to be scheduled at a convenient time during the Startup test program.

Acceptance Criteria - Level 1 - The average pump discharge flow must be equal to or greater than the 100% rated value in 30 seconds or less from automatic initiation at any reactor pressure between 150 psig (±15, -0) (10.5 kg/cm²) and rated.

The RCIC turbine shall not trip or isolate during auto or manual start tests.

Note: If any Level 1 criteria are not met, the reactor will only be allowed to operate up to a restricted power level defined by Figure 14.2-7 until the problem is resolved. Also consult the plant Technical Specifications for actions to be taken.

Level 2 - In order to provide an overspeed and isolation trip avoidance margin, the transient start first and subsequent speed peaks shall not exceed 5% above the rated RCIC turbine speed.

The speed and flow control loops shall be adjusted so that the decay ratio of any RCIC system related variable is not greater than 0.25.

The turbine gland seal condenser system shall be capable of preventing steam leakage to the atmosphere.

The delta P switch for the RCIC steam supply line high flow isolation trip shall be calibrated to a differential pressure corresponding to less than or equal to 300% of the maximum required steady state flow, with the reactor assumed to be near the pressure for main relief valve actuation.

(ST-15) HPCI System

Test Objective - The objective of this test is to verify the proper operation of the High Pressure Coolant Injection (HPCI) system at the minimum and rated operating pressures and flow ranges, and to demonstrate reliability in automatic mode starting from cold standby when the reactor is at rated pressure conditions.

Prerequisites - The required preoperational tests have been completed. Initial turbine operation (uncoupled) must have been performed to verify satisfactory operation and over-speed trip. Instrumentation has been installed and calibrated.

Test Method - The HPCI system is designed to be tested in two ways: (1) by flow injection into a test line leading to the Condensate Storage Tank (CST), and (2) by flow injection directly into the reactor vessel.

The earlier set of CST injection tests consist of manual and automatic mode starts at approximately 150 psig and near rated reactor pressure conditions. The pump discharge pressure during these tests is throttled to be approximately 100 psi above the reactor pressure to simulate the largest expected pipeline pressure drop. This CST testing is done to demonstrate general system operability and stability.

Reactor vessel injection tests are also done which consist of manual and automatic mode start near rated reactor pressure to demonstrate operability and stability.

After all final controller and system adjustments have been determined, a defined set of demonstration tests must be performed with that one set of adjustments. Two consecutive reactor vessel injections starting from cold conditions in the automatic mode must satisfactorily be performed to demonstrate system reliability. Following these tests, a set of CST injections starting from cold conditions in the automatic mode ("cold" is defined to a minimum three days without any kind of HPCI operation) are done to provide a benchmark for comparison with future surveillance tests.

After the manual start portion of certain of the above tests is completed, and while the system is still operating, small step disturbances in speed and flow command are input (in manual and automatic mode respectively) in order to demonstrate satisfactory stability. This is to be done at both low (above minimum turbine speed) and near rated flow initial conditions to span the HPCI operating range. During testing at 150 psig this is done only near rated flow initial conditions.

A continuous running test is to be scheduled at a convenient time during the Startup Test Program. This demonstration of extended operation should be for up to 2 hours or until steady turbine and pump conditions are reached or until limits on plant operation are encountered.

Pump flow testing will also be verified since auxiliary boiler supply is insufficient to fully test the system during the Preoperational Test Program.

Acceptance Criteria - Level 1 - The average pump discharge flow must be equal to or greater than the 100% rated value in 25 seconds or less from automatic initiation at any reactor pressure between 150 psig ($\pm$15, -0) (10.5 kg/cm^2) and rated.

The HPCI turbine shall not trip or isolate during auto or manual start tests.

Level 2 - In order to provide an overspeed and isolation trip avoidance margin, the transient start first peak shall not come closer than 15% (of rated speed) to the overspeed trip, and subsequent speed peaks shall not be greater than 5% above rated turbine speed.

The speed and flow control loops shall be adjusted so that the decay ratio of any HPCI system related variable is not greater than 0.25.

The turbine gland seal condenser system shall be capable of preventing steam leakage to the atmosphere.

The delta-P switch for the HPCI steam supply line high flow isolation trip shall be calibrated to actuate at no greater than 300% of the maximum required steady state flow, with the reactor assumed to be near the pressure for main relief valve actuation.

(ST-16) Selected Process Temperatures

Test Objectives - The objective of this procedure is to establish the proper setting of the low speed limiter for the recirculation pumps to avoid coolant temperature stratification in the reactor pressure vessel bottom head region.

Prerequisites - The required preoperational tests have been completed. System instrumentation has been calibrated.

Test Method - During initial heatup while at hot standby conditions, the bottom drain line temperature, recirculation loop suction temperature and applicable reactor parameters are monitored as the recirculation flow is slowly lowered to minimum stable flow. Utilizing this data it can be determined whether coolant temperature stratification occurs when the recirculation pumps are on and if so, what minimum recirculation flow will prevent it.

Monitoring the preceding information during planned pump trips will determine if temperature stratification occurs in the idle recirculation loops or in the lower plenum when one or more loops are inactive.

Acceptance Criteria - Level 1 - The reactor recirculation pumps shall not be started nor flow increased unless the coolant temperatures between the steam dome and bottom head drain are within 145°F.

The recirculation pump in an idle loop must not be started unless the loop suction temperature is within 50°F of the active loop.

Level 2 - Not applicable.

(ST-17) System Expansion

Test Objectives - The purposes of this test are to demonstrate that reactor recirculation, main steam inside containment, and those piping systems identified in Table 3.9-33 respond to thermal expansion consistent with stress analysis results. (Note that this test now includes piping previously contained in ST-38.)

Prerequisites - Instrumentation has been installed and calibrated.

Test Method - Hanger positions and locations of piping in the Nuclear Steam Supply System and piping systems identified in Table 3.9-33 inside and outside the reactor drywell are recorded prior to initial heatup and after a planned cold shutdown. During initial heatup, a visual inspection is made at an intermediate reactor water temperature to assure components are free to move as designed. Adjustments are made as necessary. Devices for measuring continuous pipe deflections are mounted on main steam, recirculation and other selected lines. Motion during heatup is compared with calculated values.

Acceptance Criteria - Level 1 - There shall be no obstructions which will interfere with the thermal expansion of the main steam and recirculation piping systems. Piping systems identified in Table 3.9-33 will not be restrained against thermal expansion except by design intent.

Hangers on piping systems identified on Table 3.9-33 shall not be bottomed out or have the spring fully stretched. Snubbers on piping systems identified in Table 3.9-33 shall not become extended or compressed to the limits of their total travel.

The measured displacements at the established transducer locations on the main steam and recirculation systems shall not exceed the allowable values calculated for the specific points.

Level 2 - The measured displacements at the established transducer locations on the main steam and recirculation systems shall not exceed the expected values calculated for the specific points. The measured displacements at the established transducer locations on the piping systems identified in Table 3.9-33 shall be within the acceptable range calculated for the specific points.

Hangers on piping systems identified in Table 3.9-33 shall be in their operating range.

(ST-18) TIP Uncertainty

Test Objectives - The objective of this test is to determine the uncertainty of the TIP system readings.

Prerequisites - System installation is completed and required preoperational tests are completed and verified. Instrumentation has been calibrated and installed.

Test Method - The TIP uncertainty consists of a random noise component and a geometric component, the geometric component being due to variation in the water gap geometry and TIP tube orientation from TIP location to location. Measurement of these components is obtained by taking repetitive TIP readings at a single TIP location, and by analyzing pairs of TIP readings taken at TIP locations which are symmetrical about the core diagonal of fuel loading and control rod symmetry.

The random noise uncertainty is determined from successive TIP runs made at the common location (32-33) with each of the TIP machines making six runs at index position 10. The TIP data will be obtained by simultaneous operation of the Process computer OD-2 program which provides 24 nodal TIP values for each TIP traverse. The standard deviation of the random noise is derived by taking the square root of the average of the variances at nodal levels 5 through 22, where the nodal variance is obtained from the fractional deviations of the successive TIP values about their nodal mean value.

The total TIP uncertainty is determined by performing a complete set of TIP traverses as required by Process Computer program OD-1. The total TIP uncertainty is obtained by dividing the standard deviation of the symmetric TIP pair nodal ratios by the square root of 2. The nodal TIP ratio is defined as the nodal BASE value of the TIP in the lower right half of the core divided by its symmetric counterpart in the upper left half.

The geometric component of TIP uncertainty is obtained by statistically subtracting the random noise component from the total TIP uncertainty.

The TIP data will be taken with the reactor operating with an octant symmetric rod pattern and at steady state conditions. One set of TIP data will be taken at approximately 50% power and at least one other set at 75% power or above. The acceptance criteria for this subtest uses the "average uncertainties" for all data sets. Therefore additional performance of the subtest may be scheduled and the previous values of uncertainty will be used in the averaging to determine the acceptability of the results.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - The total TIP uncertainty (including random noise and geometrical uncertainties) obtained by averaging the uncertainties for all data sets must be less than 6.0%.

Note: A minimum of two and up to six data sets may be used to meet the above criteria.

(ST-19) Core Performance

Test Objectives - The objectives of this test are a) to evaluate the core thermal power and b) to evaluate the following core performance parameters: 1) maximum linear heat generation rate (MLHGR), 2) minimum critical power ratio (MCPR) and 3) maximum average planar linear heat generation rate (MAPLHGR).

Prerequisites - The required preoperational tests have been completed.

Test Method - The core performance evaluation is employed to determine the principal thermal and hydraulic parameters associated with core behavior. These parameters are:

Core flow rate
Core thermal power level
MLHGR
MCPR
MAPLHGR

Prior to the verification of the Process Computer in ST-13, an independent method will be used to calculate these parameters. After the successful completion of ST-13, the process computer will be used.

Acceptance Criteria - Level 1 - The Maximum Linear Heat Generation Rate (MLHGR) of any rod during steady-state conditions shall not exceed the limit specified by the Plant Technical Specifications.

The steady-state Minimum Critical Power Ratio (MCPR) shall not exceed the limits specified by the Plant Technical Specifications.

The Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) shall not exceed the limits specified by the Plant Technical Specifications.

Steady-state reactor power shall be limited to the rated MWT and values on or below the licensed analytically determined power-flow line.

Level 2 - Not applicable.

(ST-20) Steam Production Verification

Test Objective - The objective of this test is to demonstrate that the NSSS is providing steam sufficient to satisfy all appropriate warranties.

Prerequisites - Required preoperational tests have been completed. All required instrumentation is installed and calibrated.

Test Method - A NSSS steam output performance test of 100 hours of continuous operation at the warranted steam output will be performed.

Acceptance Criteria - Level 1 - The average reactor core thermal power (CTP) shall not exceed 3293 MWt.

The Maximum Average Planar Ratio (MAPRAT) shall be less than or equal to 1.0.

The Maximum Fraction of Limiting Critical Power Ratio (MFLCPR) shall be less than or equal to 1.0.

The Maximum Fraction of Limiting Power Density (MFLPD) shall be less than or equal to 1.0.

Level 2 - The NSSS shall be capable of supplying 13,483,000 pounds per hour of steam of not less than 99.7% quality at a pressure of 985 psia at the outlet of the second main steam line isolation valve, as based upon a final feedwater temperature of 383°F measured as near the reactor pressure vessel as practicable, and a control rod drive feed flow of 32,000 pounds per hour at 80°F.

(ST-21) Core Power-Void Mode Response

Test Objectives - The objective of this test is to verify the stability of the core power-void dynamic response.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been calibrated.

Test Method - The core power void loop mode that results from a combination of the neutron kinetics and core thermal hydraulic dynamics is least stable near the natural circulation end of the rated 100 percent power rod line. A fast change in the reactivity balance is obtained by moving a very high worth rod only 1 or 2 notches and by simulating a failure of the pressure regulator.

Acceptance Criteria - Level 1 - The transient response of any system related variable to any test input must not diverge.

Level 2 - Not applicable.

(ST-22) Pressure Regulator

Test Objectives - The objectives of this test are to demonstrate the takeover capability of the backup pressure regulator upon failure of the controlling pressure regulator and to demonstrate smooth pressure control transition between the control valves and bypass valves when reactor steam generation exceeds steam flow used by the turbine.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - The pressure set point will be decreased rapidly and later increased rapidly by about 10 psi and the response of the system will be measure d in each case. It is desirable to accomplish the set point change in less than 1 second. At specified test conditions the load limit setpoint will be set so that the transient is handled by control valves, bypass valves and both. The backup regulator will be tested by simulating a failure of the operating pressure regulator so

that the backup regulator takes over control. The response of the system will be measured and evaluated.

Acceptance Criteria - Level 1 - The transient response of any pressure control system related variable to any test input must not diverge.

Level 2

a) Pressure control system related variables may contain oscillatory modes of response. In these cases, the decay ratio must be less than or equal to 0.25 when operating above the lower limit of the master manual controller.
b) When in the recirculation manual mode, the pressure response time from initiation of pressure setpoint step change to the turbine inlet pressure peak shall be 10 seconds.
c) Pressure control system deadband, delay, etc., shall be small enough that steady state limit cycles (if any) shall produce steam flow variations no larger than ± 0.5 percent of rated steam flow.
d) The normal difference between regulator set points must be small enough that the peak neutron flux and/or peak vessel pressure remain below the scram settings by 7.5 percent and 10 psi respectively, for the Regulator Failure Test performed at Test Condition 6.

(ST-23) Feedwater System

Test Objectives - The objectives of this test are a) to demonstrate acceptable response to the feedwater control system for reactor water level control, b) to demonstrate stable reactor response to subcooling changes, i.e., loss of feedwater heating, c) to demonstrate the capability of the automatic core flow runback feature to prevent low water level scram following the trip of one feedwater pump, and d) to demonstrate the maximum feedpump runout capability is compatible with licensing assumptions.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - At Test Condition (TC) 1 with the water level being automatically controlled using the low load valve and the recirculation system in Manual, ± 5 inch step changes in the water level setpoint will be made to demonstrate proper response and operability of the feedwater system at low reactor power.

At Test Conditions 2, 3 and 6, with one feedwater pump in manual and the others in auto, a ± 5% change in the manually controlled feed pump will be made. The response of the feedwater system to these steps will be analyzed and compared to the applicable acceptance criteria. The recirculation system will be in manual for these tests. At Test Conditions 1, 2, 3, 4, 5 & 6, with the recirculation system in manual, ± 5 inch changes in the water level setpoint will be made to demonstrate proper response and stability of the feedwater system.

At approximately 80% to 90% power, with core flow near 100% of rated, failure of extraction steam valves to one of the feedwater heater trains is accomplished by closing the heater train steam inlet isolation valves which will isolate extraction steam to the last three stages of that train. Recordings of the transient will be analyzed and compared to the predicted response and acceptance criteria.

At Test Condition 6, one feedwater pump will be tripped to demonstrate the capability to avoid a scram and prevent a low reactor water level trip due to the loss of one feedwater pump.

A maximum feedwater runout capability test will be done to demonstrate that the actual capability is compatible with licensing assumptions.

Acceptance Criteria - Level 1 - The transient response of any level control system-related variable to any test input must not diverge.

For the feedwater heater loss test, the maximum feedwater temperature decrease due to a single failure case must be less than or equal to 100°F. The resultant MCPR must be greater than the fuel thermal safety limit.

The increase in heat flux cannot exceed the predicted Level 2 value by more than 2%. The predicted value will be based on the actual test values of feedwater temperature change and power level.

The feedwater flow runout capability must not exceed the assumed value in the FSAR.

Level 2 - Level control system-related variables may contain oscillatory modes of response. In these cases, the decay ratio for each controlled mode of response must be less than or equal to 0.25.

The open loop dynamic flow response of each feedwater actuator (turbine or valve) to small (±10%) step disturbances shall be:

1)	Maximum time to 10% of a step disturbance	1.2 sec.
2)	Maximum time from 10% to 90% of a step disturbance	2.5 sec.
3)	Peak overshoot (% of step disturbance)	≤15%

The average rate of response of the feedwater actuator to large (≥ 20% of pump flow) step disturbances shall be between 10 percent and 25 percent rated feedwater flow/second. This average response rate will be assessed by determining the time required to pass linearly through the 10 percent and 90 percent response points.

The increase in heat flux cannot exceed the predicted value referenced to the actual Feedwater temperature change and the initial power level.

A scram must be avoided from low water level with at least a 3 inch margin following a trip of one of the operating feedwater pumps.

(ST-24) Turbine Valve Surveillance

Test Objectives - The objective of this test is to demonstrate acceptable procedures and maximum power levels for periodic surveillance testing of the main turbine control, stop, intercept and bypass valves without producing a reactor scram.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - Starting at 45 to 65% power, and continuing at progressively higher power levels, each turbine control, main stop and intermediate stop valve will be closed individually and the response of the reactor will be observed. The margin to scram for reactor pressure and neutron flux and the margin to main steam line isolation will be plotted for each tested power level. These plots will be used to determine the maximum power level at which turbine valve surveillance testing can be performed. The test of the control, main stop, intermediate stop and bypass valves are performed near the predicted highest power level to demonstrate that the Acceptance Criteria are satisfied. Rate of valve stroking and timing of the close-open sequence will be such that minimum practical disturbance is introduced and that PCIOMR limits are not exceeded.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - Peak neutron flux must remain at least 7.5% below the Neutron flux scram trip value. Peak vessel pressure must remain at least l0 psi below the high pressure scram setting. Peak steam flow in each line must remain at least 10% below the high flow isolation trip setting. Peak simulated heat flux must remain at least 5% below its scram trip point.

(ST-25) Main Steam Isolation Valves

Test Objectives - The objectives of this test are (a) to functionally check the main steam isolation valves (MSIVs) for proper operation at selected power levels, (b) to determine reactor transient behavior during and following simultaneous full closure of all MSIVs, (c) to determine isolation valve closure time and (d) to determine the maximum power at which a single valve closure can be made without a scram.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - The Main Steam Isolation Valves (MSIVs) are operated during this test to verify their functional performance and to determine closure times. While functionally testing the operation of the MSIVs, the time necessary for closing each individual valve will be noted. The fastest MSIV will then be tested to determine what power level an MSIV can experience fast closure without causing a scram. All MSIVs will later be used to demonstrate a full isolation subsequently leading to a scram. (The Nuclear Steam Supply Shutoff System (NSSSS) logic will be used to initiate the full isolation). The acceptability of the fast criteria (3 seconds) is determined by utilizing the full stroke time without delay, extrapolated from measured stroke times between 10% closed and 90% closed. The acceptability of the slow criteria (5 seconds) is determined by utilizing the full stroke time with delay extrapolated for the final 10% of stroke.

Acceptance Criteria - Level I - The positive change in vessel dome pressure occurring within 30 seconds after closure of all MSIVs must not exceed predicted values by more than 25 psi.

The positive change in heat flux following closure of all MSIVs shall not exceed predicted values by more than 2% of rated value.

Following the closure of all MSIV's, the reactor must scram.

The average of the closure times for the fastest MSIV in each steam line, exclusive of delay, shall not be less than 3.0 seconds. Closure time for any MSIV, including delay, shall not be greater than 5.0 seconds.

Closure time for any MSIV shall not be less than 3.0 seconds.

Feedwater control settings must prevent flooding the main steam lines during the full isolation test.

The time delay between the close initiation signal and the extrapolated initial valve movement from 100% open for any MSIV shall be less than or equal to 0.5 seconds.

Level 2 - The positive change in vessel dome pressure occurring within the first 30 seconds after the closure of all MSIVs must not exceed the predicted values. Predicted values will be referenced to actual test conditions of initial power level, scram timing and dome pressure and will use beginning of life nuclear data.

The positive change in heat flux occurring within the first 30 seconds after the closure of all MSIVs must not exceed the predicted values. Predicted values will be referenced to actual test conditions of initial power level, and dome pressure and will use beginning of life nuclear data.

If water level reaches Level 2 setpoint during the MSIV full closure test, RCIC shall automatically initiate and reach rated flow.

During the MSIV full closure test, the relief valves must reclose properly (without any detectable leakage) following the pressure transient.

During full closure of individual MSIVs, peak vessel dome pressure must remain at least 10 psi below the scram setpoint.

During full closure of individual MSIVs, peak neutron flux must remain at least 7.5% below its scram setpoint.

During full closure of individual MSIVs, steam flow in individual lines must remain at least 10% below the high flow isolation trip setpoint.

During full closure of individual MSIVs, the simulated heat flux must remain at least 5% less than its flow biased scram setpoint.

(ST-26) Relief Valves

Test Objectives - The objectives of this test are to verify that the relief valves function properly, reseat properly after operation and contain no major blockages in the relief valve discharge piping.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate. Factory test results on SRV flow and operating times have been reviewed.

Test Method - Testing done at low reactor pressure, in conjunction with plant surveillance testing, consists of cycling each relief valve to verify proper operation. The transient monitoring system will be used to record the results of this test. The data collected will compare the operation of individual relief valves against the operation of all relief valves. During relief valve operation, core power - and therefore steam generation rate - is maintained constant. The pressure control system will close the bypass valves an amount proportional to the relief valve

steam flow to maintain constant reactor pressure. This bypass valve motion will be monitored and a comparison of the response for each relief valve operation will be made. If differences exist, it could suggest a partial obstruction of the relief valve or its tailpipe. Tailpipe temperature will be recorded to verify the relief valve has properly reseated. Reactor variables will also be recorded to verify system stability during opening and closing each relief valve.

Testing done at rated reactor pressure consists of manually operating each relief valve at rated reactor pressure. The decrease in Main Generator output will be monitored during the operation of each relief valve to provide an indication of relief valve flow. By comparison of the generator output response for each relief valve operation, any flow obstruction in the valve or its tailpipe can be identified. Each valve will be opened for approximately 10 seconds to allow for variables to stabilize. Reactor variables will also be recorded to verify system stability during opening and closing each relief valve.

Acceptance Criteria - Level I - There should be a positive indication of steam discharge during the manual actuation of each valve.

Level 2 - Pressure control system-related variables may contain oscillatory modes of response. In these cases, the decay ratio for each controlled mode of response must be less than or equal to 0.25.

The temperature measured by thermocouples on the discharge side of the valves shall return to within 10°F of the temperature recorded before the valve was opened.

During the low pressure functional tests, the change in bypass valve position for each SRV opening shall be greater than or equal to a value corresponding to the average change minus 10% of one bypass valve.

During the rated pressure tests, the change in MWe for each SRV opening shall be greater than or equal to a value corresponding to the average change minus 0.5% of rated MWe.

(ST-27) Turbine Trip and Generator Load Rejection

Test Objectives - The objective of this test is to demonstrate the response of the reactor and its control systems to protective trips in the turbine and generator.

Prerequisites - The required preoperational tests have been completed. All instrumentation has been calibrated.

Test Method - At Test Condition 3, a turbine trip will be manually initiated by depressing the Turbine Trip pushbutton in the main control room. At Test Condition 6, a generator load rejection will be manually initiated by remotely opening the generator synchronizing breaker from the control room. During both transients, reactor water level, pressure, neutron flux and simulated heat flux will be recorded and compared to predicted results and acceptance criteria.

At approximately 24% power, a generator load rejection within bypass capacity will be manually initiated as described above. This will demonstrate the ability to ride through a load rejection within bypass capacity without a scram.

During all 3 transients, main turbine stop, control and bypass valve positions and reactor water level will be recorded and compared to the acceptance criteria.

Acceptance Criteria - Level 1

a) For Turbine and Generator trips there should be a delay of no more than 0.1 seconds following the beginning of control or stop valve closure before the beginning of bypass valve opening. The bypass valves should be opened to a point corresponding to greater than or equal to 80 percent of full open within 0.3 seconds from the beginning of control or stop valve closure motion.

b) Feedwater system settings must prevent flooding of the steam line following these transients.

c) The positive change in vessel dome pressure occurring within 30 seconds after either generator or turbine trip must not exceed the Level 2 criteria by more than 25 psi.

d) The positive change in simulated heat flux shall not exceed the Level 2 criteria by more than 2% of rated value.

The two-pump drive flow coastdown transient, during the first three seconds of an RPT trip, must fall within the specified limits.

Level 2

a) There shall be no MSIV closure in the first 3 minutes of the transient and operator action shall not be required in that period to avoid the MSIV trip.

b) The positive change in vessel dome pressure and in simulated heat flux which occur within the first 30 seconds after the initiation of either generator or turbine trip must not exceed the predicted values.

(Predicted values will be referenced to actual test conditions of initial power level, dome pressure, scram timing, and the time from the start of stop/control valve motion to start of control rod motion, and will use beginning of life nuclear data.)

c) For the Generator trip within the bypass valves capacity (initial thermal power values less than or equal to 25 percent of rated) the reactor shall not scram.

The Total Delay from the initiation of a Turbine Stop Valve Closure or Turbine Control Valve Fast Closure to complete suppression of the Electric Arc between the fully open contacts of the Recirculation Pump Trip (RPT) Breaker shall be less than 175 milliseconds.

Recirculation pump trip, HPCI and RCIC starts shall not be initiated from a low reactor water level.

Feedwater level control shall avoid the loss of feedwater flow due to a high level (L8) trip.

(ST-28) Shutdown from Outside the Main Control Room

Test Objective - The objective of this test is to demonstrate that the reactor can be shutdown, maintained in a hot shutdown condition, and cooled down from outside the main control room. Also, the adequacy of the Emergency Operating Procedures will be verified.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - While operating at approximately 20% power synchronized to the grid with normal electrical system alignment, the reactor will be scrammed and the MSIV's will be closed from inside the main control room. The control room will then be evacuated, and reactor level and pressure will be controlled from outside the main control room. The Shutdown Cooling mode of RHR will be placed into service with cooling water supplied from the ultimate heat sink. During this demonstration, some supervisory and operating personnel will remain in the control room to protect non-safety-related equipment from unnecessary damage if conditions arise and to assume control of the plant if conditions warrant. A test will be run to demonstrate that the reactor can be scrammed and isolated from outside the control room.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - During a simulated control room evacuation, the reactor must be brought to the point where cooldown is initiated and under control, and the reactor vessel pressure and water level are controlled using equipment and controls outside the control room. The test is deemed successful when reactor pressure is less than 98 psig (permissive setpoint) and the RHR shutdown cooling mode has been put in operation.

The reactor must be capable of being scrammed and isolated from outside the control room.

(ST-29) Recirculation Flow Control System

The objectives of this test are:

a) To demonstrate the flow control capability of the plant over the entire pump speed range, including individual local manual and combined Master Manual Operation.
b) To determine that all electrical compensators and controllers are set for desired system performance and stability.

Prerequisites - The required preoperational tests have been completed.

All instrumentation has been calibrated.

Test Method - At Test Conditions 2, 3, 5 and 6, the stability of the recirculation flow control system is demonstrated by performing step changes in recirculation pump speed. This testing is done in individual local manual at Test Conditions 2 and 5 and in combined Master Manual operation at Test Conditions 3 and 6 to demonstrate operability and stability.

Acceptance Criteria - Level 1 - The transient response of any system-related variable to any test input must not diverge.

Level 2 - A scram shall not occur due to recirculation flow control maneuvers.

The APRM neutron flux trip avoidance margin shall be greater than or equal to 7.5% and the simulated heat flux trip avoidance margin shall be greater than or equal to 5% when the power maneuver effects are extrapolated to those that would occur along the 100% rated rod line.

The decay ratio of any oscillatory controlled variable must be less than or equal to 0.25.

Steady state limit cycles (if any) shall not produce turbine steam flow variations greater than ± .5% of rated steam flow.

(ST-30) Recirculation System

Test Objectives - The objectives of this test are:

a) Obtain recirculation system performance data during pump trip, flow coastdown, and pump restart.
b) Verify that the feedwater control system can satisfactorily control water level without a resulting turbine trip and associated scram.
c) Record and verify acceptable performance of the recirculation two pump circuit trip system.
d) Verify the adequacy of the recirculation runback to mitigate a scram.
e) Verify that no recirculation system cavitation will occur in the operable region of the power-flow map.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - Single recirculation pump trips will be made at Test Condition (TC) 3 and TC-6. These trips will be initiated by tripping the M-G Set Drive Motor Breaker from the control room. Reactor parameters will be recorded during the transient and analyzed to verify non-divergence of oscillatory responses, adequate margins to RPS scram set points, and capability of the feedwater system to prevent a high level trip. The capability to restart the recirc. pump at a high power level will also be demonstrated. At TC-3, both recirculation pumps RPT breakers will be simultaneously tripped using a temporarily installed test switch. The data gathered will be used to demonstrate acceptable pump coastdown performance prior to high power turbine trips and generator load rejects.

Appropriate conditions will be simulated at TC-3 to demonstrate the proper operation of the recirculation pump runback circuits. This is done prior to an actual planned feed pump trip at rated power.

Both the jet pumps and the recirculation pumps will cavitate at conditions of high flow and low power where NPSH demands are high and little feedwater subcooling occurs. However, the recirculation flow will automatically runback upon sensing a decrease in feedwater flow. The maximum recirculation flow is limited by appropriate stops which will run back the recirculation flow from the possible cavitation region. At TC-3, it will be verified that these limits are sufficient to prevent operation where recirculation pump or jet pump cavitation occurs.

Acceptance Criteria - Level 1 - The response of any level related variables during a single pump trip must not diverge.

The two pump drive flow coastdown transient, during the first 3 seconds of an RFT trip, must fall within the specified bounds.

Level 2 - The reactor shall not scram during the one pump trip.

The APRM margin to avoid a scram shall be at least 7.5% during the one pump trip recovery.

The reactor water level margin to avoid a high level trip shall be at least 3.0 inches during the one pump trip.

Peak simulated heat flux must remain at least 5% below its flow biased scram value.

Runback logic shall have settings adequate to prevent recirculation pump operation in areas of potential cavitation.

The recirculation pumps shall runback upon a trip of the runback circuit.

(ST-31) Loss of Turbine-Generator and Offsite Power

Test Objectives - The objectives of this test are to demonstrate that the required safety systems will initiate and function properly without manual assistance, the electrical distribution and diesel generator systems will function properly, and the HPCI and/or RCIC systems will maintain water level if necessary during a simultaneous loss of the main turbine-generator and offsite power.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - With the unit synchronized to the grid at approximately 30% power, the main turbine-generator will be manually tripped coincident with a manual trip of the unit's offsite power source breaker, both trips initiated from the control room. To ensure a full simulation of the loss of all offsite power to Unit 1 during Unit 1 testing, all Unit 1 and Common loads will be transferred to Unit 1 Auxiliary and Startup Busses and appropriate breakers racked out to prevent automatic transfer of the loads to Unit 2 sources.

Reactor water level and the operation of safety systems will be monitored to verify that the acceptance criteria are satisfied. The proper response of the electrical distribution system will be checked.

The loss of offsite power condition will be maintained for at least 30 minutes to demonstrate that necessary equipment, controls, and indication are available following station blackout to remove decay heat from the core using only emergency power supplies and distribution system.

Acceptance Criteria - Level 1 - All safety systems, such as the Reactor Protection System, the diesel-generator, RCIC and HPCI must function properly without manual assistance, and HPCI and/or RCIC system action, if necessary, shall keep the reactor water level above the initiation level of Core Spray, LPCI and ADS.

Level 2 - The temperature measured by the thermocouples on the discharge side of any SRV that actuated shall return to within 10°F of the temperature recorded before the valve opened. Permanent instrumentation for reactor power, reactor pressure, water level, control rod position, suppression pool temperature, high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) shall be demonstrated operable following re-energization of the 4kV busses by the diesel generators.

(ST-32) Containment Atmosphere and Main Steam Tunnel Cooling

Test Objective - The objective of this test is to verify the ability of the drywell coolers/recirculation fans and the reactor building portion of the main steam tunnel coolers to maintain design conditions in the drywell and reactor building portion of the mainsteam tunnel, respectively, during operating conditions and post scram conditions. This test also demonstrates that containment main steamline penetrations do not overheat adjacent concrete.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - During heatup, at test conditions 2 and 6, and following a planned scram from 100% power, data will be taken to ascertain that the containment atmospheric conditions are within design limits.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - The general drywell area is maintained at an average temperature less than or equal to 135°F, with maximum local temperature not to exceed 150°F.

The area beneath the reactor pressure vessel is maintained at an average temperature less than or equal to 135°F, maximum local temperature not to exceed 165°F, with minimum local temperature above 100°F.

The area around the recirculation pump motors is maintained at an average temperature less than or equal to 128°F, with maximum local temperature not to exceed 135°F.

The inside base of the shield wall in the RPV skirt area is maintained at temperatures greater than 100°F.

The reactor building portion of the mainsteam pipeway is maintained at or below 120°F.

The concrete temperature surrounding the main steamlime penetrations is maintained at less than 200°F.

(ST-33) Piping Steady State Vibration

Test Objectives - The objectives of this test is to demonstrate that steady state vibration levels on reactor recirculation, main steam inside containment, and those piping systems identified in Table 3.9-33 are within acceptable limits. (Note that this test now includes piping previously contained in ST-40. Also note that dynamic transient vibration testing previously contained in this test have been merged into ST-39.)

Prerequisites - Instrumentation has been installed and calibrated.

Test Method - Devices for measuring continuous vibration are mounted on main steam lines, recirculation lines and lines of systems identified in Table 3.9-33 as applicable, and vibration during steady state operation is compared with calculated values.

Acceptance Criteria - Level 1 - The measured amplitude (peak to peak) of each remotely monitored point on the main steam inside containment and reactor recirculation lines shall not exceed the allowable value for that point.

Level 2 - The measured amplitude (peak to peak) of each remotely monitored point on the main steam inside containment and reactor recirculation lines shall not exceed the expected value for that point.

The vibratory response of non-remotely monitored systems or portions of systems identified in Table 3.9-33 shall be judged to be within acceptable limits by a qualified test engineer.

The maximum measured amplitude of the piping response for each remotely monitored point on systems identified in Table 3.9-33 shall not exceed the acceptable value for that point.

(ST-34) Control Rod Sequence Exchange

(This test number was previously assigned to the RPV Internals Vibration test which is now performed during the Preoperational Test Program. The test description for the RPV Internals Vibration test is now in TP2.16 which follows the abstract for P64.1.)

Test Objective - The objective of this test is to perform a representative sequence exchange of control rod patterns at the power level at which such exchanges will be done during plant operation and demonstrate that core limits and PCIOMR threshold limits will not be exceeded.

Prerequisites - Instrumentation has been checked or calibrated as appropriate.

Test Method - The control rod sequence exchange begins on the design flow control line with core flow near minimum. Control rods will be inserted as necessary to increase the margin to local core thermal limits. Core power is maintained above the low power setpoint of the Rod Worth Minimizer and Rod Sequence Control System and below the power which will keep fuel assembly nodal power at the PCIOMR threshold. The exchange is performed in accordance with the plant operating procedure RE-TP-009. Data taken during the exchange will be reviewed to verify that the Acceptance Criteria were satisfied.

Acceptance Criteria - Level 1 - Completion of the exchange of one rod pattern for the complimentary pattern with continual satisfaction of all licensed core limits constitutes satisfaction of the requirements of this procedure.

Level 2 - All nodal powers shall remain below their PCIOMR threshold limit during this test.

(ST-35) Recirculation System Flow Calibration

Test Objectives - The objective of this test is to perform a complete calibration of the installed recirculation system flow instrumentation.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - During the testing program at selected operating conditions which allow the recirculation system to be operated at speeds required for rated flow at rated power, the jet pump flow instrumentation will be adjusted to provide correct flow indication based on the jet pump flow.

After the relationship between drive flow and core flow is established, the flow biased APRM/RBM system will be adjusted to match this relationship.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - Jet pump flow instrumentation shall be adjusted such that the jet pump total flow recorder will provide a correct core flow indication at rated conditions.

The APRM/RBM flow-bias instrumentation shall be adjusted to function properly at rated conditions.

(ST-36) Cooling Water Systems

Test Objectives - The objective of this test is to verify that the performance of the Reactor Building Closed Cooling Water (RBCCW), the Turbine Building Closed Cooling Water (TBCCW), and Service Water Systems are adequate with the reactor at rated temperature.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - With the reactor operating at 100% power, data will be obtained to verify that the heat exchanger outlet temperatures are within design values.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - The Service Water Pump discharge header temperature is less than 95°F. The RBCCW Heat Exchanger RBCCW outlet temperature is at 100° ± 5°F. The TBCCW Heat Exchanger TBCCW outlet temperature is at 100° ± 5°F.

(ST-37) Gaseous Radwaste System

Test Objectives - The objective of this test is to demonstrate that the Gaseous Radwaste System operates within the Technical Specification and design limits during a full range of plant power operation and to demonstrate the proper operation of the containment nitrogen inerting system during plant operation.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate. In addition, the 100% power trip testing shall have been completed or 120 effective full power days shall not have elapsed prior to performing the nitrogen inerting test.

Test Method - The test will consist of collecting data and performing quantitative analysis of the off gas system influent and effluent to determine if the performance is acceptable per design and Technical Specification. For the nitrogen inerting system, the proper nitrogen concentration will be verified by the as installed plant oxygen detectors/instruments in the two major volumes of the primary containment.

Acceptance Criteria - Level 1 - The release of radioactive gaseous and particulate effluents must not exceed the limits specified in the site technical specifications.

