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.

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 will be reflected in amendments to the FSAR.

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 occurance 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 demonstrae 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 between 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 abiity 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 abiity 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 termperature 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

Later.

(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, the Instrument Air System and Reactor Building 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 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 ojbectives 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 Residual Heat Removal Flow Preoperational Test

Later.

(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 sparqers. 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.

(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 Uninterruptible 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 negligable 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.

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.

(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. 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.

(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 thru Filter Demineralizers and bypassing heat exchangers.

(b) Reactor to radwaste.

(c) Reactor to condenser hotwell thru 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. 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 simultaniously 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 spent fuel cask.

(2) The ability of mechanical stops and/or electrical interlocks to prevent the Unit 2 reactor building crane from handling the spent fuel cask when stored in the spent fuel shipping cask 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 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 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. The anticollision 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-UNINTERRUPTIBLE POWER SUPPLY ACCEPTANCE TEST

Test Objective - The general objective of this test is to demonstrate proper operation of the Computer Uninterruptible 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.

Prerequistes - 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 locally 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 operaton 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 exfilteration 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 peform 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 - Consruction 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 paramenters 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.

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 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.

(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 Sytem, 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 simualted 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 wastes:

(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 – The general objective of this test is to demonstrate the proper operation of the Gaseous Radwaste System.

Prerequisites – Construction is complete to the extent necessary to perform this test and the system is turned over to ISG. Required instrumentation has been calibrated and controls are operable.

Test Method – The system operation is initiated manually and verified. Controls are operated or simulated signals are applied to verify automative operation and alarms.

Acceptance Criteria – System performance parameters are in accordance with appropriate design documents.

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 peform 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 peform 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.

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 H$_2$O 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 ELECTRO HYDRAULIC 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 braodcast 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 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

TABLE 14.2-6

UNIT 2 PREOPERATIONAL TEST PROCEDURES

Test Number	Test Definition
P202.1	125 volt dc System
P204.1	4.16 KV 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 IE 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

TABLE 14.2-6 (Continued)

Test Number	Test Definition
P245.2	Feedwater Control System
P249.1	Residual Heat Removal System
P249.2	Post Accident RHR Flow
P250.1	Reactor Core Isolation Cooling System
P251.1	Core Spray System
P251.2	Core Spray System Pattern
P252.1	High Pressure Coolant Injection System
P253.1	Standby Liquid Control System
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	Uninterruptable 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 and Filter Demineralizer System
P264.1	Reactor Recirculation System
P269.1	Liquid Radwaste Collection System
P270.1	Standby Gas Treatment and Secondary Containment Isolation System

TABLE 14.2-6 (Continued)

Test Number	Test Definition
P273.1	Containment Atmospheric Control System
P273.2	Containment Hydrogen Recombiner System
P273.3	Containment Oxygen and Hydrogen Analyzer
P275.1	24 volt dc System
P276.1	Plant Leak Detection System
P276.3	Post Accident Sampling System
P278.1	Source Range Monitoring System
P278.2	Intermediate Range Neutron 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 Rediation 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 Nonnuclear Instrumentation System
P280.2	Post Accident RPV Instrumentation
P281.1	Fuel Handling System

TABLE 14.2-6 (Continued)

Test Number	Test Definition
P283.1	Nuclear Steam Supply Shutoff System
P283.2	ADS/Safety Relief System
P283.3	Main Steam Leakage Control System
P283.4	Steam Leak Detection System
P283.5	Post Accident MSIV Line Instrumentation
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

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	Non Radioactive Building Drain System
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
A240.1	Lube Oil Transfer, Storage & Purification System
A241.1	Cooling Tower System
A242.1	Circulating Water System
A243.1	Condenser Air Removal System

TABLE 14.2-7 CONTINUED

Test Number	Test Definition
A243.2	Condenser Tube Cleaning System
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	Gaseous Radwaste System
A274.1	Nitrogen Storage & Supply System
A276.2	Process Sampling System
A284.1	Moisture Separators
A285.1	Cathodic Protection System
A285.2	Freeze Protection System
A288.2	Non-ESS 250 Volt DC System
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