Level 2 - The system flow, pressure, temperature, and relative humidity shall comply with design specifications. The catalytic recombiner, the hydrogen analyzer, the activated carbon beds and the filters shall be performing their required function. There shall be no less than 8000 lb/hr. of dilution steam flow when the steam jet air ejectors are pumping. The containment nitrogen

inerting system shall be capable of inerting the primary containment free volume within 24 hours from the start of the test and the resulting oxygen concentration shall be less than or equal to 4%.

(ST-38) BOP Piping System Expansion

(The system expansion testing previously contained in this test has been merged into ST-17.)

(ST-39) Piping Vibration During Dynamic Transients

Test Objective - The objective of this test is to demonstrate that vibration levels on main steam inside containment, reactor recirculation, and system piping identified in Table 3.9-33 meet acceptable limits during selected dynamic transients.

Prerequisites: Instrumentation has been installed and calibration.

Test Method - Devices for measuring continuous loads, displacements, accelerations and pressures are mounted on piping systems and responses during transients are compared with calculated values. Those portions of the systems which are non-safety related are visually inspected prior to, during and subsequent to the transient loading condition.

Acceptance Criteria - Level 1 - The measured vibration amplitude (peak to peak) for each remotely monitored point of main steam inside drywell and/or reactor recirculation piping shall not exceed the allowable value for each specific point.

Level 2 - The maximum measured loads, displacements, accelerations and pressures on those systems listed in Table 3.9-33 shall not exceed the design maximum expected values at each specific point.

The vibratory response of non-remotely monitored systems identified in Table 3.9-33 shall be judged to be within acceptable limits by a qualified test engineer.

Based on visual inspection during a post transient walkdown, there shall be no signs of excessive piping response (such as damaged insulation, markings on piping, structural or hanger steel, or walls, damaged pipe supports, etc.) on systems listed in Table 3.9-33.

The measured vibration amplitude (peak to peak) for each remotely monitored point of main steam inside drywell and/or reactor recirculation piping shall not exceed the expected value for each specific point.

(ST 40) BOP Piping Steady State Vibration

(The steady state vibration testing previously contained in this test has been merged into ST-33.)

14.2.12.3 Requested Unit 1 Acceptance Test Procedure Abstracts

Tests comprising the Acceptance Test procedures are listed in Table 14.2-2. For each test a description is provided for objective, prerequisites, method and acceptance criteria, where applicable. Modifications to these descriptions of the initial acceptance test program will be reflected in amendments to the FSAR.

A3.1 13.8 KV SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the capability of the 13.8 kV system to provide electrical power to the Startup and Unit Auxiliary 13.8 kV Busses by demonstrating the proper operation of breakers, relaying and logic, permissive and prohibit interlocks, and instrumentation and alarms.

Prerequisites - Construction is completed to the extent necessary to perform this test and the systems are turned over to the ISG. Required 230 kV transmission lines are available to energize the 13.8 kV system. Required instruments and protective relays are calibrated and controls are operable.

Test Method - Breakers are opened and closed by operating or simulating controls to verify breaker operation, relaying and logic, permissive and prohibit interlocks, instrumentation and alarms, and automatic transfers.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

A7.1 LIGHTING SYSTEM AND MISCELLANEOUS 120V DISTRIBUTION ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the Station Battery Lighting System to automatically transfer on loss of the Normal power feed, to demonstrate the ability of the Control Room Emergency Lighting Units to provide limited illumination upon loss of the Essential Lighting System, and to provide a format for tabulation of Technical Procedures (TPs) performed on system components during startup testing.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Normal and essential 480 volt AC and 125 volt DC power is available. Required test instruments are calibrated and controls are operable.

Test Method - The Station Battery Lighting System and Control Room Emergency Lighting System are tested by interrupting normal power supply feeds and verifying proper switchover from normal to emergency power.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design document.

A11.1 STATION SERVICE WATER SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the capability of Station Service Water System to provide cooling water to connected components/systems.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. Water supply from the cooling tower is available.

Test Method - System operation is initiated normally. The system is operated in the different design modes and Service Water Pump performance is determined. Required controls are operated or simulated signals are applied to verify automatic features, system interlocks and alarms.

Acceptable Criteria - The system performance parameters are in accordance with applicable design documents.

A15.1 TBCCW SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate proper operation of the TBCCW system, specifically to furnish cooling water to miscellaneous turbine plant heat exchangers, coolers, and chillers, and to demonstrate the ability of a standby pump to automatically replace the operating pump in case of pressure loss in the header.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available to energize the necessary 480 volt motor control centers. Required instruments are calibrated and controls are available. The service water system is available. The instrument air system is available.

Test Method - The system operation is initiated manually, and where applicable automatically. The system is operated in the system design modes and TBCCW pumps performance is determined. Required controls are operated or simulated to verify automatic system functions and alarms.

Acceptance Criteria

1) Each of the two TBCCW pumps is capable of delivering a minimum flow of 292.5 gpm.
2) With one pump in operation, the standby pump starts automatically at a low header pressure of less than or equal to 70 psig.
3) The TBCCW system provides cooling water to the following:

    a) Control rod drive pump bearing and oil coolers
    b) Condensate pump motor bearing coolers
    c) Instrument air compressor coolers
    d) Service air compressor coolers
    e) EHC fluid coolers
    f) Turbine Building sample station chillers
    g) Auxiliary Boiler sample station chillers

A18.1 INSTRUMENT AIR SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Instrument Air System. Specific objectives are to demonstrate the following:

1) The ability of the Instrument Air System to provide air to outlets located throughout the plant.
2) System controls function in accordance with design intent.
3) Alarms function properly to provide alert of an abnormality in the Instrument Air System.

4) Instrument air dryers reduce instrument air moisture in accordance with design requirements.
5) Standby Instrument Air Unit, under AUTO Mode, starts automatically when the system pressure is down.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct the test. The system has been walked through, verified complete and air blowing has been completed. The required Technical Tests have been completed and the required instruments are calibrated.

Test Method - Both compressors are fully tested in both Manual and Auto mode of operation. The Dryer packages are tested for effectiveness and all automatic trips and alarms are verified.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A19.1 SERVICE AIR SYSTEM ACCEPTANCE TEST

Test Objectives - The objectives of this test are as follows:

1) To demonstrate that the compressors can provide pressurized air (115-130 psig) to outlets located throughout the plant.
2) To demonstrate that system controls and alarms function in accordance with the design intent.
3) To demonstrate that the standby compressor will start automatically if the system pressure is low.

Prerequisites - The prerequisites of this test are as follows:

1) Construction is complete to the extent necessary to conduct this test and system is turned over to ISG.
2) All component inspections, tests and calibrations have been completed satisfactorily.

Test Method - The system will be pressurized by starting the compressors. Compressor modes and functions will be checked for proper operation. Alarms will be verified as they are induced during normal operation or simulation.

Acceptance Criteria -

1) The service air compressors have the capacity to deliver 440 scfm of air each and provide air to outlets located throughout plant.
2) The compressors will automatically trip when an abnormal condition exists and alarms perform their design function.
3) The standby compressor will automatically start if the lead compressor fails or if its operation cannot meet service air system demand.
4) The Service Air System is capable of providing backup supply to the Instrument Air System

A20.1 BUILDING DRAINS - NON RADIOACTIVE ACCEPTANCE TEST

Test Objectives - The objectives of this test are as follows:

1) To demonstrate that system controls and alarms function in accordance with the design intent.
2) To demonstrate the waste filter is capable of automatically dewatering sludge.
3) To demonstrate the diesel generator floor drain sump pumps operate automatically.

Prerequisites - Construction is complete to the necessary extent and the system is turned over to ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply systems are available. Instrument air is available.

Test Method - Low, High and High-High sump levels are simulated to verify pumps start and stop as required.

Acceptance Criteria - The system performs in accordance with design documents.

A22.1 MAKEUP DEMINERALIZER SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the capability of the Makeup Demineralizer System to provide quality water consistent with the requirements of the Final Safety Analysis Report.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. All instrumentation contained in this system is calibrated and the controls are operational. The Water Pretreatment System and the Neutralization Basins are available.

Test Method - A normal, automatic regeneration of makeup demineralizers shall be performed verifying all regeneration sequence interlocks and verifying that the Makeup Demineralizer conforms to FSAR requirements.

All interlocks shall be verified that will remove the Makeup Demineralizer from service upon its effluent water quality not meeting specifications.

Acceptance Criteria - The Makeup Demineralizer shall be capable of making water in accordance with FSAR requirements at a flow rate between 20 and 120 gpm. It shall also be capable of performing automatic shutdowns, startups and regenerations per its design requirements.

A30.3 CONTROL STRUCTURE MISCELLANEOUS H&V SYSTEM ACCEPTANCE TEST

Test Objectives - To demonstrate that the Control Structure Miscellaneous H&V maintains temperature and delivers an adequate air supply and exhaust to various areas in accordance with design requirements.

Prerequisites - Construction is complete and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The Turbine Building Vent and Instrument Air Systems are in service. Required electrical power supply systems are available.

Test Method - The system operation is initiated manually and fan performance, damper operations and heating or cooling operation (where applicable) are determined. Required controls are operated or simulated signals are applied to verify fan interlocks, high-high temperature from charcoal filters (where applicable), electric duct heater operation and associated alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A31.1 COMPUTER UNINTERRUPTABLE POWER SUPPLY ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Computer Uninterruptable Power Supply. Specific objectives are to demonstrate the following:

1) The ability of the static transfer switch to provide automatic transfer of the 120 VAC distribution panel loads from the preferred to the alternate supply on loss of the preferred supply or overcurrent or in case of load side fault.
2) The ability of the manual transfer switch and manual operation of the static transfer switch to transfer distribution panel loads between the preferred and the alternate source.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct this test. The system has been walked through and verified complete. The required Technical Tests have been completed and the required instruments are calibrated.

Test Method - The power supply is operated at full load, the static transfer switch is tested, the manual transfer is tested and all alarms and computer inputs associated with the system are verified.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A31.2 PROCESS COMPUTER ACCEPTANCE TEST

Test Objective - The objective of this test is to demonstrate proper operation of the computer. Specific objectives are to demonstrate the ability of the DCS to monitor unit operation and generate video displays for operator use; the PMS to perform BOP calculations, log data, make historical records, generate video displays and generate alarm status summary displays; the NSS subsystem program to provide an accurate determination of the core thermal performance and data loading, and to supplement procedural requirements for control and manipulation during reactor startup and shutdown.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct this test. The system has been walked through and verified complete. The required Technical Tests have been completed and the required instruments are calibrated.

Test Method - Computer inputs are verified, the software programs are tested and computer self-protection and alarm functions are verified.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A32.1 SECURITY 125V DC SYSTEM NO. 1 ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the 125 Volt DC system to perform the following:

1) The batteries can endure a complete discharge based on their ampere hour rating without exceeding the battery bank minimum voltage limit.
2) The batteries can provide reliable stored energy to selected loads in the event of a loss of normal power.
3) The battery chargers can deliver their rated output.
4) The battery chargers can fully charge their associated batteries from design minimum charged state simultaneously providing power to the distribution panels for normal security loads.
5) That the alarms are simulated and verified to operate properly.
6) The reliable 125V DC power is delivered to the security DC distribution panel.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instruments, protective devices, and breakers is verified. 480V AC Power, Resistor Load Bank, Battery Room Ventilation and Emergency Eyewash is available and/or in service.

Test Method - The Battery Performance Test is manually initiated by connecting the battery bank to the resistor load bank and discharging the batteries at a constant current for a specified period of time. The Battery Service Test is manually initiated by connecting the battery bank to the resistor load bank and simulating, as closely as possible, the load the batteries will supply during a design basis accident. Then the battery charger is connected to the batteries and the distribution-panels to verify that they can charge the batteries while simultaneously providing power to the normal security loads. The battery charger is also connected to the resistor load bank and current is increased to its maximum rating with the charger isolated from its associated battery bank. Alarms are simulated and verified to be operated properly.

Acceptance Criteria - The batteries can satisfactorily deliver stored energy for the specified amount of time as required for the Performance and Service Test. The battery chargers can deliver rated output and can charge their associated battery bank from minimum voltage to a fully charged state in a specified amount of time while simultaneously supplying normal security loads. The alarms operate at their engineered setpoints and annunciate in the Security Control Center.

A32.2 SECURITY UNINTERRUPTABLE POWER SUPPLY NO. 1 ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Security Uninterruptable Power Supply. Specific objectives are to demonstrate the following:

1) The ability of the static transfer switch to provide automatic transfer of the 120 V AC distribution panel loads from the preferred to the alternate supply on loss of the preferred supply or overcurrent or in case of load side fault.

2) The ability of the manual transfer switch and manual operation of the static transfer switch to transfer distribution panel loads between the preferred and the alternate source.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct this test. The system has been walked through and verified complete. The required Technical Tests have been completed and the required instruments are calibrated.

Test Method - The power supply is operated at full load, the static transfer switch is tested, the manual transfer is tested and all alarms associated with the system are verified.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A32.4 SECURITY BACKUP DIESEL AND ASSOCIATED 480 VOLT DISTRIBUTION ACCEPTANCE TEST

Test Objective - To demonstrate system reliability, proper voltage and frequency regulation under transient and steady-state conditions, proper logic, correct setpoints for trip devices, and proper operation of initiating devices and permissive and prohibit interlocks. Starting, cooling, heating, ventilating, lubricating and fueling auxiliary systems will also be tested to demonstrate that their performance is in accordance with design.

To demonstrate the capability of the 480 Volt Load Centers and 480 Volt Motor Control Centers systems to provide electrical power to connected 480 Volt Load Centers and Motor Control Centers by demonstrating the proper operation of breakers, transfer and trip devices, relaying and logic, permissive and prohibit interlocks, instrumentation and alarms.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. 24 Volt DC Power is available. The diesel oil day tank is filled and a make-up source is available.

Required electrical power supply systems are available to energize the 480 Volt system. Required instruments and protective relays are calibrated and controls are operable.

Test Method - System operation is initiated manually and diesel generator capability to start and attain rated voltage within the specified time are verified. Diesel generator is loaded to the rated load and the performance is determined. Required controls are operated to verify automatic start, D-G protection.

Feeder breakers are opened and closed by operating or simulating controls. Voltage on the bus being fed are measured to verify breaker operations, relaying and logic, permissive and prohibit interlocks and alarms. Signals are applied to verify alarms and instrumentation. Buses are de-energized and energized to verify automatic transfer, switch transfer, and re-transfer and motor-generator set operation.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

A32.9 SECURITY 125 V DC AND UNINTERRUPTABLE POWER SUPPLY No. 2 ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the 125 Volt DC system to perform the following:

1) The batteries can endure a complete discharge, based on their ampere hour rating, without exceeding the battery bank minimum voltage limit.
2) The batteries can provide reliable stored energy to selected loads in the event of a design basis accident.
3) The battery chargers can deliver their rated output.
4) The battery chargers can fully charge their associated batteries from design minimum charged state simultaneously providing power to the distribution panels for normal security loads.
5) That the alarms operate and annunciate at their specified abnormal condition.
6) The reliable 125 V DC power is delivered to the security DC distribution panel.
7) The ability of the static transfer switch to provide automatic transfer of the 120 V AC distribution panel loads from the preferred to the alternate supply on loss of the preferred supply or overcurrent or in case of load side side fault.
8) The ability of the manual transfer switch and manual operation of the static transfer switch to transfer distribution panel loads between the preferred and the alternate source.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instruments, protective devices, and breakers is verified. 480 V AC Power, Resistor Load Bank, Battery Room Ventilation and Emergency Eyewash is available and/or in service.

Test Method - The Battery Performance Test is manually initiated by connecting the battery bank to the resistor load bank and discharging the batteries at a constant current for a specified period of time. The Battery Service Test is manually initiated by connecting the battery bank to the resistor load bank and simulating, as closely as possible, the load the batteries will supply during a design basis accident. Then the battery charger is connected to the batteries and the distribution panels to verify that they can charge the batteries while simultaneously providing power to the normal security loads. The battery charger is also connected to the resistor load bank and current is increased at its maximum rating with the charger isolated from its associated battery bank. Alarms are simulated and verified to be operated properly. The power supply is operated at full load, the static transfer switch is tested, the manual transfer is tested.

Acceptance Criteria - The batteries can satisfactorily deliver stored energy for the specified amount of time as required for the Performance and Service Test. The battery chargers can deliver rated output and can charge their associated battery bank from minimum voltage to a fully charged state in a specified amount of time while simultaneously supplying normal plant loads. The alarms operate at their engineered setpoints and annunciate in the Security Control Center. The system performance parameters are in accordance with applicable engineering design documents.

A33.1 TURBINE BUILDING HEATING & VENTILATING SYSTEM ACCEPTANCE TEST

Test Objectives - The objectives of this test are as follows:

1) To provide filtered and tempered air to all areas of the Turbine Building.
2) To maintain air flow from areas of lesser potential contamination to areas of greater potential contamination.
3) To exhaust air from potentially contaminated spaces to particulate and charcoal filters.
4) To maintain the Turbine Building at a slightly negative pressure with respect to atmosphere to minimize exfiltration to outside atmosphere.
5) To recirculate and cool Turbine Building air to reduce exhaust volume.
6) To discharge all exhaust air through the Turbine Building Exhaust Vent.
7) To supply cool air to the Reactor Recirculation Motor - Generator sets.

Prerequisites

1) Flow balancing is completed
2) Instrument Air System is operational.
3) Fire Protection System is operational.

Test Method - The system will be tested with manual controls and automatically where applicable. All interlocks, start and trip schemes will also be verified.

Acceptance Criteria -

1) Maintain building temperature above 40°F.
2) Maintain building spaces below the following maximum temperatures:

    a) General areas 104°F
    b) Electrical rooms 104°F
    c) Mechanical areas 120°F

A33.2 TURBINE BUILDING CHILLED WATER SYSTEM ACCEPTANCE TEST

Test Objectives - The objectives of this test are as follows:

1) To demonstrate the ability of the Turbine Building Chilled Water System to maintain design temperature.
2) To demonstrate the ability of the Service Water System to remove the chiller condenser heat.

Prerequisites

1) Construction is complete to the extent required to complete this test.
2) The following systems are operational:

    a) Instrument Air System
    b) Turbine Building H&V is functionally checked
    c) Service Water System
    d) Makeup Demineralizers
    e) Expansion tank IT-123 is filled halfway and pressurized to 20 psi

Test Method - The system will be initiated manually and automatically with all automatic functions verified. All interlocks will be verified and alarms checked as they occur during normal process variation.

Acceptance Criteria - Turbine Building Chilled Water System will supply water at 50°F.

A35.1 FUEL POOL COOLING AND CLEANUP SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate that the Fuel Pool Cooling and Cleanup System filters, demineralizes and cools the fuel pool water. The system is able to maintain a minimum differential pressure in the heat exchangers and will prevent siphoning of water from the fuel pool to any cooling water supply line.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. The Demineralized Water Transfer System, Service Water System, Sample System, Condensate System, Instrument Air System, Residual Heat Removal System, Liquid Radwaste Drain System, Emergency Service Water System, Solid Radwaste System and required electrical power supply systems are available.

Test Method - The system is operated to demonstrate the demineralizer heat exchangers and fuel pool cooling pumps operation. Required controls are operated or simulated signals are applied to verify system operation, automatic valve alignment and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design requirements.

A37.1 DEMINERALIZED WATER TRANSFER SYSTEM ACCEPTANCE TEST

Test Objectives - To demonstrate proper operation of the Demineralized Water Transfer system by verifying the following: The ability to supply condensate for various plant systems, including the condenser hotwells. The ability to supply condensate to the suction of the high pressure coolant injection(HPCI), reactor core isolation cooling (RCIC), core spray, and control rod drive (CRD) pumps. The ability to supply demineralized water as makeup to the reactor, radwaste, and closed coolant systems. The ability to supply demineralized water to the condensate storage tank & refueling water storage tank.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Hydrostatic testing, velocity flushing and air blowing have been complete to the extent required to perform this test. Required instruments are calibrated and controls are operable. Required electrical power supply systems, makeup demineralizers, and instrument air are available. The associated plant systems which are capable of receiving water from the Demineralized Water System are available to the extent required to perform this test.

Test Method - The operating modes of this system are initiated manually and, where applicable, automatically. The system is operated to determine performance of all pumps. Control devices are operated or simulated signals are applied to verify system automatic functions and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents. All automatic trips and alarms actuate within their allowable limits.

A38.1 LOW PRESSURE AIR SYSTEM ACCEPTANCE TEST

Test Objectives - The objective of this test is to demonstrate proper operation of the Low Pressure Air System; specifically to demonstrate the ability to provide air for the liquid radwaste filters, and the liquid radwaste demineralizers, as these processes require. The ability to provide backup air to the cement silo and to operate intermittently on demand is demonstrated. The protection of the compressor against low oil pressure, high oil temperature, high air discharge temperature, high cooling water temperature and low cooling water pressure is demonstrated.

Prerequisites - Construction is complete to the extent necessary to perform the test and the system is turned over to the ISG. Required instruments are calibrated and Technical Tests are complete.

Test Method - The system is operated in the Manual and Automatic modes of operation. The Flow Rate is verified and all trips and alarms are tested.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A39.1 CONDENSATE DEMINERALIZER SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the Condensate Demineralizer System to process full condensate flow producing effluent of acceptable quality thereby providing reasonable assurance that contaminants which may be introduced to the condenser during normal and abnormal plant operation will be removed. Also demonstrate that resin transfer, cleaning and regeneration are pushbutton initiated, fully automatic processes that clean and regenerate for reuse. Demonstrate valving and controls are such that a ready standby unit can be placed in service, or any operating unit can be taken out of service from the local control panels.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Component technical procedures, component calibrations have been completed satisfactorily.

Test Method - The system will be tested while processing water at 100% rated flow and at 120% rated flow, verifying that monitored influent and effluent parameters do not exceed design values. Resin capacity will be tested (one bed minimum) by processing the design quantity of water and verifying that monitored effluent parameters do not exceed design values prior to achieving the design output. Control functions related to all modes of operation shall be demonstrated. Flow paths will be verified under actual operation as will all valve operations, motor-driven equipment performance, demonstration of all monitoring control and support equipment while processing dirty, exhausted resin charges exposed to condensate flow, through the regeneration modes, returning the resin charge to inservice processing condensate to design quality effluent. Simulation of functions will be used where off-normal conditions

cannot be established or redundant testing of the same function under actual conditions serves no purpose.

Acceptance Criteria - Each vessel passing rated flow will produce water quality at design spec or better. Each vessel is capable of passing 120% rated flow for a short period of time. The condensate demineralizer and regeneration systems are pushbutton initiated, automatically controlled from a local control panel for all modes of operation. An automatically controlled isolation valve protects the resin transfer system from condensate system pressure. A proper concentration of acid solution is supplied to regenerate the cation resins and the proper concentrations of caustic solution at the proper temperature is supplied to regenerate the anion resins.

A40.1 LUBE OIL TRANSFER, STORAGE, & PURIFICATION SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the system to transfer lube oil from one lube oil reservoir to another at rated flowrates and to demonstrate proper operation of the controls and the alarms of the lube oil centrifuge.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and the controls are operable. Demineralized water transfer system and Instrument air system are operational. Required electrical supply systems are available and lube oil is available in sufficient quantity.

Test Method - The lube oil transfer pump performance parameters are measured and recorded. The batch oil tank pump performance parameters are measured and recorded. The centrifuge and oil heaters control and alarm circuits are tested and the operating parameters are measured and recorded. All flowpaths are then verified.

Acceptance Criteria - The system performance is in accordance with the applicable design documents.

A41.1 MAIN COOLING TOWER AND AUXILIARIES ACCEPTANCE TEST

Test Objectives - To demonstrate the proper operation of the cooling tower, cooling tower makeup and level control, chlorination system, sulfuric acid addition system, and the blowdown treatment system.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG.

Required instruments are calibrated and controls are operable. Required electrical power supply systems, instrument air system, plant makeup water system, and chlorination building H&V are available.

Test Method - Sliding gate valves and bypass valve operation is verified. Makeup system is verified to keep basin water level at the proper level. Chlorination addition capabilities are verified, and the acid system is verified to control pH at the proper value. The blowdown

treatment system will remove enough chlorine to allow the plant to meet the requirements of its environmental discharge permit.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A42.1 CIRCULATING WATER SYSTEM ACCEPTANCE TEST

Test Objectives - To demonstrate proper operation of the Circulating Water System.

Prerequisites - Construction is complete to the extent necessary to run this test and the system is turned over to the ISG.

Required instruments are calibrated and controls are operable. Required electrical power supply systems and the cooling tower system are available.

Test Method - Pump protective interlocks and system design pressures and flows are verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A43.1 MAIN CONDENSER AIR REMOVAL SYSTEM ACCEPTANCE TEST

Test Objectives - The objectives of this test are as follows:

1) To demonstrate the ability of the mechanical vacuum pump to pull a vacuum on the condenser.
2) To demonstrate the ability of the SJAE's to maintain condenser vacuum when pump is tripped.
3) To demonstrate system ability to remove noncondensible gases from the main condenser and discharge them to the off-gas system.
4) To condense any steam removed from the condenser with the noncondensible gases and return the condensate to the condenser.

Prerequisites - The prerequisites for this test are as follows:

1) Construction is complete to the extent necessary to perform this test and system is turned over to ISG.
2) The main turbine is on turning gear.
3) The auxiliary boiler is operational and the main turbine seals are established.
4) Instrument Air System is operational.
5) Turbine Bldg. H&V is operational.
6) The Condensate System is operational.
7) The Off-Gas System is operational.
8) The separator-silencer 1T-107 is filled to the proper level.
9) All steam lines are properly drained of condensate.

Test Method - A vacuum will be pulled on the condenser using the mechanical vacuum pump and it will be maintained using the SJAE's. Valve interlocks will be checked as will all automatic

functions. Alarms will be verified as they are induced during normal system change or simulation.

Acceptance Criteria -

1) The mechanical vacuum pump can pull a vacuum of 5 in. Hga in 95 min. on the main condenser.
2) The SJAE's can maintain the vacuum after the mechanical vacuum pump is shutdown.
3) Valve sequencing operates per design.

A44.1 CONDENSATE SYSTEM ACCEPTANCE TEST

Test Objectives - To demonstrate the following:

1) The ability of the condensate pumps and their associated valves to function properly.
2) The ability of the system to maintain minimum recirculation flow through each condensate pump.
3) The ability of the Turbine Building Closed Cooling Water System to provide sufficient cooling flow for the condensate pump bearings.
4) The ability of the Hotwell Load Control to maintain condenser at normal operating level.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Power and control voltage is available for the associated motors, valves and instruments. Required calibration and operation of instruments, protective devices and controls is verified. Motor bearing cooling and pump seal water and instrument air is available. Main condensers are cleaned and filled with water.

Test Method - The system operation is manually initiated by starting the condensate pumps and establishing flow through various paths. System logic, interlocks and alarms are verified to be in accordance with design intent and system flows, pressures are within engineering specifications under various simulated operating conditions.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents for the conditions simulated during the test.

A46.1 EXTRACTION STEAM SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Extraction Steam System and Feedwater Heaters - Drains and Vents System. Specific objectives are to demonstrate the following:

1) The isolation valves in the Extraction Steam System, the Feedwater Heater Drain System, and the Feedwater Heater Vents operate as required by their design.
2) All associated systems that drain to the feedwater heater systems isolate when required by the feedwater Heater System design.
3) The alarms function to provide indication of an abnormality in the system.

Prerequisites - Construction is completed to the necessary extent and the system is turned over to ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply systems are available. Plant demineralized water and instrument air is available.

Test Method - Extraction Steam and Feedwater Heater System tests are simulated and performed with no steam present to the turbine. All system interlocks are tested.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A65.1 RADWASTE BUILDING AIR FLOW SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the Radwaste Building Air Flow System to provide an adequate amount of filtered air to the Radwaste Building and to exhaust an adequate amount of air from the Radwaste Building.

Prerequisites - Construction is complete to the extent necessary for the test and the system is turned over to the ISG. 480 V power and instrument air are available. The required instruments are calibrated and controls are operable.

Test Method - The system is put into operation manually. Proper operation of all interlocks between system components is verified. The system air balance report and filter test reports are reviewed to ensure conformance with design specifications.

Acceptance Criteria - The system performs in accordance with design documents.

A65.2 RADWASTE BUILDING CHILLED WATER SYSTEM ACCEPTANCE TEST

Test Objectives - To demonstrate the ability of the Radwaste Building Chilled Water System to provide an adequate amount of chilled water to the Radwaste Building Air Supply System cooling coils.

Prerequisites - Construction is complete to the extent necessary for performing this test and the system is turned over to the ISG. 480V power and instrument air are available. The Makeup Demineralized Water System is available to provide makeup water as needed. The required instruments are calibrated and controls are operable.

Test Method - The system is placed in operation. Proper operation of all interlocks between system components is verified. All safety switches on both chillers are tested to ensure that they will shut down the associated unit when necessary. The system flow balance report is reviewed to verify that flowrates are within design specifications.

Acceptance Criteria - The system performs in accordance with design documents.

A67.1 Loose Parts Monitoring System

Test Objectives - To demonstrate that the Loose Parts Monitoring System is capable of detection of a loose part resulting in an alarm and automatically starting the tape recording equipment.

Prerequisites - Construction is complete to the extent necessary and the various systems are turned over to the ISG. Required instruments are calibrated and control schemes have been checked and are operable.

Test Method - Each Loose Part Detection (LPD) channel is tested by causing an impact on the piping monitored and verification that a corresponding visual alarm is activated. The Digital Loose Part Location (DLPL) is functionally tested by placing any two LPDs in alarm test condition and then verifying that the DLPL visible and audible alarms annunciator are activated and that the tape recorder starts recording the signal on the alarming channel.

Acceptance Criteria - A predetermined impact on a specified coolant piping will result in a corresponding visual alarm. A series of impacts, based on the logic indicating a loose part, will initiate an audible and visual alarm and the tape recorder will start automatically.

A68.1 RADWASTE SOLIDS HANDLING SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the capability of the Radwaste Solids Handling System to control, collect, handle, process, package, solidify and temporarily store the wet waste sludges, spent resins and evaporator concentrates.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.
Test Method - System operation is initiated manually. Required controls are operated and process is varied to verify interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A68.2 SPENT RESIN HANDLING SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the capability of the spent resin collection system to control, collect, handle and discharge spent resin to the liquid radwaste filters.

The Prerequisites, Test Method, and Acceptance criteria are the same as those for A68.1.

A69.2 LIQUID RADWASTE SUBSYSTEMS ACCEPTANCE TEST

Test Objective - To demonstrate the capability of the subsystems to collect, process, store and monitor for reuse or disposal all potentially radioactive liquid waste.

Prerequisites - Construction is complete to the extent necessary to perform this test and the subsystems are turned over to the ISG. Required instruments are calibrated and controls are

operable. Required Electrical Power Supply Systems are available. Liquid radwaste subsystem storage tanks and sample tanks are available to be filled with water.

Test Method - Subsystem pumps are operated and performance characteristics are determined. Level controls are operated to verify alarms, pump starts and pump shutoffs. Performance of the liquid radwaste filtration, demineralization, chemical waste neutralization, chemical radwaste evaporation system, laundry radwaste filtration and effluent isolation is determined to the extent possible during this test.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A71.1 GASEOUS RADWASTE RECOMBINER CCW ACCEPTANCE TEST

Test Objective - To demonstrate the proper operation of the GRRCCW system, specifically, that the cooling pumps supply the rated flow to the system, the cooling water is temperature controlled, and the chemical addition tank has flow capabilities for adding chemicals to the system.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available. Required instruments are calibrated and controls are available. The instrument air system is available. The service water system is operational and lined up to the GRRCCW heat exchangers.

Test Method - The system operation is initiated manually, and where applicable automatically. The system is operated in the system design modes and GRRCCW pumps performance is determined. Required controls are operated or simulated to verify automatic system functions and alarms.

Acceptance Criteria - The Unit One (1) and Common cooling water flow through the heat exchangers is temperature controlled through a range of 90° to 120°F. The Unit One (1) and common cooling water pumps deliver 1124 gpm to the respective system. Chemicals can be added to the system when flow is established through the Unit One (1) and common chemical addition tanks.

A72.1 OFF GAS RECOMBINER SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the operation of the Off-Gas Recombiner System, specifically, that the system will operate in the standby, pre-start and process modes and that the standby recombiner can be brought on line within 10 minutes.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available. Required instruments are calibrated and controls are available. The instrument air system is operational. The following systems are operational as needed: Condensate system, GRRCCW System, RBCCW, Auxiliary Boiler, and Main Condenser.

Test Method - The system operation is initiated manually, and, where applicable, automatically. The system is operated in the system design modes, required controls are operated or simulated to verify automatic system functions and alarms.

Acceptance Criteria - The Unit I and common Off-Gas Recombiner Systems perform the following:

1) The Off Gas Recombiner System will operate in the Standby, Prestart and Process modes.
2) A standby recombiner can maintain recombiner temperature close to 300°F and can be brought on line in 10 minutes.

3) The Off Gas Recombiners can be transferred and shut down locally and from the main control room.
4) The Charcoal Absorber subtrains are capable of being transferred and isolated locally and from the main control room.

A74.1 NITROGEN STORAGE AND SUPPLY SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the capability of the Nitrogen Storage and Supply to provide and control the supply of nitrogen gas for primary containment purging and to maintain an inert atmosphere in containment.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - System operation is initiated manually. The system is operated in the different design modes, system performance is determined and a purge flow will be established to demonstrate proper operation. Required controls are operated or simulated signals are applied to verify automatic features, system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

A76.2 PROCESS SAMPLING SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate proper operation of the Process Sampling System. This is performed by proving:

1) The operability of the reactor and turbine building water chillers and rough and trim coolers.
2) The ability of the sample station hood to control out-leakage when drawing grab samples.
3) The ability of the system to provide required monitoring of sample fluids.
4) Capability of obtaining grab samples.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instrumentation is calibrated and controls are operable.

Required electrical power supply systems are available. Plant demineralized water is available. Turbine Bldg. and Reactor Bldg. closed cooling water is available.

Test Method - Tests whenever feasible will be performed when the process being sampled is in operation. Other tests, such as main steam samples, will be simulated. All sampling devices will be calibrated and alarm conditions set.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A84.1 MOISTURE SEPARATORS ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the moisture separator drain tank level controls to maintain level and provide a main turbine trip signal as a result of high level.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Hydrostatic testing, velocity flushing and air blowing have been completed. Required instruments are calibrated and controls are operable. Required electrical power supplies, water supplies and instrument air are available. The associated plant systems which are capable of receiving water are available to the extent necessary to perform this test.

Test Method - The water level in the drain tank will actually be varied and the proper operation of the level controls, level alarms and level trips will be verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents. All automatic trips and alarms actuate within their allowable limits.

A85.2 FREEZE PROTECTION SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the system to supply and interrupt power to the individual heater circuits at the correct voltage and current in both the AUTO and MANUAL modes of operation and to demonstrate the system's ability to detect a loss of source supply voltage on a faulty heater circuit.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. The required instruments are calibrated and the controls are operable.

Test Method - Each control panel is energized and proper source supply voltage verified. The required controls will be operated and signals simulated as necessary to verify the individual heater circuits function per design in the AUTO, OFF, and Manual modes, and are providing the design specified heat requirements for the applications.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents, technical spec's. and vendor prints.

A91.1 ANNUNCIATOR SYSTEM ACCEPTANCE TEST

Test Objective - The objective of this test is to demonstrate the ability of the main control room annunciators to provide audible and visual indication of an alarm condition.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct this test. The system has been walked through, verified complete and the component technical tests have been completed.

Test Method - Simulated alarms are applied and the audible and visual indication verified. Annunciator loss of power and ground detection feature are also tested, where applicable.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A92.1 TURBINE STEAM SEALS & DRAINS ACCEPTANCE TEST

Test Objective - The objective of this test is to demonstrate the proper operation of the turbine steam seal system and drains using the auxiliary boiler steam supply to the turbine steam seal header. Also, the test will demonstrate the ability of the steam packing exhauster to maintain a proper vacuum on the steam seal exhaust header.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical supply systems are available. The instrument air system is operational. The auxiliary boilers are available and in the standby mode. The condensate system is operational. The main turbine and feedwater turbines are available to be placed on turning gear. The main condensers are lined up to receive drains and to provide support to seal the main and reactor feed pump turbines.

Test Method - The auxiliary boilers will provide a continuous and regulated supply of steam to the steam seal evaporator header. The performance of the steam packing exhauster to maintain a proper vacuum on the exhaust header is verified. Simulated and automatic signals are applied to verify system interlocks and alarms for the seal steam evaporator drain tank, seal steam system and steam packing exhauster.

Acceptance Criteria - The steam packing exhauster will maintain an approximate vacuum of 5.0 inches H_2O on the seal steam evaporator exhaust header during normal operating conditions. The auxiliary steam system can provide a continuous amount of clean steam to the seal steam evaporator header at approximately 4 psig to supply the following with sealing steam: the main turbine shaft seals, the stem packings of the main steam stop valves, control valves, and bypass valves, the combined intermediate valves, the shaft seals of the reactor feed pump turbines, and the stem packings of the reactor feed pump turbine stop and control valves.

A93.1 TURBINE LUBE OIL SYSTEM ACCEPTANCE TEST

Test Objectives - To demonstrate the proper operation of the Turbine Lube Oil System.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls operable. Required electrical power supply systems are available. The Service Water System and the Main Turbine-Generator Assembly is available.

Test Method - System operation is initiated manually and automatically testing all trips and interlocks. The main reservoir vapor extractor is tested manually and automatically to verify proper vacuum in the main reservoir and isolation on detection of fire. All main lube oil pumps are tested for proper manual and automatic start to verify proper bearing oil supply pressures during all conditions including loss of AC power. Bearing lift pumps are tested manually and automatically to verify proper bearing lift for turning gear operation. The main turbine turning gear is tested for both manual and auto engaging and starting to ensure proper rotation during shaft cooldown.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A93.2 TURBINE VALVES, VALVE TEST, EHC AND SUPERVISORY SYSTEMS ACCEPTANCE TEST

Test Objectives - To demonstrate the proper operation of the turbine EHC and supervisory system.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls operable. Required electrical power supply systems are available. The Main Condenser, Stator Cooling and Instrument Air Systems are available.

Test Method - Hydraulic System Manual and Automatic Modes are tested. All turbine trip paths are verified. All system stop, control and bypass valves are tested for EHC operation. Turbine warm-up, speed select, and load ramp functions are verified. Turbine steam lead drain valves are tested for proper operation.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A98.1 MAIN GENERATOR AND EXCITATION SYSTEM ACCEPTANCE TEST

Test Objectives - To demonstrate the ability of the protective relays and their associated interlocks to shutdown the generator.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Component calibrations and alarm verifications are complete to the extent necessary to perform this test.

Test Method - Through the use of jumpers, lifted leads, pulled fuses, and manual manipulation of relay contacts conditions are simulated to initiate automatic responses of the generator protection circuitry. Proper operation of the generator protection circuitry is verified.

Acceptance Criteria - The following is verified:

1) The ability of the voltage regulator to transfer from auto to manual upon initiation of design events.
2) The ability of the exciter field breaker to function according to design basis events.
3) The ability of the primary and backup lockout relays to trip the generator upon initiation of design basis events.

A99.2 Communications System Acceptance Test

Test Objective - To demonstrate the ability of the three part communications system (PA, Plant Maint./Test Jack, and Plant Evacuation and Alarm Systems) components to function as an integrated system. The PA system to provide communications and a medium for transmitting plant alarms in conjunction with the Plant Evacuation Alarm System. The Plant Evacuation Systems ability to generate the necessary tones and frequencies and the Plant Maint./Test Jack Systems ability to provide an additional independent means of communication.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. The required instruments are calibrated and the controls are operable.

Test Method - By operating the required controls each Public Address station will be tested in the transmit and receive modes on all channels. The associated speakers will be tested for functional audibility. The systems loop separation and muting features will be operationally verified.

The Plant Maint./Test Jack System will be tested by operating the required controls and verifying each Jack Stations transmit/receive capability on all of the systems 23 channels. An integrated test with several remote Jack Stations attached will also be performed.

The Plant Evacuation and Alarm System will be used in conjunction with the PA system to broadcast all 5 of the possible tones and frequencies generated by the system. Also the systems isolation and silencing features will be operationally verified.

Acceptance Criteria - The systems performance is in accordance with the applicable design documents.

A99.6 Seismographical Monitoring System Acceptance Test

Test Objective - To verify the operability of the seismic monitoring instrumentation (digital cassette accelerographs, playback unit, response spectrum analyzer and triaxial accelerometers) and to demonstrate proper integrated response of the system to activate upon occurrence of a seismic event as designed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The required electrical power supply system is available. All recorders have ample paper and all accelerographs are loaded with the proper magnetic tape cassettes.

Test Method - Both an internal calibration feature on the SMR-102 (seismic monitoring recorder) and a simulated seismic event at each triaxial accelerometer are used as "trigger input" to the seismic monitoring system to verify automatic initiation and alarm actuations. Playback (production of time-history seismic graphs) is demonstrated by manual transfer of cassette tapes from the digital cassette accelerographs to the seismic monitoring recorder.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

14.2.12.4 Unit 2 Preoperational Test Procedure Abstracts

(P202.1) 125 Volt DC System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the 125 Volt DC System. Specific objectives are to demonstrate the following:

1) The ability of the 125 Volt DC System batteries - Channels A, B, C and D - to provide stored energy to supply power to selected loads in the event of a loss of all AC power at the station.
2) The ability of the 125 Volt DC System battery chargers to provide power as required for station operation while simultaneously charging and maintaining the charge of the 125 Volt DC batteries when station AC power is available.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instruments, protective devices, and breakers is verified. 480V AC Power, Resistor Load Bank, Battery Room Ventilation and Emergency Eyewash is available and/or in service.

Test Method - The Battery Performance Test is manually initiated by connecting the battery bank to the resistor load bank and discharging the batteries at a constant current for a specified period of time. The Battery Service Test is manually initiated by connecting the battery bank to the resistor load bank and simulating, as closely as possible, the load the batteries will supply during a design base accident. Then the battery charger is connected to the batteries and the distribution panels to verify that they can charge the batteries while simultaneously providing power to the normal plant loads. The battery charger is also connected to the resistor load bank and current is increased to its maximum rating with the charger isolated from its associated battery bank. Alarms are simulated and verified to be operated properly.

Acceptance Criteria - The batteries can satisfactorily deliver stored energy for the specified amount of time as required for the Performance and Service Test. The battery chargers can deliver rated output and can charge their associated battery bank from minimum voltage to a fully charged state in a specified amount of time while simultaneously supplying normal plant loads. The alarms operate at their engineered setpoints and annunciate in the Control Room.

(P204.1) 4.16 kV System Preoperational Test

Test Objective - The Unit 2 4.16kV System was tested during Unit 1 Preoperational Test P 4.1. The objective of this test is to document those items left open when the Unit 1 4.16kv System completed preoperational testing.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems including 125 volt dc systems are operable.

Test Method - The 4.16 kV system is energized. Required controls are operated or simulated signals are applied to verify proper operation of protective devices, relaying and logic, transfer and trip devices, permissive and prohibit interlocks, instrumentation and alarms, breakers, switchgear, transformers and cables.

Acceptance Criteria - None.

(P205.1) ESS 480 Volt Load Center Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Engineered Safeguards System (ESS) 480 volt load centers. Specific objectives are to demonstrate the following:

1) Capability of high voltage breakers to provide electrical power to their respective ESS load center transformers.
2) Capability of ESS load center transformers to provide electrical power to their respective ESS 480 volt load centers.
3) Proper operation of instrumentation, controls and alarms.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available to energize the 480 Volt system. Required instruments and protective relays are calibrated and controls are operable.

Test Method - Feeder breakers are opened and closed by operating or simulating controls. Voltages on the bus being fed are measured to verify breaker operations, relaying and logic, permissive and prohibit interlocks and alarms. Signals are applied to verify alarms and instrumentation. Buses are de-energized and energized to verify automatic transfer and re-transfer.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P205.2) Non-ESS 480 Volt Load Centers Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Non-Engineering Safeguards System (Non-ESS) 480 volt load centers. Specific objectives are to demonstrate the following:

1) Capability of high voltage breakers to provide electrical power to their respective Non-ESS load center transformers.
2) Capability of Non-ESS load center transformers to provide electrical power to their respective Non-ESS 480 volt load centers.
3) Capability of Non-ESS 480 volt double-ended load centers to manually transfer electrical power between ends without momentarily paralleling transformers at both ends.
4) Proper operation of instrumentation and controls.

Prerequisites - Construction is completed to the extent necessary to perform the test and the system is turned over to ISG. Required electrical power supply systems are available to energize the 480 volt system. Required instruments and protective relays are calibrated and controls are operable.

Test Method - The 4.16kV system is energized. Required controls are operated or simulated signals are applied to verify proper operation of protective devices, relaying and logic, transfer and trip devices, permissive and prohibit interlocks, instrumentation and alarms, breakers, switchgear, transformers and cables.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P205.3) ESS 480 Volt MCC Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the ESS 480 V MCC and Auxiliaries. Specific objectives are to demonstrate the following:

1) Capability of 480 volt 3 phase power to be delivered at the buses of the 480 volt Engineered Safeguards System (ESS) motor control centers in accordance with the engineering design.
2) Capability of the 480 volt ESS auto transfer switches to transfer and retransfer electrical power.
3) Capability of the 480 volt ESS swing bus MCC to receive preferred power from the M-G set or alternative power from the load center bus in the event of M-G set failure through an auto transfer switch.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available to energize the 480 volt system. Required instruments and protective relays are calibrated and controls are operated.

Test Method - The 4.16kV system is energized. Required controls are operated or simulated signals are applied to verify proper operation of protective devices, relaying and logic, transfer and trip devices, permissive and prohibit interlocks, instrumentation and alarms, breakers, switchgear, transformers and cables.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P205.4) Non-ESS 480 Volt MCC Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the non-ESS 480 volt MCC and auxiliary. The specific objectives is to demonstrate the following:

1) Capability of 480 volt 3 phase power to be delivered at the buses of the 480 volt Non-Engineered Safeguards System (non-ESS) motor control centers in accordance with the engineering design.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available to

energize the 480 volt system. Required instruments and protective relays are calibrated and controls are operable.

Test Method - The 4.16kV system is energized. Required controls are operated or simulated signals are applied to verify proper operation of protective devices, relaying and logic, transfer and trip devices, permissive and prohibit interlocks, instrumentation and alarms, breakers, switchgear, transformers and cables.

Acceptance Criteria - The system performance parameters are within applicable design documents.

(P213.1) Fire Protection Water System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Fire Protection Water System. Specific objectives are to demonstrate the following:

1) The ability of the Fire Protection Water System hose reels to operate properly.
2) The ability of the following automatic sprinkler types to respond to automatic and manual initiation:

   (a) Wet pipe sprinkler systems
   (b) Dry pipe sprinkler systems
   (c) Pre-action sprinkler systems
   (d) Deluge sprinkler systems

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operational. The river water makeup system, instrument air system, and the required electrical power supplies are available.

Test Method - The operating modes are initiated manually and, where applicable, automatically. Fire pump performance is determined for OP511 and OP512. Automatic and manual initiation of the individual sprinkler systems are conducted. Flow tests are conducted on end of line fire hydrants. Flow verification is established at the hose stations. Required controls are operated or simulated signals are applied to verify proper operation and proper alarm annunciation locally and remotely.

Acceptance Criteria - The system performance parameters are in accordance with applicable codes and design documents.

(P213.3) Fire and Smoke Detection System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Fire and Smoke Detection System. Specific objectives are to demonstrate the following:

1) The ability of the system to sense the presence of smoke (simulated) and/or fire (simulated), and to annunciate these conditions.
2) The ability of the system to supervise various circuits and annunciate trouble conditions.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. The required instruments are calibrated and controls are operational. The required electrical power supplies are available.

Test Method - The fire and smoke detector system required controls and instruments are operated or simulated signals are applied to ensure proper operation of interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable codes and design documents.

(P213.4) Halon 1301 Extinguishing System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Halon 1301 Extinguishing Systems. The specific objectives are to demonstrate the following:

1) The ability of the system to initiate a pre-alarm condition upon activation of a product-of-combustion detector.
2) The ability of the system to automatically initiate a Halon 1301 release upon activation of a thermal detector.
3) The ability of each pushbutton station to initiate a Halon 1301 release.
4) The ability of the supervisory systems to monitor the control systems for faults.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supplies are available.

Test Method - The operating modes are initiated manually and automatically. The required controls are operated or simulated signals are applied to verify system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable codes and design documents.

(P214.1) Reactor Building Closed Cooling Water System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Reactor Building Closed Cooling Water (RBCCW) System. Specific objectives are to demonstrate the following:

1) The ability of the RBCCW System to provide cooling water to equipment located in the Reactor and Radwaste Buildings during normal operation and on loss of off-site power.
2) The ability of the standby pump to automatically replace the operating pump upon loss of pressure in the header.
3) The ability of the RBCCW System to automatically furnish cooling water to the Reactor Building Chilled Water (RBCW) on loss of off-site power.
4) The ability of the containment isolation valves to close automatically upon a loss-of-coolant accident (LOCA).

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The Service Water System, Instrument Air System and a makeup water source for the RBCCW System are available.

Test Method - The system operation is initiated manually and the performance of the pumps is determined. Required controls are operated or simulated signals are applied to verify; automatic change of Service Water flow from RBCCW System with changes in the closed cycle water temperature; and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P216.1) RHR Service Water System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Residual Heat Removal Service Water System (RHRSWS) as much as possible while Unit I/II separation is installed. Specific objectives are to demonstrate the following:

1) The operability of the system valves which provide flood service water to the reactor when required.
2) The ability of the system controls to operate in accordance with design intent, i.e., to verify automatic loop/valve alignments, system interlocks and alarms.
3) The ability of the system to circulate water from the ESSW spray pond through the residual heat removal heat exchanger and back to the pond. After the Unit I/II separation is removed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The spray pond and a make-up water source to it are available. RHR Emergency Service Water is required to conduct the flow balancing test.

Test Method - System operation is initiated manually and where applicable automatically. The system is operated in the system design modes and RHR service water pump performance is determined. Required controls are operated or simulated signals are applied to verify automatic loop/valve alignments, system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P216.2) RHR Heat Exchanger Discharge Temperature Indication Preoperational Test

Test Objective - The general objective of this test is to demonstrate the proper operation of the reactor heat removal heat exchanger discharge temperature indication.

Prerequisites - Construction is complete to the extent necessary to perform this test and the RHR system has been turned over to ISG. Instrumentation has been installed and calibrated and controls are operable.

Test Method - Required controls are operated or simulated signals are applied to verify proper operation, signals, and alarms.

Acceptance Criteria - Performance parameters are in accordance with applicable design documents.

(P217.1) Instrument AC Power System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate proper operation of the Instrument AC Power System. Specific objectives are to demonstrate the following:

1) The ability of the system to provide power to the four Class 1E, Engineered Safeguard Feature (ESF) instrument load groups.
2) The ability of the system to provide power to three, non-Class 1E, miscellaneous 208/120V instrument distribution panels.
3) The ability of the system to identify a power loss to any 208/120V distribution panel.
4) That electrical independence of 1E and non-1E equipment is in accordance with design.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. The alarms operate properly, and 480V AC power is available.

Test Method - The four class 1E ESF distribution panels are energized by manually closing their respective feeder breakers. While maintaining required voltage of three distribution panels, the remaining fourth panel is de-energized to show that it is electrically independent of the other three distribution panels. (This is performed for all four distribution panels.) Also, the undervoltage alarms are checked when each panel is de-energized. The three non-class 1E distribution panels are also energized by manually closing their respective feeder breakers. The automatic transfer switch normal supply breaker is manually opened to simulate a loss of normal power and the output voltage of the distribution panel is monitored to verify that the supply voltage switched from normal to emergency in a specified time period. The emergency supply breaker is opened and the output voltage of the distribution panel is monitored to verify that output voltage is not present. The emergency supply breaker is closed and the normal supply breaker is closed to restore normal power. Output voltage is monitored to verify that supply voltage switched from emergency to normal in the specified period of time. The non-class 1E distribution panel undervoltage alarms are verified when both normal and emergency supply breakers in the automatic transfer switches are opened.

Acceptance Criteria - That reliable 120V AC Power, at design load, is supplied to all instrument buses. That loss of normal supply to the automatic transfer switches causes a shift, in a specified time period, to the emergency supply and vice-versa when normal supply voltage is restored. That the four class 1E distribution panels are electrically isolated from each other and that loss of power alarms operate and annunciate in the Control Room.

(P225.1) Primary Containment Instrument Gas System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Primary Containment Instrument Gas System. Specific objectives are to demonstrate the following:

1) The ability of the system to provide a continuous supply of filtered, dry, oil free gas at suitable pressure for operation of the main steam relief valves (with Automatic Depressurization System function) and other pneumatic devices located inside the containment.
2) The ability of a standby compressor to automatically start and support the operating compressor in case of low pressure in the header.

3) The ability of the system to override manual controls and automatically engage the standby reserve nitrogen bottles in case of gas compressor low discharge pressure or during a containment isolation actuation.
4) The ability of compressor controls and protective devices to function properly and annunciate abnormal conditions.
5) The ability of the compressor controls to trip the compressor during a LOCA coincident with a LOOP.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems, the Reactor Building Closed Cooling Water System and Instrument Air System are available.

Test Method - System operation is initiated manually to determine the performance of compressors, moisture separators, dryers and filters. Required controls are operated or simulated signals are applied to verify; instrument gas system backup, isolation on primary containment isolation signal, and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P225.2) Containment Instrument Gas Pressure Loop Preoperational Test

Test Objective - The general objective of this test is to demonstrate the proper operation of the containment instrument gas pressure loops.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system has been turned over to ISG.

Test Method - The required controls are operated or simulated signals are applied to verify proper operation, signals, and alarms.

Acceptance Criteria - Performance parameters are in accordance with appropriate design documents.

(P230.1) Control Structure H&V System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the control structure H&V system. Specific objectives are to demonstrate the following:

1) Loss of offsite power trip schemes interlock as designed with related systems.

Prerequisite - Construction is complete and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The Control Structure Chilled Water System, Instrument Air System and turbine building vent are available. Required electrical power supply systems are available.

Test Method - The system operation is initiated manually and fan performance, damper operations and heating element operation are determined. The differential pressures with respect to outside atmosphere are measured. Required controls are operated or simulated signals are applied to verify the emergency filter operation on high radiation signal, automatic

recirculation on high chlorine signal, system manual isolation and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P228.1) ESSW Pumphouse H&V System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the ESSW Pumphouse H&V System. Specific objectives are to demonstrate the following:

1) The ability of each of the ventilation fans to start automatically when its RHR service water pump starts.
2) The ability of the ventilation fans to start automatically when ambient temperature in the ESSW pumphouse increases to a predetermined level, provided that the corresponding pump is not running.
3) The ability of the ventilation fans to stop automatically, after they have been started automatically, when ambient temperature in the ESSW pumphouse decreases to a predetermined level.
4) The ability of the damper systems to respond to temperature changes in the ESSW pumphouse.
5) The ability to operate properly following a LOOP.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems and the Instrument Air System are available.

Test Method - System operation is initiated manually and the fan air flow, damper operation, heater operation and ambient conditions inside the pumphouse are determined. Required controls are operated or simulated signals are applied to verify fan(s) automatic starts with associated pump starts and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P233.4) Post-Accident 1E Power Preoperational Test

Test Objective - To demonstrate the operability of the circuit breakers for the Turbine Building Stack and Reactor Building Stack Noble Gas Sample pumps.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG.

Test Method - Component technical procedures completed and verified.

Acceptance Criteria - Component technical procedures have been completed.

(P234.1) Reactor Building H&V System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Unit II Reactor Building Heating and Ventilation (H&V) System, after the removal of the Unit I isolation boundary tags. Specific objectives are to demonstrate the following:

1) The ability of the system to isolate the required areas on receipt of a LOCA signal or high radiation signal.
2) The ability of the system to maintain the Reactor Building at a negative pressure.
3) The ability of system fans to perform in accordance with design intent.
4) The ability of the backdraft isolation dampers to automatically isolate localized areas of the H&V system.
5) The ability of the system to maintain the areas of greater potential contamination at a lower pressure than the rest of the building.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments and controls are operable. The Instrument Air System is available. Required electrical power supply systems and Reactor Building Vent are available. The Reactor Building ventilation flow balancing is complete.

Test Method - The system is operated to measure the fan performance and determine the capability to maintain the Reactor Building at negative pressure within the required thermal environment and areas of greater potential contamination at a lower pressure than the rest of the building.

Required controls are operated or simulated signals are applied to verify the system isolation on LOCA and/or high radiation signal, and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P234.2) Reactor Building Chilled Water System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Reactor Building Chilled Water System. Specific objectives are to demonstrate the following:

1) Proper operation of all alarms and interlocks.
2) Proper system flow paths and rates.
3) The ability of system automatic features to function as required.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The Reactor Building Closed Cooling Water System, Service Water System, Instrument Air System, Make-up Demineralizer Water System and required electrical power supply systems are available.

Test Method - The system is operated to demonstrate the chiller and chilled water pump operation. Required controls are operated or simulated signals are applied to verify system isolation, automatic valve alignment, equipment operation under emergency condition and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P234.3) Reactor Building Electrical Equipment Room H&V System Preoperational Test

Test Objective - The general objective of this test is to demonstrate the proper operation of the Reactor Building Electrical Equipment Room Heating and Ventilation System. Specific objectives are to demonstrate the following:

1) The ability of the system to supply cooling air to the reactor building electrical equipment room.
2) To verify the operation of the unit heater.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - System operation is initiated manually and fan air flow, damper operation, heater operation, and ambient temperatures inside the reactor building electrical equipment room are determined. Required controls are operated or simulated to verify fan trips on low air flow and annunciation is received on loss of power to fan.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P234.4) Emergency Switchgear Room Cooling System Preoperational Test

Test Objective - To demonstrate the capability of the system to maintain the required ambient temperatures inside the Emergency Switchgear Room.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical supply systems, instrument air system, and chilled water system are available.

Test Method - System operation is initiated manually and fan air flow, damper operation, and heater operation is verified. Required ambient temperatures are determined. Required controls are operated or simulated signals are applied to verify automatic starts, system interlocks, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

(P245.1) Feedwater System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate proper operation of the Feedwater System. Specific objectives are to demonstrate the following:

1) System controls function in accordance with design intent.
2) Interlocks with the main turbine, recirculation system and feed pumps function correctly.

Prerequisites - The prerequisites for this test are as follows:

1) Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG.
2) The Service Water System is operational.
3) The Main Turbine Lube-Oil System is filled and operational.
4) The Instrument Air System is operational.
5) The Computer is operational to the extent necessary to verify inputs from the feedwater system.
6) The 480 volt motor control centers necessary for this test are operational.
7) The 250 volt DC control centers necessary for this test are operational.
8) RFPT A, B, and C Lube-Oil reservoirs are filled.

Test Method - Normal and emergency responses of the lube oil and turbine trip systems are verified following simulation or process manipulation of the controlling variable.

Acceptance Criteria -

1) Interlocks of the reactor feed pump turbine (RFPT) and of the alternate and emergency lube oil pumps and their corresponding alarms function as designed.
2) All abnormal conditions providing trip signals to the RFPTs function as designed.

(P245.2) Feedwater Control System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate proper operation of the Feedwater Control System. This will be accomplished to the extent possible without actually pumping water with the feed pump turbines. The test will demonstrate:

1) Interlocks to the main turbine, recirculation system, and feed pumps function correctly.
2) Feedwater control signals to the start-up regulating valve and feed pumps function correctly with simulated inputs and step commands originating from their respective control stations.
3) All feedwater alarm/trip points have been set correctly.
4) All recorders, indicators and annunciators function correctly.

Prerequisites - The prerequisites for this test are as follows:

1) Construction of the system is complete to the extent required to conduct this test and the system is turned over to the ISG.
2) The 125 Volt DC system is operational.
3) The Instrument AC system is operational.
4) The 24 Volt DC system is operational.
5) Panel 2C651 annunciator is energized.

Test Method - Various level, flow, pressure, and speed signals will be simulated and the proper responses will be verified.

Acceptance Criteria -

1) The reactor, main steam, and feedwater pressure and flow indicators, recorders, computer inputs, and trip points respond within designed tolerances.

2) Speed regulation response of each RFP Turbine is within design limits.
3) The response of the startup regulating valve is within design tolerances.
4) Changes in the control mode, selection of control channels, or integrity of incoming signal do not produce adverse changes in the controlled variables.

(P249.1) Residual Heat Removal System Preoperational Test

Test Objective - The general objective of this test is to demonstrate operation of the Residual Heat Removal System (RHRS). The system performs both safety and normal operational functions. The specific objectives of the test are intended to:

1) Assure the proper functioning of the components of the system including interlocks.
2) Demonstrate the abilities of certain components to be operated from the Remote Shutdown Panel.
3) Demonstrate the ability of certain valves to automatically isolate from signals generated from the Nuclear Steam Supply Shutoff System (NSSSS).
4) Demonstrate the ability of the system to automatically initiate into the Low Pressure Coolant Injection (LPCI) Mode upon receipt of an automatic initiation signal.
5) Demonstrate the pump flow rates and NPSHA are acceptable.
6) Demonstrate the various operational modes of the system as practical. These modes include:

    a) Fuel Pool Cooling Mode
    b) Steam Condensing Mode (logic and valve operability only)
    c) LPCI Mode
    d) Suppression Pool Cooling Mode
    e) Shutdown Cooling Mode
    f) Containment Spray Mode (logic and valve operability only)

Notes:

1) RHR Heat Exchanger sample isolation valves E11-2F079A&B and 2F080A&B interlocks and logic are tested in the NSSSS Preoperational Test P283.1A.
2) RHR Service Water Injection valves HV-E11-2F073A&B, 2F074A&B and 2F075A&B interlocks and logic are tested in the RHRSW Preoperational Test P216.1.
3) The interlocks between Unit 1 & II automatic initiation logic of the RHRS pumps will be functionally demonstrated.
4) Steam Condensing Mode is fully demonstrated during the Startup Program.

    All GE components are prefixed by MPL E11 unless otherwise noted.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems and the Instrument Air Systems are available. Reactor pressure vessel, suppression pool, fuel pool, and fuel pool skimmer surge tank are filled up to required level to provide enough suction head to the RHR pumps. Makeup water sources are available.

Test Method - The operating modes of the system are initiated manually and where applicable, automatically. RHR pump performance is determined for each operating mode. Control devices are operated or simulated signals are applied to verify valve alignment, LPCI mode

operation for low reactor water level and high drywell pressure, and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

(P249.2) Post-Accident RHR Flow, Drywell Spray and Suppression Pool Spray

Test Objective - Demonstrate operability of the instrumentation to monitor RHR system flow in the Drywell Spray and Suppression Pool Spray piping.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required inspections and calibrations of system instruments are complete and on file.

Test Method - Instrument calibrations completed and verified.

Acceptance Criteria - Instrument calibrations have been completed.

(P250.1) Reactor Core Isolation Cooling System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Reactor Core Isolation Cooling System. Specific objectives are to demonstrate the following:

1) The ability of the system to automatically start upon receipt of an initiation signal.
2) The ability of the system to isolate upon receipt of an isolation signal.
3) The ability of the RCIC turbine to trip upon receipt of a trip signal.
4) The ability of the system to operate in the following flow modes:

    a) Minimum flow - suppression pool to suppression pool
    b) RHR heat exchanger suction (steam condensing)
    c) Test mode-CST to CST
    d) Vessel injection

5) The ability of the system to be operated from the Main Control Room and the Remote Shutdown Panel.
6) Assure proper system component function including interlocks.

Prerequisites - Construction is complete to the extent necessary to perform these tests and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems and the Instrument Air System are available. Suppression pool and condensate storage tank are filled to provide enough suction head to RCIC pump and reactor pressure vessel is available to receive water. Auxiliary steam is available for RCIC turbine operation. Part of the RHR system will also be available to provide a suction flow path for RCIC pump.

Test Method - The system operation is initiated manually and automatically. The system is operated to determine the performance parameters for the RCIC turbine and pump and the barometric condensate pump. Control devices are operated or simulated signals are applied to

verify automatic valve alignment (system isolation), turbine trip and start modes, and other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

(P251.1) Core Spray System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate operation of the Core Spray System. The specific objectives of this test are intended to:

1) Assure the proper functioning of components of the system, including interlocks.
2) The ability of the system to automatically start upon receipt of an initiation signal.
3) Demonstrate the operability of the Unit I to Unit II Core Spray Pump Interlock.

Prerequisites - Construction is complete to the extent necessary to perform these tests and the system is turned over to the ISG. Power and control voltage is available for the motors, valves and instruments associated with this system. Required instruments are calibrated and controls are operable. The suppression pool and condensate storage tanks are filled to the required level. The reactor pressure vessel head is removed and the vessel can accept water. The condensate transfer system is available.

Test Method - The normal system operation is initiated automatically by simulating a Design Base Accident. The pumps are started and the appropriate valves and instruments are operated to ensure that water flow is established to the reactor pressure vessel. System logic, interlocks, and alarms are verified to be in accordance with design intent and system flows and pressures are verified to ensure that they are adequate to inject water into the reactor pressure vessel via the core spray spargers. The system is operated manually through the test line back to the suppression pool. Also, the system is manually lined up to accept water from the condensate storage tank and deliver core cooling water to the reactor pressure vessel.

Acceptance Criteria - That the core spray system can deliver cooling water at design flow and pressure to the reactor pressure vessel within a specified period of time for various simulated operating conditions.

(P251.2) Core Spray System Pattern Preoperational Test

Test Objective

1) This test shall demonstrate proper spray pattern of the Core Spray System, at rated and run out flow conditions. Each core spray loop shall be operated independently as well as in parallel operation together.

    a) Photographs shall be taken to document that sufficient flow is provided to all parts of the core, and that the flow pattern is acceptably uniform. These photographs will be evaluated by site test personnel and by General Electric-Operating Plant Engineering/San Jose.

    b) Photographs of core spray patterns are taken for the following six conditions:

        (i) Rate spray flow:

Loop A at 6350, +100, -0 gpm
Loop B at 6350, +100, -0 gpm
Loops A and B at 6350, +100, -0 gpm each

(ii) Run out spray flow:

Loop A at 7900, +0, -300 gpm
Loop B at 7900, +0, -300 gpm
Loops A & B at 7900, +0, -300 gpm each

2) Observe the physical response of the Core Spray System components within the reactor pressure vessel during system initiation and operation.
3) Properly size the restrictive orifice FO-2D002A and FO-2D002B such that run out flow does not exceed the design values in the system Process Flow Diagram (Mode G -7900 gpm), manufacturer's specification and manufacturer's tested values.
4) Demonstrate pump flow rates and NPSHA are acceptable.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Power and control voltage is available for the motors, valves and instruments associated with this system. Required instruments are calibrated and controls are operable. The suppression pool is filled to the required level. The reactor pressure vessel head is removed and the vessel can accept water. The condensate transfer system is available.

Test Method - System operation shall be manually initiated, monitored and controlled such that vessel injection is achieved in accordance with test objectives.

Acceptance Criteria - The Core Spray System can deliver cooling water at design flow with an acceptable spray pattern to the reactor pressure vessel. During this test photographic records shall be made, no system abnormalities shall be observed, restriction flow orifices shall be properly sized, and free route from the core spray junction box vent holes shall be verified.

(P252.1) High Pressure Coolant Injection System Preoperational Test

Test Objective - The general objective of this test is to demonstrate operation of the High Pressure Coolant Injection System. Specific objectives are to demonstrate the following:

1) The ability of the system to automatically start upon receipt of an initiation signal.
2) The ability of the system to isolate upon receipt of an isolation signal.
3) The ability of the turbine to trip upon receipt of a turbine trip signal.
4) To verify the HPCI system flow paths.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. The suppression pool and condensate storage tank are filled to provide the required suction head to the HPCI pump. The reactor pressure vessel head is off and the vessel is ready to receive water from the HPCI system. Required electrical power supply systems, Standby Gas Treatment, required ventilation systems and Instrument Air System are available. The Auxiliary Boiler or another source of steam supply is available to run the HPCI turbine.

Test Method - System operation is initiated manually and where applicable automatically. Reactor water low level and drywell high pressure signals are simulated to verify HPCI turbine automatic functions. System isolation is verified by operating required controls and or simulated signals. Steamline high differential pressure signals are simulated to verify automatic functions. Limited turbine and pump operation (depending upon auxiliary steam conditions) and automatic valve alignment are demonstrated. Containment isolation valves are functionally tested. Required controls are operated or simulated signals are applied to verify interlocks, trips and alarms.

Acceptance Criteria - The system performance characteristics are in accordance with applicable design documents.

(P253.1) Standby Liquid Control System Preoperational Test

Test Objective - The general objective of this test is to demonstrate the proper and reliable operation of the Standby Liquid Control System. Specific objectives are to demonstrate the following:

1) The ability of the system to deliver the designed quantity of fluid to the reactor vessel. This test will be performed with water as a substitute for the neutron absorber.
2) The operability of instrumentation, controls, interlocks, alarms, heaters, air spargers and heat tracing.
3) The ability to verify redundancy and electrical independence, and conduct test firings of squib actuated valves, and demonstrate design injection capability.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The reactor vessel is available to receive water injected from the Standby Liquid Control System. Required electrical power supply systems and a source of demineralized makeup water are available.

Test Method - System operation is initiated manually. Demineralized water is used for testing the system. The pumps are run taking suction from the standby liquid storage tank and the test tank. Squib valves are fired and the rate of demineralized water injection into the reactor vessel from each pump is measured. Required controls are operated or simulated signals are applied to verify interlocks and alarms.

Acceptance Criteria - The system performance characteristics are in accordance with the applicable design documents.

(P253.2) Standby Liquid Control System Initiation Instrument Loop Preoperational Test

Test Objective - To demonstrate proper operation of the instrument loop added to the SLCS by Regulatory Guide 1.97.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Component calibrations have been completed satisfactorily.

Test Method - System flow is initiated by design means and recorded along with storage tank level from instruments being tested.

Acceptance Criteria - Verify installed instruments indicate accurately.

(P254.1) Emergency Service Water System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Emergency Service Water (ESW) System. Specific objectives are to demonstrate the following:

1) The ability of the ESWS to supply cooling water to the following:

   a) RHR pump room unit coolers
   b) RHR pump motor oil coolers
   c) RHR pump seal water coolers
   d) Core spray pump room unit coolers
   e) HPCI pump room units coolers
   f) RCIC pump room unit coolers
   g) Control structure chillers
   h) Emergency switchgear and load center coolers
   i) RBCCW heat exchangers
   j) TBCCW heat exchangers
   k) Fuel pool makeup

2) The ability to start the ESW pumps from the control room or a remote location.
3) The ability to operate the spray pond valves from a remote location.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The spray pond is filled to provide enough suction head for the ESW pumps, and a makeup source to the spray pond is available. The RHR service water system is in operation.

Test Method - The system is started manually and automatically through the associated diesel generator start signal. Pump flow paths are established and pump flows are measured for each loop. Flow balancing of the RHR Service Water System and Emergency Service Water System is performed. Proper operation of the line break detection system is verified. Required controls are operated and simulated signals are applied to verify interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P255.1) Control Rod Drive Hydraulic System Preoperational Test

Test Objective - The general objective of this test is to demonstrate the proper operation of the Control Rod Hydraulic System. The specific objectives of this test are intended to:

1) Demonstrate the ability of the hydraulic system to supply water at required pressures and flows.
2) Demonstrate the ability of the system to position all control rods inside the core at specified speeds.
3) Demonstrate the ability of the system to rapidly insert (SCRAM) the control rods into the core within a specified time period.

4) Assure the proper functioning of all components of the system, including the control rod mechanisms, control rod position indicator system, alarms and interlocks.
5) Obtain baseline operating data for the system.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The condensate storage tank is filled to provide enough suction head to the CRD pump. The TBCCW System and Instrument Air System are available. The Reactor Manual Control System is operational to the point required for continuing with this test. Initial coupling and venting is completed.

Test Method - System operation is initiated manually and the system flow and pressure control stations are adjusted. CRD pump performance parameters are measured. Control rod drives are exercised to verify, position indication and insert/withdraw speeds. Scram tests are conducted and scram times are measured for each control rod drive. Required controls are operated or simulated signals are applied to verify system interlocks and alarms. Rod buffer performance is also tested.

Acceptance Criteria - System performance parameters are in accordance with the applicable design documents.

(P256.1) Reactor Manual Control System Preoperational Test

Test Objectives - To verify the operation of the Reactor Manual Control System, including relays, control circuitry, switches, rod blocks, indicating lights and control valves.

Prerequisites - Construction is complete to the extent necessary to perform this test and system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - System integrated operation is initiated manually. Controls are operated and simulated signals are applied to verify: rod blocks, alarms and interlocks of the reactor mode switch; proper operation of the rod position information system; and rod drift alarm circuit directional control valve time sequence for insert and withdraw commands.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P256.2) Rod Sequence Control System Preoperational Test

Test Objectives - To demonstrate and verify the operation of the Rod Sequence Control System, including the Rod Pattern Controller and its associated external test circuitry.

Prerequisites - Construction is complete to the extent necessary to perform this test and system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - The Rod Pattern Controller will be tested and verified to operate correctly in the "Self Test" mode. All RSCS operator display functions and controls as well as the ability of the RSCS to substitute rod position data will be demonstrated and verified. Systems operations of

all control rod withdraw and insert blocks and forced single notch rod motion will be verified by conducting rod movements under the control of both sequence "A" and "B".

Acceptance Criteria - The System performance parameters are in accordance with the applicable design documents.

(P256.3) Rod Worth Minimizer System Preoperational Test

Test Objectives - To demonstrate and verify the operation of the Rod Worth Minimizer System, including the ability of the system to provide insert and withdraw blocks below low power setpoint, when the control rod insert/withdraw sequences are not within pre-set sequences, and the ability to provide visual displays and alarms between low power setpoint and low power alarm point.

Prerequisites - Construction is complete to the extent necessary to perform this test and system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - The Rod Worth Minimizer will be tested and verified to operate under various acceptable and non-acceptable rod position modes, while demonstrating rod blocks and alarms for low power interlocks.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P257.1) Uninterruptable AC Power System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Uninterruptable AC Power System. Specific objectives are to demonstrate the following:

1) That full load power is supplied to the distribution panel
2) That the static transfer switch will automatically shift load from the preferred to the alternate source upon loss of the preferred source
3) That the static transfer switch will automatically shift load from the preferred source to the alternate source when the preferred source becomes overloaded and shift back to the preferred source when the overload condition is cleared
4) That loads can manually be switched from preferred to alternate source and vice-versa

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instrument, protective devices and breakers is verified. 480V AC Power, 250 V DC Power, and Resistor Load Bank are available.

Test Method - The Uninterruptable Power Supply is energized by manually closing the 250 V DC preferred breaker (inverter) and the 480 V AC Alternate Breaker (Voltage Regulating Transformer). With the static transfer switch in normal mode, the load is increased by use of the Resistor Load Bank while the voltage and current is monitored. The current is gradually increased above normal rating until the automatic transfer switch shifts the overload to the alternate source. Then the load is slowly decreased to clear the overload and to verify that the automatic transfer switch shifts the load back to the preferred source. A loss of the preferred

source is simulated to verify that the automatic transfer switch will shift the load to the alternate source. Then with both sources available the transfer switch is manually switched from the preferred to alternate source and vice versa by means of the bypass mode and normal mode pushbuttons. Alarms are either simulated or functionally checked throughout the above procedure.

Acceptance Criteria - That reliable 120 V AC Power, at design load is supplied to the distribution panel. That the automatic transfer switch will shift loads from the preferred to the alternate source with negligible power interruption upon loss of preferred source. That the automatic transfer switch will shift load from the preferred to the alternate source in an overloaded condition and back to the preferred source when the overload condition is cleared and, that the load can manually be shifted from the preferred to the alternate source and vice-versa that alarms operate at their engineered set points and annunciate in the control room.

(P258.1) Reactor Protection System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Reactor Protection System (RPS). That is, to initiate a REACTOR SCRAM with precision and reliability in order to prevent or limit core damage following abnormal conditions.

Specific objectives are to demonstrate the following:

1) All electrical components of the RPS operate correctly and that the Integrated System functions as intended.
2) Relay contact annunciations function as designed in accordance with the applicable RPS Elementary Diagrams.
3) To prove the System Logic Combinations by inserting simulated signals or actuating the device.
4) To perform response time tests by inserting a simulated signal and timing the scram chain.
5) To verify RPS Related Recirc Pump Trip (RPT) logic.
6) To demonstrate redundancy, electrical independence, mode switch operation and safe failure on loss of power.
7) To test the RPS Power Distribution System to assure its availability and verify its tripping capabilities.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Integrated system operation is initiated manually to verify M-G set performance and electrical independence. Required controls are operated or simulated signals are applied to verify: sensor relay-to-scram trip actuator response time, scram reset delay time, mode switch operation, and system interlocks and alarms.

Acceptance Criteria - System performance is in accordance with the applicable design documents.

(P259.1) Primary Containment System Preoperational Test

Test Objective - To demonstrate the operability and isolation capability of the Primary Containment System. Containment isolation valve functional tests will be performed.

To test the vacuum breakers and show proper operation of the controls and actuators, which will demonstrate the ability to limit the drywell and suppression pool internal and differential pressures.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. The suppression pool is filled with demineralized water to the required level and the hotwell is available. The Containment Instrument Gas System, Instrument Air System and required electrical power supply systems are available. All primary containment isolation valves are operable.

Test Method - The suppression pool cleanup system will be tested for proper operation; the primary containment isolation system will have signals simulated with the valves in the non-isolation position, to verify the primary containment isolates when an isolation signal is received. The test method is described in the General Test Statement. Vacuum breakers will be actuated to show proper directional movement when permissives are available to control circuitry.

Acceptance Criteria - The Suppression Pool Cleanup System functions are as designed.

The Primary Containment isolation functions are designed when appropriate isolation signals are present.

(P259.2) Containment Integrated Leak Rate Preoperational Test

Test Objective - To demonstrate that the leakage through the primary containment pressure boundary at design base accident pressure does not exceed the specified maximum allowable value and to demonstrate that the bypass leakage from the drywell to the suppression pool at a specified differential pressure does not exceed the allowable leakage. The data collected during the test will be:

1) To determine the primary reactor containment integrated leakage rate at test pressure (Pa).
2) To obtain a calculated leakage rate with a statistically determined 95% confidence level, such that the calculated leakage rate at the 95% confidence level does not exceed the acceptance criteria.
3) To conduct a supplemental verification test at test pressure such that the verification test results meet the acceptance criteria.
4) To determine the bypass leakage from drywell to suppression pool at 4.3 psid.

Prerequisites - Construction of the primary containment, including installation of all portions of mechanical, fluid, electrical, and instrumentation systems penetrating containment is complete. Type B and Type C local leakage rate is satisfactorily complete. Required test equipment instruments and data acquisition systems are operable. Systems required to support the ILRT are operational.

Test Method - The test shall be conducted in accordance with the requirements of Subsection 6.2.6 of the FSAR.

Acceptance Criteria - Acceptance criteria for this test are in accordance with the requirements of Chapter 16 of the FSAR.

(P259.3) Local Leakage Rate Test

Test Objective - The objective of this test is to ensure local leakage rate test requirements for Type B and C containment penetrations are identified and documented. Additional objectives are as follows:

1) Specify acceptance methods for performing type B & C local leakage rate tests.
2) Serve as a prerequisite for the performance of the integrated leak rate test.
3) Provide standard forms for recording local leakage rate test data.
4) Insure sufficient data is obtained for evaluating local leakage data against plant technical specifications.

Prerequisites - Construction of the primary containment, including installation of all portions of mechanical, fluid, electrical, and instrument systems penetrating containment is complete. Required test equipment instruments and data acquisition systems are operable. Systems required to support the LLRT are operational.

Test Method - Type B tests are performed by local pneumatic pressurization of penetrations either individually or in groups.

Type C tests measure local leakage across containment isolation valves either by local pneumatic or hydraulic pressurization of individual containment penetrations. Containment isolation valves which are in lines not designed to be, or remain filled with water for at least 30 days subsequent to a LOCA, are tested by local pneumatic pressurization. Containment isolation valves which are in lines designed to be, or remain filled with water for at least 30 days subsequent to a LOCA, are tested by local hydraulic pressurization. The FSAR identifies those valves which are hydraulically tested.

Acceptance Criteria - Acceptance criteria for this test are in accordance with the requirements of Chapter 16 of the FSAR.

(P259.4) Primary Containment Isolation Valve Timing Preoperational Test

Test Objective - The general objective of this test is to demonstrate the closing (opening) time of containment isolation valves receiving an automatic actuation signal.

Prerequisites - Construction is complete to the extent necessary and the various systems are turned over to the ISG. Required instruments are calibrated and control schemes have been checked and are operable. The required electrical power supply systems are available.

Test Method - Each valve receiving an automatic isolation signal will be closed (opened) by simulating the isolation signal of the interlock relay contacts. Upon initiation of the simulated signals, the valve(s) will be timed from their pre-isolation to their post-isolation position.

Acceptance Criteria - Valves receiving automatic isolation signals close (open) within the required time noted in FSAR Table 6.2-12.

(P260.1) Containment Atmosphere Circulation System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Containment Atmosphere Circulation System. Specific objectives are to demonstrate the following:

1) The ability of the primary Containment Atmosphere Circulation System to maintain temperatures in the drywell various spaces within specific limits during normal or transient mode of operation.
2) The ability to provide additional cooling in the CRD (control rod drive), area after a SCRAM (sudden shutdown of nuclear reactor) mode of operation.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - The system operation is initiated manually, and flow for each fan is determined. Required controls are operated or simulated signals are applied to verify; automatic start of standby units and other system interlocks and alarms. No heat loads are simulated during the test.

Acceptance Criteria - The system performance is in accordance with the applicable design documents.

(P261.1) Reactor Water Cleanup and Filer Demineralizer System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate proper operation of the Reactor Water Cleanup and Filter Demineralizer System. Specific objectives are to demonstrate the following:

1) The ability of the Reactor Water Cleanup System to use the various flow paths:

    a) Reactor to reactor through Filter Demineralizers and bypassing heat exchangers.
    b) Reactor to radwaste.
    c) Reactor to condenser hotwell through Filter Demineralizers and bypassing them.
    d) Influent from reactor recirculation loops.
    e) Influent from reactor drain.

2) The ability to check system performance:

    a) Capability for design flow rate.
    b) RWCU pumps suction and discharge pressure.
    c) Effluent water quality from both filter demineralizers.

3) The ability of RWCU pump trip logic:

    a) System isolation valves closed.
    b) Pump cooling water high temperature.
    c) Pump discharge low flow.

4) The ability of system isolation logic:

    a) Leak detection high differential flow.

b) Nuclear Steam Supply Shutoff System isolation relays.

5) The ability of the filter demineralizers:

a) Filter demineralizer isolation logic.
b) Automatic backwash operation.
c) Automatic precoat operation.
d) Valve cycle times and failure modes.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. The Reactor vessel is filled to provide enough suction head to the Reactor Water Cleanup Recirculation Pumps. The Reactor Building Closed Cooling Water System, Instrument Air System, condenser hotwell or Liquid Radwaste Collection System, and the RWCU Precoat System are available. Required electrical power supply systems are available.

Test Method - System operation is initiated manually. Pump flow and filter and demineralizer differential pressures are determined. Precoat and backwash cycles are tried. Controls are operated or simulated signals are applied to verify system isolation upon initiation of the respective NSSS isolation relay, other system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P264.1) Reactor Recirculation System Preoperational Test

Test Objectives - The objective of this test is to demonstrate the proper operation of the Reactor Recirculation System.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The Reactor Building Closed Cooling Water System, is available. The reactor vessel is filled with demineralized water to the required level.

Test Method - System operation is initiated manually. The system is tested by individual and integrated operation of M-G sets, pumps, and valves. Performance of the M-G sets, recirculation pumps, and jet pumps are determined to the extent possible during this test. Required controls are operated or simulated signals are applied to verify interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P269.1) Liquid Radwaste Collection System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Liquid Radwaste Collection after the Unit I/II separation is removed. Specific objectives are to demonstrate the following:

1) The ability of area tanks and sumps to collect and hold drainage.

2) The ability of drain line drum traps to be either automatically or manually flushed.
3) The ability of the leak detection instrumentation for the drywell floor drain sumps and equipment drain tank to detect abnormal leakage.
4) The ability of the drywell floor drain sumps and equipment drain tank primary containment isolation valves to isolate on receipt of a primary containment isolation signal.
5) The ability of the condenser area transfer sump to automatically isolate.
6) The ability of the oil interceptors to separate oil from oily wastes.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. Liquid Radwaste Collection System and storage tanks are available.

Test Method - Sump pumps are operated and performance characteristics are determined. Level controls are operated to verify pump starts and alarms. Liquid radwaste discharge valves from primary containment are verified to close upon containment isolation signal .

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P270.1) Standby Gas Treatment System And Secondary Containment Isolation Preoperational Test

Test Objective - To demonstrate the capability of the Standby Gas Treatment System (SGTS) to function as designed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The Reactor Building Heating and Ventilation System, SGTS vent, and Instrument Air System are available.

Test Method - System operation is initiated manually and where applicable automatically. Required controls are operated or simulated signals are applied to verify secondary containment isolation and start of SGTS. SGTS performance is determined by measuring secondary containment pressures, system pressures and fan flow rates. System interlocks and alarms are verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P273.1) Containment Atmospheric Control System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Containment Atmosphere Control System. Specific objectives are to demonstrate the following:

1) The ability of the Containment Atmospheric Control System to operate under a LOCA.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instrumentation are calibrated and controls are operable. Required electrical power supply system are available.

Test Method - The system valves will be operated to demonstrate proper operation. Simulated signals are applied to verify interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P273.2) Containment Hydrogen Recombiner System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Containment Hydrogen Recombiner System. Specific objectives are to demonstrate the following:

1) The ability of the hydrogen recombiners to achieve rated temperature and air flow within the required time.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply system is available.

Test Method - The Hydrogen Recombiner System will be operated to the extent practical.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P273.3) Containment Oxygen-Hydrogen Analyzer Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the hydrogen and oxygen analyzers. Specific objectives are to demonstrate the following:

1) The ability of the analyzer to measure the percent hydrogen at a sample point.
2) The ability of the analyzer to measure the percent oxygen at a sample point.
3) The ability of the analyzer to automatically switch to the standby mode on a simulated containment isolation signal.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply system is available.

Test Method - The oxygen and hydrogen analyzers are utilized to determine the containment atmospheric analysis.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P275.1) 24 Volt DC System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the 24 Volt DC System. Specific objectives are to demonstrate the following:

1) That the batteries can ensure a complete discharge, based on their ampere-hour rating, without exceeding the battery bank minimum voltage limit. (Performance Test)
2) That the batteries can provide reliable stored energy to their design loads as indicated in Table 8.3-8 in the event of a Design Base Accident.
3) That the battery chargers can deliver their rated output.
4) That the battery chargers can fully charge their associated batteries from design minimum discharge (i.e., after the service test) while simultaneously providing power to the distributed panel for normal station loads.
5) That alarms operate and annunciate at their specified abnormal condition.
6) That reliable ± 24 Volt DC is delivered to the distribution panels.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instrument protective devices and breakers is verified. l20 V AC, Resistor Load Bank, Battery Room Ventilation and Emergency Eyewash is available and/or in service.

Test Method - The battery performance test is manually initiated by connecting the battery bank to the Resistor Load Bank and discharging the batteries at a constant current for a specified period of time.

The Battery Service Test is manually initiated by connecting the battery bank to the Resistor Load Bank and simulating, as closely as possible, the load the batteries will supply during a Design Base Accident.

Then the battery charger is connected to the batteries and the distribution panels to verify that they can equalize charge the batteries while simultaneously providing power to the normal plant loads. The battery charger is also connected to the Resistor Load Bank and current is increased to its maximum rating with the charger isolated from its associated battery bank.

Alarms are simulated and verified to operate properly.

Acceptance Criteria - The batteries can satisfactorily deliver stored energy for the specified amount of time as required for the performance and service tests. The battery chargers can deliver rated output, and can charge their associated battery bank from minimum voltage to a fully charged state in a specified amount of time while simultaneously supplying normal plant loads. The alarms operate at their engineered setpoints and annunciate in the control room.

(P276.1) Plant Leak Detection System Preoperational Test

Test Objective - The general objective of this test is to demonstrate the operability of the sensors associated with the detection of leaks from the primary system during normal plant operation, and to verify the system logic and active components associated with the annunciation of these leaks. Specific objectives are to demonstrate the following:

1) The flood detecting switches actuate the proper alarms for the following rooms.

    a) RHR Loop A pump room and Loop B pump room
    b) RCIC pump room
    c) HPCI pump room
    d) Core spray Loop A pump room and Loop B pump room
    e) TBCCW heat exchanger area

f) RBCCW, heat exchanger A and heat exchanger B areas.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Sump levels will be varied (if practicable) or simulated signals are applied to level sensors to verify the leak detection system alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P276.3) Post-Accident Sampling System Preoperational Test

Test Objective - The objective of this test is to demonstrate proper operation of the Post-Accident Sampling System. Specific objectives are to demonstrate the following:

1) The proper operation of the system's sample line solenoid valves from panel 2C104D.
2) The proper operation of the permissive switch on panel 2C693.
3) The proper operation of the sample system control logic.
4) The proper operation of the 2C104A graphic display lights.
5) The proper operation of the process heat trace.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Control switches will be manipulated and proper relay and indicating light operation will be verified. Response of valves will be checked functionally (i.e. voltage used as an indication that the valve is open or closed.) The system will then be operational checked by taking actual samples.

Acceptance Criteria - Control switches and associated interlocks function properly and the system shall be capable of obtaining a sample in less than one hour from initiating the sampling operation.

(P278.1) Source Range Monitoring System Preoperational Test

Test Objective - The objective of this test is to demonstrate the proper operation of the Source Range Monitoring System. Specific objectives are to demonstrate the following:

1) All source range monitors have been calibrated for the design range of operation.
2) Source range monitor trip settings are as required by design specification.
3) All source range monitors, recorders, meters, indicators and annunciators function properly.
4) Rod withdrawal interlocks that are a function of the source range monitors operate as designed.
5) Reactor Protection System trips that are a function of the source range monitors operate correctly.
6) Source range monitor insert and retract drives function as designed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required reactor internals are installed, instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Source Range Monitor Detector insert/retract drive mechanisms are operated to verify proper operation. Required simulated signals are applied to verify SRM channel trips, indicating lights and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P278.2) Intermediate Range Monitoring System Preoperational Test

Test Objective - The objective of this test is to demonstrate proper operation of the Intermediate Range Neutron Monitoring System. Specific objectives are to demonstrate the following:

1) All Intermediate Range Monitors have been calibrated for the design range of operation.
2) Intermediate Range Monitor Trip Settings are as required by Design Specifications.
3) All Intermediate Range Monitors, recorders, meters, indicators and annunciators function properly.
4) Rod Withdrawal interlocks that are a function of the Intermediate Range Monitoring System operate as designed.
5) Reactor Protection System Trips that are a function of the Intermediate Range Monitoring System operate as designed.
6) Intermediate Range Monitoring Drive Control System functions as designed.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required reactor internals are installed, instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Intermediate Range Monitors detector insert/retract drive mechanisms are operated. Required simulated signals are applied to verify IRM channel trips, rod blocks, indicating lights and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P278.3) Average Power Range Neutron Monitoring System Preoperational Test

Test Objective - To demonstrate the operability of the Average Power Range Neutron Monitoring (APRM System) including LPRM's, Recirc. flow bias signals and Rod Block Monitor.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required reactor internals are installed. Instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - Required input signals are simulated to verify LPRM channel trip lamps, remote meters and alarms. Required signals from the LPRM System are simulated to each APRM channel to verify trip functions, indicating meters, lights and alarms. Each flow transmitter is checked from flow element to its end function. Signals are simulated to verify flow inducted trips,

remote meters and alarms. Required signals from the LPRM and flow bias systems are simulated to each RBM channel to verify trip functions, indicating lights, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P278.4) Traversing Incore Probe System Preoperational Test

Test Objective - To demonstrate the proper operation of the Traversing In-Core Probe System. Specific objectives are to demonstrate the following:

1) Manual and automatic Operation.
2) Proper operation of all interlocks, overrides and automatic functions.
3) Proper operation of all indications and alarms.
4) Simulated operation of the shear valves.
5) Proper interface between the TIP system and process computer.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. LPRMs are installed inside the reactor vessel and required instruments are calibrated and controls are operable. TIP tracing X-Y recorder and purge system are available.

Test Method - System operation is initiated manually. The indexer interlock, shear valve control and monitoring, ball valve control and monitoring, squib circuits and purging operations are verified. Required controls are operated or simulated signals are applied to verify interlocks external to the system and system alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P278.5) Post-Accident Neutron Monitoring Preoperational Test

Test Objective - The general objective of this test is to demonstrate the proper operation of the post accident neutron monitors.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system has been turned over to ISG.

Test Method - The required controls are operated or simulated signals are applied to verify proper operation, signals, and alarms.

Acceptance Criteria - Performance parameters are in accordance with appropriate design documents.

(P279.1) Area Radiation Monitoring System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Area Radiation Monitoring System. Specific objectives are to demonstrate the following:

1) System response with a calibrated gamma source.
2) Indicators, local horns, recorders, annunciators and trip circuits function correctly.

The Area Radiation Monitoring System does not have any automatic protective functions.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify area radiation monitor channel trips, indicating lights, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P279.2) Main Steam Line Radiation Monitoring Subsystem Preoperational Test

Test Objective - The general objective of these tests is to demonstrate proper operation of the Process and Effluent Radiological Monitoring and Sampling System. This specific test is to verify the proper operation of the Main Steam Line Radiation Monitoring Subsystem.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify process radiation monitor channel trips, indicating lights, interlocks, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P279.3) Liquid Process Radiation Monitoring Subsystem Preoperational Test

Test Objective - The general objective of these tests is to demonstrate proper operation of the Process and Effluent Radiological Monitoring and Sampling System. This specific test is to verify the proper operation of the Liquid Process Radiation Monitoring Subsystem:

1) RHR Service Water Loop A
2) RHR Service Water Loop B
3) Reactor Bldg. Closed Cooling Water
4) Service Water Effluent

This subsystem has no automatic protective functions.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify process radiation monitor channel trips, indicating lights, interlocks, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P279.4) Refueling Floor Wall and High Exhaust Subsystems Preoperational Test

Test Objective - The general objective of these tests are to demonstrate proper operation of the Process and Effluent Radiological Monitoring and Sampling System. This specific test is to verify the proper operation of the following radiation monitoring subsystems:

1) Refueling Floor Wall Exhaust
2) Refueling Floor High Exhaust

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify process radiation monitor channel trips, indicating lights, interlocks, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P279.5) Offgas Pretreatment Radiation Monitoring Subsystem Preoperational Test

Test Objective - The general objective of these tests is to demonstrate proper operation of the Process and Effluent Radiological Monitoring and Sampling System. This specific test is to verify the proper operation of the Offgas Pretreatment Radiation Monitoring Subsystem.

This subsystem does not have any automatic protective functions and is used for alarms only.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify process radiation monitor channel trips, indicating lights, interlocks, and alarms.
Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P279.6) Reactor and Turbine Vent Stack Radiation Monitoring Subsystem Preoperational Test

Test Objective - The general objective of these tests is to demonstrate proper operation of the Process and Effluent Radiological Monitoring and Sampling System. This specific test is to verify the proper operation of the Reactor and Turbine Vent Stack Radiation Monitoring Subsystem.

The Reactor and Turbine Vent Stack Radiation Monitoring Subsystem has no automatic protective functions.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify process radiation monitor channel trips, indicating locating lights, interlocks, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P279.7) Primary Containment Radiation Monitoring Subsystem Preoperational Test

Test Objective - The general objective of these tests is to demonstrate proper operation of the Process and Effluent Radiological Monitoring and Sampling System. This specific test is to verify the proper operation of the Primary Containment Radiation Monitoring Subsystem.

This subsystem has no protective automatic functions.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify process radiation monitor channel trips, indicating lights, interlocks, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P279.8) Containment Accident Range Radiation Monitoring Subsystem Preoperational Test

Test Objective - The objective of this specific test is to verify the proper operation of the Containment Accident Range Radiation Monitoring Subsystem

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and required electrical power supply systems are available. The required radioactivity sources with known strengths are available.

Test Method - The radioactive sources are used or simulated signals are applied to verify process radiation monitor channel trips, indicating lights, interlocks, and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P279.9) Post-Accident Area Radiation Monitoring Preoperational Test

Test Objective - The general objective of this test is to demonstrate the proper operation of the Post-Accident Area Radiation Monitors.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system has been turned over to ISG.

Test Method - The required controls are operated or simulated signals are applied to verify proper operation, signals, and alarms.

Acceptance Criteria - Performance parameters are in accordance with appropriate design documents.

(P280.1) Reactor Non-nuclear Instrumentation System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Reactor Non-Nuclear Instrumentation System. Specific objectives are to demonstrate the following:

1) Verify that reactor vessel surface temperature instrumentation is operational.
2) Verify that reactor vessel level instrumentation is operational.
3) Verify that reactor vessel pressure instrumentation is operational.
4) Verify that the reactor vessel head vent valves are operational.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and the controls are operable. All relays that are initiated from reactor vessel level and pressure sensors are placed in the untripped condition.

Test Method - Simulated signals are applied to instrument loops and trip functions, indicating functions and alarms are verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P280.2) Post-Accident RPV Instrumentation Preoperational Test

Test Objective - The general objective of this test is to demonstrate the proper operation of the Post-Accident RPV Instrumentation.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system has been turned over to ISG.

Test Method - The required controls are operated or simulated signals are applied to verify proper operation, signals, and alarms.

Acceptance Criteria - Performance parameters are in accordance with appropriate design documents.

(P281.1) Fuel Handling System Preoperational Test

Test Objective - The general objective of this is to demonstrate that the reactor refueling and servicing tools and equipment operate in a safe and proper manner. Specific objectives are to demonstrate that:

1) All interlocks with the reactor manual control system will be verified.
2) All equipment logics and interlocks will be verified.
3) All tools have been accounted for and operate satisfactorily.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. The fuel pool and reactor cavity are available to test the fuel grapple, and the auxiliary hoists. The Reactor Manual Control System is available to test the refueling platform interlocks.

Test Method - The refueling platform travel speed and interlocks with the Reactor Manual Control System are verified. All servicing tools are tried for proper operation. Load tests for the fuel grapple and the auxiliary hoists are performed. The fuel grapple and the auxiliary hoists are operated at designated speeds. System alarms are verified by operating the controls or simulating the required signals.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P283.1) Nuclear Steam Supply Shutoff System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate the proper operation of the Nuclear Steam Supply Shutoff System. Specific objectives are to demonstrate the following:

1) The ability of the Main Steam Isolation Valves (MSIV's) to function properly.
2) The ability of the Main Steam drip leg drains to function properly.
3) The ability of the valve isolation logic to function properly.
4) The ability of the steam jet air ejector steam supply valves to function properly.
5) The ability of the main steam supply drain valves to function properly.
6) The ability of the instrumentation that initiates NSSSS isolation to meet required time responses.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems, Instrument Air System, and the Containment Instrument Gas System are available.

Test Method - The Main Steam Isolation Valves are exercised and functionally checked for closure by their logic circuit trips, loss of control power and loss of normal air supply using their charged accumulator. The Nuclear Steam Supply Shutoff System isolation logic is tested by verifying it sends appropriate signals to isolate the RHR System, the RWCU System and the Main Steam drains. The Main Steam Line Drip Leg Drain Valves and the Main Steam Line branch valves are functionally checked for proper operation. Instrumentation time responses

are measured from the time the setpoints are reached to the time the final logic contacts change state.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P283.2) ADS/Safety Relief System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate the proper operation of the ADS/Safety Relief System. Specific objectives are to demonstrate the following:

1) The ability of the Safety/Relief Valves to operate correctly in the safety relief mode.
2) The ability of selected Safety/Relief Valves to operate correctly in the ADS mode.
3) The ability of 3 Safety/Relief Valves, which are not ADS valves, to operate from the Remote Shutdown Panel, 2C201.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical supplies are available and the Containment Instrument Gas System is available.

Test Method - The Automatic Depressurization System is functionally checked for proper operation in automatic and manual modes. Each Safety/Relief valve is verified operational when any one of its control solenoids is energized. The Remote Shutdown Panel operation is also demonstrated. Valves are also checked for the following: fail close on loss of air, loss of power, and full stroke operation. The acoustic Monitor System is functionally tested to verify proper operation.

Acceptance Criteria - The system performance parameters are in accordance with the applicable documents.

(P283.3) Main Steam Leakage Control System Preoperational Test

Test Objectives - To demonstrate the proper operation of the Main Steam Isolation Valve Leakage Control System to collect steam from the main steam lines by operation of its air blowers, heaters, and motor operated valves.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. The required electrical power supply systems are also available.

Test Method - The Main Steam Isolation Valve Leakage Control System interlocks are verified, and the system is initiated manually and checked for proper operation.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P283.4) Main Steam Leak Detection System Preoperational Test

Test Objectives - The general objective of this test is to demonstrate proper operation of the Steam Leak Detection System. Specific objectives are to demonstrate the following:

1) The ability of the equipment area ambient temperature recorder to monitor and record area temperatures.
2) The ability of the equipment area differential temperature recorder to monitor and record differences in area temperatures.
3) The ability of the isolation logic to generate isolation signals to the Nuclear Steam Supply Shutoff System (NSSSS).

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated, controls are operable, and electrical power supplies are available.

Test Method - The Main Steam Leak Detection System is functionally tested to verify the ability of the area temperature monitors to monitor changes in temperature and to give isolation signals into the Nuclear Steam Supply Shutoff System logic.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P288.1) 250 Volt DC System Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the 250 Volt DC System. Specific objectives are to demonstrate the following:

1) The ability of the 250 Volt DC System batteries - Divisions I and II - to provide stored energy to supply power to selected loads in the event of a loss of all AC power at the station.
2) The ability of the 250 Volt DC System battery chargers to provide power as required for station operation while simultaneously charging and maintaining the charge of the 250 Volt DC batteries when station AC power is available.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems and a load resistor bank are available. The Battery Room Ventilation system is also available.

Test Method - The system is operated and a load capacity test is conducted for the battery with the battery charger disconnected. Required controls are operated or simulated signals are applied to verify battery charger performance, system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P299.1) Reactor Building Crane Preoperational Test

Test Objective - The general objective of this test is to demonstrate proper operation of the Unit 2 Reactor Building Crane. Specific objectives are to demonstrate the following:

1) The ability of the Unit 2 Reactor Building Crane to handle all normal plant operation loads except the reactor vessel heads, spent fuel cask and On-Site Transfer Cask.

2) The ability of mechanical stops and/or electrical interlocks to prevent the Unit 2 reactor building crane from handling heavy loads over the spent fuel storage pool and otherwise restrict the main hoist from moving loads in travel restriction zones.
3) The performance of the Unit 2 reactor building crane's components in accordance with design requirements.
4) The ability of the crane to stop all movements and safely maintain suspended load during a loss of offsite power.
5) The ability to safely lower a load by manual means should the main hoist drum shaft fail or it otherwise be required.

Prerequisites - Construction is complete and the system is turned over to the ISG. Required electrical power supply systems are available and controls are operable. Required loads are available to perform load testing of this crane. Construction phase static load testing (125% of rated load) is completed.

Test Method - The lighting system for the crane is energized and observed for proper operation. The bridge and the trolley are speed-tested in both directions. Current and voltage readings are taken in both directions. The proximity switches are tested for both the bridge and the trolley including trolley movement restriction switches in zones A, B, and C.

The main hoist and the auxiliary hoist are speed-tested traveling up and traveling down. Current and voltage readings are taken in both directions. All limit switches are tested. A loss of power situation is created for both hoists to check the brakes ability to hold without power. An overspeed test is simulated for the main hoist.

The above listed tests are run from the pendant pushbutton control system. Operability of the crane is also demonstrated from the cab. The anti-collision system is tested and the crane power source is verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

(P200.1) Cold Functional Test

Test Objective - To demonstrate that the Unit 2 plant systems alone and the Unit 1 and Unit 2 plant systems together are capable of operating on an integrated basis in normal and emergency modes.

Prerequisites - Required system preoperational tests have been completed and plant systems are ready for operation on an integrated basis.

Test Method - Emergency Core Cooling Systems (RHR & Core Spray) are lined up in their normal standby mode. The plant electrical system is lined up per normal electrical system lineup. Loss of coolant accident signals are initiated with and without a loss of offsite power. Voltages and loads are adjusted, as practical, to simulate the anticipated ranges of variations. Proper response of the electrical distribution system, diesel generators, and ECCS pumps will be verified.

Acceptance Criteria - Systems performance parameters are in accordance with the applicable design documents.

14.2.12.5 Unit 2 Acceptance Test Procedure Abstracts

Tests comprising the Acceptance Test procedures are listed in Table 14.2-7. For each test a description is provided for objective, prerequisites, method and acceptance criteria, where applicable.

A203.1 13.8 kV SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the capability of the 13.8 kV system to provide electrical power to the Startup and Unit 2 Auxiliary 13.8 kV Busses by demonstrating the proper operation of breakers, relaying and logic, permissive and prohibit interlocks, and instrumentation and alarms.

Prerequisites - Construction is completed to the extent necessary to perform this test and the systems are turned over to the ISG. Required 230 kV transmission lines are available to energize the 13.8 kV system. Required instruments and protective relays are calibrated and controls are operable.

Test Method - Breakers are opened and closed by operating or simulating controls to verify breaker operation, relaying and logic, permissive and prohibit interlocks, instrumentation and alarms, and automatic transfers.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

A207.1 LIGHTING SYSTEM AND MISCELLANEOUS 120V DISTRIBUTION ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Power and Lighting System. Specific objectives are to demonstrate the following:

1) The ability of Station Battery Lighting System to automatically transfer on loss of the Normal Lighting System.
2) To provide a format for tabulation of Technical Procedures (TP's) performed on system components during startup testing.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Normal and essential 480 volt AC and 125 volt DC power is available. Required test equipment is calibrated and controls are operable.

Test Method - The Station Battery Lighting System and Control Room Emergency Lighting System are tested by interrupting normal power supply feeds and verifying proper switchover from normal to emergency power and back to normal power.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design document.

A208.1 Domestic Water System Acceptance Test

Test Objective - The objective of this test is to functionally test the Domestic Water System and to demonstrate the following:

1) Ability of the Domestic Water System to provide hot and cold water for designated areas of the plant.
2) Ability of the Domestic Water System to provide required pressure for system operation.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - System operation is initiated manually. Ability of the system to provide water at the required temperatures and pressure is verified.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

A211.1 SERVICE WATER SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Service Water System. Specific objectives are to demonstrate the following:

1) The ability of Unit 2 Service Water System to supply the common loads after Unit I/II separation is removed.
2) The ability of Unit 2 Service Water to furnish a backup supply for dilution and injection water to the Cooling Tower Chlorination De-chlorination and Acid Injection Systems.
3) The ability of the system to furnish cooling water to the assigned Unit 2 heat exchangers and coolers.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available. Water supply from the cooling tower is available.

Test Method - System operation is initiated normally. The system is operated in the different design modes and Service Water Pump performance is determined. Required controls are operated or simulated signals are applied to verify automatic features, system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

A215.1 TURBINE BUILDING CLOSED COOLING WATER SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Turbine Building Closed Cooling Water (TBCCW) System. Specific objectives are to demonstrate the following:

1) The ability of the TBCCW System to furnish cooling water to miscellaneous turbine plant heat exchangers, coolers, and chillers.
2) The ability of a standby pump to automatically start in case of pressure loss in the header.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available to energize the necessary 480 volt motor control centers. Required instruments are calibrated and controls are available. The service water system is available. The instrument air system is available.

Test Method - The system operation is initiated manually, and where applicable automatically. The system is operated in the system design modes and TBCCW pumps performance is determined. Required controls are operated or simulated to verify automatic system functions and alarms.

Acceptance Criteria -

1) Each of the two TBCCW pumps is capable of delivering a minimum flow of 292.5 gpm.
2) With one pump in operation, the standby pump starts automatically at a low header pressure of less than or equal to 70 psig.
3) The TBCCW system provides cooling water to the following:

    a) Control rod drive pump bearing and oil coolers
    b) Condensate pump motor bearing coolers
    c) Instrument air compressor coolers
    d) Service air compressor coolers
    e) EHC fluid coolers
    f) Turbine Building sample station chillers
    g) Auxiliary Boiler sample station chillers

A218.1 INSTRUMENT AIR SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Instrument Air System. Specific objectives are to demonstrate the following:

1) The ability of the Instrument Air System to provide air to outlets located throughout the plant.
2) System controls function in accordance with design intent.
3) Alarms function properly to provide alert of an abnormality in the Instrument Air System.
4) Instrument air dryers reduce instrument air moisture in accordance with design requirements.
5) Service Air System can supply air at the dryer inlet of the Instrument Air System.
6) Standby Instrument Air Compressor, under AUTO Mode, starts automatically when the system pressure is below acceptable limits.
7) The ability of Unit 2 Instrument Air System to provide Unit 1 Instrument Air Distribution System with air, after Unit I/II Separation is removed.
8) The ability of Unit 2 Instrument Air System control circuits to trip the compressors during a LOCA coincident with a LOOP.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct the test. The system has been walked through, verified complete and air blowing has been completed. The required Technical Tests have been completed and the required instruments are calibrated.

Test Method - Both compressors are fully tested in both Manual and Auto mode of operation. The Dryer packages are tested for effectiveness and all automatic trips and alarms are verified.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A219.1 SERVICE AIR SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the General Service Air System as much as possible while Unit I/II separation is installed. Specific objectives are to demonstrate that:

1) The Service Air System can provide pressurized air to outlets located throughout the plant.
2) System controls function in accordance with design intent.
3) The standby unit will start automatically if the operating unit malfunctions.
4) The Unit II service air system can provide the Unit I service air system with air after the Unit I/II separation is removed.

Prerequisites - The prerequisites of this test are as follows:

1) Construction is complete to the extent necessary to conduct this test and system is turned over to ISG.
2) All component inspections, tests and calibrations have been completed satisfactorily.

Test Method - The system will be pressurized by starting the compressors. Compressor modes and functions will be checked for proper operation. Alarms will be verified as they are induced during normal operation or simulation.

Acceptance Criteria -

1) The service air compressors have the capacity to deliver 440 scfm of air each and provide air to outlets located throughout plant.
2) The compressors will automatically trip when an abnormal condition exists and alarms perform their design function.
3) The standby compressor will automatically start if the lead compressor fails or if its operation cannot meet service air system demand.
4) The Service Air System is capable of providing backup supply to the Instrument Air System

A220.1 NON RADIOACTIVE BUILDING DRAIN SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Nonradioactive Building Drain System. Specific objectives are to demonstrate the following:

1) The ability of the system to collect all radioactive liquid waste produced in the plant.
2) The ability of system controls to automatically or manually remove the nonradioactive, liquid waste from its source to a suitable, designated storage point. Prerequisites - Construction is complete to the necessary extent and the system is turned over to ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply systems are available. Instrument air is available.

Test Method - Low, High and High-High sump levels are simulated to verify pumps start and stop as required.

Acceptance Criteria - The system performs in accordance with design documents.

A228.5 CIRCULATING WATER PUMPHOUSE HEATING & VENTILATION SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Circulating Water Pumphouse heating and ventilating systems. Specific objectives are to demonstrate the following:

1) The ability of the following systems to maintain temperatures in their specific areas in accordance with selected set points of the corresponding thermostats:

    a) Circulating Water Pump H&V System
    b) Service Water Pump

2) The ability of each exhaust fan to start automatically and remove overheated air when the room temperature reaches the thermostat set point temperature.
3) System controls function in accordance with design intent.
4) Alarms function properly to provide alert of an abnormality in the H&V Systems.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. All instrumentation contained in this system is calibrated and the controls are operational.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

A231.1 COMPUTER UNINTERRUPTABLE POWER SUPPLY ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Computer Uninterruptable Power Supply. Specific objectives are to demonstrate the following:

1) The ability of the static transfer switch to provide automatic transfer of the 120 volt AC distribution panel loads from the preferred to the alternate supply on loss of the preferred supply or overcurrent or in case of load side fault.
2) The ability of the manual transfer switch and manual operation of the static transfer switch to transfer distribution panel loads between the preferred and the alternate source.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct this test. The system has been walked through and verified complete. The required Technical Tests have been completed and the required instruments are calibrated.

Test Method - The power supply is operated at full load, the static transfer switch is tested, the manual transfer is tested and all alarms and computer inputs associated with the system are verified.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A231.2 COMPUTER ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the computer. Specific objectives are to demonstrate the following:

1) The ability of the Display Control System (DCS) to monitor unit operation and generate video displays for operator use.
2) The ability of the Performance Monitoring System (PMS) to log data, make historical records, generate video displays and generate alarm status summary displays.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct this test. The system has been walked through and verified complete. The required Technical Tests have been completed and the required instruments are calibrated.

Test Method - Computer inputs are verified, the software programs are tested and computer self-protection and alarm functions are verified.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A232.1 SECURITY DEVICES ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Phase II security devices. Specific objectives are to demonstrate the following:

1) Video output of CCTV cameras and tamper and environmental functions operability.
2) E-Field detection and alarm capability also tamper and loss-of-power functions.
3) Hatch, manhole and handhole tamper/position indication function.
4) Microwave detection and alarm capability, also tamper and loss-of-power functions.

Prerequisites - Construction is complete to the extent necessary to perform this test, and components and systems have been turned over to the ISG.

Test Method - Verify operation of components.

Acceptance Criteria - Components perform in accordance with appropriate design documents.

A232.2 SOUTH GATEHOUSE EQUIPMENT ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the South Gatehouse Equipment. Specific objectives are to demonstrate the following:

1) Video output of legally controlled CCTV cameras and environmental functions operability.
2) Metal, material and explosion detectors operate properly.
3) Truck bay gates open, shut and lock as designed.
4) Microwave detection and alarm capability, also tamper and loss-of-power functions.
5) Turnstiles and handicap doors operate properly.

6) Inspection pit sump pumps will control sump level.
7) Snow detection system operates correctly.

Prerequisites - Construction is complete to the extent necessary to perform this test and components and systems have been turned over to ISG.

Test Method - Verify operation of components.

Acceptance Criteria - Components perform in accordance with appropriate design documents.

A232.3 SOUTH GATEHOUSE HVAC SYSTEM ACCEPTANCE TEST

Test Objective - The objective of this test is to demonstrate proper operation of the SGH HVAC System. Specific objectives are to demonstrate the following:

1) The ability of the Heating and Ventilation system to maintain temperatures in accordance with selected setpoints in the South Gatehouse compartments.
2) Ensure baseboard and unit heaters operate per thermostat control.
3) System controls function in accordance with design intent.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instrumentation is calibrated and controls are operable. Instrument air is available. Required electrical power is available.

Test Method - System operation is initiated manually. Required controls are operated or simulated signals are applied to verify system operation and temperature setpoints.
Acceptance Criteria - System performance parameters are in accordance with applicable design documents.

A232.4 LLRWF SECURITY SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the LLRWHF Security System. Specific objectives are to demonstrate the following:

1) The functional operation of Closed Circuit Television System (CCTV).
2) Proper operation of E-Field Devices, including normal operation, alarm and tamper of the devices.
3) Proper operation of manhole and handhole tamper switches.

Prerequisites - Construction is complete to the extent necessary to perform this test and components and systems have been turned over to ISG.

Test Method - Verify operation of components.

Acceptance Criteria - Components perform in accordance with appropriate design documents.

A233.1 TURBINE BUILDING HEATING & VENTILATING SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Turbine Building Heating and Ventilating System. Specific objectives are to demonstrate the following:

1) The ability of the system to provide a supply of filtered and tempered air to all areas of the Turbine Building.
2) The ability of the system to maintain air flow from areas of lesser potential contamination to areas having greater potential contamination.
3) The ability of the system to exhaust air from potentially contaminated spaces through particulate and charcoal filters.
4) The ability of the system to maintain the Turbine Building at a slightly negative pressure (with respect to atmospheric) to minimize exfiltration to the outside atmosphere.
5) The ability of the system to recirculate and cool Turbine Building air to reduce exhaust volume.
6) The ability of the system to discharge all exhaust air through the Turbine Building exhaust vent.
7) The ability of the system to supply cooling air to the reactor recirculation motor-generator sets.

Prerequisites

1) Flow balancing is completed
2) Instrument Air System is operational.
3) Fire Protection System is operational.

Test Method - The system will be tested with manual controls and automatically where applicable. All interlocks, start and trip schemes will also be verified.

Acceptance Criteria -

1) Maintain building temperature above 40°F.
2) Maintain building spaces below the following maximum temperatures:

    a) General areas 104°F
    b) Electrical rooms 104°F
    c) Mechanical areas 120°F

A233.2 TURBINE BUILDING CHILLED WATER SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Turbine Building Chilled Water System. Specific objectives are to demonstrate the following:

1) The ability of the Turbine Building Chilled Water System to maintain design temperature.
2) The ability of the Service Water System to remove the chiller condenser heat.
3) The ability of the Chilled Water System pumps to perform their design function.
4) The ability of the chillers to perform their design function.
5) The ability of the temperature control valves to perform their design function.

Prerequisites

1) Construction is complete to the extent required to complete this test.
2) The following systems are operational:
   a) Instrument Air System
   b) Turbine Building H&V is functionally checked
   c) Service Water System
   d) Makeup Demineralizers
   e) Expansion tank is filled halfway and pressurized to 20 psi

Test Method - The system will be initiated manually and automatically with all automatic functions verified. All interlocks will be verified and alarms checked as they occur during normal process variation.

Acceptance Criteria - Turbine Building Chilled Water System will supply water at 50°F ± 5°F.

A233.3 TURBINE BUILDING BATTERY ROOM EXHAUST SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Turbine Building Battery Room Exhaust System. Specific objectives are to demonstrate the following:

1) The ability of the system to exhaust air from the turbine building battery room to the atmosphere.

Prerequisites - Construction is complete to the extent necessary to complete this test and the system is turned over to ISG. Required instrumentation is calibrated and controls are operable. Required electrical power is available.

Test Method - The exhaust fan is put into operation manually and operation is verified. Required controls are operated or a simulated signal is applied to verify that the fan will trip automatically on a low flow signal after a time delay.

Acceptance Criteria - System performance parameters are in accordance with applicable design documents.

A235.1 FUEL POOL COOLING AND CLEANUP SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Fuel Pool Cooling and Cleanup System. Specific objectives are to demonstrate the following:

1) Fuel pool filter/demineralizers operate as designed.
2) The system is able to maintain a minimum differential pressure between shell and tube sides of the fuel pool cooling heat exchangers.
3) The fuel pool skimmer surge tank operates properly.
4) It is not possible to siphon water from the fuel pool through any cooling water supply line.
5) The system will automatically apply and remove filter medium from the filters.

Prerequisite - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable.

The Demineralized Water Transfer System, Service Water System, Sample System, Condensate System, Instrument Air System, Residual Heat Removal System, Liquid Radwaste Drain System, Emergency Service Water System, Solid Radwaste System and required electrical power supply systems are available.

Test Method - The system is operated to demonstrate the demineralizer heat exchangers and fuel pool cooling pumps operation. Required controls are operated or simulated signals are applied to verify system operation, automatic valve alignment and system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design requirements.

A237.1 MAKEUP TRANSFER AND STORAGE, CONDENSATE AND REFUELING WATER TRANSFER SYSTEMS ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Makeup Transfer and Storage, Condensate and Refueling Water Transfer Systems. The specific objectives are to demonstrate the following:

1) Ability to supply demineralized water as makeup to the reactor closed coolant systems.
2) Ability to supply demineralized water to the condensate storage tank.
3) Ability to supply condensate makeup for the various plant systems, including the condenser hotwells.
4) Ability to supply condensate to the suctions of the high pressure coolant injection (HPCI), reactor core isolation cooling (RCIC), core spray and control rod drive (CRD) pumps.
5) Ability to supply demineralized water as makeup to the TBCCW and GRW closed coolant systems.
6) Ability of the Condensate Transfer System to supply a suction to condensate transfer pumps from condensate storage Tank B.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Hydrostatic testing, velocity flushing and air blowing have been complete to the extent required to perform this test. Required instruments are calibrated and controls are operable. Required electrical power supply systems, makeup demineralizers, and instrument air are available. The associated plant systems which are capable of receiving water from the Demineralized Water System are available to the extent required to perform this test.

Test Method - The operating modes of this system are initiated manually and, where applicable, automatically. The system is operated to determine performance of all pumps. Control devices are operated or simulated signals are applied to verify system automatic functions and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents. All automatic trips and alarms actuate within their allowable limits.

A239.1 CONDENSATE DEMINERALIZER SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the Condensate Demineralizer System to process full condensate flow producing effluent of acceptable quality thereby providing reasonable assurance that contaminants which may be introduced to the condenser during normal and

abnormal plant operation will be removed. Also demonstrate that resin transfer, cleaning and regeneration are pushbutton initiated, fully automatic processes that clean and regenerate for reuse. Demonstrate valving and controls are such that a ready standby unit can be placed in service, or any operating unit can be taken out of service from the local control panels.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Component technical procedures, component calibrations have been completed satisfactorily.

Test Method - The system will be tested while processing water at 100% rated flow and at 120% rated flow, verifying that monitored influent and effluent parameters do not exceed design values. Resin capacity will be tested (one bed minimum) by processing the design quantity of water and verifying that monitored effluent parameters do not exceed design values prior to achieving the design output. Control functions related to all modes of operation shall be demonstrated. Flow paths will be verified under actual operation as will all valve operations, motor-driven equipment performance, demonstration of all monitoring control and support equipment while processing dirty, exhausted resin charges exposed to condensate flow, through the regeneration modes, returning the resin charge to inservice processing condensate to design quality effluent. Simulation of functions will be used where off-normal conditions cannot be established or redundant testing of the same function under actual conditions serves no purpose.

Acceptance Criteria - Each vessel passing rated flow will produce water quality at design spec or better. Each vessel is capable of passing 120% rated flow for a short period of time. The condensate demineralizer and regeneration systems are pushbutton initiated, automatically controlled from a local control panel for all modes of operation. An automatically controlled isolation valve protects the resin transfer system from condensate system pressure. A proper concentration of acid solution is supplied to regenerate the cation resins and the proper concentrations of caustic solution at the proper temperature is supplied to regenerate the anion resins.

A239.2 Ultra Sonic Resin Cleaner

Test Objective - To ensure design requirements are met and document critical operating parameters.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Regeneration system is not in use. The resin storage vessel is empty of resin and the Cation Vessel is filled with test resin.

Test Method - System is to be run using intrinsic components with both exhausted and fresh resin.

Acceptance Criteria - The system processed 0.5 to 1.5 cubic ft. of mixed resin beads per minute as required. Resin processed meets cleanliness requirements with minimal resin losses due to resin failure from ultrasonic generation.

A240.1 LUBE OIL TRANSFER, STORAGE, & PURIFICATION SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Lube Oil Transfer, Storage and Purification System. Specific objectives are to demonstrate the ability of the system to do the following:

1) Transfer lube oil to and from any combination of the following reservoirs:

    a) Reactor Feed Pump Turbine Lube Oil Reservoir A (RFPTLOR A)
    b) RFPTLOR B
    c) RFPTLOR C
    d) Batch Oil Tank
    e) Main Turbine Lube Oil Reservoir

2) Purify the lube oil during any of the above mentioned transfers.
3) The centrifuge safety interlocks and alarm devices function properly.
4) The Lube Oil Transfer Pump 2P-143 meets or exceeds the minimum capacity given in the manufacturers data.
5) The Batch Oil Tank Pump 2P-144 meets or exceeds the minimum capacity given in the manufacturers data.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and the controls are operable. Demineralized water transfer system and Instrument air system are operational. Required electrical supply systems are available and lube oil is available in sufficient quantity.

Test Method - The lube oil transfer pump performance parameters are measured and recorded. The batch oil tank pump performance parameters are measured and recorded. The centrifuge and oil heaters control and alarm circuits are tested and the operating parameters are measured and recorded. All flowpaths are then verified.

Acceptance Criteria - The system performance is in accordance with the applicable design documents.

A241.1 COOLING TOWER SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Cooling Tower System. Specific objectives are to demonstrate the following:

1) The ability of the chlorination system to prepare and deliver a chlorine solution of the proper strength to the cooling tower basin diffusers.
2) The ability of the sulfuric acid injection system to prepare and deliver an acid solution to the cooling tower basin diffusers.
3) The ability of the cooling tower blowdown valves to direct blowdown water to either the discharge spargers or the cooling pond.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG.

Required instruments are calibrated and controls are operable. Required electrical power supply systems, instrument air system, plant makeup water system, and chlorination building H&V are available.

Test Method - Sliding gate valves and bypass valve operation is verified. Makeup system is verified to keep basin water level at the proper level. Chlorination addition capabilities are verified, and the acid system is verified to control pH at the proper value. The blowdown treatment system will remove enough chlorine to allow the plant to meet the requirements of its environmental discharge permit.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A242.1 CIRCULATING WATER SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Circulating Water System. Specific objectives are to demonstrate the following:

1) The ability of the system to circulate water from the cooling tower through the circulating water pumps and main condensers at design pressure and flow and return it to the cooling tower.
2) The ability of the control systems to perform within design limits.
3) The ability of interlock circuits to protect against component failures that might result from improper system lineups.

Prerequisites - Construction is complete to the extent necessary to run this test and the system is turned over to the ISG.

Required instruments are calibrated and controls are operable. Required electrical power supply systems and the cooling tower system are available.

Test Method - Pump protective interlocks and system design pressures and flows are verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A243.1 CONDENSER AIR REMOVAL SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Condenser Air Removal System. Specific objectives are to demonstrate the following:

1) The ability of the mechanical vacuum pump to pull a vacuum on the condenser.
2) The ability of the SJAE's to maintain condenser vacuum
3) The ability of the SJAE condenser to remove noncondensible gases from the main condenser and discharge them to the gaseous radioactive waste system.
4) The ability of SJAE condenser to condense any steam removed from the condenser with the noncondensible gases and return the condensate to the condenser.
5) The ability of dilution steam flow controls to operate properly and to verify the low and low-low flow alarms.

Prerequisites - The prerequisites for this test are as follows:

1) Construction is complete to the extent necessary to perform this test and system is turned over to ISG.
2) The main turbine is on turning gear.

3) The aux. boiler is operational and the main turbine seals are established.
4) Instrument Air System is operational.
5) Turbine Building H&V is operational.
6) The Condensate System is operational.
7) The Off-Gas System is operational.
8) The separator-silencer is filled to the proper level.
9) All steam lines are properly drained of condensate.

Test Method - A vacuum will be pulled on the condenser using the mechanical vacuum pump and it will be maintained using the SJAE's. Valve interlocks will be checked as will all automatic functions. Alarms will be verified as they are induced during normal system change or simulation.

Acceptance Criteria -

1) The mechanical vacuum pump can pull a vacuum of 5 in. Hga on the main condenser.
2) The SJAE's can maintain the vacuum after the mechanical vacuum pump is shutdown.
3) Valve sequencing operates per design.

A243.2 CONDENSER TUBE CLEANING SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Condenser Tube Cleaning System. Specific objectives are to demonstrate the following:

1) The ability of the system to operate automatically and in proper sequence for all functions.
2) The ability of the alarms to provide alert of an abnormality in the system.
3) The ability of the system to be operated manually.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instruments are calibrated and controls are operable.

Test Method - System operation is initiated manually and verified. System operation is put in automatic and sequencing is verified. Controls are operated or simulated signals are applied to verify operation of alarms.

Acceptance Criteria - System performance parameters are in accordance with applicable design documents.

A244.1 CONDENSATE SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Condensate System. Specific objectives are to demonstrate the following:

1) The ability of the condensate pumps and their associated valves to function properly.
2) The ability of the system to maintain minimum recirculation flow through each condensate pump.
3) The ability of the Turbine Building Closed Cooling Water System to provide sufficient cooling flow for the condensate pump bearings.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Power and control voltage is available for the associated motors, valves and instruments. Required calibration and operation of instruments, protective devices and controls is verified. Motor bearing cooling and pump seal water and instrument air is available. Main condensers are cleaned and filled with water.

Test Method - The system operation is manually initiated by starting the condensate pumps and establishing flow through various paths. System logic, interlocks and alarms are verified to be in accordance with design intent and system flows, pressures are within engineering specifications under various simulated operating conditions.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents for the conditions simulated during the test.

A246.1 EXTRACTION STEAM SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Extraction Steam System and Feedwater Heaters - Drains and Vents System. Specific objectives are to demonstrate the following:

1) The isolation valves in the Extraction Steam System, the Feedwater Heater Drain System, and the Feedwater Heater Vents operate as required by their design.
2) All associated systems that drain to the feedwater heater systems isolate when required by the Feedwater Heater System design.

Prerequisites - Construction is completed to the necessary extent and the system is turned over to ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply systems are available. Plant demineralized water and instrument air is available.

Test Method - Extraction Steam and Feedwater Heater System tests are simulated and performed with no steam present to the turbine. All system interlocks are tested.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A263.1 BYPASS INDICATION SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Bypass Indication System and the Bypass Indication System Panel 2C694.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG.

Test Method - The system is placed in operation. Proper operation and indication is verified by operating controls or applying simulated signals.

Acceptance Criteria - System performance parameters are in accordance with applicable design documents.

A267.1 Vibration and Loose Parts Monitoring System

Test Objectives - The general objective of this test is to demonstrate proper operation of the Loose Parts Monitoring System and Vibration Monitoring System. Specific objectives are to demonstrate the following:

1) The ability of the system to detect and annunciate unusual noises that indicate a metallic loose part.
2) The ability of the system to detect excessive vibration in the reactor recirculation pumps.

Prerequisites - Construction is complete to the extent necessary and the various systems are turned over to the ISG. Required instruments are calibrated and control schemes have been checked and are operable.

Test Method - Each Loose Part Detection (LPD) channel is tested by causing an impact on the piping monitored and verification that a corresponding visual alarm is activated. The Digital Loose Part Location (DLPL) is functionally tested by placing any two LPDs in alarm test condition and then verifying that the DLPL visible and audible alarms annunciator are activated and that the tape recorder starts recording the signal on the alarming channel. Each vibration probe channel is tested during recirculation pump operation and proper indication verified including visible alarms.

Acceptance Criteria - A predetermined impact on a specified coolant piping will result in a corresponding visual alarm. A series of impacts, based on the logic indicating a loose part, will initiate an audible and visual alarm and the tape recorder will start automatically. Excessive vibration in either recirculation pump in any direction will be detected and a visual alarm initiated.

A268.1 SOLID RADWASTE SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Solid Radwaste System. Specific objectives are to demonstrate the following:

1) The ability of the system to control, handle and transfer wet waste sludges generated by the Reactor Water Cleanup System, the Fuel Pool Cleanup System and the Condensate Cleanup System.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - System operation is initiated manually. Required controls are operated and process is varied to verify interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A269.2 LIQUID RADWASTE PROCESSING SUBSYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Liquid Radwaste Subsystems. Specific objectives are to demonstrate the ability of the following subsystems to collect, process, store and monitor for reuse or disposal, all potentially radioactive liquid waste:

1) Chemical waste collection.
2) Chemical waste neutralizing.
3) Chemical waste storage and transfer.

Prerequisites - Construction is complete to the extent necessary to perform this test and the subsystems are turned over to the ISG. Required instruments are calibrated and controls are operable. Required Electrical Power Supply Systems are available. Liquid radwaste subsystem storage tanks and sample tanks are available to be filled with water.

Test Method - Subsystem pumps are operated and performance characteristics are determined. Level controls are operated to verify alarms, pump starts and pump shutoffs. Performance of the liquid radwaste filtration, demineralization, chemical waste neutralization, chemical radwaste evaporation system, laundry radwaste filtration and effluent isolation is determined to the extent possible during this test.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A271.1 GASEOUS RADWASTE RECOMBINER CLOSED COOLING WATER SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the proper operation of the GRRCCW system, specifically, that the cooling pumps supply the rated flow to the system, the cooling water is temperature controlled, and the chemical addition tank has flow capabilities for adding chemicals to the system.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available. Required instruments are calibrated and controls are available. The instrument air system is available. The service water system is operational and lined up to the GRRCCW heat exchangers.

Test Method - The system operation is initiated manually, and where applicable automatically. The system is operated in the system design modes and GRRCCW pumps performance is determined. Required controls are operated or simulated to verify automatic system functions and alarms.

Acceptance Criteria - The Unit One (1) and Common cooling water flow through the heat exchangers is temperature controlled through a range of 90° to 120°F. The Unit One (1) and common cooling water pumps deliver 1124 gpm to the respective system. Chemicals can be added to the system when flow is established through the Unit One (1) and common chemical addition tanks.

A272.1 GASEOUS RADWASTE SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the operation of the Off-Gas Recombiner System, specifically, that the system will operate in the standby, pre-start and process modes and that the standby recombiner can be brought on line within 10 minutes.

Prerequisites - Construction is completed to the extent necessary to perform this test and the system is turned over to the ISG. Required electrical power supply systems are available. Required instruments are calibrated and controls are available. The instrument air system is operational. The following systems are operational as needed: Condensate system, GRRCCW system, RBCCW, Auxiliary Boiler, and Main Condenser.

Test Method - The system operation is initiated manually, and where applicable, automatically. The system is operated in the system design modes, required controls are operated or simulated to verify automatic system functions and alarms.

Acceptance Criteria - The Unit II Off-Gas Recombiner System performs the following:

1) The Off-Gas Recombiner System will operate in the Standby, Prestart and Process modes.
2) The Unit 2 recombiner can maintain recombiner temperature close to 300°F and can be brought on line in 10 minutes.
3) The Off Gas Recombiners can be transferred and shut down locally and from the main control room.
4) The Charcoal Absorber subtrains are capable of being transferred and isolated locally and from the main control room.

A272.2 Off Gas Recombiner System

Test Objective - To demonstrate the operation of the Off Gas Recombiner unit two cross tie with the unit common recombiner; such that the unit two off gas can be processed through the common recombiner and on to the unit two charcoal absorbers.

Prerequisites - The completion and acceptance of test A272.1B. Component technical procedures and instrument calibrations associated with the unit two and common cross-ties as required are performed. The unit two Turbine Building Ventilation and Offgas Radiation Monitoring system is in service. Unit two shall have, in effect, a license to discharge gaseous radioactive effluent.

Test Method - System operation is initiated manually, and where applicable operated in the system design modes. Required controls are operated or simulated to verify automatic system function.

Acceptance Criteria - Unit two and common recombiner and charcoal train components are capable of being transferred, shutdown, crosstied and isolated locally or remotely depending on the requirements of unit one and unit two.

A274.1 NITROGEN STORAGE AND SUPPLY SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Nitrogen Storage and Supply. Specific objectives are to demonstrate the following:

1) Ability to control the supply of nitrogen gas for primary containment purging.
2) Ability to provide and control the supply of makeup nitrogen gas to maintain an inert atmosphere in the containment during normal operations and for post LOCA containment dilution.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical power supply systems are available.

Test Method - System operation is initiated manually. The system is operated in the different design modes, system performance is determined and a purge flow will be established to demonstrate proper operation. Required controls are operated or simulated signals are applied to verify automatic features, system interlocks and alarms.

Acceptance Criteria - The system performance parameters are in accordance with applicable design documents.

A276.2 PROCESS SAMPLING SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Process Sampling System. Specific objectives are to demonstrate the following:

1) The operability of the reactor and turbine building thermal baths.
2) The ability of the system to provide required flow to all associated analytical and monitoring equipment.
3) The capability to obtain grab samples at required locations.
4) The proper operation of all instruments to give proper indications, readings and alarms.
5) The ability of chemical fume hoods to prevent or control outleakage when drawing grab samples at the turbine, reactor and radwaste building sampling stations.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instrumentation is calibrated and controls are operable. Required electrical power supply systems are available. Plant demineralized water is available. Turbine Bldg. and Reactor Bldg. closed cooling water is available.

Test Method - Tests whenever feasible will be performed when the process being sampled is in operation. Other tests, such as main steam samples, will be simulated. All sampling devices will be calibrated and alarm conditions set.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A284.1 MOISTURE SEPARATORS ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Moisture Separators. Specific objectives are to demonstrate the following:

1) The ability of the moisture separators drain tank level controls to maintain level and provide a main turbine trip signal as a result of high level.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Hydrostatic testing, velocity flushing and air blowing have been completed. Required instruments are calibrated and controls are operable. Required electrical power supplies, water supplies and instrument air are available. The associated plant systems which are capable of receiving water are available to the extent necessary to perform this test.

Test Method - The water level in the drain tank will actually be varied and the proper operation of the level controls, level alarms and level trips will be verified.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents. All automatic trips and alarms actuate within their allowable limits.

A285.1 CATHODIC PROTECTION SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Cathodic Protection System. Specific objectives are to demonstrate the following:

1) To ensure that Cathodic Protection System equipment has been completely installed and the various components properly tested and adjusted for system startup and operation.
2) To demonstrate that the Cathodic Protection System performs its design functions to protect the various underground structures and piping systems.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG.

Test Method - Verify equipment has been completely installed. Operate controls or apply simulated signals to verify system performs to its design function.

Acceptance Criteria - System performance parameters are in accordance with applicable design documents.

A285.2 FREEZE PROTECTION SYSTEM ACCEPTANCE TEST

Test Objective - To demonstrate the ability of the system to supply and interrupt power to the individual heater circuits at the correct voltage and current in both the AUTO and MANUAL modes of operation and to demonstrate the system's ability to detect a loss of source supply voltage on a faulty heater circuit.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. The required instruments are calibrated and the controls are operable.

Test Method - Each control panel is energized and proper source supply voltage verified. The required controls will be operated and signals simulated as necessary to verify the individual heater circuits function per design in the AUTO, OFF, and Manual modes, and are providing the design specified heat requirements for the applications.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents, technical spec's. and vendor prints.

A288.2 NON-ESS 250 VOLT DC SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Non-ESS 250 Volt DC System. Specific objectives are to demonstrate the following:

1) The ability of the Non-ESS 250 Volt DC System battery to provide stored energy to supply power to selected loads in the event of a loss of all AC power at the station.
2) The ability of the Non-ESS 250 Volt DC System battery chargers to provide power as required for station operation while simultaneously charging and maintaining the charge of the 250 Volt DC battery when station AC power is available.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required calibration and operation of instruments, protective devices, and breakers is verified. 480V AC Power, Resistor Load Bank, Battery Room Ventilation and Emergency Eyewash is available and/or in service.

Test Method - The Battery Performance Test is manually initiated by connecting the battery bank to the resistor load bank and discharging the battery at a constant current for a specified period of time. The Battery Service Test is manually initiated by connecting the battery bank to the resistor load bank and simulating, as closely as possible, the load the battery will supply during a design basis accident. Following the battery service test, the battery will be charged while the chargers are also supplying the maximum expected steady-state plant loads as simulated with the resistor load bank. Each battery charger is also connected to the resistor load bank and current is increased to its maximum rating with the charger isolated from the battery bank to verify charger capacity, ripple, regulation and current limit capability.

Acceptance Criteria - The batteries can satisfactorily deliver stored energy for the specified amount of time as required for the Performance and Service Test. The battery chargers can deliver rated output and can charge their associated battery bank from minimum voltage to a fully charged state in a specified amount of time while simultaneously supplying normal loads.

A290.1 - Safety Parameter Display System Acceptance Test

Test Objective - Verify proper data system response to dynamic system variations. Verify primary parameter display dynamic response and ensure display keyboards have proper system command control.

Prerequisites - Construction is complete and the system is turned over to the ISG. Component technical procedures and calibrations are complete and on file.

Test Method - The SPDS is verified operational by using intrinsic components and features and by simulating varying plant conditions to test system response.

Acceptance Criteria - Verify diagnostic point display and primary parameter display respond as designated to simulated dynamic inputs. Control Room and TSC, function switch panel and aydin display keyboards direct SPDS CRT's properly.

A290.2 Safety Parameter Display System Power Supply Acceptance Test

Test Objectives - Demonstrate the ability of the static and manual transfer switches to provide SPDS loads from either the preferred or alternate power supply.
Prerequisites - Construction is complete and the system is turned over to the ISG. Component technical procedures and calibrations are complete and on file.

Test Method - A strip chart recorder and variable load bank are used to vary operating conditions and record system response.

Acceptance Criteria - All power supplies are verified to supply 120 vac. Both static and manual transfer switches transfer from one power supply to another as designed.

A291.1 ANNUNCIATOR SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the plant annunciators. Specific objectives are to demonstrate the following:

1) The ability of the main control room annunciators to provide audible and visual indication of an alarm condition.

Prerequisites - Construction turnover of the system is complete to the extent required to conduct this test. The system has been walked through, verified complete and the component technical tests have been completed.

Test Method - Simulated alarms are applied and the audible and visual indication verified. Annunciator loss of power and ground detection feature are also tested, where applicable.

Acceptance Criteria - The system performance parameters are in accordance with applicable engineering design documents.

A292.1 TURBINE STEAM SEALS & DRAINS ACCEPTANCE TEST

Test Objective - The objective of this test is to demonstrate the proper operation of the turbine steam seal system and drains using the auxiliary boiler steam supply to the turbine steam seal header. Also, the test will demonstrate the ability of the steam packing exhauster to maintain a proper vacuum on the steam seal exhaust header.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls are operable. Required electrical supply systems are available. The instrument air system is operational. The auxiliary boilers are available and in the standby mode. The condensate system is operational. The main turbine and feedwater turbines are available to be placed on turning gear. The main condensers are lined up to receive drains and to provide support to seal the main and reactor feed pump turbines.

Test Method - The auxiliary boilers will provide a continuous and regulated supply of steam to the steam seal evaporator header. The performance of the steam packing exhauster to maintain a proper vacuum on the exhaust header is verified. Simulated and automatic signals are applied to verify system interlocks and alarms for the seal steam evaporator drain tank, seal steam system and steam packing exhauster.

Acceptance Criteria - The steam packing exhauster will maintain an approximate vacuum of 5.0 inches of water on the seal steam evaporator exhaust header during normal operating conditions. The auxiliary steam system can provide a continuous amount of clean steam to the seal steam evaporator header at approximately 4 psig to supply the following with sealing steam: the main turbine shaft seals, the stem packings of the main steam stop valves, control valves, and bypass valves, the combined intermediate valves, the shaft seals of the reactor feed pump turbines, and the stem packings of the reactor feed pump turbine stop and control valves.

A293.1 TURBINE LUBE OIL SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Turbine Lube Oil System. Specific objectives are to demonstrate the following:

1) Turning gear operates per design.
2) Lube oil vapor extractor and mist eliminator operate per design.
3) Turbine-generator motor suction pump operates per design.
4) Emergency bearing oil pump operates per design.
5) Turning gear oil pump operates per design.
6) Turbine-generator bearing lift pumps operate per design.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls operable. Required electrical power supply systems are available. The Service Water System and the Main Turbine-Generator Assembly is available.

Test Method - System operation is initiated manually and automatically testing all trips and interlocks. The main reservoir vapor extractor is tested manually and automatically to verify proper vacuum in the main reservoir and isolation on detection of fire. All main lube oil pumps are tested for proper manual and automatic start to verify proper bearing oil supply pressures during all conditions including loss of AC power. Bearing lift pumps are tested manually and automatically to verify proper bearing lift for turning gear operation. The main turbine turning gear is tested for both manual and auto engaging and starting to ensure proper rotation during shaft cooldown.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A293.2 TURBINE ELECTROHYDRAULIC CONTROL AND SUPERVISORY SYSTEMS ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Turbine Electro Hydraulic Control (EHC) and Supervisory System. Specific objectives are to demonstrate the following:

1) The EHC Hydraulic System operates per design.
2) The hydraulic trip circuit operates per design.
3) The EHC operates to control the turbine per design.
4) The turbine valves and valve test circuits operate per design.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Required instruments are calibrated and controls operable. Required electrical power supply systems are available. The Main Condenser, Stator Cooling and Instrument Air Systems are available.

Test Method - Hydraulic System Manual and Automatic Modes are tested. All turbine trip paths are verified. All system stop, control and bypass valves are tested for EHC operation. Turbine warm-up, speed select, and load ramp functions are verified. Turbine steam lead drain valves are tested for proper operation.

Acceptance Criteria - The system performance parameters are in accordance with the applicable design documents.

A295.1 HYDROGEN SEAL OIL SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate the proper operation of the Hydrogen Seal Oil System. Specific objectives are to demonstrate the following:

1) Proper flows and pressures can be maintained in the Hydrogen Seal Oil System.
2) The generator can be purged with carbon dioxide to an air-free acceptable level.
3) The Generator Gas Sampling System operates per design.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system has been turned over to ISG. All necessary support systems are operable. Required instrumentation is calibrated and controls are operable.

Test Method - System operation is initiated manually. The system is operated in the system design modes, required controls are operated or simulated to verify automatic system functions and alarms.

Acceptance Criteria - System performance parameters are in accordance with applicable design documents.

A297.1 STATOR COOLING SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this procedure is to demonstrate proper operation of the Stator Cooling System. Specific objectives are to demonstrate the following:

1) The system provides automatic regulation of flow and temperatures of clean de-ionized water to the stator windings, alterrex-exciter power rectifiers and high voltage bushings.
2) The stator liquid system functions as required for proper safety protection of system components (trips, indications, alarms).

Prerequisites - Construction is complete to the extent necessary to perform this test and the system has been turned over to ISG. All necessary support systems are operable. Required implementation is calibrated and controls are operable.

Test Method - System operation is initiated manually. The system is operated in the system design modes, required controls are operated or simulated to verify automatic system function and alarms.

Acceptance Criteria - System performance parameters are in accordance with applicable design documents.

A298.1 MAIN GENERATOR AND EXCITATION SYSTEM ACCEPTANCE TEST

Test Objectives - To demonstrate the ability of the protective relays and their associated interlocks to shutdown the generator.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to the ISG. Component calibrations and alarm verifications are complete to the extent necessary to perform this test.

Test Method - Through the use of jumpers, lifted leads, pulled fuses, and manual manipulation of relay contacts conditions are simulated to initiate automatic responses of the generator protection circuitry. Proper operation of the generator protection circuitry is verified.

Acceptance Criteria - The following is verified:

1) The ability of the voltage regulator to transfer from auto to manual upon initiation of design events.
2) The ability of the exciter field breaker to function according to design basis events.
3) The ability of the primary and backup lockout relays to trip the generator upon initiation of design basis events.

A299.2 COMMUNICATION SYSTEM ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Communication System. Specific objectives are to demonstrate the following:

1) The ability of PA System components to function as an integrated system.
2) The ability of the Plant Evacuation Alarm System to broadcast selected signals to selected areas of the plant.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG.

Test Method - By operating the required controls each Public Address station will be tested in the transmit and receive modes on all channels. The associated speakers will be tested for functional audibility.

The Plant Evacuation and Alarm System will be used in conjunction with the PA system to broadcast all 5 of the possible tones and frequencies generated by the system. Also the systems isolation and silencing features will be operationally verified.

Acceptance Criteria - The systems performance is in accordance with the applicable design documents.

A299.3 COMMUNICATION SYSTEM ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Communication System. Specific objectives are to demonstrate the following:

1) The ability of the Plant Maintenance/Test Jack System to provide communications throughout the plant.

Prerequisites - Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. The required instruments are calibrated and controls are operable.

Test Method - The Plant Maint./Test Jack System will be tested by operating the required controls and verifying each Jack Stations transmit/receive capability on all of the systems 23 channels. An integrated test with several remote Jack Stations attached will also be performed.

Acceptance Criteria - The systems performance is in accordance with the applicable design documents.

A299.4 RADIATION AREA DOORS ACCEPTANCE TEST

Test Objectives - The general objective of this test is to demonstrate proper operation of the Radiation Area Doors. Specific objectives are to demonstrate the following:

1) Radiation area door "CAUTION/HIGH RADIATION AREA" alarms actuate properly.
2) Air lock door indicating lights operate properly.

Prerequisites - Construction is complete to the extent necessary to perform this test and areas are turned over to ISG.

Test Method - Unlatch radiation area door to ensure alarm actuates. Verify air lock door indicating lights operate properly.

Acceptance Criteria - Components perform in accordance with applicable design documents.

14.2.12.6 Unit 2 Startup Test Program Procedure Abstracts

All those tests comprising the Unit 2 Startup Test Program (Table 14.2-3) are discussed in this section. For each test a description is provided for test purpose, test prerequisites, test description and statement of test acceptance criteria, where applicable. Additions, deletions, and changes to these discussions are expected to occur as the test program progresses. Such modification to these discussions of the initial startup test program will be reflected in amendments to the FSAR.

In describing the purpose of a test, an attempt is made to identify those operating and safety-oriented characteristics of the plant which are being explored.

Where applicable, a definition of the relevant acceptance criteria for the test is given and is designated either Level 1 or Level 2. A Level 1 criterion normally relates to the value of a process variable assigned in the design of the plant, component systems or associated equipment. If a Level 1 criterion is not satisfied, the plant will be placed in a suitable hold-condition until resolution is obtained. Tests compatible with this hold-condition may be continued. Following resolution, applicable tests must be repeated to verify that the requirements of the Level 1 criterion are now satisfied.

A Level 2 criterion is associated with expectations relating to the performance of systems. If a Level 2 criterion is not satisfied, operating and testing plans would not necessarily be altered. Investigations of the measurements and of the analytical techniques used for the predictions would be started.

For transients involving oscillatory response, the criteria are specified in terms of decay ratio (defined as the ratio of successive maximum amplitudes of the same polarity). The decay ratio must be less than unity to meet a Level 1 criterion and less than 0.25 to meet Level 2.

(ST-1) Chemical and Radiochemical

Test Objectives - The principal objective of this test is to demonstrate that the chemistry of all parts of the entire reactor system meet specifications and process requirements.

Specific objectives of the test program include documentation of radwaste liquid discharge, evaluation of the Condensate Polishing system, and evaluation of the Reactor Water Cleanup system. Data for these purposes is secured from a variety of sources: plant operating records, regular routine coolant analysis, radiochemical measurements of specific nuclides, and special chemical tests.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - Prior to fuel loading, chemical samples are taken to ensure that reactor coolant and Fuel Pool Cooling and Cleanup System sample stations are functioning properly and to determine initial concentrations. Additionally, subsequent to fuel loading, during reactor heatup, and at each major power level change, samples are taken to determine the chemical and radiochemical quality of reactor water and reactor feedwater.

Acceptance Criteria - Level 1 - Chemical factors defined in the Technical Specifications and Fuel Warranty must be maintained within the limits specified. The activity of liquid effluents must conform to license limitations. Water quality must be known at all times and should remain within the guidelines of the Water Quality Specifications.

Level 2 - Not applicable.

(ST-2) Radiation Measurements

Test Objectives - The objectives of this test are (a) to determine the background radiation levels in the plant environs prior to operation for base data on activity buildup and (b) to monitor radiation at selected power levels to assure the protection of personnel during plant operation.

Prerequisites - The required preoperational tests have been completed.

Test Method - A survey of natural background radiation at selected locations throughout the plant will be made prior to fuel loading. During the Heatup Test Condition and during Test Conditions 1, 3 and 6, gamma radiation level measurements and, where appropriate, thermal and fast neutron measurements will be made at selected locations throughout the plant.

Acceptance Criteria - Level 1 - The radiation doses of plant origin and the occupancy times of personnel in radiation zones shall be controlled consistent with the guidelines of the standards for protection against radiation outlined in 10CFR20.

Level 2 - The radiation doses of plant origin shall meet the following limits depending upon which Radiations Zone the radiation base survey point is located:

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Radiation Zone	Limit
I	0.5 mRem/hr.
II	2.5 mRem/hr.
III	15 mRem/hr.
IV	100 mRem/hr.

Note: All areas designated Radiation Zone V have potential radiation doses of 100 mRem/hr. Readings taken in Zone V during the Startup Test Program may be less than 100 mRem/hr; however, since Zone V is defined in terms of potential levels, there are no Acceptance Criteria for Zone V base survey points.

(ST-3) Fuel Loading

Test Objective - The objective of this test is to achieve the full and proper core complement of nuclear fuel assemblies through a safe and efficient fuel loading evolution.

Prerequisites - The required Preoperational Tests have been completed. In addition, prior to starting this test procedure, the following prerequisites will be met:

a) Fuel and Control Rod inspections will be complete.
b) Control Rods will be installed and tested.
c) Reactor vessel water level will be established and minimum level prescribed.
d) The standby liquid control system will be operable and in readiness.
e) Fuel handling equipment will have been checked and dry runs completed.
f) The status of protection systems, interlocks, mode switches, alarms, and radiation protection equipment will be prescribed and verified.
g) Water quality must meet required specifications.

The following prerequisites will be met prior to commencing actual fuel loading to assure that this operation is performed in a safe manner:

a) The status of all systems required for fuel loading will be specified and will be in the status required.
b) At least two movable neutron detectors will be calibrated and operable. At least two neutron detectors will be connected to the high flux scram trips. They will be located so as to provide acceptable signals during fuel loading.
c) Source range monitoring Nuclear instruments will be checked with a neutron source prior to fuel loading or resumption of fuel loading if sufficient delays are incurred.
d) The status of secondary containment will be specified and established.
e) Reactor vessel status will be specified relative to internal component placements and this placement established to make the vessel ready to receive fuel.
f) The high flux trip points will be set for a relatively low power level.
g) Neutron sources will be installed near the center of the core and at other specified locations.

Test Method - Before the first fuel assembly is taken from the fuel pool and inserted into the reactor, core components (fuel support castings, blade guides, control rod drives, etc.) will be installed, tested and/or verified. This procedure begins with the steps required to load neutron sources, includes the activities necessary to monitor neutron population using specially constructed fuel loading chambers (FLCs), and culminates with the insertion of fuel assemblies

into the reactor core. Fuel loading continues until the core is fully loaded, verified and ready to perform subsequent Startup Tests.

Control rod functional tests, subcriticality checks, and a shutdown margin demonstration will be performed during the loading.

Acceptance Criteria - Level 1 - The partially loaded core must be subcritical by at least 0.38% delta k/k with the analytically determined, highest worth rod fully withdrawn.

(ST-4) Full Core Shutdown Margin

Test Objective - The purpose of this test is to demonstrate that the reactor will be subcritical throughout the first fuel cycle with any single control rod fully withdrawn.

Prerequisites - The following prerequisites will be complete prior to performing the full core shutdown margin test:

a) The predicted critical rod position is available
b) The Standby Liquid Control System is available
c) Nuclear instrumentation is available with neutron count rate of at least three counts per second and signal to noise ratio greater than two to one
d) High-flux scram trips are set conservatively low
e) Instrumentation has been checked or calibrated as appropriate

Test Method - This test will be performed in the fully loaded core in the xenon-free condition. The shutdown margin test will be performed by withdrawing the control rods from the all-rods-in configuration until criticality is reached. If the highest worth rod will not be withdrawn in sequence, other rods may be withdrawn providing that the reactivity worth is equivalent. The difference between the measured Keff and the calculated Keff for the in-sequence critical will be applied to the calculated value to obtain the true shutdown margin.

Acceptance Criteria - Level 1 - The shutdown margin of the fully loaded, cold (68°F), xenon-free core occurring at the most reactive time during the cycle must be at least 0.38% delta k/k with the analytically strongest rod (or its reactivity equivalent) withdrawn. If the shutdown margin is measured at some time during the cycle other than the most reactive time, compliance with the above criterion is shown by demonstrating that the shutdown margin is 0.38% delta k/k plus an exposure dependent correction factor which corrects the shutdown margin at that time to the minimum shutdown margin.

Level 2 - Criticality should occur within ±1.0% delta k/k of the predicted critical.

(ST-5) Control Rod Drive System

Test Objective - The objectives of the Control Rod Drive System test are; a) to demonstrate that the Control Rod Drive (CRD) System operates properly over the full range of primary coolant temperatures and pressures from ambient to operating, and b) to determine the initial operating characteristics of the entire CRD System.

Prerequisites - The required preoperational tests have been completed.

Test Method - The CRD tests performed during the startup test program are designed as an extension of the tests performed during the preoperational CRD system tests. Thus, after it is verified that all control rod drives operate properly when installed, they are tested periodically during heatup to assure that there is no significant binding caused by thermal expansion of the core components. A list of all control rod drive tests to be performed during startup testing is given in Table 14.2-5.

Acceptance Criteria - Level 1 - Each CRD must have a normal withdraw time greater than or equal to 40 seconds.

The mean scram time of all operable CRDs must not exceed the values specified in the plant technical specifications. (Scram time is measured from the time the pilot scram valve solenoids are deenergized.)

The mean scram time of the three fastest CRDs in a two by two array must not exceed the values specified in the plant technical specifications. (Scram time is measured from the time the pilot scram solenoids are deenergized)

Level 2 - Each CRD must have a normal insert speed of 3.0 0.6 inches per second, indicated by a full 12-foot stroke in 40 to 60 seconds. With respect to the control rod drive friction tests, if the differential pressure variation exceeds 15 psid for a continuous drive in, a settling test must be performed, in which case, the differential settling pressure should not be less than 30 psid nor should it vary by more than 10 psid over a full stroke.

(ST-6) SRM Performance and Control Rod Sequence

The testing previously contained in this test has been merged into ST-10.

(ST-7) Reactor Water Cleanup System

Test Objectives - The objective of this test is to demonstrate specific aspects of the mechanical operability of the Reactor Water Cleanup System. (This test, performed at rated reactor pressure and temperature, is actually the completion of the preoperational testing that could not be done without nuclear heating).

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - With the reactor at rated temperature and pressure, process variables will be recorded during steady state operation in three modes as defined by the System Process Diagram: Blowdown, Hot Standby, and Normal. Additional system configurations will also be aligned to verify proper performance of the bottom head flow and temperature indicators.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - The temperature at the tube side outlet of the non-regenerative heat exchangers (NRHX) shall not exceed 130°F in the blowdown mode and 120°F in the normal mode.

The pump available NPSH will be 13 feet or greater during the hot standby mode defined in the process diagrams.

The cooling water flow to the NRHX's shall be limited to 6% above the flow corresponding to the heat exchanger capacity (as determined from the process diagram) and the existing temperature differential across the heat exchangers. The cooling water outlet temperature shall not exceed 180°F.

During two pump operations at rated core flow, the bottom head temperature as measured by the bottom drain line thermocouple should be within 30°F of the recirculation loop temperatures.

Bottom head flow indicator FI-2R610 shall indicate within 25 gpm of RWCU flow indicator FI-2R609 when total system flow is through the bottom head drain.

(ST-8) Residual Heat Removal System

Test Objectives - The objectives of this test are to demonstrate the ability of the Residual Heat Removal (RHR) System to: 1) remove heat from the reactor pressure vessel and the suppression pool and 2) operate in the suppression pool cooling mode, steam condensing mode and shutdown cooling mode.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - The suppression pool cooling mode and steam condensing mode will be used to measure the RHR heat exchanger capacity. Data will be obtained to determine the heat transfer rate with rated flow on both sides of the heat exchanger. For the suppression pool cooling mode test, attempts will be made to establish a large temperature differential between the service and suppression pool water by extended RCIC or relief valve operations. Heat exchanger capacity in the steam condensing mode will be measured with the reactor in power operation, supplying a steam source to the RHR heat exchangers. Due to the insufficient decay heat load during the startup test period, full heat exchanger heat capacity in the shutdown cooling mode cannot be measured without the risk of exceeding the 100°F/hr cooldown rate limit of the reactor pressure vessel. Shutdown cooling mode operability will be demonstrated after scheduled trips and cooldowns during the Startup Test Program.

Steam condensing mode control system stability will be demonstrated with the reactor in power operation, supplying a steam source to the RHR heat exchangers.

Acceptance Criteria - Level 1 - The transient response of any system-related variable to any test input must not diverge.

Level 2 - The RHR system shall be capable of operating in the steam condensing, suppression pool cooling and shutdown cooling modes at the heat exchanger capacities indicated on the process diagrams. Both simultaneous operation of RHR loops and single loop operation shall be tested in the steam condensing and shutdown cooling modes. Each RHR loop shall be tested independently in the suppression pool cooling mode. System-related variables may contain oscillatory modes of response. In these cases, the decay ratio for each controlled mode of response must be less than or equal to 0.25.

(ST-9) Water Level Measurement

Test Objectives - The objective of this test is to determine actual reference leg temperature and recalibrate instruments if necessary.

Prerequisites - The required preoperational tests have been completed. All system instrumentation is installed and calibrated.

Test Method - At rated temperature and pressure under steady state conditions, the reference leg temperature will be measured and compared to the value assumed during initial calibration. If the difference of the two temperatures exceed the Acceptance Criteria, then the instruments will be recalibrated using the measured value.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - The difference between the actual reference leg temperature(s) and the value(s) assumed during calibration shall be less than that amount which will result in a scale end point error of 1% of the instrument span for each range.

(ST-10) SRM and IRM Performance and Control Rod Sequence

Test Objectives - The objectives of this test are: (a) to demonstrate that the operational sources, SRM and IRM instrumentation and rod withdrawal sequences provide adequate information to achieve criticality and increase power in a safe and efficient manner for each of the specified rod withdrawal sequences and (b) to adjust the Intermediate Range Monitor System as necessary to obtain the desired overlap with the SRM and APRM systems. (Note that this test now includes testing previously contained in ST-6.)

Prerequisites - The required preoperational tests have been completed.

Test Method - Source range monitor count-rate data will be taken and compared with stated criteria.

A withdrawal sequence has been calculated which completely specifies control rod withdrawals from the all-rods-in condition to the rated power configuration. Each sequence will be used to attain cold criticality.

Movement of rods in a prescribed sequence is monitored by the Rod Worth Minimizer and rod sequence control system, which will prevent out of sequence withdrawal.

Initially the IRM system is set during the Preoperational Test Program. SRM-IRM and IRM-APRM overlap is verified the first time sufficient neutron flux conditions arise. After the APRM calibration, the IRM gains will be adjusted as necessary to optimize the IRM overlap with the SRMs and APRMs.

Acceptance Criteria - Level 1 - There must be a neutron signal count-to-noise count ratio of at least 2 to 1 on the required operable SRMs. There must be a minimum count rate of 3 counts/second on the required operable SRMs.

Each IRM channel must be adjusted so that overlap with the SRMs and APRMs is assured.

The IRMs must be on scale before the SRMs exceed the rod block setpoint.

(ST-11) LPRM Calibration

Test Objectives - The objective of this test is to calibrate the Local Power Range Monitoring System.

Prerequisites - The required preoperational tests have been completed. Instrumentation for calibration has been checked.

Test Method - The LPRM channels will be calibrated to make the LPRM readings proportional to the neutron flux in the water gap at the chamber elevation. Calibration factors will be obtained through the use of either an off-line or a process computer calculation that relates the LPRM reading to average fuel assembly power at the chamber height.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - Each LPRM will be within 10% of its calculated value.

(ST-12) APRM Calibration

Test Objective - The objective of this test is to calibrate the Average Power Range Monitoring (APRM) system.

Prerequisites - The required preoperational tests have been completed. Instrumentation for calibration has been checked.

Test Method - A heat balance will be made after initially achieving power level associated with each test plateau. Each APRM channel reading will be adjusted to be consistent with the core thermal power as determined from the heat balance. During heatup a preliminary calibration will be made by adjusting the APRM amplifier gains so that the APRM readings agree with the results of a constant heatup rate heat balance. The APRMs should be recalibrated in the power range by a heat balance as soon as adequate feedwater indication is available.

Acceptance Criteria - Level 1 - The APRM channels must be calibrated to read equal to or greater than the actual core thermal power.

Level 2 - Not applicable.

(ST-13) NSSS Process Computer

Test Objective - The objective of this test is to verify the NSSS performance of the process computer under plant operating conditions.

Prerequisites - The required preoperational tests have been completed.

Test Method - The Dynamic System Test Case will be run to verify that the results of NSSS performance calculations are correct.

Acceptance Criteria - Level 1 - Not applicable.

Level 2

1) The MCPR calculated by an independent method and the process computer either:

a) Are in the same fuel assembly and do not differ in value by more than 2% or,
b) For the case in which the MCPR calculated by the process computer is in a different assembly than that calculated by the independent method, for both assemblies, the MCPR and CPR calculated by the two methods shall agree within 2% for the same assembly.

2) The maximum LHGR calculated by the independent method and the process computer either:

a) Are in the same fuel assembly and do not differ in value by more than 2%, or
b) For the case in which the maximum LHGR calculated by the process computer is in a different assembly than that calculated by the independent method, for both assemblies, the maximum LHGR and LHGR calculated by the two methods shall agree within 2% for the same assembly.

3) The MAPLHGR calculated by the independent method and the process computer either:

a) Are in the same fuel assembly and do not differ in value by more than 2%, or
b) For the case in which the MAPLHGR calculated by the process computer is in a different assembly than that calculated by the independent method for both assemblies, the MAPLHGR and APLHGR calculated by the two methods shall agree within 2% for the same assembly.

4) The LPRM calibration factors calculated by the independent method and the process computer agree to within 2%.

(ST-14) RCIC System

Test Objective - The objectives of this test are to verify the proper operation of the Reactor Core Isolation Cooling (RCIC) system at the minimum and rated operating pressures and flow ranges, and to demonstrate reliability in automatic mode starting from cold standby when the reactor is at power conditions.

Prerequisites - The required preoperational tests have been completed. Initial turbine operation (uncoupled) must have been performed to verify satisfactory operation and over-speed trip. Instrumentation has been installed and calibrated.

Test Method - The RCIC System is designed to be tested in two ways: (1) by flow injection into a test line leading to the Condensate Storage Tank (CST), and (2) by flow injection directly into the reactor vessel.

The earlier set of CST injection tests consist of manual and automatic mode starts at approximately 150 psig and near rated reactor pressure conditions. The pump discharge pressure during these tests is throttled to be approximately 100 psi above the reactor pressure to simulate the largest expected pipeline pressure drop. This CST testing is done to demonstrate general system operability and stability.

Reactor vessel injection tests are also done which consist of manual and automatic mode starts near rated reactor pressure and automatic mode start at approximately 150 psig reactor pressure conditions to demonstrate operability and stability.

After all final controller and system adjustments have been determined, a defined set of demonstration tests must be performed with that one set of adjustments. Two consecutive reactor vessel injections starting from cold conditions in the automatic mode must satisfactorily be performed to demonstrate system reliability. ("Cold" is defined as a minimum three days without any kind of RCIC operation.)

After the manual start portion of certain of the above tests is completed, and while the system is still operating, small step disturbances in speed and flow command are input (in manual and automatic mode respectively) in order to demonstrate satisfactory stability. This is to be done at both low (above minimum turbine speed) and near rated flow initial conditions to span the RCIC operating range. During testing at 150 psig, this is done only near rated flow initial conditions.

A demonstration of extended operation of up to 2 hours (or until pump and turbine oil temperature is stabilized) of continuous running at rated flow conditions is to be scheduled at a convenient time during the Startup Test Program.

Acceptance Criteria - Level 1 - The average pump discharge flow must be equal to or greater than the 100% rated value after 30 seconds have elapsed from automatic initiation at any reactor pressure between 150 psig ($\pm$15, -0) (10.5 kg/cm^2) and rated.

The RCIC turbine shall not trip or isolate during auto or manual start tests.

Note: If any Level 1 criteria are not met, the reactor will only be allowed to operate up to a restricted power level defined by Figure 14.2-7 until the problem is resolved. Also consult the plant Technical Specifications for actions to be taken.

Level 2 - In order to provide an overspeed and isolation trip avoidance margin, the transient start first and subsequent speed peaks shall not exceed 5% above the rated RCIC turbine speed.

The speed and flow control loops shall be adjusted so that the decay ratio of any RCIC system related variable is not greater than 0.25.

The turbine gland seal condenser system shall be capable of preventing steam leakage to the atmosphere.

The delta P switch for the RCIC steam supply line high flow isolation trip shall be calibrated to a differential pressure corresponding to less than or equal to 300% of the maximum required steady state flow, with the reactor assumed to be near the pressure for main relief valve actuation.

(ST-15) HPCI System

Test Objective - The objective of this test is to verify the proper operation of the High Pressure Coolant Injection (HPCI) system at the minimum and rated operating pressures and flow ranges, and to demonstrate reliability in automatic mode starting from cold standby when the reactor is at rated pressure conditions.

Prerequisites - The required preoperational tests have been completed. Initial turbine operation (uncoupled) must have been performed to verify satisfactory operation and over-speed trip. Instrumentation has been installed and calibrated.

Test Method - The HPCI system is designed to be tested in two ways: (1) by flow injection into a test line leading to the Condensate Storage Tank (CST), and (2) by flow injection directly into the reactor vessel.

The earlier set of CST injection tests consist of manual and automatic mode starts at approximately 150 psig and near rated reactor pressure conditions. The pump discharge pressure during these tests is throttled to be approximately 100 psi above the reactor pressure to simulate the largest expected pipeline pressure drop. This CST testing is done to demonstrate general system operability and stability.

Reactor vessel injection tests are also done which consist of manual and automatic mode start near rated reactor pressure to demonstrate operability and stability.

After all final controller and system adjustments have been determined, a defined set of demonstration tests must be performed with that one set of adjustments. Two consecutive reactor vessel injections starting from cold conditions in the automatic mode must satisfactorily be performed to demonstrate system reliability. ("Cold" is defined to a minimum three days without any kind of HPCI operation.)

After the manual start portion of certain of the above tests is completed, and while the system is still operating, small step disturbances in speed and flow command are input (in manual and automatic mode respectively) in order to demonstrate satisfactory stability. This is to be done at both low (above minimum turbine speed) and near rated flow initial conditions to span the HPCI operating range. During testing at 150 psig this is done only near rated flow initial conditions.

A continuous running test is to be scheduled at a convenient time during the Startup Test Program. This demonstration of extended operation should be for up to 2 hours or until steady turbine and pump conditions are reached or until limits on plant operation are encountered.

Pump flow testing will also be verified since auxiliary boiler supply is insufficient to fully test the system during the Preoperational Test Program.

Acceptance Criteria - Level 1 - The average pump discharge flow must be equal to or greater than the 100% rated value after 30 seconds have elapsed from automatic initiation at any reactor pressure between 150 psig ($\pm$15, -0) (10.5 kg/cm^2) and rated.

The HPCI turbine shall not trip or isolate during auto or manual start tests.

Level 2 - In order to provide an overspeed and isolation trip avoidance margin, the transient start first peak shall not come closer than 15% (of rated speed) to the overspeed trip, and subsequent speed peaks shall not be greater than 5% above rated turbine speed.

The speed and flow control loops shall be adjusted so that the decay ratio of any HPCI system related variable is not greater than 0.25.

The turbine gland seal condenser system shall be capable of preventing steam leakage to the atmosphere.

The delta-P switch for the HPCI steam supply line high flow isolation trip shall be calibrated to actuate at no greater than 300% of the maximum required steady state flow, with the reactor assumed to be near the pressure for main relief valve actuation.

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(ST-16) Selected Process Temperatures

Test Objectives - The objectives of this procedure are a) to establish the proper setting of the low speed limiter for the recirculation pumps to avoid coolant temperature stratification in the reactor pressure vessel bottom head region, b) to identify any reactor operating modes that cause temperature stratification, and c) to familiarize the plant personnel with the temperature differential limitations of the reactor system.

Prerequisites - The required preoperational tests have been completed. System instrumentation has been calibrated.

Test Method - During initial heatup while at hot standby conditions, the bottom drain line temperature, recirculation loop suction temperature and applicable reactor parameters are monitored as the recirculation flow is slowly lowered to minimum stable flow. Utilizing this data it can be determined whether coolant temperature stratification occurs when the recirculation pumps are on and if so, what minimum recirculation flow will prevent it.

Monitoring the preceding information during planned pump trips will determine if temperature stratification occurs in the idle recirculation loops or in the lower plenum when one or more loops are inactive.

Acceptance Criteria - Level 1 - The reactor recirculation pumps shall not be started nor flow increased unless the coolant temperatures between the steam dome and bottom head drain are within 145°F.

The recirculation pump in an idle loop must not be started unless the loop suction temperature is within 50°F of the active loop.

The recirculation pump in an idle loop must not be started unless the operating loop flow rate is less than or equal to 50% of rated loop flow.

When both loops have been idle, an idle recirculation loop shall not be started unless the temperature differential between the reactor coolant within the idle loop to be started up and the coolant within the reactor pressure vessel is less than or equal to 50°F.

Level 2 - Not applicable.

(ST-17) System Expansion

Test Objectives - The purposes of this test are to demonstrate that reactor recirculation, main steam inside containment, and those piping systems identified in Table 3.9-33 respond to thermal expansion consistent with stress analysis results. (Note that this test now includes piping previously contained in ST-38.)

Prerequisites - Instrumentation has been installed and calibrated.

Test Method - Hanger positions and locations of piping in the Nuclear Steam Supply System and piping systems identified in Table 3.9-33 inside and outside the reactor drywell are recorded prior to initial heatup and after a planned cold shutdown. During initial heatup, visual inspections are made at intermediate reactor water temperatures and at rated temperature to assure components are free to move as designed. Adjustments are made as necessary.

Devices for measuring continuous pipe deflections are mounted on main steam, recirculation and other selected lines. Motion during heatup is compared with calculated values.

Acceptance Criteria - Level 1 - There shall be no obstructions which will interfere with the thermal expansion of the main steam and recirculation piping systems. Piping systems identified in Table 3.9-33 will not be restrained against thermal expansion except by design intent.

Hangers on piping systems identified in Table 3.9-33 shall not be bottomed out or have the spring fully stretched. Snubbers on piping systems identified in Table 3.9-33 shall not become extended or compressed to the limits of their total travel.

The measured displacements at the established transducer locations on the main steam and recirculation systems shall not exceed the allowable values calculated for the specific points.

Level 2 - The measured displacements at the established transducer locations on the main steam and recirculation systems shall not exceed the expected values calculated for the specific points. The measured displacements at the established transducer locations on the piping systems identified in Table 3.9-33 shall be within the acceptable range calculated for the specific points.

Hangers on piping systems identified in Table 3.9-33 shall be in their operating range.

(ST-18) TIP Uncertainty

Test Objectives - The objective of this test is to determine the uncertainty of the TIP system readings.

Prerequisites - System installation is completed and required preoperational tests are completed and verified. Instrumentation has been calibrated and installed.

Test Method - The TIP uncertainty consists of a random noise component and a geometric component, the geometric component being due to variation in the water gap geometry and TIP tube orientation from TIP location to location. Measurement of these components is obtained by taking repetitive TIP readings at a single TIP location, and by analyzing pairs of TIP readings taken at TIP locations which are symmetrical about the core diagonal of fuel loading and control rod symmetry.

The random noise uncertainty is determined from successive TIP runs made at the common location (32-33) with each of the TIP machines making six runs at index position 10. The TIP data will be obtained by simultaneous operation of the Process computer OD-2 program which provides 24 nodal TIP values for each TIP traverse. The standard deviation of the random noise is derived by taking the square root of the average of the variances at nodal levels 5 through 22, where the nodal variance is obtained from the fractional deviations of the successive TIP values about their nodal mean value.

The total TIP uncertainty is determined by performing a complete set of TIP traverses as required by Process Computer program OD-1. The total TIP uncertainty is obtained by dividing the standard deviation of the symmetric TIP pair nodal ratios by the square root of 2. The nodal TIP ratio is defined as the nodal BASE value of the TIP in the lower right half of the core divided by its symmetric counterpart in the upper left half.

The geometric component of TIP uncertainty is obtained by statistically subtracting the random noise component from the total TIP uncertainty.

The TIP data will be taken with the reactor operating with an octant symmetric rod pattern and at steady state conditions. One set of TIP data will be taken at approximately 50% power and at least one other set at 75% power or above. The acceptance criteria for this subtest uses the "average uncertainties" for all data sets. Therefore additional performance of the subtest may be scheduled and the previous values of uncertainty will be used in the averaging to determine the acceptability of the results.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - The total TIP uncertainty (including random noise and geometrical uncertainties) obtained by averaging the uncertainties for all data sets must be less than 6.0%.

Note: A minimum of two and up to six data sets may be used to meet the above criteria.

(ST-19) Core Performance

Test Objectives - The objectives of this test are a) to evaluate the core thermal power and b) to evaluate the following core performance parameters: 1) maximum linear heat generation rate (MLHGR), 2) minimum critical power ratio (MCPR) and 3) maximum average planar linear heat generation rate (MAPLHGR).

Prerequisites - The required preoperational tests have been completed.

Test Method - The core performance evaluation is employed to determine the principal thermal and hydraulic parameters associated with core behavior. These parameters are:

Core flow rate
Core thermal power level
MLHGR
MCPR
MAPLHGR

Prior to the verification of the Process Computer in ST-13, an independent method will be used to calculate these parameters. After the successful completion of ST-13, the process computer will be used.

Acceptance Criteria - Level 1 - The Maximum Linear Heat Generation Rate (MLHGR) of any rod during steady-state conditions shall not exceed the limit specified by the Plant Technical Specifications.

The steady-state Minimum Critical Power Ratio (MCPR) shall not exceed the limits specified by the Plant Technical Specifications.

The Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) shall not exceed the limits specified by the Plant Technical Specifications.

Steady-state reactor power shall be limited to the rated MWT and values on or below the licensed analytically determined power-flow line.

Level 2 - Not applicable.

(ST-20) Steam Production Verification

(This test deleted from the FSAR for Unit 2).

(ST-21) Core Power-Void Mode Response

Test Objectives - The objective of this test is to verify the stability of the core power-void dynamic response.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been calibrated.

Test Method - The core power void loop mode that results from a combination of the neutron kinetics and core thermal hydraulic dynamics is least stable near the natural circulation end of the rated 100 percent power rod line. A fast change in the reactivity balance is obtained by moving a very high worth rod only 1 or 2 notches and by performing pressure regulator setpoint changes.

Acceptance Criteria - Level 1 - The transient response of any system related variable to any test input must not diverge.

Level 2 - Not applicable.

(ST-22) Pressure Regulator

Test Objectives - The objectives of this test are to demonstrate the takeover capability of the backup pressure regulator upon failure of the controlling pressure regulator and to demonstrate smooth pressure control transition between the control valves and bypass valves when reactor steam generation exceeds steam flow used by the turbine.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - The pressure set point will be decreased rapidly and later increased rapidly by about 10 psi and the response of the system will be measure d in each case. It is desirable to accomplish the set point change in less than 1 second. At specified test conditions the load limit setpoint will be set so that the transient is handled by control valves, bypass valves and both. The backup regulator will be tested by simulating a failure of the operating pressure regulator so that the backup regulator takes over control. The response of the system will be measured and evaluated.

Acceptance Criteria - Level 1 - The transient response of any pressure control system related variable to any test input must not diverge.

Level 2

a) Pressure control system related variables may contain oscillatory modes of response. In these cases, the decay ratio must be less than or equal to 0.25 when operating above the lower limit of the master manual controller.

b) When in the recirculation manual mode, the pressure response time from initiation of pressure setpoint step change to the turbine inlet pressure peak shall be 10 seconds.
c) Pressure control system deadband, delay, etc., shall be small enough that steady state limit cycles (if any) shall produce steam flow variations no larger than ±0.5 percent of rated steam flow.
d) The normal difference between regulator set points must be small enough that the peak neutron flux and/or peak vessel pressure remain below the scram settings by 7.5 percent and 10 psi respectively, for the Regulator Failure Test performed at Test Condition 6.

(ST-23) Feedwater System

Test Objectives - The objectives of this test are a) to demonstrate acceptable response to the feedwater control system for reactor water level control, b) to demonstrate stable reactor response to subcooling changes, i.e., loss of feedwater heating, c) to demonstrate the capability of the automatic core flow runback feature to prevent low water level scram following the trip of one feedwater pump, and d) to demonstrate the maximum feedpump runout capability is compatible with licensing assumptions.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - At Test Condition (TC) 1 with the water level being automatically controlled using the low load valve and the recirculation system in Manual, ±5 inch step changes in the water level setpoint will be made to demonstrate proper response and operability of the feedwater system at low reactor power.

At Test Conditions 2, 3 and 6, with one feedwater pump in manual and the others in auto, small and large flow changes in the manually controlled feed pump will be made. The response of the feedwater system to these steps will be analyzed and compared to the applicable acceptance criteria. The recirculation system will be in manual for these tests. At Test Conditions 1, 2, 3, 4, 5 & 6, with the recirculation system in manual, ± 5 inch changes in the water level setpoint will be made to demonstrate proper response and stability of the feedwater system.

At approximately 80% to 90% power with core flow near 100% of rated, a simulated failure of the extraction steam valves to one of the feedwater heater trains is accomplished by closing the heater train steam inlet isolation valves which will isolate extraction steam from the last three stages of that train. Recordings of the transient will be analyzed and compared to the predicted response and acceptance criteria.

At Test Condition 6, one feedwater pump will be tripped to demonstrate the capability to avoid a scram and prevent a low reactor water level trip due to the loss of one feedwater pump.

A maximum feedwater runout capability test will be done to demonstrate that the actual capability is compatible with licensing assumptions.

Acceptance Criteria - Level 1 - The transient response of any level control system-related variable to any test input must not diverge.

For the feedwater heater loss test, the maximum feedwater temperature decrease due to a single failure case must be less than or equal to 100°F. The resultant MCPR must be greater than the fuel thermal safety limit.

For the feedwater heater loss test the increase in heat flux cannot exceed the predicted Level 2 value by more than 2%. The predicted value will be based on the actual test values of feedwater temperature change and power level.

The feedwater flow runout capability must not exceed the assumed value in the FSAR.

Level 2 - Level control system-related variables may contain oscillatory modes of response. In these cases, the decay ratio for each controlled mode of response must be less than or equal to 0.25.

The open loop dynamic flow response of each feedwater actuator (turbine or valve) to small (≤ 10%) step disturbances shall be:

1)	Maximum time to 10% of a step disturbance	1.2 sec.
2)	Maximum time from 10% to 90% of a step disturbance	2.5 sec.
3)	Peak overshoot (% of step disturbance)	≤ 15%

The average rate of response of the feedwater actuator to large (≥ 20% of pump flow) step disturbances shall be between 10 percent and 25 percent rated feedwater flow/second. This average response rate will be assessed by determining the time required to pass linearly through the 10 percent and 90 percent response points.

For the feedwater heater loss test the increase in heat flux cannot exceed the predicted value referenced to the actual Feedwater temperature change and the initial power level.

A scram must be avoided from low water level with at least a 3 inch margin following a trip of one of the operating feedwater pumps.

With extrapolated reactor pressure equal to 1060 psig, the sum of the calculated maximum reactor feed pump flows must be greater than 15.4×10^6 lbs/hr.

With extrapolated reactor pressure equal to 1010 psig, the sum of the two smallest maximum reactor feed pump flows as calculated must be greater than 9.1×10^6 lbs/hr.

(ST-24) Turbine Valve Surveillance

Test Objectives - The objective of this test is to demonstrate acceptable procedures and maximum power levels for periodic surveillance testing of the main turbine control, stop, intercept and bypass valves without producing a reactor scram.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - The test of the control, main stop, intermediate stop and bypass valves are performed near the predicted highest power level to demonstrate that the Acceptance Criteria

are satisfied. Rate of valve stroking and timing of the close-open sequence will be such that minimum practical disturbance is introduced and that PCIOMR limits are not exceeded.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - Peak neutron flux must remain at least 7.5% below the Neutron flux scram trip value. Peak vessel pressure must remain at least 10 psi below the high pressure scram setting. Peak steam flow in each line must remain at least 10% below the high flow isolation trip setting. Peak simulated heat flux must remain at least 5% below its scram trip point.

(ST-25) Main Steam Isolation Valves

Test Objectives - The objectives of this test are (a) to functionally check the main steam isolation valves (MSIVs) for proper operation at selected power levels, (b) to determine reactor transient behavior during and following simultaneous full closure of all MSIVs, (c) to determine isolation valve closure time and (d) to demonstrate the maximum power at which a single valve closure can be made without a scram.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - The Main Steam Isolation Valves (MSIVs) are operated during this test to verify their functional performance, determine closure times, and to demonstrate the maximum power level at which an MSIV can experience fast closure without causing a scram. All MSIVs will later be used to demonstrate a full isolation subsequently leading to a scram. (The Nuclear Steam Supply Shutoff System (NSSSS) logic will be used to initiate the full isolation). The acceptability of the fast criteria (3 seconds) is determined by extrapolating full stroke time from measured stroke times between 10% closed and 90% closed. The acceptability of the slow criteria (5 seconds) is determined by utilizing the full stroke time from solenoid deenergization to 90% closed and extrapolating the final 10% of stroke.

Acceptance Criteria - Level 1

The positive change in vessel dome pressure occurring within 30 seconds after closure of all MSIVs must not exceed predicted values by more than 25 psi.

The positive change in heat flux following closure of all MSIVs shall not exceed predicted values by more than 2% of rated value.

Following the closure of all MSIV's, the reactor must scram.

Closure time for any MSIV shall not be less than 3.0 seconds nor greater than 5.0 seconds.

Feedwater control settings must prevent flooding the main steam lines during the full isolation test.

Level 2 - The positive change in vessel dome pressure occurring within the first 30 seconds after the closure of all MSIVs must not exceed the predicted values. Predicted values will be referenced to actual test conditions of initial power level, scram timing and dome pressure and will use beginning of life nuclear data.

The positive change in heat flux occurring within the first 30 seconds after the closure of all MSIVs must not exceed the predicted values. Predicted values will be referenced to actual test conditions of initial power level, and dome pressure and will use beginning of life nuclear data.

If water level reaches Level 2 setpoint during the MSIV full closure test, RCIC shall automatically initiate and reach rated flow.

During the MSIV full closure test, the relief valves must reclose properly (without any detectable leakage) following the pressure transient.

During full closure of individual MSIVs, peak vessel dome pressure must remain at least 10 psi below the scram setpoint.

During full closure of individual MSIVs, peak neutron flux must remain at least 7.5% below its scram setpoint.

During full closure of individual MSIVs, steam flow in individual lines must remain at least 10% below the high flow isolation trip setpoint.

During full closure of individual MSIVs, the simulated heat flux must remain at least 5% less than its flow biased scram setpoint.

(ST-26) Relief Valves

Test Objectives - The objectives of this test are to verify that the relief valves function properly, reseat properly after operation and contain no major blockages in the relief valve discharge piping.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate. Factory test results on SRV flow and operating times have been reviewed.

Test Method - Testing done at low reactor pressure, in conjunction with plant surveillance testing, consists of cycling each relief valve to verify proper operation. The transient monitoring system will be used to record the results of this test. The data collected will compare the operation of individual relief valves against the operation of all relief valves. During relief valve operation, core power - and therefore steam generation rate - is maintained constant. The pressure control system will close the bypass valves an amount proportional to the relief valve steam flow to maintain constant reactor pressure. This bypass valve motion will be monitored and a comparison of the response for each relief valve operation will be made. If differences exist, it could suggest a partial obstruction of the relief valve or its tailpipe. Tailpipe temperature will be recorded to verify the relief valve has properly reseated. Reactor variables will also be recorded to verify system stability during opening and closing each relief valve.

Testing done at rated reactor pressure consists of manually operating each relief valve at rated reactor pressure. The decrease in Main Generator output will be monitored during the operation of each relief valve to provide an indication of relief valve flow. By comparison of the generator output response for each relief valve operation, any flow obstruction in the valve or its tailpipe can be identified. Each valve will be opened for approximately 10 seconds to allow for variables to stabilize. Reactor variables will also be recorded to verify system stability during opening and closing each relief valve.

Acceptance Criteria - Level 1

There should be a positive indication of steam discharge during the manual actuation of each valve.

Level 2 - Pressure control system-related variables may contain oscillatory modes of response. In these cases, the decay ratio for each controlled mode of response must be less than or equal to 0.25.

The temperature measured by thermocouples on the discharge side of the valves shall return to within 10°F of the temperature recorded before the valve was opened.

During the low pressure functional tests, the change in bypass valve position for each SRV opening shall be greater than or equal to a value corresponding to the average change minus 10% of one bypass valve.

During the rated pressure tests, the change in MWe for each SRV opening shall be greater than or equal to a value corresponding to the average change minus 0.5% of rated MWe.

(ST-27) Turbine Trip and Generator Load Rejection

Test Objectives - The objective of this test is to demonstrate the response of the reactor and its control systems to protective trips in the turbine and generator.

Prerequisites - The required preoperational tests have been completed. All instrumentation has been calibrated.

Test Method - At Test Condition 3, a turbine trip will be manually initiated by depressing the Turbine Trip pushbutton in the main control room. At Test Condition 6, a generator load rejection will be manually initiated by remotely opening the generator synchronizing breaker from the control room. During both transients, reactor water level, pressure, neutron flux and simulated heat flux will be recorded and compared to predicted results and acceptance criteria.

At approximately 24% power, a generator load rejection within bypass capacity will be manually initiated as described above. This will demonstrate the ability to ride through a load rejection within bypass capacity without a scram.

During all 3 transients, main turbine stop, control and bypass valve positions and reactor water level will be recorded and compared to the acceptance criteria.

Acceptance Criteria - Level 1

a) For Turbine and Generator trips there should be a delay of no more than 0.1 seconds following the beginning of control or stop valve closure before the beginning of bypass valve opening. The bypass valves should be opened to a point corresponding to greater than or equal to 80 percent of full open within 0.3 seconds from the beginning of control or stop valve closure motion.
b) Feedwater system settings must prevent flooding of the steam line following these transients.
c) The positive change in vessel dome pressure occurring within 30 seconds after either generator or turbine trip must not exceed the Level 2 criteria by more than 25 psi.

d) The positive change in simulated heat flux shall not exceed the Level 2 criteria by more than 2% of rated value.
e) The two pump drive flow coastdown transient, during the first three seconds of an RPT trip, must fall within the specified limits.

Level 2

a) There shall be no MSIV closure in the first 3 minutes of the transient and operator action shall not be required in that period to avoid the MSIV trip.
b) The positive change in vessel dome pressure and in simulated heat flux which occur within the first 30 seconds after the initiation of either generator or turbine trip must not exceed the predicted values.

(Predicted values will be referenced to actual test conditions of initial power level, dome pressure, scram timing, and the time from the start of stop/control valve motion to start of control rod motion, and will use beginning of life nuclear data.)

c) For the Generator trip within the bypass valves capacity (initial thermal power values less than or equal to 25 percent of rated) the reactor shall not scram.
d) The Total Delay from the initiation of a Turbine Stop Valve Closure or Turbine Control Valve Fast Closure to complete suppression of the Electric Arc between the fully open contacts of the Recirculation Pump Trip (RPT) Breaker shall be less than 175 milliseconds.
e) Feedwater level control shall avoid the loss of feedwater flow due to a high level (L8) trip.
f) Feedwater level control shall maintain water level above the L2 level trip setpoint for HPCI, RCIC and ATWS RPT.

(ST-28) Shutdown from Outside the Main Control Room

Test Objective - The objective of this test is to demonstrate that the reactor can be scrammed, shut down, maintained in a hot shutdown condition, and cooled down from outside the main control room. Also, the adequacy of the Emergency Operating Procedures will be verified.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - While operating at approximately 20% power synchronized to the grid with normal electrical system alignment, the reactor will be scrammed and the MSIV's will be closed from inside the main control room. The control room will then be evacuated, and reactor level and pressure will be controlled from outside the main control room. The Shutdown Cooling mode of RHR will be placed into service with cooling water supplied from the ultimate heat sink. During this demonstration, some supervisory and operating personnel will remain in the control room to protect non-safety-related equipment from unnecessary damage if conditions arise and to assume control of the plant if conditions warrant. A test will be run to demonstrate that the reactor can be scrammed and isolated from outside the control room.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - During a simulated control room evacuation, the reactor must be brought to the point where cooldown is initiated and under control, and the reactor vessel pressure and water level

are controlled using equipment and controls outside the control room. The test is deemed successful when reactor pressure is less than the permissive setpoint and the RHR shutdown cooling mode has been put in operation.

The reactor must be capable of being scrammed and isolated from outside the control room.

(ST-29) Recirculation Flow Control System

The objectives of this test are:

a) To demonstrate the flow control capability of the plant over the entire pump speed range, including individual local manual and combined Master Manual Operation.
b) To determine that all electrical compensators and controllers are set for desired system performance and stability.

Prerequisites - The required preoperational tests have been completed.

All instrumentation has been calibrated.

Test Method - At Test Conditions 2, 3, 5 and 6, the stability of the recirculation flow control system is demonstrated by performing step changes in recirculation pump speed. This testing is done in individual local manual at Test Conditions 2 and 5 and in combined Master Manual operation at Test Conditions 3 and 6 to demonstrate operability and stability.

Testing will also be performed to verify that the Recirc M-G set high speed mechanical stops are properly set.

Acceptance Criteria - Level 1 - The transient response of any system-related variable to any test input must not diverge.

Level 2 - A scram shall not occur due to recirculation flow control maneuvers.

The APRM neutron flux trip avoidance margin shall be greater than or equal to 7.5% and the simulated heat flux trip avoidance margin shall be greater than or equal to 5% when the power maneuver effects are extrapolated to those that would occur along the 100% rated rod line.

The decay ratio of any oscillatory controlled variable must be less than or equal to 0.25.

Steady state limit cycles (if any) shall not produce turbine steam flow variations greater than $\pm$.5% of rated steam flow.

(ST-30) Recirculation System

Test Objectives - The objectives of this test are:

a) Verify that the feedwater control system can satisfactorily control water level without a resulting turbine trip and associated scram.
b) Record and verify acceptable performance of the recirculation two pump circuit trip system.
c) Verify the adequacy of the recirculation runback to mitigate a scram.

d) Verify that no recirculation system cavitation will occur in the operable region of the power-flow map.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - Single recirculation pump trips will be made at Test Condition (TC) 3 and TC-6. These trips will be initiated by tripping the M-G Set Drive Motor Breaker from the control room. Reactor parameters will be recorded during the transient and analyzed to verify non-divergence of oscillatory responses, adequate margins to RPS scram set points, and capability of the feedwater system to prevent a high level trip. The capability to restart the recirc. pump at a high power level will also be demonstrated. At TC-3, both recirculation pumps RPT breakers will be simultaneously tripped using a temporarily installed test switch. The data gathered will be used to demonstrate acceptable pump coastdown performance prior to high power turbine trips and generator load rejects.

Appropriate conditions will be simulated at TC-3 to demonstrate the proper operation of the recirculation pump runback circuits. This is done prior to an actual planned feed pump trip at rated power.

Both the jet pumps and the recirculation pumps will cavitate at conditions of high flow and low power where NPSH demands are high and little feedwater subcooling occurs. However, the recirculation flow will automatically runback upon sensing a decrease in feedwater flow. The maximum recirculation flow is limited by appropriate stops which will run back the recirculation flow from the possible cavitation region. At TC-3, it will be verified that these limits are sufficient to prevent operation where recirculation pump or jet pump cavitation occurs.

Acceptance Criteria - Level 1 - The response of any level related variables during a single pump trip must not diverge.

The two-pump drive flow coastdown transient, during the first 3 seconds of an RFT trip, must fall within the specified limits.

Level 2 - The reactor shall not scram during the one pump trip.
The APRM margin to avoid a scram shall be at least 7.5% during the one pump trip recovery.

The reactor water level margin to avoid a high level trip shall be at least 3.0 inches during the one pump trip.

Peak simulated heat flux must remain at least 5% below its flow biased scram setpoint.

Runback logic shall have settings adequate to prevent recirculation pump operation in areas of potential cavitation.

The recirculation pumps shall runback upon a trip of the runback circuit.

(ST-31) Loss of Turbine-Generator and Offsite Power

Test Objectives - The objectives of this test are to demonstrate that the required safety systems will initiate and function properly without manual assistance, the electrical distribution and diesel generator systems will function properly, and the HPCI and/or RCIC systems will maintain water

level if necessary during a coincidental loss of the Unit 2 main turbine-generator and offsite power to Unit 2.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - With the unit synchronized to the grid at approximately 30% power, the main turbine-generator will be manually tripped coincident with a manual trip of the unit's offsite power source breaker, both trips initiated from the control room. During Unit 2 testing, to ensure a full simulation of the loss of all offsite power to Unit 2 while minimizing the impact on Unit 1 operations, all Unit 2 loads will be transferred to Unit 2 Auxiliary and Startup busses, all Unit 1 and common loads will be transferred to Unit 1 Auxiliary and Startup Busses, and appropriate breakers will be racked out to prevent automatic transfer of Unit 2 loads to Unit 1 sources.

Reactor water level and the operation of safety systems will be monitored to verify that the acceptance criteria are satisfied. The proper response of the electrical distribution system will be checked.

The loss of offsite power condition will be maintained for at least 30 minutes to demonstrate that necessary equipment, controls, and indication are available to remove decay heat from the core using only emergency power supplies and distribution system.

Acceptance Criteria - Level 1 - All safety systems, such as the Reactor Protection System, the diesel-generators, RCIC and HPCI must function properly without manual assistance, and HPCI and/or RCIC system action, if necessary, shall keep the reactor water level above the initiation level of Core Spray, LPCI and ADS.

Level 2 - The temperature measured by the thermocouples on the discharge side of any SRV that actuated shall return to within 10°F of the temperature recorded before the valve opened.

Permanent instrumentation for reactor power, reactor pressure, water level, control rod position, suppression pool temperature, high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) shall be demonstrated operable following re-energization of the 4kV busses by the diesel generators.

(ST-32) Containment Atmosphere and Main Steam Tunnel Cooling

Test Objective - The objective of this test is to verify the ability of the drywell coolers/recirculation fans and the reactor building portion of the main steam tunnel coolers to maintain design conditions in the drywell and reactor building portion of the mainsteam tunnel, respectively, during operating conditions and post scram conditions.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - During heatup, at test conditions 2 and 6, and following a planned scram from 100% power, data will be taken to ascertain that the containment atmospheric conditions are within design limits.

Acceptance Criteria - Level 1 - The area under the reactor vessel in the Control Rod Drive area is maintained at or below 185°F.

Level 2 - The general drywell area is maintained at an average temperature less than or equal to 135°F, with maximum local temperature not to exceed 150°F.

The area beneath the reactor pressure vessel in the Control Rod Drive area is maintained at an average temperature less than or equal to 135°F, with minimum local temperature above 100°F.

The area around the recirculation pump motors is maintained at an average temperature less than or equal to 128°F, with maximum local temperature not to exceed 135°F.

The inside base of the shield wall in the RPV skirt area is maintained at temperatures greater than 100°F.

The reactor building portion of the main steam pipeway is maintained at or below 125°F.

The area surrounding the drywell head shall have an average temperature equal to or greater than 135°F, with maximum local temperature not to exceed 150°F.

The reactor pressure vessel support skirt flange shall be maintained at or below 150°F.

The temperature of the concrete surrounding the primary containment main steamline penetrations are maintained less than 200°F.

(ST-33) Piping Steady State Vibration

Test Objectives - The objectives of this test is to demonstrate that steady state vibration levels on reactor recirculation, main steam inside containment, and those piping systems identified in Table 3.9-33 are within acceptable limits. (Note that this test now includes piping previously contained in ST-40. Also note that dynamic transient vibration testing previously contained in this test have been merged into ST-39.)
Prerequisites - Instrumentation has been installed and calibrated.

Test Method - Devices for measuring continuous vibration are mounted on main steam lines, recirculation lines and lines of systems identified in Table 3.9-33 as applicable and vibration during steady state operation is compared with calculated values.

Acceptance Criteria - Level 1 - The measured amplitude (peak to peak) of each remotely monitored point on the main steam inside containment and reactor recirculation lines shall not exceed the allowable value for that point.

Level 2 - The measured amplitude (peak to peak) of each remotely monitored point on the main steam inside containment and reactor recirculation lines shall not exceed the expected value for that point.

The vibratory response of non-remotely monitored systems or portions of systems identified in Table 3.9-33 shall be judged to be within acceptable limits by a qualified test engineer.

The maximum measured amplitude of the piping response for each remotely monitored point on systems identified in Table 3.9-33 shall not exceed the acceptable value for that point.

(ST-34) Control Rod Sequence Exchange

This test will not be performed during the Unit 2 Startup Test Program.

Test Method - The control rod sequence exchange begins on the design flow control line with core flow near minimum. Control rods will be inserted as necessary to increase the margin to local core thermal limits. Core power is maintained above the low power setpoint of the Rod Worth Minimizer and Rod Sequence Control System and below the power which will keep fuel assembly nodal power at the PCIOMR threshold. The exchange is performed in accordance with the plant operating procedure RE-TP-009. Data taken during the exchange will be reviewed to verify that the Acceptance Criteria were satisfied.

Acceptance Criteria - Level 1 - Completion of the exchange of one rod pattern for the complimentary pattern with continual satisfaction of all licensed core limits constitutes satisfaction of the requirements of this procedure.

Level 2 - All nodal powers shall remain below their PCIOMR threshold limit during this test.

(ST-35) Recirculation System Flow Calibration

Test Objectives - The objective of this test is to perform a complete calibration of the installed recirculation system flow instrumentation.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate.

Test Method - During the testing program at selected operating conditions which allow the recirculation system to be operated at speeds required for rated flow at rated power, the jet pump flow instrumentation will be adjusted to provide correct flow indication based on the jet pump flow.

After the relationship between drive flow and core flow is established, the flow biased APRM/RBM system will be adjusted to match this relationship.

Acceptance Criteria - Level 1 - Not applicable.

Level 2 - Jet pump flow instrumentation shall be adjusted such that the jet pump total flow recorder will provide a correct core flow indication at rated conditions.

The APRM/RBM flow-bias instrumentation shall be adjusted to function properly at rated conditions.

(ST-36) Cooling Water Systems

This test will not be performed during the Unit 2 Startup Test Program.

(ST-37) Gaseous Radwaste System

Test Objectives - The objective of this test is to demonstrate that the Gaseous Radwaste System operates within the Technical Specification during a full range of plant power operation and to demonstrate the proper operation of the offgas and containment nitrogen inerting system during plant operation.

Prerequisites - The required preoperational tests have been completed. Instrumentation has been checked or calibrated as appropriate. In addition, the 100% power trip testing shall have been completed or 120 effective full power days shall not have elapsed prior to performing the nitrogen inerting test.

Test Method - The test will consist of collecting data and performing quantitative analysis of the off gas system effluent to determine if the performance is acceptable per the Technical Specification. For the nitrogen inerting system, the proper nitrogen concentration will be verified by the as installed plant oxygen detectors/instruments in the two major volumes of the primary containment. Proper operation of the offgas system will also be verified.

Acceptance Criteria - Level 1 - The release of radioactive gaseous and particulate effluents must not exceed the limits specified in the site technical specifications.

Level 2 - The system flow, pressure, temperature, and relative humidity shall comply with design specifications. The catalytic recombiner, the hydrogen analyzer, the activated carbon beds and the filters shall be performing their required function. There shall be no less than 8000 lb/hr. of dilution steam flow when the steam jet air ejectors are pumping. The containment nitrogen inerting system shall be capable of inerting the primary containment free volume within 24 hours from the start of the test and the resulting oxygen concentration shall be less than 4%.

(ST-38) BOP Piping System Expansion

(The system expansion testing previously contained in this test has been merged into ST-17.)

(ST-39) Piping Vibration During Dynamic Transients

Test Objective - The objective of this test is to demonstrate that vibration levels on main steam inside containment, reactor recirculation, and system piping identified for dynamic transient testing in Table 3.9-33 meet acceptable limits during selected dynamic transients.

Prerequisites - Instrumentation has been installed and calibrated.

Test Method - Devices for measuring displacements are mounted on main steam inside containment and reactor recirculation piping systems, and responses during transients are compared with calculated values. Other piping systems identified in Table 3.9-33 are visually inspected prior to, during and subsequent to the transient loading condition, as applicable, by qualified test engineers to determine acceptable vibratory response.

Acceptance Criteria - Level 1 - The measured vibration amplitude (peak to peak) for each remotely monitored point of main steam inside drywell and/or reactor recirculation piping shall not exceed the allowable value for each specific point.

The vibratory response of systems identified in Table 3.9-33 shall be judged to be within acceptable limits by a qualified test engineer.

Based on visual inspection during a post transient walkdown, there shall be no signs of excessive piping response (such as damaged insulation, markings on piping, structural or hanger steel, or walls, damaged pipe supports, etc.) on systems listed in Table 3.9-33.

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The measured vibration amplitude (peak to peak) for each remotely monitored point of main steam inside drywell and/or reactor recirculation piping shall not exceed the expected value for each specific point.

(ST-40) BOP Piping Steady State Vibration

(The steady state vibration testing previously contained in this test has been merged into ST-33.)

END HISTORICAL

TABLE 14.2-1
PREOPERATIONAL TEST PROCEDURES

TEST NUMBER	TEST DEFINITION
P2.1	125 Volt DC System
P4.1	4.16kV System
P5.1	480 Volt System
P13.1	Fire Protection Water System
P13.2	Fire Protection & Generator Purge Systems
P13.3	Smoke Detection System
P13.4	Control Room Halon System
P14.1	Reactor Building Closed Cooling Water System
P16.1	RHR Service Water System
P17.1	Instrument AC Power System
P23.1	Diesel Fuel Oil System
P24.1	Diesel Generator System
P25.1	Primary Containment Instrument Gas System
P28.1	ESSW Pumphouse H&V System
P28.3	Diesel Generator Building H&V System
P30.1	Control Structure H&V System
P30.2	Control Structure Chilled Water System
P34.1	Reactor Building H&V System
P34.2	Reactor Building Chilled Water System
P45.1	Feedwater System
P45.2	Feedwater Control System
P49.1	Residual Heat Removal System
P50.1	Reactor Core Isolation Cooling System
P51.1	Core Spray System
P51.1A	Core Spray System Pattern
P52.1	High Pressure Coolant Injection System
P53.1	Standby Liquid Control System
P54.1	Emergency Service Water System

TABLE 14.2-1 (Cont'd.)
PREOPERATIONAL TEST PROCEDURES

TEST NUMBER	TEST DEFINITION
P55.1	Control Rod Drive System
P56.1A	Reactor Manual Control System
P56.1B	Rod Sequence Control System
P56.1C	Rod Worth Minimizer System
P57.1	Uninterruptible AC Power System
P58.1	Reactor Protection System
P59.1	Primary Containment System
P59.2	Containment Integrated Leak Rate Test
P60.1	Containment Atmosphere Circulation System
P61.1	Reactor Water Cleanup System
P64.1	Reactor Recirculation System
P69.1	Liquid Radwaste Collection System
P70.1	Standby Gas Treatment System and Secondary Containment Isolation
P73.1	Containment Atmospheric Control System
P73.2	Containment Hydrogen Recombiner System
P73.3	Containment Oxygen and Hydrogen Analyzer System
P75.1	24 Volt DC System
P76.1	Plant Leak Detection System
P78.1	Source Range Monitoring System
P78.2	Intermediate Range Monitoring System
P78.3	Average Power Range Neutron Monitoring System
P78.4	Traversing Incore Probe System
P79.1 & P79.2I	Area Radiation Monitoring System
P79.2A-H	Process Radiation Monitoring System
P80.1	Reactor Non-nuclear Instrumentation System
P81.1	Fuel Handling System
P83.1A	Main Steam-Nuclear Steam Supply Shutoff System Preoperational Test

TABLE 14.2-1 (Cont'd.)
PREOPERATIONAL TEST PROCEDURES

TEST NUMBER	TEST DEFINITION
P83.1B	Main Steam Relief Valves/Automatic Depressurization System Preoperational Test
P83.1C	Main Steam Leakage Control System Preoperational Test
P83.1D	Main Steam Leak Detection System Preoperational Test
P88.1	250 Volt DC System
P99.1	Reactor Building Crane
P100.1	Cold Functional Test

TABLE 14.2-2
ACCEPTANCE TEST PROCEDURES Page 1 of 3

TEST NUMBER	TEST DEFINITION
A-3.1	13.8 kV System
A-7.1	Lighting System and Miscellaneous 120V Distribution
A-8.1	Domestic Water System
A-9.1	River Water Makeup System
A-9.2	Intake Structure Compressed Air System
A-10.1	Screens & Screen Wash System
A-11.1	Station Service Water System
A-15.1	Turbine Building Closed Cooling Water System
A-18.1	Instrument Air System
A-19.1	Service Air System
A-20.1	Building Drains - Nonradioactive
A-21.1	Water Pretreatment System
A-22.1	Makeup Demineralizer System
A-27.1	Auxiliary Boiler System
A-28.2	River Intake Structure H&V System
A-28.4	Chlorination Building H&V System
A-28.5	Circulating Water Pump House H&V System
A-30.3	Control Structure Miscellaneous H&V System
A-31.1	Computer
A-31.2	Process Computer
A-32.1	Security System 125 VDC
A-32.2	Security UPS
A-32.3	Security 480 Volt
A-32.4	Security Backup Diesel
A-32.5	Security 480/120 Volt
A-32.6	Security Buildings H&V
A-32.7	Security Buildings Halon

TABLE 14.2-2 (Cont'd.)
ACCEPTANCE TEST PROCEDURES

TEST NUMBER	TEST DEFINITION
A-33.1	Turbine Building H&V System
A-33.2	Turbine Building Chilled Water System
A-35.1	Fuel Pool Cooling and Cleanup System
A-37.1	Demineralized Water Transfer System
A-38.1	Low Pressure Air System
A-39.1	Condensate Demineralizer System
A-40.1	Lube Oil Transfer, Storage & Purification System
A-41.1	Cooling Tower System
A-42.1	Circulating Water System
A-43.1	Main Condenser Air Removal System
A-43.2	Condenser Tube Cleaning
A-44.1	Condensate System
A-46.1	Extraction Steam System
A-65.1	Radwaste Building Air Flow System
A-65.2	Radwaste Building Chilled Water System
A-68.1	Radwaste Solids Handling System
A-69.2	Liquid Radwaste Subsystems
A-71.1	Gaseous Radwaste Recombiner Closed Cooling Water
A-72.1	Off-Gas Recombiner System
A-74.1	Nitrogen Storage & Supply System
A-74.2	Bulk Hydrogen System
A-76.2	Process Sampling System
A-84.1	Moisture Separators
A-85.1	Cathodic Protection System
A-85.2	Freeze Protection System
A-91.1	Annunciator System

TABLE 14.2-2 (Cont'd.)
ACCEPTANCE TEST PROCEDURES

TEST NUMBER	TEST DEFINITION
A-92.1	Turbine Steam Seals & Drains
A-93.1	Turbine Lube Oil Systems
A-93.2	Turbine Valves, Valve Test, EHC and Supervisory Systems
A-95.1	Hydrogen Seal Oil System
A-97.1	Stator Cooling System
A-98.1	Main Generator & Excitation System
A-99.2	Communications System
A-99.4	Radiation Area Doors
A-99.6	Seismographical Monitoring System

TABLE 14.2-3
STARTUP TEST PROCEDURES Page 1 of 2

TEST NUMBER	TEST DEFINITION
ST-1	Chemical and Radiochemical
ST-2	Radiation Measurements
ST-3	Fuel Loading
ST-4	Full Core Shutdown Margin
ST-5	Control Rod Drive System
ST-6	SRM Performance and Control Rod Sequence (Unit 1 only)
ST-7	Reactor Water Cleanup System
ST-8	Residual Heat Removal System
ST-9	Water Level Measurement
ST-10	IRM Performance (Unit 1) SRM and IRM Performance and Control Rod Sequence (Unit 2)
ST-11	LPRM Calibration
ST-12	APRM Calibration
ST-13	NSSS Process Computer
ST-14	RCIC System
ST-15	HPCI System
ST-16	Selected Process Temperatures
ST-17	System Expansion
ST-18	TIP Uncertainty
ST-19	Core Performance
ST-20	Steam Production Verification (Unit 1 only)
ST-21	Core Power - Void Mode Response
ST-22	Pressure Regulator
ST-23	Feedwater System
ST-24	Turbine Valve Surveillance
ST-25	Main Steam Isolation Valves
ST-26	Relief Valves

TABLE 14.2-3 (Cont'd.)
STARTUP TEST PROCEDURES

TEST NUMBER	TEST DEFINITION
ST-27	Turbine Trip and Generator Load Rejection
ST-28	Shutdown from Outside the Main Control Room
ST-29	Recirculation Flow Control System
ST-30	Recirculation System
ST-31	Loss of Turbine Generator and Offsite Power
ST-32	Containment Atmosphere and Main Steam Tunnel Cooling
ST-33	Piping Steady State Vibration
ST-34	Control Rod Sequence Exchange (Unit 1 only)
ST-35	Recirculation System Flow Calibration
ST-36	Cooling Water Systems (Unit 1 only)
ST-37	Gaseous Radwaste System
ST-38	BOP Piping System Expansion
ST-39	Piping Vibration During Dynamic Transients
ST-40	BOP Piping Steady State Vibration

TABLE 14.2-4

MAJOR TEST PHASE AND TEST PLATEAU SCHEDULE TEST CONDITION SEQUENCE

TEST PHASE	TEST PLATEAU	TEST CONDITION SEQUENCE
III	-	Open Vessel Test Condition
IV	-	Heatup Test Condition
V	A	Test Condition 1
V	B	Testing during approach to Test Condition 2 Test Condition 2
V	C	Testing during approach to Test Condition 3 Test condition 3
V	D*	Testing during approach to Test Condition 5 Test Condition 5 Testing during approach to Test Condition 6 Test Condition 6 Test Condition 4

* Because of the transitory nature of testing performed along the 100% rod line during Test Phase V Test Plateau D, all testing assigned to Test Condition 6 may not be completed prior to entering Test Condition 4.

TABLE 14.2-5

CONTROL ROD DRIVE SYSTEM STARTUP TESTS

ACTION	ACCUMULATOR PRESSURE	REACTOR PRESSURE WITH CORE LOADED psig			
		0	600	800	Rated
Position Indication		all			
Normal Times Insert/Withdraw		all			4*
Coupling		all			
Friction		all			all
Scram Times	Normal	all	4*	4*	all
Scram Times	Minimum	4*			
Scram Times	Zero				4*
Scram Times	Normal				4**

* Refers to four CRDs selected for continuous monitoring based on slow normal accumulator pressure scram times, or unusual operating characteristics, at zero reactor pressure or rated reactor pressure when this data is available. The four selected CRDs must be compatible with the rod worth minimizer, RSCS system, and CRD sequence requirements.

** Scram times of the four slowest CRDs (based on scram data at rated pressure) will be determined at Test Conditions 1, 3 and 6 during planned reactor scrams.

TABLE 14.2-6
UNIT 2 PREOPERATIONAL TEST PROCEDURES Page 1 of 3

TEST NUMBER	TEST DEFINITION
P202.1	125 Volt DC System
P204.1	4.16kV System
P205.1	ESS 480 Volt Load Center
P205.2	Non-ESS 480 Volt Load Center
P205.3	ESS 480 Volt Motor Control Center
P205.4	Non-ESS 480 Volt Motor Control Center
P213.1	Fire Protection Water System
P213.3	Fire and Smoke Detection System
P213.4	Halon 1301 Extinguishing System
P214.1	Reactor Building Closed Cooling Water System
P216.1	RHR Service Water System
P216.2	RHR Heat Exchanger Discharge Temperature Indication
P217.1	Instrument AC Power System
P225.1	Primary Containment Instrument Gas System
P225.2	Containment Instrument Gas Pressure Loop
P228.1	ESSW Pumphouse H&V System
P230.1	Control Structure H&V System
P233.4	Post Accident 1E Power
P234.1	Reactor Building H&V System
P234.2	Reactor Building Chilled Water System
P234.3	Reactor Building Electrical Equipment Room H&V System
P234.4	Emergency Switchgear Room Cooling System
P245.1	Feedwater System
P245.2	Feedwater Control System
P249.1	Residual Heat Removal System
P249.2	Post Accident RHR Flow
P250.1	Reactor Core Isolation Cooling System

TABLE 14.2-6 (Cont'd.)
UNIT 2 PREOPERATIONAL TEST PROCEDURES

TEST NUMBER	TEST DEFINITION
P251.1	Core Spray System
P251.2	Core Spray System Pattern
P252.1	High Pressure Coolant Injection System
P253.1	Standby Liquid Control System
P253.2	Standby Liquid Control System Initiation Instrument Loop
P254.1	Emergency Service Water System
P255.1	Control Rod Drive System
P256.1	Reactor Manual Control System
P256.2	Rod Sequence Control System
P256.3	Rod Worth Minimizer System
P257.1	Uninterruptible AC Power System
P258.1	Reactor Protection System
P259.1	Primary Containment System
P259.2	Containment Integrated Leak Rate Test
P259.3	Local Leakage Rate Test
P259.4	Primary Containment Isolation Valve Timing Test
P260.1	Containment Atmosphere Circulation System
P261.1	Reactor Water Cleanup System and Filter Demineralizer System
P264.1	Reactor Recirculation System
P269.1	Liquid Radwaste Collection System
P270.1	Standby Gas Treatment System and Secondary Containment Isolation System
P273.1	Containment Atmospheric Control System
P273.2	Containment Hydrogen Recombiner System
P273.3	Containment Oxygen and Hydrogen Analyzer System
P275.1	24 Volt DC System
P276.1	Plant Leak Detection System

TABLE 14.2-6 (Cont'd.)
UNIT 2 PREOPERATIONAL TEST PROCEDURES

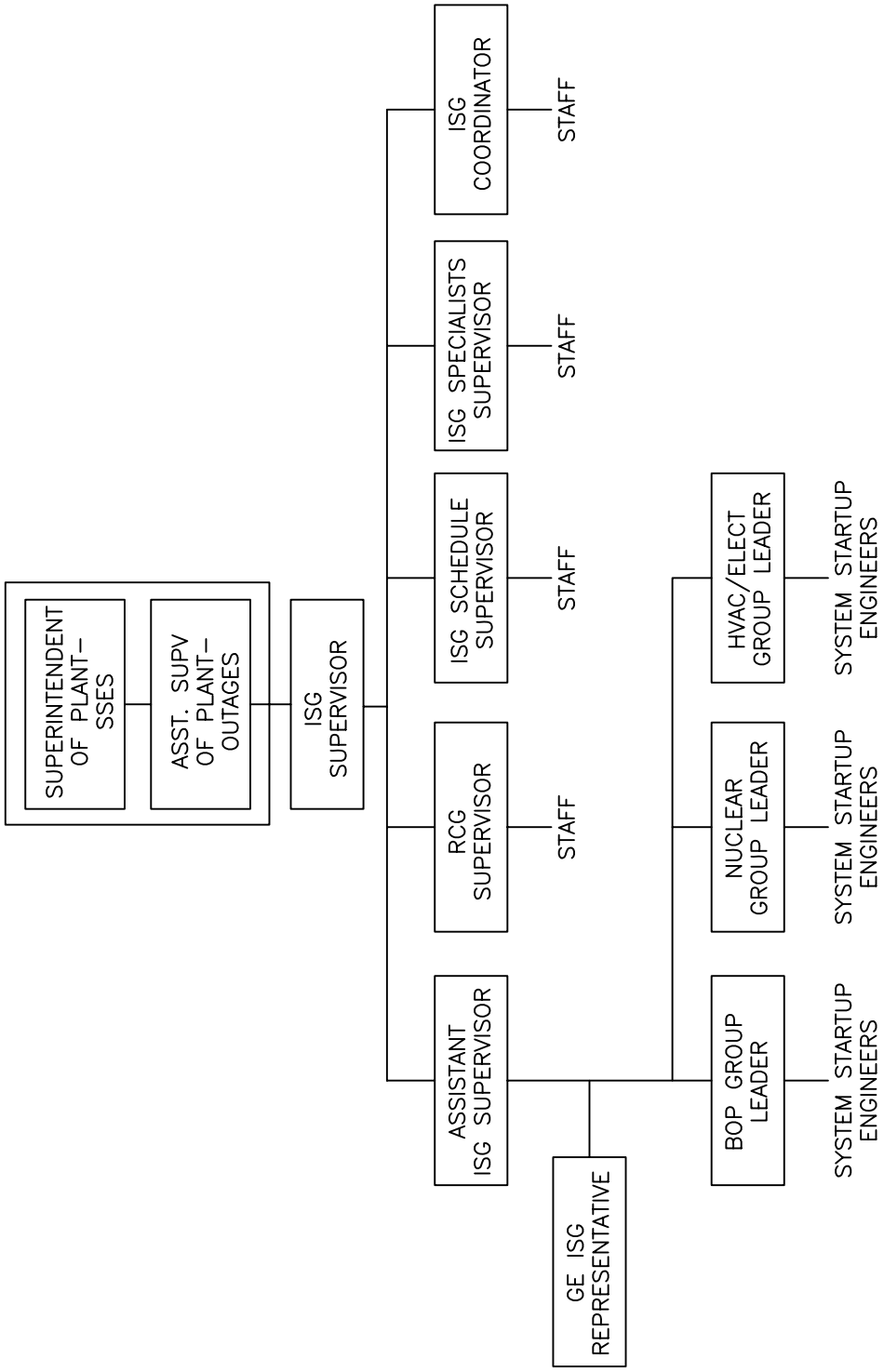
TEST NUMBER	TEST DEFINITION
P276.3	Post Accident Sampling System
P278.1	Source Range Monitoring System
P278.2	Intermediate Range Monitoring System
P278.3	Average Power Range Neutron Monitoring System
P278.4	Traversing Incore Probe System
P278.5	Post Accident Neutron Monitoring
P279.1	Area Radiation Monitoring System
P279.2	Main Steam Line Radiation Monitoring Subsystem
P279.3	Liquid Process Radiation Monitoring Subsystem
P279.4	Refueling Floor Wall and High Exhaust Subsystems
P279.5	Offgas Pretreatment Radiation Monitoring Subsystem
P279.6	Reactor and Turbine Vent Stack Radiation Monitoring Subsystem
P279.7	Primary Containment Radiation Monitoring Subsystem
P279.8	Containment Accident Range Radiation Monitoring Subsystem
P279.9	Post Accident Area Radiation Monitoring
P280.1	Reactor Non-nuclear Instrumentation System
P280.2	Post Accident RPV Instrumentation
P281.1	Fuel Handling System
P283.1	Nuclear Steam Supply Shutoff System
P283.2	ADS/Safety Relief System
P283.3	Main Steam Leakage Control System
P283.4	Main Steam Leak Detection System
P288.1	250 Volt DC System
P299.1	Reactor Building Crane
P200.1	Cold Functional Test

TABLE 14.2-7
UNIT 2 ACCEPTANCE TEST PROCEDURES Page 1 of 2

TEST NUMBER	TEST DEFINITION
A203.1	13.8 kV System
A207.1	Lighting System and Miscellaneous 120V Distribution
A208.1	Domestic Water System
A211.1	Station Service Water System
A215.1	Turbine Building Closed Cooling Water System
A218.1	Instrument Air System
A219.1	Service Air System
A220.1	Building Drains - Nonradioactive
A231.1	Computer Uninterruptible Power Supply
A231.2	Computer
A232.1	Security Devices
A232.2	South Gatehouse Equipment
A232.3	South Gatehouse HVAC System
A232.4	LLRWF Security System
A233.1	Turbine Building H&V System
A233.2	Turbine Building Chilled Water System
A233.3	Turbine Building Battery Room Exhaust System
A235.1	Fuel Pool Cooling and Cleanup System
A237.1	Makeup Transfer and Storage, Condensate and Refueling Water Transfer Systems
A239.1	Condensate Demineralizer System
A239.2	Ultra Sonic Resin Cleaner
A240.1	Lube Oil Transfer, Storage & Purification System
A241.1	Cooling Tower System
A242.1	Circulating Water System
A243.1	Condenser Air Removal System
A243.2	Condenser Tube Cleaning System

TABLE 14.2-7 (Cont'd.)
UNIT 2 ACCEPTANCE TEST PROCEDURES

TEST NUMBER	TEST DEFINITION
A244.1	Condensate System
A246.1	Extraction Steam System
A263.1	Bypass Indication
A267.1	Loose Parts Monitoring System
A268.1	Solid Radwaste System
A269.2	Liquid Radwaste Processing Subsystem
A271.1	Gaseous Radwaste Recombiner Closed Cooling Water
A272.1	Off-Gas Recombiner System
A272.2	Off-Gas Recombiner System
A274.1	Nitrogen Storage & Supply System
A276.2	Process Sampling System
A284.1	Moisture Separators
A285.1	Cathodic Protection System
A288.2	Non-ESS 250 Volt DC System
A290.1	Safety Parameter Display System
A290.2	Safety Parameter Display System Power Supply
A291.1	Plant Annunciators
A292.1	Turbine Steam Seals & Drains
A293.1	Turbine Lube Oil Systems
A293.2	Turbine Electro Hydraulic Control and Supervisory Systems
A295.1	Hydrogen Seal Oil System
A297.1	Stator Cooling System
A298.1	Main Generator & Excitation System
A299.2	Communication System
A299.3	Communication System
A299.4	Radiation Area Doors



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SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 & 2
FINAL SAFETY ANALYSIS REPORT

INTEGRATED STARTUP GROUP
ORGANIZATION

FIGURE 14.2-1, Rev 47

AutoCAD: Figure Fsar 14.2-1.dwg

1.0 OBJECTIVES

2.0 ACCEPTANCE CRITERIA

3.0 REFERENCES

4.0 PREREQUISITES

5.0 PRECAUTIONS AND NOTES

6.0 TEST EQUIPMENT

7.0 SYSTEM TEST

(a) TEMPORARY INSTALLATIONS

(b) INITIAL STATUS

(c) TEST INSTRUCTIONS

(d) RESTORATION

8.0 APPENDICES, FIGURES, TABLES

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PREOPERATIONAL TEST
PROCEDURE
STANDARD FORMAT

FIGURE 14.2-2A, Rev 47

AutoCAD: Figure Fsar 14.2-2A.dwg

ST.0	MAIN BODY
ST.0.1	OBJECTIVES
ST.0.2	TEST DESCRIPTION
ST.0.3	ACCEPTANCE CRITERIA
ST.0.4	REFERENCES
ST.0.5	PREREQUISITES
ST.0.6	PRECAUTIONS
ST.0.7	TEST EQUIPMENT
ST.0.8	PROCEDURE
ST.0-A	GENERAL APPENDICES
ST.X	SUBTEST
ST.X.1	DISCUSSION
ST.X.2	INITIAL STATUS
ST.X.3	TEST INSTRUCTIONS
ST.X.4	ANALYSIS
ST.X-A	SPECIFIC APPENDICES

Legend: ST - Startup Test Number
X - Subtest Number
A - Appendix Designator

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UNIT 1
STARTUP TEST PROCEDURE
STANDARD FORMAT

FIGURE 14.2-2B, Rev 47

AutoCAD: Figure Fsar 14.2-2B.dwg

ST.0 MAIN BODY

ST.0.1 OBJECTIVES

ST.0.2 TEST DESCRIPTION

ST.0.3 ACCEPTANCE CRITERIA

ST.0.4 REFERENCES

ST.0.5 PROCEDURE

ST.0-A GENERAL APPENDICES

ST.X SUBTEST

ST.X.1 DISCUSSION

ST.X.2 PREREQUISITES

ST.X.3 INITIAL STATUS

ST.X.4 TEST INSTRUCTIONS

ST.X.5 SUBSEQUENT ACTIONS

ST.X.6 GROUP A ANALYSIS

ST.X.7 GROUP B ANALYSIS

ST.X-A SPECIFIC APPENDICES

Legend: ST - Startup Test Number
X - Subtest Number
A - Appendix Designator

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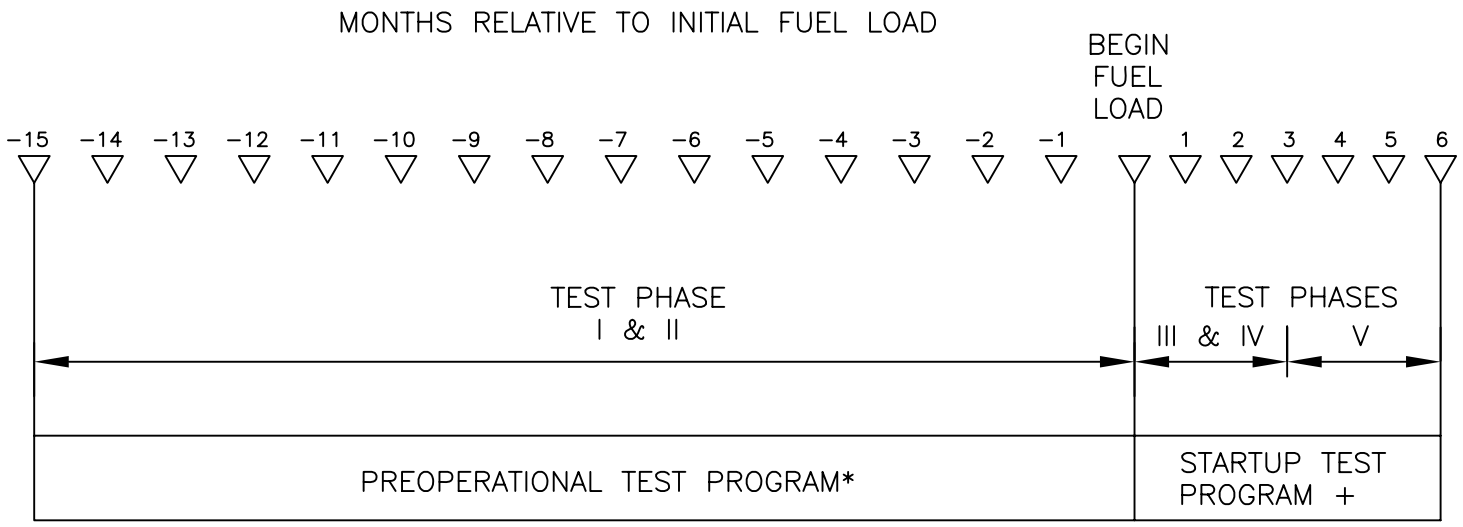
FINAL SAFETY ANALYSIS REPORT

UNIT 2
STARTUP TEST PROCEDURE
STANDARD FORMAT

FIGURE 14.2-2C, Rev 47

AutoCAD: Figure Fsar 14.2-2C.dwg



NOTES:

a) Test Phase I – Component and Inspection Testing
b) Test Phase II – Preoperational and Acceptance Testing
c) Test Phase III – Initial Fuel Loading
d) Test Phase IV – Initial Heatup and Low Power Testing
e) Test Phase V – Power Ascension Testing

(*) Reference Figure 14.2–4 for individual preoperational test sequence.

(+) Reference Figure 14.2–5 for startup test requirements by test condition.

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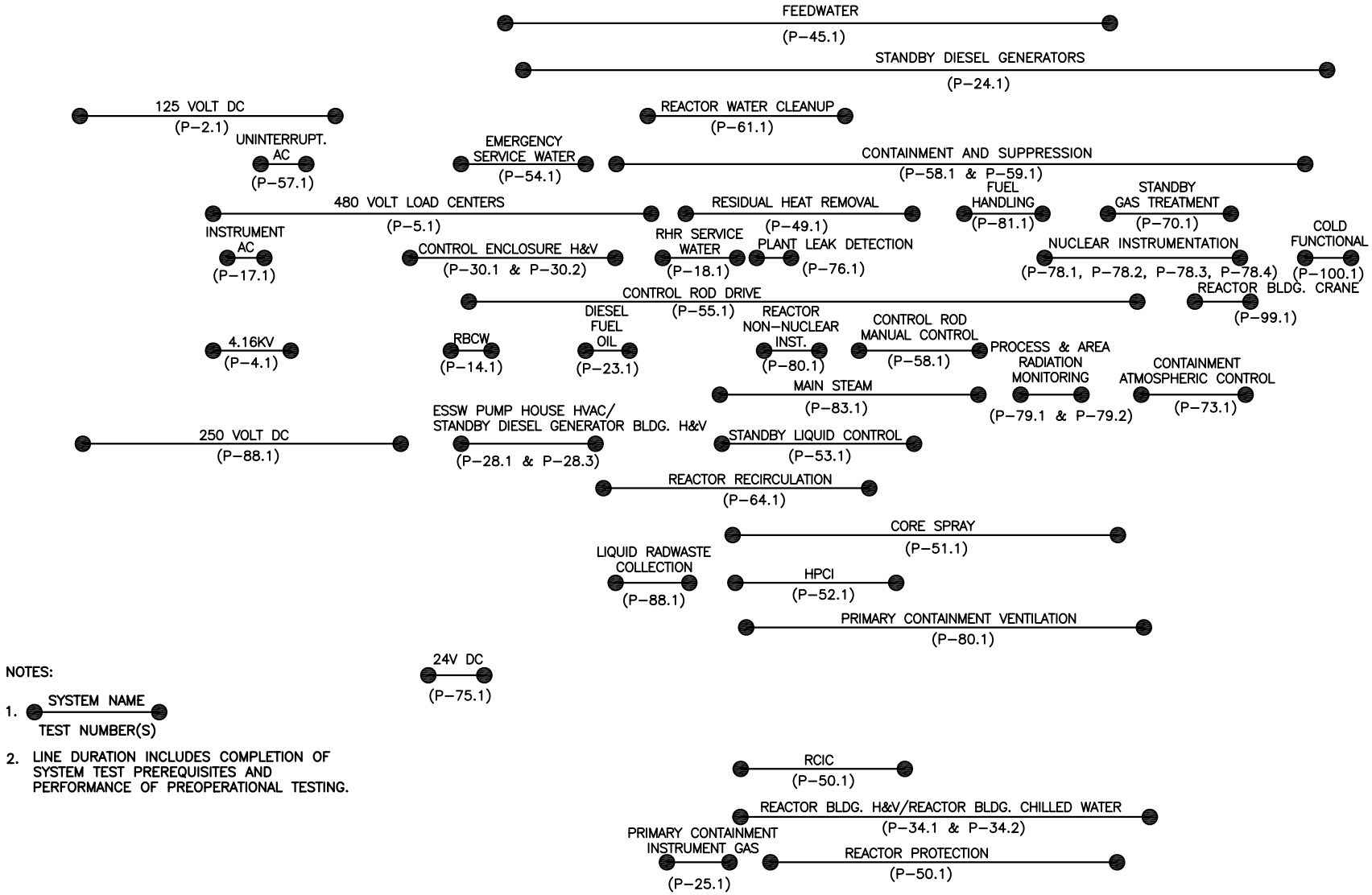
FINAL SAFETY ANALYSIS REPORT

INITIAL TEST PROGRAM SCHEDULE

FIGURE 14.2-3, Rev 47

AutoCAD: Figure Fsar 14.2-3.dwg



NOTES:

1. SYSTEM NAME — TEST NUMBER(S)
2. LINE DURATION INCLUDES COMPLETION OF SYSTEM TEST PREREQUISITES AND PERFORMANCE OF PREOPERATIONAL TESTING.

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SUSQUEHANNA STEAM ELECTRIC STATION
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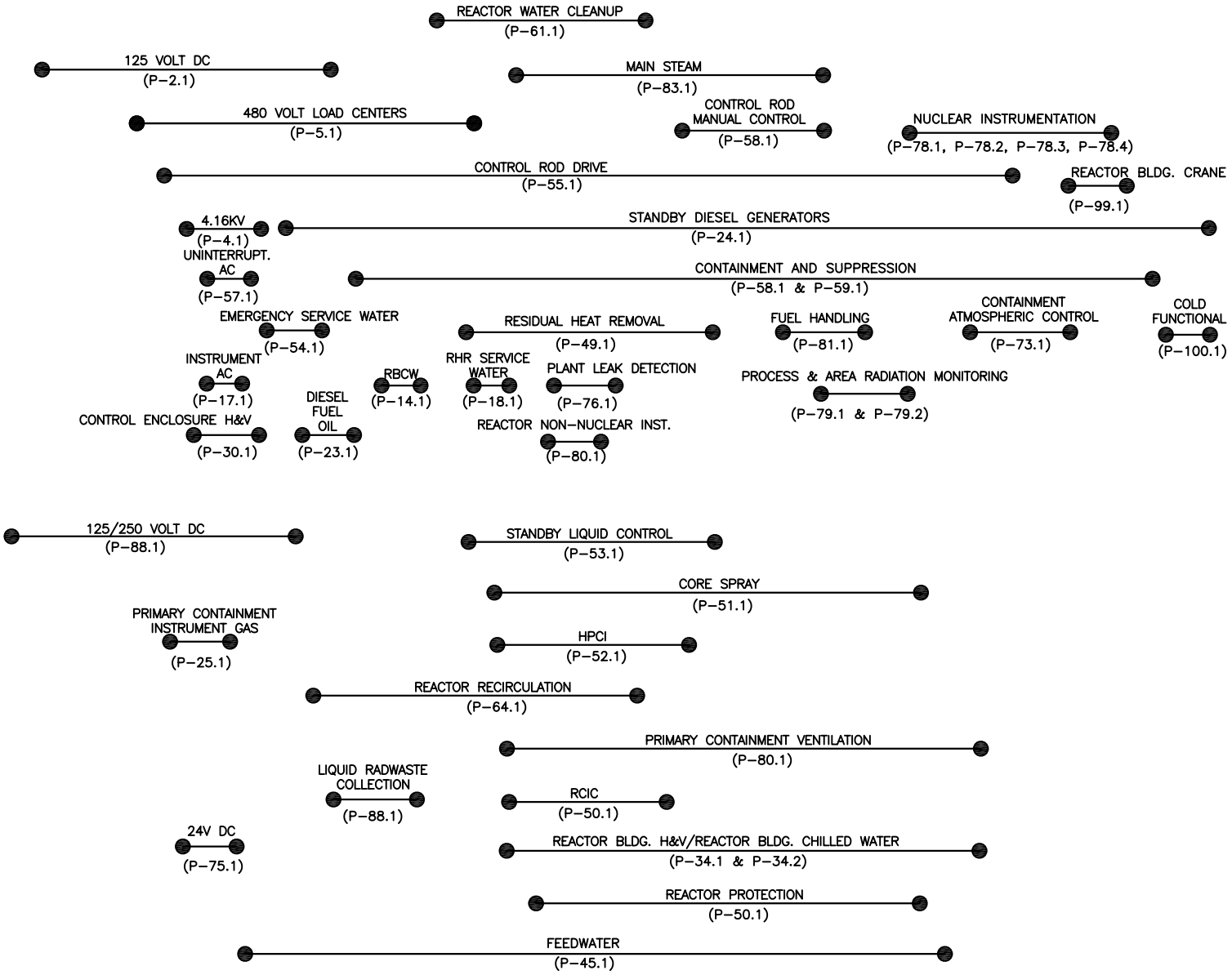
UNIT 1
PREOPERATIONAL
TEST SEQUENCE

FIGURE 14.2-4A, Rev 47

AutoCAD: Figure Fsar 14.2-4A.dwg



NOTES:

1. SYSTEM NAME
   TEST NUMBER(S)
2. LINE DURATION INCLUDES COMPLETION OF SYSTEM TEST PREREQUISITES AND PERFORMANCE OF PREOPERATIONAL TESTING.

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SUSQUEHANNA STEAM ELECTRIC STATION
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UNIT 2
PREOPERATIONAL TEST SEQUENCE

FIGURE 14.2-4B, Rev 47

AutoCAD: Figure Fsar 14.2-4B.dwg

FIGURE 14.2–5, SHT. 1

Test No.	Test Name	Test Condition (1)							
		Open Vessel	Heat Up	1	2	3	4	5	6	Warranty
ST-1	Chemical & Radiochemical	X(2)	X	X	X	X		X	X	X
ST-2	Radiation Measurements	X(2)	X	X		X			X	
ST-3	Fuel Loading	X(2)								
ST-4	Full Core Shutdown Margin		X(6)							
ST-5	Control Rod Drive	X(2,3)	X(3)	X(3)	X(3)	X(3)			X(3)	
ST-6	SRM Perf. & Control Rod Seq.		X(6)					X(12)	X(12)	
ST-7	Reactor Water Cleanup		X	X(7)		X				
ST-8	Residual Heat Removal				X				X(9,13)	
ST-9	Water Level Measurements		X							
ST-10	IRM Performance		X(6)	X	X(8)					
ST-11	LPRM Calibration			X(7)	X	X			X	
ST-12	APRM Calibration		X	X	X	X(9)		X	X	X
ST-13	Process Computer								X(8,9)	
ST-14	RCIC		X	X(7)				X(8,9)	X(8)	
ST-15	HPCI		X			X			X(14)	
ST-16	Selected Process Temps		X			X	X(14)		X(9,13)	
ST-17	System Expansion		X(6)		X(8)				X	
ST-18	Tip Uncertainty					X			X	
ST-19	Core Performance			X	X	X	X	X	X	X
ST-20	Steam Production									X
ST-21	Core Power-Void Mode Response						X		X(17)	
ST-22	Pressure Regulator			X	X	X	X	X	X	
ST-23	Feedwater			X	X	X	X	X	X(8,15)	
ST-24	Turbine Valve Surv.					X		X	X(8,16)	
ST-25	MSIVs		X	X		X		X	X(8,16)	
ST-26	Relief Valves		X		X					
ST-27	Turbine Stop Valve Trip Generator Load Rejection				X(10)	X			X	
ST-28	Shutdown From Outside Control Room			X						
ST-29	Recirculation Flow Control				X	X		X	X	
ST-30	Recirculation System					X(11)			X	
ST-31	Loss of T-G & Offsite Power				X					
ST-32	Containment Atmosphere and Main Steam Tunnel Cooling		X		X				X(13)	
ST-33	Piping Steady State Vibration		X		X	X		X	X(8,13,9)	
ST-34	Rod Sequence Exchange								X(17)	
ST-35	Recirculation System Flow Calibration					X			X	
ST-36	Cooling Water Systems			X		X			X	
ST-37	Gaseous Radwaste System		X	X		X		X	X	X
ST-38	BOP Piping System Expansion (4)									
ST-39	Piping Vibration During Synamic Transients		X		X	X	X		X	
ST-40	BOP Piping Steady State Vibration (5)									

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SUSQUEHANNA STEAM ELECTRIC STATION
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INDIVIDUAL STARTUP
TEST SEQUENCE
UNIT 1

FIGURE 14.2-5-1, Rev 47

AutoCAD: Figure Fsar 14.5-5-1.dwg

FIGURE 14.2–5, SHT. 2

Descriptive Notes:

(1) See Figure 14.2–6 for Test Condition (TC) region map.
(2) Some Subtests required to be completed prior to fuel load and may be performed during Phase II.
(3) Refer to Table 14.2–5.
(4) Testing merged into ST–17.
(5) Testing merged into ST–33.
(6) May be done during Open Vessel Testing.
(7) May be done during Heatup.
(8) Some Subtests done during approach to Test Condition.
(9) May be done during earlier Test Condition if conditions warrant.
(10) Done within steam bypass capacity.
(11) The simultaneous trip of two Reactor recirculation pumps is done at 100% core flow on the 75% rod line.
(12) Started during approach to Test Condition 5, continued during approach to Test Condition 6.
(13) Some Subtests done after planned major trips from 100% power.
(14) Started during Test Condition 6 and continued during Test Condition 4.
(15) Loss of feedwater heating test done at 80% power.
(16) Determine maximum power Subtest can be performed without causing reactor scram.
(17) Done on 100% rod line near minimum core flow with recirc pumps on.

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SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 & 2
FINAL SAFETY ANALYSIS REPORT

INDIVIDUAL STARTUP
TEST SEQUENCE
UNIT 1

FIGURE 14.2-5-2, Rev 47

AutoCAD: Figure Fsar 14_2_5_2.dwg

FIGURE 14.2-5, Sht. 3

Test No.	Test Name	Open Vessel	Heat Up	Test Condition(1) 1	2	3	4	5	6
ST-1	Chemical & Radiochemical	X(2)	X	X	X	X		X	X
ST-2	Radiation Measurements	X(2)	X	X					X
ST-3	Fuel Loading	X(2)							
ST-4	Full Core Shutdown Margin		X(6)						
ST-5	Control Rod Drive	X(2,3)	X(3)	X(3)		X(3)			X(3)
ST-6	SRM Performance & Control Rod Seq.(18)								
ST-7	Reactor Water Cleanup			X(7)			X(9)		
ST-8	Residual Heat Removal								X(9,13)
ST-9	Water Level Measurements		X						
ST-10	SRM & IRM Performance & Control Rod Seq.		X(6)	X					
ST-11	LPRM Calibration			X(7)	X	X			X
ST-12	APRM Calibration		X	X	X	X		X	X
ST-13	Process Computer					X(9)			
ST-14	RCIC		X	X(7)					X(8,9)
ST-15	HPCI		X			X			X(8,9)
ST-16	Selected Process Temps		X			X	X(14)		X(14)
ST-17	System Expansion		X(6)						X(9,13)
ST-18	Tip Uncertainty					X			X(9)
ST-19	Core Performance			X	X	X	X	X	X
ST-20	Steam Production(19)								
ST-21	Core Power-Void Mode Response						X		X(12)
ST-22	Pressure Regulator			X	X	X	X	X	X
ST-23	Feedwater			X	X	X	X	X	X(8,15)
ST-24	Turbine Valve Surv.								X(8,16)
ST-25	MSIVs		X					X	X(8,16)
ST-26	Relief Valves		X		X				
ST-27	Turbine Stop Valve Trip Generator Load Rejection				X(10)	X			X
ST-28	Shutdown From Outside Control Room			X					
ST-29	Recirculation Flow Control				X	X		X	X
ST-30	Recirculation System					X(11)			X
ST-31	Loss of T-G & Offsite Power				X				
ST-32	Containment Atmosphere and Main Steam Tunnel Cooling		X		X				X(13)
ST-33	Piping Steady State Vibration		X		X	X		X	X(8,9)
ST-34	Rod Sequence Exchange(17)								
ST-35	Recirculation System Flow Calibration					X			X
ST-36	Cooling Water Systems(17)								
ST-37	Gaseous Radwaste System		X	X		X		X	X
ST-38	BOP Piping System Expansion(4)								
ST-39	Piping Vibration During Synamic Transients		X		X	X	X		X
ST-40	BOP Piping Steady State Vibration(5)								

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TEST SEQUENCE
UNIT 2

FIGURE 14.2-5-3, Rev 47

AutoCAD: Figure Fsar 14_2_5_3.dwg

FIGURE 14.2–5, SHT. 4

Descriptive Notes:

(1) See Figure 14.2–6 for Test Condition (TC) region map.
(2) Some Subtests required to be completed prior to fuel load and may be performed during Phase II.
(3) Refer to Table 14.2–5.
(4) Testing merged into ST–17.
(5) Testing merged into ST–33.
(6) May be done during Open Vessel Testing.
(7) May be done during Heatup.
(8) Some Subtests done during approach to Test Condition.
(9) May be done during earlier Test Condition if conditions warrant.
(10) Done within steam bypass capacity.
(11) The simultaneous trip of two Reactor recirculation pumps is done at 100% core flow on the 75% rod line.
(12) Done on 100% rod line near minimum core flow with recirc pumps at minimum speed.
(13) Some Subtests done after planned major trips from 100% power.
(14) Started during Test Condition 6 and continued during Test Condition 4.
(15) Loss of feedwater heating test done at 80% to 90% power.
(16) Determine maximum power Subtest can be performed without causing reactor scram.
(17) This test will not be performed during the Unit 2 Startup Test Program.
(18) Testing merged into ST–10.
(19) Deleted from Unit 2 FSAR.

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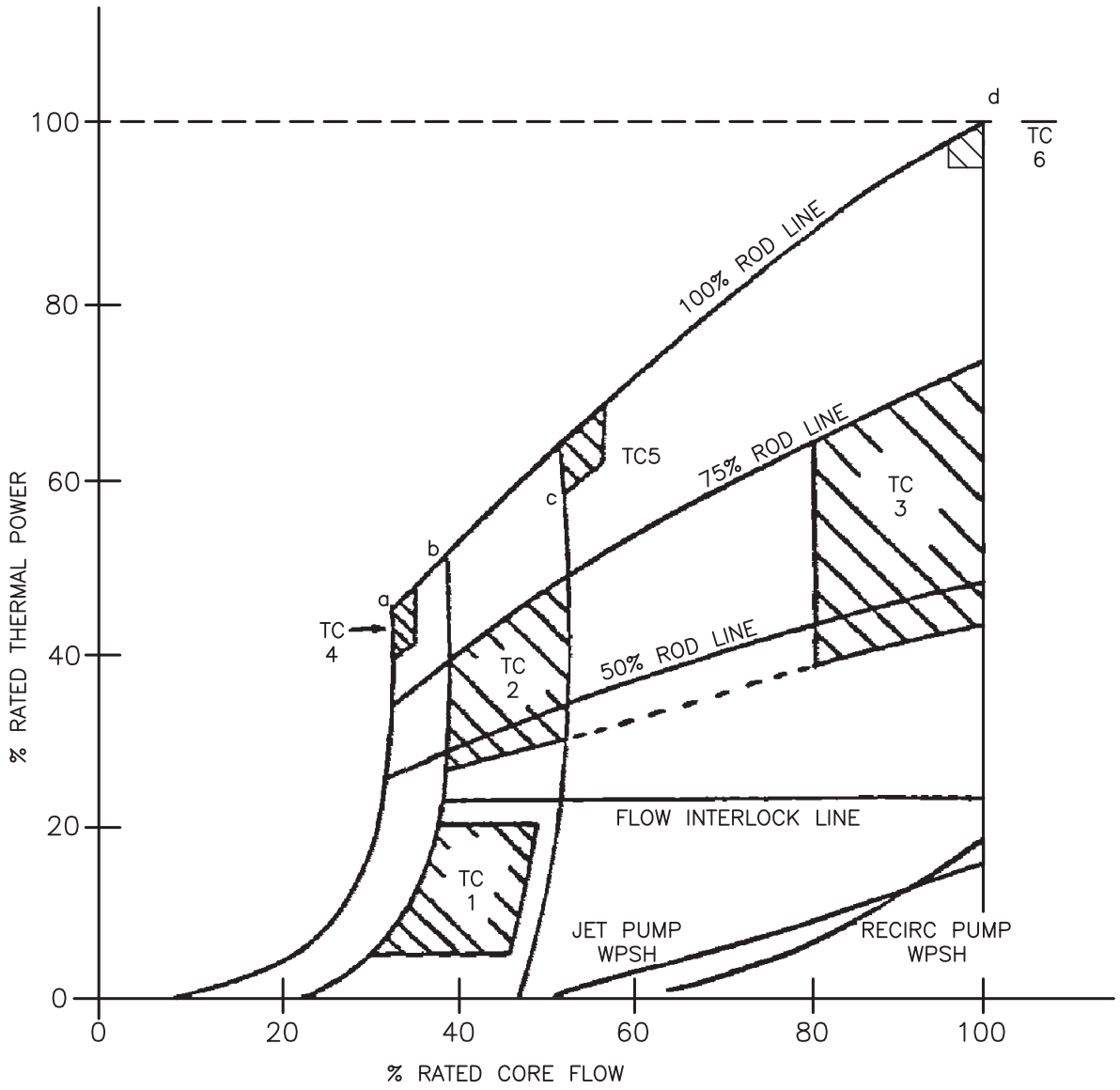
FIGURE 14.2-5-4, Rev 47

AutoCAD: Figure Fsar 14_2_5_4.dwg



NOTES:

1. SEE FIGURE 14.2–6 SH. 2 FOR DEFINITION TEST CONDITIONS

2. CONSTANT PUMP SPEED LINES
   a. NATURAL CIRCULATION
   b. MINIMUM RECIRCULATION PUMP SPEED
   c. ANALYTICAL LOWER LIMIT OF MASTER FLOW CONTROL
   d. ANALYTICAL UPPER LIMIT OF MASTER FLOW CONTROL

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POWER FLOW MAP
AND
TEST CONDITIONS

FIGURE 14.2-6-1, Rev 47

AutoCAD: Figure Fsar 14_2_6_1.dwg

Test Condition Number	Power-Flow Map Region and Notes
1	Core thermal power between approximately 5% and 20% rated (1). Recirculation pump speed within +10% of minimum pump speed. Before and after main generator sychronization.
2	Core thermal power between the 45% power rod line (2) and 75% power rod line. Recirculation pump speed between minimum and lowest pump speed corresponding to Master Manual Mode. Lowerpower corner is within Bypass valve capacity.
3	Core thermal power between 45% power rod line and 75% power rod line. Total core flow between 80% and 100% rated.
4	On the natural circulation core flow, line within +0, -5% of the intersection with the 100% power rod line.
5	Core thermal power within +0, -5% of the 100% power rod line. Recirculation pump speed within +5% of the minimum recirculation pump speed corresponding to Master Manual Mode.
6	Core thermal power between 95% and 100% rated. Total Core flow +0, -5% rated core flow.

Notes:

(1) Rated core thermal power is 3293 MW. Rated core flow is 106.5×10^6 lb/hr.

(2) 45% power rod line goes through 45% rated core thermal power and 100% rated core flow.

75% power rod line goes through 75% rated core thermal power and 100% rated core flow.

100% power rod line goes through 100% rated core thermal power and 100% rated core flow.

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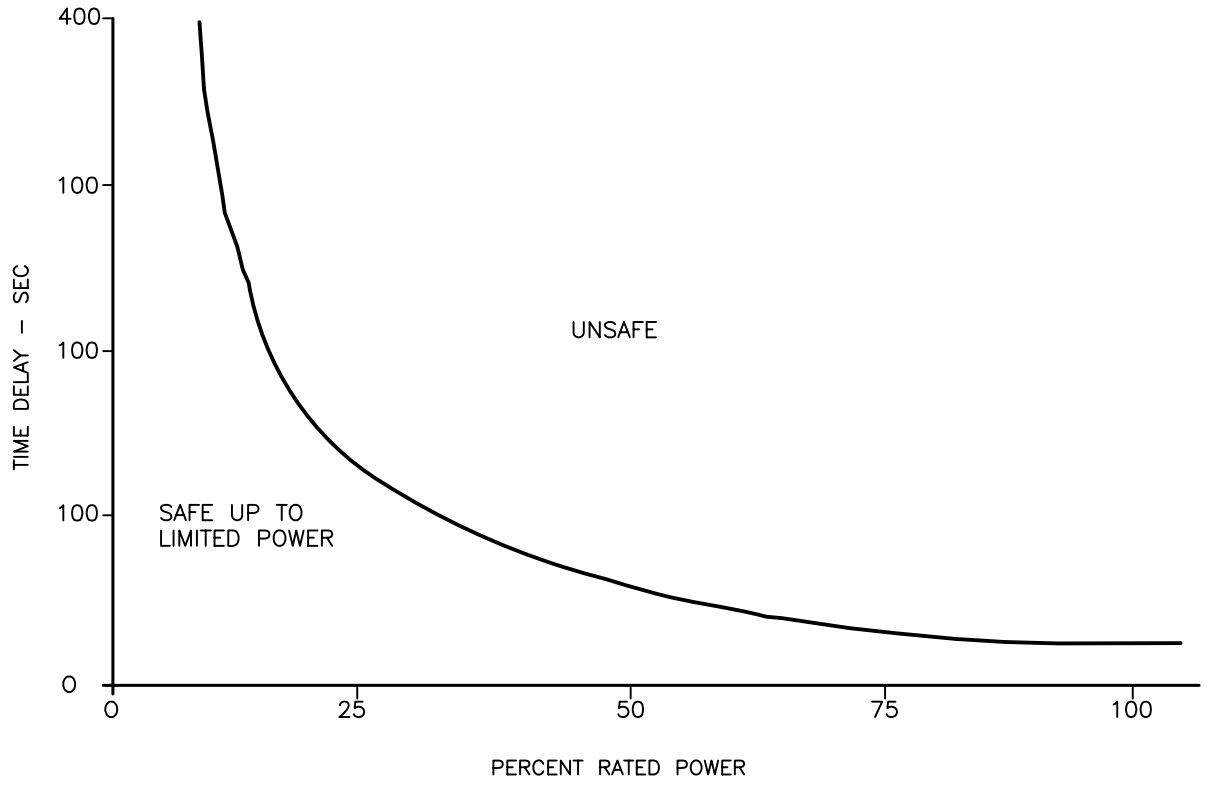
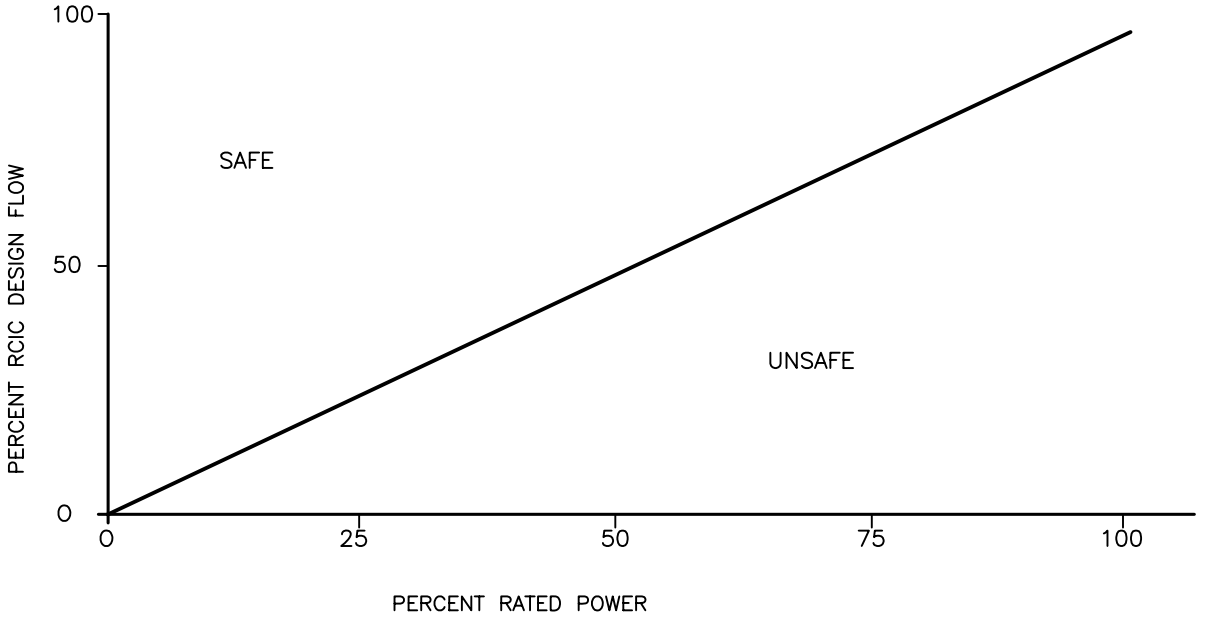
POWER FLOW MAP
AND
POWER TEST CONDITIONS

FIGURE 14.2-6-2, Rev 47

AutoCAD: Figure Fsar 14_2_6_2.dwg





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RCIC ACCEPTANCE CRITERIA
CURVES FOR CAPACITY AND
ACTUATION TIME

FIGURE 14.2-7, Rev 47

AutoCAD: Figure Fsar 14_2_7.dwg